

**ECOLOGICAL STUDIES ON
SELECT SACRED GROVES OF
MALABAR**

Thesis submitted to
University of Calicut
in part-fulfilment of the Degree of
Doctor of Philosophy in Botany

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**Centre for Water Resources Development & Management
Kunnamangalam, Kozhikode, Kerala**

February 2009

**CENTRE FOR
WATER
RESOURCES
DEVELOPMENT AND
MANAGEMENT**



CWRDM

An Institution of the Kerala State Council for Science, Technology and Environment, Government of Kerala

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CERTIFICATE

This is to certify that the thesis entitled “**Ecological Studies on Select Sacred Groves of Malabar**” submitted by Ms C Anupama in part-fulfillment of the degree of **Doctor of Philosophy** in Botany of the **University of Calicut**, is the *bona fide* research work carried out by her during 2004-2007 under my supervision. This work has not previously formed the basis for the award of any degree, diploma, fellowship or other similar title or recognition.

Kozhikode

28 February 2009

P Narayanan Unni

DECLARATION

I hereby declare that the thesis entitled “**Ecological Studies on Select Sacred Groves of Malabar**” submitted by me in part-fulfillment of the degree of **Doctor of Philosophy** in Botany of the **University of Calicut**, has not been submitted for the award of any other degree or diploma, and it represents the original work done by me.

Kozhikode

28 February 2008

ANUPAMA

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ACRONYMS USED

Units

ppm	:	parts per million
mg	:	milligram
g	:	gram
kg	:	kilogram
mm	:	millimetre
cm	:	centimetre
M	:	metre
km	:	kilometer
ml	:	millilitre
l	:	litre
ha	:	hectare
m mhos	:	milli mhos
me	:	milli equivalents

Elements

OC	:	Organic Carbon
Ca	:	Calcium
N	:	Nitrogen
Na	:	Sodium
K	:	Potassium
Mg	:	Magnesium
NO ₃	:	Nitrate
EDTA	:	Ethylene Diamine Tetra acetic Acid

Others

EC	:	Electrical Conductivity
pH	:	Hydrogen Ion Concentration
N	:	Normality
CWRDM	:	Centre for Water Resources Development & Management

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INTRODUCTION

1.1 GENERAL

Sacred groves have existed from time immemorial all over the world as patches of densely wooded areas, harbouring unique flora and fauna with perennial water sources in the vicinity. Many sacred groves have been preserved as sustainable resources, ensuring the basic capital intact and hence considered valuable gene pool and the first major effort to recognize and conserve biodiversity. In India, they are known from the Himalayas, Northeast India, and highlands of Bihar, Orissa, Madhya Pradesh, Andhra Pradesh, Karnataka, Tamil Nadu and Kerala. Locally they are known variously as “Ka Law Kyntang”/“Ka Law Adong”/“Ka Law Lyngdoh” in Meghalaya, “Than” in Assam, ‘Oran’/“Vani”/“Kenkri” in Rajasthan, “Devrai”/“Deviahate” in Maharashtra, “Sarana” in Central India, “Nandavana” and “Kovilkadu” in Tamil Nadu, “Devarkadu”/“Kan”/“Sidharavanam” in Karnataka, “Kavu” in Andhra Pradesh, and “Kavu”/ “Sarpakkavu”/“Nagavanam” in Kerala. In the first document on sacred groves, Brandis (1897) states that *“Very little has been published regarding sacred groves in India, but they are, or rather were very numerous... These, as a rule are not touched by the axe, except when wood is wanted for repair of religious buildings”*. Gadgil and Vartak (1975) observed that in many parts of India, sacred groves represent surviving examples of climax vegetation and are disappearing under the influence of modernization. In the words of Dr. M. S. Swaminathan, the sacred groves, *“Unlike a botanical garden, where a wide range of trees and plants are collected and cultivated for the purpose of our education and enjoyment, the sacred groves are one method of expressing the gratitude of human families to the trees which sustain and support life under a given agro-ecological condition.”* The age-old system of having a temple, a tank and associated sacred grove explains the

ancient method of water harvesting and sharing in villages of Kerala. As an ecosystem, they help in soil and water conservation, besides preserving the biological wealth. They are the treasure house of rare and endangered species of animals and abode of many medicinal, endemic, endangered and economically important plants. The ponds and streams adjoining the groves are perennial sources of water. Many animals and birds resort to them for their water requirements during summer. The nutrients generated in the groves find their way into the adjoining agro ecosystems like paddy fields, coconut, tapioca and rubber plantations (Ramachandran *et al.*, 1991). They provide a country-wide network of protected areas, wherein the inherent diversity of flora and fauna are preserved for present and future human use. While the adjacent areas were all cleared for agriculture, the sacred groves are maintained intact for generations to support relic vegetations and are often among the best places to study endemism (Induchoodan & Balasubramanian, 1991). Ward & Conner (1927) reported existence of about 15,000 sacred groves in Travancore. Ramachandran and Mohanan (1991) identified 239 sacred groves in Kerala. Induchoodan and Balasubramanian (1991) made a study on the endemic plants of three sacred groves. Induchoodan (1998) identified 364 important sacred groves in Kerala with floristic wealth of over 722 species. A number of studies have been conducted on the floristic diversity of Sacred Groves throughout the Western Ghats (Gadgil & Vartak, 1975, 1976 & 1981; Unnikrishnan, 1995; Chandran & Gadgil, 1993a & b). Chand Basha (1998) has given an account on the distribution and conservation values of sacred groves in Kerala. A detailed survey of sacred groves in Kozhikode district shows that there are 65 sacred groves and listed 83 Naga Kottas in the district (Unnikrishnan Nambeesan, 1999).

Sacred Groves are important, not only because they are sacred, but values of far reaching importance are implicit in them. The scientific economical social and spiritual values implicit in them will have to made explicit. The new land reforms in Kerala and the religious beliefs and taboos of younger generations are major threats in protecting and conserving these sacred groves. Under these circumstances, preservation, conservation and management of the sacred groves are an important necessity and warrants top priority.

1.2 FLORA AND VEGETATION

The general floristic composition and physiognomy of vegetation of the sacred groves are typically like the low level evergreen forest. The vegetation in undisturbed groves is luxuriant and comprises several stories of trees mixed with shrubs, lianas and herbs. The soil

is rich in humus and covered with thick litter. Macro fungi are abundant, so also the ferns. Whenever there is a water body, algae and water plants grow gregariously. Floristic variations have occurred in many sacred groves exposed to human and animal interferences and climatic and edaphic changes. Top canopy is represented by species like *Artocarpus hirsutus*, *Vateria indica*, *Hopea* sp., etc.

1.3 CONCEPT OF THE SACRED

The concept of sacredness implies the perception of the existence of something, or much, not yet fully understood. Man knows that he is part of the whole of nature, but the whole is awe inspiring, imperfectly understood and must therefore be treated with care and respect. While discussing the difference between sacred and divine, Vannucci (1998) remarks, “it should be noted that, for instance, it would be incorrect to speak of “divine groves” or “divine forests”, and that sacredness is different from divinity”. As a logical consequence, all living bodies and things or associations of living beings are to be respected as sacred manifestations, not just symbols but also as embodiments of the Eternal mysterious. For the ancients, everything that was not fully understood was sacred, vastly because it was not mysterious; since the concepts of life and living are vastly unexplained, as a corollary, all living things had to be sacred (Vannucci, 1995). The word ‘sacred’ should be interpreted not in the narrow sense of religious belief alone but to cover all places, which people have chosen to care for, whatever may be the reasons. The right interpretation of ‘sacred’ would be that which is held in great esteem and awe and hence sacred to the people.

1.4 CULTURAL VALUES AND HERITAGE OF SACRED GROVES

1.4.1 **Worship/Deities of Sacred Groves**

There are many myths, legends and faith associated with the sacred groves of Kerala. All sacred groves of Kerala are dedicated to Gods or Goddesses or to certain ancestral or natural spirits. The deities in the sacred groves are at times represented by some trees like *Alstonia scholaris*, *Adenanthera pavonina*, *Hydnocarpus pentandra*, *Commiphora caudatum*, *Caryota urens*, *Holarrhena antidysenterica*, *Strychnos nux-vomica*, *Ficus tinctorius*, *Mimusops elengi*, etc. A stone slab installed at the base of the tree is the altar on which the offerings including the animal sacrifices are made. These trees are also considered to be the abode of ancestral or natural spirits and demons. The sacred groves owned collectively by the villagers are mostly dedicated to Lord Ayyappa and called as ‘Ayyappankavu’ or

‘Sasthamkavu’ and to Goddess Bhagavathi called ‘Bhagavathikkavu’ or ‘Ammankavu’. One interesting feature about ‘Ayyappan Kavvu’ is the freedom to enter this sacred grove to offer worship irrespective of the caste or creed. Sacred groves owned by the tribal communities are dedicated to ‘Vanadevatha’, the Goddess of the forest, or to natural spirits or demons or ancestral spirits. The fishermen caste ‘Dheevara’ or ‘Araya’ also maintain sacred groves in the coastal areas of Kerala. These groves are called ‘Cheerma’ or ‘Cheerumba’ and the patron deity is ‘Cheerma’. ‘Cheerma’ is the Goddess of smallpox and other epidemic diseases. The sacred groves owned by families are mostly dedicated to Snake God (Naga) or Goddess or both, hence, known as “Nagakkavu” or “Sarpakkavu”. Sacred groves of the tribal inhabiting near and around the forest areas are known as ‘Madankavu’ or ‘Yakshikkavu’. The sacred groves of North Kerala are mostly associated with Goddess whereas the sacred groves of South Kerala are associated mostly with snake worship. Many sacred groves associated with Siva temples also have serpent Gods.

The various patrons Gods/Goddess/Spirits associated with the sacred groves are grouped as follows:

(a) Dedicated to Snake Gods (Sarpakkavu/Nagakkavu):

They are variously known as Nagam’, ‘Nagaraja’, ‘Nagakanya’, ‘Sarpam’, ‘Nagayakshi’, ‘Karingayakshi’, and ‘Karinganagini’.

(b) Dedicated to Goddess Kali (Kalikavu/Bhagavathikkavu):

They are variously known as ‘Amma’, ‘Ayiravalli’, ‘Bhadrakali’, ‘Bhavani’, ‘Bhagavathy’, ‘Bhuvaneswari’, ‘Chandi’, ‘Chamundi’, ‘Devi’, ‘Durga’, ‘Mahishasuramardini’, ‘Mariamma’, ‘Mookambika’, ‘Rakteswari’, ‘Vanadurga’, and ‘Vanadevatha’.

(c) Dedicated to Lord Ayyappan (Ayyappankavu/Sasthamkavu):

They are variously known as Ayyappan, Sastha, and Paradaivam.

(d) Dedicated to Spirits:

They are variously known as ‘Arukola’, ‘Marutha’, ‘Madan’, ‘Yakshi’, ‘Gandharvan’, ‘Yogeeswaran’, and ‘Muthappan’.

Many sacred groves have more than one deity, the patron deity and two or more supporting deities.

The local people observe a strict code of conduct in protecting the sanctity of sacred groves. Human interventions are not normally allowed inside sacred groves except to perform rituals and offer prayers and offerings to propitiate the deities. No material, either plant or animal origin, are not permitted to be taken out of the sacred groves except on certain

exceptional cases or occasions, and that too, only after consulting the local priest. No one is allowed to cut or remove any plants or kill animals associated with the sacred groves; even the fallen twigs, branches or leaves are not to be removed. Violation of the rules that disturb or dispel the sanctity of the sacred grove and its immediate surroundings were considered to be unpardonable sins that will invite the wrath of the patron deity or spirits by bringing epidemic disease, famine, natural calamities or sufferings to the people.

1.4.2 Rituals and Celebrations in the Sacred Groves

It is believed that the spirits inhabiting the kavu would manifest their displeasure in different ways. Therefore, annual rituals are performed on the belief that as long as the sacred groves exist, none can destroy them for money or other material gains. The rituals and rites performed in the sacred groves vary with the region, caste and patron deity of the sacred grove. 'Noorum Palum' is an important offering made to the Snake Gods in 'Sarpakkavus'. 'Noorum Palum' is the offering of rice powder, turmeric powder, lime, cow's milk, tender coconut water, 'Kadali' banana and ghee. This ritual is performed on 'Ayilyam' star of the local almanac every year. A ritualistic devotional dance called "Pambuthullal" or "Nagappattu" is also performed by girls once in every 10 or 12 years or as and when required, as per the predictions of the priest to propitiate the Snake Gods. Elaborate preparations are to be made to organize the "Pambuthullal" or "Sarpamthullal". The ground in front of the serpent deities are cleaned and thinly plastered with a paste of fresh cow dung and mud in the morning which will become dry by evening. Then, the area is decorated beautifully with tender coconut leaves, banana stem/pith, leaves of mango tree, jack tree, peepal tree, etc. Some invocational 'Pooja' is done and offerings of fruits and rice preparation are made. Brass lamps or stone lamps are lit and designs of various sketches of Gods and images of serpent Gods known as "Nagakkalam" or "Sarpakkalam" are drawn on the plastered floor with powders of 5 different colours; rice powder for white, burned paddy husk charcoal powder for black, green leaf powder for green, red coloured sand for red and turmeric powder for yellow. The girls and the main priest who are to perform the "Sarpamthullal" observe 41 days of strict discipline before the ceremony. Late at night at about 10 pm, the girls take their seat on one side of the 'Sarpakkalam' and the priest takes his seat on the opposite side. Husband and wife of the Pulluvar family sit on a corner of the "Sarpakkalam" with their traditional musical accompaniment called the 'Pulluvakkudam' and sing the devotional song known as the 'Pulluvanpattu' to invoke the serpent Gods. The girls

with unlocked hair hold the tender inflorescence of areca nut palm, close their eyes and concentrate on the 'Pulluvanpattu'. Within half an hour, the girls begin to shiver and shake their body, which is considered the sign of being possessed by the serpent Goddess 'Nagini' when the girls are then known as 'Naginis'. The music emanating from the strings of 'Pulluvakkudam' and the drum beating with a peculiar rhythm provides the background and the girls start dancing by moving like snakes through the 'Sarpakkalam' to reach in front of the male priest who also begins to show the sign of being possessed by the 'Nagaraja', the serpent God and begins to shake his body violently and dance with the fast rhythm of the drum. The girls get exhausted due to their dance and faints down one after another. At this juncture, the 'Nagaraja' is ready to bless the devotees, answer their questions and clear their doubts pertaining to matters like misfortunes, diseases or problems of the society/family/individuals. 'Nagaraja' tell the devotees that the diseases/misfortunes faced by the devotees are due to violation of the sanctity of the sacred groves, killing of snakes or dispelling/disturbing other elements of the sacred grove. He suggests them to do penance for their abuse, preserve the sanctity of the grove and ensure protection of the flora and fauna of the sacred grove. The whole ceremony lasts till midnight or sometimes till the daybreak. But this elaborate ceremony has now become rare and some of the villagers feel that the misfortunes and deterioration in the social and family life are due to the disappearance of these rituals and ceremonies.

Similar rituals are also performed in sacred groves associated with goddesses or Lord Ayyappan or ancestral spirits or demons. The 'kalam' design drawn in such groves are mostly the images of goddesses or Ayyappan or ancestral spirits/demons and the 'kalam' thus made are known after the patron deity of the sacred grove, whose image is drawn.

Animal sacrifice is also a part of the rituals in sacred groves associated with Goddesses and ancestral spirits/demons, where, after being possessed by the patron deity, the priest asks for blood of fowls sacrificed at the altar. After this, the priest blesses the devotees, answers their questions and suggests how to solve their problems. Sometimes, goats are also sacrificed at the altar of the grove to satisfy the deity.

1.4.2.1 ***Theyyam***

Most of the sacred groves associated with Goddesses in northern Kerala perform the ritual dance called 'Theyyam' or 'Theyyattam' or 'Kaliyattam' (Plates 11-16), which literally means the dance of God. 'Theyyam' is a distortion of the word 'Daivam' in Malayalam or

Tamil for God. Theyyam is also known as 'Thira' or 'Thirayattam'. Only the male members of some particular castes like the Vannan, Malayan, Cheravan, Chingathan, Velan, Mannuthan, Anjuthan, Koppalan, Pulayan, Pampathar and Paravan alone perform this devotional dance. More than 100 types of 'Theyyam' representing various goddesses, spirits and demons are known. The performers of 'Theyyam' are supposed to be possessed by the deities they represent and move in measured steps and rhythmic dances from time to time, and continue till the end of the performance. Most interesting feature of 'Theyyattam' is that the performers use resplendent costumes of gorgeous colours and magnificent facial makeup (Plate 16) and the towering headgear called the 'Mudi' (Plate 14 D), which makes 'Theyyam' as one of the unique spectacular pageant among the ritual dances of Kerala, and perhaps India. The Theyyam season begins from Thulam 10 (early November) of the Malayalam calendar and lasts till the end of May. The last Theyyam of the year is held during May at the famous Kalarivathukkal Temple at Valapattanam of Kannur district.

Theyyam or Kaliyattam, a popular centuries-old ritual performance associated with sacred groves of North Malabar, is a unique combination of dance, music and religious worship. It reflects the main features of a traditional tribal culture dating back to the early days of Dravidian influence. There are around 450 Theyyams and Saktism, Vaishnavism and Saivism have a powerful role in the Theyyam cult. In several cult centers, violent ritual practices are totally forbidden which is a clear indication of the influence of Buddhism, Jainism and Brahmanism. Some of the deities represent the Moppila (Muslim) heroic figures such as Ali Chamundi, Bappirian (Plate 12 C), Ummachi and Ali Theyyam, which indicates the advent of Islam and the resultant synthesis brought out by the Muslim community in North Malabar, reflecting the confluence of different religious traditions and beliefs and the religious harmony that existed during those days.

After a period of intense preparation involving abstinence, fasting, prayer and solitary confinement, the Theyyam wears the costume of the deity. The Theyyam performance, which often takes place late at night, has an aura of divine splendor, as it is accompanied by rituals and devotional hymns. As the Theyyam dances in synchronization with drums and music, it provides a thrilling, awe-inspiring and unearthly experience. The performer loses his physical identity and becomes the deity during those moments and creates the illusion that he is then the supreme power capable of blessing and inspiring his devotees. During the performance, he identifies himself with the deity and receives homage from the worshippers who revere

him as such. In this elevated state, he is presumed to have supernatural powers and he moves, speaks, heals and blesses the devotees. According to Jnana Yoga, he proclaims 'Aham Brahmasmi', *i. e.*, I am the Brahma. It is a moment of total synthesis, which will reinforce the faith in the supreme power.

There is lot of elegance, regality and exclusiveness that goes with the attire of individual Theyyams. Tender fronds of coconut palm (Plate 12 A & B; 13 A & C; 15 A), wild flowers, ornaments made of wood, seashells, peacock feathers and metal, and bright coloured clothes with unique patterns and designs give each Theyyam a distinctive appearance. The facial painting and makeup too are unique and no Theyyams are alike, each one having its own identity. This speaks much about the effort made to give a meticulous individual touch and distinctive appearance to each Theyyam.

Purpose of Theyyam Performance

Theyyams are performed with various objectives. The Kaliyattam festival conducted in the sacred groves or family houses were mainly with the intention that they may bring prosperity and well being to the family and the village as a whole. The family gods and village deities were worshipped through the performance of Theyyams. It was believed that if certain village deities were not propitiated through Theyyam performance, they could cause misery to the village or community as a whole. Theyyams are also performed for specific purposes or occasions such as curing or warding off certain epidemics. Vasoormala, Khandakaranan, Dandadevan and Puthiya Bhagavathy Theyyams were performed to prevent small pox. There were also instances, where the Theyyams of Muchilot and Kannangattu Bhagavathy (Plate 14 A) visited the patient's house for speedy recovery and restoration of health. For painless delivery, the Uchitta Theyyam was performed and the Maka Bhagavathy, Naga Bhagavathy and Nagakani Theyyams were performed for the welfare of the progeny. When a particular desire or wish is fulfilled or family disputes, court cases and problems related to hatred or vengeance are amicably settled, an act of gratitude towards that deity, the Muthappan (Plate 13 D), Pottan Daivam (Plate 15 A) and the Kathivannur Veeran Theyyams were performed. For agricultural prosperity, well being of animals and before embarking on hunting expeditions, certain Theyyams were performed. The ancient war heroes and heroines are also remembered and worshipped through the Theyyam performance.

Stages of Theyyam Performance

In the initial stage of performance ('thudangal'), the 'thottampattu' (devotional songs) are usually sung without any decorative costume or makeup. On this occasion, the performer accompanied by drummers and wearing only a small red headdress recites the 'thottampattu' followed by songs related to the deity. The accompaniment of musical instruments creates a vibrant devotional atmosphere. In the second stage called 'Vellattam' (Plate 15 B), the performer does certain rituals and feats in an elegant manner. In the case of Theyyams where the 'thottampattu' is very long, Vellattam is not performed, wherein, only the invocation of the deity is performed initially. After a brief interlude, the performer appears in elegant costumes and facial makeup ('Mukhathezhuthu') (Plate 16). Finally, the performer puts on the 'mudi' or headdress and is seated on a sacred seat called 'Peedham' in front of the sanctum, which symbolizes the act of identifying the performer with the deity. This is followed by the actual moment of "becoming" the deity, the moment of crossing the line, as he stares into a small hand-held mirror. It is at this point that the performer perceptibly slips into another state of being, his eyes widens focusing on his own transformed image of the deity. This is the moment of synthesis known as the 'mukhadarshanam' (viewing the face), when the performer identifies himself with the deity. These moments of the performance are quite dynamic and filled with a hypnotic spell that mesmerizes the audience.

'Theyyam' is an exceptionally vigorous dance in which the performer moves forward and backward and reaches its heights of frenzy when the movements become quicker and quicker in tune with the rhythmic beats of traditional drums, cymbals, etc. The performer occupying the central position among the surging devotees and spectators, move in procession around the village and finally returns to the sacred grove. When the theyyam performer sits on the heavy wooden stool called the "Peedham" (Plate 14 C) and proclaims his appreciation of the ceremonies, the devotees prostrate before him and offer offerings and pray for blessing to fulfill their wishes or solve their problems.

The Theyyam bestows upon the devotees benediction and 'prasadam', which is called the 'kurikodukkal'. Different gods and goddesses give different types of 'prasadam'. The goddesses usually distribute a mixture of rice powder and turmeric, believed to be excellent for many ailments. Certain Theyyams like the Vettakkorumakan (Plate 14 B), Urpazhachi, Veluthabhootham and Munjappan gives raw rice as the 'prasadam'. Theyyams associated with Lord Shiva usually bless the devotees with 'bhasma' (ash).

Certain performances are so dangerous that the artist puts his life at risk when he decides to include some items which could be performed only after adequate practice and self control. The audience remain awe struck, enthralled by such incredible performances. The performer should learn to distribute his weight to different parts of the body by supple movements of his limbs. Some of the dangerous feats (Plate 15 C) performed by the Theyyams are again attributed to the divine vibrant power in them during the performance, which is specially mentioned below:

- (a) ***Thaiparadevatha*** dances with an enormous '*mudi*' (headdress) towering like a ten-meter tall coconut tree (Plate 14 D).
- (b) ***Chamundi*** wearing only tender coconut fronds, repeatedly throws himself into fire heaped up to a height of two meters without apparently any effort or damage (Plate 15 C).
- (c) ***Puthiya Bhagavathy*** has burning wicks tied around the waist and the performer dances in the burning heat, directly exposed to the flames (Plate 1 2 A & B).
- (d) ***Kandanarkelan*** does walking in fire with a heavy dress.

Though there had been instances of accidental death in the case of unskilled artists who perform Muchilot Bhagavathy, Kannangattu Bhagavathy and Pottakkattu Bhagavathy, this astonishing immunity to fire creates awe and wonder among the devotees. The Theyyam performers are expected to strictly observe rigorous purification processes like fasting for 3 -21 days (in exceptional cases, extending up to 41 days) and chanting of 'mantras' for 3 to 41 days prior to the performance. During this period, they are allowed to drink only a concoction made of millets, have to remain secluded, take only vegetarian diet, avoid liquor, chant mantras and engage in acts of self-purification. Fire-related Theyyam performers have to chant 'Agnimantras' and Bhagavathy, while the Theyyam performers have more mantra related rituals.

Makeup and Costume

Usually, 8 to 10 hours are required for facial makeup of the Theyyam performer (Plate 16) according to the tradition. The crown, the headdress, breast plates, arm ornaments, bangles, garland and the woolen or cotton garments are so elaborately furnished and differently shaped that the overall costume and makeup of a Theyyam will awe anyone.

All male and female Theyyams wear bangles and anklets on the feet. In the case of Bhagavathy in her terrifying mood, oil wicks are tied to the waist and burnt. The dress of the

heroic Theyyams are made of split bamboo covered with red cloth and for some other Theyyams, they are woven out of tender coconut palm leaves. Theyyams of Bhagavathy wear a silver diadem of serpent's heads crowned with red flowers and a huge golden collar carved out of wood and set with fancy jewels. The breasts of goddesses are generally covered with glittering ornaments and make-up known as 'ezhu tharam' (seven types).

The Headdress

The headdresses are of different types; some are conical, circular, rectangular, round and long in shape and others are made of peacock feathers. These headdresses are classified not only on the basis of shape and size but also on the basis of the objects by which they are prepared. They are made out of bamboo splices and wood, covered with coloured cloth, flowers and tender coconut palm leaves. The Vishnumurthy theyyam uses the dress made of tender coconut leaves, which provides protection from the heat of the scorching sun. A circular headdress is used in the case of Puthiya Bhagavathy (Plate 12 A & B), Chamundi and Rakta Chamundi (Plate 13 A, B & C), Kannangattu Bhagavathy, Vettakkorumakan (Plate 14 A & B), and Muchilot Bhagavathy. The Kshethrapalan, Thaiparadevatha and Bhagavathy Theyyams use a 55-65 feet tall headdress known as the "mudi" made of long bamboos covered with red cloth (Plate 14 D), which are lifted by several helpers to keep the balance when crowned on the head of the Theyyam performer.

1.5 WHY CONSERVATION?

Protection of the environment and life supporting systems are interwoven with biodiversity conservation. Sacred groves are valuable gene pools and the first major effort of the society to recognize and conserve biodiversity. They harbour many rare, endangered/endemic plants and animals and have been preserving many rare and endemic wild plant species, which potentially benefit mankind in medicine, agriculture, and industry as a source of natural products for drugs, food, fuel, fibre, etc. In general, they act as nursery and storehouse of many plants used in ayurvedic, tribal and folk medicines. Besides preserving rich biodiversity, they help in soil and water conservation. The ponds and streams adjoining the groves serve as perennial water sources, serving as the last resort to many animals and birds for their water requirements, especially during summer. Sacred groves enrich the soil through its rich litter and the nutrients generated by litter decomposition are not only recycled within the sacred grove ecosystem but also find their way into the adjoining agro ecosystems. In spite of the very high land to man ratio, these groves have been thriving

due to the very high reverence and importance people attribute to them. In the context of the dwindling of evergreen forests at an alarming rate in the Western Ghats, preservation and management of the sacred groves are unavoidable, as each 'kavu' is a treasure house of many rare/endangered species, germplasm collection of all the plants in an area and an abode of rare/endemic medicinal and economically important plants.

1.6 ECOLOGICAL SIGNIFICANCE

Being a unique unit in the rural landscape, the sacred grove performs several ecological functions, which can directly or indirectly help in the maintenance of ecosystem health of all interacting landscape units. According to Rajendraprasad (1995), sacred groves with their complex array of interaction, influence the flora and fauna of the region as well as the microclimate of that locality. The soils of sacred groves show high porosity and low bulk density compared to the soils of the vicinity. The thick litter cover and channels created by soil macro fauna together enhances water retention, root system development, gaseous exchange, and heat conductance. The role of sacred groves as micro watersheds has been recognized by several workers. In Maharashtra, many major sacred groves are located in the catchment of rivers (Gokhale *et al.*, 1998). For example, Bhimashankar in Pune district harbour a large grove of over 700 ha at the origin of Bhima, a major tributary of the river Krishna. The ecosystem services of sacred groves through watershed functions in Tamil Nadu have been studied in detail (Swamy *et al.*, 1998). According to Rajendraprasad (1995), most of the sacred groves in Kerala are associated with freshwater ecosystem, and to certain extent, these water bodies meet the water needs of the local communities. People residing in the settlements located near Nagoni sacred forest in Himachal Pradesh believe that the sacred forest being located on steep and rugged slope towards ridges regulates the flow of water and sediment to the settlements and agricultural land down the slope (Singh *et al.*, 1998).

1.7 ECONOMIC SIGNIFICANCE

It is well known that the climax form of vegetation in any locality often tends to be richer in species than the earlier stages of its succession. As climax forests, the sacred groves are particularly diverse in tree species and the life forms, especially climbers and epiphytes which are dependent on trees for their existence. With the destruction of forests around them, the sacred groves have become the last refuge of many plant species, and hence islands of biodiversity.

Many plant species, which depend on the sacred groves for their very survival in the region, have become the last refuge of many plant species which are of considerable economic value. A striking example of this was provided by a small sacred grove at the village of Tunbad in Shrivardhan Taluk, which harboured a magnificent climber Garabi or Gaidhari (*Entada phaseoloides* Merr.), a leguminous climber, the bark of which was used by the local people in treating cattle against snakebites. It is told that this was the only specimen of this species within a radius of 40 km and people came up from considerable distances to this grove for collecting its bark. It is certain that many species now preserved in the sacred groves possess such medicinal properties and may prove to be of considerable economic value, if properly studied and utilized sustainably.

Apart from preservation of rare species, the sacred groves may be serving the function of conservation of biodiversity of common trees. Two sacred groves in Maharashtra support ancient Teak (*Tectona grandis*), although teak has disappeared from the vicinity of groves in the locality.

1.8 THREATS

In many parts of the country, during the past three decades, sacred groves have started deterioration both in terms of cultural and biological integrity, though the nature and extent of threats and pressures are often regional and even grove-specific. The magnitude of these threats varies from region to region as well as from one type of grove to another. The major threats to sacred groves can be grouped under the following ten heads:

1.8.1 Commercial Forestry

Over the past two centuries, the local people have lost their customary rights of forest management in many parts of the country, due to government regulations. Hence, many sacred groves have been destroyed due to commercial forestry operations.

1.8.2 Development Projects

Some of the sacred groves that fell under government vested lands were destroyed when townships grew. Railroads and highways have also taken their toll of many sacred groves, and some of them have been inundated by big dam projects.

1.8.3 Shift in Belief Systems

In some cases, conversion to other religions has resulted in the mismanagement and degradation of sacred groves.

1.8.4 Sanskritization

In many places, local folk deities have been replaced with Hindu Gods and Goddesses. This has resulted in the erection of temples in the sacred groves leading to their fragmentation and destruction.

1.8.5 Pilgrimage and Tourism

The integrity of many groves with regional or pan-Indian character has suffered deterioration due to the influx of large number of pilgrims and tourists.

1.8.6 Removal of Biomass

In many sacred groves, removal of biomass and cattle grazing was permitted and continuation of these practices over generations has resulted in the dwindling of the groves.

1.8.7 Encroachment

Many instances have been reported, where the groves have been encroached by local communities as well as by people migrating from outside for settlements and agriculture.

1.8.8 Modernization and Market Forces

The most recent threat to sacred groves comes from the process of modernization. Local traditions are being challenged by the westernized urban culture and the present education system has failed to instill respect for local traditions and need for conservation of sacred groves. As a result, the sacred groves are losing its cultural importance among the younger generations. The spread of market economy has resulted in the denial and erosion of identities of local communities. The lure of short-term commercial gains has prompted the destruction of many traditional resource bases, including sacred groves.

1.8.9 Fragmentation

Many of the sacred groves have been fragmented by roadways, extension of power lines, reclamation of land for agriculture, and illegal encroach may lead to fragmentation of the grove and consequently to loss of biodiversity and disruption of ecological functions.

1.8.10 Socio-cultural causes

Religion had an overwhelming influence on the preservation of forest patches as sacred groves, in addition to the ecological and economic values attributed to them. A notable feature of Indian culture is the continuation of many prehistoric religious practices, despite the growth of dogmatic religions along with them. Vedic Hinduism, with its text-based dogmas, appeared in the Indian sub-continent during the fourth millennium BP. Despite its proclaimed faith in gods abstracted from the elements of nature like water and wind, sun and moon, planets and stars, for the next 1,500 years or so was on a course of collision with the various earlier regional cults of India, which were more intimately linked to local ecosystems. There was, however, no outright rejection of folk cults related to nature. By the time the great Epics like Mahabharata and Ramayana were composed, the Hindu religion, the most ancient of the dogmatic religions such as Jainism and Buddhism to develop in the subcontinent, went on hybridizing with the various indigenous creeds. Such a cultural transformation and changing worldview of nature among the people of the Western Ghats were among the causes for the decline of the sacred groves (Chandran *et al.*, 1998).

REVIEW OF LITERATURE

2.1 GLOBAL SCENARIO

Sacred groves are a very ancient and widespread phenomenon in the old world cultures. References about sacred groves have been made in Greek and Sanskrit classics. Sacred groves have been reported from many parts of the world like Mexico, Ghana, Nigeria, China, Syria and Turkey, wherein there are areas where the tribal live and practice shifting cultivation. However, it appears that they are entirely unknown to the New World.

Sacred groves were a feature of the mythological landscape and the cult practice of Old Europe, of the most ancient levels of Germanic paganism, Greek mythology, Slavic mythology, Roman mythology, and in Druidic practice. Sacred groves also feature prominently in many Asian and African mythologies and cultures, most notably in India, Japan, West Africa, and Anatolia. In Syria, some sacred groves are believed to have been made during Assyrian times. The most famous sacred grove in mainland Greece was the oak grove at Dodona. Outside the walls of Athens, the site of the Academy was a sacred grove of olive trees, still recalled in the phrase "the groves of Academe."

In Central Italy, the town of Nemi recalls the Latin nemus Aricinum, or "grove of Ariccia", a small town, a quarter of the way around the lake. In Antiquity, the area had no town, but the grove was the site of one of the most famous of Roman cults and temples.

A sacred grove behind the House of the Vestal Virgins on the edge of the Roman Forum lingered until its last vestiges were burnt in the Great Fire of Rome in 64 CE. The Bosco Sacro (literally sacred grove) at Bomarzo, Italy is a well-known sculpture garden and sacred grove.

Sacred groves have survived in the Baltic States longer than in other parts of Europe. The Baltic Prussian sanctuary, which is also considered a sacred grove, was Romowe. The last extermination of sacred groves was carried out in the lands of present-day Lithuania after its Christianization in 1387 and Samogitia in 1413. A sacred grove is known as *alka(s)* in Lithuanian.

Sacred groves feature prominently in Scandinavian mythology. The most famous sacred grove of Northern Europe was at the Temple at Uppsala in Old Uppsala, where every tree was considered sacred - described by Adam of Bremen. The practice of *Blót* - the sacrificial ritual in Norse paganism was usually held in Lunds or sacred groves. According to Adam of Bremen, in Scandinavia, pagan kings sacrificed nine males of each species at the sacred groves every ninth year.

The pagan Germanic tribes also performed tree-worship and had the concept of sacred groves. It is thought that the idea of sacred trees like the Thor's Oak might have led to the concept of the present day Christmas tree.

The Celts used sacred groves, called *nemeton* in Gaulish, for performing ritual animal and human sacrifices and other rituals, based on Celtic mythology. The deity involved was usually *Nemetona* - a Celtic goddess. Druids oversaw such rituals. Existence of such groves have been found in Germany, Switzerland, Czech Republic and Hungary in Central Europe, in many sites of ancient Gaul in France, as well as England and Northern Ireland. Sacred grove remains had been plentiful up until the 3rd century BC, when the Romans attacked and conquered Gaul. One of the most well known *nemeton* sites is that in the Nevet forest near Locronan in Bretagne, France. Gournay-sur-Aronde (Gournay-on-Aronde), a village in the Oise department of France, also houses the remains of a *nemeton*. *Nemetons* were often fenced off by enclosures, as indicated by the German term *Viereckschanze* - meaning a quadrangular space surrounded by a ditch enclosed by wooden palisades. Many of these groves, like the sacred grove at Didyma, Turkey are thought to be *nemetons*, sacred groves protected by druids based on Celtic Mythology. In fact, according to Strabo, the central shrine at Galatia was called *Drunemeton*. Some of these were also sacred groves in Greek times (as in the case of Didyma), but were based on a different or slightly changed mythology.

West Africa

The concept of sacred groves is present in Nigerian mythology as well. The Osun-Osogbo Sacred Grove, containing dense forests, is located just outside the city of Osogbo, and is regarded as one of the last virgin high forests in Nigeria. It is dedicated to the fertility god in Yoruba mythology, and is dotted with shrines and sculptures. Suzanne Wenger, an Austrian artist, has helped revive the grove. The grove was designated as an UNESCO World Heritage Site in 2005.

Sacred groves are also present in Ghana and the Buoyem Sacred Grove is one of Ghana's most famous sacred groves. Numerous other sacred groves are present in the Techiman Municipal District and nearby districts of the Brong Ahafo Region. They provide a refuge for wildlife which has been exterminated in nearby areas, and one of the groves houses 20,000 fruit bats in underground caves of the grove. The capital of the historical Ghana Empire El-Ghaba contained a sacred grove for performing religious rites of the Soninke people. Other sacred groves in Ghana include sacred groves along the coastal savannahs of Ghana. Many sacred groves in Ghana are now under federal protection like the Anweam Sacred Grove in the Esukawkaw Forest Reserve. Other well-known sacred groves in Ghana include the Malshegu Sacred Grove in Northern Ghana, one of the last remaining closed canopy forests in the savannah regions, and the Jachie Sacred Grove.

Japan

Sacred groves in Japan are typically associated with Shinto shrines, and are reported to be present all over Japan. The Cryptomeria tree is venerated in Shinto practice is considered sacred. Among the sacred groves associated with such Jinjas or Shinto shrines are the shrine at Atsutaku, Nagoya, one of the most important Shinto shrines in Japan, and the Kashima Shrine is now protected as part of the Kashima Wildlife Preservation Area on account of its varied avifauna and trees (the grove houses over 800 species of trees). The Utaki sacred sites (often with associated burial grounds) at Okinawa are based on Ryukyuan religion and usually are associated with toun or kami-asagi-regions dedicated to the gods, where people are forbidden. Sacred groves are often present in such places as in Gusukus, which are fortified areas containing sacred sites within. The Seifa-Utaki consisting of a triangular cavern formed by gigantic rocks was designated as a UNESCO World Heritage Site in 2003, contains a sacred grove with rare, indigenous trees like the Kubanoki (a kind of

palm) and the Yabunikkei (the wild cinnamon, *Cinnamomum japonicum*). Direct access to the grove is forbidden.

2.2 INDIAN SCENARIO

In India, as in other countries of the world, many communities practice different forms of worship of nature. One such significant tradition of nature worship was that of providing protection to patches of forests designated as sacred groves dedicated to deities or ancestral spirits. Although different authors have described these groves in different ways, most scholars emphasize the natural or near-natural state of vegetation in the sacred groves, and the preservation of these groves by local communities through social taboos and sanctions that reflect spiritual and ecological ethos of these communities.

Sacred groves were dedicated by local communities to their ancestral spirits or deities. Such a grove may consist of a multi-species, multi-tier primary forest or a cluster of trees, depending on the history of the vegetation. These groves were protected by local communities, usually through customary taboos and sanctions with cultural and ecological implications. Thus, sacred groves are segments of landscape containing vegetation and other forms of life and geographical features that are delimited and protected by human societies to keep them in a relatively undisturbed state. It is the expression of the relationship of man with the divine or with nature (Hughes & Chandran, 1998). Diverse cultures perceive this relationship in different ways, and institutionalize various taboos with regard to the sacred space and its elements.

The concept of sacred groves in India has its roots in antiquity, even before the Vedic age, the Vedas representing the only recorded remains of the thoughts of the ancient Aryans who migrated into this sub-continent. In their migration from the steppes of the Central Asia through Balkh in Khorasan to the Indian sub-continent, the Vedic people of pre-historic times assimilated new environmental values incorporating into their value system, the concept of the 'sacred grove' from the original inhabitants of the Indian sub-continent. Being part of the post-Vedic Hindu ritualism, sacredness attached to species is perhaps more recent. Thus the already existing ecosystem level concept of the 'sacred grove' of the original pre-Vedic inhabitants of India was extended by the Vedic migrants down to 'species' level on one

extreme of the scale and to the level of the 'landscape' on the other extreme (Ramakrishnan, 1996).

Sacred groves have existed in India from time immemorial as patches of densely wooded areas, venerated on religious grounds. Sacred groves have preserved many rare and endemic wild plant species, many of which hold potential benefit to man in medicine, agriculture and industry. In fact, sacred groves represent the ancient Indian way of *in situ* conservation of genetic diversity. In India, the sacred groves were reported earlier from the Himalayas, North-east India, highlands of Bihar, Orissa, Madhya Pradesh, Andhra Pradesh, Karnataka, Tamil Nadu and Kerala. Earlier workers have studied floristic and ethnobotanical aspects of sacred groves and provided detailed scientific account of the sacred groves in India (Gadgil & Vartak, 1975, 1976, 1981; Chandran *et al.*, 1998; Malhotra, 1998; Malhotra & Das, 1997; Malhotra *et al.*, 1997, 2000).

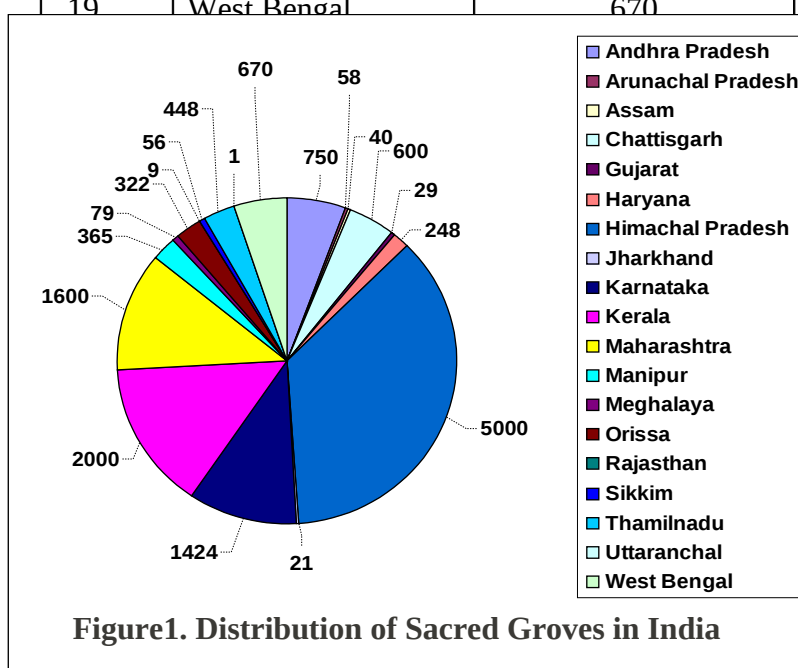
Distributed throughout India, the current level of protection and conservation of sacred groves is hampered by erosion in traditional and cultural values, but these traditional methods of social fencing of these ecosystem types as conservation patches are being rediscovered at present by the environmentally conscious communities. Though there are many reports on general aspects of the sacred groves, the ecological value of the species within them and the ecosystem function are yet to be fully studied. In many landscapes, the sacred grove is a representative of the relic climax vegetation, which existed once upon a time and is now destroyed through a variety of anthropogenic perturbations. In that sense, these islands of biodiversity have the potential for biodiversity conservation in a variety of ways.

In the present day India, the tradition of sacred groves is reported from most parts of the country, though it is difficult to make a guess regarding the total number of sacred groves in the country. But in view of the known presence and pattern of distribution of sacred groves in Chattisgarh, Jharkhand, Orissa, Uttranchal, Madhya Pradesh and West Bengal for which detailed inventories are not available, we strongly feel that the number of Sacred groves in India is likely to be between 100,000 and 150,000 (Malhotra, 1998). According to Gokhale *et al.* (1998), the total area of sacred groves in India would be about 33,000 ha which comes to 0.01 percent of the total area of the country. But the actual area of the 4,415 sacred groves reported so far cover more than 42,000 ha. Hence, it may not be possible to come up with a reasonable estimate based on the present reports. Maximum number of sacred groves has

been reported from Himachal Pradesh, Kerala, Maharashtra and Karnataka (Malhotra *et. al.*, 2000) (Table 1 & Figure 1). The deities of the groves in Mysore and Kerala are snake gods rather and the mother goddesses as in Maharashtra. Aravalli hills in Rajasthan have groves dedicated to a mother goddess Jogmaya.

Table1. Number of Sacred Groves Reported from Various States of India

Sl. No	State	No. of Sacred Groves
1.	Andhra Pradesh	750
2.	Arunachal Pradesh	58
3.	Assam	40
4.	Chhattisgarh	600
5.	Gujarat	29
6.	Harayana	248
7.	Himachal Pradesh	5, 000
8.	Jharkhand	21
9.	Karnataka	1, 424
10.	Kerala	2, 000
11.	Maharashtra	1, 600
12.	Manipur	365
13.	Meghalaya	79
14.	Orissa	322
15.	Rajasthan	9
16.	Sikkim	56
17.	Tamil Nadu	448
18.	Uttaranchal	1
19.	West Bengal	670



The finest sacred groves of India presumably occur in the Sarguja district of Madhya Pradesh. Here every village in the area has a grove about 20 hectares in extent. What is remarkable is that not only plant, but also animal life receives absolute protection in these groves. The groves therefore serve as sanctuaries for herds of ungulates as well. These groves are locally known as "Sarana" forests, a word that probably derives from the Sanskrit "Sharana" or sanctuary.

The sacred groves of India has been fairly well studied from anthropological as well as biological conservation points of view (Malhotra, 1998; Malhotra & Das, 1997); Chandrashekara & Sankar, 1998a & b; Deshmukh *et al.*, 1998; Pushpangadan *et al.*, 1998; Gokhale *et al.*, 1998; Ramakrishnan, 1998; Ramakrishnan *et al.*, 1998). An overview of the sociological and ecological dimensions of sacred groves in India is given below.

2.2.1 Sociological Dimensions

Anthropological dimensions of sacred groves can be broadly described under the following heads:

- *Antiquity of sacred groves*
- *Ownership pattern and management of sacred groves*
- *Ethnicity and sacred groves*
- *Gender and sacred groves*

2.2.1.1 Antiquity

Several scholars have noted that sacred groves are a very ancient and widespread institution in the Old World cultures. The institution in India is very ancient and dates back to the pre-agrarian hunting-gathering stage, before humans had settled down to raise livestock or till the land.

2.2.1.2 Ownership and Management

The available information on this aspect, though sparse and scanty, suggests the existence of a wide variation in the legal status and management of sacred groves in the country. It appears that in terms of the legal tenurial rights, sacred groves fall under three categories:

- *Sacred groves under the control of State Forest Departments;*
- *Sacred groves under the control of revenue and other government departments; and*
- *Privately owned sacred groves.*

There are significant variations in the management of the sacred groves, their upkeep, protection, predominance of rituals and festivals, conflict resolution and harvesting of biomass. To cite few examples: the Orans in Rajasthan are usually managed by the Grama Panchayat. The Haryali grove in Garhwal is managed by a temple committee consisting of members of three villages (Sinha & Maikhuri, 1998). Among the Mahadeo Kolis of Pune district, management of the grove is vested with the clan elders, whereas among the Kunbis of Kolhapur district, the groves are managed by village elders. The Kantabanshini Thakurma sacred grove in Koraput district is managed by two clans of the Proja Tribe. Clan-based management appears to be a widespread practice among the Santhal, Oraon, Milnda, Kharia and other tribes of central, eastern and north-eastern India.

Legally, all the sacred groves in Meghalaya are under the control of District Councils (Tiwari *et al.*, 1998). A large number of sacred groves in Maharashtra are under the control of the Forest Department. Many Sacred groves in western Maharashtra are under the control of the Revenue Department (Godbole *et al.*, 1998). Many temples and their groves in western Maharashtra were brought under the scrutiny of the government by forming the Paschim Maharashtra Deosthan Prabodhan Samiti in 1960s. Gadgil and Vartak (1981) have documented 223 such groves.

In Kerala, several sacred groves are owned by a family, a group of families, a caste, or a trust. Examples of some such groves in Kerala are the Ollur Kavu, owned by a single family, the S.N. Puram Grove, owned and managed by several families, and the Iringole Kavu, owned and managed by a Temple Trust (Chandrashekara & Sankar, 1998a).

2.2.1.3 *Ethnicity*

The process of peopling of India stretching over indeed a long period brought in not only different human biological traits, but also a variety of cultural, religious and

technological characteristics. Contemporary India is an agglomeration of over 40,000 endogamous groups (Malhotra, 1998). An estimated 37,000 groups are structured in the Hindu caste system, where each group (caste) belongs to one of the five varnas: Brahmin, Kshatriya, Vaishya, Sudra and Pancham. The remaining 3,000 groups constitute different tribes, religious communities and other communities like Parsis and Siddis who immigrated to India in the recent history. In other words, there is a bewildering heterogeneity in the Indian society in terms of religious beliefs, customs, taboos, culture, language and livelihood. A few tentative inferences that can be drawn from the information provided earlier in terms of association of sacred groves with different ethnic groups are:

- (i) *The sacred groves are found among both tribals and non-tribals;*
- (ii) *There is regional variation in terms of ethnic association;*
- (iii) *The association with castes of different varnas is not clear;*
- (iv) *In States like Bihar, Madhya Pradesh, Orissa, West Bengal, etc., where we have both tribals and non-tribals, the existence of groves in the non-tribal areas is not clear.*

2.2.1.4 **Gender Issues**

A survey of available literature reveals that majority of the sacred groves are associated with female deities. Gadgil and Vartak (1976) found that among 21 sacred groves in Maharashtra, 15 were associated with goddesses and 5 with male deity (phallic worship) and one with ancestor worship. Chandran *et al* (1998) reported the occurrence of both male (Bhutappa, Jatakappa) and female, (Choudamma) deities associated with sacred groves in Karnataka. The deities are mostly female in southwest Bengal and in Koraput district of Orissa (Malhotra *et al.*, 1997). The role of gender in sacred groves can be analyzed at four levels:

- (a) *The gender of the deity associated with the sacred groves;*
- (b) *The gender of the priest serving the groves;*
- (c) *The nature and extent of access to men and women in various rituals, festivals and ceremonies in the groves, and harvest of biomass from the groves; and*
- (d) *Role of gender in the management of the sacred groves.*

Regarding the gender of the priest, it appears that the priesthood rests with males without exception (Godbole *et al.*, 1998). However, this aspect needs to be further studied, as many earlier studies do not provide sufficient information on this aspect. Of great interest is

the situation among the matrilineal societies such as Nairs in Kerala, Khasis and Garos in northeast India.

The information regarding access to sacred groves by women too is scanty. Generally women are not permitted enter the groves after attaining puberty. However, women are not allowed in the Sarana, but take part in dance at the akhara, which is located close to the grove. Malhotra *et al.*, (1997) have observed taboo against entry of women in the sacred groves among the tribes of southwest Bengal and among the tribes of Koraput district of Orissa. Although many studies have been conducted on harvesting of biomass from sacred groves (Mitra & Pal, 1994), it is not clear whether women are allowed to gather the same.

Nothing is known on the role of women in decision-making on management of sacred groves. The limited information available from the studies in West Bengal and Orissa shows that there is no role for women in the management of sacred groves. It may be interesting to study whether women are represented in the trust bodies managing sacred groves, particularly in Maharashtra, Karnataka and Kerala.

2.2.2 **Biological and Ecological Values**

Many have studied the biological and ecological values of sacred groves in the country. The literature is too vast to be reviewed; hence, only some of the salient findings are reviewed below.

2.2.2.1 **Biological Values**

As mentioned earlier, the institution of sacred groves is very ancient in the country. Access to and interference with sacred groves has been culturally restricted and to reduce the human impact in terms of harvesting of natural resources. As a consequence of such restriction, the sacred groves have evolved as reservoirs of biodiversity and germplasm permitted the complex and diverse array of ecological processes to continue uninterruptedly over long period of time. Many Sacred groves constitute pristine vegetation, and are particularly rich in trees and associated groups of organisms like epiphytes, amphibians, reptiles, birds, butterflies, etc.

2.2.2.1.1 **Plant diversity**

A number of studies have emphasized that many sacred groves are climax forests, and probably constitute the only representative of near-natural vegetation in many parts of India. Such islands of climax vegetation amidst a degraded landscape can be seen in many parts of

Western Ghats, Koraput and Kalahandi districts of Orissa and south-west Bengal. Several studies have shown that many groves in Meghalaya (Tiwari *et al.*, 1998), Kerala (Chandrashekara & Sankar, 1998a & b), Maharashtra (Gadgil & Vartak, 1976) and Himachal Pradesh (Singh *et al.*, 1998) harbour rich floral and faunal biodiversity. Sacred groves found in the hilly states of north eastern India are noted for rare species of orchids. Pushpangadan *et al.* (1998) reported that the biological spectrum of groves in Kerala closely resembles the typical spectrum of tropical forest biodiversity. A typical sacred grove occupying only 1.4 km² contained 722 species of angiosperms, compared with 960 species occurring in 90 km² of the Silent Valley forest.

With the continued destruction of forest all around them, the sacred groves have become fragmented habitats housing gene pools and became the last refuge for many threatened, endangered and endemic plant and animal species. Tree species like *Phoeba hainsiana* (vulnerable), *Rhus hookeri* (endangered) and *Flacourtia cataphracta* (endangered) have been found well represented in two sacred groves in Manipur valley. *Syzygium travancoricum*, an endemic tree, reported from the low-level evergreen forests of Kulathupuzha (South Kerala) has been totally eliminated from its type locality. Today, only a few plants are reported thriving in some of the sacred groves of Pathanamthitta district and in the wetlands of Asramom area of Quilon in the southern Western Ghats region of Kerala State. Sacred groves of Kerala are also found to harbour a number of plant species that are wild relatives of many crops, which are important in genetic improvement of the cultivated varieties.

Sacred groves, in general, act as a nursery and repository of many plants used in ayurveda, tribal and folk medicines. Species not listed under immediate risk of extinction, if preserved in sacred groves, may have great potential for diverse uses in future. The sacred groves may also serve to preserve genotypes which may be useful in tree-breeding programmes. Sacred groves are also of great interest in forestry as indicators of natural productivity of the region. Ecologically valuable species like *Albizia lebbeck* and *Ficus glomerata* which are reported conserve high amount of nitrogen, phosphorous, magnesium and calcium in their leaves, are found in several sacred groves of Manipur. Keystone species that contribute to the maintenance and enhancement of biodiversity and socially valued by local communities for cultural and religious reasons have been reported from many sacred groves. In the Orans of Rajasthan, the Khejari (*Prosopis cineraria*), a keystone species

intimately linked to the survival of many other species, occupies a special position in Rajasthani culture. The Kallabbekan sacred grove in Kumta taluk, Karnataka, with an extent of 50 ha amidst an arecanut-spice garden of a populated village, is rich in endemics like wild nutmeg (*Myristica malabarica*), cinnamon, *Garcinia gummi-gutta* and wild pepper (Chandran *et al.*, 1998). *Kunstleria keralensis*, a climbing legume, reported from a sacred grove in southern Kerala, is a species found only in that sacred grove. *Belpharistemma membranifolia*, *Buchanania lanceolata* and *Syzygium travancoricum* are rare species found only in some sacred groves of Kerala. A rare species of cinnamon, *Cinnamomum quilonensis*, have been reported from some of the sacred groves of Alappuzha district in Kerala (Nair & Mohanan, 1981).

2.2.2.1.2 **Animal diversity**

The landscape of the pre-colonial Western Ghats, where sacred groves were enmeshed in secondary forests, fallows and grasslands would have been ideal for wildlife. Animal life was very rich in the region until the close of the nineteenth century. But landscape changes resulting from takeover of forests by the State and hunting for sport by British sportsmen and local gunmen caused the decline of wildlife (Chandran & Gadgil, 1993b). Decline of the groves, impoverishment of the village people, invasion of the grassy clearings by forest growth following the ban on shifting cultivation, and establishment of large scale plantations of timber trees and other commercial crops might have contributed to the overall decrease in wildlife.

Though isolated sacred groves do not shelter any major mammalian wildlife except some primates and minor mammals like bats, civet cats, etc., they harbor numerous birds, butterflies and insects. Many animal species including birds that are otherwise threatened or becoming rare, find a safe refuge in sacred groves. The Orans in Rajasthan managed by the Bishnoi community, provide protection to the Indian Gazelle (*Gazella gazella*), Blackbuck (*Antelope cervicapra*) and to migratory bird Demoiselle Crane (*Anthropoides virgo*).

2.2.2.2 **Ecological Values**

Some of the important ecological services provided by the sacred groves reported in literature are summarized below:

2.2.2.2.1 **Recharge of Aquifers**

Many Sacred groves hold water resources in the form of springs, ponds, lakes, streams or rivers. The vegetation of the grove itself retains water, soaking it up like a sponge during wet periods and releasing it slowly in times of drought. It is evident that one of the important ecological roles of these groves is to provide a more dependable source of water for the organisms living in and around the sacred groves (Puspangadan *et al.*, 1998). The ponds and streams adjoining the groves are often perennial and in some cases, act as the last resort to many animals and birds for their water requirements, especially during dry season. Another function may be, to reduce the incidence and intensity of forest fire, at least in some climates. In addition, transpiration from the sacred grove vegetation would increase atmospheric humidity and reduce temperature in the immediate vicinity and produce a more favourable microclimate for many organisms (Khiewtam & Ramakrishnan, 1989).

2.2.2.2.2 *Soil Conservation and Nutrient Cycling*

Sacred groves play a crucial role in soil and water conservation. The Mawsmi sacred groves in the Cherrapunji ecosystem receive very high rainfall. With a rapid litter decomposition rate, nutrient release in to the soil of these groves is very high. The soil itself has little nutrients to support the large biomass of the sacred grove. The fine root mat developed on the surface of the soil is important for supporting the large above-ground biomass and for effective recycling of nutrients. Many microorganisms, invertebrates, fungi, etc. flourish and a vast array of species not hitherto indigenous to the groves may also colonize and thrive. The root mat prevents the nutrients from leaching out. The land surrounding the sacred groves in this area, which is devoid of necessary root mat and litter decomposition, can no longer sustain vegetation (Khiewtam & Ramakrishnan, 1989).

All of these factors indicate that the conservation of sacred groves is essential for maintaining local/regional biodiversity, the comprehensive health of a landscape, and preserving the socio-cultural integrity of local communities. The existing sacred groves may thus provide far more values and benefits than their small size would otherwise indicate.

Northeastern hill regions of India constitute an important component of the Eastern Himalayan complex, a 'hot spot' of biodiversity. This region has rich ecological diversity, ranging from the tropical humid forests of lower elevations, through the sub-temperate forests of mid-elevation ranges, to the alpine vegetation of the high elevations. This ecological complexity is compounded with a rich human cultural diversity with over 100 different tribes originating from different parts of south and Southeast Asia and bringing with them their own

distinct cultures and having evolved and adapted to local situations in the agro forest landscape. Whilst we know so little about this eco-cultural interface, the Meghalayan situation is indicative of the yet to be documented large body of information embedded in the tribal culture. Sacred groves have always been part of the cultural heritage of the people of Meghalaya even before the advent of Christianity, wherein; each village had a sacred grove. At present, there are only about 79 groves reported in varied levels of protection (Tiwari *et al.*, 1998). A large number of them are located in the Cherrapunji region of the East Khasi Hills District. Here, there are two types of groves: (a) those that are considered traditionally sacred and therefore ideally not even a fallen twig could be removed from within and where a whole variety of religious beliefs and practices exist; and (b) those that are protected reserve forest groves, declared in recent times by the village headman with the occurrence of the Village Council, wherein only limited extraction of timber is permitted (Khiewtam & Ramakrishnan, 1989).

Mawsami sacred grove, a climax forest in Cherrapunji in Meghalaya in northeast India, is now represented only by a relic sacred grove, protected by the local Khasi tribe due to religious/cultural reasons. This is located in one of the highest rainfall region of the world with an annual average rainfall of about 10,370 mm, which in an exceptional year may increase to as high as 24,550 mm as in 1974. Obviously, the humid sub-tropical forests, which were extensive in the past, are developed on highly leached nutrient deficient soils and are therefore very fragile (Khiewtam & Ramakrishnan, 1993). The fragility of these humid forests is compounded by the limestone formations beneath them that have extensive underground tunnels of stalactites and stalagmites (Kratz topography). In spite of the limestone formation, the soil is highly acidic (pH 3.9-5.2) and with poor nutrient contents (Ramakrishnan, 1992). With very high annual litter fall and rapid litter decomposition rate comparable to lower montane rainforests, the nutrient release rate in the grove is very high (Khiewtam & Ramakrishnan, 1993).

2.3 KERALA SCENARIO

The first authentic report on the sacred groves appeared in the Census report of Travancore in which. Lt. Ward and Lt. Conner reported the presence of 15,000 sacred groves in Travancore (Ward & Conner 1927). A sarpakkavu, an abode of snake god was an indispensable adjunct to each well-to-do Namboothiri and Nair family of Kerala (Chandran &

Gadgil, 1993a). The serpent worship is an important feature of sacred groves in the State. The sacred grove tradition in Kerala can be broadly classified as follows:

- ❖ *The sacred groves owned collectively by the villagers are mostly dedicated to Lord Ayyappan and called as Ayyappan Kavu or Sasthamkavu and those dedicated to Goddess Bhagavathy are called Bhagavathikkavu or Ammankavu.*
- ❖ *Sacred groves owned by the tribal communities are dedicated to Vanadevatha, the goddess of the forest or to spirits, demons or to ancestors. These groves are known as Madankavu or Yakshikkavu; and*
- ❖ *The other castes like Nair, Namboothiri, Ezhava and coastal fisher folk Dheevara also maintain the groves called Cheema or Cheerumba (Pushpangadan et al., 1998).*

In Kerala, most of the sacred groves are distributed in the lowlands and midlands; hence their distribution does not overlap with the forest areas. It is estimated that about 500 ha. of forest area of the State is under sacred groves (Prasad & Mohanan, 1995), contributing 0.05% of the total forest area (Chandrashekara & Sankar, 1998a). Though on a rough estimate, Kerala has about 1500 sacred groves, which are distinct, and unique in biodiversity, a review of the available information on sacred groves reveals that there are 568 sacred groves of more than 0.5 ha. exist at present in the State distributed in various districts (Table 2; Figs. 2 & 3), though some of them are just relics of the once gregarious vegetation. The extent of sacred groves varies from few acres to more than 20 hectares as in the case of Iringole Kavau. The Iringole Kavau (20.00 ha), Kunnathurpadi Kavau, Payyanur (18.21 ha) and Theyyottu Kavau of Kannur district (16.19 ha) are examples of large sacred groves in Kerala. A complete detailed inventory of the sacred groves of Kerala is not available at present and they are distributed throughout the lowlands of the State extending up to the foothills, though a few of them are found in the high ranges of Idukki and Wayanad districts. In general, they are confined to lower elevations. Kozhikode, Kannur and Kasaragod districts have maximum number of sacred groves.

Till the beginning of this century, sacred groves were an indispensable adjunct of the traditional Hindu families of Kerala. Sacred groves and associated ponds constituted a unique network of ecological system that intervened with the life and culture of the people of Kerala. 'Ayyappan Kavau' the sacred groves dedicated to Lord Ayyappan, used to be the most common in Kerala in the past. Such Kavaus are numerous in the length and breadth of Kerala. Many sacred groves are associated with the temples and ancestral home (Tharavad) temples of Namboothiri, Nair and Ezhava families. Prior to 1800 AD, about 15000 groves were

present in the erstwhile Travancore State alone (Veluppillai, 1940). In his monumental work, the Malabar Manual, Logan (1887) mentions that innumerable sacred groves were present in Malabar.

Literature on the distribution of sacred groves of Kerala is scanty. The first scholar to document sacred groves of the State was D. Brandis, the first Inspector General of Forests, who wrote about occurrence of sacred groves in 1897 (Rao, 1996). The first authentic report on the sacred groves is the Census report of Travancore of 1891 in which Ward and Conner (1927) reported 15,000 sacred groves in Travancore. Historical records, legends and the folk songs, particularly certain devotional songs like 'Thottampattu' sung in praise of Lord Ayyappan throw light on sacred groves of ancient Kerala. 'Thottampattu' (believed to have been composed during 500-600 AD) names 108 major 'Ayyappan Kavus' and mention about numerous 'Ayyappan Kavus' distributed all over Kerala.

A preliminary study of the sacred groves of Kerala was done earlier by Ramachandran and Mohanan (1991), who listed 239 important sacred groves. Induchoodan and Balasubramanyan (1991) made a survey on endemic plants of sacred groves. A detailed eco-folklore study on sacred groves of North Kerala has been done by Unnikrishnan (1995), who listed 62 sacred groves in Kasaragod and 57 in Kannur district. Rajendraprasad (1995); Rajendraprasad *et al.*, (1996a & b) studied the floristic aspects of sacred groves of Kerala and reported that there are about 2000 reasonably well-preserved sacred groves in Kerala. Balasubramanyan and Induchoodan (1996) listed 761 important sacred groves in Kerala with floristic wealth of over 722 species belonging to 217 families and 474 genera, out of which 153 species are endemic to peninsular India. Induchoodan (1998) worked on the phytosociological and ecological aspects of sacred groves of Kerala. The biodiversity potential of sacred groves was found to be very good when compared to the well protected evergreen forests of South India. For example, 90 km² area of the Silent Valley encompasses 960 species of angiosperms compared to 722 species in 1.4 km² of the area of sacred groves. Sarojini Menon (1997) also worked on sacred groves of Kerala. Chandrashekara and Sankar (1998a & b) described ecological, structural and functional aspects of sacred groves of Kerala.

2.3.1 Distribution

A review of available literature shows that there are 577 sacred groves distributed in various districts of Kerala. Maximum numbers of sacred groves have been recorded in

Kasaragod,
Kannur and
Kozhikode in
the north and

Table 2. Distribution of Sacred Groves in Kerala

District	Number of Sacred Groves
Kasaragod	115
Kannur	73
Wayanad	5
Kozhikode	147
Malappuram	12
Palakkad	3
Thrissur	16
Eranakulam	11
Idukki	3
Kottayam	13
Alappuzha	49
Pathanamthitta	33
Kollam	49
Thiruvananthapuram	48
Total	577

Thiruvananthapuram Kollam and Alappuzha in the south (Table 2; Figures 2 & 3).

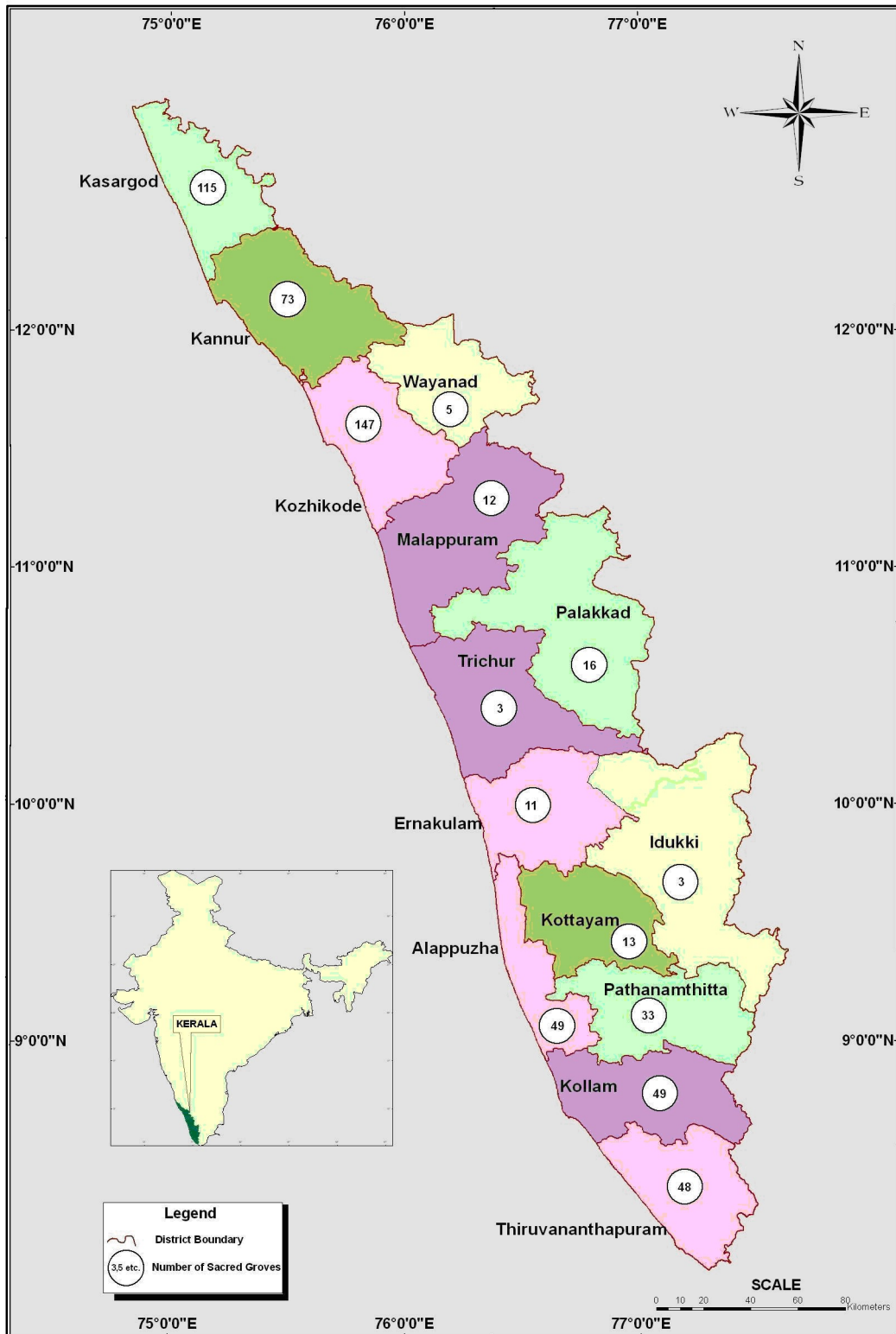


Figure 3. Map of Kerala showing the Distribution of Sacred Groves

The names, location, deity associated with the sacred grove and extent of 577 major sacred groves in various districts are presented in Table 3.

Table 3. District wise Details of Sacred Groves in Kerala

Sl. No	Name	Locality	Deity	Approx. area (ha)
1. Kasaragod				
1	Adukkunnathu Kavu	Kanhangad	Durga	0.080
2	Thachare Kavu	Madikky	Cheerma	0.808
3	Kanai Kavu, Kanai	Madikky	Kana Bhagavathy	1.212
4	Mekkattu Kavu	Madikky	Bhagavathy	0.0600
5	Manakkottu Kavu,	Manakkottu, Madikky	Manakkottachi	0.202
6	Pethalan Kavu	Kothattupara, Madikky	Pethalan	0.404
7	Vettakkorumakan Kavu	Erikkulam, Madikky	Vettakkorumakan	0.808
8	Vavillathu Kavu	Pulikkal, Madikky	Pottan theyyam	0.606
9	Alampadi Illam	Alampadi, Madikky	Kuttichathan	0.808
10	Kannippara Kavu	Kannippara, Madikky	Bhagavathy	0.0400

11	Kothottu Kavu	Kothottupara, Madikky	Sasthavu	0.202
12	Kulangattu Kavu	Kanhirappoyil, Madikky	Sasthavu	0.404
13	Anankur Dhoomavathi Kavu	Nullippadi	Bhagavathy	-
14	Kalichamaram Kavu	Aramanganam	Bhagavathy	-
15	Ayyappan Kavu	Kodakkadu	Sasthavu	0.100
16	Ayyamkunnu Kavu	Palathadam	Shivan, Parvathy	0.080
17	Ayyan Kavu	Parakalai	Sasthavu	0.800
18	Chakrapani Temple	Thankayam	Ayyappan, Ganapathy	0.1400
19	Ayatti Kavu	Ayattikkadavu, Thrikkarippur	Ayatti Bhagavathy	0.400
20	Edayilakkadu Kavu	Thrikkarippur	Bhagavathy, Nagam	
21	Cheerma Kavu	Koyonkara, Thrikkarippur	Cheerma	0.202
22	Morkadu Nambi Naga Kavu	Ilambachi, Thrikkarippur	Nagam	0.202
23	Poomala Kavu	Koyonkara, Thrikkarippur	Poomala (Bhagavathy)	0.202
24	Paravoor Veedu Tharavadu Devaswom Kavu	Udinoor	Bhagavathy	-
25	Pavoor Nagam Kavu 1	Udinoor	Nagam, Bhagavathy	0.200
26	Udinoor Kulom	Udinoor, Thrikkarippur	Kshethrapalan	0.404
27	Udinoor Paravoorveedu Tharavadu Devaswom Kavu	Udinoor	Bhagavathy	
28	Cheerma Kavu	Neeleswaram	Cheerma, Nagam	0.080
29	Mannampurathu Kavu (1)	Neeleswaram	Thayipparadevatha	2.830
30	Mannampurathu Kavu (2)	Neeleswaram	Nagam	0.202
31	Puthiyaparambu Kavu	Puthukky, Neeleswaram	Bhagavathy	0.0800
32	Kulangattambalam	Kadangod, Cheruvathur	Shivan	1.212
33	Cheerma Kavu	Kuttamath, Cheruvathur	Cheerma	0.404
34	Kumara Bhagavathy Kshethram	Kuttamath, Cheruvathur	Ayyappan	0.500
35	Cherippadi Kavu	Uduma	Cherippadi Chamundy	1.212
36	Gulikan Kavu	Aramaganam, Uduma	Gulikan	0.808
37	Kariyappil Kavu	Cheemeni	Sasthavu, Ganapathy	0.4000
38	Cholappan Kavu	Nedumba	Vishnumurthy	0.160

39	Dharmasasthamkavu	Cheemeni, Kayyur-Cheemeni	Sasthavu	3.830
40	Kariyappil Kavu	Cheemeni, Kayyur-Cheemeni	Thayipparadevatha	1.040
41	Padikkal Bhagavathy Kavu	Puliyannur, Kayyur-Cheemeni	Bhagavathy	0.800
42	Sree Kattumadam Kavu	Pullur	Bhagavathy	-
43	Poroni Kavu	Iriya, Pullur	Bhagavathy	-
44	Edappani Kavu	Madurakkadu, Pullur-Periya	Nagam	0.010
45	Sasthamkotta	Madurakkadu, Pullur-Periya	Sasthavu	0.010
46	Ayyappan Kavu	Eravil-Pullur	Sasthavu	0.200
47	Chonkulam Nagathil Kavu	Eravil-Pullur	Nagam	-
48	Kalichamaram Kavu	Eravil-Pullur	Bhagavathy	-
49	Pookkula Bhagavathy Kavu	Eravil-Pullur	Bhagavathy	-
50	Sasthamkavu	Eravil-Pullur	Sasthavu	0.200
51	Gulikan Kavu	Pallanchi, Delampadi	Gulikan	0.202
52	Idayilakkattu Kavu	Idayilakkadu, Valiyaparamba	Ayatti Bhagavathy, Nagam	6.460
53	Parakkavu	Karinthalam	Devi, Nagam	0.600
54	Kalariyal Kavu,Cheruvulliyadukkam Kavu	Kinanur, Karinthalam	Bhagavathy	0.808
55	Karattu Kavu	Thalayadukkam, Kinanur, Karinthalam	Sasthavu	0.404
56	Cheruvulliyadukkam Kavu,	Nelliyadukkam, Kinanur, Karinthalam	Vishnumurthy	0.808
57	Kammadathu Kavu	West Eleri	Thayipparadevatha	21.810
58	Mappittacheri Kavu	Peelikodu	Thayipparadevatha	0.4000
59	Karakka Kavu	Peelikodu	Thayipparadevatha	2.000
60	Pacheni Kavu	Puthur, Peelikode	Thayipparadevatha	0.800
61	Meethale Kavu	Puthur, Peelikodu	Thayipparadevatha	0.404
62	Katharambathu Kavu	Uduma	Nagam	0.010
63	Mundakkal Kavu	Belur	Bhagavathy	-
64	Bhagavathy Kavu	Kodom-Belur	Bhagavathy	-
65	Ayyan Kavu	Kodom-Belur	Sasthavu	0.800
66	Ayarottu Kavu	Kodom-Belur	Bhagavathy	2.020
67	Chittur Sastham Kavu	Parakkalai, Belur	Sasthavu	0.240
68	Chittur Kavu	Parakkalai, Kodom- Belur	Sasthavu	0.808

69	Kankalan Kavu	Panangad, Kodom-Belur	Kankalan	0.404
70	Kiliyalam Kavu	Kalichanadukkam, Kodom-Belur	Bhagavathy	0.404
71	Mulavannur Kavu	Parakkalayi, Kodom-Belur	Mulavannur Bhagavathy	0.0800
72	Kurumba Kavu	Ramanchira	Bhagavathy	0.200
73	Kuttichathan Kavu	Mundoth	Kuttichathan	0.0400
74	Madathinkal Kavu	Thankayam	Vairajathakan	0.0200
75	Mahadeva Kshethra Kavu	Peruthadi	Shivan	-
76	Mahavishnu Kshethra Sree Pandyala Bhagavathy Kshethra Kavu	Panathadi	Mahavishnu, Bhagavathy	-
77	Mahalingeswara Kavu	Adoor	Mahalingeswaran, Ganapathy	1.500
78	Sree Panchalingeswari	Mallappara, Adoor	Panchalingeswari, Bhagavathy	0.400
79	Melothum Kavu	Vavadukkam, Bedadukka	Devi	0.404
80	Muchilottu Kavu	Perena, Surambayal	Vishnu, Bhagavathy	0.100
81	Shadrumpadi Kavu	Edanadu, Surambayal	Bhagavathy, Vishnu	0.100
82	Mungathu Kavu	Pattena	Bhagavathy	0.100
83	Pattayam Kavu	Pattena	Bhagavathy	0.600
84	Muthapanar Kavu	Kanhangad South	Sasthavu	0.202
85	Poomala Kavu	Cheruvathur	Poomala (Bhagavathy)	0.808
86	Poomala Kavu	Olavara, Thrikkarippur	Poomala (Bhagavathy)	0.800
87	Vadakke Veedu Poomala Kavu	Olavara, Thrikkarippur	Poomala (Bhagavathy), Kshe thrapalan	0.404
88	Mundyia Kavu	Olavara, Thrikkarippur	Poomala (Bhagavathy)	0.800
89	Sree Kurumba Bhagavathy Kavu	Cheruvathur	Bhagavathy	
90	Nellikkal Bhagavathy Kavu	Kadangod, Cheruvathur	Aayatti Bhagavathy	0.404
91	Pavoor Nagam Kavu 2	Padanna, Cheruvathur	Nagam, Bhagavathy	-
92	Melarippu Kavu	Klayikkode, Cheruvathur	Bhagavathy	0.2400

93	Nakravanam	Muzhakkoth, Cheruvathur	Sasthavu, Durga	1.212
94	Oorikkal Kavu	Koadakkadu	Bhagavathy	0.0800
95	Sree Chiram Bhagavathy Kshethra Kavu	Panathadi, Rajapuram	Bhagavathy	-
96	Panayakkadu	Kodakkadu	Bhagavathy	0.200
97	Periyamkottu Kavu	Mundottu	Bhagavathy	0.200
98	Pothavur Kavu 1	Mampalli	Vishnumurthy	0.120
99	Pothavur Kavu 2	Pothavur	Devi	0.140
100	Vazhavalappil Kavu	Pothavur, Kayyur	Bhagavathy	-
101	Sadasiva Kshethram Naga Kavu	Puthukky, Kanhangad	Nagam	0.010
102	Sree Dharmasastha Kavu	Koyithatta	Sasthavu	0.440
103	Sasthamkavu	Koyithatta, Kinanur-Karinthalam	Sasthavu	0.404
104	Varanhur Kavu	Kinanur-Karinthalam	Nagam	0.606
105	Payyamkulam Kavu	Kinanur-Karinthalam	Poomala (Bhagavathy)	0.606
106	Sree Bhagavathy Kavu	Balal	Bhagavathy	2.020
107	Sree Dharmasastha Kavu	Periyanganam	Sasthavu	0.100
108	Sree Chakrapani Kshethram	Thankayam	Ayyappan, Ganapathy	0.140
109	Uthamandir Kavu	Thankayam	Bhagavathy, Nagam	0.0200
110	Thalappadi Kavu	Thalappadi Chekpost, Mancheswaram	Bhagavathy	0.202
111	Thottamunda Kavu	Edattummal	Vishnu, Bhagavathy	0.0400
112	Urikkal Kavu	Kodakkadu	Bhagavathy	-
113	Vellikunnathu Kavu	Vellikoth, Ajanur	Bhagavathy	0.010
114	Vishnumoorthi Kavu	Kariyappu	Bhagavathy	0.600
115	Bhagavathy Kavu	Aaramam	Bhagavathy	0.4000
2. Kannur				
116	Armeniyude Makhana	Kannur	Muslim Aradhanalayam	0.404
117	Adakkaparak Kavu	Kuttur, Eramam Kuttur	Bhagavathy	0.404
118	Aerambala Nagam	Kalyassery	Nagarajan	0.1000
119	Andaloor Kavu	Andaloor, Dharmadam	Daivathar	0.606
120	Aravanchal Kavu	Aravanchal, Peringom Vayakkara	Thayipparadevatha	2.830
121	Bhoodathar Kavu	Aravanchal,	Bhoothathar	0.404

		Peringom Vayakkara		
122	Varayil KavU, Kodolipram	Koodali	Bhagavathy	1.616
123	Chirayil KavU	Pattanoor, Koodali	Bhagavathy	0.404
124	Chukannamma Kottam	Parassinikkadavu	Bhagavathy	0.0200
125	Kunhimangalam Tharavattu Nagam	Kunhimangalam	Nagam	0.020
126	Kannanatt Nagam	Edattu, Kunhimangalam	Nagam	0.1200
127	Edattu KavU	Edattu, Kunhimangalam	Bhagavathy, Nagam	0.030
128	Edattu Nagam	Edattu, Kunhimangalam	Nagam	0.050
129	Pongarattu KavU	Moosarikkovil, Kunhimangalam	Thayipparadevatha	0.404
130	Eriveri Puli Devaswam	Chembilode	Puli Daivangal	2.020
131	Kalarivathukkal	Valapattanam	Thayipparadevatha	3.640
132	Chenthukulangara Illam Naga KavU	Ramanthali	Nagam	0.010
133	Kaniyar KavU, Ezhimala	Ramanthali	Bhagavathy	0.808
134	Chandramana Nagam	Ramanthali	Nagam	0.0200
135	Parokkavu	Kunnaru, Ramanthali	Bhagavathy	0.404
136	Pramancheri KavU	Kunnaru, Ramanthali	Nagam	0.404
137	Kankol Siva Kshethram Naga KavU	Alappadambu	Nagam	0.404
138	Kariman KavU	Kakkara, Eramam-Kuttur	Bhagavathy	0.404
139	Karippala Nagam	Kadannappalli Panappuzha	Nagam	0.1600
140	Kayyathu Nagam	Pattuvam	Nagam	12.120
141	Parappool KavU	Pattuvam	Thayipparadevatha	4.040
142	Kizhakkan KavU	Kadoor, Kuttyattoor	Bhagavathy	0.404
143	Madayi KavU	Eripuram, Madayi	Thayipparadevatha	6.06
144	Kizhekkeyara KavU	Vengara, Madayi	Bhagavathy	0.050
145	Chamakkavu, Velloor	Payyannur	Thayipparadevatha	3.640
146	Thalayanneri KavU	Payyannur	Poomala (Bhagavathy)	0.030
147	Karayil Nagam	Kandoth, Payyannur	Nagam	0.030
148	Kokkanitharavattu Nagam	Kandoth, Payyannur	Nagam	0.020
149	Kunduvalappil Tharavattu Nagam	Kandoth, Payyannur	Nagam	0.030
150	Kolichar Veeran Kottam	Kanayi, Payyannur	Veeran	1.010
151	Krishnan Mathilakam	Muthiyalam, Payyannur	Sree Krishnan	0.202

152	Mankulam Nagam	Korom, Payyannur	Nagam	0.030
153	Konginichal Kavuvu	Thulluvadakkam, Alappadambu	Narambil Bhagavathy	3.230
154	Krishnan Mathilakam	Karinkuzhi, Alappadambu	Sree Krishnan	0.010
155	Kotterikavu	Kottiyoor	Shivan, Parvathy	1.6000
156	Kunchirakkal	Chapparapadavu	-	0.3200
157	Kunnummolom	Cherukunnu	Shivan	2.424
158	Kuppol Kavuvu	Ponnampara, Peringom Vayakkara	Bhagavathy	1.212
159	Kuruva Kavuvu	Kannapuram	Vettakkorumakan	0.404
160	Madathi Kavuvu	Chemballikkundu, Cheruthazham	Bhagavathy	1.212
161	Vareekkara Kavuvu, Kozhummal	Karivellur-Peralam	Thayipparadevatha	1.212
162	Oritharavattu Nagam	Karivellur-Peralam	Nagam	0.020
163	Parambathu Kavuvu, Valiyarakkal Kavuvu	Karivellur-Peralam	Nagam	0.404
164	Kuniyan Kavuvu	Karivellur	Nagam	0.0800
165	Mookambika Kavuvu	Paliyeri, Karivellur-Peralam	Mookambika	2.420
166	Puzhakkara Mundy Naga Kavuvu	Kuniyan, Karivellur-Peralam	Nagam	0.606
167	Ooriyara Kavuvu	Karivellur	Bhagavathy	
168	Mookkunnu Nagam	Pariyaram	Nagarajan	0.0800
169	Moovaripalathara Kavuvu	Palathara	Shivan, Nagam	1.000
170	Muthukkattu Kavuvu	Eramam, Eramam-Kuttur	Sasthavu	0.808
171	Nagathadam Sarparaja Kavuvu	Chelora	Nagam	0.808
172	Vettakkorumakan Kavuvu	Chelora	Vettakkorumakan	0.001
173	Neelamuttam	Irikkur	Muslim Aradhanalayam	0.808
174	Neelanchal Kavuvu	Madathil, Kankol	Thayipparadevatha	2.020
175	Neeliar Kottam	Morazha, Anthoor	Neeliamma	4.040
176	Olavara Mundy Naga Kavuvu	Olavannoor	Vishnumurthy	1.600
177	Sastham Kavuvu	Poongottu, Mattannur	Sasthavu	14.140
178	Thavidisseri Kavuvu	Thavidisseri, Peringom Vayakkara	Thayipparadevatha	20.200
179	Thazhekkavu	Thekkumbadam, Mattul	Bhagavathy	7.272
180	Theyyottu Kavuvu	Alappadambu	Muthalal Daivam	24.240
181	Ukkente Nagam	Cheruthazham	Nagam	0.020

182	Varanakottillam	Cheruthazham	Kuttichathan	0.050
183	Panamkavu	Chirakkal	Bhagavathy	0.0800
184	Kundanchal Kavuvu	Chirakkal	Nagam	0.0800
185	Vellarianam Kavuvu	Kadannappalli, Panappuzha	Devi	0.808
186	Ayilyar Kavuvu	Kottiyoor	Shivan	1.600
187	Komathil Kavuvu	Kannadiparambu	Vishnu	0.0200
188	Kottoli Kavuvu	Kannadiparambu	Sastha	0.1000
3. Wayanad				
189	Pakshy Pathalam	Thirunelly	Vishnu, Shivan	100.00
190	Kambakkodi Kavuvu	Muthanga	Sasthavu	0.400
191	Ponkuzhi Kshethram	Muthanga	Sree Raman, Seetha Devi	0.200
192	Sree Valliyoor Kavuvu	Mananthavady	Bhagavathy, Sasthavu	8.000
193	Thrissilery Kavuvu	Thrissilery	Shivan	0.652
4. Kozhikode				
194	Aayikkiara Naga Kavuvu	Vadakara	Nagam	0.020
195	Irattakkulangara Naga Kotta	Vadakara	Nagam	0.020
196	Kalariyambalam Vaka Naga Kotta	Vadakara	Nagam	0.020
197	Memunda Madam Kshethram	Vadakara	Shivan	0.080
198	Palayattu Koman Vaka Naga Kotta	Vadakara	Nagam	0.020
199	Thorothe Naga Bhagavathi Kshethram	Vadakara, Thalassery	Nagam, Bhagavathy	0.020
200	Naniyath Kotta	Palayad	-	0.020
201	Koonamvelli Kavuvu	Meppayur	Kariyathan	0.800
202	Thevar Kovil	Kuttiyadi	Thevar	0.060
203	Elappila Illam Bhagavathy Kshethram	Perambra	Bhagavathy, Nagam	0.100
204	Mammili Kavuvu	Perambra	-	2.500
205	Kalloor Kavuvu	Perambra	Pamboothikkorum akan (Shivan)	0.008
206	Kizhakkedath Kshethram	Perambra	Bhagavathy, Kuttichathan	0.120
207	Sreekanda Manassala Kshethram	Perambra	Naga, Bhagavathy	0.120
208	Thacharath Kandi Kavuvu	Perambra	Seethala Devi	0.060
209	Vilangottillath Naga Kavuvu	Perambra	Nagam	0.200

210	Marakkattu Kannankode Naga Kotta	Perambra	Nagam	0.080
211	Puthiyedath Kavu	Perambra	-	0.008
212	Mundappuram Sarpa Kavu	Meppayur, Perambra	Nagam	0.040
213	Kallur Kavu	Changaroath, Perambra	Nagam	0.020
214	Poyilil Kavu	Chemancheri	Durga	4.400
215	Mepparambil Naga Kotta	Chemancheri	Nagam	0.020
216	Madathillam Naga Kotta	Chemancheri	Nagam	0.080
217	Arekkara Kotta	Chemancheri	Nagam	0.060
218	Pottol Naga Kotta	Chemancheri	-	0.020
219	Poyil Kavu	Chemancheri	Durga	4.400
220	Puthiyottil Naga Kotta	Chemancheri	Nagam	0.100
221	Vellariambala Kotta	Chemancheri	-	0.200
222	Kunnimadam Illam Naga Kotta	Kolakkadu, Chemancheri	Nagam	0.020
223	Ayyadathillam Naga Kotta	Kolakkadu, Chemancheri	Nagam	0.200
224	Nechuli Illam Naga Kotta	Kolakkadu, Chemancheri	Nagam	0.030
225	Puthussery Illam Naga Kotta	Kolakkadu, Chemancheri	Nagam	0.020
226	Mappullakandi Devi Badrakali Kshethram	Thuvakotu, Chemancheri	Bhadrakali	0.060
227	Manalil Thrikkovil Naga Kotta	Chemancheri Chelia	Nagam	0.020
228	Varikkattu Kavu	Ulliyeri	-	0.020
229	Chayidathillam Naga Kotta	Atholi	Nagam	0.120
230	Cherupullery Naga Kotta	Atholi	Nagam	0.200
231	Kariyathan Kotta	Kolathur, Atholi	Kariyathan	0.120
232	Kalari Parambu	Sivapuram	Kalari Bhagavathy	0.040
233	Malur Para	Sivapuram	Nagam	
234	Maniyottu Nagathan Kotta	Sivapuram	Nagam	0.060
235	Perilla Bhagavathy Kotta	Sivapuram	Bhagavathy	0.080
236	Kavil Kotta	Sivapuram	Nagam	0.800
237	Puthiyottil Kotta	Sivapuram, Koyilandy	-	0.120
238	Elampilassery Nagathan Kotta	Sivapuram, Koyilandy	Nagam	0.020
239	Narikkini Illam Naga Kavu	Koyilandy	Nagam	0.200
240	Pishari Kavu	Koyilandy	Pisharikkavil	1.250

			Amma	
241	Nellikottu Nagathan Kotta	Koyilandy	Nagam	0.040
242	Areppurath Naga Kotta	Balussery	Nagam	0.120
243	Karimala	Balussery	Shivan, Bhagavathy	4.000
244	Eramangalam Kotta	Puthur Kavu, Balussery	Nagam	0.100
245	Odakkali	Eakarur, Balussery	Bhagavathy	0.200
246	Nagathingal Naga Kotta	Nanminda, Balussery	Nagam	0.020
247	Karayadu Kotta	Nanminda	Nagam	0.020
248	Panniyavalli Naga Kotta	Nanminda	Nagam	0.020
249	Thekkedath Nagathan Kotta	Nanminda	Nagam	0.120
250	Gurukkal Kavu	Thikkodi	Nagam	0.200
251	Karadu Kavu	Pattampurath, Thikkodi	Nagam	0.080
252	Chathanathillam Naga Kotta	Kakkodi Mukku	Nagam	0.020
253	Vallikkattu Kavu	Thalakkulathur	Shivan	6.500
254	Paramannil Sree Nagakali Kshethram	Chelannur	Nagam	1.250
255	Orupottum Kavu	Kappad	Jala Durga	0.008
256	5 Nagakkottakal	Thiruvallur	Nagam	0.020
257	Chamundikkandiyil	Chorode	Bhagavathy	0.040
258	Kalathillam Naga Kotta	Thamarassery	Nagam	0.080
259	Chathanathillam Naga Kotta	Thamarassery	Nagam	0.020
260	Neeroth Kotta	Karadi, Thamarassery	-	0.080
261	Pallippuram Illam Naga Kotta	Thachampoyil, Thamarassery	Nagam	0.080
262	Thechott Palliar Kotta	Narikkuni	Bhadrakali, Devi	1.000
263	Ayyappan Kavu	Mukkom	Sasthavu	0.040
264	Muthedathillam Naga Kotta	Mukkom	Nagam	0.020
265	Trikkudamanna Siva Kshetram	Mukkom	Shivan	0.120
266	Karingali Kavu	Manassery, Mukkom	Karingali	0.020
267	Kottol Kavu	Chathamangalam	Nagam	0.120
268	Sree Thalassiva Kshetram	Arayankod, Chathamangalam	Kiratha Murthy (Shivan), Bhagavathy, Nagam	1.000
269	Payingottupuram Kotta	Chathamangalam	-	0.060
270	Peradi Nagathan Kotta	Chethukadavu, Kunnamangalam	Nagam	0.020

271	Kakkottiriyidam Kavuvu	Pilasseri	Karuvan, Kariyathan	0.040
272	Chimmanath Kavuvu	Padanilam	Nagam	1.000
273	Chembakkottu Kavuvu	Medical College	Kariyathan	1.200
274	Chenthankandi Naga Kotta	Kunnamangalam	Nagam	0.040
275	Eadayankara Naga Kotta	Kunnamangalam	Nagam	0.020
276	Pilathottathil Naga Kotta	Kunnamangalam	Nagam	0.020
277	Manathanath Kavuvu	Kunnamangalam	Bhagavathy, Nagam	0.040
278	Kollarikandi Kavuvu	Mayanad	Nagam	0.020
279	Parambath Kavuvu	Mayanad	-	0.020
280	Thazhepurakkal Kavuvu	Mayanad	-	1.000
281	Sree Thala Siva Kshethram	Arayankod, Mavoor	Shivan	1.000
282	Chirakkal Bhagavathy Kshethram	Perumanna	Bhagavathy	0.300
283	Edakkod Kotta	Perumanna	Nagam	0.020
284	Karuppayil Kavuvu	Perumanna	Nagam	0.060
285	Kannancheri Puthoor Kariyathan Kavuvu	Perumanna	Kariyathan	0.320
286	Palathumkuzhi Kotta	Perumanna	-	0.040
287	Kariyathan Kavuvu	Pantheerankavu	Kariyathan	0.060
288	Nedumburath Nagathan Kotta	Pantheerankavu	Nagam	0.040
289	Thondasseru Kavuvu	Pantheerankavu	-	1.200
290	Kalari Bhagavathy Kshethram	Peruvayal	Bhagavathy	0.002
291	Kolad Naga Kotta	Peruvayal	Nagam	0.020
292	Kolattukavu Kshethram	Peruvayal	Nagam	0.400
293	Varapurath Naga Kotta	Peruvayal	Nagam	0.020
294	Thekkedath Nagathan Kotta	Peruvayal	Nagam	0.020
295	Kalariyil Kotta	Kuttikkattur	Nagam	0.020
296	Neroth Kotta	Kuttikkattur	-	0.020
297	Payampurath Kotta	Kuttikkattur	-	0.020
298	Pullangode Naga Kotta	Kuttikkattur	Nagam	0.040
299	Kalariyil Kotta	Velliparamba	Nagam, Bhagavathy	0.002
300	Manathanath Kotta	Velliparamba	Nagam	0.020
301	Puliyath Kavil Kotta	Velliparamba	Nagam	0.020
302	Ittappurath Nagathan Kotta	Medical College	Nagam	0.040

303	Palathode Kavu	Medical College	-	0.040
304	Payyadi Karuman Kavu	Medical College	-	0.240
305	Peralal Kavu	Medical College	-	0.800
306	Perumballi Kavu	Medical College	-	0.500
307	Palakunnath Kotta	Near Devagiri College	Nagam	0.060
308	Padinharuveetil Kotta	Kovoor	Nagam	0.060
309	Tharol Kotta	Kovoor	-	0.040
310	Nagathan Kotta (Daivathil Kavu)	Thondayad	Nagam	0.020
311	Edavalath Kavu	Kottuli	Nagam	0.080
312	Asarikkani Kavu	Kottuli	Nagam	0.020
313	Madattu Kavu	Kottuli	Nagam	0.020
314	Meledath Kotta	Kottuli	Nagam	0.020
315	Parambalath Kavu	Kottuli	-	0.080
316	Bhayankavu	Kozhikode	Durga	3.200
317	Kalarikkal Kotta	Kozhikode City	Nagam	0.050
318	Kuttyattu Kavu	Kozhikode Corporation	Nagam	0.200
319	Nellikavu	Kozhikode Corporation	-	0.200
320	Jathiyur Madam	Kayakkodi	Bhagavathy	0.008
321	Jathiyur Shiva Kshethram	Kayakkodi	Shivan	0.008
322	Kongodu Kunnu Bhagavathy Kshethram	Kannankode	Bhagavathy	0.200
323	Karuvan Kavu		-	0.060
324	Kottol Kavu	Chettikkadavu	Nagam	0.020
325	Kozhissery Kavu	Kodal Nadakkavu		0.080
326	Pulppalli Bhagavathy Kshethram	Kodal Nadakkavu	Bhagavathy	0.440
327	Valiaveetil Poyilil Kavu	Kodal Nadakkavu	-	0.120
328	Kunhikulangara Madam		-	0.001
329	Mecheri Kotta		Nagam	0.040
330	Mukkorakkal Kavu		-	-
331	Thurayil Kotta	Chelavoor	Durga, Vettakkorumakan	4.000
332	Pareri Kavu	Paroppadi	-	0.050
333	Pullankodu Karinkali Kavu		-	0.080
334	Ramakshethram Vaka Naga Kotta	Aayancheri	Nagam	0.020
335	Sreekanda Vallikotta		Nagam	0.080

336	Theruvath Kadavu Kavu		-	0.120
337	Thevarvallan	Memunda	Shivan	0.001
338	Valur Kovilakam Kshetram Naga Kavu	Nochad	Nagam	0.020
339	Vettakkorumakan Kavu		Vettakkorumakan	0.040
340	Vattoli Siva Kshethram	Kuttyadi	Sivan	0.060
5. Malappuram				
341	Ayyappan Kavu	Chamravattom	Ayyappan, Ganapathy, Vishnu	0.1200
342	Bhayankavu	Chamravattom	Bhagavathy, Hanuman, Ayyappan	0.600
343	Chandanakkavu	Kurumbathoor	Bhagavathy, Vishnu, Ganapathy	2.400
344	Chundayil Kavu	Mankada	Nagam	0.024
345	Verkadu Kuzhikadu	Mankada	Nagam	-
346	Kadampuzha Temple	Kadampuzha	Bhagavathy, Ayyappan	0.600
347	Karimpiyan Kavu	Thavanur	Shivan, Bhagavathy	0.428
348	Mukkola Kavu	Changaramkulam	Vana Durga	4.000
349	Odayamkandi Parambu	Thanoor	Nagam	0.080
350	Puthanveetil Kavu	Thanoor	Nagam, Brahma Rakshus	0.040
351	Sobhapparambu Temple	Thanoor	Devi	0.040
352	Kallingal Kavu	Thanoor	Nil (Muslim)	0.020
6. Palakkad				
353	Ayyarmalai	Parali	Ayyappan	1.000
354	Kalladathoor Kavu	Kappoor	Bhagavathy	0.160
355	Kavasseri Kavu	Alathur	Bhagavathy	4.000
7. Thrissur				
356	Ayalathu Yakshi	S.N. Puram	Nagam	0.0200
357	Kumaramangalathu Kavu	S.N. Puram	Nagam	0.6000
358	Sankulangara Kavu	S.N. Puram	Sasthavu, Durga, Nagam	1.2100
359	Chathan Kavu	Meppanangadu	Bhagavathy, Chathan Veerabhadran	0.0200
360	Daivathin Kavu	Kaippamangalam	Nagam	0.0920
361	Kalapparambathu Kavu	Kaippamangalam	Nagam	0.0200

362	Kalappurakkal Kavu	Thrithalloor	Nagam	0.1000
363	Kottaichalippattu Kavu	Thrithalloor	Annapoorneswari, Veerabhadran	0.0320
364	Kozhipparambil	Thrithalloor	Bhagavathy, Vishnu Maya	0.0800
365	Padinjare Mana	Thanniyam	Vishnu, Nagam	0.8000
366	Palliyankkadu Temple	Naduvilkkara	Nagam	0.2000
367	Puthillathu Kavu	Naduvilkkara	Sasthavu, Nagam	0.2000
368	Pampumekattu Mana	Mala	Nagam	0.0400
369	Adiparambu Kavu	Valappad	Naga Yakshi, Sarpam	-
370	Nhayappilly Illam Kavu	Nattika	Nagam	0.0200
371	Valapparambu Kavu	Arimpoor	Nagam	0.0200
8. Eranakulam				
372	Amaeda Kavu	Udayamperoor	Nagam	0.0400
373	Chettaei Kavu	Maradu	Nagam	0.040
374	Kavumparambil Kavu	Maradu	Nagam	0.033
375	Eroor Kavu	Thripunithura	Nagam	0.0200
376	Iringole Kavu	Perumbavoor	Bhagavathy	10.0000
377	Kizhakompu Kavu	Koothattukulam	Devi	1.5000
378	Mannam Kavu	North Paravur	Nagam	0.0400
379	Njayallore Kavu	Eranakulam	Nagam	0.020
380	Prasanthanagar Kavu	Eranakulam	Nagam	0.183
381	Vadakkacheppel Kavu	Puthiyakavu	Nagarajan, Naga Yakshi	0.6000
382	Vyloppilli Kavu	Kaloor	Nagam, Devi	0.0200
9. Idukki				
383	Adappurathu Kavu	Arakkulam	Bhagavathy, Shivan	0.0400
384	Kolani Kavu	Thodupuzha	Vana Durga, Nagam	4.0000
385	Meenuliyan Para	Anakkuzhy	Bhagavathy	2.5000
10. Kottayam				
386	Kattikunnu Kavu	Chempu	Nagam	0.0400
387	Kolathaimadom Kavu	Madappally	Nagarajan	0.0400
388	Kondoor Kavu	Madappally	Devi, Sasthavu, Murthy	0.0600
389	Peralyillam Kavu	Madappally	Nagarajan, Naga Yakshi	0.0200
390	Thengannal Kavu	Madappally	Sasthavu, Nagam	0.016
391	Kottakkunnu Kavu	Aymanam	Nagam	0.162

392	Kurunjikkavu	Ramapuram	Sasthavu, Devi	0.1200
393	Mahadevar Temple	Thengana	Shivan, Nagarajan, Ganapathy	0.0200
394	Manappuram Kavuvu	Ayimanam	Nagam	0.101
395	Nagampozhillum	Vaikom	Nagam	1.7200
396	Neerozhukkil Kavuvu	Vaikom	Nagam	0.0400
397	Nechipozhur	Palai	Bhagavathy	0.0800
398	Panachikkadu	Chingavanam	Saraswathy	0.0400
11. Alappuzha				
399	Ayikkattu Kavuvu	Chennithala	Nagam	0.0400
400	Elenjelil Kavuvu	Chennithala	Nagam	0.0800
401	Cherukara Kavuvu	Perungala	Nagam	0.4000
402	Nadalakkal Kavuvu	Perungala	-	0.4000
403	Kochupokkattu Kavuvu	Perungala	-	0.1800
404	Thayyil Kavuvu	Perungala	Nagam	0.1400
405	Kakkanattu Kavuvu	Perungala	Durga, Bhagavathy, Nagam	0.2400
406	Edayodi Kavuvu	Perungala East	Durga, Bhagavathy, Nagam	0.2000
407	Kalathoor Kavuvu	Thekkekara	Nagam	0.6000
408	Malimeyil Kavuvu	Thekkekara	Bhadrakali, Nagam	0.4000
409	Mullikulangara Kavuvu	Thekkekara	Devi, Nagam	0.2400
410	Karavalli Kavuvu	Karavally	Devi, Nagam	0.0600
411	Karimuttathu Temple	Mankuzhi South	Devi, Nagam	0.3200
412	Keecheril Kavuvu	Pandanadu	Nagam	0.0320
413	Koduvanal Kavuvu	Budhanoor	Nagam	0.0400
414	Kolassery Kavuvu	Kannamangalam North	Bhadrakali, Nagam	0.2600
415	Kopparathu Kavuvu	Pullukulangara	Nagam	0.0800
416	Puthussery Kavuvu	Pullukulangara	Nagam	0.0320
417	Pullukulangara Kavuvu	Pullukulangara	Nagam	0.0400
418	Koravazhiyathu Kavuvu	Eruva East	Nagam	0.1000
419	Kulathinaethu Kavuvu	Bhagavathippadi	Nagam	0.0720
420	Kundanthara Kavuvu	Veruvallybhagam	Nagam	0.4000
421	Kuzhuvelil Kavuvu	Deshathinakam	Nagam	0.2400
422	Madassery Illathu Kavuvu	Pela	Devi, Nagam	0.0600
423	Nilakkal Kavuvu	Pela	Bhadra, Nagam	0.2000
424	Mannarasala Nagaraja	Harippad	Nagam	4.0000

425	Mannathu Kavuvu	Chettikulangara	Nagam	0.0200
426	Thattakkattu Kavuvu	Chettikulangara	Nagam	0.0240
427	Varampathanathu	Chettikulangara	Nagam	0.0810
428	Vattapparambu Kavuvu	Kandalloor	Bhadrakali	0.1200
429	Mezhuvana Kavuvu	Kandalloor North	Nagarajan	0.1040
430	Nagaraja Kavuvu	Vettikkode	Nagam	0.6000
431	Pallippurathu Kavuvu	Vettikkode	Nagam	1.2000
432	Nangiar Kulangara	Kanjoor	Durga, Nagam	0.6000
433	Nediyankkal Kavuvu	Thamarakkulam	Bhadrakali, Nagam	0.0520
434	Varanappallil Kavuvu	Muthukulam	Nagam	0.0240
435	Njavarakkal Kavuvu	Muthukulam South	Nagam	0.0400
436	Pallyara Kavuvu	Koyikkapadikkal	-	0.2400
437	Panikkasseryil Temple	Kattachira	Devi, Nagam	0.0280
438	Paro Kavuvu	Kandalloor North	Nagam	0.0300
439	Pavureth Kavuvu	Mankuzhi South	Nagam	0.3600
440	Sarnga Kavuvu	Venmony	Bhoomidevi, Nagam	1.4000
441	Thondathara Kavuvu	Venmony	Nagam	0.1200
442	Punthala Devi	Punthala, Venmony	Nagam	0.0600
443	Sastha Kavuvu	Cherukol	Sasthavu, Nagam	0.0200
444	Thanniyil Kavuvu	Kaitha North	Bhadrakali, Nagam	0.1000
445	Vallattoor Kavuvu	Puthiyavila	Nagam	0.2840
446	Vallikkavu	Elengimel	Bhadrakali, Nagam	4.0000
447	Vandanathu Kavuvu	Vandanam	Nagam	0.2000
12. Pathanamthitta				
448	Chamakkavu	Kulanada	-	0.2000
449	Cherupuzhakkattu Kavuvu	Edayaranmula	Durga, Devi, Nagam	0.2400
450	Choorakunnil Kavuvu	Kodumon	Nagam	0.1000
451	Vadakkedathu Kavuvu	Kodumon	Nagam	0.0400
452	Kodiyattu Kavuvu	Kodumon	Nagam	0.1000
453	Meloottu Kavuvu	Kodumon	Nagam	0.0400
454	Eanathu Kavuvu	Eanathu	Nagam	0.0360
455	Endalliyappan Kavuvu	Parakkode	Nagam	0.0600
456	Ezhamkulam Devi Temple	Ezhamkulam	Bhagavathy, Nagam	0.0600
457	Kadakkal Kavuvu	Aranmula	Nagam	0.0240
458	Poikayil Kavuvu	Aranmula	Nagam	0.0240

459	Kadakkattu Temple	Pandalam	Bhagavathy	0.0400
460	Kaleekkal Kavu	Pandalam	Nagam	0.0720
461	Kaliyathu Kavu	Pandalam	Nagam	0.0640
462	Kannimel Kavu	Angadikkal South	Murthy, Nagam	0.0720
463	Manakkattu Devi Temple	Angadikkal South	Bhagavathy	0.4800
464	Valiyaveetil Kavu	Parumala	Nagarajan, Yakshi	0.0320
465	Kavumpattu Kavu	Edathitta	Nagam	0.3000
466	Keezhaedathu Kavu	Aikkadu	Nagam	0.0600
467	Komattu Kavu	Thonnalloor	Nagam	0.0320
468	Konnathu Moolayil Kavu	Adoor	Nagam	0.0400
469	Mandarathu Kavu	Pallikkal	Nagam, Madan, Yakshi	0.0800
470	Parathoor Kavu	Pallikkal	Bhadrakali, Nagarajan, Yakshi	0.2000
471	Mayayekshi Kavu	Elampallikkal	Bhagavathy, Ganapathy, Nagam	0.6000
472	Moorthy Kavu	Mannar	Bhagavathy	0.0200
473	Nambara Kavu	Mannar	Nagarajan	0.0280
474	Panayannar Kavu	Mannar	Bhadrakali, Shivan	2.0000
475	Koyikkal Kottaram	Mannar	Nagam	0.0280
476	Paekkavu	Maniyar	Devi	10.0000
477	Poonkavanam	Sabarimala	Sasthavu	0.0100
478	Puliyara Kavu	Manthuka	Nagam	0.0320
479	Sastham Kovil	Manthuka	Sasthavu, Shivan, Parvathy, Nagam	0.0800
480	Vadakkedathu Kavu	Erathu	Nagam	0.0800
13. Kollam				
481	Amman Kavu	Achankovil	Ayyappan, Nagam	0.2000
482	Anchumoorthy Temple	Veliyam	Shivan, Nagam	0.0800
483	Aruvannoor Kavu	Memana	Sarpam, Bhagavathy	0.2000
484	Kunjinadi Kavu	Memana	Nagam	0.2000
485	Valloppally Kavu	Memana	Nagarajan	0.0200
486	Ayyappa Temple	Kulathupuzha	Ayyappan	0.3000
487	Eramathu Kavu	Prayar South	Nagam	0.3560
488	Azhakiya Kavu	Sooranadu North	Bhadrakali, Nagam	0.0400
489	Karichappallil Kavu	Sooranadu North	Nagam	0.0320
490	Panampilavil Kavu	Sooranadu South	Nagam	0.2000
491	Kochalathu Kavu	Perinadu	Durga, Shivan, Lakshmi	0.0640

492	Kulakkada Kavuvu	Earathu Kulakkada	Nagam	0.0200
493	Mahadevar Temple	Pavithreswaram	Mahadevar, Nagam	0.0400
494	Marangattu Kavuvu	Pavithreswaram	Nagam	0.0400
495	Choolur Kavuvu	Kalleli Bhagam	Nagam	0.1200
496	Thennala Kavuvu	Kalleli Bhagam	Nagam	0.4000
497	Mahadevar Temple	Kottarakkara	Mahadevar	0.0800
498	Manakkara Kavuvu	Vendar	Endalayappan, Nagam	0.0200
499	Mandarathu Kavuvu	Pallikkal	Nagam	0.0810
500	Maya Yakshi Kavuvu	Pallikkal	Bhagavathy, Nagam	0.3040
501	Maniyal Kavuvu	Koduvila	Bhagavathy, Nagam	0.0400
502	Matheri Nada Kavuvu	Koduvila	Nagam	0.0400
503	Murthy Kavuvu	Kundara	Murthy, Madan, Yakshi	0.1000
504	Mulangadakam Temple	Mulangadakam	Nagam, Madan	0.1400
505	Mylamkulam Kavuvu	Kulakkad	Nagam	0.0800
506	Vendar Kavuvu	Kulakkad	Bhagavathy, Nagarajan, Yakshi	0.1200
507	Padinjarae Kavuvu	Pangode	Sree Krishnan	0.0800
508	Padinjarodukkathu	Thazhava	Nagam	1.000
509	Vaindamangalathu Kavuvu	Thazhava South	Devi, Nagam	0.0800
510	Paloni Kavuvu	-	Nagam, Vishnu	0.0330
511	Palloor Kavuvu	Klappana	Durga Devi, Nagarajan	0.3200
512	Pokkattu Kavuvu	Klappana	Nagam	0.2020
513	Parissery Kavuvu	Klappana North	Bhadrakali, Nagam	0.0800
514	Panikkasseril Kavuvu	Klappana North	Shivan, Parvathy, Murthy, Nagam	0.0600
515	Pappadyil Kavuvu	Klappana North	Nagam	0.0200
516	Parabrahma Temple	Ochira	Nagam	0.3000
517	Pariyarathu Kavuvu	Payikkuzhi	Nagam	0.1200
518	Payyampallil kavuvu	Puthoor	Nagam	0.0920
519	Pillaveetil Kavuvu	Kundara	Nagam	0.0640
520	Thenkottu Kavuvu	Kundara	Bhagavathy, Nagam	0.0920
521	Puduvana Kavuvu	East Kallada	Nagam	0.0320
522	Pullikanaku	Manappally	Nagam	0.4080
523	Rudhira Bhayankari Kavuvu	Attuvassery	Nagarajan,	0.0920

			Yogeswaran, Murthy	
524	Sasthamcotta Kavu	Sasthamcotta	Nagam	0.2800
525	Sree Krishna Temple	Mavady	Sree Krishnan	0.0800
526	Thiruvloor Palliyara	Padanayar Kulangara	Sree Bhuvaneshwari, Nagam	0.7200
527	Udayan Kavu	Edavattom	Parabrahmam	0.1000
528	Vallikkavu Temple	Vallikkavu	Bhagavathy, Nagam	0.1600
529	Venkittakkal Kavu	Thazhava	Nagam	0.1400
14. Thiruvananthapuram				
530	Cherainkode Kavu	Vizhinjam	Nagam	0.0200
531	Thennoorkonam Kavu	Vizhinjam	Nagam, Rajeshwari	0.0360
532	Thoppilsree Bhagavathi Temple	Vizhinjam	Bhagavathy, Lakshmi	0.0200
533	Cherukulathoor Kavu	Vellanadu	Bhagavathy, Nagam	0.0200
534	Cheruvalli Nair Kavu	Sreekariyam	Nagarajan, Nagakanyaka	0.0240
535	Dharmasastha Kavu	Sreekariyam	Durga	0.0200
536	Kuzhikkattukonam Kavu	Sreeekariyam	Nagam	0.0200
537	Vilayilkadayil Kavu	Sreekariyam	Nagam	0.0600
538	Chinnakkan Kavu	Kidarakuzhy	Nagam	0.0200
539	Dharmasastha Kavu	Poolanthara	Nagarajan	0.0240
540	Durgadevi Temple	Thannimoodu	Durga	0.0200
541	Karathala Kavu	Karathala	Bhagavathy, Nagam	0.0600
542	Pullielengam Kavu	Thalayil	Bhagavathy	0.0240
543	Kattumudi Pura	Thalayil/Karathala	Bhadrakali	0.0600
544	Kattakkada Kavu	Kattakkada	Bhagavathy, Nagam	0.0400
545	Keezhthalakuzhi Kavu	Chittakkode	Nagarajan	0.0480
546	Kozhimada Kavu	Vailoor	Sasthavu	0.2000
547	Kulathinkara Bhadrakali	Thiruvallom	Bhadrakali, Sasthavu	0.0610
548	Chokkan Kavu	Thiruvallom	Nagam	0.0610
549	Thuppanathu Kavu	Thiruvallom	Nagam	0.081
550	Kunchiveedu Kavu	Thembamuttom	Yakshi Amma	0.0360
551	Kunnampally Konathu Kavu	Vattavila	Nagam	0.0800
552	Kunnuvila Devi Temple	Pattom	Nagam	0.0400

553	Madan Thamburan Kavuv	Irattakkulangara	Madan Thamburan	0.0200
554	Madan Thamburan Kavuv	Pongummood	Madan Thamburan	0.0200
555	Malea Chokkan Kavuv	Pachalloor	Nagam, Sasthavu	0.1400
556	Mathanattu Kavuv	Velavoor	Nagam, Sasthavu	0.1000
557	Muttada Kavuv	Paruthippara	Durga	0.0480
558	Nagam Kotta	Nilamel	Nagarajan	0.0480
559	Nagaramma Kovil	Thirupuram	Naga Yakshi	0.0200
560	Nagar Kavuv	Chovvara	Nagam	0.0200
561	Pangottu Kavuv	Thiruvananthapuram	Devi, Nagam	0.0240
562	Perayil Kavuv	Kidarakkuzhy	Lakshmi Devi, Nagam	0.0200
563	Poolanthara Kavuv	Manickal	Nagam	0.041
564	Poovannarantal Kavuv	Neyyattinkara	Nagaraja	0.0320
565	Sree Bhagavathy Kavuv	Neyyattinkara	Bhagavathy, Nagam	0.0200
566	Pulinthanathu Kavuv	Koliyakkode	Madan Thamburan	0.0600
567	Punnakulam Kavuv	Kottukal	Nagam, Madan	0.0320
568	Punnamoodu Kavuv	Maranalloor	Nagam	0.01200
569	Puthalathu Kavuv	Kidarakuzhy	Devi, Nagam	0.0200
570	Sree Jagannatha Kavuv	Varkala	Nagam	0.020
571	Sree Janardana Swamy Kavuv	Varkala	Nagarajan, Naga Yakshi	0.0200
572	Thannimootil Kavuv	Oruvathil Kotta	Nagam	0.0200
573	Thekkethu Kavuv	Thembamuttom	Nagarajan	0.0320
574	Thottam Kavuv	Manacadu	Bhagavathy	0.0400
575	Thuppanathu Kavuv	Vazhamuttom	Nagarajan, Naga Yakshi	0.0600
576	Vadakodu Sasthamkavuv	Perumpazhuthoor	Sasthavu, Nagam	0.0610
577	Valia Veetil Kavuv	Nedumangad	Madan, Nagam	0.0200

2.3.2 Categorization of Sacred Groves of Kerala

Sacred groves were once a common feature in every village. Time immemorial, the original groves came in to the hands of individual families and remained family-owned property. As the families split into smaller units, the eldest male usually retained the grove with the place of worship. Since many families were unable to follow the 'Kavuv' rituals, they were handed over to organizations like the Devaswom Boards or local trusts and temple committees.

More than 99% of the sacred groves are privately owned, based on the way they are managed, they can be broadly into the following four groups.

- (i) *Family owned, where management is looked after by a single family or managed by a group of families forming a trust.*
- (ii) *Establishment-owned, where the management is left entirely to the Devaswom Boards or the Hindu Religious and Charitable Endowment (HR & CE). Here the establishment provides annual maintenance grants to the temples situated in the groves. Most groves located in south Kerala are under the Devaswom Board and many in the northern parts are supported by the HR & CE.F*
- (iii) *Community owned, where certain communities are managing the sacred grove.*
- (iv) *Local trust-owned, where many groves are managed by the local committees or trusts. These committees have come into existence as a result of disintegration of the families, which originally owned the groves.*

2.3.3 Vegetation Structure and Dynamics

Ecological investigations of the sacred groves of Kerala has been done earlier by Induchoodan (1992), Menon and Sasidharan (1994), Rajendraprasad (1995) and Rajendraprasad *et al* (1998, 1996a & b). Induchoodan (1998) worked on the phytosociological and ecological aspects of sacred groves of Kerala and carried out detailed ecological investigations of 'Iringole Kavu', one of the largest sacred groves existing in Kerala. Menon and Sasidharan (1994) evaluated the optimum productivity of the sacred grove systems.

The general structure of sacred groves of Kerala is extremely complex in structure, species richness and diversity. There is overwhelming predominance of woody plants with uniformity of foliage and the absence of marked seasonal canopy dynamics. The abundance of phanerophytes indicates the non-seasonal and continuous favourable climate. Occasionally, an aggressive species may find an opportunity for rapid expansion and species like *Vateria indica* and *Hopea ponga* invade the disturbed sacred groves.

2.4 SIGNIFICANCE OF THE PRESENT STUDY

Sacred groves are considered remnants of the past evergreen forest vegetation which once existed in the locality and later lost due to anthropogenic interventions like shifting

cultivation, overexploitation of forest products, cattle grazing and changes in land use by converting forest to tea, coffee, cardamom, rubber, teak, eucalyptus and other monoculture plantations, agricultural lands and dwelling sites. These activities have been continuing ever since man started cultivation and exploitation of natural resources for livelihood. These isolated undisturbed forest patches have been protected by the society in the name of worship of deities which has resulted in the conservation and management of these micro ecosystems designated as sacred groves. Having left undisturbed and unexploited for years, these sacred groves even now remains a treasure of biodiversity and gene pool conserving many endemic and endangered plants and animals of economic and scientific importance which does not exist elsewhere. Kerala being a humid tropical State endowed with a mean annual rainfall of 3000mm and humid tropical climate, the sacred groves are rich in plant and animal diversity. A review of the available literature reveals that the biodiversity of the sacred groves of Kerala have been very little explored due to religious customs, taboos and beliefs. Considering these cardinal points, the present study was undertaken to build up a scientific data base on major physical, chemical aspects of the soil and floral diversity of select sacred groves of northern Kerala. Results of the present study are expected to create awareness among the present and future generations on the need and importance of conservation and management of the sacred groves as a treasure of biodiversity and gene pool of the State as well as the Country.

MATERIALS AND METHODS

The area of present study includes three northern districts of Kerala viz., Kasaragod (Figure 4), Kannur (Figure 5) and Kozhikode (Figure 6).

3.1 SAMPLING

3.1.1 Study Area and Sampling Sites

Detailed preliminary survey was conducted in the sacred groves of Malabar covering Kasaragod, Kannur, and Kozhikode districts. Seven Sacred groves with appreciable extent and rich biodiversity were selected for detailed study. One sacred grove was selected in Kasaragod district, three in Kannur, and three in Kozhikode (Table 4). The different sites were selected in such a manner that at each sampling station, both sacred groves as well as bare areas were located, in order to have a clear comparison of the impact of sacred groves on the ecosystem and *vice-versa*.

Table 4. Sacred Groves Selected for Detailed Study

Sl. No	Name of the Grove	Deity	Area (Ha)	Location	District
1 Kamm	Kammadathukavu	Thaiparadevatha	21.81	West Eleri	Kasaragod
2	Parappoolkavu	Thaiparadevatha	4.04	Pattuvam	Kannur
3	Poongottukavu	Sasthavu	14.14	Mattannur	Kannur
4	Thazhekkavu	Bhagavathy	7.27	Mattul	Kannur
5	Bhayankavu	Durga	3.20	Palazhi	Kozhikode
6	Poyilkkavu	Vanadurga	4.40	Chemancheri	Kozhikode
7	Thurayilkavu	Shivan	4.00	Chelavoor	Kozhikode

3.1.2 Sampling Seasons

Sampling was carried out at monthly intervals from November-June for two consecutive years (2004-2006).

3.1.3 Sample Collection and Preservation

3.1.3.1 Plant Samples

3.1.3.1.1 Preparation of Herbarium

Specimens for herbarium were prepared following the wet method of Fosberg & Sachet (1965).

3.1.3.1.2 Identification of Plant Specimens

The specimens were identified with the help of the **Flora of the Presidency of Madras** (Gamble & Fischer, 1915-1936) and other relevant Floras, Manuals, Revisions, etc. Confirmations of identified specimens were made by matching with the specimens of the herbarium of the Calicut University (CALI).

3.1.3.2 Soil Samples

Soil samples were collected up to 90 cm depth using the core type soil auger at 15 cm intervals *i. e.*, 0 – 15, 16 – 30, 31 – 45, 46 – 60, 61 – 75, and 76 – 90 cm. A small portion of the fresh wet soil sample was used for the estimation of moisture content. This was collected

in particular aluminum containers. Remaining samples were collected in acid washed polyethylene bottles for physicochemical analysis. A portion of the soil was sieved through metal sieves of 0.5-0.6 mm and 0.2 mm mesh size and preserved as given in table 5. The remaining samples were air-dried, pulverized and sieved through 2 mm and 0.5 mm sieves and stored separately. Soil sieved through 0.5 mm sieve was analyzed for organic carbon. The soil sieved through the 2 mm sieve was analyzed for other chemical parameters.

Table 5. Methods of Preservation of Soil Samples

Sl. No	Parameters	Preservation
1	Moisture content	Analyzed immediately
2	Mechanical analysis, organic carbon	Drying at 105°C in a hot air oven
3	pH	Analyzed immediately
4	Available Nitrogen	Analyzed fresh samples immediately
5	Exchangeable sodium, potassium, calcium, magnesium.	Air drying (<40°C)

3.2 ANALYTICAL METHODS

Parameters and methods of analysis followed are given in table 6.

Table 6. Methods and Instruments Used for Soil Analysis

Sl. No	Parameter	Method	Instrument & Model/Make	Unit
1	pH	Electrometry	Digital pH Meter (Systronics 335)	-
2	Conductivity (EC)	Electrometry	Conductivity Meter (Elico-180)	m mhos/cm
3	Moisture Content	Gravimetry	-	%
4	Organic Carbon (OC)	Method of Walkley & Black (1934)	-	%
5	Exchangeable Sodium (Na)	Flame Photometry	Flame Photometer (Systronics 132, Digital)	mg/100g
6	Exchangeable Potassium (K)	Flame Photometry	-do-	mg/100g

7	Exchangeable Calcium (Ca)	EDTA Titrimetry	Titration	mg/100g
8	Exchangeable Magnesium (Mg)	EDTA Titrimetry	Titration	mg/100g
9	Available Nitrogen	Phenol Disulphonic Acid Method	UV-Visible Spectrophotometer (Hitachi 220)	mg/100g

3.2.1 Physical Parameters

The physical parameters studied for soils were moisture content, infiltration rate and hydraulic conductivity.

3.2.1.1 *Moisture Content*

Soil moisture was estimated using the gravimetric method. Initial weights of fresh soil samples were recorded and the samples were kept in a hot air oven at 105°C, until a constant weight was attained. After cooling the sample in a dessicator, the final weight was recorded. Soil moisture of the samples was calculated using the formula:

$$\text{Moisture \%} = \frac{I - F}{I} \times 100$$

Where,

I = Initial weight of the soil (g)

F = Final weight of the soil (g)

3.2.1.2 *Hydraulic Conductivity*

Method:

Variable-Head method

Equipment/Materials required:

A special apparatus consisting of galvanized iron cylinder of 40 cm length and 30cm diameter with a conical top was used with a vertical glass tube of small diameter attached at the conical top; rubber gaskets, stop watch and spade.

Procedure:

- The cylinder was pressed into the soil to a known depth
- The whole apparatus was fitted and filled with water
- Drop in water level in the narrow tube against time was recorded.

Calculation:

$$K = \frac{2.3 aL}{At} \text{Log}_{10} \frac{H_1}{H_2}$$

Where,

- A = Cross sectional area of the cylinder
- A = Cross sectional area of the glass tube
- L = Thickness of the soil in cylinder or flow length
- t = Time interval
- H₁ = Initial water head
- H₂ = Final water head
- K = Hydraulic conductivity

3.2.1.3 *Infiltration*

Principle involved:

The entry of water into the soil is quantified using two concentric rings. The outer ring provides the water for radial spread and the inner ring for the vertical entry. The measurement made gives the rate of vertical entry.

Equipment/Materials required:

Steel double ring infiltrometer with rings of 25 cm high 30 cm and 60 cm diameter each; hammer, hook gauge or point gauge; stop watch, one liter measuring cylinder, bucket, plastic sheet and a meter scale.

Procedure:

- Level the site for the experiment
- The infiltration cylinder as well as buffer cylinder are driven together to 10 cm depth in the soil using the hammer

- Water is poured into the outer cylinder to prevent lateral movement from the inner cylinder when the water is filled in the inner cylinder
- Set the pointer or hook gauge at desired height
- Place the plastic sheet inside the inner cylinder to prevent water from infiltrating suddenly when the water is poured into the infiltrometer
- Water is added to the inner cylinder from a container of known volume with a graduated jar up to the desired height.
- Remove the plastic sheet immediately
- Take the initial reading after two minutes. Level of water is adjusted by a measuring cylinder and the amount of water added is noted
- Consecutive reading are taken at 5, 10, 30, 45, 60, 90 and 120 minutes and after each reading water level should be brought up to the desired level
- Refill the cylinder when the water in the inner cylinder is almost over
- Try to maintain equivalent water levels in the inner and outer rings
- Continue the measurement until a steady state has been reached

Infiltration rate was calculated using the formula:

$$I = K t^c$$

Where,

I = Cumulative infiltration rate mm/hr.

T = Elapsed time in minute

K = Empirical coefficient

C = Empirical exponent

3.2.2 Chemical Parameters

The soil samples were analyzed for pH, electrical conductivity, available nitrogen, organic carbon, exchangeable sodium, potassium, calcium and magnesium following Jackson (1969) and Walkley & Black (1934)

3.2.2.1 pH

To determine pH at the moisture saturation level, 20 gram of soil was dissolved in 100 ml of distilled water (1:5) and stirred with a glass rod for an hour at regular intervals. The pH was determined with a pH meter and expressed directly in pH units associated with the

specific dilution of the soil suspension.

3.2.2.2 *Electrical Conductivity*

A 1:5 soil suspension was prepared after shaking a mixture of 20 grams of soil in 100 ml de-ionized water for about an hour. Conductivity of the suspension was measured within an hour by using a conductivity meter. The values were expressed in m mhos/cm at specific dilution of the soil suspension.

3.2.2.3 *Organic Carbon*

Reagents:

- Potassium dichromate (1 N)
- Silver sulphate-sulphuric acid reagent
- Ferriin indicator
- Ferrous sulphate (0.5 N)

Procedure:

Ten ml of 1N potassium dichromate solution was added to 1 gram of sieved (0.5 mm mesh), air-dried soil and swirled gently to disperse the soil. 20 ml of silver sulphate-sulphuric acid reagent was added rapidly to the suspension with constant swirling and allowed to stand on an asbestos sheet for 30 minutes. After 30 minutes, 100 ml distilled water was added followed by 3–4 drops of Ferriin indicator. The solution was titrated against 0.5 N ferrous sulphate solution. At the end point, solution changes from blue to red.

Calculation:

$$\text{Organic Carbon \%} = \frac{(\text{me K}_2\text{Cr}_2\text{O}_7 - \text{me FeSO}_4)}{\text{g of air dried soil}} \times 0.003 \times 100 \times f$$

Where,

f = Correction factor (1.33)

me = Normality of solution x ml of the solution used

OC% = %of organic matter in soil (% organic carbon x 1.729)

3.2.2.4 *Nitrogen*

Reagents:

Standard nitrate solution (0 – 1 mg/l)

Phenol disulphonic acid

Liquid ammonia (30%)

Nitrate extraction reagent

Calcium hydroxide

Magnesium carbonate

Procedure:

250 ml of nitrate extracting reagent was added to 50 g of dried soil and shaken for 15 minutes. To this 0.4 g of dried calcium hydroxide powder was added and shaken for 5 minutes. To this added 1 gram of dried magnesium carbonate powder. The suspension was filtered through Whatman No. 50 filter paper and the total volume of the filtrate was measured. 50 ml of the filtrate was evaporated in a porcelain basin to dryness, cooled and dissolved the residue in 2 ml phenol disulphonic acid. The contents were diluted to 50 ml and 6 ml of liquid ammonia was added to develop a yellow colour, which was measured at 410 nm in a spectrophotometer.

Calculation:

$$\text{Mg / 100g NO}_3\text{-N} = \frac{\text{V1} \times \text{V2}}{1000 \times \text{W}} \times 100$$

Where,

V1 = NO₃ – N in the filtrate (mg/l)

V2 = Total volume of filtrate (ml)

W = Weight of the dried soil

3.2.2.5 Exchangeable Sodium and Potassium*Apparatus:*

Flame Photometer

Reagents:

Standard sodium solution (0-40 mg/l)

Standard potassium solution (0-10 mg/l)

Procedure:

The remaining ammonium acetate leachate of soil left after calcium and magnesium determination was used for the estimation of sodium and potassium. Using a Flame Photometer, concentration of sodium and potassium was found out as per the procedure adopted for water analysis.

Calculation:

$$\text{Na mg/100 g} = \frac{A \times V \times 100}{W \times 10,000}$$

Where,

A = Sodium/ Potassium content of soil extract (mg/l)

V = Total volume of the soil extract (ml)

W = Weight of the air dried soil taken for extraction (g)

3.2.2.6 *Exchangeable Calcium and Magnesium*

Reagents:

Ethyl alcohol (40%)

Absolute alcohol

Ammonium acetate solution (pH 7.0); and

All the reagents used in the determination of calcium and magnesium in water

Procedure:

Preparation of soil extract:

50 grams of air-dried soil was taken in a conical flask to which 100 ml of 40% ethyl alcohol was added and shaken well. After 10 minutes, the suspension was filtered through Whatman No. 50 filter paper. The soil residue on the filter paper was eluted with 40% ethyl alcohol and finally absolute alcohol. The residue was then transferred to a beaker; 100 ml of ammonium acetate solution was added, stirred and allowed to stand overnight. The supernatant was filtered through Whatman No.42 filter paper and collected filtrate was measured to note the volume. Calcium and magnesium in soil extract was determined following the same method used for the determination of calcium and magnesium in water.

Calculation:

$$\text{Ca mg/100g} = \frac{T \times 400.4 \times V_1}{V_2 \times W \times 10,000} \times 100$$

Where,

T = Volume of EDTA used (ml)

V₁ = Total volume of soil extract (ml)

V₂ = Volume of soil extract titrated (ml)

W = Weight of the air dried soil taken for extraction (g)

$$\text{Mg mg/100g} = \frac{T_2 - T_1 \times 400.4 \times V_1}{V_2 \times 1.645 \times W \times 10,000} \times 100$$

Where,

T₁ = Volume of EDTA used for determination of Ca (ml)

T₂ = Volume of EDTA used for the determination of Ca & Mg (ml)

V₁ = Total volume of soil extract (ml)

V₂ = Volume of soil extract titrated (ml)

W = Weight of the air dried soil taken for extraction (g)

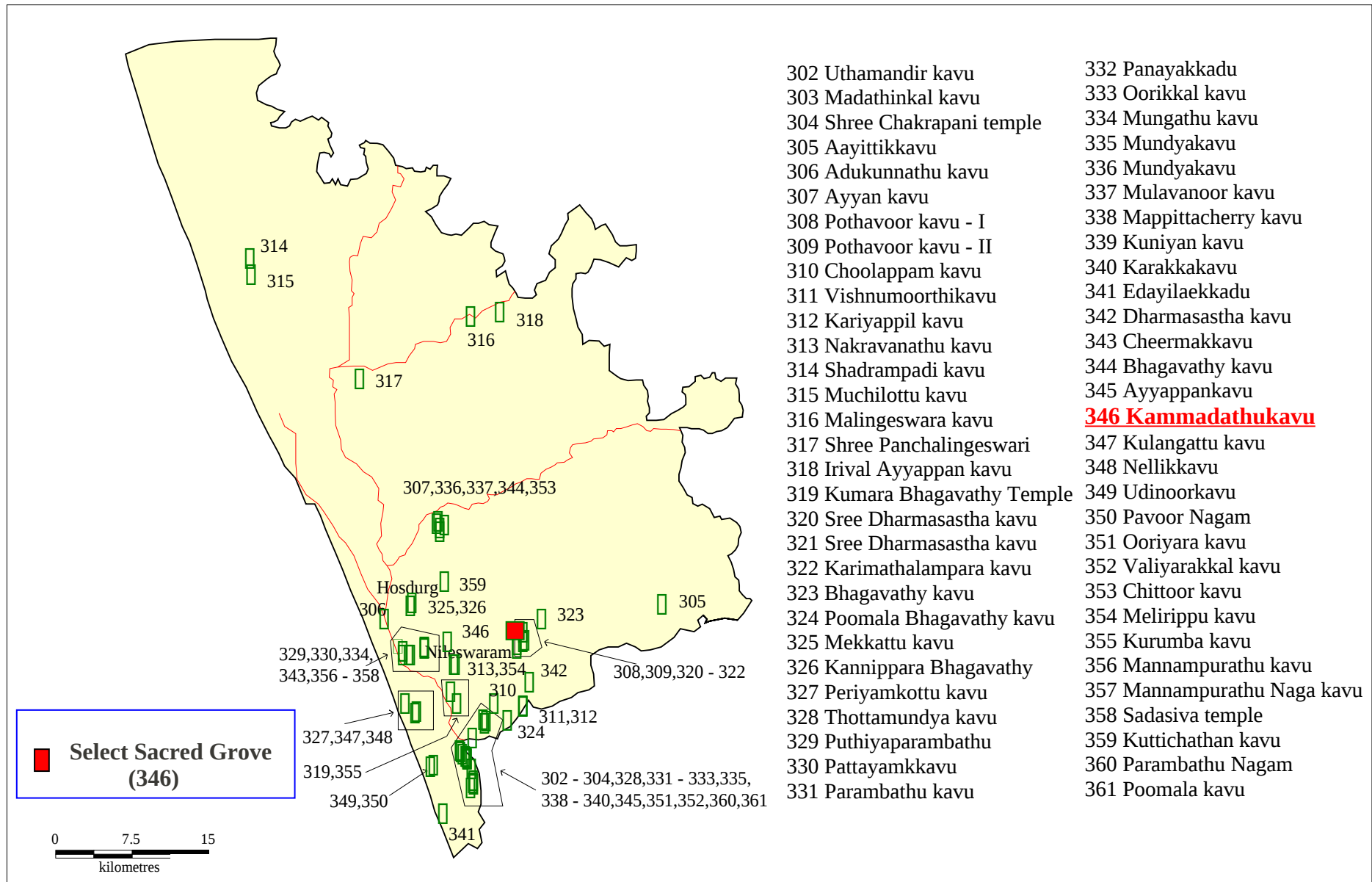


Figure 4. Map of Kasaragod District Showing Major Sacred Groves

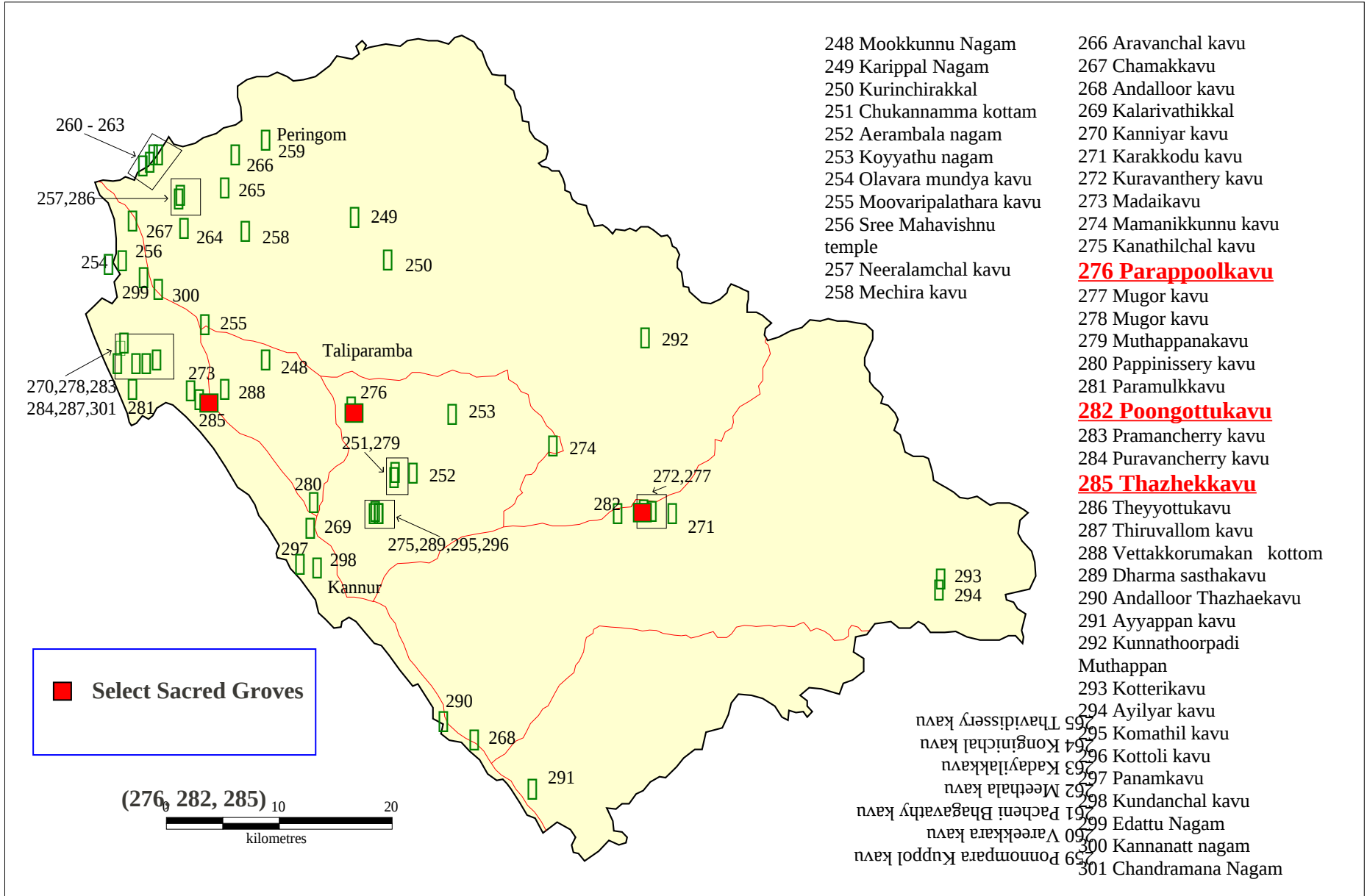
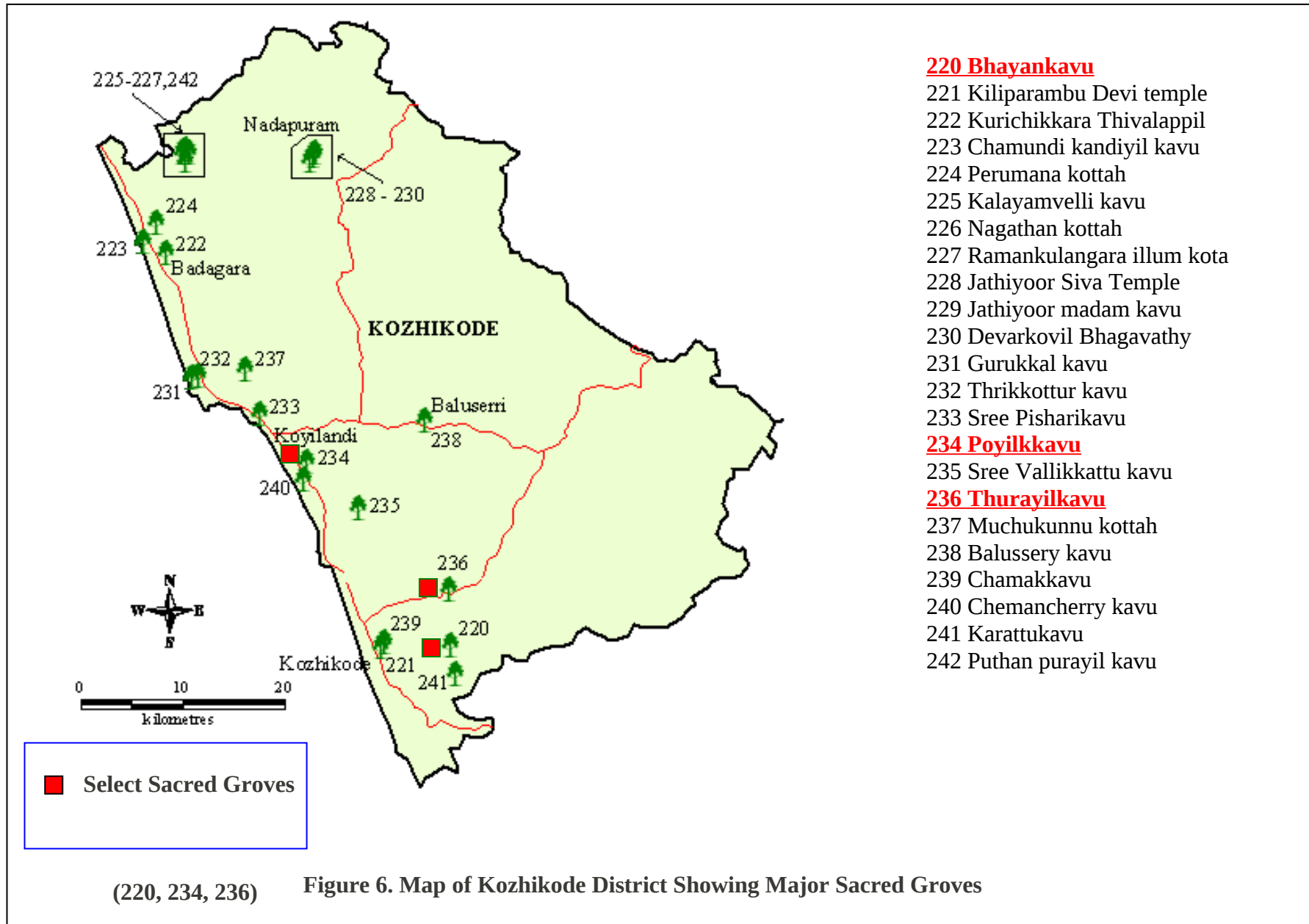


Figure 5. Map of Kannur District Showing Major Sacred Groves



RESULTS AND DISCUSSION

The Malabar area of Kerala State has enormous sacred groves ranging from less than 0.5 ha. to very large sacred groves extending to more than 20 hectares. The present study was centered round select sacred groves of Kasaragod, Kannur and Kozhikode districts. The investigation was done for four-years from 2003 to 2007. First year of the study was concentrated for the preliminary survey and collection of secondary information on the sacred groves of Malabar. After the preliminary survey, seven sacred groves - one from Kasaragod (Kammadathukavu), three from Kannur (Parappoolkavu, Poongottukavu and Thazhekkavu) and three from Kozhikode (Bhayankavu, Poyilkkavu and Thurayilkavu) districts - were selected for detailed study.

In the present study, floristic diversity, and physicochemical properties of soils including spatial and temporal variations in soil moisture and macronutrients in sacred groves have been analyzed and compared with the open areas in the vicinity for two consecutive years. Results of the present study revealed that the sacred groves possess high capacity to retain the soil moisture. In comparison with the open areas, sacred groves were characterized by high amounts of nutrients. Even though the open areas selected as control were only half a kilometer apart, the nutrients, biodiversity and density of biota showed a lesser degree in comparison with the corresponding sacred groves.

The differences observed in the abiotic and biotic elements between the sacred groves and open areas clearly indicate the importance of the sacred groves in soil moisture and nutrient conservation and the need for their conservation. The high biodiversity observed in sacred groves contributes to high primary and secondary productivity.

4.1 FLORAL DIVERSITY

In most of the sacred groves of Malabar, the first storey of vegetation mainly consists of *Hopea parviflora*, *Hopea ponga*, *Alstonia scholaris*, etc. The second storey consists of *Mimusops elengi*, *Hydnocarpus pentandra*, *Holigarna arnottiana*, etc. *Chasalia curviflora*, *Ixora coccinea* and *Ixora bracteata* are constituents of the shrubby layer. The ground layer is usually formed of seasonal species such as *Geophila repens*, *Centella asiatica*, *Aerva lanata*, *Andrographis paniculata*, and *Biophytum sensitivum*. Common climbers are *Calamus hookerianus*, *Calycopteris floribunda*, etc. Other climbers commonly found in these groves belong to Vitaceae, Menispermaceae, Asclepiadaceae and Apocynaceae. Total parasites like *Cassytha filiformis* and semiparasites like *Loranthus spp.*, are also common. Common constituents of the shrubby layer include species like *Memecylon umbellatum*, *Pavetta indica*, *Chasalia curviflora*, *Ixora spp.*, etc. The ground layer is usually thickly populated with species, which prefer humus and love shade. Along with few angiosperms, ferns, Selaginellales and many macrofungi like species of *Agaricus*, *Phallus*, etc., occur. Dead trunks of fallen trees harbour varieties of Polyporales, especially species of *Fomes* and *Polyporus*.

Typical evergreen elements of the tree layer of these sacred groves are *Artocarpus hirsutus*, *Hopea parviflora*, *Vateria indica*, *Ficus spp.*, etc. There are a few semi-evergreen representatives like *Fagraea ceylanica*, *Scleropyrum pentandrum* etc. A few deciduous and semi deciduous members are also common. Some of the common semi-deciduous representatives are *Cinnamomum malabratrum*, *Litsea coriacea*, *Mangifera indica*, etc. *Mallotus philippensis* and *Trema orientalis* are some of the deciduous species.

Semi-evergreen representatives like *Pavetta indica*, *Nephrolepis spp.*, etc. are also found among the undergrowth. Epiphytic orchids like *Acampe praemorsa* and *Bulbophyllum sterile* are also common.

Some characteristic morphological adaptations accompany the members of the sacred groves. Broad prominent buttresses are seen in most of the trees like *Ficus spp.*, *Hopea parviflora*, etc., which attain enormous heights with tall bole, the branches confining to the top most region.

A very interesting constituent of the sacred groves of Malabar is the typical *Myristica* swamps found in evergreen swampy sacred groves of Kannur and Kasaragod viz., Kammadathukavu (Kasaragod) and Poongottukavu (Kannur) represented by *Myristica beddomei* with dense prominent stilt and breathing roots. The common representative members are *Myristica beddomei* and *Hydnocarpus pentandra*. In the sacred groves, a microclimate with a high humidity profile occurs that favours the luscious undergrowth of members of Araceae, Zingiberaceae, Urticaceae, Acanthaceae, etc. The exact ecophysiological implication of this high humidity has not been studied in detail, but may be attributed to the very high rates of transpiration of the trees, rich soil humus and soil moisture, and shade under the canopy.

The sacred groves harbour many rare endemics of the Western Ghats and serve as a nursery and storehouse of many local ayurvedic, tribal and folk medicines. Many edible fruit-bearing species are also common in the groves. Though most of the sacred groves have many trees of high timber and economic value, they are not exploited for timber due to their sacredness. As a result, the trunks of fallen giant trees lie as such on the ground untouched and slowly attacked by wood-rotting fungi.

The flora of seven sacred groves viz., Kammadathukavu (Kasaragod), Parappoolkavu, Poongottukavu and Thazhekkavu (Kannur) and Bhayankavu, Poyilkkavu and Thurayilkavu (Kozhikode) has been studied with special reference to angiosperms in detail. The consolidated lists of flowering plants of these sacred groves are presented in Tables 7-13, with details on their taxonomic position and vernacular name. A total of 171 Plants have been listed consisting of 10 monocots 159 dicots and 2 gymnosperms. The 10 species of monocots belong to 8 families dominated by the members of Orchidaceae. The 159 species of dicots belongs to 72 families included under 20 orders, dominated by the members of Rubiaceae, Apocynaceae, Dipterocarpaceae and Euphorbiaceae. Among the species listed, many are of medicinal and economic value. Among them species such as *Diospyros paniculata*, *Elaeocarpus munronii* and *Ophiorrhiza brunonis* are threatened species and many of them are endemic to Western Ghats. Many of these species are common in all the seven sacred groves studied, hence, their general systematic discussion have been given.

As the flora of the seven sacred groves has been studied in detail, the floristic diversity has been enumerated separately in tables 7 to 13. From these tables, uniqueness of

the flora of each sacred grove is amply elucidated, highlighting the endemic, rare, and dominant species characteristic of each sacred grove which makes them unique.

Table 7. Flora of Kammadathukavu, Kasaragod District

Sl. No	Botanical Name	Family	Habit	Vernacular Name
1	<i>Asystasia chelonoides</i> Nees	Acanthaceae	Shrub	Murikoottipacha
2	<i>Eranthemum capense</i> L.	Acanthaceae	Herb	
3	<i>Strobilanthes ciliatus</i> Nees	Acanthaceae	Shrub	Cherukurunji
4	<i>Alangium salvifolium</i> (L.f.) Wang.	Alangiaceae	Climber	Valli ankolam
5	<i>Holigarna arnottiana</i> Hook. f.	Anacardiaceae	Tree	Cheru
6	<i>Nothopegia travancorica</i> Bedd. ex Hook. f.	Anacardiaceae	Small tree	Avukarum
7	<i>Artabotrys zeylanicus</i> Hook. f.	Annonaceae	Climber	Manoranjini
8	<i>Polyalthia korintii</i> (Dunal) Benth. & Hook.f. ex Hook.f. & Thoms.	Annonaceae	Shrub	Karuvalli
9	<i>Uvaria narum</i> (Dunal) Wall. ex Hook.f. & Thoms.	Annonaceae	Climber	Narumpanal
10	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Herb	Kodangal
11	<i>Alstonia scholaris</i> (L.) R. Br.	Apocynaceae	Tree	Ezhilamppala
12	<i>Kammetia caryophyllata</i> (Roxb.) Nicolson & Suresh	Apocynaceae	Climber	Narumarathivu
13	<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Apocynaceae	Herb	Sarpagandhi
14	<i>Rauvolfia tetraphylla</i> L.	Apocynaceae	Shrub	Pambumkolli
15	<i>Wrightia arborea</i> (Dennst.) Mabb.	Apocynaceae	Tree	Mylampala
16	<i>Wrightia tinctoria</i> (Roxb.) R. Br.	Apocynaceae	Tree	Kambippala
17	<i>Pothos scandens</i> L.	Araceae	Climber	Anapparuva
18	<i>Rhaphidophora pertusa</i> (Roxb.) Schott	Araceae	Climber	Elitthadi
19	<i>Schefflera venulosa</i> (Wight & Arn.) Harms	Araliaceae	Shrub	Ungavalli

20	<i>Schefflera wallichiana</i> (Wight & Arn.) Harms	Araliaceae	Shrub	Modakom
21	<i>Aristolochia indica</i> L.	Aristolochiaceae	Climber	Eshwaramulla/Garudakodi
22	<i>Wattakaka volubilis</i> (L. f.) Stapf	Asclepiadaceae	Climber	Vattakakkakoti/Kakkalankodi
23	<i>Vernonia cinerea</i> (L.) Less.	Asteraceae	Herb	Poovamkurunthal
24	<i>Stereospermum colais</i> (Buch.-Ham. ex Dillw.) Mabb.	Bignoniaceae	Tree	Pathiri/Poopathiri
25	<i>Canarium strictum</i> Roxb.	Burseraceae	Tree	Karuthakungiliyam
26	<i>Caesalpinia bonduc</i> (L.) Roxb.	Caesalpiniaceae	Climber	Kazhanji/Kazhanchikkuru
27	<i>Saraca asoca</i> (Roxb.) de Wilde	Caesalpiniaceae	Tree	Ashokam
28	<i>Lophopetalum wightianum</i> Arn.	Celastraceae	Tree	Venkkotta
29	<i>Combretum latifolium</i> Blume	Combretaceae	Climber	
30	<i>Connarus monocarpus</i> L.	Connaraceae	Climber	Kuriel/Puzhukkadikaya
31	<i>Connarus wightii</i> Hook. f.	Connaraceae	Shrub	Kuringil
32	<i>Rourea minor</i> (Gaertn.) Merr.	Connaraceae	Climber	Cheriyamarikunni/Kuriel
33	<i>Erycibe paniculata</i> Roxb.	Convolvulaceae	Climber	Erumathali
34	<i>Hopea parviflora</i> Bedd.	Dipterocarpaceae	Tree	Irumbagam
35	<i>Hopea ponga</i> (Dennst.) Mabb.	Dipterocarpaceae	Tree	Eyyakam
36	<i>Vateria indica</i> L.	Dipterocarpaceae	Tree	Pandam/Payin
37	<i>Elaeocarpus serratus</i> L.	Elaeocarpaceae	Tree	Bhadraksham/Kara/Karamavu
38	<i>Elaeocarpus variabilis</i> Zmarzty	Elaeocarpaceae	Tree	Kara/Kattakara
39	<i>Antidesma acidum</i> Retz.	Euphorbiaceae	Shrub	Asaripuli
40	<i>Antidesma bunius</i> (L.) Spreng.	Euphorbiaceae	Tree	Aryaporiyan
41	<i>Antidesma montanum</i> Blume	Euphorbiaceae	Tree	Putharaval/Thathalamaram
42	<i>Briedelia stipularis</i> (L.) Blume	Euphorbiaceae	Shrub	Cherupanachi

43	<i>Glochidion zeylanicum</i> (Gaertn.) A. Juss.	Euphorbiaceae	Tree	Neervetti
44	<i>Tragia involucrata</i> L.	Euphorbiaceae	Herb	Choriyanam/Kodithoova
45	<i>Abrus precatorius</i> L.	Fabaceae	Climber	Kunnikuru
46	<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	Tree	Venga
47	<i>Vigna trilobata</i> (L.) Verdc.	Fabaceae	Climber	Kattupayar
48	<i>Hydnocarpus pentandra</i> (Buch.-Ham.) Oken	Flacourtiaceae	Tree	Marotti
49	<i>Gnetum edule</i> (Willd.) Blume	Gnetaceae	Climber	Karuthodal
50	<i>Salacia fruticosa</i> Heyne ex Lawson	Hippocratiaceae	Climber	Eakanayakam
51	<i>Curculigo orchioides</i> Gaertn.	Hypoxidaceae	Herb	Nilappana
52	<i>Sarcostigma kleinii</i> Wight & Arn.	Icacinaceae	Climber	Odal
53	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Herb	Thumba
54	<i>Ocimum gratissimum</i> L.	Lamiaceae	Shrub	Attuthulasi
55	<i>Cinnamomum malabatum</i> (Burm. f.) Blume	Lauraceae	Tree	Ilavangam
56	<i>Litsea coriacea</i> (Heyne ex Meisner) Hook. f.	Lauraceae	Tree	Maravettithali
57	<i>Persea macrantha</i> (Nees) Kosterm.	Lauraceae	Tree	Kulamavu/Kulirmavu
58	<i>Barringtonia acutangula</i> (L.) Gaertn.	Lecythidaceae	Tree	Attupezhu
59	<i>Careya arborea</i> Roxb.	Lecythidaceae	Tree	Pezhu
60	<i>Leea indica</i> (Burm. f.) Merr.	Leeaceae	Shrub	Chorianthali
61	<i>Leea macrophylla</i> Roxb. ex Hornem.	Leeaceae	Shrub	Njallu
62	<i>Fagraea ceilanica</i> Thunb.	Loganiaceae	Shrub	Modakam
63	<i>Strychnos nux-vomica</i> L.	Loganiaceae	Tree	Kanjiram
64	<i>Strychnos potatorum</i> L.f.	Loganiaceae	Tree	Thettamaram/Thettamparel
65	<i>Dendrophthoe falcata</i> (L. f.) Etting.	Loranthaceae	Tree	Ithikkanni

66	<i>Lagerstroemia microcarpa</i> Wight	Lythraceae	Tree	Vellilavu/Venthekku
67	<i>Magnolia champaca</i> (L.) Baill. ex Pierre	Magnoliaceae	Tree	Chembakam
68	<i>Gossypium arboreum</i> L.	Malvaceae	Shrub	Kattuparuthi
69	<i>Urena lobata</i> L.	Malvaceae	Shrub	Uram
70	<i>Memecylon umbellatum</i> Burm.f.	Melastomaceae	Shrub	Kayampoomaram
71	<i>Aphanamixis polystachya</i> (Wall.) Parker	Meliaceae	Tree	Chemmaram/Karakil
72	<i>Cipadessa baccifera</i> (Roth) Miq.	Meliaceae	Tree	Kaipanarangi
73	<i>Swietenia macrophylla</i> King	Meliaceae	Tree	Mahogani/Manthagani
74	<i>Swietenia mahagoni</i> (L.) Jacq.	Meliaceae	Tree	Mahogani
75	<i>Cyclea peltata</i> (Lam.) Hook. f. & Thoms.	Menispermaceae	Climber	Padakizhangu/Padathali
76	<i>Tiliacora acuminata</i> (Poir.) Miers ex Hook.f. & Thoms.	Menispermaceae	Climber	Vallikanjiram
77	<i>Tinospora cordifolia</i> (Willd.) Miers.	Menispermaceae	Climber	Chitamruthu
78	<i>Tinospora sinensis</i> (Lour.) Merr.	Menispermaceae	Climber	Kattamruthu
79	<i>Albizia lebbek</i> (L.) Benth.	Mimosaceae	Tree	Nenmenivaka
80	<i>Xylia xylocarpa</i> (Roxb.) Taub.	Mimosaceae	Tree	Irumullu
81	<i>Ficus benghalensis</i> L.	Moraceae	Tree	Peral
82	<i>Ficus exasperata</i> Vahl	Moraceae	Tree	Parakam/Therakam
83	<i>Ficus hispida</i> L. f.	Moraceae	Tree	Thonditherakam
84	<i>Ficus microcarpa</i> L. f.	Moraceae	Tree	Ithi
85	<i>Ficus religiosa</i> L.	Moraceae	Tree	Arayal
86	<i>Myristica beddomei</i> King	Myristicaceae	Tree	Adakkapayin/Kattujathi
87	<i>Ardisia pauciflora</i> Heyne ex Roxb.	Myrsinaceae	Shrub	Muttamaram
88	<i>Syzygium caryophyllatum</i> (L.) Alston	Myrtaceae	Tree	Njara

89	<i>Gomphia serrata</i> (Gaertn.) Kanis	Ochnaceae	Tree	Aanaperal
90	<i>Jasminum coarctatum</i> Roxb.	Oleaceae	Climber	Vellakattumulla/Kattumulla
91	<i>Myxopyrum smilacifolium</i> (Wall.) Blume	Oleaceae	Climber	Chathuramulla
92	<i>Olea dioica</i> Roxb.	Oleaceae	Tree	Edana
93	<i>Acampe praemorsa</i> (Roxb.) Blatt. & McCann	Orchidaceae	Herb	Maravazha
94	<i>Bulbophyllum sterile</i>	Orchidaceae	Herb	Mookittakaya
95	<i>Biophytum sensitivum</i> (L.) DC.	Oxalidaceae	Herb	Mukkutti
96	<i>Piper betle</i> L.	Piperaceae	Climber	Vettilakkodi
97	<i>Piper longum</i> L.	Piperaceae	Herb	Pippali/Thippali
98	<i>Piper nigrum</i> L.	Piperaceae	Climber	Kurumulaku
99	<i>Setaria palmifolia</i> (Koenig) Stapf	Poaceae	Herb	Palmgrass
100	<i>Xanthophyllum arnottianum</i> Wight	Polygalaceae	Tree	Madukka
101	<i>Naravelia zeylanica</i> (L.) DC.	Ranunculaceae	Climber	Soothravalli/Vadakkodivalli
102	<i>Ziziphus oenoplia</i> (L.) Mill.	Rhamnaceae	Climber	Cheriyalantha/Cheruthudali
103	<i>Canthium angustifolium</i> Roxb.	Rubiaceae	Shrub	Kattakara
104	<i>Canthium coromandelicum</i> (Burm. f.) Alston	Rubiaceae	Shrub	Kandakara/Karamullu/ Kattaramullu
105	<i>Chassalia curviflora</i> (Wall. ex Kurz) Thw.	Rubiaceae	Shrub	Yamari/Vellakurinji
106	<i>Haldina cordifolia</i> (Roxb.) Ridsd.	Rubiaceae	Tree	Manjakadambu
107	<i>Ixora brachiata</i> Roxb. ex DC.	Rubiaceae	Tree	Marachekki/Marachethi
108	<i>Ixora coccinea</i> L.	Rubiaceae	Shrub	Chethi/Chekki/Kattuchethi/ Thechi/Thetti
109	<i>Ixora polyantha</i> Wight	Rubiaceae	Shrub	Kalingi/Vellachethi

110	<i>Pavetta indica</i> L.	Rubiaceae	Shrub	Kamatta/Nochi/Pavetta
111	<i>Psychotria flavida</i> Talbot	Rubiaceae	Shrub	
112	<i>Glycosmis pentaphylla</i>	Rutaceae	Shrub	Panal
113	<i>Toddalia asiatica</i> (L.) Lam.	Rutaceae	Shrub	Kakkathodali/Karamullu
114	<i>Zanthoxylum rhetsa</i> (Roxb.) DC.	Rutaceae	Tree	Kothumurikku/Mullilam
115	<i>Santalum album</i> L.	Santalaceae	Tree	Chandanam
116	<i>Scleropyrum pentandrum</i> (Dennst.) Mabb.	Santalaceae	Tree	Irumulli
117	<i>Allophylus cobbe</i> (L.) Raeusch.	Sapindaceae	Shrub	Mukkannanpezhu
118	<i>Lepisanthes tetraphylla</i> (Vahl) Radlk.	Sapindaceae	Tree	Kulapunna
119	<i>Schleichera oleosa</i> (Lour.) Oken	Sapindaceae	Tree	Poovam
120	<i>Madhuca neriifolia</i> (Moon) H. J. Lam	Sapotaceae	Tree	Attu-ilippa
121	<i>Mimusops elengi</i> L.	Sapotaceae	Tree	Elangi
122	<i>Bacopa monnieri</i> (L.) Pennell	Scrophulariaceae	Herb	Bhrammi
123	<i>Ailanthus triphysa</i> (Dennst.) Alston	Simaroubaceae	Tree	Matti/Mattipala
124	<i>Smilax zeylanica</i> L.	Smilacaceae	Climber	Kareelanchi
125	<i>Grewia nervosa</i> (Lour.) Panigrahi	Tiliaceae	Shrub	Cherikkotta
126	<i>Trema orientalis</i> (L.) Blume	Ulmaceae	Shrub	Amathali
127	<i>Callicarpa tomentosa</i> (L.) L.	Verbenaceae	Shrub	Cheruthekku/Kattuthekku
128	<i>Clerodendrum inerme</i> (L.) Gaertn.	Verbenaceae	Shrub	Puzhamulla
129	<i>Premna serratifolia</i> L.	Verbenaceae	Shrub	Munja
130	<i>Vitex altissima</i> L. f.	Verbenaceae	Tree	Mylellu
131	<i>Ampelocissus latifolia</i> (Roxb.) Planch.	Vitaceae	Climber	Chembravalli
132	<i>Cissus discolor</i> Blume	Vitaceae	Climber	Njerinjampuli

Table 8. Flora of Poongottukavu, Kannur District

Sl. No	Botanical Name	Family	Habit	Vernacular Name
1	<i>Asystasia chelonoides</i> Nees	Acanthaceae	Shrub	Murikoottipacha
2	<i>Justicia wynaadensis</i> (Nees) Heyne ex Anders.	Acanthaceae	Herb	Kurinji
3	<i>Strobilanthes ciliatus</i> Nees	Acanthaceae	Shrub	Cherukurunji
4	<i>Alangium salvifolium</i> (L.f.) Wang.	Alangiaceae	Climber	Valli ankolam
5	<i>Holigarna arnottiana</i> Hook. f.	Anacardiaceae	Tree	Cheru
6	<i>Nothopegia travancorica</i> Bedd. ex Hook. f.	Anacardiaceae	Small tree	Avukarum
7	<i>Polyalthia korintii</i> (Dunal) Benth. & Hook.f. ex Hook.f. & Thoms.	Annonaceae	Shrub	Karuvalli
8	<i>Uvaria narum</i> (Dunal) Wall. ex Hook.f. & Thoms.	Annonaceae	Climber	Narumpanal
9	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Herb	Kodangal
10	<i>Alstonia scholaris</i> (L.) R. Br.	Apocynaceae	Tree	Ezhilamppala
11	<i>Chonemorpha grandiflora</i> (Roth) M. R. & S. M. Almeida	Apocynaceae	Climber	Appuppanthadi
12	<i>Kammelia caryophyllata</i> (Roxb.) Nicolson & Suresh	Apocynaceae	Climber	Narumarathivu
13	<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Apocynaceae	Herb	Sarpagandhi
14	<i>Rauvolfia tetraphylla</i> L.	Apocynaceae	Shrub	Pambumkolli
15	<i>Tabernaemontana alternifolia</i> L.	Apocynaceae	Tree	Kundalappala
16	<i>Wrightia arborea</i> (Dennst.) Mabb.	Apocynaceae	Tree	Mylampala
17	<i>Wrightia tinctoria</i> (Roxb.) R. Br.	Apocynaceae	Tree	Kambippala
18	<i>Pothos scandens</i> L.	Araceae	Climber	Anapparuva
19	<i>Schefflera venulosa</i> (Wight & Arn.) Harms	Araliaceae	Shrub	Ungavalli
20	<i>Schefflera wallichiana</i> (Wight & Arn.) Harms	Araliaceae	Shrub	Modakom
21	<i>Aristolochia indica</i> L.	Aristolochiaceae	Climber	Eshwaramulla/Garudakodi

22	<i>Wattakaka volubilis</i> (L. f.) Stapf	Asclepiadaceae	Climber	Vattakakkakkoti/Kakkalankodi
23	<i>Vernonia cinerea</i> (L.) Less.	Asteraceae	Herb	Poovamkurunthal
24	<i>Stereospermum colais</i> (Buch.-Ham. ex Dillw.) Mabb.	Bignoniaceae	Tree	Pathiri/Poopathiri
25	<i>Caesalpinia bonduc</i> (L.) Roxb.	Caesalpiniaceae	Climber	Kazhanji/Kazhanchikkuru
26	<i>Saraca asoca</i> (Roxb.) de Wilde	Caesalpiniaceae	Tree	Ashokam
27	<i>Lophopetalum wightianum</i> Arn.	Celastraceae	Tree	Venkkotta
28	<i>Combretum latifolium</i> Blume	Combretaceae	Climber	
29	<i>Floscopa scandens</i> Lour.	Commelinaceae	Herb	
30	<i>Connarus monocarpus</i> L.	Connaraceae	Climber	Kuriel/Puzhukkadikaya
31	<i>Connarus wightii</i> Hook. f.	Connaraceae	Shrub	Kuringil
32	<i>Rourea minor</i> (Gaertn.) Merr.	Connaraceae	Climber	Cheriyamarikunni/Kuriel
33	<i>Erycibe paniculata</i> Roxb.	Convolvulaceae	Climber	Erumathali
34	<i>Hopea parviflora</i> Bedd.	Dipterocarpaceae	Tree	Irumbagam
35	<i>Hopea ponga</i> (Dennst.) Mabb.	Dipterocarpaceae	Tree	Eyyakam
36	<i>Vateria indica</i> L.	Dipterocarpaceae	Tree	Pandam/Payin
37	<i>Vatica chinensis</i> L.	Dipterocarpaceae	Tree	Adakkapine
38	<i>Diospyros paniculata</i> Dalz.	Ebenaceae	Tree	Karivella/Karumaram
39	<i>Elaeocarpus munronii</i> (Wight) Mast.	Elaeocarpaceae	Tree	Kalrudraksham
40	<i>Elaeocarpus serratus</i> L.	Elaeocarpaceae	Tree	Bhadraksham/Kara/Karamavu
41	<i>Elaeocarpus variabilis</i> Zmarzty	Elaeocarpaceae	Tree	Kara/Kattakara
42	<i>Antidesma acidum</i> Retz.	Euphorbiaceae	Shrub	Asaripuli
43	<i>Antidesma bunius</i> (L.) Spreng.	Euphorbiaceae	Tree	Aryaporiyan
44	<i>Antidesma montanum</i> Blume	Euphorbiaceae	Tree	Putharaval/Thathalamaram
45	<i>Briedelia stipularis</i> (L.) Blume	Euphorbiaceae	Shrub	Cherupanachi

46	<i>Glochidion zeylanicum</i> (Gaertn.) A. Juss.	Euphorbiaceae	Tree	Neervetti
47	<i>Tragia involucrata</i> L.	Euphorbiaceae	Herb	Choriyanam/Kodithoova
48	<i>Abrus precatorius</i> L.	Fabaceae	Climber	Kunnikuru
49	<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	Tree	Venga
50	<i>Vigna trilobata</i> (L.) Verdc.	Fabaceae	Climber	Kattupayar
51	<i>Hydnocarpus pentandra</i> (Buch.-Ham.) Oken	Flacourtiaceae	Tree	Marotti
52	<i>Gnetum edule</i> (Willd.) Blume	Gnetaceae	Climber	Karuthodal
53	<i>Salacia fruticosa</i> Heyne ex Lawson	Hippocratiaceae	Climber	Eakanayakam
54	<i>Curculigo orchioides</i> Gaertn.	Hypoxidaceae	Herb	Nilappana
55	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Herb	Thumba
56	<i>Ocimum gratissimum</i> L.	Lamiaceae	Shrub	Attuthulasi
57	<i>Cinnamomum malabatum</i> (Burm. f.) Blume	Lauraceae	Tree	Ilavangam
58	<i>Cinnamomum travancoricum</i> Gamble	Lauraceae	Tree	Ilavangam
59	<i>Litsea coriacea</i> (Heyne ex Meisner) Hook. f.	Lauraceae	Tree	Maravettithali
60	<i>Persea macrantha</i> (Nees) Kosterm.	Lauraceae	Tree	Kulamavu/Kulirmavu
61	<i>Careya arborea</i> Roxb.	Lecythidaceae	Tree	Pezhu
62	<i>Leea indica</i> (Burm. f.) Merr.	Leeaceae	Shrub	Chorianthali
63	<i>Leea macrophylla</i> Roxb. ex Hornem.	Leeaceae	Shrub	Njallu
64	<i>Gloriosa superba</i> L.	Liliaceae	Climber	Menthonni
65	<i>Fagraea ceilanica</i> Thunb.	Loganiaceae	Shrub	Modakam
66	<i>Strychnos nux-vomica</i> L.	Loganiaceae	Tree	Kanjiram
67	<i>Strychnos potatorum</i> L.f.	Loganiaceae	Tree	Thettamaram/Thettamparel
68	<i>Dendrophthoe falcata</i> (L. f.) Etting.	Loranthaceae	Tree	Ithikkanni
69	<i>Lagerstroemia microcarpa</i> Wight	Lythraceae	Tree	Vellilavu/Venthekku

70	<i>Hiptage benghalensis</i> (L.) Kurz	Malpighiaceae	Tree	Chittilakody
71	<i>Gossypium arboreum</i> L.	Malvaceae	Shrub	Kattuparuthi
72	<i>Urena lobata</i> L.	Malvaceae	Shrub	Uram
73	<i>Memecylon randerianum</i> SM & MR Almeida	Melastomaceae	Shrub	Kasavu
74	<i>Memecylon umbellatum</i> Burm.f.	Melastomaceae	Shrub	Kayampoomaram
75	<i>Aglaiia elaeagnoidea</i> (A. Juss.) Benth.	Meliaceae	Shrub	Punyava
76	<i>Aphanamixis polystachya</i> (Wall.) Parker	Meliaceae	Tree	Chemmaram/Karakil
77	<i>Cipadessa baccifera</i> (Roth) Miq.	Meliaceae	Tree	Kaipanarangi
78	<i>Swietenia macrophylla</i> King	Meliaceae	Tree	Mahogani/Manthagani
79	<i>Swietenia mahagoni</i> (L.) Jacq.	Meliaceae	Tree	Mahogani
80	<i>Cyclea peltata</i> (Lam.) Hook. f. & Thoms.	Menispermaceae	Climber	Padakizhangu/Padathali
81	<i>Tiliacora acuminata</i> (Poir.) Miers ex Hook.f. & Thoms.	Menispermaceae	Climber	Vallikanjiram
82	<i>Tinospora cordifolia</i> (Willd.) Miers.	Menispermaceae	Climber	Chitamruthu
83	<i>Tinospora sinensis</i> (Lour.) Merr.	Menispermaceae	Climber	Kattamruthu
84	<i>Albizia lebbek</i> (L.) Benth.	Mimosaceae	Tree	Nenmenivaka
85	<i>Xylia xylocarpa</i> (Roxb.) Taub.	Mimosaceae	Tree	Irumullu
86	<i>Ficus benghalensis</i> L.	Moraceae	Tree	Peral
87	<i>Ficus exasperata</i> Vahl	Moraceae	Tree	Parakam/Therakam
88	<i>Ficus hispida</i> L. f.	Moraceae	Tree	Thonditherakam
89	<i>Ficus microcarpa</i> L. f.	Moraceae	Tree	Ithi
90	<i>Ficus religiosa</i> L.	Moraceae	Tree	Arayal
91	<i>Myristica beddomei</i> King	Myristicaceae	Tree	Adakkapayin/Kattujathi
92	<i>Ardisia pauciflora</i> Heyne ex Roxb.	Myrsinaceae	Shrub	Muttamaram
93	<i>Syzygium caryophyllatum</i> (L.) Alston	Myrtaceae	Tree	Njara

94	<i>Syzygium zeylanicum</i> (L.) DC.	Myrtaceae	Tree	Poochappazham/Velutthakanali
95	<i>Gomphia serrata</i> (Gaertn.) Kanis	Ochnaceae	Tree	Aanaperal
96	<i>Jasminum coarctatum</i> Roxb.	Oleaceae	Climber	Vellakattumulla/Kattumulla
97	<i>Myxopyrum smilacifolium</i> (Wall.) Blume	Oleaceae	Climber	Chathuramulla
98	<i>Olea dioica</i> Roxb.	Oleaceae	Tree	Edana
99	<i>Cansjera rheedei</i> Gmel.	Opiliaceae	Climber	
100	<i>Opilia amentacea</i> Roxb.	Opiliaceae	Climber	
101	<i>Acampe praemorsa</i> (Roxb.) Blatt. & McCann	Orchidaceae	Herb	Maravazha
102	<i>Bulbophyllum sterile</i>	Orchidaceae	Herb	Mookittakaya
103	<i>Biophytum sensitivum</i> (L.) DC.	Oxalidaceae	Herb	Mukkutti
104	<i>Piper betle</i> L.	Piperaceae	Climber	Vettilakkodi
105	<i>Piper longum</i> L.	Piperaceae	Herb	Pippali/Thippali
106	<i>Piper nigrum</i> L.	Piperaceae	Climber	Kurumulaku
107	<i>Xanthophyllum arnottianum</i> Wight	Polygalaceae	Tree	Madukka
108	<i>Ziziphus oenoplia</i> (L.) Mill.	Rhamnaceae	Climber	Cheriyalantha/Cheruthudali
109	<i>Canthium angustifolium</i> Roxb.	Rubiaceae	Shrub	Kattakara
110	<i>Canthium coromandelicum</i> (Burm. f.) Alston	Rubiaceae	Shrub	Kandakara/Karamullu/ Kattaramullu
111	<i>Chassalia curviflora</i> (Wall. ex Kurz) Thw.	Rubiaceae	Shrub	Yamari/Vellakurinji
112	<i>Haldina cordifolia</i> (Roxb.) Ridsd.	Rubiaceae	Tree	Manjakadambu
113	<i>Ixora brachiata</i> Roxb. ex DC.	Rubiaceae	Tree	Marachekki/Marachethi
114	<i>Ixora coccinea</i> L.	Rubiaceae	Shrub	Chethi/Chekki/Kattuchethi/ Thechi/Thetti
115	<i>Ophiorrhiza brunonis</i> Wight & Arn.	Rubiaceae	Herb	

116	<i>Pavetta indica</i> L.	Rubiaceae	Shrub	Kamatta/Nochi/Pavetta
117	<i>Psychotria flavida</i> Talbot	Rubiaceae	Shrub	
118	<i>Glycosmis pentaphylla</i>	Rutaceae	Shrub	Panal
119	<i>Toddalia asiatica</i> (L.) Lam.	Rutaceae	Shrub	Kakkathodali/Karamullu
120	<i>Santalum album</i> L.	Santalaceae	Tree	Chandanam
121	<i>Scleropyrum pentandrum</i> (Dennst.) Mabb.	Santalaceae	Tree	Irumulli
122	<i>Allophylus cobbe</i> (L.) Raeusch.	Sapindaceae	Shrub	Mukkannanpezhu
123	<i>Lepisanthes tetraphylla</i> (Vahl) Radlk.	Sapindaceae	Tree	Kulapunna
124	<i>Schleichera oleosa</i> (Lour.) Oken	Sapindaceae	Tree	Poovam
125	<i>Madhuca neriifolia</i> (Moon) H. J. Lam	Sapotaceae	Tree	Attu-ilippa
126	<i>Mimusops elengi</i> L.	Sapotaceae	Tree	Elangi
127	<i>Ailanthus triphysa</i> (Dennst.) Alston	Simaroubaceae	Tree	Matti/Mattipala
128	<i>Smilax zeylanica</i> L.	Smilacaceae	Climber	Kareelanchi
129	<i>Grewia nervosa</i> (Lour.) Panigrahi	Tiliaceae	Shrub	Cherikkotta
130	<i>Trema orientalis</i> (L.) Blume	Ulmaceae	Shrub	Amathali
131	<i>Vitex altissima</i> L. f.	Verbenaceae	Tree	Mylellu
132	<i>Viscum capitellatum</i> Smith	Viscaceae	Parasitic Shrub	
133	<i>Viscum heyneanum</i> DC.	Viscaceae	Parasitic Shrub	
134	<i>Ampelocissus latifolia</i> (Roxb.) Planch.	Vitaceae	Climber	Chembravalli

Table 9. Flora of Parappoolkavu, Kannur District

Sl. No	Botanical Name	Family	Habit	Vernacular Name
1	<i>Justicia adhatoda</i> L.	Acanthaceae	Shrub	Aadalodakam
2	<i>Justicia wynaadensis</i> (Nees) Heyne ex Anders.	Acanthaceae	Herb	Kurinji
3	<i>Alangium salvifolium</i> (L.f.) Wang.	Alangiaceae	Climber	Valli ankolam
4	<i>Holigarna arnottiana</i> Hook. f.	Anacardiaceae	Tree	Cheru
5	<i>Artabotrys zeylanicus</i> Hook. f.	Annonaceae	Climber	Manoranjini
6	<i>Uvaria narum</i> (Dunal) Wall. ex Hook.f. & Thoms.	Annonaceae	Climber	Narumpanal
7	<i>Alstonia scholaris</i> (L.) R. Br.	Apocynaceae	Tree	Ezhilampala
8	<i>Kammelia caryophyllata</i> (Roxb.) Nicolson & Suresh	Apocynaceae	Climber	Narumarathivu
9	<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Apocynaceae	Herb	Sarpagandhi
10	<i>Rauvolfia tetraphylla</i> L.	Apocynaceae	Shrub	Pambumkolli
11	<i>Tabernaemontana alternifolia</i> L.	Apocynaceae	Tree	Kundalappala
12	<i>Wrightia arborea</i> (Dennst.) Mabb.	Apocynaceae	Tree	Mylampala
13	<i>Wrightia tinctoria</i> (Roxb.) R. Br.	Apocynaceae	Tree	Kambippala
14	<i>Pothos scandens</i> L.	Araceae	Climber	Anapparuva
15	<i>Schefflera venulosa</i> (Wight & Arn.) Harms	Araliaceae	Shrub	Ungavalli
16	<i>Schefflera wallichiana</i> (Wight & Arn.) Harms	Araliaceae	Shrub	Modakom
17	<i>Aristolochia indica</i> L.	Aristolochiaceae	Climber	Eshwaramulla/Garudakodi
18	<i>Wattakaka volubilis</i> (L. f.) Stapf	Asclepiadaceae	Climber	Vattakakkakoti/Kakkalankodi
19	<i>Vernonia cinerea</i> (L.) Less.	Asteraceae	Herb	Poovamkurunthal
20	<i>Caesalpinia bonduc</i> (L.) Roxb.	Caesalpiniaceae	Climber	Kazhanji/Kazhanchikkuru
21	<i>Saraca asoca</i> (Roxb.) de Wilde	Caesalpiniaceae	Tree	Ashokam

22	<i>Combretum latifolium</i> Blume	Combretaceae	Climber	
23	<i>Rourea minor</i> (Gaertn.) Merr.	Connaraceae	Climber	Cheriyamarikunni/Kuriel
24	<i>Erycibe paniculata</i> Roxb.	Convolvulaceae	Climber	Erumathali
25	<i>Hopea parviflora</i> Bedd.	Dipterocarpaceae	Tree	Irumbagam
26	<i>Hopea ponga</i> (Dennst.) Mabb.	Dipterocarpaceae	Tree	Eyyakam
27	<i>Vateria indica</i> L.	Dipterocarpaceae	Tree	Pandam/Payin
28	<i>Vatica chinensis</i> L.	Dipterocarpaceae	Tree	Adakkapine
29	<i>Diospyros paniculata</i> Dalz.	Ebenaceae	Tree	Karivella/Karumaram
30	<i>Elaeocarpus serratus</i> L.	Elaeocarpaceae	Tree	Bhadraksham/Kara/Karamavu
31	<i>Antidesma acidum</i> Retz.	Euphorbiaceae	Shrub	Asaripuli
32	<i>Antidesma bunius</i> (L.) Spreng.	Euphorbiaceae	Tree	Aryaporiyan
33	<i>Antidesma montanum</i> Blume	Euphorbiaceae	Tree	Putharaval/Thathalamaram
34	<i>Briedelia stipularis</i> (L.) Blume	Euphorbiaceae	Shrub	Cherupanachi
35	<i>Glochidion zeylanicum</i> (Gaertn.) A. Juss.	Euphorbiaceae	Tree	Neervetti
36	<i>Tragia involucrata</i> L.	Euphorbiaceae	Herb	Choriyanam/Kodithoova
37	<i>Abrus precatorius</i> L.	Fabaceae	Climber	Kunnikuru
38	<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	Tree	Venga
39	<i>Vigna trilobata</i> (L.) Verdc.	Fabaceae	Climber	Kattupayar
40	<i>Flacourtia indica</i> (Burm. f.) Merr.	Flacourtiaceae	Tree	Karimulli/Kattukara
41	<i>Hydnocarpus pentandra</i> (Buch.-Ham.) Oken	Flacourtiaceae	Tree	Marotti
42	<i>Gnetum edule</i> (Willd.) Blume	Gnetaceae	Climber	Karuthodal
43	<i>Salacia fruticosa</i> Heyne ex Lawson	Hippocratiaceae	Climber	Eakanayakam
44	<i>Curculigo orchoides</i> Gaertn.	Hypoxidaceae	Herb	Nilappana
45	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Herb	Thumba

46	<i>Ocimum gratissimum</i> L.	Lamiaceae	Shrub	Attuthulasi
47	<i>Cinnamomum malabratrum</i> (Burm. f.) Blume	Lauraceae	Tree	Ilavangam
48	<i>Litsea coriacea</i> (Heyne ex Meisner) Hook. f.	Lauraceae	Tree	Maravettithali
49	<i>Persea macrantha</i> (Nees) Kosterm.	Lauraceae	Tree	Kulamavu/Kulirmavu
50	<i>Careya arborea</i> Roxb.	Lecythidaceae	Tree	Pezhu
51	<i>Leea indica</i> (Burm. f.) Merr.	Leeaceae	Shrub	Chorianthali
52	<i>Leea macrophylla</i> Roxb. ex Hornem.	Leeaceae	Shrub	Njallu
53	<i>Gloriosa superba</i> L.	Liliaceae	Climber	Menthonni
54	<i>Fagraea ceilanica</i> Thunb.	Loganiaceae	Shrub	Modakam
55	<i>Strychnos nux-vomica</i> L.	Loganiaceae	Tree	Kanjiram
56	<i>Strychnos potatorum</i> L.f.	Loganiaceae	Tree	Thettamaram/Thettamparel
57	<i>Lagerstroemia microcarpa</i> Wight	Lythraceae	Tree	Vellilavu/Venthekku
58	<i>Gossypium arboreum</i> L.	Malvaceae	Shrub	Kattuparuthi
59	<i>Urena lobata</i> L.	Malvaceae	Shrub	Uram
60	<i>Memecylon umbellatum</i> Burm.f.	Melastomaceae	Shrub	Kayampoomaram
61	<i>Aglaia elaeagnoidea</i> (A. Juss.) Benth.	Meliaceae	Shrub	Punyava
62	<i>Cipadessa baccifera</i> (Roth) Miq.	Meliaceae	Tree	Kaipanarangi
63	<i>Cyclea peltata</i> (Lam.) Hook. f. & Thoms.	Menispermaceae	Climber	Padakizhangu/Padathali
64	<i>Tiliacora acuminata</i> (Poir.) Miers ex Hook.f. & Thoms.	Menispermaceae	Climber	Vallikanjiram
65	<i>Tinospora cordifolia</i> (Willd.) Miers.	Menispermaceae	Climber	Chitamruthu
66	<i>Tinospora sinensis</i> (Lour.) Merr.	Menispermaceae	Climber	Kattamruthu
67	<i>Albizia lebbeck</i> (L.) Benth.	Mimosaceae	Tree	Nenmenivaka
68	<i>Xylia xylocarpa</i> (Roxb.) Taub.	Mimosaceae	Tree	Irumullu
69	<i>Ficus exasperata</i> Vahl	Moraceae	Tree	Parakam/Therakam

70	<i>Ficus hispida</i> L. f.	Moraceae	Tree	Thonditherakam
71	<i>Ficus microcarpa</i> L. f.	Moraceae	Tree	Ithi
72	<i>Ficus religiosa</i> L.	Moraceae	Tree	Arayal
73	<i>Ardisia pauciflora</i> Heyne ex Roxb.	Myrsinaceae	Shrub	Muttamaram
74	<i>Syzygium caryophyllatum</i> (L.) Alston	Myrtaceae	Tree	Njara
75	<i>Syzygium zeylanicum</i> (L.) DC.	Myrtaceae	Tree	Poochappazham/Velutthakanali
76	<i>Gomphia serrata</i> (Gaertn.) Kanis	Ochnaceae	Tree	Aanaperal
77	<i>Jasminum coarctatum</i> Roxb.	Oleaceae	Climber	Vellakattumulla/Kattumulla
78	<i>Myxopyrum smilacifolium</i> (Wall.) Blume	Oleaceae	Climber	Chathuramulla
79	<i>Olea dioica</i> Roxb.	Oleaceae	Tree	Edana
80	<i>Cansjera rheedei</i> Gmel.	Opiliaceae	Climber	
81	<i>Acampe praemorsa</i> (Roxb.) Blatt. & McCann	Orchidaceae	Herb	Maravazha
82	<i>Bulbophyllum sterile</i>	Orchidaceae	Herb	Mookittakaya
83	<i>Biophytum sensitivum</i> (L.) DC.	Oxalidaceae	Herb	Mukkutti
84	<i>Piper nigrum</i> L.	Piperaceae	Climber	Kurumulaku
85	<i>Ziziphus oenoplia</i> (L.) Mill.	Rhamnaceae	Climber	Cheriyalantha/Cheruthudali
86	<i>Canthium angustifolium</i> Roxb.	Rubiaceae	Shrub	Kattakara
87	<i>Canthium coromandelicum</i> (Burm. f.) Alston	Rubiaceae	Shrub	Kandakara/Karamullu/ Kattaramullu
88	<i>Chassalia curviflora</i> (Wall. ex Kurz) Thw.	Rubiaceae	Shrub	Yamari/Vellakurinji
89	<i>Ixora coccinea</i> L.	Rubiaceae	Shrub	Chethi/Chekki/Kattuchethi/ Thechi/Thetti
90	<i>Pavetta indica</i> L.	Rubiaceae	Shrub	Kamatta/Nochi/Pavetta
91	<i>Glycosmis pentaphylla</i>	Rutaceae	Shrub	Panal

92	<i>Toddalia asiatica</i> (L.) Lam.	Rutaceae	Shrub	Kakkathodali/Karamullu
93	<i>Santalum album</i> L.	Santalaceae	Tree	Chandanam
94	<i>Scleropyrum pentandrum</i> (Dennst.) Mabb.	Santalaceae	Tree	Irumulli
95	<i>Allophylus cobbe</i> (L.) Raeusch.	Sapindaceae	Shrub	Mukkannanpezhu
96	<i>Schleichera oleosa</i> (Lour.) Oken	Sapindaceae	Tree	Poovam
97	<i>Mimusops elengi</i> L.	Sapotaceae	Tree	Elangi
98	<i>Ailanthus triphysa</i> (Dennst.) Alston	Simaroubaceae	Tree	Matti/Mattipala
99	<i>Smilax zeylanica</i> L.	Smilacaceae	Climber	Kareelanchi
100	<i>Grewia nervosa</i> (Lour.) Panigrahi	Tiliaceae	Shrub	Cherikkotta
101	<i>Trema orientalis</i> (L.) Blume	Ulmaceae	Shrub	Amathali
102	<i>Ampelocissus latifolia</i> (Roxb.) Planch.	Vitaceae	Climber	Chembravalli

Table 10. Flora of Thazhekkavu, Kannur District

Sl. No	Botanical Name	Family	Habit	Vernacular Name
1	<i>Cerbera odollam</i> Gaertn.	Apocynaceae	Tree	Odalam
2	<i>Parsonsia inodora</i> (Lour.) M. R. & S. M. Almeida	Apocynaceae	Climber	Peenarivalli
3	<i>Pothos scandens</i> L.	Araceae	Climber	Anapparuva
4	<i>Calamus hookerianus</i> Becc.	Arecaceae	Climber	Kallenchooral
5	<i>Avicennia marina</i> (Forssk.) Vierh.	Avicenniaceae	Tree	Cheru-uppatti
6	<i>Avicennia officinalis</i> L.	Avicenniaceae	Tree	Uppatti
7	<i>Excoecaria agallocha</i> L.	Euphorbiaceae	Tree	Kammetti/Kannampotti
8	<i>Derris trifoliata</i> Lour.	Fabaceae	Climber	Ponumvalli
9	<i>Ocimum gratissimum</i> L.	Lamiaceae	Shrub	Attuthulasi
10	<i>Memecylon randerianum</i> SM & MR Almeida	Melastomaceae	Shrub	Kasavu
11	<i>Aegiceras corniculatum</i> (L.) Balnco	Myrsinaceae	Shrub	Pookandal
12	<i>Bruguiera cylindrica</i> (L.) Blume	Rhizophoraceae	Shrub	Kuttikandal
13	<i>Rhizophora apiculata</i> Blume	Rhizophoraceae	Tree	Vallikandel
14	<i>Rhizophora mucronata</i> Poir.	Rhizophoraceae	Tree	Pranthakandel
15	<i>Morinda citrifolia</i> L.	Rubiaceae	Tree	Cherumanjanathi
16	<i>Bacopa monnieri</i> (L.) Pennell	Scrophulariaceae	Herb	Bhrammi
17	<i>Sonneratia alba</i> J. E. Smith	Sonneratiaceae	Tree	Nakshathrakandel
18	<i>Clerodendrum inerme</i> (L.) Gaertn.	Verbenaceae	Shrub	Puzhamulla
19	<i>Premna serratifolia</i> L.	Verbenaceae	Shrub	Munja

Table 11. Flora of Bhayankavu, Kozhikode District

Sl. No	Botanical Name	Family	Habit	Vernacular Name
1	<i>Justicia adhatoda</i> L.	Acanthaceae	Shrub	Aadalodakam
2	<i>Strobilanthes ciliatus</i> Nees	Acanthaceae	Shrub	Cherukurunji
3	<i>Alangium salvifolium</i> (L.f.) Wang.	Alangiaceae	Climber	Valli Akolam
4	<i>Holigarna arnottiana</i> Hook. f.	Anacardiaceae	Tree	Cheru
5	<i>Artabotrys zeylanicus</i> Hook. f.	Annonaceae	Climber	Manoranjini
6	<i>Polyalthia korintii</i> (Dunal) Benth. & Hook.f. ex Hook.f. & Thoms.	Annonaceae	Shrub	Karuvalli
7	<i>Uvaria narum</i> (Dunal) Wall. ex Hook.f. & Thoms.	Annonaceae	Climber	Narumpanal
8	<i>Alstonia scholaris</i> (L.) R. Br.	Apocynaceae	Tree	Ezhilamppala
9	<i>Kammetia caryophyllata</i> (Roxb.) Nicolson & Suresh	Apocynaceae	Climber	Narumarathivu
10	<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Apocynaceae	Herb	Sarpagandhi
11	<i>Rauvolfia tetraphylla</i> L.	Apocynaceae	Shrub	Pambumkolli
12	<i>Tabernaemontana alternifolia</i> L.	Apocynaceae	Tree	Kundalappala
13	<i>Wrightia arborea</i> (Dennst.) Mabb.	Apocynaceae	Tree	Mylampala
14	<i>Wrightia tinctoria</i> (Roxb.) R. Br.	Apocynaceae	Tree	Kambippala
15	<i>Pothos scandens</i> L.	Araceae	Climber	Anapparuva
16	<i>Schefflera venulosa</i> (Wight & Arn.) Harms	Araliaceae	Shrub	Ungavalli
17	<i>Aristolochia indica</i> L.	Aristolochiaceae	Climber	Eshwaramulla/Garudakodi
18	<i>Wattakaka volubilis</i> (L. f.) Stapf	Asclepiadaceae	Climber	Vattakakkakkoti/Kakkalankodi
19	<i>Vernonia cinerea</i> (L.) Less.	Asteraceae	Herb	Poovamkurunthal
20	<i>Combretum latifolium</i> Blume	Combretaceae	Climber	

21	<i>Connarus monocarpus</i> L.	Connaraceae	Climber	Kuriel/Puzhukkadikaya
22	<i>Rourea minor</i> (Gaertn.) Merr.	Connaraceae	Climber	Cheriyamarikunni/Kuriel
23	<i>Erycibe paniculata</i> Roxb.	Convolvulaceae	Climber	Erumathali
24	<i>Hopea parviflora</i> Bedd.	Dipterocarpaceae	Tree	Irumbagam
25	<i>Hopea ponga</i> (Dennst.) Mabb.	Dipterocarpaceae	Tree	Eyyakam
26	<i>Vateria indica</i> L.	Dipterocarpaceae	Tree	Pandam/Payin
27	<i>Vatica chinensis</i> L.	Dipterocarpaceae	Tree	Adakkapine
28	<i>Diospyros paniculata</i> Dalz.	Ebenaceae	Tree	Karivella/Karumaram
29	<i>Diospyros peregrina</i> (Gaertn.) Gurke	Ebenaceae	Tree	Panachi
30	<i>Elaeocarpus serratus</i> L.	Elaeocarpaceae	Tree	Bhadraksham/Kara/Karamavu
31	<i>Antidesma acidum</i> Retz.	Euphorbiaceae	Shrub	Asaripuli
32	<i>Antidesma bunius</i> (L.) Spreng.	Euphorbiaceae	Tree	Aryaporiyan
33	<i>Antidesma montanum</i> Blume	Euphorbiaceae	Tree	Putharaval/Thathalamaram
34	<i>Briedelia stipularis</i> (L.) Blume	Euphorbiaceae	Shrub	Cherupanachi
35	<i>Glochidion zeylanicum</i> (Gaertn.) A. Juss.	Euphorbiaceae	Tree	Neervetti
36	<i>Tragia involucrata</i> L.	Euphorbiaceae	Herb	Choriyanam/Kodithoova
37	<i>Abrus precatorius</i> L.	Fabaceae	Climber	Kunnikuru
38	<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	Tree	Venga
39	<i>Vigna trilobata</i> (L.) Verdc.	Fabaceae	Climber	Kattupayar
40	<i>Flacourtia indica</i> (Burm. f.) Merr.	Flacourtiaceae	Tree	Karimulli/Kattukara
41	<i>Hydnocarpus pentandra</i> (Buch.-Ham.) Oken	Flacourtiaceae	Tree	Marotti
42	<i>Gnetum edule</i> (Willd.) Blume	Gnetaceae	Climber	Karuthodal
43	<i>Salacia fruticosa</i> Heyne ex Lawson	Hippocratiaceae	Climber	Eakanayakam
44	<i>Curculigo orchoides</i> Gaertn.	Hypoxidaceae	Herb	Nilappana

45	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Herb	Thumba
46	<i>Ocimum gratissimum</i> L.	Lamiaceae	Shrub	Attuthulasi
47	<i>Cinnamomum malabattrum</i> (Burm. f.) Blume	Lauraceae	Tree	Ilavangam
48	<i>Litsea coriacea</i> (Heyne ex Meisner) Hook. f.	Lauraceae	Tree	Maravettithali
49	<i>Persea macrantha</i> (Nees) Kosterm.	Lauraceae	Tree	Kulamavu/Kulirmavu
50	<i>Careya arborea</i> Roxb.	Lecythidaceae	Tree	Pezhu
51	<i>Leea indica</i> (Burm. f.) Merr.	Leeaceae	Shrub	Chorianthali
52	<i>Leea macrophylla</i> Roxb. ex Hornem.	Leeaceae	Shrub	Njallu
53	<i>Gloriosa superba</i> L.	Liliaceae	Climber	Menthonni
54	<i>Strychnos nux-vomica</i> L.	Loganiaceae	Tree	Kanjiram
55	<i>Dendrophthoe falcata</i> (L. f.) Etting.	Loranthaceae	Tree	Ithikkanni
56	<i>Lagerstroemia microcarpa</i> Wight	Lythraceae	Tree	Vellilavu/Venthekkku
57	<i>Magnolia champaca</i> (L.) Baill. ex Pierre	Magnoliaceae	Tree	Chembakam
58	<i>Hiptage benghalensis</i> (L.) Kurz	Malpighiaceae	Tree	Chittilakody
59	<i>Urena lobata</i> L.	Malvaceae	Shrub	Uram
60	<i>Memecylon umbellatum</i> Burm.f.	Melastomaceae	Shrub	Kayampoomaram
61	<i>Aphanamixis polystachya</i> (Wall.) Parker	Meliaceae	Tree	Chemmaram/Karakil
62	<i>Cipadessa baccifera</i> (Roth) Miq.	Meliaceae	Tree	Kaipanarangi
63	<i>Swietenia macrophylla</i> King	Meliaceae	Tree	Mahogani/Manthagani
64	<i>Cyclea peltata</i> (Lam.) Hook. f. & Thoms.	Menispermaceae	Climber	Padakizhangu/Padathali
65	<i>Tiliacora acuminata</i> (Poir.) Miers ex Hook.f. & Thoms.	Menispermaceae	Climber	Vallikanjiram
66	<i>Tinospora cordifolia</i> (Willd.) Miers.	Menispermaceae	Climber	Chitamruthu
67	<i>Tinospora sinensis</i> (Lour.) Merr.	Menispermaceae	Climber	Kattamruthu
68	<i>Albizia lebbek</i> (L.) Benth.	Mimosaceae	Tree	Nenmenivaka

69	<i>Xylia xylocarpa</i> (Roxb.) Taub.	Mimosaceae	Tree	Irumullu
70	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	Tree	Chakkamaram/Pilavu
71	<i>Artocarpus hirsutus</i> Lam.	Moraceae	Tree	Anjili/Ayini
72	<i>Ficus benghalensis</i> L.	Moraceae	Tree	Peral
73	<i>Ficus exasperata</i> Vahl	Moraceae	Tree	Parakam/Therakam
74	<i>Ficus hispida</i> L. f.	Moraceae	Tree	Thonditherakam
75	<i>Ficus microcarpa</i> L. f.	Moraceae	Tree	Ithi
76	<i>Ficus religiosa</i> L.	Moraceae	Tree	Arayal
77	<i>Syzygium caryophyllatum</i> (L.) Alston	Myrtaceae	Tree	Njara
78	<i>Syzygium zeylanicum</i> (L.) DC.	Myrtaceae	Tree	Poochappazham/Velutthakanali
79	<i>Gomphia serrata</i> (Gaertn.) Kanis	Ochnaceae	Tree	Aanaperal
80	<i>Jasminum coarctatum</i> Roxb.	Oleaceae	Climber	Vellakattumulla/Kattumulla
81	<i>Myxopyrum smilacifolium</i> (Wall.) Blume	Oleaceae	Climber	Chathuramulla
82	<i>Olea dioica</i> Roxb.	Oleaceae	Tree	Edana
83	<i>Acampe praemorsa</i> (Roxb.) Blatt. & McCann	Orchidaceae	Herb	Maravazha
84	<i>Bulbophyllum sterile</i>	Orchidaceae	Herb	Mookittakaya
85	<i>Biophytum sensitivum</i> (L.) DC.	Oxalidaceae	Herb	Mukkutti
86	<i>Piper betle</i> L.	Piperaceae	Climber	Vetilakkodi
87	<i>Piper longum</i> L.	Piperaceae	Herb	Pippali/Thippali
88	<i>Piper nigrum</i> L.	Piperaceae	Climber	Kurumulaku
89	<i>Ziziphus oenoplia</i> (L.) Mill.	Rhamnaceae	Climber	Cheriyalantha/Cheruthudali
90	<i>Canthium angustifolium</i> Roxb.	Rubiaceae	Shrub	Kattakara
91	<i>Canthium coromandelicum</i> (Burm. f.) Alston	Rubiaceae	Shrub	Kandakara/Karamullu/ Kattaramullu

92	<i>Chassalia curviflora</i> (Wall. ex Kurz) Thw.	Rubiaceae	Shrub	Yamari/Vellakurinji
93	<i>Ixora coccinea</i> L.	Rubiaceae	Shrub	Chethi/Chekki/Kattuchethi/ Thechi/Thetti
94	<i>Pavetta indica</i> L.	Rubiaceae	Shrub	Kamatta/Nochi/Pavetta
95	<i>Glycosmis pentaphylla</i>	Rutaceae	Shrub	Panal
96	<i>Toddalia asiatica</i> (L.) Lam.	Rutaceae	Shrub	Kakkathodali/Karamullu
97	<i>Zanthoxylum rhetsa</i> (Roxb.) DC.	Rutaceae	Tree	Kothumurikku/Mullilam
98	<i>Santalum album</i> L.	Santalaceae	Tree	Chandanam
99	<i>Allophylus cobbe</i> (L.) Raeusch.	Sapindaceae	Shrub	Mukkannanpezhu
100	<i>Schleichera oleosa</i> (Lour.) Oken	Sapindaceae	Tree	Poovam
101	<i>Madhuca neriifolia</i> (Moon) H. J. Lam	Sapotaceae	Tree	Attu-ilippa
102	<i>Mimusops elengi</i> L.	Sapotaceae	Tree	Elangi
103	<i>Ailanthus triphysa</i> (Dennst.) Alston	Simaroubaceae	Tree	Matti/Mattipala
104	<i>Smilax zeylanica</i> L.	Smilacaceae	Climber	Kareelanchi
105	<i>Grewia nervosa</i> (Lour.) Panigrahi	Tiliaceae	Shrub	Cherikkotta
106	<i>Trema orientalis</i> (L.) Blume	Ulmaceae	Shrub	Amathali
107	<i>Ampelocissus latifolia</i> (Roxb.) Planch.	Vitaceae	Climber	Chembravalli

Table 12. Flora of Poyilkkavu, Kozhikode District

Sl. No	Botanical Name	Family	Habit	Vernacular Name
1	<i>Eranthemum capense</i> L.	Acanthaceae	Herb	
2	<i>Justicia adhatoda</i> L.	Acanthaceae	Shrub	Aadalodakam
3	<i>Strobilanthes ciliatus</i> Nees	Acanthaceae	Shrub	Cherukurunji
4	<i>Alangium salvifolium</i> (L.f.) Wang.	Alangiaceae	Climber	Valli ankolam
5	<i>Holigarna arnottiana</i> Hook. f.	Anacardiaceae	Tree	Cheru
6	<i>Uvaria narum</i> (Dunal) Wall. ex Hook.f. & Thoms.	Annonaceae	Climber	Narumpanal
7	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Herb	Kodangal
8	<i>Alstonia scholaris</i> (L.) R. Br.	Apocynaceae	Tree	Ezhilamppala
9	<i>Chonemorpha grandiflora</i> (Roth) M. R. & S. M. Almeida	Apocynaceae	Climber	Appuppanthadi
10	<i>Kammetia caryophyllata</i> (Roxb.) Nicolson & Suresh	Apocynaceae	Climber	Narumarathivu
11	<i>Parsonsia inodora</i> (Lour.) M. R. & S. M. Almeida	Apocynaceae	Climber	Peenarivalli
12	<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Apocynaceae	Herb	Sarpagandhi
13	<i>Rauvolfia tetraphylla</i> L.	Apocynaceae	Shrub	Pambunkolli
14	<i>Tabernaemontana alternifolia</i> L.	Apocynaceae	Tree	Kundalappala
15	<i>Wrightia arborea</i> (Dennst.) Mabb.	Apocynaceae	Tree	Mylampala
16	<i>Wrightia tinctoria</i> (Roxb.) R. Br.	Apocynaceae	Tree	Kambippala
17	<i>Pothos scandens</i> L.	Araceae	Climber	Anapparuva
18	<i>Aristolochia indica</i> L.	Aristolochiaceae	Climber	Eshwaramulla/Garudakodi
19	<i>Wattakaka volubilis</i> (L. f.) Stapf	Asclepiadaceae	Climber	Vattakakkakoti/Kakkalankodi
20	<i>Vernonia cinerea</i> (L.) Less.	Asteraceae	Herb	Poovamkurunthal

21	<i>Canarium strictum</i> Roxb.	Burseraceae	Tree	Karuthakungiliyam
22	<i>Saraca asoca</i> (Roxb.) de Wilde	Caesalpiniaceae	Tree	Ashokam
23	<i>Combretum latifolium</i> Blume	Combretaceae	Climber	
24	<i>Floscopa scandens</i> Lour.	Commelinaceae	Herb	
25	<i>Connarus monocarpus</i> L.	Connaraceae	Climber	Kuriel/Puzhukkadikaya
26	<i>Connarus wightii</i> Hook. f.	Connaraceae	Shrub	Kuringil
27	<i>Rourea minor</i> (Gaertn.) Merr.	Connaraceae	Climber	Cheriyamarikunni/Kuriel
28	<i>Erycibe paniculata</i> Roxb.	Convolvulaceae	Climber	Erumathali
29	<i>Cycas circinalis</i> L.	Cycadaceae	Shrub	Eenth/Eenthinpana
30	<i>Hopea parviflora</i> Bedd.	Dipterocarpaceae	Tree	Irumbagam
31	<i>Hopea ponga</i> (Dennst.) Mabb.	Dipterocarpaceae	Tree	Eyyakam
32	<i>Vateria indica</i> L.	Dipterocarpaceae	Tree	Pandam/Payin
33	<i>Vatica chinensis</i> L.	Dipterocarpaceae	Tree	Adakkapine
34	<i>Diospyros paniculata</i> Dalz.	Ebenaceae	Tree	Karivella/Karumaram
35	<i>Diospyros peregrina</i> (Gaertn.) Gurke	Ebenaceae	Tree	Panachi
36	<i>Elaeocarpus serratus</i> L.	Elaeocarpaceae	Tree	Bhadraksham/Kara/Karamavu
37	<i>Antidesma acidum</i> Retz.	Euphorbiaceae	Shrub	Asaripuli
38	<i>Antidesma bunius</i> (L.) Spreng.	Euphorbiaceae	Tree	Aryaporian
39	<i>Antidesma montanum</i> Blume	Euphorbiaceae	Tree	Putharaval/Thathalamaram
40	<i>Briedelia stipularis</i> (L.) Blume	Euphorbiaceae	Shrub	Cherupanachi
41	<i>Glochidion zeylanicum</i> (Gaertn.) A. Juss.	Euphorbiaceae	Tree	Neervetti
42	<i>Tragia involucrata</i> L.	Euphorbiaceae	Herb	Choriyanam/Kodithoova
43	<i>Abrus precatorius</i> L.	Fabaceae	Climber	Kunnikuru
44	<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	Tree	Venga

45	<i>Vigna trilobata</i> (L.) Verdc.	Fabaceae	Climber	Kattupayar
46	<i>Flacourtia indica</i> (Burm. f.) Merr.	Flacourtiaceae	Tree	Karimulli/Kattukara
47	<i>Hydnocarpus pentandra</i> (Buch.-Ham.) Oken	Flacourtiaceae	Tree	Marotti
48	<i>Gnetum edule</i> (Willd.) Blume	Gnetaceae	Climber	Karuthodal
49	<i>Salacia fruticosa</i> Heyne ex Lawson	Hippocratiaceae	Climber	Eakanayakam
50	<i>Curculigo orchoides</i> Gaertn.	Hypoxidaceae	Herb	Nilappana
51	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Herb	Thumba
52	<i>Ocimum gratissimum</i> L.	Lamiaceae	Shrub	Attuthulasi
53	<i>Cinnamomum malabatum</i> (Burm. f.) Blume	Lauraceae	Tree	Ilavangam
54	<i>Litsea coriacea</i> (Heyne ex Meisner) Hook. f.	Lauraceae	Tree	Maravettithali
55	<i>Persea macrantha</i> (Nees) Kosterm.	Lauraceae	Tree	Kulamavu/Kulirmavu
56	<i>Careya arborea</i> Roxb.	Lecythidaceae	Tree	Pezhu
57	<i>Leea indica</i> (Burm. f.) Merr.	Leeaceae	Shrub	Chorianthali
58	<i>Leea macrophylla</i> Roxb. ex Hornem.	Leeaceae	Shrub	Njallu
59	<i>Gloriosa superba</i> L.	Liliaceae	Climber	Menthonni
60	<i>Fagraea ceilanica</i> Thunb.	Loganiaceae	Shrub	Modakam
61	<i>Strychnos nux-vomica</i> L.	Loganiaceae	Tree	Kanjiram
62	<i>Dendrophthoe falcata</i> (L. f.) Etting.	Loranthaceae	Tree	Ithikkanni
63	<i>Lagerstroemia microcarpa</i> Wight	Lythraceae	Tree	Vellilavu/Venthekku
64	<i>Magnolia champaca</i> (L.) Baill. ex Pierre	Magnoliaceae	Tree	Chembakam
65	<i>Hiptage benghalensis</i> (L.) Kurz	Malpighiaceae	Tree	Chittilakody
66	<i>Urena lobata</i> L.	Malvaceae	Shrub	Uram
67	<i>Memecylon randerianum</i> SM & MR Almeida	Melastomaceae	Shrub	Kasavu
68	<i>Memecylon umbellatum</i> Burm.f.	Melastomaceae	Shrub	Kayampoomaram

69	<i>Aphanamixis polystachya</i> (Wall.) Parker	Meliaceae	Tree	Chemmaram/Karakil
70	<i>Cipadessa baccifera</i> (Roth) Miq.	Meliaceae	Tree	Kaipanarangi
71	<i>Swietenia macrophylla</i> King	Meliaceae	Tree	Mahogani/Manthagani
72	<i>Cyclea peltata</i> (Lam.) Hook. f. & Thoms.	Menispermaceae	Climber	Padakizhangu/Padathali
73	<i>Tiliacora acuminata</i> (Poir.) Miers ex Hook.f. & Thoms.	Menispermaceae	Climber	Vallikanjiram
74	<i>Tinospora cordifolia</i> (Willd.) Miers.	Menispermaceae	Climber	Chitamruthu
75	<i>Tinospora sinensis</i> (Lour.) Merr.	Menispermaceae	Climber	Kattamruthu
76	<i>Albizia lebbbeck</i> (L.) Benth.	Mimosaceae	Tree	Nenmenivaka
77	<i>Xylia xylocarpa</i> (Roxb.) Taub.	Mimosaceae	Tree	Irumullu
78	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	Tree	Chakkamaram/Pilavu
79	<i>Artocarpus hirsutus</i> Lam.	Moraceae	Tree	Anjili/Ayani
80	<i>Ficus benghalensis</i> L.	Moraceae	Tree	Peral
81	<i>Ficus exasperata</i> Vahl	Moraceae	Tree	Parakam/Therakam
82	<i>Ficus hispida</i> L. f.	Moraceae	Tree	Thonditherakam
83	<i>Ficus microcarpa</i> L. f.	Moraceae	Tree	Ithi
84	<i>Ficus religiosa</i> L.	Moraceae	Tree	Arayal
85	<i>Syzygium caryophyllatum</i> (L.) Alston	Myrtaceae	Tree	Njara
86	<i>Syzygium zeylanicum</i> (L.) DC.	Myrtaceae	Tree	Poochappazham/Velutthakanali
87	<i>Gomphia serrata</i> (Gaertn.) Kanis	Ochnaceae	Tree	Aanaperal
88	<i>Jasminum coarctatum</i> Roxb.	Oleaceae	Climber	Vellakattumulla/Kattumulla
89	<i>Myxopyrum smilacifolium</i> (Wall.) Blume	Oleaceae	Climber	Chathuramulla
90	<i>Olea dioica</i> Roxb.	Oleaceae	Tree	Edana
91	<i>Cansjera rheedei</i> Gmel.	Opiliaceae	Climber	
92	<i>Acampe praemorsa</i> (Roxb.) Blatt. & McCann	Orchidaceae	Herb	Maravazha

93	<i>Bulbophyllum sterile</i>	Orchidaceae	Herb	Mookittakaya
94	<i>Biophytum sensitivum</i> (L.) DC.	Oxalidaceae	Herb	Mukkutti
95	<i>Piper betle</i> L.	Piperaceae	Climber	Vetilakkodi
96	<i>Piper longum</i> L.	Piperaceae	Herb	Pippali/Thippali
97	<i>Piper nigrum</i> L.	Piperaceae	Climber	Kurumulaku
98	<i>Ziziphus oenoplia</i> (L.) Mill.	Rhamnaceae	Climber	Cheriyalantha/Cheruthudali
99	<i>Canthium angustifolium</i> Roxb.	Rubiaceae	Shrub	Kattakara
100	<i>Canthium coromandelicum</i> (Burm. f.) Alston	Rubiaceae	Shrub	Kandakara/Karamullu/ Kattaramullu
101	<i>Chassalia curviflora</i> (Wall. ex Kurz) Thw.	Rubiaceae	Shrub	Yamari/Vellakurinji
102	<i>Ixora coccinea</i> L.	Rubiaceae	Shrub	Chethi/Chekki/Kattuchethi/ Thechi/Thetti
103	<i>Pavetta indica</i> L.	Rubiaceae	Shrub	Kamatta/Nochi/Pavetta
104	<i>Pavetta zeylanica</i> (Hook. f.) Gamble	Rubiaceae	Shrub	
105	<i>Glycosmis pentaphylla</i>	Rutaceae	Shrub	Panal
106	<i>Toddalia asiatica</i> (L.) Lam.	Rutaceae	Shrub	Kakkathodali/Karamullu
107	<i>Zanthoxylum rhetsa</i> (Roxb.) DC.	Rutaceae	Tree	Kothumurikku/Mullilam
108	<i>Santalum album</i> L.	Santalaceae	Tree	Chandanam
109	<i>Scleropyrum pentandrum</i> (Dennst.) Mabb.	Santalaceae	Tree	Irumulli
110	<i>Allophylus cobbe</i> (L.) Raeusch.	Sapindaceae	Shrub	Mukkannanpezhu
111	<i>Lepisanthes tetraphylla</i> (Vahl) Radlk.	Sapindaceae	Tree	Kulapunna
112	<i>Schleichera oleosa</i> (Lour.) Oken	Sapindaceae	Tree	Poovam
113	<i>Madhuca neriifolia</i> (Moon) H. J. Lam	Sapotaceae	Tree	Attu-ilippa
114	<i>Mimusops elengi</i> L.	Sapotaceae	Tree	Elangi

115	<i>Smilax zeylanica</i> L.	Smilacaceae	Climber	Kareelanchi
116	<i>Grewia nervosa</i> (Lour.) Panigrahi	Tiliaceae	Shrub	Cherikkotta
117	<i>Trema orientalis</i> (L.) Blume	Ulmaceae	Shrub	Amathali
118	<i>Vitex altissima</i> L. f.	Verbenaceae	Tree	Mylellu
119	<i>Viscum capitellatum</i> Smith	Viscaceae	Parasitic Shrub	
120	<i>Ampelocissus latifolia</i> (Roxb.) Planch.	Vitaceae	Climber	Chembravalli
121	<i>Cissus trilobata</i> Lam.	Vitaceae	Climber	Neelachunnambuvalli

Table 13. Flora of Thurayilkavu, Kozhikode District

Sl . No	Botanical Name	Family	Habit	Vernacular Name
1	<i>Holigarna arnottiana</i> Hook. f.	Anacardiaceae	Tree	Cheru
2	<i>Uvaria narum</i> (Dunal) Wall. ex Hook.f. & Thoms.	Annonaceae	Climber	Narumpanal
3	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Herb	Kodangal
4	<i>Alstonia scholaris</i> (L.) R. Br.	Apocynaceae	Tree	Ezhilampala
5	<i>Kammetia caryophyllata</i> (Roxb.) Nicolson & Suresh	Apocynaceae	Climber	Narumarathivu
6	<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Apocynaceae	Herb	Sarpagandhi
7	<i>Rauvolfia tetraphylla</i> L.	Apocynaceae	Shrub	Pambumkolli
8	<i>Wrightia arborea</i> (Dennst.) Mabb.	Apocynaceae	Tree	Mylampala
9	<i>Pothos scandens</i> L.	Araceae	Climber	Anapparuva
10	<i>Aristolochia indica</i> L.	Aristolochiaceae	Climber	Eshwaramulla/Garudakodi
11	<i>Wattakaka volubilis</i> (L. f.) Stapf	Asclepiadaceae	Climber	Vattakakkakoti/Kakkalankodi

12	<i>Vernonia cinerea</i> (L.) Less.	Asteraceae	Herb	Poovamkurunthal
13	<i>Saraca asoca</i> (Roxb.) de Wilde	Caesalpiniaceae	Tree	Ashokam
14	<i>Lophopetalum wightianum</i> Arn.	Celastraceae	Tree	Venkkotta
15	<i>Combretum latifolium</i> Blume	Combretaceae	Climber	
16	<i>Terminalia cuneata</i> Roth	Combretaceae	Tree	Attumaruthu/Kattukadukka
17	<i>Terminalia elliptica</i> Willd.,	Combretaceae	Tree	Karimaruthu
18	<i>Rourea minor</i> (Gaertn.) Merr.	Connaraceae	Climber	Cheriyamarikunni/Kuriel
19	<i>Erycibe paniculata</i> Roxb.	Convolvulaceae	Climber	Erumathali
20	<i>Hopea parviflora</i> Bedd.	Dipterocarpaceae	Tree	Irumbagam
21	<i>Hopea ponga</i> (Dennst.) Mabb.	Dipterocarpaceae	Tree	Eyyakam
22	<i>Vateria indica</i> L.	Dipterocarpaceae	Tree	Pandam/Payin
23	<i>Vatica chinensis</i> L.	Dipterocarpaceae	Tree	Adakkapine
24	<i>Diospyros affinis</i> Thw.	Ebenaceae	Tree	
25	<i>Diospyros paniculata</i> Dalz.	Ebenaceae	Tree	Karivella/Karumaram
26	<i>Diospyros peregrina</i> (Gaertn.) Gurke	Ebenaceae	Tree	Panachi
27	<i>Elaeocarpus serratus</i> L.	Elaeocarpaceae	Tree	Bhadraksham/Kara/Karamavu
28	<i>Antidesma acidum</i> Retz.	Euphorbiaceae	Shrub	Asaripuli
29	<i>Antidesma bunius</i> (L.) Spreng.	Euphorbiaceae	Tree	Aryaporiyan
30	<i>Antidesma montanum</i> Blume	Euphorbiaceae	Tree	Putharaval/Thathalamaram
31	<i>Briedelia stipularis</i> (L.) Blume	Euphorbiaceae	Shrub	Cherupanachi
32	<i>Glochidion zeylanicum</i> (Gaertn.) A. Juss.	Euphorbiaceae	Tree	Neervetti
33	<i>Tragia involucrata</i> L.	Euphorbiaceae	Herb	Choriyanam/Kodithoova
34	<i>Abrus precatorius</i> L.	Fabaceae	Climber	Kunnikuru

35	<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	Tree	Venga
36	<i>Vigna trilobata</i> (L.) Verdc.	Fabaceae	Climber	Kattupayar
37	<i>Hydnocarpus pentandra</i> (Buch.-Ham.) Oken	Flacourtiaceae	Tree	Marotti
38	<i>Gnetum edule</i> (Willd.) Blume	Gnetaceae	Climber	Karuthodal
39	<i>Salacia fruticosa</i> Heyne ex Lawson	Hippocratiaceae	Climber	Eakanayakam
40	<i>Curculigo orchioides</i> Gaertn.	Hypoxidaceae	Herb	Nilappana
41	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Herb	Thumba
42	<i>Ocimum gratissimum</i> L.	Lamiaceae	Shrub	Attuthulasi
43	<i>Cinnamomum malabatum</i> (Burm. f.) Blume	Lauraceae	Tree	Ilavangam
44	<i>Litsea coriacea</i> (Heyne ex Meisner) Hook. f.	Lauraceae	Tree	Maravettithali
45	<i>Persea macrantha</i> (Nees) Kosterm.	Lauraceae	Tree	Kulamavu/Kulirmavu
46	<i>Barringtonia acutangula</i> (L.) Gaertn.	Lecythidaceae	Tree	Attupezhu
47	<i>Careya arborea</i> Roxb.	Lecythidaceae	Tree	Pezhu
48	<i>Leea indica</i> (Burm. f.) Merr.	Leeaceae	Shrub	Choriantali
49	<i>Leea macrophylla</i> Roxb. ex Hornem.	Leeaceae	Shrub	Njallu
50	<i>Strychnos nux-vomica</i> L.	Loganiaceae	Tree	Kanjiram
51	<i>Dendrophthoe falcata</i> (L. f.) Etting.	Loranthaceae	Tree	Ithikkanni
52	<i>Lagerstroemia microcarpa</i> Wight	Lythraceae	Tree	Vellilavu/Venthekku
53	<i>Magnolia champaca</i> (L.) Baill. ex Pierre	Magnoliaceae	Tree	Chembakam
54	<i>Hiptage benghalensis</i> (L.) Kurz	Malpighiaceae	Tree	Chittilakody
55	<i>Urena lobata</i> L.	Malvaceae	Shrub	Uram
56	<i>Memecylon umbellatum</i> Burm.f.	Melastomaceae	Shrub	Kayampoomaram
57	<i>Aglaia elaeagnoidea</i> (A. Juss.) Benth.	Meliaceae	Shrub	Punyava
58	<i>Aphanamixis polystachya</i> (Wall.) Parker	Meliaceae	Tree	Chemmaram/Karakil

59	<i>Swietenia macrophylla</i> King	Meliaceae	Tree	Mahogani/Manthagani
60	<i>Cyclea peltata</i> (Lam.) Hook. f. & Thoms.	Menispermaceae	Climber	Padakizhangu/Padathali
61	<i>Tiliacora acuminata</i> (Poir.) Miers ex Hook.f. & Thoms.	Menispermaceae	Climber	Vallikanjiram
62	<i>Tinospora cordifolia</i> (Willd.) Miers.	Menispermaceae	Climber	Chitamruthu
63	<i>Tinospora sinensis</i> (Lour.) Merr.	Menispermaceae	Climber	Kattamruthu
64	<i>Albizia lebbek</i> (L.) Benth.	Mimosaceae	Tree	Nenmenivaka
65	<i>Xylia xylocarpa</i> (Roxb.) Taub.	Mimosaceae	Tree	Irumullu
66	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	Tree	Chakkamaram/Pilavu
67	<i>Artocarpus hirsutus</i> Lam.	Moraceae	Tree	Anjili/Ayani
68	<i>Ficus benghalensis</i> L.	Moraceae	Tree	Peral
69	<i>Ficus exasperata</i> Vahl	Moraceae	Tree	Parakam/Therakam
70	<i>Ficus microcarpa</i> L. f.	Moraceae	Tree	Ithi
71	<i>Ficus religiosa</i> L.	Moraceae	Tree	Arayal
72	<i>Myristica beddomei</i> King	Myristicaceae	Tree	Adakkapayin/Kattujathi
73	<i>Syzygium caryophyllatum</i> (L.) Alston	Myrtaceae	Tree	Njara
74	<i>Syzygium zeylanicum</i> (L.) DC.	Myrtaceae	Tree	Poochappazham/Velutthakanali
75	<i>Gomphia serrata</i> (Gaertn.) Kanis	Ochnaceae	Tree	Aanaperal
76	<i>Myxopyrum smilacifolium</i> (Wall.) Blume	Oleaceae	Climber	Chathuramulla
77	<i>Olea dioica</i> Roxb.	Oleaceae	Tree	Edana
78	<i>Acampe praemorsa</i> (Roxb.) Blatt. & McCann	Orchidaceae	Herb	Maravazha
79	<i>Bulbophyllum sterile</i>	Orchidaceae	Herb	Mookittakaya
80	<i>Biophytum sensitivum</i> (L.) DC.	Oxalidaceae	Herb	Mukkutti
81	<i>Piper nigrum</i> L.	Piperaceae	Climber	Kurumulaku
82	<i>Ziziphus oenoplia</i> (L.) Mill.	Rhamnaceae	Climber	Cheriyalantha/Cheruthudali

83	<i>Canthium angustifolium</i> Roxb.	Rubiaceae	Shrub	Kattakara
84	<i>Canthium coromandelicum</i> (Burm. f.) Alston	Rubiaceae	Shrub	Kandakara/Karamullu/ Kattaramullu
85	<i>Chassalia curviflora</i> (Wall. ex Kurz) Thw.	Rubiaceae	Shrub	Yamari/Vellakurinji
86	<i>Geophila repens</i> (L.) Johnst.	Rubiaceae	Herb	Karimutthil/Karinkudungal
87	<i>Haldina cordifolia</i> (Roxb.) Ridsd.	Rubiaceae	Tree	Manjakadambu
88	<i>Ixora coccinea</i> L.	Rubiaceae	Shrub	Chethi/Chekki/Kattuchethi/ Thechi/Thetti
89	<i>Pavetta indica</i> L.	Rubiaceae	Shrub	Kamatta/Nochi/Pavetta
90	<i>Zanthoxylum rhetsa</i> (Roxb.) DC.	Rutaceae	Tree	Kothumurikku/Mullilam
91	<i>Santalum album</i> L.	Santalaceae	Tree	Chandanam
92	<i>Scleropyrum pentandrum</i> (Dennst.) Mabb.	Santalaceae	Tree	Irumulli
93	<i>Allophylus cobbe</i> (L.) Raeusch.	Sapindaceae	Shrub	Mukkannanpezhru
94	<i>Schleichera oleosa</i> (Lour.) Oken	Sapindaceae	Tree	Poovam
95	<i>Madhuca neriifolia</i> (Moon) H. J. Lam	Sapotaceae	Tree	Attu-ilippa
96	<i>Mimusops elengi</i> L.	Sapotaceae	Tree	Elangi
97	<i>Ailanthus triphysa</i> (Dennst.) Alston	Simaroubaceae	Tree	Matti/Mattipala
98	<i>Smilax zeylanica</i> L.	Smilacaceae	Climber	Kareelanchi
99	<i>Grewia nervosa</i> (Lour.) Panigrahi	Tiliaceae	Shrub	Cherikkotta
100	<i>Trema orientalis</i> (L.) Blume	Ulmaceae	Shrub	Amathali
101	<i>Ampelocissus latifolia</i> (Roxb.) Planch.	Vitaceae	Climber	Chembravalli

4.1.1 Systematics of the Flora

The important plants identified from the select sacred groves of malabar are treated in the alphabetic order of families.

Acanthaceae

Asystasia chelonoides Nees in Wall., Pl. Asiat. Rar. 3: 89. 1832; Hook. f., Fl. Brit. India 4: 493. 1884; Gamble, Fl. Pres. Madras 1063(744). 1924; Manilal & Sivar., Fl. Calicut 222. 1982; Manilal, Fl. Silent Valley 202. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 335. 1996; Sasidh., Fl. Shenduruny WLS 232. 1997; Sasidh., Fl. Chinnar WLS 230. 1999; Mohanan & Sivad., Fl. Agasthyamala 504. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 375. 2005.

Asystasia chelonoides Nees var. *quadrangularis* Clarke in Hook. f., Fl. Brit. India 4: 494. 1884; Gamble, Fl. Pres. Madras 1063(744). 1924; Mohanan, Fl. Quilon Dist. 300. 1984; Vajr., Fl. Palghat Dist. 343. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 343. 1994.

Family: Acanthaceae

Habit: Shrub

Flowering & Fruiting: January-March

Vernacular Name: Murikootipacha (Mal.)

Distribution: Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Eranthemum capense L., Sp. Pl. 9. 1753, var. *capense*; Hook. f., Fl. Brit. India 4: 525. 1885; Gamble, Fl. Pres. Madras 1078(720). 1924; Manilal & Sivar., Fl. Calicut 216. 1982; Mohanan, Fl. Quilon Dist. 302. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 335. 1988; Babu, Fl. Malappuram Dist. 577. 1990; Vajr., Fl. Palghat Dist. 348. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 346. 1994; Subram., Fl. Thenmala Div. 265. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 15. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 338. 1996; Sivar. & Mathew, Fl. Nilambur 498. 1997; Sasidh., Fl. Shenduruny WLS 233. 1997; Sasidh., Fl. Periyar Tiger Reserve 295. 1998; Sasidh., Fl. Chinnar WLS 234. 1999; Sunil, Fl. Pl. Alappuzha Dist. 684. 2000; Sunil, Fl. Pl. Alappuzha Dist. 684. 2000; Pradeep, Fl. Vellarimala 112. 2000; Sasidh., Fl. Parambikulam WLS 228. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 378. 2005.

Family: Acanthaceae

Habit: Herb

Flowering & Fruiting: January-March

Distribution: Poyilkavu (Kozhikode Dist.), Kammadathukavu (Kasaragod Dist.)

Justicia adhatoda L., Sp. Pl. 15. 1753; Ansari, Fl. Kasaragod Div. 283. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 303. 1989; Ramach. & V. J. Nair, Fl. Cannanore Dist. 340. 1988; Babu, Fl. Malappuram Dist. 585. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 348. 1994; Subram., Fl. Thenmala Div. 274. 1995; Sivar. & Mathew, Fl. Nilambur 505. 1997; Sunil, Fl. Pl. Alappuzha Dist. 689. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 383. 2005.

Family: Acanthaceae

Habit: Shrub

Flowering & Fruiting: Throughout the year

Vernacular Name: Aadalodakam/Pothadalotakam/Vasica (Mal.); Vasa/Vasaka/Malabar nut/Adhatoda (Eng.)

Distribution: Poyilkavu, Bhayankavu (Kozhikode Dist.), Parappoolkavu (Kannur Dist.)

Justicia wynaadensis (Nees) Heyne ex Anders., J. Linn. Soc. Bot. 9: 515. 1867; Hook. f., Fl. Brit. India 4: 533. 1885; Gamble, Fl. Pres. Madras 1079(755). 1924; Ramach. & V. J. Nair, Fl. Cannanore Dist. 342. 1988; Vajr., Fl. Palghat Dist. 353. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 342. 1996; Sivar. & Mathew, Fl. Nilambur 511. 1997; Sasidh., Fl. Periyar Tiger Reserve 299. 1998; Sasidh., Fl. Parambikulam WLS 232. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 383. 2005.

Family: Acanthaceae

Habit: Herb

Flowering & Fruiting: November-March

Vernacular Name: Kurinji (Mal.)

Distribution: Parappoolkavu, Poongottu Kavvu, (Kannur Dist.)

Strobilanthes ciliatus Nees in Wall., Pl. Asiat. Rar. 3: 85. 1832; Hook. f., Fl. Brit. India 4: 439. 1884; Gamble, Fl. Pres. Madras 1039(728). 1924; Antony, Syst. Stud. Fl. Kottayam Dist. 306. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 348. 1996; Sivar. & Mathew, Fl. Nilambur 521. 1997; Sasidh., Fl. Periyar Tiger Reserve 304. 1998; Sasidh., Fl. Parambikulam WLS 237. 2002.

Family: Acanthaceae

Habit: Shrub

Flowering & Fruiting: December-May

Vernacular Name: Cherukurunji/Chinnikurunji/Karimkurinji/Kurunji/Vellakurunji (Mal.)

Distribution: Poyilkkavu, Bhayankavu, (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Alangiaceae

Alangium salvifolium (L.f.) Wang. ssp. hexapetalum (Lam.) Wang. in Engl., Pflanzenreich Alangiac. 9. 1910; Gamble, Fl. Pres. Madras 572(404). 1919; Manilal & Sivar., Fl. Calicut 128. 1982; Ansari, Fl. Kasaragod Div. 184. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 209. 1988; Subram., Fl. Thenmala Div. 160. 1995.

Family: Alangiaceae

Habit: Climber

Flowering & Fruiting: March-August

Vernacular Name: Valli ankolam/Arinjil/Irinjil/Kumbi (Mal.)

Distribution: Poyilkkavu, Bhayankavu, (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Anacardiaceae

Holigarna arnottiana Hook. f., Fl. Brit. India 2: 36. 1876; Gamble, Fl. Pres. Madras 268(191). 1918; Manilal & Sivar., Fl. Calicut 73. 1982; Mohanan, Fl. Quilon Dist. 128. 1984; Ansari, Fl. Kasaragod Div. 110. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 116. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 113. 1989; Babu, Fl. Malappuram Dist. 148. 1990; Vajr., Fl. Palghat Dist. 136. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 128. 1994; Subram., Fl. Thenmala Div. 80. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 21, 29; Sasidh. & Sivar., Fl. Pl. Thrissur For. 121. 1996; Sivar. & Mathew, Fl. Nilambur 169. 1997; Sasidh., Fl. Shenduruny WLS 80. 1997; Sasidh., Fl. Periyar Tiger Reserve 82. 1998; Sunil, Fl. Pl. Alappuzha Dist. 187. 2000; D. Chandra & S.K. Mukh. in N.P. Singh *et al.*, Fl. India 5: 457. 2000; Sasidh., Fl. Parambikulam WLS 78. 2002; Mohanan & Sivad., Fl. Agasthyamala 179. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 146. 2005.

Family: Anacardiaceae

Habit: Tree

Flowering & Fruiting: January-July

Vernacular Name: Cheru/Kattucheru/Karincheru(Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Nothopegia travancorica Bedd. ex Hook. f., Fl. Brit. India 2: 40. 1876; Gamble, Fl. Pres. Madras 265(189). 1918; Ansari, Fl. Kasaragod Div. 111. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 119. 1988; M. Mohanan & Henry, Fl. Thiruvanthapuram 129. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 124. 1996; Sasidh., Fl. Shenduruny WLS 81. 1997; Sasidh., Fl. Periyar Tiger Reserve 84. 1998; D. Chandra & S.K. Mukh. in N.P. Singh *et al.*, Fl. India 5: 477. 2000; Sasidh., Fl. Parambikulam WLS 80. 2002; Mohanan & Sivad., Fl. Agasthyamala 184. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 148. 2005.

Family: Anacardiaceae

Habit: Small tree

Flowering & Fruiting: December-May

Vernacular Name: Avukarum (Mal.)

Distribution: Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Annonaceae

Artabotrys zeylanicus Hook. f. & Thoms., Fl. Ind. 128. 1855 & Hook. f., Fl. Brit. India 1: 54. 1872; Gamble, Fl. Pres. Madras 14(10). 1915; Manilal & Sivar., Fl. Calicut 26. 1982; Mohanan, Fl. Quilon Dist. 61. 1984; Ansari, Fl. Kasaragod Div. 53. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 37. 1988; Manilal, Fl. Silent Valley 2. 1988; Babu, Fl. Malappuram Dist. 5. 1990; Vajr., Fl. Palghat Dist. 46. 1990; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 253. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 45. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 29. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 26. 1996; Sivar. & Mathew, Fl. Nilambur 36. 1997; Sasidh., Fl. Shenduruny WLS 11. 1997; Sasidh., Fl. Periyar Tiger Reserve 4. 1998; Sunil, Fl. Pl. Alappuzha Dist. 29. 2000; Sasidh., Fl. Parambikulam WLS 2. 2002; Mohanan & Sivad., Fl. Agasthyamala 51. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 40. 2005.

Family: Annonaceae

Habit: Climber

Flowering & Fruiting: September-June

Vernacular Name: Manoranjini (Mal.)

Distribution: Bhayankavu, (Kozhikode Dist.); Parappoolkavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Polyalthia korintii (Dunal) Benth. & Hook.f. ex Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 64. 1872; Gamble, Fl. Pres. Madras 16(11). 1915; Manilal & Sivar., Fl. Calicut 28. 1982; Mohanan, Fl. Quilon Dist. 64. 1984; Ansari, Fl. Kasaragod Div. 55. 1985; Subram., Fl. Thenmala Div. 4. 1995; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 273. 1993; Sunil, Fl. Pl. Alappuzha Dist. 30. 2000; Mohanan & Sivad., Fl. Agasthyamala 61. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 48. 2005.

Family: Annonaceae

Habit: Shrub

Flowering & Fruiting: April-June

Vernacular Name: Karuvalli (Mal.)

Distribution: Bhayankavu (Kozhikode Dist.); Kammadathukavu (Kasaragod Dist.)

Uvaria narum (Dunal) Wall. ex Hook.f. & Thoms., Fl. Ind. 102.1855; Hook. f., Fl. Brit. India 1:50.1872; Gamble, Fl. Pres. Madras 13(9). 1915; Manilal & Sivar., Fl. Calicut 26. 1982; Mohanan, Fl. Quilon Dist. 65. 1984; Ansari, Fl. Kasaragod Div. 56. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 59. 1989; Babu, Fl. Malappuram Dist. 8. 1990; Vajr., Fl. Palghat Dist. 49. 1990; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 292. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 625. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 34. 1996; Ramach. & V. J. Nair, Fl. Cannanore Dist. 41. 1988; Sivar. & Mathew, Fl. Nilambur 42. 1997; Sasidh., Fl. Chinnar WLS 14. 1999; Sunil, Fl. Pl. Alappuzha Dist. 34. 2000; Sasidh., Fl. Parambikulam WLS 6. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 49. 2005.

Family: Annonaceae

Habit: Climber

Flowering & Fruiting: November-June

Vernacular Name: Korandapazham/Kooril/Koorilvalli/Narumpanal (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Apiaceae

Centella asiatica (L.) Urban in Mart., Fl. Bras. 11:287. t.78. f. 1879; Gamble, Fl. Pres. Madras 556(392). 1919; Manilal & Sivar., Fl. Calicut 128. 1982; Mohanan, Fl. Quilon Dist. 199. 1984; Ansari, Fl. Kasaragod Div. 183. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 205. 1988; Manilal, Fl. Silent Valley 124. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 183. 1989; Babu, Fl. Malappuram Dist. 312. 1990; Vajr., Fl. Palghat Dist. 222. 1990; P.K. Mukh. & Constance, Umbell. India 15. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 213. 1994; Subram., Fl. Thenmala Div. 158. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 209. 1996; Sivar. & Mathew, Fl. Nilambur 308. 1997; Sasidh., Fl. Shenduruny WLS 139. 1997; Sasidh., Fl. Periyar Tiger Reserve 161. 1998; Sasidh., Fl. Chinnar WLS 142. 1999; Sunil, Fl. Pl. Alappuzha Dist. 401. 2000; Sasidh., Fl. Parambikulam WLS 141. 2002; Mohanan & Sivad., Fl. Agasthyamala 297. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 241. 2005.

Family: Apiaceae

Habit: Herb

Flowering & Fruiting: Throughout the year

Vernacular Name: Kodangal/Kudakan/Kuthirakkulambuchedi/Mutthil/Vellara (Mal.) Indian penny-wort/Pohekula/Spadeleaf (Eng.)

Distribution: Poyilkkavu, Thurayilkavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Apocynaceae

Alstonia scholaris (L.) R. Br., Mem. Wern. Nat. Hist. Soc. 1: 76. 1811; Hook. f., Fl. Brit. India 3: 642. 1882; Gamble, Fl. Pres. Madras 810(569). 1923; Manilal & Sivar., Fl. Calicut 164. 1982; Mohanan, Fl. Quilon Dist. 250. 1984; Ansari, Fl. Kasaragod Div. 226. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 274. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 238. 1989; Babu, Fl. Malappuram Dist. 409. 1990; Vajr., Fl. Palghat Dist. 278. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 288. 1994; Subram., Fl. Thenmala Div. 218. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 277. 1996; Sasidh., Fl. Shenduruny WLS 201. 1997; Sivar. & Mathew, Fl. Nilambur 407. 1997; Sasidh., Fl. Periyar Tiger Reserve 241. 1998; Sunil, Fl. Pl. Alappuzha Dist. 512. 2000; Sasidh., Fl. Parambikulam WLS 187. 2002; Mohanan & Sivad., Fl. Agasthyamala 434. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 307. 2005.

Family: Apocynaceae

Habit: Tree

Flowering & Fruiting: October-February

Vernacular Name: Daivappala/Ezhilampala/Mangalappala/Pala/Yekshippala (Mal.) Devil tree/Shaitan wood (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Cerbera odollam Gaertn., Fruct. 2: 193. 1791; Hook. f., Fl. Brit. India 3. 638. 1882; Mohanan, Fl. Quilon Dist. 252. 1984; Ansari, Fl. Kasaragod Div. 227. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 276. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 240. 1989; Babu, Fl. Malappuram Dist. 413. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 290. 1994; Sunil, Fl. Pl. Alappuzha Dist. 518. 2000.

Family: Apocynaceae

Habit: Tree

Flowering & Fruiting: July-November

Vernacular Name: Chattankai/Othallam/Odalam (Mal.) Chiute/Chatthankai/Dog-bane/Grey Milkwood/Sea Mango/Pong Pong Tree (Eng.)

Distribution: Thazhekkavu (Kannur Dist.)

Chonemorpha grandiflora (Roth) M. R. & S. M. Almeida, Journ. Bombay Nat. Hist. Soc. 90: 427. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 279. 1996; Sasidh., Fl. Periyar Tiger Reserve 242. 1998.

Family: Apocynaceae

Habit: Climber

Flowering & Fruiting: April-December

Vernacular Name: Appuppanthadi/Mutthappanthadi/Novunni/Perumkurumba (Mal.); Frangipani vine (Eng.)

Distribution: Poyilkkavu (Kozhikode Dist.)

Kammetia caryophyllata (Roxb.) Nicolson & Suresh, Taxon 35: 354. 1986; Ramach. & V. J. Nair, Fl. Cannanore Dist. 278. 1988; Babu, Fl. Malappuram Dist. 418. 1990; Sunil, Fl. Pl. Alappuzha Dist. 521. 2000; Sasidh., Fl. Parambikulam WLS 189. 2002; Mohanan & Sivad., Fl. Agasthyamala 440. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 311. 2005.

Family: Apocynaceae

Habit: Climber

Flowering & Fruiting: September-January

Vernacular Name: Narumarathivu (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Parsonsia inodora (Lour.) M. R. & S. M. Almeida, Journ. Bombay Nat. Hist. Soc. 90: 428. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 281. 1996; Sasidh., Fl. Parambikulam WLS 189. 2002.

Family: Apocynaceae

Habit: Climber

Flowering & Fruiting: March-April

Vernacular Name: Penalivalli/Peenarivalli (Mal.)

Distribution: Poyilkkavu (Kozhikode Dist.); Thazhekkavu (Kannur Dist.)

Rauvolfia serpentina (L.) Benth. ex Kurz, For. Fl. Burma 2: 171. 1877; Hook. f., Fl. Brit. India 3: 632. 1882; Gamble, Fl. Pres. Madras 807(567). 1923; Manilal & Sivar., Fl. Calicut 164. 1982; Mohanan, Fl. Quilon Dist. 254. 1984; Ansari, Fl. Kasaragod Div. 229. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 279. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 243. 1989; Babu, Fl. Malappuram Dist. 421. 1990; Vajr., Fl. Palghat Dist. 282. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 293. 1994; Subram., Fl. Thenmala Div. 217. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 9, 15; Sasidh. & Sivar., Fl. Pl. Thrissur For. 282. 1996; Sasidh., Fl. Shenduruny WLS 204. 1997; Sivar. & Mathew, Fl. Nilambur 417. 1997; Sasidh., Fl. Periyar Tiger Reserve 244. 1998; Sunil, Fl. Pl. Alappuzha Dist. 524. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 316. 2000 Sasidh., Fl. Parambikulam WLS 190. 2002; Mohanan & Sivad., Fl. Agasthyamala 443. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 313. 2005.

Family: Apocynaceae

Habit: Herb

Flowering & Fruiting: April-October

Vernacular Name: Amalpori/Avalpori/Chuvannavilpuri/Sarpagandhi/Vanduvazha (Mal.)
Serpentina/Snake root (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Rauvolfia tetraphylla L., Sp. Pl. 208. 1753; Manilal & Sivar., Fl. Calicut 165. 1982; Ansari, Fl. Kasaragod Div. 230. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 279. 1988; Babu, Fl. Malappuram Dist. 422. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 293. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 282. 1996; Sivar. & Mathew, Fl. Nilambur 417. 1997; Sunil, Fl. Pl. Alappuzha Dist. 525. 2000.

Family: Apocynaceae

Habit: Shrub

Flowering & Fruiting: Throughout the year

Vernacular Name: Pambumkolli (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Tabernaemontana alternifolia L., Sp. Pl. 211.1753; Babu, Fl. Malappuram Dist. 423. 1990; Sivar. & Mathew, Fl. Nilambur 418. 1997; Sunil, Fl. Pl. Alappuzha Dist. 526. 2000; Mohanan & Sivad., Fl. Agasthyamala 445. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 313. 2005.

Family: Apocynaceae

Habit: Tree

Flowering & Fruiting: April-October

Vernacular Name: Kundalappala/Kunninpala/Kuruttupala/Koonampala (Mal.)

Distribution: Poyilkkavu, Bhayankavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.)

Wrightia arborea (Dennst.) Mabb., Taxon 26: 533. 1977; Ramach. & V. J. Nair, Fl. Cannanore Dist. 280. 1988; M. Mohanan & Henry, Fl. Thiruvanthapuram 295. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 283. 1996; Sasidh., Fl. Shenduruny WLS 205. 1997; Sasidh., Fl. Periyar Tiger Reserve 245. 1998; Sunil, Fl. Pl. Alappuzha Dist. 535. 2000; Sasidh., Fl. Parambikulam WLS 191. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 314. 2005.

Family: Apocynaceae

Habit: Tree

Flowering & Fruiting: April-December

Vernacular Name: Mylampala/Nilampala/Nettampala/Thouthapala (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Wrightia tinctoria (Roxb.) R. Br., Mem. Wern. Nat. Hist. Soc. 1: 47. 1811; Hook. f., Fl. Brit. India 3: 653. 1882; Gamble, Fl. Pres. Madras 815(573). 1923; Mohanan, Fl. Quilon Dist. 255. 1984; Ansari, Fl. Kasaragod Div. 230. 1985; Manilal, Fl. Silent Valley 175. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 281. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 244. 1989; Babu, Fl. Malappuram Dist. 425(b); Vajr., Fl. Palghat Dist. 283. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 295. 1994; Subram., Fl. Thenmala Div. 219. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 9, 15; Sasidh. & Sivar., Fl. Pl. Thrissur For. 283. 1996; Sasidh., Fl. Shenduruny WLS 206. 1997; Sivar. & Mathew, Fl. Nilambur 420. 1997; Sasidh., Fl. Periyar Tiger Reserve 245. 1998; Sasidh., Fl. Chinnar WLS 189. 1999; Sunil, Fl. Pl. Alappuzha Dist. 536. 2000; Sasidh., Fl. Parambikulam WLS 191. 2002; Mohanan & Sivad., Fl. Agasthyamala 446. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 314. 2005.

Family: Apocynaceae

Habit: Tree

Flowering & Fruiting: February-November

Vernacular

Name: Aiyappala/Adukomba/Dhanthappala/Irumpala/Kambippala/Kotakappala/Neelappala/Thattan-chavana/Thinnamppala/Thondappala/Vettupala (Mal.) Pala indigo/Sweet indrajao (Eng.)

Distribution: Poyilkkavu, Bhayankavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Araceae

Pothos scandens L., Sp. Pl. 968. 1753; Hook. f., Fl. Brit. India 6: 551. 1893; Gamble, Fl. Pres. Madras 1592(1110). 1931; Manilal & Sivar., Fl. Calicut 302. 1982; Mohanan, Fl. Quilon Dist. 433. 1984; Ansari, Fl. Kasaragod Div. 404. 1985; Manilal, Fl. Silent Valley 334. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 494. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 418. 1989; Babu, Fl. Malappuram Dist. 841. 1990; Vajr., Fl. Palghat Dist. 535. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 498. 1994; Subram., Fl. Thenmala Div. 412. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 26. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 487. 1996; Sasidh., Fl. Shenduruny WLS 359. 1997; Sivar. & Mathew, Fl.

Nilambur 758. 1997; Sasidh., Fl. Periyar Tiger Reserve 476. 1998; Sivad. in Manoharan *et al.*, Silent Valley-Whispers Reason 245. 1999; Sasidh., Fl. Parambikulam WLS 368. 2002; Mohanan & Sivad., Fl. Agasthyamala 761. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 526. 2005.

Family: Araceae

Habit: Climber

Flowering & Fruiting: October-November

Vernacular Name: Anapparuva/Paruvakodi/Paruval (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Rhaphidophora pertusa (Roxb.) Schott, Bonplandia 5: 45. 1857; Hook. f., Fl. Brit. India 6: 546. 1893; Gamble, Fl. Pres. Madras 1598(1109). 1931; Manilal & Sivar., Fl. Calicut 302. 1982; Mohanan, Fl. Quilon Dist. 433. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 494. 1988; Babu, Fl. Malappuram Dist. 842. 1990; Vajr., Fl. Palghat Dist. 536. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 487. 1996; Sivar. & Mathew, Fl. Nilambur 759. 1997; Sasidh., Fl. Periyar Tiger Reserve 476. 1998; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 319. 2000 Sasidh., Fl. Parambikulam WLS 368. 2002; Mohanan & Sivad., Fl. Agasthyamala 763. 2002.

Family: Araceae

Habit: Climber

Flowering & Fruiting: August-September

Vernacular

Name: Elitthadi/Aanachurukki/Aanamakudam/Aanathippali/Athithippali/Gajathippiali/Ilathim aravazha/Pudayavu/Teyaarvalli (Mal.)

Distribution: Kammadathukavu (Kasaragod Dist.)

Araliaceae

Schefflera venulosa (Wight & Arn.) Harms in Engl. & Prantl, Naturl. Pflanzenfam. 3(8): 39. 1894; Gamble, Fl. Pres. Madras 570(403). 1919; Mohanan, Fl. Quilon Dist. 201. 1984; Manilal, Fl. Silent Valley 128. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 208. 1988; Vajr., Fl. Palghat Dist. 224. 1990; Subram., Fl. Thenmala Div. 159. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 9, 29; Sasidh. & Sivar., Fl. Pl. Thrissur For. 212. 1996; Sasidh., Fl.

Shenduruny WLS 141. 1997; Sivar. & Mathew, Fl. Nilambur 310. 1997; Muktesh, Epiphytic Fl. Western Ghats 65. 1998; Sunil, Fl. Pl. Alappuzha Dist. 402. 2000; Sasidh., Fl. Parambikulam WLS 142. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 243. 2005.

Family: Araliaceae

Habit: Shrub

Flowering & Fruiting: March-June

Vernacular Name: Ungavalli (Mal.)

Distribution: Bhayankavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Schefflera wallichiana (Wight & Arn.) Harms in Engl. & Prantl, Naturl. Pflanzenfam. 3(8): 38. 1894; Gamble, Fl. Pres. Madras 570(403). 1919; Mohanan, Fl. Quilon Dist. 201. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 209. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 185. 1989; M. Mohanan & Henry, Fl. Thiruvanthapuram 216. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 29. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 212. 1996; Sasidh., Fl. Shenduruny WLS 141. 1997; Sasidh., Fl. Periyar Tiger Reserve 165. 1998; Pradeep, Fl. Vellarimala 71. 2000; Sasidh., Fl. Parambikulam WLS 143. 2002.

Family: Araliaceae

Habit: Shrub

Flowering & Fruiting: April-May

Vernacular Name: Etilamaram/Kannimaram/Modakom(Mal.)

Distribution: Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Arecaceae

Calamus hookerianus Becc., Ann. Roy. Bot. Gard. (Calcutta) 11: 83, 226. t. 70. 1908; Gamble, Fl. Pres. Madras 1568(1094). 1931; Ansari, Fl. Kasaragod Div. 398. 1985; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 26. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 479. 1996; Sasidh., Fl. Shenduruny WLS 353. 1997; Sivar. & Mathew, Fl. Nilambur 743. 1997; Sasidh. & Anto in Manoharan *et al.*, Silent Valley-Whispers Reason 137. 1999; Sasidh., Fl. Periyar Tiger Reserve 469. 1998; Renuka, Palms Kerala 25. 1999; Sasidh., Fl. Parambikulam WLS 362. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 519. 2005.

Family: Arecaceae

Habit: Climber

Flowering & Fruiting: October-April

Vernacular Name: Kallenchooral/Pindichooral/Velichooral/Kakkachooral/Vanthal/Kallan (Mal.)

Distribution: Thazhekkavu (Kannur Dist.)

Aristolochiaceae

Aristolochia indica L., Sp. Pl. 960. 1753; Hook. f., Fl. Brit. India 5: 75. 1886; Gamble, Fl. Pres. Madras 1202(841). 1925; Manilal & Sivar., Fl. Calicut 248. 1982; Mohanan, Fl. Quilon Dist. 334. 1984; Ansari, Fl. Kasaragod Div. 318. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 383. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 340. 1989; Babu, Fl. Malappuram Dist. 683. 1990; Vajr., Fl. Palghat Dist. 394. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 381. 1994; Subram., Fl. Thenmala Div. 302. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 373. 1996; Sasidh., Fl. Shenduruny WLS 255. 1997; Sasidh., Fl. Periyar Tiger Reserve 335. 1998; Sasidh., Fl. Chinnar WLS 265. 1999; Sunil, Fl. Pl. Alappuzha Dist. 776. 2000; Sasidh., Fl. Parambikulam WLS 260. 2002; Mohanan & Sivad., Fl. Agasthyamala 546. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 414. 2005.

Family: Aristolochiaceae

Habit: Climber

Flowering & Fruiting: July-March

Vernacular

Name: Aaduthinnappala/Eshwaramulla/Garudakodi/Iswaremooli/Kadalivegam/Karalakam/Karalayam/Karalvegam/Karanavalli/Karandavalli/Kudukkamooli/Urithoongi/Urikizhangu (Mal.) Indian birthwort (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Asclepiadaceae

Wattakaka volubilis (L. f.) Stapf, Bot. Mag. 148: sub t. 8976. 1923; Manilal & Sivar., Fl. Calicut 170. 1982; Mohanan, Fl. Quilon Dist. 260. 1984; Ansari, Fl. Kasaragod Div. 233. 1985; Manilal, Fl. Silent Valley 180. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 286. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 248. 1989; Babu, Fl. Malappuram Dist. 439. 1990; Vajr., Fl. Palghat Dist. 293. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 300.

1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 294. 1996; Swarup. *et al.*, Shola For. Kerala 36. 1998; Sasidh., Fl. Chinnar WLS 199. 1999; Anil Kumar *et al.*, Fl. Pathanamthitta 322. 2005.

Family: Asclepiadaceae

Habit: Climber

Flowering & Fruiting: March-July

Vernacular Name: Vattakakkakkoti/Kakkalankodi (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Asteraceae

Vernonia cinerea (L.) Less., Linnaea 4: 291. 1829; Hook. f., Fl. Brit. India 3: 233. 1881; Gamble, Fl. Pres. Madras 676(475). 1921; Manilal & Sivar., Fl. Calicut 149. 1982; Mohanan, Fl. Quilon Dist. 235. 1984; Ansari, Fl. Kasaragod Div. 218. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 224. 1989; Babu, Fl. Malappuram Dist. 386. 1990; Vajr., Fl. Palghat Dist. 257. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 269. 1994; Subram., Fl. Thenmala Div. 193. 1995; Uniyal in Hajra *et al.*, Fl. India 13: 367. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 29. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 256. 1996; Sasidh., Fl. Shenduruny WLS 180. 1997; Sivar. & Mathew, Fl. Nilambur 382. 1997; Sasidh., Fl. Periyar Tiger Reserve 211. 1998; Sasidh., Fl. Chinnar WLS 173. 1999; Sunil, Fl. Pl. Alappuzha Dist. 475. 2000; Sasidh., Fl. Parambikulam WLS 173. 2002; Mohanan & Sivad., Fl. Agasthyamala 392. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 290. 2005.

Family: Asteraceae

Habit: Herb

Flowering & Fruiting: Throughout the year

Vernacular Name: Pirina/Poovamkurunthala/Puvamkozhinjal/Puvankurunal (Mal.) Ash colored fleabane/Purplefleabane(Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Avicenniaceae

Avicennia marina (Forssk.) Vierh. in Denkschr., Akad. 71: 435. 1907; Gamble, Fl. Pres. Madras 1106(774). 1924; Manilal & Sivar., Fl. Calicut 234. 1982; Mohanan, Fl. Quilon Dist.

311. 1984; Babu, Fl. Malappuram Dist. 628. 1990; Sunil, Fl. Pl. Alappuzha Dist. 727. 2000; Anupama & Sivad., Rheedea 14: 15. 2004.

Family: Avicenniaceae

Habit: Tree

Flowering & Fruiting: March-July

Vernacular Name: Chakkapoo/Cheru-uppatti/Orei (Mal.)

Distribution: Thazhekkavu (Kannur Dist.)

Avicennia officinalis L., Sp. Pl. 110. 1753; Hook. f., Fl. Brit. India 4: 604. 1885; Gamble, Fl. Pres. Madras 1105(774). 1924; Manilal & Sivar., Fl. Calicut 234. 1982; Mohanan, Fl. Quilon Dist. 311. 1984; Ansari, Fl. Kasaragod Div. 291. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 321. 1989; Ramach. & V. J. Nair, Fl. Cannanore Dist. 360. 1988; Babu, Fl. Malappuram Dist. 629. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 363. 1994; Sunil, Fl. Pl. Alappuzha Dist. 727. 2000; Anupama & Sivad., Rheedea 14: 17. 2004.

Family: Avicenniaceae

Habit: Tree

Flowering & Fruiting: April-November

Vernacular Name: Uppatti/Orei (Mal.)

Distribution: Thazhekkavu (Kannur Dist.)

Bignoniaceae

Stereospermum colais (Buch.-Ham. ex Dillw.) Mabb., Taxon 27: 553. 1979, var. colais; Mohanan, Fl. Quilon Dist. 295. 1984; Ansari, Fl. Kasaragod Div. 270. 1985; Manilal, Fl. Silent Valley 201. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 327. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 294. 1989; Vajr., Fl. Palghat Dist. 336. 1990; Subram., Fl. Thenmala Div. 258. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 9,16; Sasidh. & Sivar., Fl. Pl. Thrissur For. 332. 1996; Sasidh., Fl. Shenduruny WLS 230. 1997; Sivar. & Mathew, Fl. Nilambur 485. 1997; Sasidh., Fl. Periyar Tiger Reserve 290. 1998; Sasidh., Fl. Chinnar WLS 228. 1999; Sasidh., Fl. Parambikulam WLS 224. 2002; Mohanan & Sivad., Fl. Agasthyamala 499. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 371. 2005.

Family: Bignoniaceae

Habit: Tree

Flowering & Fruiting: February-October

Vernacular Name: Pathiri/Poopathiri/Pumbathiri/Karingazha/Karinkura/Kouringoura (Mal.)

Trumpet flower/Yellow snake tree (Eng.)

Distribution: Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Burseraceae

Canarium strictum Roxb., Fl. Ind. 3: 138. 1832; Hook. f., Fl. Brit. India 1: 534. 1875; Gamble, Fl. Pres. Madras 172(123). 1915; Mohanan, Fl. Quilon Dist. 108. 1984; Manilal, Fl. Silent Valley 47. 1988; Vajr., Fl. Palghat Dist. 107. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 108. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 22,30. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 86. 1996; Sivar. & Mathew, Fl. Nilambur 129. 1997; V. Chithra & A.N. Henry in Hajra *et al.*, Fl. India 4: 440. 1997; Sasidh., Fl. Periyar Tiger Reserve 56. 1998; Sasidh., Fl. Chinnar WLS 59. 1999; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 74. 2000 Pradeep, Fl. Vellarimala 39. 2000; Sasidh., Fl. Parambikulam WLS 52. 2002; Mohanan & Sivad., Fl. Agasthyamala 147. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 115. 2005.

Family: Burseraceae

Habit: Tree

Flowering & Fruiting: January-December

Vernacular

Name: Karuthakungiliyam/Kungiliyium/Kunthirikkam/Pantham/Pantappayan/Thelli/Viraka/Thellipayin (Mal.) Black dammer/Black dhup/Indian white Mahogany (Eng.)

Distribution: Poyilkkavu (Kozhikode Dist.); Kammadathukavu (Kasaragod Dist.)

Caesalpiaceae

Caesalpinia bonduc (L.) Roxb., Fl. Ind. 2: 362. 1832; Sanjappa, Legumes Ind. 9. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 161. 1996; Sivar. & Mathew, Fl. Nilambur 229. 1997; Sasidh., Fl. Periyar Tiger Reserve 120. 1998; Sasidh., Fl. Chinnar WLS 110. 1999; Sunil, Fl. Pl. Alappuzha Dist. 270. 2000; Sasidh., Fl. Parambikulam WLS 106. 2002.

Guilandina bonduc L., Sp. Pl. 381. 1753.

Caesalpinia bonducella (L.) Flem., Asiat. Res. 11: 159. 1810; Hook. f., Fl. Brit. India 2: 254. 1878.

Caesalpinia crista sensu Gamble, Fl. Pres. Madras 393(278). 1919, non L. 1753.

Family: Caesalpiaceae

Habit: Climber

Flowering & Fruiting: March-May

Vernacular Name: Kalimarakam/Kazhanji/Kazhanchikkuru (Mal.) Fever nut/Physic nut

Bonduc nut (Eng.)

Distribution: Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Saraca asoca (Roxb.) de Wilde, Blumea 15: 393. 1968; Manilal & Sivar., Fl. Calicut 94. 1982; Mohanan, Fl. Quilon Dist. 164. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 167. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 147. 1989; Vajr., Fl. Palghat Dist. 184. 1990; Sanjappa, Legumes Ind. 35. 1992; M. Mohanan & Henry, Fl. Thiruvanthapuram 170. 1994; Subram., Fl. Thenmala Div. 119. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 166. 1996; Sunil, Fl. Pl. Alappuzha Dist. 285. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 334. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 200. 2005.

Family: Caesalpiniaceae

Habit: Tree

Flowering & Fruiting: March-July

Vernacular Name: Ashokam/Hemapushpam/Vanjuulam (Mal.) Asoka tree (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Celastraceae

Lophopetalum wightianum Arn., Ann. Nat. Hist. 3: 151. 1839; Hook. f., Fl. Brit. India 1: 615. 1875; Gamble, Fl. Pres. Madras 205(147). 1918; Mohanan, Fl. Quilon Dist. 115. 1984; Ansari, Fl. Kasaragod Div. 100. 1985; Manilal, Fl. Silent Valley 55. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 96. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 104. 1989; Vajr., Fl. Palghat Dist. 119. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 116. 1994; Subram., Fl. Thenmala Div. 68. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 106. 1996; Sasidh., Fl. Shenduruny WLS 66. 1997; Sasidh., Fl. Periyar Tiger Reserve 68. 1998; Sunil, Fl. Pl. Alappuzha Dist. 164. 2000; K. Ramam. in N.P. Singh *et al.*, Fl. India 5: 116. 2000; Sasidh., Fl. Parambikulam WLS 65. 2002; Mohanan & Sivad., Fl. Agasthyamala 161. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 126. 2005.

Family: Celastraceae

Habit: Tree

Flowering & Fruiting: December-July

Vernacular Name: Vembala/Venkadavam/Venkkotta (Mal.)

Distribution: Thurayilkavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Combretaceae

Combretum latifolium Blume, Bijdr. 641. 1826; Manilal & Sivar., Fl. Calicut 105. 1982; Mohanan, Fl. Quilon Dist. 173. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 177. 1988; Babu, Fl. Malappuram Dist. 241. 1990; Vajr., Fl. Palghat Dist. 195. 1990; Subram., Fl. Thenmala Div. 128. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 177. 1996; Gangop. & Chakrab., Journ. Econ. Tax. Bot. 21: 311. 1997; Sasidh., Fl. Shenduruny WLS 117. 1997; Sivar. & Mathew, Fl. Nilambur 255. 1997; Sunil, Fl. Pl. Alappuzha Dist. 316. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 211. 2005.

Family: Combretaceae

Habit: Climber

Flowering & Fruiting: December-April

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Commelinaceae

Floscopa scandens Lour., Fl. Cochinch. 193. 1790; Hook. f., Fl. Brit. India 6: 390. 1892; Gamble, Fl. Pres. Madras 1522(1083). 1931; Mohanan, Fl. Quilon Dist. 422. 1984; Ansari, Fl. Kasaragod Div. 394. 1985; Manilal, Fl. Silent Valley 326. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 485. 1988; Vajr., Fl. Palghat Dist. 521. 1990; Antony, Syst. Stud. Fl. Kottayam Dist. 407. 1989; M. Mohanan & Henry, Fl. Thiruvanthapuram 487. 1994; Subram., Fl. Thenmala Div. 398. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 475. 1996; Sasidh., Fl. Shenduruny WLS 348. 1997; Sivar. & Mathew, Fl. Nilambur 737. 1997; Sasidh., Fl. Periyar Tiger Reserve 463. 1998; Sasidh., Fl. Parambikulam WLS 359. 2002; Mohanan & Sivad., Fl. Agasthyamala 737. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 514. 2005.

Family: Commelinaceae

Habit: Herb

Flowering & Fruiting: January-April

Distribution: Poyilkkavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.);

Connaraceae

Connarus monocarpus L., Sp. Pl. 675. 1753; Hook. f., Fl. Brit. India 2: 50. 1876; Gamble, Fl. Pres. Madras 272(194). 1918; Manilal & Sivar., Fl. Calicut 74. 1982; Mohanan, Fl. Quilon Dist. 131. 1984; Antony, Syst. Stud. Fl. Kottayam Dist. 116. 1989; Vajr., Fl. Palghat Dist. 141. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 130. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 30. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 126. 1996; Sasidh., Fl. Shenduruny WLS 83. 1997; Sasidh., Fl. Periyar Tiger Reserve 85. 1998; Sunil, Fl. Pl. Alappuzha Dist. 193. 2000; M.S. Mondal in N.P. Singh *et al.*, Fl. India 5: 526. 2000; Sasidh., Fl. Parambikulam WLS 81. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 149. 2005.

Family: Connaraceae

Habit: Climber

Flowering & Fruiting: April-June

Vernacular Name: Kuriel/Puzhukkadikaya (Mal.)

Distribution: Poyilkkavu, Bhayankavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Connarus wightii Hook. f., Fl. Brit. India 2: 51. 1876; Gamble, Fl. Pres. Madras 272(194). 1918; Manilal, Fl. Silent Valley 68. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 120. 1988; Vajr., Fl. Palghat Dist. 141. 1990; Subram., Fl. Thenmala Div. 87. 1995; Sasidh., Fl. Shenduruny WLS 83. 1997; Sivar. & Mathew, Fl. Nilambur 172. 1997; Sasidh., Fl. Periyar Tiger Reserve 85. 1998; M.S. Mondal in N.P. Singh *et al.*, Fl. India 5: 532. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 151. 2005.

Family: Connaraceae

Habit: Shrub

Flowering & Fruiting: March-May

Vernacular Name: Kuringil (Mal.)

Distribution: Poyilkkavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Rourea minor (Gaertn.) Merr., Interpr. Rumph. Herb. Amboin. 413. 1917; Manilal & Sivar., Fl. Calicut 74. 1982; Mohanan, Fl. Quilon Dist. 132. 1984; Ansari, Fl. Kasaragod Div. 113. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 120. 1988; Vajr., Fl. Palghat Dist. 141. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 131. 1994; Subram., Fl. Thenmala Div.

87. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 30. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 126. 1996; Sasidh., Fl. Shenduruny WLS 85. 1997; M.S. Mondal in N.P. Singh *et al.*, Fl. India 5: 538. 2000; Sunil, Fl. Pl. Alappuzha Dist. 193. 2000; Mohanan & Sivad., Fl. Agasthyamala 188. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 151. 2005.

Family: Connaraceae

Habit: Climber

Flowering & Fruiting: December-August

Vernacular Name: Cheriymarikunni/Kuriel (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Convolvulaceae

Erycibe paniculata Roxb., Pl. Corom. 2: 31. t.159.1798; Hook. f., Fl. Brit. India 4:180. 1883; Gamble, Fl. Pres. Madras 930(653). 1923; Manilal & Sivar., Fl. Calicut 179. 1982; Mohanan, Fl. Quilon Dist. 270. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 298. 1988; Vajr., Fl. Palghat Dist. 307. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 313. 1994; Subram., Fl. Thenmala Div. 233. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 306. 1996; Sasidh., Fl. Shenduruny WLS 216. 1997; Sasidh., Fl. Periyar Tiger Reserve 264. 1998; Sunil, Fl. Pl. Alappuzha Dist. 582. 2000; Sasidh., Fl. Parambikulam WLS 206. 2002; Mohanan & Sivad., Fl. Agasthyamala 469. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 337. 2005.

Family: Convolvulaceae

Habit: Climber

Flowering & Fruiting: November-March

Vernacular Name: Erumathali/Irimpiyathali/Irumbithali/Nakkuvalli/Vadayara (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Cycadaceae

Cycas circinalis L., Sp. Pl. 1188. 1753; Hook. f., Fl. Brit. India 5: 656. 1888; Gamble, Fl. Pres. Madras 1394(975). 1928; Mohanan, Fl. Quilon Dist. 487. 1984; Ansari, Fl. Kasaragod Div. 363. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 443. 1988; Vajr., Fl. Palghat Dist. 459. 1990; Antony, Syst. Stud. Fl. Kottayam Dist. 471. 1989; M. Mohanan & Henry, Fl. Thiruvanthapuram 440. 1994; Subram., Fl. Thenmala Div. 360. 1995; Ravikumar & Ved,

Illustr. Field Guide 100 Red Listed Med. Pl. 107. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 590. 2005.

Family: Cycadaceae

Habit: Shrub

Flowering & Fruiting: December-February

Vernacular Name: Chana/Edanthu/Eenth/Eenthinpana (Mal.) Queen sago (Eng.)

Distribution: Poyilkkavu (Kozhikode Dist.)

Dipterocarpaceae

Hopea parviflora Bedd., Fl. Sylv. t. 7. 1869; Hook. f., Fl. Brit. India 1: 308. 1874; Gamble, Fl. Pres. Madras 82(59). 1915; Mohanan, Fl. Quilon Dist. 83. 1984; Ansari, Fl. Kasaragod Div. 72. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 57. 1988; Vajr., Fl. Palghat Dist. 74. 1990; Babu, Fl. Malappuram Dist. 51. 1990; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. India 3: 228. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 75. 1994; Subram., Fl. Thenmala Div. 27. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 56. 1996; Sivar. & Mathew, Fl. Nilambur 73. 1997; Sasidh., Fl. Shenduruny WLS 34. 1997; Sasidh., Fl. Periyar Tiger Reserve 28. 1998; Sasidh., Fl. Chinnar WLS 32. 1999; Sunil, Fl. Pl. Alappuzha Dist. 83. 2000; Sasidh., Fl. Parambikulam WLS 24. 2002; Mohanan & Sivad., Fl. Agasthyamala 93. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 74. 2005.

Family: Dipterocarpaceae

Habit: Tree

Flowering & Fruiting: January-June

Vernacular Name: Irumbagam/Iripu/Kambagam/Thambagam/Urippu (Mal.) Iron wood of Malabar/white Kongu/Hopea (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Hopea ponga (Dennst.) Mabb., Taxon 28: 587. 1979; Manilal & Sivar., Fl. Calicut 42. 1982; Mohanan, Fl. Quilon Dist. 84. 1984; Ansari, Fl. Kasaragod Div. 72. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 58. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 73. 1989; Babu, Fl. Malappuram Dist. 50. 1990; Vajr., Fl. Palghat Dist. 74. 1990; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. India 3: 230. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 75. 1994; Subram., Fl. Thenmala Div. 28. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 56.

1996; Sivar. & Mathew, Fl. Nilambur 73. 1997; Sasidh., Fl. Shenduruny WLS 34. 1997; Sasidh., Fl. Periyar Tiger Reserve 28. 1998; Sunil, Fl. Pl. Alappuzha Dist. 83. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 75. 2005.

Family: Dipterocarpaceae

Habit: Tree

Flowering & Fruiting: March-June

Vernacular

Name:Eyyakam/Illapongu/Pongu/Irumbagam/Iripu/Kambagam/Thambagam/Nayurippu/Nait hambagam/Naduvalippongu (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Vateria indica L., Sp. Pl. 513. 1753; Hook. f., Fl. Brit. India 1: 313. 1874; Gamble, Fl. Pres. Madras 85(61). 1915; Manilal & Sivar., Fl. Calicut 42. 1982; Mohanan, Fl. Quilon Dist. 84. 1984; Ansari, Fl. Kasaragod Div. 73. 1985; Manilal, Fl. Silent Valley 24. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 58. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 73. 1989; Babu, Fl. Malappuram Dist. 52. 1990; Vajr., Fl. Palghat Dist. 75. 1990; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. India 3: 245. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 75. 1994; Subram., Fl. Thenmala Div. 28. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 22,30. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 56. 1996; Sasidh., Fl. Shenduruny WLS 35. 1997; Sasidh., Fl. Periyar Tiger Reserve 28. 1998; Sunil, Fl. Pl. Alappuzha Dist. 84. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 391. 2000 Sasidh., Fl. Parambikulam WLS 25. 2002; Mohanan & Sivad., Fl. Agasthyamala 94. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 75. 2005

Family: Dipterocarpaceae

Habit: Tree

Flowering & Fruiting: March-August

Vernacular

Name:Pandam/Payin/Painimaram/Perumpiney/Vellappayin/Vellathelly/Vellakundirikkam (Mal.) Indian copal tree/Piney varnish tree/White dammar (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Vatica chinensis L., Mant. Pl. 2: 242. 1771; Gamble, Fl. Pres. Madras 84(61). 1915; Mohanan, Fl. Quilon Dist. 84. 1984; Manilal & Sivar., Fl. Calicut 42. 1982; Babu, Fl. Malappuram Dist. 53. 1990; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. India 3: 248. 1993; Sunil, Fl. Pl. Alappuzha Dist. 85. 2000.

Family: Dipterocarpaceae

Habit: Tree

Flowering & Fruiting: March-June

Vernacular Name: Adakkapine/Cherupiney/Kattujadhikkamram/Payinipasa (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.)

Ebenaceae

Diospyros paniculata Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 109. 1852; Hook. f., Fl. Brit. India 3: 570. 1882; Gamble, Fl. Pres. Madras 775(544). 1923; Mohanan, Fl. Quilon Dist. 244. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 265. 1988; Vajr., Fl. Palghat Dist. 269. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 280. 1994; Subram., Fl. Thenmala Div. 208. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 30. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 271. 1996; Sasidh., Fl. Shenduruny WLS 194. 1997; Sivar. & Mathew, Fl. Nilambur 400. 1997; Sasidh., Fl. Periyar Tiger Reserve 231. 1998; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 118. 2000 Sasidh., Fl. Parambikulam WLS 182. 2002; Mohanan & Sivad., Fl. Agasthyamala 418. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 300. 2005.

Family: Ebenaceae

Habit: Tree

Flowering & Fruiting: January-April

Vernacular Name: Karivella/Karumaram/Karivella/Illakatta/Thuvvara (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.)

Diospyros peregrina (Gaertn.) Gurke in in Engl. & Prantl, Naturl. Pflanzenfam. 4(1): 164. 1891; Gamble, Fl. Pres. Madras 777(546). 1921; Manilal & Sivar., Fl. Calicut 157. 1982.

Family: Ebenaceae

Habit: Tree

Flowering & Fruiting: March-May

Vernacular Name: Panachi/Panancha/Vananji (Mal.) Gaub persimmon/Indian persimmon (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist)

Elaeocarpaceae

Elaeocarpus munronii (Wight) Mast. in Hook. f., Fl. Brit. India 1: 407. 1874; Gamble, Fl. Pres. Madras 124(88). 1915; Mohanan, Fl. Quilon Dist. 98. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 73. 1988; Manilal, Fl. Silent Valley 35. 1988; Vajr., Fl. Palghat Dist. 96. 1990; S.K. Murti in B.D. Sharma & Sanjappa, Fl. India 3: 546. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 93. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 22. 1996; Sasidh., Fl. Periyar Tiger Reserve 41. 1998; Mohanan & Sivad., Fl. Agasthyamala 120. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 102. 2005.

Family: Elaeocarpaceae

Habit: Tree

Flowering & Fruiting: September-April

Vernacular Name: Kalrudraksham/Pungari/Shirukodala (Mal.)

Distribution: Poongottukavu (Kannur Dist.)

Elaeocarpus serratus L., Sp. Pl. 515. 1753, var. *serratus*; Hook. f., Fl. Brit. India 1:401.1874; Gamble, Fl. Pres. Madras 124(88). 1915; Mohanan, Fl. Quilon Dist. 99. 1984; Ansari, Fl. Kasaragod Div. 86. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 74. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 87. 1989; Vajr., Fl. Palghat Dist. 96. 1990; S.K. Murti in B.D. Sharma & Sanjappa, Fl. India 3: 553. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 93. 1994; Subram., Fl. Thenmala Div. 46. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 22. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 74. 1996; Sasidh., Fl. Shenduruny WLS 46. 1997; Swarup. *et al.*, Shola For. Kerala 47. 1998; Sivar. & Mathew, Fl. Nilambur 112. 1997; Sasidh., Fl. Periyar Tiger Reserve 41. 1998; Sunil, Fl. Pl. Alappuzha Dist. 127. 2000; Zmarzty, Kew Bull. 56: 434. 2001; Sasidh., Fl. Parambikulam WLS 39. 2002; Mohanan & Sivad., Fl. Agasthyamala 121. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 102. 2005.

Family: Elaeocarpaceae

Habit: Tree

Flowering & Fruiting: April-September

Vernacular Name: Bhadraksham/Kara/Karamavu/Nallakara/Perinkara/Valiyakara (Mal.) Wild Olive tree/Ceylon Olive(Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Elaeocarpus variabilis Zmarzty, Kew Bull. 56: 429. 2001.

Family: Elaeocarpaceae

Habit: Tree

Flowering & Fruiting: May-October

Vernacular Name: Kara/Kattakara/Kotlampazhamaram/Malamkara/Varali (Mal.)

Distribution: Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Euphorbiaceae

Antidesma acidum Retz., Obs. Bot. 5: 30. 1788; Mohanan, Fl. Quilon Dist. 357. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 408. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 353. 1989; Vajr., Fl. Palghat Dist. 420. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 427. 1994; Subram., Fl. Thenmala Div. 347. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 10,31. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 392. 1996; Sasidh., Fl. Shenduruny WLS 280. 1997; Sivar. & Mathew, Fl. Nilambur 603. 1997; Sasidh., Fl. Periyar Tiger Reserve 364. 1998; Chakrab. & Gangop., Journ. Econ. Tax. Bot. 24: 8. 2000; Sunil, Fl. Pl. Alappuzha Dist. 797. 2000; Sasidh., Fl. Parambikulam WLS 281. 2002; Mohanan & Sivad., Fl. Agasthyamala 593. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 436. 2005.

Family: Euphorbiaceae

Habit: Shrub

Flowering & Fruiting: July-December

Vernacular Name: Asaripuli/Areepazham/Arippazhachedi/Sirupulli (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Antidesma buniis (L.) Spreng., Syst. Veg. 1: 826.1825; Hook. f., Fl. Brit. India 5:358.1887; Gamble, Fl. Pres. Madras 1298(908). 1925; Manilal & Sivar., Fl. Calicut 272. 1982; Manilal, Fl. Silent Valley 245. 1988; Ansari, Fl. Kasaragod Div. 332. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 408. 1988; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 22. 1996; Sivar. &

Mathew, Fl. Nilambur 604. 1997; Chakrab. & Gangop., Journ. Econ. Tax. Bot. 24: 12. 2000; Mohanan & Sivad., Fl. Agasthyamala 595. 2002.

Family: Euphorbiaceae

Habit: Tree

Flowering & Fruiting: March-May

Vernacular Name: Aryaporiyan/Cherutali/Mayilkombi/Neelathali/Noolithali (Mal.) Chinese laurel/Salamander tree (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Antidesma montanum Blume, Bijdr. 1124. 1826; Chakrab. & Gangop., Journ. Econ. Tax. Bot. 24: 26. 2000; Sasidh., Fl. Parambikulam WLS 281. 2002.

Family: Euphorbiaceae

Habit: Tree

Flowering & Fruiting: January-December

Vernacular Name: Putharaval/Thathalamaram (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Briedelia stipularis (L.) Blume, Bijdr. 597. 1825; Hook. f., Fl. Brit. India 5: 270. 1887; Gamble, Fl. Pres. Madras 1281(896). 1925; Ramach. & V. J. Nair, Fl. Cannanore Dist. 412. 1988; Chakrabarty *et al.*, Journ. Econ. Tax. Bot. 26: 324. 2002.

Family: Euphorbiaceae

Habit: Shrub

Flowering & Fruiting: December-February

Vernacular Name: Cheruka/Cherukapanachi/Cherupanachi/Kanjikottam (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Excoecaria agallocha L., Sp. Pl. 1451. 1763; Hook. f., Fl. Brit. India 5: 472. 1888; Gamble, Fl. Pres. Madras 1344(941). 1925; Manilal & Sivar., Fl. Calicut 270. 1982; Mohanan, Fl. Quilon Dist. 366. 1984; Ansari, Fl. Kasaragod Div. 339. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 417. 1988; Babu, Fl. Malappuram Dist. 715. 1990; M. Mohanan & Henry,

Fl. Thiruvanthapuram 416. 1994; Chakrab. & Gangop., Journ. Econ. Tax. Bot. 18: 198. 1994; Sunil, Fl. Pl. Alappuzha Dist. 817. 2000; Anupama & Sivad., Rheedea 14: 27. 2004.

Family: Euphorbiaceae

Habit: Tree

Flowering & Fruiting: November-February

Vernacular Name: Komatti/Kammetti/Kannampotti (Mal.) Blinding tree (Eng.)

Distribution: Thazhekkavu (Kannur Dist.)

Glochidion zeylanicum (Gaertn.) A. Juss., Euphorb. Gen. 107. 1824, var. *zeylanicum*; Hook. f., Fl. Brit. India 5: 310. 1887; Gamble, Fl. Pres. Madras 1306(914). 1925; Manilal & Sivar., Fl. Calicut 260. 1982; Mohanan, Fl. Quilon Dist. 367. 1984; Ansari, Fl. Kasaragod Div. 339. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 360. 1989; Babu, Fl. Malappuram Dist. 716. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 417. 1994; Subram., Fl. Thenmala Div. 338. 1995; Chakrab. & Gangop., Journ. Econ. Tax. Bot. 19: 226. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 405. 1996; Sasidh., Fl. Shenduruny WLS 289. 1997; Sivar. & Mathew, Fl. Nilambur 623. 1997; Sasidh., Fl. Periyar Tiger Reserve 374. 1998; Sasidh., Fl. Chinnar WLS 285. 1999; Sunil, Fl. Pl. Alappuzha Dist. 821. 2000; Sasidh., Fl. Parambikulam WLS 292. 2002; Mohanan & Sivad., Fl. Agasthyamala 610. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 447. 2005.

Family: Euphorbiaceae

Habit: Tree

Flowering & Fruiting: March-May

Vernacular Name: Neervetti/Pannimutti (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Tragia involucrata L., Sp. Pl. 980. 1753; Hook. f., Fl. Brit. India 5: 465. 1888,p.p.; Gamble, Fl. Pres. Madras 1332(931). 1925; Manilal & Sivar., Fl. Calicut 267. 1982; Mohanan, Fl. Quilon Dist. 374. 1984; Ansari, Fl. Kasaragod Div. 348. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 427. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 369. 1989; Babu, Fl. Malappuram Dist. 741. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 427. 1994; Subram., Fl. Thenmala Div. 335. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 10,16. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 415. 1996; Sivar. & Mathew, Fl. Nilambur 645. 1997;

Sunil, Fl. Pl. Alappuzha Dist. 842. 2000; Sasidh., Fl. Parambikulam WLS 299. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 458. 2005.

Family: Euphorbiaceae

Habit: Herb

Flowering & Fruiting: July-December

Vernacular Name: Choriyanam/Kodithoova (Mal.) Indian stinging nettle (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Fabaceae

Abrus precatorius L., Syst. Nat. (ed. 12) 2: 472.1767; Hook. f., Fl. Brit. India 2:175.1876; Gamble, Fl. Pres. Madras 349(247). 1918; Mohanan, Fl. Quilon Dist. 135. 1984; Ansari, Fl. Kasaragod Div. 115. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 118. 1989; Babu, Fl. Malappuram Dist. 155. 1990; Vajr., Fl. Palghat Dist. 145. 1990; Sanjappa, Legumes Ind. 74. 1992; M. Mohanan & Henry, Fl. Thiruvanthapuram 133. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 129. 1996; Sivar. & Mathew, Fl. Nilambur 173. 1997; Sasidh., Fl. Chinnar WLS 83. 1999; Sunil, Fl. Pl. Alappuzha Dist. 199. 2000; Sasidh., Fl. Parambikulam WLS 83. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 155. 2005.

Family: Fabaceae

Habit: Climber

Flowering & Fruiting: October-May

Vernacular Name: Chuvannakunni/Kakani/Kunni/Kunnikuru (Mal.) Crab's eye/Indian liquorice/Jequirity/Rosary pea/Wild liquorice (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Pterocarpus marsupium Roxb., Pl. Corom. t. 116. 1799; Hook. f., Fl. Brit. India 2: 239. 1876; Gamble, Fl. Pres. Madras 385(271). 1918; Mohanan, Fl. Quilon Dist. 154. 1984; Ansari, Fl. Kasaragod Div. 132. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 152. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 135. 1989; Vajr., Fl. Palghat Dist. 168. 1990; Sanjappa, Legumes Ind. 232. 1992; M. Mohanan & Henry, Fl. Thiruvanthapuram 156. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 10,17. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 149. 1996; Sasidh., Fl. Shenduruny WLS 99. 1997; Sivar. & Mathew, Fl. Nilambur 187.

1997; Sasidh., Fl. Periyar Tiger Reserve 112. 1998; Sasidh., Fl. Chinnar WLS 102. 1999; Sunil, Fl. Pl. Alappuzha Dist. 251. 2000; Sasidh., Fl. Parambikulam WLS 98. 2002; Mohanan & Sivad., Fl. Agasthyamala 217. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 188. 2005.

Family: Fabaceae

Habit: Tree

Flowering & Fruiting: September-October

Vernacular Name: Venga (Mal.) Kino/Indian kino tree/Malabar kino tree/Bijasal (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Vigna trilobata (L.) Verdc., Taxon 17: 172. 1968 & Kew Bull. 24: 560. 1970; Manilal & Sivar., Fl. Calicut 93. 1982; Ansari, Fl. Kasaragod Div. 137. 1985; Vajr., Fl. Palghat Dist. 176. 1990; Sanjappa, Legumes Ind. 276. 1992; M. Mohanan & Henry, Fl. Thiruvanthapuram 161. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 10. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 157. 1996; Sasidh., Fl. Shenduruny WLS 104. 1997; Swarup. *et al.*, Shola For. Kerala 52. 1998; Sasidh., Fl. Chinnar WLS 108. 1999; Sasidh., Fl. Parambikulam WLS 104. 2002.

Family: Fabaceae

Habit: Climber

Flowering & Fruiting: July-December

Vernacular Name: Cheruvidukol/Kattupayar/Kokkikai (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Flacourtiaceae

Flacourtia indica (Burm. f.) Merr., Interpr. Rumph. Herb. Amboin. 377. 1917; Manilal & Sivar., Fl. Calicut 35. 1982; Mohanan, Fl. Quilon Dist. 73. 1984; Ansari, Fl. Kasaragod Div. 64. 1985; Manilal, Fl. Silent Valley 9. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 49. 1988; Babu, Fl. Malappuram Dist. 26. 1990; Vajr., Fl. Palghat Dist. 60. 1990; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 402. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 61. 1994; Sasidh., Fl. Chinnar WLS 23. 1999; Sunil, Fl. Pl. Alappuzha Dist. 62. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 58. 2005.

Gmelina indica Burm. f., Fl. Ind. 132. t.39, f. 5. 1768.

Family: Flacourtiaceae

Habit: Tree

Flowering & Fruiting: December-May

Vernacular

Name: Cherumullikkachedi/Karkkadappazham/Karimulli/Kattukara/Oushadakkara (Mal.)

Batoko palm/Governor's plum/Madagascar plum (Eng.)

Distribution: Poyilkkavu, Bhayankavu (Kozhikode Dist.); Parappoolkavu (Kannur Dist.)

Hydnocarpus pentandra (Buch.-Ham.) Oken, Allg. Naturf. 3: 1381. 1841; Mohanan, Fl. Quilon Dist. 73. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 50. 1988; Ansari, Fl. Kasaragod Div. 65. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 68. 1989; Babu, Fl. Malappuram Dist. 27. 1990; Vajr., Fl. Palghat Dist. 61. 1990; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 422. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 62. 1994; Subram., Fl. Thenmala Div. 15. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 31. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 46. 1996; Sasidh., Fl. Shenduruny WLS 27. 1997; Sivar. & Mathew, Fl. Nilambur 59. 1997; Sasidh., Fl. Periyar Tiger Reserve 19. 1998; Sunil, Fl. Pl. Alappuzha Dist. 62. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 203. 2000 Pradeep, Fl. Vellarimala 21. 2000; Sasidh., Fl. Parambikulam WLS 17. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 59. 2005.

Family: Flacourtiaceae

Habit: Tree

Flowering & Fruiting: December-May

Vernacular Name: Kodi/Koti/Maravetti/Marotti/Neeratti/Niralam/Thamana (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Gnetaceae

Gnetum edule (Willd.) Blume, Nov. Pl. Expos. 31. 1833; Anil Kumar *et al.*, Fl. Pathanamthitta 591. 2005.

Family: Gnetaceae

Habit: Climber

Flowering & Fruiting: March-April

Vernacular Name: Karuthodal/Odal/Sunamkai/Oola kodi (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Hippocratiaceae

Salacia fruticosa Heyne ex Lawson in Hook. f., Fl. Brit. India 1: 628. 1875; Gamble, Fl. Pres. Madras 215(155). 1918; Manilal & Sivar., Fl. Calicut 66. 1982; Mohanan, Fl. Quilon Dist. 116. 1984; Ansari, Fl. Kasaragod Div. 101. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 98. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 104. 1989; Babu, Fl. Malappuram Dist. 123. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 118. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 108. 1996; Sasidh., Fl. Shenduruny WLS 68. 1997; Sasidh., Fl. Periyar Tiger Reserve 69. 1998; K. Ramam. & B.D. Naithani in N.P. Singh *et al.*, Fl. India 5: 153. 2000; Sunil, Fl. Pl. Alappuzha Dist. 164. 2000; Sasidh., Fl. Parambikulam WLS 67. 2002; Mohanan & Sivad., Fl. Agasthyamala 164. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 127. 2005.

Family: Hippocratiaceae

Habit: Climber

Flowering & Fruiting: February-May

Vernacular Name: Eakanayakam/Ponkarandi (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Hypoxidaceae

Curculigo orchioides Gaertn., Fruct. 1: 63. t. 16. f.11. 1788; Hook. f., Fl. Brit. India 6: 279. 1892; Gamble, Fl. Pres. Madras 1502(1050). 1928; Manilal & Sivar., Fl. Calicut 290. 1982; Mohanan, Fl. Quilon Dist. 415. 1984; Ansari, Fl. Kasaragod Div. 388. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 473. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 396. 1989; Babu, Fl. Malappuram Dist. 804. 1990; Vajr., Fl. Palghat Dist. 505. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 476. 1994; Subram., Fl. Thenmala Div. 385. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 13,27,39. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 467. 1996; Sasidh., Fl. Shenduruny WLS 340. 1997; Swarup. *et al.*, Shola For. Kerala 79. 1998; Sivar. & Mathew, Fl. Nilambur 720. 1997; Sasidh., Fl. Periyar Tiger Reserve 453. 1998; Sasidh., Fl. Chinnar WLS 311. 1999; Sunil, Fl. Pl. Alappuzha Dist. 894. 2000; Sasidh., Fl. Parambikulam

WLS 351. 2002; Mohanan & Sivad., Fl. Agasthyamala 716. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 503. 2005.

Family: Hypoxidaceae

Habit: Herb

Flowering & Fruiting: June-December

Vernacular Name: Nelpana/Nilappana (Mal.) Black musale (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Icacinaceae

Sarcostigma kleinii Wight & Arn., Edinb. New Phil. J. 14: 299. 1833; Hook. f., Fl. Brit. India 1: 594. 1875; Gamble, Fl. Pres. Madras 199(142). 1915; Manilal & Sivar., Fl. Calicut 65. 1982; Mohanan, Fl. Quilon Dist. 114. 1984; Ansari, Fl. Kasaragod Div. 99. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 94. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 103. 1989; Vajr., Fl. Palghat Dist. 115. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 114. 1994; Subram., Fl. Thenmala Div. 65. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 11. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 104. 1996; Sasidh., Fl. Shenduruny WLS 64. 1997; Sivar. & Mathew, Fl. Nilambur 141. 1997; Sasidh., Fl. Periyar Tiger Reserve 65. 1998; Sunil, Fl. Pl. Alappuzha Dist. 163. 2000; R. Mathur in N.P. Singh *et al.*, Fl. India 5: 35. 2000; Sasidh., Fl. Parambikulam WLS 63. 2002; Mohanan & Sivad., Fl. Agasthyamala 157. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 125. 2005.

Family: Icacinaceae

Habit: Climber

Flowering & Fruiting: February-June

Vernacular Name: Erumathali/Odal/Vattodal/Vellodal (Mal.)

Distribution: Kammadathukavu (Kasaragod Dist.)

Lamiaceae

Leucas aspera (Willd.) Link, Enum. Hort. Berol. Alt. 2: 113. 1822; Hook. f., Fl. Brit. India 4: 690. 1885; Gamble, Fl. Pres. Madras 1150(803). 1924; Manilal & Sivar., Fl. Calicut 239. 1982; Mohanan, Fl. Quilon Dist. 322. 1984; Ansari, Fl. Kasaragod Div. 305. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 324. 1989; Vajr., Fl. Palghat Dist. 377. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 366. 1994; Subram., Fl. Thenmala Div. 286. 1995; Sivar. &

Mathew, Fl. Nilambur 548. 1997; Sasidh., Fl. Chinnar WLS 249. 1999; Sunil, Fl. Pl. Alappuzha Dist. 740. 2000; Sasidh., Fl. Parambikulam WLS 247. 2002.

Family: Lamiaceae

Habit: Herb

Flowering & Fruiting: September-January

Vernacular Name: Thumba (Mal. & Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Ocimum gratissimum L., Sp. Pl. 1197. 1753; Hook. f., Fl. Brit. India 4: 608. 1885; Gamble, Fl. Pres. Madras 1111(777). 1924; Manilal & Sivar., Fl. Calicut 236. 1982; Mohanan, Fl. Quilon Dist. 324. 1984; Ansari, Fl. Kasaragod Div. 308. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 327. 1989; Ramach. & V. J. Nair, Fl. Cannanore Dist. 368. 1988; Babu, Fl. Malappuram Dist. 650. 1990; Vajr., Fl. Palghat Dist. 380. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 362. 1996; Sasidh., Fl. Periyar Tiger Reserve 321. 1998; Sasidh., Fl. Chinnar WLS 252. 1999; Sunil, Fl. Pl. Alappuzha Dist. 744. 2000; Sasidh., Fl. Parambikulam WLS 248. 2002.

Family: Lamiaceae

Habit: Shrub

Flowering & Fruiting: August-December

Vernacular Name: Attuthulasi/Anathulasi/Kattuthrithavu/Karpoorathulasi/Ramathulasi (Mal.)
Shrubby basil/Lemon basil/Tea bush (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottu Kav, Thazhekkavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Lauraceae

Cinnamomum malabattrum (Burm. f.) Blume, Bijdr. 568. 1826; Manilal, Fl. Silent Valley 234. 1988; Vajr., Fl. Palghat Dist. 403. 1990; Ansari, Fl. Kasaragod Div. 324. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 346. 1989; M. Mohanan & Henry, Fl. Thiruvanthapuram 392. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 11,23,31. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 380. 1996; Sasidh., Fl. Shenduruny WLS 267. 1997; Sivar. & Mathew, Fl. Nilambur 583. 1997; Sasidh., Fl. Periyar Tiger Reserve 345. 1998; Sunil, Fl. Pl. Alappuzha

Dist. 781. 2000; Sasidh., Fl. Parambikulam WLS 268. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 423. 2005.

Family: Lauraceae

Habit: Tree

Flowering & Fruiting: March-April

Vernacular Name: Elavarung/Illavangam/Karappa/Patta/Shanthamaram/Vayana/Vazhana/Vellakodala (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Cinnamomum travancoricum Gamble, Bull. Misc. Inform. Kew 1925: 128. 1925 & Gamble, Fl. Pres. Madras 1224(857). 1925; Ramach. & V. J. Nair, Fl. Cannanore Dist. 393. 1988; M. Mohanan & Henry, Fl. Thiruvanthapuram 392. 1994; Gopalan & Henry, Endemic Pl. Agasthiyamala 81. 2000; Mohanan & Sivad., Fl. Agasthiyamala 568. 2002.

Family: Lauraceae

Habit: Tree

Flowering & Fruiting: January-June

Distribution: Poongottukavu (Kannur Dist.)

Litsea coriacea (Heyne ex Meisner) Hook. f., Fl. Brit. India 5: 166. 1886; Gamble, Fl. Pres. Madras 1236(865). 1925; Manilal & Sivar., Fl. Calicut 251. 1982; Mohanan, Fl. Quilon Dist. 347. 1984; Ansari, Fl. Kasaragod Div. 325. 1985; Manilal, Fl. Silent Valley 236. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 395. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 347. 1989; Babu, Fl. Malappuram Dist. 691. 1990; Vajr., Fl. Palghat Dist. 404. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 394. 1994; Subram., Fl. Thenmala Div. 313. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 382. 1996; Sasidh., Fl. Shenduruny WLS 271. 1997; Sivar. & Mathew, Fl. Nilambur 586. 1997; Sasidh., Fl. Periyar Tiger Reserve 349. 1998; Sunil, Fl. Pl. Alappuzha Dist. 783. 2000; Sasidh., Fl. Parambikulam WLS 269. 2002; Mohanan & Sivad., Fl. Agasthiyamala 569. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 425. 2005.

Family: Lauraceae

Habit: Tree

Flowering & Fruiting: December-January

Vernacular Name: Maravettithali/Pannithali/Vettithali (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Persea macrantha (Nees) Kosterm., Reinwardtia 6: 193. 1962; Mohanan, Fl. Quilon Dist. 348. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 397. 1988; Vajr., Fl. Palghat Dist. 407. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 397. 1994; Subram., Fl. Thenmala Div. 315. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 11,23. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 383. 1996; Sasidh., Fl. Shenduruny WLS 273. 1997; Swarup. *et al.*, Shola For. Kerala 56. 1998; Sivar. & Mathew, Fl. Nilambur 588. 1997; Sasidh., Fl. Periyar Tiger Reserve 353. 1998; Sasidh., Fl. Chinnar WLS 271. 1999; Sunil, Fl. Pl. Alappuzha Dist. 784. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 279. 2000 Sasidh., Fl. Parambikulam WLS 271. 2002; Mohanan & Sivad., Fl. Agasthyamala 573. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 426. 2005.

Family: Lauraceae

Habit: Tree

Flowering & Fruiting: December-May

Vernacular Name: Kulamavu/Kulirmavu/Kurma/Malamavu/Uramavu/Uravu/Ooravu (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Lecythidaceae

Barringtonia acutangula (L.) Gaertn., Fruct. 2: 97, t.101. 1790; Hook. f., Fl. Brit. India 2: 508. 1879; Gamble, Fl. Pres. Madras 487(344). 1919; Manilal & Sivar., Fl. Calicut 109. 1982; Mohanan, Fl. Quilon Dist. 183. 1984; Ansari, Fl. Kasaragod Div. 160. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 162. 1989; Babu, Fl. Malappuram Dist. 251. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 185. 1996; Sivar. & Mathew, Fl. Nilambur 266. 1997; Sunil, Fl. Pl. Alappuzha Dist. 334. 2000; Sasidh., Fl. Parambikulam WLS 122. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 219. 2005.

Family: Lecythidaceae

Habit: Tree

Flowering & Fruiting: March-May

Vernacular

Name: Attampu/Attupera/Aattuvanchimaram/Adambu/Attupezhu/Cheriyasamskaravadi/Neer pezhu (Mal.) Indian oak/Small indian oak (Eng.)

Distribution: Thurayilkavu (Kozhikode Dist.) Kammadathukavu (Kasaragod Dist.)

Careya arborea Roxb., Pl. Corom. t. 218. 1811; Hook. f., Fl. Brit. India 2: 511. 1879; Gamble, Fl. Pres. Madras 488(345). 1919; Manilal & Sivar., Fl. Calicut 108. 1982; Mohanan, Fl. Quilon Dist. 183. 1984; Ansari, Fl. Kasaragod Div. 160. 1985; Manilal, Fl. Silent Valley 108. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 184. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 163. 1989; Babu, Fl. Malappuram Dist. 252. 1990; Vajr., Fl. Palghat Dist. 201. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 193. 1994; Subram., Fl. Thenmala Div. 136. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 11. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 186. 1996; Sasidh., Fl. Shenduruny WLS 125. 1997; Sivar. & Mathew, Fl. Nilambur 267. 1997; Sasidh., Fl. Periyar Tiger Reserve 140. 1998; Sunil, Fl. Pl. Alappuzha Dist. 336. 2000; Sasidh., Fl. Parambikulam WLS 124. 2002; Mohanan & Sivad., Fl. Agasthyamala 266. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 220. 2005.

Family: Lecythidaceae

Habit: Tree

Flowering & Fruiting: February-July

Vernacular Name: Aalam/Alasoo/Peru/Pezhu (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Leeaceae

Leea indica (Burm. f.) Merr., Philipp. J. Sci. 14. 245. 1919; Manilal & Sivar., Fl. Calicut 70. 1982; Mohanan, Fl. Quilon Dist. 122. 1984; Ansari, Fl. Kasaragod Div. 106. 1985; Manilal, Fl. Silent Valley 61. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 107. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 109. 1989; Babu, Fl. Malappuram Dist. 137. 1990; Vajr., Fl. Palghat Dist. 127. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 122. 1994; Subram., Fl. Thenmala Div. 74. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 23,31. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 114. 1996; Sasidh., Fl. Shenduruny WLS 73. 1997; Sivar. & Mathew, Fl. Nilambur 157. 1997; Sasidh., Fl. Periyar Tiger Reserve 75. 1998; Sunil, Fl. Pl. Alappuzha Dist. 179. 2000; B.D. Naithani in N.P. Singh *et al.*, Fl. India 5: 337. 2000;

Sasidh., Fl. Parambikulam WLS 72. 2002; Mohanan & Sivad., Fl. Agasthyamala 170. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 137. 2005.

Family: Leeaceae

Habit: Shrub

Flowering & Fruiting: March-August

Vernacular Name: Chorianthali (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Leea macrophylla Roxb. ex Hornem., Hort. Hafn. 1: 231. 1813; Hook. f., Fl. Brit. India 1: 664. 1875; Gamble, Fl. Pres. Madras 239(171). 1918; Manilal & Sivar., Fl. Calicut 70. 1982; Mohanan, Fl. Quilon Dist. 122. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 108. 1988; Babu, Fl. Malappuram Dist. 139. 1990; Vajr., Fl. Palghat Dist. 127. 1990; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 17. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 114. 1996; Sivar. & Mathew, Fl. Nilambur 158. 1997; B.D. Naithani in N.P. Singh *et al.*, Fl. India 5: 339. 2000.

Family: Leeaceae

Habit: Shrub

Flowering & Fruiting: November-December

Vernacular Name: Njallu (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Liliaceae

Gloriosa superba L., Sp. Pl. 305. 1753; Hook. f., Fl. Brit. India 6: 358. 1892; Gamble, Fl. Pres. Madras 1519(1061). 1928; Manilal & Sivar., Fl. Calicut 292. 1982; Mohanan, Fl. Quilon Dist. 416. 1984; Ansari, Fl. Kasaragod Div. 389. 1985; Manilal, Fl. Silent Valley 320. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 477. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 401. 1989; Babu, Fl. Malappuram Dist. 812. 1990; Vajr., Fl. Palghat Dist. 510. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 482. 1994; Subram., Fl. Thenmala Div. 391. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 14,34. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 471. 1996; Sivar. & Mathew, Fl. Nilambur 729. 1997; Sasidh., Fl. Periyar Tiger Reserve 457. 1998; Sasidh., Fl. Chinnar WLS 314. 1999; Ravikumar & Ved, Illustr.

Field Guide 100 Red Listed Med. Pl. 165. 2000 Sunil, Fl. Pl. Alappuzha Dist. 901. 2000; Sasidh., Fl. Parambikulam WLS 353. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 507. 2005.

Family: Liliaceae

Habit: Climber

Flowering & Fruiting: July-December

Vernacular Name: Kanthel/Kariyilanchi/Karthikapoo/Malathamara/Menthonni/Ventoni (Mal.) Climbing lily/Glory lily/Malabar glory lily (Eng.)

Distribution: Poyilkkavu, Bhayankavu, (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.)

Loganiaceae

Fagraea ceilanica Thunb., Vetensk. Acad. Handl. 3: 132. 1782; Hook. f., Fl. Brit. India 4: 83. 1883 "zeylanica"; Gamble, Fl. Pres. Madras 865(608). 1923; Manilal & Sivar., Fl. Calicut 172. 1982; Mohanan, Fl. Quilon Dist. 261. 1984; Ansari, Fl. Kasaragod Div. 234. 1985; Manilal, Fl. Silent Valley 180. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 287. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 250. 1989; Babu, Fl. Malappuram Dist. 441. 1990; Vajr., Fl. Palghat Dist. 294. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 302. 1994; Subram., Fl. Thenmala Div. 227. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 11. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 295. 1996; Sasidh., Fl. Shenduruny WLS 211. 1997; Swarup. *et al.*, Shola For. Kerala 57. 1998; Sivar. & Mathew, Fl. Nilambur 429. 1997; Muktesh, Epiphytic Fl. Western Ghats 66. 1998; Sasidh., Fl. Periyar Tiger Reserve 254. 1998; Sasidh., Fl. Chinnar WLS 201. 1999; Sunil, Fl. Pl. Alappuzha Dist. 550. 2000; Sasidh., Fl. Parambikulam WLS 198. 2002; Mohanan & Sivad., Fl. Agasthyamala 456. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 323. 2005.

Family: Loganiaceae

Habit: Shrub

Flowering & Fruiting: March-November

Vernacular Name: Modakam (Mal.) Perfume Flower Tree (Eng.)

Distribution: Poyilkkavu, (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Strychnos nux-vomica L., Sp. Pl. 189. 1753; Hook. f., Fl. Brit. India 4: 90. 1883; Gamble, Fl. Pres. Madras 868(610). 1923; Manilal & Sivar., Fl. Calicut 171. 1982; Mohanan, Fl. Quilon

Dist. 262. 1984; Ansari, Fl. Kasaragod Div. 234. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 289. 1988; Babu, Fl. Malappuram Dist. Antony, Syst. Stud. Fl. Kottayam Dist. 250. 1989; 444; Vajr., Fl. Palghat Dist. 296. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 303. 1994; Subram., Fl. Thenmala Div. 228. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 11,17. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 297. 1996; Sasidh., Fl. Shenduruny WLS 212. 1997; Sivar. & Mathew, Fl. Nilambur 430. 1997; Sasidh., Fl. Periyar Tiger Reserve 256. 1998; Sasidh., Fl. Chinnar WLS 201. 1999; Sunil, Fl. Pl. Alappuzha Dist. 555. 2000; Sasidh., Fl. Parambikulam WLS 199. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 324. 2005.

Family: Loganiaceae

Habit: Tree

Flowering & Fruiting: March-December

Vernacular Name: Etti/Kangnalam/Kanjiram/Kanniram/Kariram (Mal.) Nux-vomica tree/Poison nut/Strychnine tree/Snake wood (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Strychnos potatorum L.f., Suppl. Pl. 148. 1781; Hook. f., Fl. Brit. India 4: 90. 1883; Gamble, Fl. Pres. Madras 868(610). 1923; Vajr., Fl. Palghat Dist. 296. 1990; Sasidh., Fl. Chinnar WLS 201. 1999; Sasidh., Fl. Parambikulam WLS 199. 2002.

Family: Loganiaceae

Habit: Tree

Flowering & Fruiting: March-May

Vernacular Name: Chillam/Kadakam/Thettamaram/Thettamparel (Mal.) Clearing nut tree (Eng.)

Distribution: Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Loranthaceae

Dendrophthoe falcata (L. f.) Etting., Denkschr. Kaisel. Akad. Wiss. Math.-Naturwiss. Klasse 32: 52,53,58. t.13. 1871, var. *falcata*; Manilal & Sivar., Fl. Calicut 252. 1982; Mohanan, Fl. Quilon Dist. 349. 1984; Ansari, Fl. Kasaragod Div. 326. 1985; Manilal, Fl. Silent Valley 239. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 399. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 348. 1989; Babu, Fl. Malappuram Dist. 694. 1990; Vajr., Fl. Palghat Dist.

409. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 399. 1994; Subram., Fl. Thenmala Div. 318. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 385. 1996; Sasidh., Fl. Shenduruny WLS 274. 1997; Sivar. & Mathew, Fl. Nilambur 591. 1997; Sasidh., Fl. Periyar Tiger Reserve 355. 1998; Sasidh., Fl. Chinnar WLS 272. 1999; Sunil, Fl. Pl. Alappuzha Dist. 785. 2000; Sasidh., Fl. Parambikulam WLS 273. 2002; Mohanan & Sivad. Fl. Agasthyamala 579. 2002.

Family: Loranthaceae

Habit: Tree

Flowering & Fruiting: December-May

Vernacular

Name:Chempoo/Chuvannaitthikkanni/Ithikkanni/Ithil/Kannirattinmelpulluni/Pullunni (Mal.)

Mistletoe (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Lythraceae

Lagerstroemia microcarpa Wight, Ic. t. 109. 1839; Mohanan, Fl. Quilon Dist. 189. 1984; Manilal, Fl. Silent Valley 113. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 192. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 170. 1989; Vajr., Fl. Palghat Dist. 205. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 202. 1994; Subram., Fl. Thenmala Div. 144. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 11. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 195. 1996; Sasidh., Fl. Shenduruny WLS 133. 1997; Sivar. & Mathew, Fl. Nilambur 277. 1997; Sasidh., Fl. Periyar Tiger Reserve 148. 1998; Sunil, Fl. Pl. Alappuzha Dist. 346. 2000; Sasidh., Fl. Parambikulam WLS 131. 2002; Mohanan & Sivad., Fl. Agasthyamala 286. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 228. 2005.

Family: Lythraceae

Habit: Tree

Flowering & Fruiting: June-February

Vernacular Name: Vellilavu/Venthekku (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Magnoliaceae

Magnolia champaca (L.) Baill. ex Pierre, Fl. Forest. Cochinch. t. 3. 1880.

Michelia champaca L., Sp. Pl. 536. 1753; Hook. f., Fl. Brit. India 1: 42. 1872; Gamble, Fl. Pres. Madras 9 (6). 1915; Manilal & Sivar., Fl. Calicut 26. 1982; Mohanan, Fl. Quilon Dist. 60. 1984; Antony, Syst. Stud. Fl. Kottayam Dist. 55. 1989; Babu, Fl. Malappuram Dist. 2. 1990; Vajr., Fl. Palghat Dist. 45. 1990; D. C. S. Raju in B. D. Sharma *et al.*, Fl. India 1: 175. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 43. 1994; Sasidh., Fl. Periyar Tiger Reserve 3. 1998; Sunil, Fl. Pl. Alappuzha Dist. 21. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 235. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 39. 2005.

Family: Magnoliaceae

Habit: Tree

Flowering & Fruiting: March-July

Vernacular Name: Chembakam/Champakam (Mal.) Champak/Golden champa/Yellow champa (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Kammadathukavu (Kasaragod Dist.)

Malvaceae

Gossypium arboreum L., Sp. Pl. 693. 1753; Hook. f., Fl. Brit. India 1: 347. 1874; T.K. Paul in B.D. Sharma & Sanjappa, Fl. India 3: 387. 1993; Sivar. & Pradeep, Malvac. Southern Peninsular India 27. 1996; Sunil, Fl. Pl. Alappuzha Dist. 89. 2000.

Family: Malvaceae

Habit: Shrub

Flowering & Fruiting: August-December

Vernacular Name: Kattuparuthi/Muripparutthi/Chemparuthi (Mal.) Tree cotton (Eng.)

Distribution: Poongottukavu (Kannur Dist.)

Urena lobata L. ssp. *sinuata* (L.) Borss., Blumea 14: 142. 1966; Hook. f., Fl. Brit. India 1: 329. 1874; Manilal & Sivar., Fl. Calicut 46. 1982; Ansari, Fl. Kasaragod Div. 78. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 65. 1988; T.K. Paul & M.P. Nayar, Fasc. Fl. Ind. 19: 230. 1988; Vajr., Fl. Palghat Dist. 85. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3:382.1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 63. 1996; Sasidh., Fl. Shenduruny WLS 40. 1997; Sivar. & Mathew, Fl. Nilambur 96. 1997; Sunil, Fl. Pl. Alappuzha Dist. 110. 2000;

Sasidh., Fl. Parambikulam WLS 30. 2002; Mohanan & Sivad., Fl. Agasthyamala 103. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 92. 2005.

Family: Malvaceae

Habit: Shrub

Flowering & Fruiting: August-December

Vernacular Name: Uthiram/Uram (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Malpighiaceae

Hiptage benghalensis (L.) Kurz, J. Asiat. Soc. Bengal 43: 136. 1874; Manilal & Sivar., Fl. Calicut 55. 1982; Ansari, Fl. Kasaragod Div. 86. 1985; Manilal, Fl. Silent Valley 38. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 75. 1988; Vajr., Fl. Palghat Dist. 97. 1990; Babu, Fl. Malappuram Dist. 92. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 75. 1996; R.C. Srivastava in Hajra *et al.*, Fl. India 4:14.1997; Sasidh., Fl. Shenduruny WLS 48. 1997; Sasidh., Fl. Periyar Tiger Reserve 43. 1998; Sasidh., Fl. Chinnar WLS 50. 1999; Sunil, Fl. Pl. Alappuzha Dist. 131. 2000; Sasidh., Fl. Parambikulam WLS 40. 2002; Mohanan & Sivad., Fl. Agasthyamala 125. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 104. 2005.

Family: Malpighiaceae

Habit: Tree

Flowering & Fruiting: January-November

Vernacular Name: Chittilakody/Njarambodal/Pongapoo/Seethambu/Sitampu (Mal.) Clustered hiptage/Hiptage/Helicopter Flower (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Melastomaceae

Memecylon randerianum SM & MR Almeida, Journ. Bombay Nat. Hist. Soc. 85: 521. 1989. *Memecylon malabaricum* (Clarke) Cogn. in A. & C. DC., Monogr. Phan. 7: 1148. 1891; Gamble, Fl. Pres. Madras 505(356). 1919; Manilal & Sivar., Fl. Calicut 111. 1982; Babu, Fl. Malappuram Dist. 255. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 197. 1994; Subram., Fl. Thenmala Div. 137. 1995; Mohanan & Sivad., Fl. Agasthyamala 274. 2002;

Sasidh., Fl. Periyar Tiger Reserve 143. 1998; Pradeep, Fl. Vellarimala 62. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 226. 2005.

Family: Melastomaceae

Habit: Shrub

Flowering & Fruiting: February-May

Vernacular Name: Kaikkathetti/Kashara/Kazhavu/Koovachekki (Mal.)

Distribution: Poyilkkavu (Kozhikode Dist.); Poongottu Kavu, Thazhekkavu (Kannur Dist.)

Memecylon umbellatum Burm.f., Fl. Ind. 87. 1768; Gamble, Fl. Pres. Madras 504(355). 1919; Manilal & Sivar., Fl. Calicut 110. 1982; Mohanan, Fl. Quilon Dist. 186. 1984; Ansari, Fl. Kasaragod Div. 163. 1985; Manilal, Fl. Silent Valley 110. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 187. 1988; Babu, Fl. Malappuram Dist. 255. 1990; Vajr., Fl. Palghat Dist. 202. 1990; Antony, Syst. Stud. Fl. Kottayam Dist. 165. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 187. 1996; Sivar. & Mathew, Fl. Nilambur 271. 1997; Sasidh., Fl. Chinnar WLS 131. 1999; Pradeep, Fl. Vellarimala 63. 2000; Sunil, Fl. Pl. Alappuzha Dist. 341. 2000; Sasidh., Fl. Parambikulam WLS 127. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 226. 2005.

Family: Melastomaceae

Habit: Shrub

Flowering & Fruiting: February-March

Vernacular

Name: Anakayavu/Anjanamaram/Kanali/Kalayam/Kannavu/Kayampoomaram/Kasavu/Netu njetti (Mal.) Ironwood tree (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Meliaceae

Aglaia elaeagnoidea (A. Juss.) Benth., Fl. Austral. 1: 383. 1863; Manilal & Sivar., Fl. Calicut 63. 1982; Mohanan, Fl. Quilon Dist. 109. 1984; Ansari, Fl. Kasaragod Div. 95. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 100. 1989; Babu, Fl. Malappuram Dist. 116. 1990; Subram., Fl. Thenmala Div. 61. 1995; Pannell, Kew Bull. Add. ser. 16, 143.1992; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 461.1997; Sasidh., Fl. Chinnar WLS 61. 1999; Sunil, Fl. Pl. Alappuzha Dist. 154. 2000; Sasidh., Fl. Parambikulam WLS 54. 2002; Mohanan & Sivad., Fl. Agasthyamala 149. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 116. 2005.

Family: Meliaceae

Habit: Shrub

Flowering & Fruiting: November-August

Vernacular Name: Punyava (Mal.)

Distribution: Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu

Aphanamixis polystachya (Wall.) Parker, Indian For. 57: 486. 1931; Manilal & Sivar., Fl. Calicut 63. 1982; Mohanan, Fl. Quilon Dist. 109. 1984; Ansari, Fl. Kasaragod Div. 95. 1985; Subram., Fl. Thenmala Div. 59. 1995; Antony, Syst. Stud. Fl. Kottayam Dist. 100. 1989; Manilal, Fl. Silent Valley 48. 1988; Vajr., Fl. Palghat Dist. 110. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 109. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 24,31. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 94. 1996; Sasidh., Fl. Shenduruny WLS 59. 1997; Sivar. & Mathew, Fl. Nilambur 131. 1997; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 477. 1997; Sasidh., Fl. Periyar Tiger Reserve 58. 1998; Sasidh., Fl. Chinnar WLS 61. 1999; Sunil, Fl. Pl. Alappuzha Dist. 157. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 57. 2000 Sasidh., Fl. Parambikulam WLS 56. 2002; Mohanan & Sivad., Fl. Agasthyamala 150. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 116. 2005.

Family: Meliaceae

Habit: Tree

Flowering & Fruiting: January-December

Vernacular Name: Chemmaram/Karakil/Vallikonna (Mal.) Rohituka tree (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Cipadessa baccifera (Roth) Miq., Ann. Mus. Lugd.-Bat. 4: 6. 1868; Gamble, Fl. Pres. Madras 176(126). 1915; Manilal & Sivar., Fl. Calicut 64. 1982; Mohanan, Fl. Quilon Dist. 109. 1984; Manilal, Fl. Silent Valley 49. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 88. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 100. 1989; Vajr., Fl. Palghat Dist. 110. 1990; Babu, Fl. Malappuram Dist. 118. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 110. 1994; Subram., Fl. Thenmala Div. 59. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 95. 1996; Sasidh., Fl. Shenduruny WLS 59. 1997; Swarup. *et al.*, Shola For. Kerala 59. 1998; Sivar. & Mathew, Fl. Nilambur 132. 1997; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 482. 1997; Sasidh., Fl. Periyar Tiger Reserve 59. 1998; Sasidh., Fl. Chinnar WLS 62. 1999; Sunil,

Fl. Pl. Alappuzha Dist. 159. 2000; Sasidh., Fl. Parambikulam WLS 56. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 118. 2005.

Family: Meliaceae

Habit: Tree

Flowering & Fruiting: November-July

Vernacular Name: Kaipanarangi/Potti/Pulippanchedi (Mal.)

Distribution: Poyilkkavu, Bhayankavu, (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Swietenia macrophylla King in Hook., Ic. t. 1550. 1886; Subram., Fl. Thenmala Div. 59. 1995; Sasidh., Fl. Shenduruny WLS 61. 1997; Sasidh. & Sivar., Fl. Pl. Thrissur For. 100. 1996; Sivar. & Mathew, Fl. Nilambur 136. 1997; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 526. 1997; Sunil, Fl. Pl. Alappuzha Dist. 161. 2000.

Family: Meliaceae

Habit: Tree

Flowering & Fruiting: April-March

Vernacular Name: Mahogani/Manthagani (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Poongottu Kavvu, (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Swietenia mahagoni (L.) Jacq., Enum. Syst. Pl. 20. 1760; Gamble, Fl. Pres. Madras 187(134). 1915; Mohanan, Fl. Quilon Dist. 111. 1984; Ansari, Fl. Kasaragod Div. 97. 1985; M. Mohanan & Henry, Fl. Thiruvanthapuram 112. 1994; Vajr., Fl. Palghat Dist. 113. 1990; Subram., Fl. Thenmala Div. 59. 1995; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. India 4: 525. 1997.

Family: Meliaceae

Habit: Tree

Flowering & Fruiting: April-November

Vernacular Name: Mahogani/Manthagani (Mal.)

Distribution: Poongottu Kavvu, (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Menispermaceae

Cyclea peltata (Lam.) Hook. f. & Thoms., Fl. Ind. 201. 1855 & in Hook. f., Fl. Brit. India 1: 104. 1872p.p; Gamble, Fl. Pres. Madras 31(22). 1915; Manilal & Sivar., Fl. Calicut 29. 1982; Mohanan, Fl. Quilon Dist. 66. 1984; Ansari, Fl. Kasaragod Div. 58. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 42. 1988; Manilal, Fl. Silent Valley 5. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 61. 1989; Vajr., Fl. Palghat Dist. 51. 1990; Gangop. in B. D. Sharma *et al.*, Fl. India 1: 325. 1993; Babu, Fl. Malappuram Dist. 11. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 50. 1994; Subram., Fl. Thenmala Div. 7. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 11,24. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 36. 1996; Sasidh., Fl. Shenduruny WLS 23. 1997; Sivar. & Mathew, Fl. Nilambur 46. 1997; Sasidh., Fl. Periyar Tiger Reserve 12. 1998; Pradeep, Fl. Vellarimala 16. 2000; Sunil, Fl. Pl. Alappuzha Dist. 38. 2000; Mohanan & Sivad., Fl. Agasthyamala 66. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 51. 2005.

Family: Menispermaceae

Habit: Climber

Flowering & Fruiting: April-May

Vernacular Name: Padakizhangu/Padathali/Padavalli/Pattichevian (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Tiliacora acuminata (Poir.) Miers ex Hook.f. & Thoms., Fl. Ind. 187.1855; Gamble, Fl. Pres. Madras 28(20).1915; Manilal & Sivar., Fl. Calicut 30. 1982; Mohanan, Fl. Quilon Dist. 67. 1984; Antony, Syst. Stud. Fl. Kottayam Dist. 62. 1989; Babu, Fl. Malappuram Dist. 12. 1990; Vajr., Fl. Palghat Dist. 52. 1990; A. Pramanik in B. D. Sharma *et al.*, Fl. India 1: 343. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 52. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 37. 1996; Sivar. & Mathew, Fl. Nilambur 50. 1997; Pradeep, Fl. Vellarimala 19. 2000; Sunil, Fl. Pl. Alappuzha Dist. 39. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 52. 2005.

Family: Menispermaceae

Habit: Climber

Flowering & Fruiting: April-December

Vernacular Name: Vallikanjiram (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Tinospora cordifolia (Willd.) Miers. in Ann. Mag. Nat. Hist. 2, 7: 38. 1855; Hook. f., Fl. Brit. India 1: 97. 1872; Gamble, Fl. Pres. Madras 26(19). 1915; Manilal & Sivar., Fl. Calicut 29. 1982; Mohanan, Fl. Quilon Dist. 67. 1984; Antony, Syst. Stud. Fl. Kottayam Dist. 62. 1989; Babu, Fl. Malappuram Dist. 13. 1990; Vajr., Fl. Palghat Dist. 52. 1990; A. Pramanik in B. D. Sharma *et al.*, Fl. India 1: 347. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 53. 1994; Sasidh., Fl. Chinnar WLS 15. 1999; Sunil, Fl. Pl. Alappuzha Dist. 40. 2000; Sasidh., Fl. Parambikulam WLS 9. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 52. 2005.

Family: Menispermaceae

Habit: Climber

Flowering & Fruiting: January-June

Vernacular Name: Amrthu/Amrutavalli/Chitamruthu/Siddamirth (Mal.) Moon creeper/Bile killer/Tinospora (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Tinospora sinensis (Lour.) Merr., Sunyatsenia 1: 193. 1934 & Trans. Am. Phil. Soc. Philad. 24. 158. 1935; Manilal & Sivar., Fl. Calicut 30. 1982; Ansari, Fl. Kasaragod Div. 59. 1985; Babu, Fl. Malappuram Dist. 14. 1990; Vajr., Fl. Palghat Dist. 52. 1990; A. Pramanik in B. D. Sharma *et al.*, Fl. India 1: 349. 1993; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 11,18. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 39. 1996; Sivar. & Mathew, Fl. Nilambur 51. 1997; Sasidh., Fl. Periyar Tiger Reserve 13. 1998; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 372. 2000 Sunil, Fl. Pl. Alappuzha Dist. 41. 2000; Sasidh., Fl. Parambikulam WLS 9. 2002.

Campylus sinensis Lour., Fl. Cochinch. 113. 1790.

Family: Menispermaceae

Habit: Climber

Flowering & Fruiting: February-June

Vernacular Name: Amrthu/Kattamruthu/Peiamerdu (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Mimosaceae

Albizia lebbbeck (L.) Benth. in Hook.'s London J. Bot. 3: 87. 1844; Hook. f., Fl. Brit. India 2: 298. 1878; Gamble, Fl. Pres. Madras 432(306). 1919; Mohanan, Fl. Quilon Dist. 167. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 170. 1988; Sanjappa, Legumes Ind. 56. 1992; M. Mohanan & Henry, Fl. Thiruvanthapuram 173. 1994; Subram., Fl. Thenmala Div. 125. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 17. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 168. 1996; Chakrab. & Gangop., Journ. Econ. Tax. Bot. 20: 589. 1996; Sasidh., Fl. Periyar Tiger Reserve 126. 1998; Sasidh., Fl. Chinnar WLS 120. 1999; Sunil, Fl. Pl. Alappuzha Dist. 292. 2000; Sasidh., Fl. Parambikulam WLS 111. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 203. 2005.

Family: Mimosaceae

Habit: Tree

Flowering & Fruiting: March-December

Vernacular Name: Nenmenivaka/Kattuvaka/Karivaka/Karimthakara/Vaka (Mal.) East India walnut/Lebbek tree/Raom tree/Siris tree/Soros-tree/Womans tongue

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Xylia xylocarpa (Roxb.) Taub., Bot. Centralbl. 47: 395. 1891; Gamble, Fl. Pres. Madras 417(295). 1919; Manilal & Sivar., Fl. Calicut 101. 1982; Mohanan, Fl. Quilon Dist. 168. 1984; Ansari, Fl. Kasaragod Div. 152. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 172. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 153. 1989; Babu, Fl. Malappuram Dist. 234. 1990; Vajr., Fl. Palghat Dist. 190. 1990; Sanjappa, Legumes Ind. 73. 1992; M. Mohanan & Henry, Fl. Thiruvanthapuram 176. 1994; Subram., Fl. Thenmala Div. 123. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 11,17. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 171. 1996; Sivar. & Mathew, Fl. Nilambur 245. 1997; Sasidh., Fl. Periyar Tiger Reserve 128. 1998; Sunil, Fl. Pl. Alappuzha Dist. 301. 2000; Sasidh., Fl. Parambikulam WLS 113. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 206. 2005.

Family: Mimosaceae

Habit: Tree

Flowering & Fruiting: February-December

Vernacular Name: Irul/Irulpool/Irumullu/Kadamaram/Pangal (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Moraceae

Artocarpus heterophyllus Lam., Encycl. 3: 209. 1789; Manilal & Sivar., Fl. Calicut 278. 1982; Mohanan, Fl. Quilon Dist. 376. 1984; Ansari, Fl. Kasaragod Div. 350. 1985; Manilal, Fl. Silent Valley 258. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 430. 1988; Babu, Fl. Malappuram Dist. 745. 1990; Vajr., Fl. Palghat Dist. 443. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 430. 1994; Subram., Fl. Thenmala Div. 354. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 24,31. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 426. 1996; Sasidh., Fl. Shenduruny WLS 300. 1997; Sivar. & Mathew, Fl. Nilambur 659. 1997; Sasidh., Fl. Periyar Tiger Reserve 390. 1998; Sunil, Fl. Pl. Alappuzha Dist. 849. 2000; Sasidh., Fl. Parambikulam WLS 308. 2002; Mohanan & Sivad., Fl. Agasthyamala 625. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 460. 2005.

Artocarpus integrifolius Wight, Ic. t. 678. 1840; Hook. f., Fl. Brit. India 5: 541. 1888, non L.f. 1781; Gamble, Fl. Pres. Madras 1369(957). 1928.

Family: Moraceae

Habit: Tree

Flowering & Fruiting: November-April

Vernacular Name: Chakka maram/Pilavu/Plavu/Kottachakka (Mal.) Jack fruit tree (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.)

Artocarpus hirsutus Lam., Encycl. 3: 210. 1789; Hook. f., Fl. Brit. India 5: 541. 1888; Gamble, Fl. Pres. Madras 1369(957). 1928; Manilal & Sivar., Fl. Calicut 278. 1982; Mohanan, Fl. Quilon Dist. 376. 1984; Ansari, Fl. Kasaragod Div. 351. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 430. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 371. 1989; Babu, Fl. Malappuram Dist. 746. 1990; Vajr., Fl. Palghat Dist. 443. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 431. 1994; Subram., Fl. Thenmala Div. 355. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 426. 1996; Sasidh., Fl. Shenduruny WLS 301. 1997; Sivar. & Mathew, Fl. Nilambur 660. 1997; Sasidh., Fl. Periyar Tiger Reserve 390. 1998; Sasidh., Fl. Chinnar WLS 296. 1999; Sunil, Fl. Pl. Alappuzha Dist. 850. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 63. 2000 Sasidh., Fl. Parambikulam WLS 308. 2002;

Mohanani & Sivad., Fl. Agasthyamala 626. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 461. 2005.

Family: Moraceae

Habit: Tree

Flowering & Fruiting: December-March

Vernacular Name: Anjili/Ayani/Anniliayari (Mal.) Wild jack (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.)

Ficus benghalensis L., Sp. Pl. 1059. 1753, var. *benghalensis*; Hook. f., Fl. Brit. India 5: 499. 1888; Gamble, Fl. Pres. Madras 361(952). 1928; Manilal & Sivar., Fl. Calicut 277. 1982; Mohanan, Fl. Quilon Dist. 378. 1984; Ansari, Fl. Kasaragod Div. 354. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 431. 1988; Babu, Fl. Malappuram Dist. 748. 1990; Vajr., Fl. Palghat Dist. 450. 1990; Subram., Fl. Thenmala Div. 352. 1995; Sivar. & Mathew, Fl. Nilambur 663. 1997; Sasidh., Fl. Chinnar WLS 297. 1999; Sunil, Fl. Pl. Alappuzha Dist. 853. 2000; Mohanan & Sivad., Fl. Agasthyamala 630. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 463. 2005.

Family: Moraceae

Habit: Tree

Flowering & Fruiting: May-August

Vernacular Name: Alamaram/Peraal/Aal/Nyagrodham/Vadavriksham (Mal.) Benyan tree (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Poongottu Kavu, (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Ficus exasperata Vahl, Enum. Pl. 2: 197. 1805; Manilal & Sivar., Fl. Calicut 275. 1982; Mohanan, Fl. Quilon Dist. 378. 1984; Ansari, Fl. Kasaragod Div. 355. 1985; Manilal, Fl. Silent Valley 259. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 432. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 372. 1989; Babu, Fl. Malappuram Dist. 751. 1990; Vajr., Fl. Palghat Dist. 447. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 432. 1994; Subram., Fl. Thenmala Div. 352. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 32. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 429. 1996; Sasidh., Fl. Shenduruny WLS 303. 1997; Sivar. & Mathew, Fl. Nilambur 665. 1997; Sasidh., Fl. Periyar Tiger Reserve 394. 1998; Sunil, Fl. Pl.

Alappuzha Dist. 855. 2000; Sasidh., Fl. Parambikulam WLS 311. 2002; Mohanan & Sivad., Fl. Agasthyamala 632. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 464. 2005.

Family: Moraceae

Habit: Tree

Flowering & Fruiting: February-April

Vernacular Name: Parakam/Therakam (Mal.) Sandpaper tree (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Ficus hispida L. f., Suppl. Pl. 442. 1781; Hook. f., Fl. Brit. India 5: 522. 1888; Gamble, Fl. Pres. Madras 1367(956). 1928; Manilal & Sivar., Fl. Calicut 275. 1982; Mohanan, Fl. Quilon Dist. 378. 1984; Ansari, Fl. Kasaragod Div. 356. 1985; Manilal, Fl. Silent Valley 259. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 432. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 372. 1989; Babu, Fl. Malappuram Dist. 752. 1990; Vajr., Fl. Palghat Dist. 447. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 433. 1994; Subram., Fl. Thenmala Div. 351. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 24,31. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 429. 1996; Sasidh., Fl. Shenduruny WLS 303. 1997; Sivar. & Mathew, Fl. Nilambur 667. 1997; Sasidh., Fl. Periyar Tiger Reserve 394. 1998; Sasidh., Fl. Chinnar WLS 298. 1999; Sunil, Fl. Pl. Alappuzha Dist. 856. 2000; Sasidh., Fl. Parambikulam WLS 312. 2002; Mohanan & Sivad., Fl. Agasthyamala 633. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 464. 2005.

Family: Moraceae

Habit: Tree

Flowering & Fruiting: September-May

Vernacular Name: Erumanakku/Kattatthi/Parakam/Peyatti/Thonditherakam/Thondi (Mal.)

Distribution: Poyilkkavu, Bhayankavu (Kozhikode Dist.); Parappoolkavu, Poongottu Kav, (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Ficus microcarpa L. f., Suppl. Pl. 442. 1781; Manilal & Sivar., Fl. Calicut 276. 1982; Mohanan, Fl. Quilon Dist. 379. 1984; Ansari, Fl. Kasaragod Div. 356. 1985; Vajr., Fl. Palghat Dist. 448. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 429. 1996; Sasidh., Fl. Periyar Tiger Reserve 394. 1998; Sasidh., Fl. Chinnar WLS 298. 1999; Sunil, Fl. Pl. Alappuzha Dist.

857. 2000; Sasidh., Fl. Parambikulam WLS 312. 2002; Mohanan & Sivad., Fl. Agasthyamala 634. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 465. 2005

Family: Moraceae

Habit: Tree

Flowering & Fruiting: March-May

Vernacular Name: Ithi/Ithiyal/Kallithi (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Ficus religiosa L., Sp. Pl. 1059. 1753; Hook. f., Fl. Brit. India 5: 513. 1888; Gamble, Fl. Pres. Madras 1363(953). 1928; Manilal & Sivar., Fl. Calicut 277. 1982; Mohanan, Fl. Quilon Dist. 380. 1984; Ansari, Fl. Kasaragod Div. 357. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 434. 1988; Babu, Fl. Malappuram Dist. 754. 1990; Vajr., Fl. Palghat Dist. 450. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 433. 1994; Sasidh., Fl. Shenduruny WLS 304. 1997; Sunil, Fl. Pl. Alappuzha Dist. 859. 2000; Sasidh., Fl. Parambikulam WLS 313. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 465. 2005.

Family: Moraceae

Habit: Tree

Flowering & Fruiting: November-February

Vernacular Name: Arayal/Arasu/Ashvatham/Bodhivriksham/Thullal (Mal.) Peepal tree

Pipul/Sacred bo tree/Sacred fig (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Myristicaceae

Myristica beddomei King, Ann. Roy. Bot. Gard. (Calcutta) 3: 291, t. 118. f.1-8,1891, ssp. beddomei: de Wilde, Blumea 42: 151. 1997; Gamble, Fl. Pres. Madras 1214(850). 1915.

Family: Myristicaceae

Habit: Tree

Flowering & Fruiting: December-May

Vernacular

Name: Adakkapayin/Chithirapoovu/Kattujathi/Kothappayin/Painpoo/Pasupathi/Pathiripoovu (Mal.) Wild Nutmeg (Eng.)

Distribution: Thurayilkavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Myrsinaceae

Aegiceras corniculatum (L.) Balnco, Fl. Philipp. 79. 1837; Hook. f., Fl. Brit. India 3: 533. 1882; Gamble, Fl. Pres. Madras 757 (532). 1921; Babu, Fl. Malappuram Dist. 393. 1990; Mohanan, Fl. Quilon Dist. 238. 1984; Ansari, Fl. Kasaragod Div. 219. 1985; Sunil, Fl. Pl. Alappuzha Dist. 484. 2000; Anupama & Sivad., Rheedea 14: 12. 2004.

Family: Myrsinaceae

Habit: Shrub

Flowering & Fruiting: February-May

Vernacular Name: Pookandal (Mal.)

Distribution: Thazhekkavu (Kannur Dist.)

Ardisia pauciflora Heyne ex Roxb., Fl. Ind. 2: 279. 1824; Hook. f., Fl. Brit. India 3: 529. 1882; Gamble, Fl. Pres. Madras 755(531). 1928; Mohanan, Fl. Quilon Dist. 239. 1984; Manilal, Fl. Silent Valley 166. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 261. 1988; Vajr., Fl. Palghat Dist. 263. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 274. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 24,31. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 259. 1996; Sasidh., Fl. Shenduruny WLS 184. 1997; Sivar. & Mathew, Fl. Nilambur 390. 1997; Sasidh., Fl. Periyar Tiger Reserve 222. 1998; Sasidh., Fl. Chinnar WLS 177. 1999; Sasidh., Fl. Parambikulam WLS 176. 2002; Mohanan & Sivad., Fl. Agasthyamala 404. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 294. 2005.

Family: Myrsinaceae

Habit: Shrub

Flowering & Fruiting: February-May

Vernacular Name: Muttamaram (Mal.)

Distribution: Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Myrtraceae

Syzygium caryophyllatum (L.) Alston in Trimen, Handb. Fl. Ceylon 6: (Suppl.) 116. 1931; Manilal & Sivar., Fl. Calicut 107. 1982; Mohanan, Fl. Quilon Dist. 179. 1984; Ansari, Fl.

Kasaragod Div. 158. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 181. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 160. 1989; Babu, Fl. Malappuram Dist. 249. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 188. 1994; Sasidh., Fl. Shenduruny WLS 121. 1997; Swarup. *et al.*, Shola For. Kerala 61. 1998; Sivar. & Mathew, Fl. Nilambur 262. 1997; Sunil, Fl. Pl. Alappuzha Dist. 327. 2000; Mohanan & Sivad., Fl. Agasthyamala 260. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 215. 2005.

Family: Myrtaceae

Habit: Tree

Flowering & Fruiting: February-January

Vernacular Name: Njara/Cherujara/Pottinjal (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Syzygium zeylanicum (L.) DC., Prodr. 3: 260.1828; Gamble, Fl. Pres. Madras 479(338). 1919; Manilal & Sivar., Fl. Calicut 108. 1982; Mohanan, Fl. Quilon Dist. 182. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 183. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 161. 1989; M. Mohanan & Henry, Fl. Thiruvanthapuram 192. 1994; Subram., Fl. Thenmala Div. 134. 1995; Sunil, Fl. Pl. Alappuzha Dist. 333. 2000; Sunil, Fl. Pl. Alappuzha Dist. 333. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 219. 2005.

Family: Myrtaceae

Habit: Tree

Flowering & Fruiting: January-April

Vernacular Name: Chaliyakkani/Kattuvayanilla/Poochappazham/Pula/Velutthakanali (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.)

Ochnaceae

Gomphia serrata (Gaertn.) Kanis, Taxon 16: 422. 1967; Manilal & Sivar., Fl. Calicut 62. 1982; Mohanan, Fl. Quilon Dist. 107. 1984; Antony, Syst. Stud. Fl. Kottayam Dist. 98. 1989; M. Mohanan & Henry, Fl. Thiruvanthapuram 106. 1994; Sasidh., Fl. Shenduruny WLS 55. 1997; B. Safui & M.P. Nayar in Hajra *et al.*, Fl. India 4: 425. 1997; Sunil, Fl. Pl. Alappuzha Dist. 152. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 114. 2005.

Family: Ochnaceae

Habit: Tree

Flowering & Fruiting: Throughout the year

Vernacular Name: Aanaperal/Chavakambu/Chavetti/Chokkatti/Valermani (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Oleaceae

Jasminum coarctatum Roxb., Fl. Ind. 1: 91. 1820; P. S. Green, Kew Bull. 58: 289. 2003.

Jasminum rottlerianum Wall. ex A. DC. in DC., Prodr. 8: 305. 1844; Hook. f., Fl. Brit. India 3: 593. 1882; Gamble, Fl. Pres. Madras 789(555). 1923; Mohanan, Fl. Quilon Dist. 248. 1984; Ansari, Fl. Kasaragod Div. 224. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 272. 1988; Vajr., Fl. Palghat Dist. 275. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 285. 1994; Subram., Fl. Thenmala Div. 213. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 274. 1996; Sasidh., Fl. Shenduruny WLS 198. 1997; Sivar. & Mathew, Fl. Nilambur 403. 1997; Sasidh., Fl. Periyar Tiger Reserve 239. 1998; Sasidh., Fl. Chinnar WLS 185. 1999; Seema & Narayanan, Journ. Econ. Tax. Bot. 26: 129. 2002; Sasidh., Fl. Parambikulam WLS 185. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 303. 2005.

Jasminum rottlerianum Wall. ex A. DC. var. *glabrior* Clarke in Hook.f., Fl. Brit. India 3:593. 1882; Manilal, Fl. Silent Valley 171. 1988.

Family: Oleaceae

Habit: Climber

Flowering & Fruiting: January-June

Vernacular Name: Vellakattumulla/Kattumulla (Mal.)

Distribution: Poyilkkavu, Bhayankavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Myxopyrum smilacifolium (Wall.) Blume, Mus. Bot. Ludg.-Bat. 1: 320. 1851; Hook. f., Fl. Brit. India 3: 618. 1882; Kiew, Blumea 29: 509. 1984; Manilal, Fl. Silent Valley 172. 1988; Babu, Fl. Malappuram Dist. 404. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 275. 1996; Sasidh., Fl. Shenduruny WLS 199. 1997; Sivar. & Mathew, Fl. Nilambur 404. 1997; Sasidh., Fl. Periyar Tiger Reserve 239. 1998; Sunil, Fl. Pl. Alappuzha Dist. 507. 2000; Sasidh., Fl. Parambikulam WLS 185. 2002; Mohanan & Sivad., Fl. Agasthyamala 431. 2002; P. S. Green, Kew Bull. 58: 273. 2003; Anil Kumar *et al.*, Fl. Pathanamthitta 304. 2005.

Chionanthus smilacifolia Wall. in Roxb., Fl. Ind. 1: 108. 1820.

Myxopyrum serratum Hill., Bull. Misc. Inform. Kew 1910: 41. 1910; Gamble, Fl. Pres. Madras 798(561). 1923; Mohanan, Fl. Quilon Dist. 249. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 272. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 236. 1989; Vajr., Fl. Palghat Dist. 276. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 286. 1994; Subram., Fl. Thenmala Div. 212. 1995.

Family: Oleaceae

Habit: Climber

Flowering & Fruiting: February-August

Vernacular Name: Chathuramulla/Chathuravalli/Chathurakkodi (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Olea dioica Roxb., Fl. Ind. 1: 105. 1820; Hook. f., Fl. Brit. India 3: 612. 1882; Gamble, Fl. Pres. Madras 796(559). 1923; Manilal & Sivar., Fl. Calicut 158. 1982; Mohanan, Fl. Quilon Dist. 249. 1984; Ansari, Fl. Kasaragod Div. 224. 1985; Manilal, Fl. Silent Valley 173. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 273. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 237. 1989; Babu, Fl. Malappuram Dist. 405. 1990; Vajr., Fl. Palghat Dist. 276. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 286. 1994; Subram., Fl. Thenmala Div. 210. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 12,18,24,32; Sasidh. & Sivar., Fl. Pl. Thrissur For. 275. 1996; Sasidh., Fl. Shenduruny WLS 199. 1997; Sivar. & Mathew, Fl. Nilambur 405. 1997; Sasidh., Fl. Periyar Tiger Reserve 240. 1998; Sasidh., Fl. Chinnar WLS 186. 1999; Sunil, Fl. Pl. Alappuzha Dist. 507. 2000; Sasidh., Fl. Parambikulam WLS 185. 2002; P.S. Green, Kew. Bull. 57: 121. 2002; Mohanan & Sivad., Fl. Agasthyamala 432. 2002; P. S. Green, Kew Bull. 58: 259. 2003; Anil Kumar *et al.*, Fl. Pathanamthitta 304. 2005.

Family: Oleaceae

Habit: Tree

Flowering & Fruiting: November-April

Vernacular Name: Edana/Edala/Karivetti/Koruku/Vayala/Vayana/Vetila/Vidana/Palarana (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Opiliaceae

Cansjera rheedei Gmel., Syst. 1: 280. 1791, 'rheedii'; Hook. f., Fl. Brit. India 1: 582. 1875; Gamble, Fl. Pres. Madras 193(138). 1915; Manilal & Sivar., Fl. Calicut 64. 1982; Ansari, Fl. Kasaragod Div. 97. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 92. 1988; Babu, Fl. Malappuram Dist. 119. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 112. 1994; Sasidh., Fl. Periyar Tiger Reserve 63. 1998; Sasidh., Fl. Chinnar WLS 64. 1999; Sunil, Fl. Pl. Alappuzha Dist. 162. 2000; R. Mathur in N.P. Singh *et al.*, Fl. India 5: 40. 2000; Sasidh., Fl. Parambikulam WLS 60. 2002.

Family: Opiliaceae

Habit: Climber

Flowering & Fruiting: November-February

Distribution: Poyilkkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.)

Opilia amentacea Roxb., Corom. Pl. 3: t.158. 1802; Hook. f., Fl. Brit. India 1: 583. 1875; Gamble, Fl. Pres. Madras 192(138). 1915; Subram., Fl. Thenmala Div. 64. 1995; Sasidh., Fl. Chinnar WLS 64. 1999; R. Mathur in N.P. Singh *et al.*, Fl. India 5: 44. 2000; Sasidh., Fl. Parambikulam WLS 60. 2002.

Family: Opiliaceae

Habit: Climber

Flowering & Fruiting: February-April

Distribution: Poongottukavu (Kannur Dist.)

Orchidaceae

Acampe praemorsa (Roxb.) Blatt. & McCann, Journ. Bombay Nat. Hist. Soc. 35: 495. 1932; Abraham & Vatsala, Introd. Orchids 450. 1981; Manilal & Sivar., Fl. Calicut 284. 1982; Mohanan, Fl. Quilon Dist. 390. 1984; Ansari, Fl. Kasaragod Div. 367. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 382. 1989; Babu, Fl. Malappuram Dist. 775. 1990; Vajr., Fl. Palghat Dist. 465. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 446. 1994; Subram., Fl. Thenmala Div. 373. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 433. 1996; Sasidh., Fl. Shenduruny WLS 308. 1997; Sivar. & Mathew, Fl. Nilambur 677. 1997; Muktesh, Epiphytic Fl. Western Ghats 74. 1998; Sunil, Fl. Pl. Alappuzha Dist. 870. 2000; Sasidh., Fl. Parambikulam WLS 320. 2002; Mohanan & Sivad., Fl. Agasthyamala 652. 2002; Sathish & Manilal, Orchid Memories 163. 2004; Anil Kumar *et al.*, Fl. Pathanamthitta 477. 2005.

Family: Orchidaceae

Habit: Herb

Flowering & Fruiting: March-April

Vernacular Name: Maravazha/Taliyamaravada/Upputhali

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Bulbophyllum sterile (Lam.) Suresh in Nicolson, Suresh & Manilal, Interpr. Hort. Malab. 298. 1988; Babu, Fl. Malappuram Dist. 777. 1990; Sivar. & Mathew, Fl. Nilambur 680. 1997; Mohanan & Sivad., Fl. Agasthyamala 658. 2002; Sathish & Manilal, Orchid Memories 171. 2004; Anil Kumar *et al.*, Fl. Pathanamthitta 479. 2005.

Epidendrum sterile Lam., Encycl. 1: 189. 1783.

Bulbophyllum neilgherrense Wight, Ic. t. 1650. 1851; Hook. f., Fl. Brit. India 5: 761. 1890; Gamble, Fl. Pres. Madras 1418(992). 1928; Abraham & Vatsala, Introd. Orchids 334. 1981; Manilal & Sivar., Fl. Calicut 284. 1982; Mohanan, Fl. Quilon Dist. 390. 1984; Ansari, Fl. Kasaragod Div. 367. 1985; Manilal, Fl. Silent Valley 271. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 447. 1988; Vajr., Fl. Palghat Dist. 468. 1990; Subram., Fl. Thenmala Div. 374. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 27. 1996; Muktesh, Epiphytic Fl. Western Ghats 80. 1998; Sasidh. & Sivar., Fl. Pl. Thrissur For. 435. 1996; Sasidh., Fl. Shenduruny WLS 310. 1997; Sasidh., Fl. Periyar Tiger Reserve 405. 1998; Sathish in Manoharan *et al.*, Silent Valley-Whispers Reason 196. 1999; Sunil, Fl. Pl. Alappuzha Dist. 871. 2000; Sasidh., Fl. Parambikulam WLS 321. 2002.

Family: Orchidaceae

Habit: Herb

Flowering & Fruiting: December-January

Vernacular Name: Mookittakaya (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Oxalidaceae

Biophytum sensitivum (L.) DC., Prodr. 1: 690. 1824, var. *sensitivum*; Hook. f., Fl. Brit. India 1: 436. 1874; Gamble, Fl. Pres. Madras 133(95). 1915; Mohanan, Fl. Quilon Dist. 100. 1984; Ansari, Fl. Kasaragod Div. 87. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 76. 1988;

Antony, Syst. Stud. Fl. Kottayam Dist. 89. 1989; Babu, Fl. Malappuram Dist. 94. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 95. 1994; Subram., Fl. Thenmala Div. 50. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 25,31. 1996; Manna in Hajra *et al.*, Fl. India 4: 238. 1997.

Family: Oxalidaceae

Habit: Herb

Flowering & Fruiting: October-January

Vernacular Name: Mukkutti (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Piperaceae

Piper betle L., Sp. Pl. 28. 1753; Gamble, Fl. Pres. Madras 1208(845). 1925; Antony, Syst. Stud. Fl. Kottayam Dist. 344. 1989; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 38.1996; Anil Kumar *et al.*, Fl. Pathanamthitta 419. 2005.

Family: Piperaceae

Habit: Climber

Flowering & Fruiting: October-May

Vernacular Name: Kodinjali/Vettilakkodi (Mal.) Betel pepper/Betel/Betel leaf vine (Eng.)

Distribution: Poyilkkavu, Bhayankavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Piper longum L., Sp. Pl. 29. 1753; Hook. f., Fl. Brit. India 5: 83. 1886; Gamble, Fl. Pres. Madras 1205(844). 1925; Manilal & Sivar., Fl. Calicut 248. 1982; Mohanan, Fl. Quilon Dist. 338. 1984; Ansari, Fl. Kasaragod Div. 321. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 343. 1989; Ramach. & V. J. Nair, Fl. Cannanore Dist. 387. 1988; Babu, Fl. Malappuram Dist. 685. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 384. 1994; Subram., Fl. Thenmala Div. 306. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 12,18. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 376. 1996; Sasidh., Fl. Shenduruny WLS 259. 1997; Sivar. & Mathew, Fl. Nilambur 577. 1997; Sasidh., Fl. Periyar Tiger Reserve 339. 1998; Sunil, Fl. Pl. Alappuzha Dist. 778. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 287. 2000; Sasidh., Fl. Parambikulam WLS 264. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 418. 2005.

Family: Piperaceae

Habit: Herb

Flowering & Fruiting: August-January

Vernacular Name: Chapala/Cheenathippali/Kattuthippali/Maghadi/Pippali/Thippali (Mal.)

Indian long pepper/Long pepper (Eng.)

Distribution: Poyilkkavu, Bhayankavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Piper nigrum L., Sp. Pl. 28. 1753, var. *nigrum*; Hook. f., Fl. Brit. India 5: 90. 1886; Gamble, Fl. Pres. Madras 1206(845). 1925; Manilal & Sivar., Fl. Calicut 248. 1982; Mohanan, Fl. Quilon Dist. 338. 1984; Ansari, Fl. Kasaragod Div. 321. 1985; Manilal, Fl. Silent Valley 231. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 388. 1988; Babu, Fl. Malappuram Dist. 686. 1990; Vajr., Fl. Palghat Dist. 398. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 384. 1994; Subram., Fl. Thenmala Div. 307. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 376. 1996; Sasidh., Fl. Shenduruny WLS 259. 1997; Sivar. & Mathew, Fl. Nilambur 578. 1997; Sasidh., Fl. Periyar Tiger Reserve 339. 1998; Sunil, Fl. Pl. Alappuzha Dist. 779. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 293. 2000 Sasidh., Fl. Parambikulam WLS 264. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 418. 2005.

Family: Piperaceae

Habit: Climber

Flowering & Fruiting: July-March

Vernacular Name: Kurumulaku/Mulakukodi/Nallamulaka (Mal.) Black pepper/Common pepper/Pepper (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Poaceae

Setaria palmifolia (Koenig) Stapf, J. Linn. Soc. Bot. 42. 186. 1914; Gamble, Fl. Pres. Madras 1789(1239). 1936; Mohanan, Fl. Quilon Dist. 484. 1984; Manilal, Fl. Silent Valley 362. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 554. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 468. 1989; Vajr., Fl. Palghat Dist. 590. 1990; Sreek. & V. J. Nair, Fl. Kerala Grasses 307. 1991; M. Mohanan & Henry, Fl. Thiruvanthapuram 559. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 14,27. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 525. 1996; Swarup. *et al.*, Shola For. Kerala 84. 1998; Sivar. & Mathew, Fl. Nilambur 849. 1997;

Sasidh., Fl. Periyar Tiger Reserve 547. 1998; Sasidh., Fl. Chinnar WLS 358. 1999; Sasidh., Fl. Parambikulam WLS 402. 2002; Sasidh., Fl. Parambikulam WLS 403. 2002; Mohanan & Sivad., Fl. Agasthyamala 844. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 587. 2005.

Family: Poaceae

Habit: Herb

Flowering & Fruiting: August-November

Vernacular Name: Palmgrass (Eng.)

Distribution: Kammadathukavu (Kasaragod Dist.)

Polygalaceae

Xanthophyllum arnottianum Wight, Illustr. 1: 50. t.23. 1840; Manilal, Fl. Silent Valley 16. 1988; Babu, Fl. Malappuram Dist. 33. 1990; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 25. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 48. 1996; Sasidh., Fl. Shenduruny WLS 28. 1997; Sivar. & Mathew, Fl. Nilambur 64. 1997; Sasidh., Fl. Periyar Tiger Reserve 21. 1998; Sasidh., Fl. Parambikulam WLS 19. 2002; Mohanan & Sivad., Fl. Agasthyamala 80. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 64. 2005.

Family: Polygalaceae

Habit: Tree

Flowering & Fruiting: Throughout the year

Vernacular Name: Madukka/Madakka/Mottal (Mal.)

Distribution: Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Ranunculaceae

Naravelia zeylanica (L.) DC., Syst. Nat. 1: 167. 1817; Hook. f., Fl. Brit. India 1: 7. 1872; Gamble, Fl. Pres. Madras 3(3). 1915; Manilal & Sivar., Fl. Calicut 25. 1982; Mohanan, Fl. Quilon Dist. 59. 1984; Ansari, Fl. Kasaragod Div. 52. 1985; Manilal, Fl. Silent Valley 1. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 35. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 54. 1989; Babu, Fl. Malappuram Dist. 1. 1990; Vajr., Fl. Palghat Dist. 44. 1990; M. A. Rau in B. D. Sharma *et al.*, Fl. India 1: 106. 1993; M. Mohanan & Henry, Fl. Thiruvanthapuram 41. 1994; Subram., Fl. Thenmala Div. 1. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 12, 18; Sasidh. & Sivar., Fl. Pl. Thrissur For. 24. 1996; Sivar. & Mathew, Fl. Nilambur 33. 1997; Sasidh., Fl. Shenduruny WLS 9. 1997; Sasidh., Fl. Periyar Tiger Reserve 1. 1998; Sasidh., Fl. Chinnar WLS 10. 1999; Pradeep, Fl. Vellarimala 14. 2000; Sunil, Fl. Pl.

Alappuzha Dist. 19. 2000; Sasidh., Fl. Parambikulam WLS 1. 2002; Mohanan & Sivad., Fl. Agasthyamala 48. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 35. 2005.

Family: Ranunculaceae

Habit: Climber

Flowering & Fruiting: October-April

Vernacular

Name: Chinamketykody/Kuruppakodi/Pozhuthalachi/Soothravalli/Thalavedanavalli/Vathamkodi/Vadakkodivalli (Mal.)

Distribution: Kammadathukavu (Kasaragod Dist.)

Rhamnaceae

Ziziphus oenopia (L.) Mill., Gard. Dict. (ed. 8). 3.1768; Hook. f., Fl. Brit. India 1:634.1875; Gamble, Fl. Pres. Madras 220(158).1918; Manilal & Sivar., Fl. Calicut 67. 1982; Mohanan, Fl. Quilon Dist. 117. 1984; Ansari, Fl. Kasaragod Div. 102. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 101. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 105. 1989; Babu, Fl. Malappuram Dist. 127. 1990; Vajr., Fl. Palghat Dist. 121. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 118. 1994; Subram., Fl. Thenmala Div. 69. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 18. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 110. 1996; Sasidh., Fl. Shenduruny WLS 69. 1997; Sivar. & Mathew, Fl. Nilambur 147. 1997; Sasidh., Fl. Periyar Tiger Reserve 71. 1998; Sasidh., Fl. Chinnar WLS 69. 1999; Sunil, Fl. Pl. Alappuzha Dist. 169. 2000; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 238. 2000; Sasidh., Fl. Parambikulam WLS 68. 2002; Mohanan & Sivad., Fl. Agasthyamala 166. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 131. 2005.

Family: Rhamnaceae

Habit: Climber

Flowering & Fruiting: November-March

Vernacular

Name: Cherialantha/Cheruthudali/Churimullu/Kothavalli/Kottaipazham/Mulli/Thodalli (Mal) Jackal jujube (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Rhizophoraceae

Bruguiera cylindrica (L.) Blume, Enum. Pl. Jav. 1: 93. 1827; Gamble, Fl. Pres. Madras 459(325). 1919; Sunil, Fl. Pl. Alappuzha Dist. 308. 2000; Anupama & Sivad., Rheedea 14: 20. 2004.

Family: Rhizophoraceae

Habit: Shrub

Flowering & Fruiting: December-October

Vernacular Name: Kuttikandal (Mal.)

Distribution: Thazhekkavu (Kannur Dist.)

Rhizophora apiculata Blume, Enum. Pl. Jav. 1: 91. 1827; Mohanan, Fl. Quilon Dist. 173. 1984; Sunil, Fl. Pl. Alappuzha Dist. 311. 2000; Anupama & Sivad., Rheedea 14: 34. 2004.

Family: Rhizophoraceae

Habit: Tree

Flowering & Fruiting: Throughout the year

Vernacular Name: Kaya-kandel/Vallikandel (Mal.)

Distribution: Thazhekkavu (Kannur Dist.)

Rhizophora mucronata Poir. in Lam., Tabl. Encycl. 2: 517. 1794; Hook. f., Fl. Brit. India 2: 435. 1878; Gamble, Fl. Pres. Madras 456(323). 1919; M. Mohanan & Henry, Fl. Thiruvanthapuram 180. 1994; Sunil, Fl. Pl. Alappuzha Dist. 312. 2000; Anupama & Sivad., Rheedea 14: 36. 2004.

Family: Rhizophoraceae

Habit: Tree

Flowering & Fruiting: Throughout the year

Vernacular Name: Pranthakandel (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottu Kavuvu, Thazhekkavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Rubiaceae

Canthium angustifolium Roxb., Fl. Ind. 2: 169. 1824; Hook. f., Fl. Brit. India 3: 135. 1880; Manilal & Sivar., Fl. Calicut 130. 1982; Mohanan, Fl. Quilon Dist. 205. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 212. 1988; Babu, Fl. Malappuram Dist. 319. 1990; M. Mohanan

& Henry, Fl. Thiruvanthapuram 223. 1994; Subram., Fl. Thenmala Div. 180. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 217. 1996; Sasidh., Fl. Shenduruny WLS 146. 1997; Sasidh., Fl. Periyar Tiger Reserve 169. 1998; Mohanan & Sivad., Fl. Agasthyamala 309. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 248. 2005.

Family: Rubiaceae

Habit: shrub

Flowering & Fruiting: March-May

Vernacular Name: Kattakara/Kattaramullu/Koyikkodavam (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Canthium coromandelicum (Burm. f.) Alston in Trimen, Handb. Fl. Ceylon (Suppl.) 6: 152. 1903; Babu, Fl. Malappuram Dist. 320. 1990; Sivar. & Mathew, Fl. Nilambur 315. 1997; Sasidh., Fl. Chinnar WLS 146. 1999; Sasidh., Fl. Parambikulam WLS 146. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 248. 2005.

Family: Rubiaceae

Habit: shrub

Flowering & Fruiting: April-June

Vernacular Name: Kandakara/Karamullu/Kattaramullu/Madhakara (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Chassalia curviflora (Wall. ex Kurz) Thw. var. *ophioxyloides* (Wall.) Deb & Krishna, Bull. Bot. Surv. India 24: 222. 1982(1983); Antony, Syst. Stud. Fl. Kottayam Dist. 190. 1989; Subram., Fl. Thenmala Div. 176. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 218. 1996; Sasidh., Fl. Shenduruny WLS 147. 1997; Swarup. *et al.*, Shola For. Kerala 66. 1998; Sasidh., Fl. Periyar Tiger Reserve 171. 1998; Sasidh., Fl. Chinnar WLS 147. 1999; Sasidh., Fl. Parambikulam WLS 147. 2002.

Family: Rubiaceae

Habit: shrub

Flowering & Fruiting: July-February

Vernacular Name: Yamari/Vellakurinji (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Geophila repens (L.) Johnst., Sargentia 8: 281. 1949; Mohanan, Fl. Quilon Dist. 208. 1984; Ansari, Fl. Kasaragod Div. 189. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 214. 1988; Vajr., Fl. Palghat Dist. 231. 1990; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 12, 18; Sasidh. & Sivar., Fl. Pl. Thrissur For. 219. 1996; Sasidh., Fl. Shenduruny WLS 147. 1997; Sivar. & Mathew, Fl. Nilambur 321. 1997; Sasidh., Fl. Periyar Tiger Reserve 172. 1998; Sunil, Fl. Pl. Alappuzha Dist. 414. 2000; Sasidh., Fl. Parambikulam WLS 148. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 249. 2005.

Family: Rubiaceae

Habit: Herb

Flowering & Fruiting: October-April

Vernacular Name: Karimutthil/Karinkudungal (Mal.)

Distribution: Thurayilkavu (Kozhikode Dist.)

Haldina cordifolia (Roxb.) Ridsd., Blumea 24: 361. 1978; Mohanan, Fl. Quilon Dist. 208. 1984; Ansari, Fl. Kasaragod Div. 189. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 215. 1988; Vajr., Fl. Palghat Dist. 231. 1990; Subram., Fl. Thenmala Div. 183. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 219. 1996; Sasidh., Fl. Shenduruny WLS 148. 1997; Sivar. & Mathew, Fl. Nilambur 321. 1997; Sasidh., Fl. Periyar Tiger Reserve 172. 1998; Sasidh., Fl. Parambikulam WLS 148. 2002; Mohanan & Sivad., Fl. Agasthyamala 312. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 250. 2005.

Family: Rubiaceae

Habit: Tree

Flowering & Fruiting: October-March

Vernacular Name: Barakuram/Katamba/Manjakadambu/Malamkadambu (Mal.) Haldu (Eng.)

Distribution: Thurayilkavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Ixora brachiata Roxb. ex DC., Prodr. 4: 488. 1830; Hook. f., Fl. Brit. India 3: 142. 1880; Gamble, Fl. Pres. Madras 631(445). 1921; Mohanan, Fl. Quilon Dist. 211. 1984; Ansari, Fl. Kasaragod Div. 195. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 219. 1988; Antony,

Syst. Stud. Fl. Kottayam Dist. 195. 1989; Vajr., Fl. Palghat Dist. 233. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 234. 1994; Subram., Fl. Thenmala Div. 176. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 18. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 225. 1996; Sasidh., Fl. Shenduruny WLS 155. 1997; Sivar. & Mathew, Fl. Nilambur 330. 1997; Sasidh., Fl. Periyar Tiger Reserve 176. 1998; Sasidh., Fl. Parambikulam WLS 151. 2002; Mohanan & Sivad., Fl. Agasthyamala 324. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 255. 2005.

Family: Rubiaceae

Habit: Tree

Flowering & Fruiting: January-May

Vernacular Name: Marachekki/Marachethi (Mal.)

Distribution: Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Ixora coccinea L., Sp. Pl. 110. 1753; Hook. f., Fl. Brit. India 3: 145. 1880; Gamble, Fl. Pres. Madras 631(445). 1921; Manilal & Sivar., Fl. Calicut 147. 1982; Mohanan, Fl. Quilon Dist. 212. 1984; Ansari, Fl. Kasaragod Div. 195. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 220. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 195. 1989; Babu, Fl. Malappuram Dist. 334. 1990; Vajr., Fl. Palghat Dist. 233. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 234. 1994; Sivar. & Mathew, Fl. Nilambur 330. 1997; Sunil, Fl. Pl. Alappuzha Dist. 429. 2000; Mohanan & Sivad., Fl. Agasthyamala 324. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 255. 2005.

Family: Rubiaceae

Habit: Shrub

Flowering & Fruiting: Throughout the year

Vernacular Name: Chethi/Chekki/Kattuchethi/Thechi/Thetti (Mal.) Flame of the woods

Jungle flame ixora/Jungle Geranium/Needle flower/Sacred Ixora (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Ixora polyantha Wight, Ic. t. 1066. 1846; Hook. f., Fl. Brit. India 3: 140. 1880; Gamble, Fl. Pres. Madras 629(444). 1921; Ansari, Fl. Kasaragod Div. 196. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 222. 1988; M. Mohanan & Henry, Fl. Thiruvanthapuram 235. 1994; Anil Kumar *et al.*, Fl. Pathanamthitta 256. 2005.

Family: Rubiaceae

Habit: Shrub

Flowering & Fruiting: March-May

Vernacular Name: Kalingi/Vellachethi (Mal.)

Distribution: Kammadathukavu (Kasaragod Dist.)

Morinda citrifolia L., Sp. Pl. 176. 1753; Hook. f., Fl. Brit. India 3: 155. 1880; Gamble, Fl. Pres. Madras 651(459). 1921; Manilal & Sivar., Fl. Calicut 144. 1982; Ansari, Fl. Kasaragod Div. 197. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 225. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 197. 1989; Babu, Fl. Malappuram Dist. 340. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 236. 1994; Sunil, Fl. Pl. Alappuzha Dist. 432. 2000.

Family: Rubiaceae

Habit: Tree

Flowering & Fruiting: July-November

Vernacular Name: Cherumanjanathi/Kattapitalavam/Manjanathi (Mal.) Great Morinda

Indian Mulberry (Eng.)

Distribution: Thazhekkavu (Kannur Dist.)

Ophiorrhiza brunonis Wight & Arn., Prodr. 404. 1834, var. *brunonis*; Hook. f., Fl. Brit. India 3: 79. 1880; Gamble, Fl. Pres. Madras 608(428). 1921; Manilal, Fl. Silent Valley 139. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 228. 1988; M. Mohanan & Henry, Fl. Thiruvanthapuram 240. 1994; Subram., Fl. Thenmala Div. 165. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 232. 1996; Sasidh., Fl. Shenduruny WLS 162. 1997; Deb & Mondal, Bull. Bot. Surv. India 39: 34. 1997; Sivar. & Mathew, Fl. Nilambur 342. 1997; Sasidh., Fl. Periyar

Family: Rubiaceae

Habit: Herb

Flowering & Fruiting: February-September

Distribution: Poongottukavu (Kannur Dist.)

Pavetta indica L. var. *tomentosa* (Roxb. ex J. E. Smith) Hook. f., Fl. Brit. India 3: 150. 1880; Gamble, Fl. Pres. Madras 633(446). 1921; Subram., Fl. Thenmala Div. 174. 1995; Rout & Deb, Bull. Bot. Surv. India 41: 128. 1999.

Family: Rubiaceae

Habit: Shrub

Flowering & Fruiting: May-June

Vernacular Name: Kamatta/Nochi/Pavetta (Mal.) Indian sorrel (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Pavetta zeylanica (Hook. f.) Gamble, Fl. Pres. Madras 633. 1921; Manilal, Fl. Silent Valley 141. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 231. 1988; Mohanan & Sivad., Fl. Agasthyamala 349. 2002.

Family: Rubiaceae

Habit: Shrub

Flowering & Fruiting: August-March

Distribution: Poyilkkavu (Kozhikode Dist.)

Psychotria flavida Talbot, Trees & Shrubs Bombay 113. 1894; Gamble, Fl. Pres. Madras 641(452). 1921; Mohanan, Fl. Quilon Dist. 219. 1984; Ansari, Fl. Kasaragod Div. 203. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 232. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 201. 1989; Babu, Fl. Malappuram Dist. 346. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 243. 1994; Subram., Fl. Thenmala Div. 178. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 236. 1996; Sasidh., Fl. Shenduruny WLS 166. 1997; Sasidh., Fl. Periyar Tiger Reserve 186. 1998; Pradeep, Fl. Vellarimala 82. 2000; Sunil, Fl. Pl. Alappuzha Dist. 438. 2000; Mohanan & Sivad., Fl. Agasthyamala 352. 2002.

Family: Rubiaceae

Habit: Shrub

Flowering & Fruiting: April-June

Distribution: Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Rutaceae

Glycosmis pentaphylla (Retz.) DC., Prodr. 1:538. 1824, quoad basionym; Hook. f., Fl. Brit. India 1:499.1875, p.p; Antony, Syst. Stud. Fl. Kottayam Dist. 94. 1989; Babu, Fl. Malappuram Dist. 106. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 104. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 33. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 82. 1996; Sasidh., Fl. Shenduruny WLS 53. 1997; Sivar. & Mathew, Fl. Nilambur 123. 1997; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. India 4:343.1997; Sunil, Fl. Pl. Alappuzha Dist.

146. 2000; Sasidh., Fl. Parambikulam WLS 49. 2002; Mohanan & Sivad., Fl. Agasthyamala 144. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 112. 2005.

Family: Rutaceae

Habit: shrub

Flowering & Fruiting: September-April

Vernacular Name: Kuttippannel/Kurumpannal/Panal/Panchi (Mal) Distribution: Poyilkkavu, Bhayankavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Toddalia asiatica (L.) Lam., Tabl. Encycl. 2: 116. 1797; Gamble, Fl. Pres. Madras 150(107). 1915; Manilal & Sivar., Fl. Calicut 59. 1982; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 25,33. 1996; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. India 4: 403.1997; Swarup. *et al.*, Shola For. Kerala 69. 1998; Sasidh., Fl. Periyar Tiger Reserve 55. 1998; Pradeep, Fl. Vellarimala 38. 2000; Sasidh., Fl. Parambikulam WLS 51. 2002.

Family: Rutaceae

Habit: shrub

Flowering & Fruiting: September-July

Vernacular Name: Kakkathodali/Karamullu (Mal.) Forest pepper/Lopez root (Eng.)

Distribution: Poyilkkavu, Bhayankavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Zanthoxylum rhetsa (Roxb.) DC., Prodr. 1: 728. 1824; Hook. f., Fl. Brit. India 1: 495. 1875; Gamble, Fl. Pres. Madras 150(107). 1925; Manilal & Sivar., Fl. Calicut 59. 1982; Mohanan, Fl. Quilon Dist. 106. 1984; Ansari, Fl. Kasaragod Div. 93. 1985; Babu, Fl. Malappuram Dist. 112. 1990; Subram., Fl. Thenmala Div. 53. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 85. 1996; Sasidh., Fl. Shenduruny WLS 54. 1997; Sivar. & Mathew, Fl. Nilambur 127. 1997; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. India 4: 387.1997; Sasidh., Fl. Periyar Tiger Reserve 56. 1998; Sasidh., Fl. Parambikulam WLS 52. 2002.

Family: Rutaceae

Habit: Tree

Flowering & Fruiting: March-November

Vernacular Name: Kothumurikku/Mullilam (Mal.) Indian prickly ash (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Kammadathukavu (Kasaragod Dist.)

Santalaceae

Santalum album L., Sp. Pl. 349. 1753; Hook. f., Fl. Brit. India 5: 231. 1886; Gamble, Fl. Pres. Madras 1261(883). 1925; Manilal & Sivar., Fl. Calicut 254. 1982; Mohanan, Fl. Quilon Dist. 351. 1984; Ansari, Fl. Kasaragod Div. 328. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 350. 1989; Ramach. & V. J. Nair, Fl. Cannanore Dist. 402. 1988; Babu, Fl. Malappuram Dist. 697. 1990; Vajr., Fl. Palghat Dist. 414. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 401. 1994; Subram., Fl. Thenmala Div. 321. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 388. 1996; Sasidh., Fl. Shenduruny WLS 277. 1997; Sivar. & Mathew, Fl. Nilambur 598. 1997; Sasidh., Fl. Periyar Tiger Reserve 360. 1998; Sasidh., Fl. Chinnar WLS 276. 1999; Sunil, Fl. Pl. Alappuzha Dist. 786. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 331. 2000 Sasidh., Fl. Parambikulam WLS 277. 2002.

Family: Santalaceae

Habit: Tree

Flowering & Fruiting: November-December

Vernacular Name: Chandanam (Mal.) Sandal tree/White sandal tree (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Scleropyrum pentandrum (Dennst.) Mabb., Taxon 26: 533. 1977; Manilal & Sivar., Fl. Calicut 254. 1982; Mohanan, Fl. Quilon Dist. 351. 1984; Ansari, Fl. Kasaragod Div. 329. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 403. 1988; Vajr., Fl. Palghat Dist. 414. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 402. 1994; Subram., Fl. Thenmala Div. 320. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 388. 1996; Sasidh., Fl. Shenduruny WLS 276. 1997; Sasidh., Fl. Periyar Tiger Reserve 360. 1998; Mohanan & Sivad., Fl. Agasthyamala 587. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 430. 2005.

Family: Santalaceae

Habit: Tree

Flowering & Fruiting: January-April

Vernacular Name: Irumulli (Mal.)

Distribution: Poyilkkavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Sapindaceae

Allophylus cobbe (L.) Raeusch., Nomencl. Bot. (ed. 3) 108. 1797; Hook. f., Fl. Brit. India 1: 673. 1875p.p; Mohanan, Fl. Quilon Dist. 123. 1984; Manilal, Fl. Silent Valley 62. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 109. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 110. 1989; Vajr., Fl. Palghat Dist. 129. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 123. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 116. 1996; Sivar. & Mathew, Fl. Nilambur 160. 1997; Sasidh., Fl. Periyar Tiger Reserve 77. 1998; Sasidh., Fl. Chinnar WLS 73. 1999; Sunil, Fl. Pl. Alappuzha Dist. 181. 2000; P.C. Pant in N.P. Singh *et al.*, Fl. India 5: 346. 2000; Sasidh., Fl. Parambikulam WLS 73. 2002; Mohanan & Sivad., Fl. Agasthyamala 172. 2002.\

Family: Sapindaceae

Habit: Shrub

Flowering & Fruiting: July-November

Vernacular Name: Mukkannanpezhu (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Lepisanthes tetraphylla (Vahl) Radlk., Sitzungsber. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 8: 276. 1878; Gamble, Fl. Pres. Madras 247(176). 1918; Mohanan, Fl. Quilon Dist. 125. 1984; Manilal, Fl. Silent Valley 64. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 113. 1988; Vajr., Fl. Palghat Dist. 132. 1990; Subram., Fl. Thenmala Div. 77. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 25, 33; Sasidh. & Sivar., Fl. Pl. Thrissur For. 118. 1996; Sasidh., Fl. Shenduruny WLS 76. 1997; Sivar. & Mathew, Fl. Nilambur 164. 1997; Sasidh., Fl. Periyar Tiger Reserve 79. 1998; Sasidh., Fl. Chinnar WLS 76. 1999; Sunil, Fl. Pl. Alappuzha Dist. 183. 2000; P.C. Pant in N.P. Singh *et al.*, Fl. India 5: 372. 2000; Sasidh., Fl. Parambikulam WLS 75. 2002; Mohanan & Sivad., Fl. Agasthyamala 174. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 142. 2005.

Family: Sapindaceae

Habit: Tree

Flowering & Fruiting: February-July

Vernacular Name: Kalpoovathi/Kulapunna/Naikolli (Mal.)

Distribution: Poyilkkavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Schleichera oleosa (Lour.) Oken, Allg. Naturgesch. 3:1341. 1841; Manilal & Sivar., Fl. Calicut 71. 1982; Mohanan, Fl. Quilon Dist. 125. 1984; Ansari, Fl. Kasaragod Div. 108. 1985; Manilal, Fl. Silent Valley 64. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 114. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 111. 1989; Babu, Fl. Malappuram Dist. 145. 1990; Vajr., Fl. Palghat Dist. 133. 1990; Subram., Fl. Thenmala Div. 78. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 12, 19; Sasidh. & Sivar., Fl. Pl. Thrissur For. 119. 1996; Sasidh., Fl. Shenduruny WLS 77. 1997; Sivar. & Mathew, Fl. Nilambur 166. 1997; Sasidh., Fl. Periyar Tiger Reserve 80. 1998; Sasidh., Fl. Chinnar WLS 78. 1999; Sunil, Fl. Pl. Alappuzha Dist. 184. 2000; P.C. Pant in N.P. Singh *et al.*, Fl. India 5: 384. 2000; Sasidh., Fl. Parambikulam WLS 76. 2002; Mohanan & Sivad., Fl. Agasthyamala 176. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 143. 2005.

Family: Sapindaceae

Habit: Tree

Flowering & Fruiting: March-June

Vernacular Name: Doodalam/Poovanam/Poovam/Puvam/Puvathi (Mal.) Ceylon oak/Lac tree/Macassar oil tree (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Sapotaceae

Madhuca neriifolia (Moon) H. J. Lam, Bull. Jard. Bot. Buitenz. ser. 3, 7:182,265. 1925; Mohanan, Fl. Quilon Dist. 241. 1984; Ansari, Fl. Kasaragod Div. 220. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 264. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 231. 1989; Babu, Fl. Malappuram Dist. 394. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 277. 1994; Subram., Fl. Thenmala Div. 202. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 265. 1996; Sasidh., Fl. Shenduruny WLS 188. 1997; Sivar. & Mathew, Fl. Nilambur 396. 1997; Sasidh., Fl. Periyar Tiger Reserve 227. 1998; Pradeep, Fl. Vellarimala 97. 2000; Sunil, Fl. Pl. Alappuzha Dist. 497. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl.

231. 2000 Sasidh., Fl. Parambikulam WLS 179. 2002; Mohanan & Sivad., Fl. Agasthyamala 413. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 296. 2005.

Family: Sapotaceae

Habit: Tree

Flowering & Fruiting: November-March

Vernacular Name: Attu-ilippa/Iluppa/Kattirippa/Neeririppa/Wallangi (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Mimusops elengi L., Sp. Pl. 349. 1753; Hook. f., Fl. Brit. India 3: 548. 1882; Gamble, Fl. Pres. Madras 765(538). 1921; Manilal & Sivar., Fl. Calicut 157. 1982; Mohanan, Fl. Quilon Dist. 241. 1984; Ansari, Fl. Kasaragod Div. 221. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 232. 1989; Babu, Fl. Malappuram Dist. 396. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 277. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 19. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 267. 1996; Sivar. & Mathew, Fl. Nilambur 397. 1997; Sasidh., Fl. Periyar Tiger Reserve 228. 1998; Sasidh., Fl. Chinnar WLS 180. 1999; Sunil, Fl. Pl. Alappuzha Dist. 498. 2000; Sasidh., Fl. Parambikulam WLS 180. 2002; Mohanan & Sivad., Fl. Agasthyamala 414. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 296. 2005.

Family: Sapotaceae

Habit: Tree

Flowering & Fruiting: December-August

Vernacular Name: Bakulam/Elanchi/Elangi/Mukura (Mal.) Asian bullet wood/Bullet wood/Bakul tree/Spanish cherry/West India medlar (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Scrophulariaceae

Bacopa monnieri (L.) Pennell, Proc. Acad. Nat. Sci. Philad. 98: 94. 1946; Manilal & Sivar., Fl. Calicut 193. 1982; Mohanan, Fl. Quilon Dist. 280. 1984; Ansari, Fl. Kasaragod Div. 255. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 278. 1989; Babu, Fl. Malappuram Dist. 511. 1990; Vajr., Fl. Palghat Dist. 322. 1990; Joseph, Aquatic Angiosp. Malabar 211. 1991; M. Mohanan & Henry, Fl. Thiruvanthapuram 325. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For.

319. 1996; Sasidh., Fl. Chinnar WLS 220. 1999; Sunil, Fl. Pl. Alappuzha Dist. 616. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 355. 2005.

Family: Scrophulariaceae

Habit: Herb

Flowering & Fruiting: Throughout the year

Vernacular Name: Bhrammi/Neerbrahmi (Mal.) Bacopa/Thyme leaved gratiola (Eng.)

Distribution: Thazhekkavu (Kannur Dist.)

Simaroubaceae

Ailanthus triphysa (Dennst.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.) 41:1931; Manilal & Sivar., Fl. Calicut 61. 1982; Mohanan, Fl. Quilon Dist. 106. 1984; Ramach. & V. J. Nair, Fl. Cannanore Dist. 86. 1988; Babu, Fl. Malappuram Dist. 113. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 105. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 86. 1996; Sasidh., Fl. Shenduruny WLS 55. 1997; Sivar. & Mathew, Fl. Nilambur 128. 1997; R.K. Basak in Hajra *et al.*, Fl. India 4: 413. 1997; Sunil, Fl. Pl. Alappuzha Dist. 150. 2000.

Family: Simaroubaceae

Habit: Tree

Flowering & Fruiting: January-May

Vernacular Name: Matti/Mattipala/Pongallyam/Perumaram/Pongilium (Mal.) Maharukh (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Smilacaceae

Smilax zeylanica L., Sp. Pl. 1029. 1753; Hook. f., Fl. Brit. India 6: 309. 1892; Gamble, Fl. Pres. Madras 1518(1061). 1928; Manilal & Sivar., Fl. Calicut 292. 1982; Mohanan, Fl. Quilon Dist. 413. 1984; Ansari, Fl. Kasaragod Div. 389. 1985; Manilal, Fl. Silent Valley 323. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 478. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 401. 1989; Babu, Fl. Malappuram Dist. 813. 1990; Vajr., Fl. Palghat Dist. 511. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 482. 1994; Subram., Fl. Thenmala Div. 391. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 27, 34; Sasidh. & Sivar., Fl. Pl. Thrissur For. 471. 1996; Sasidh., Fl. Shenduruny WLS 345. 1997; Sivar. & Mathew, Fl. Nilambur 730. 1997; Sasidh., Fl. Periyar Tiger Reserve 458. 1998; Sunil, Fl. Pl. Alappuzha

Dist. 903. 2000; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 348. 2000
Sasidh., Fl. Parambikulam WLS 350. 2002; Mohanan & Sivad., Fl. Agasthyamala 727. 2002;
Anil Kumar *et al.*, Fl. Pathanamthitta 507. 2005.

Family: Smilacaceae

Habit: Climber

Flowering & Fruiting: July-January

Vernacular Name: Arikanni/Kareelanchi/Keeralanchi/Valiyakanni (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu,
Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Sonneratiaceae

Sonneratia alba J. E. Smith in Rees, Cyclop. 2: 33. 1819; Hook. f., Fl. Brit. India 2: 580.
1879; Anupama & Sivad., Rheedea 14: 40. 2004.

Family: Sonneratiaceae

Habit: Tree

Flowering & Fruiting: February-May

Vernacular Name: Nakshathrakandel (Mal.)

Distribution: Thazhekkavu (Kannur Dist.)

Tiliaceae

Grewia nervosa (Lour.) Panigrahi, Taxon 34: 702. 1985; Ramach. & V. J. Nair, Fl.
Cannanore Dist. 71. 1988; Babu, Fl. Malappuram Dist. 86. 1990; P. Daniel & M. Chandra. in
B.D. Sharma & Sanjappa, Fl. India 3:502.1993; M. Mohanan & Henry, Fl. Thiruvanthapuram
90. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 72. 1996; Sasidh., Fl. Shenduruny WLS 44.
1997; Sunil, Fl. Pl. Alappuzha Dist. 125. 2000.

Family: Tiliaceae

Habit: Shrub

Flowering & Fruiting: August-April

Vernacular Name: Cherikkotta/Kotta/Kottakka (Mal.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu,
Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Ulmaceae

Trema orientalis (L.) Blume, Mus. Bot. Lugd.-Bat. 2: 62. 1856; Hook. f., Fl. Brit. India 5: 484. 1888; Gamble, Fl. Pres. Madras 1350(944). 1928; Manilal & Sivar., Fl. Calicut 274. 1982; Mohanan, Fl. Quilon Dist. 375. 1984; Ansari, Fl. Kasaragod Div. 350. 1985; Manilal, Fl. Silent Valley 258. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 429. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 371. 1989; Babu, Fl. Malappuram Dist. 743. 1990; Vajr., Fl. Palghat Dist. 442. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 429. 1994; Subram., Fl. Thenmala Div. 349. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 13,26. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 424. 1996; Sasidh., Fl. Shenduruny WLS 299. 1997; Swarup. *et al.*, Shola For. Kerala 73. 1998; Sivar. & Mathew, Fl. Nilambur 656. 1997; Sasidh., Fl. Periyar Tiger Reserve 389. 1998; Sasidh., Fl. Chinnar WLS 295. 1999; Sunil, Fl. Pl. Alappuzha Dist. 847. 2000; Sasidh., Fl. Parambikulam WLS 307. 2002; Mohanan & Sivad., Fl. Agasthyamala 623. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 459. 2005.

Family: Ulmaceae

Habit: Shrub

Flowering & Fruiting: September-December

Vernacular Name: Aamathali/Pottamaram/Thundinaru (Mal.) Charcoal tree/Gunpowder tree/Oriental nettle/Oriental trema (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Verbenaceae

Callicarpa tomentosa (L.) L. in Murr., Syst. Veg. (ed. 13) 130. 1774; Manilal & Sivar., Fl. Calicut 227. 1982; Mohanan, Fl. Quilon Dist. 311. 1984; Ansari, Fl. Kasaragod Div. 291. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 314. 1989; Manilal, Fl. Silent Valley 213. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 353. 1988; Babu, Fl. Malappuram Dist. 604. 1990; Vajr., Fl. Palghat Dist. 364. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 357. 1994; Subram., Fl. Thenmala Div. 279. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 13,33. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 351. 1996; Sasidh., Fl. Shenduruny WLS 241. 1997; Sivar. & Mathew, Fl. Nilambur 529. 1997; Sasidh., Fl. Periyar Tiger Reserve 309. 1998; Sunil, Fl. Pl. Alappuzha Dist. 709. 2000; Sasidh., Fl. Parambikulam WLS 240. 2002;

Mohanani & Sivad., Fl. Agasthyamala 521. 2002; Rajendran & Daniel, The Indian Verbenaceae 53. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 390. 2005.

Family: Verbenaceae

Habit: Shrub

Flowering & Fruiting: November-April

Vernacular Name: Cheruthekku/Kattuthekku (Mal.) Great woolly malayan lilac (Eng.)

Distribution: Kammadathukavu (Kasaragod Dist.)

Clerodendrum inerme (L.) Gaertn., Fruct. 1: 271, t. 75. 1788; Hook. f., Fl. Brit. India 4: 589. 1885; Gamble, Fl. Pres. Madras 1099(769). 1924; Manilal & Sivar., Fl. Calicut 233. 1982; Mohanan, Fl. Quilon Dist. 312. 1984; Ansari, Fl. Kasaragod Div. 293. 1985; Antony, Syst. Stud. Fl. Kottayam Dist. 315. 1989; Ramach. & V. J. Nair, Fl. Cannanore Dist. 353. 1988; Babu, Fl. Malappuram Dist. 611. 1990; Vajr., Fl. Palghat Dist. 364. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 357. 1994; Sunil, Fl. Pl. Alappuzha Dist. 712. 2000; Rajendran & Daniel, The Indian Verbenaceae 112. 2002.

Family: Verbenaceae

Habit: Shrub

Flowering & Fruiting: November-December

Vernacular Name: Cheruchinna/Chinnayila/Nironchi/Puzhamulla/Vishamadari (Mal.) Garden quinine/Sorcerers Bush/Seaside clerodendrum/Wild Jasmine (Eng.)

Distribution: Thazhekkavu (Kannur Dist.)

Premna serratifolia L., Mant. Pl. 2: 253. 1771; Gamble, Fl. Pres. Madras 1096(767). 1924; Ramach. & V. J. Nair, Fl. Cannanore Dist. 357. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 318. 1989; Rajendran & Daniel, The Indian Verbenaceae 284. 2002.

Family: Verbenaceae

Habit: Shrub

Flowering & Fruiting: November-December

Vernacular Name: Munja/Kozhichedi (Mal.)

Distribution: Thazhekkavu (Kannur Dist.)

Vitex altissima L. f., Suppl. Pl. 294. 1781; Hook. f., Fl. Brit. India 4: 584. 1885; Gamble, Fl. Pres. Madras 1102(772). 1924; Mohanan, Fl. Quilon Dist. 317. 1984; Ansari, Fl. Kasaragod

Div. 299. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 359. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 319. 1989; Babu, Fl. Malappuram Dist. 622. 1990; Vajr., Fl. Palghat Dist. 370. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 361. 1994; Subram., Fl. Thenmala Div. 277. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 13,19. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 355. 1996; Sasidh., Fl. Shenduruny WLS 244. 1997; Sivar. & Mathew, Fl. Nilambur 539. 1997; Sasidh., Fl. Periyar Tiger Reserve 312. 1998; Sasidh., Fl. Chinnar WLS 245. 1999; Sunil, Fl. Pl. Alappuzha Dist. 724. 2000; Sasidh., Fl. Parambikulam WLS 244. 2002; Mohanan & Sivad., Fl. Agasthyamala 526. 2002; Rajendran & Daniel, The Indian Verbenaceae 344. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 395. 2005.

Family: Verbenaceae

Habit: Tree

Flowering & Fruiting: March-July

Vernacular Name: Myila/Mylellu (Mal.)

Distribution: Poyilkkavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Viscaceae

Viscum capitellatum Smith in Rees, Cyclop. 37. Viscum no. 18. 1817; Hook. f., Fl. Brit. India 5: 225. 1886; Gamble, Fl. Pres. Madras 1258(881). 1924; Manilal & Sivar., Fl. Calicut 253. 1982.

Family: Viscaceae

Habit: Parasitic shrub

Flowering & Fruiting: March-May

Distribution: Poyilkkavu (Kozhikode Dist.); Poongottukavu (Kannur Dist.)

Viscum heyneanum DC., Prodr. 4: 278. 1830; Antony, Syst. Stud. Fl. Kottayam Dist. 350. 1989; Sasidh., Fl. Periyar Tiger Reserve 359. 1998; Sasidh., Fl. Parambikulam WLS 276. 2002; Mohanan & Sivad., Fl. Agasthyamala 586. 2002.

Viscum verruculosum Wight & Arn., Prodr. 379. 1834; Hook. f., Fl. Brit. India 5: 224. 1886; Gamble, Fl. Pres. Madras 1258(881). 1925.

Family: Viscaceae

Habit: Parasitic shrub

Flowering & Fruiting: June-September

Distribution: Poongottukavu (Kannur Dist.)

Vitaceae

Ampelocissus latifolia (Roxb.) Planch., Vigne Aner. Europe 8: 374. 1884 & in A. & C. DC., Monogr. Phan. 5: 370. 1887; Gamble, Fl. Pres. Madras 230(165). 1918; Manilal & Sivar., Fl. Calicut 68. 1982; Ansari, Fl. Kasaragod Div. 103. 1985; Ramach. & V. J. Nair, Fl. Cannanore Dist. 102. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 106. 1989; Babu, Fl. Malappuram Dist. 129. 1990; Vajr., Fl. Palghat Dist. 122. 1990; Sivar. & Mathew, Fl. Nilambur 149. 1997; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 256. 2000.

Vitis latifolia Roxb., Fl. Ind. 1: 661. 1820; Hook. f., Fl. Brit. India 1: 652. 1875.

Family: Vitaceae

Habit: Climber

Flowering & Fruiting: May-June

Vernacular Name: Chembravalli/Karantavalli/Valiyapirappitikha (Mal.) Jungle angoor/Jungle grave vine (Eng.)

Distribution: Poyilkkavu, Bhayankavu, Thurayilkavu (Kozhikode Dist.); Parappoolkavu, Poongottukavu (Kannur Dist.); Kammadathukavu (Kasaragod Dist.)

Cissus discolor Blume, Cat. Gew. Buitenz. 39. 1823; Gamble, Fl. Pres. Madras 235(168). 1918; Mohanan, Fl. Quilon Dist. 119. 1984; Ansari, Fl. Kasaragod Div. 105. 1985; Manilal, Fl. Silent Valley 59. 1988; Ramach. & V. J. Nair, Fl. Cannanore Dist. 104. 1988; Babu, Fl. Malappuram Dist. 132. 1990; Vajr., Fl. Palghat Dist. 124. 1990; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 13,34. 1996; Sasidh., Fl. Shenduruny WLS 71. 1997; Sasidh. & Sivar., Fl. Pl. Thrissur For. 112. 1996; Sivar. & Mathew, Fl. Nilambur 152. 1997; Sasidh., Fl. Shenduruny WLS 71. 1997; Sasidh., Fl. Periyar Tiger Reserve 73. 1998; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 282. 2000; Sasidh., Fl. Parambikulam WLS 71. 2002.

Family: Vitaceae

Habit: Climber

Flowering & Fruiting: July-January

Vernacular Name: Aaronpuli/Njerinjampuli (Mal.)

Distribution: Kammadathukavu (Kasaragod Dist.)

Cissus trilobata Lam., Encycl. 1:31.1788; Gamble, Fl. Pres. Madras 233(167). 1918; Subram., Fl. Thenmala Div. 72. 1995; Sunil, Fl. Pl. Alappuzha Dist. 176. 2000; Shetty & P. Singh in N.P. Singh *et al.*, Fl. India 5: 293. 2000; Anil Kumar *et al.*, Fl. Pathanamthitta 135. 2005.

Vitis rheedei Wight & Arn. in Wight, Cat. 27. 1833 & Prodr. 127. 1834; Hook. f., Fl. Brit. India 1: 653. 1875.

Family: Vitaceae

Habit: Climber

Flowering & Fruiting: June-August

Vernacular Name: Neelachunnambuvalli (Mal.)

Distribution: Poyilkkavu (Kozhikode Dist.)

4.2 SOIL PHYSICOCHEMICAL PROPERTIES

The soils of Kammadathukavu (Kasaragod), Parappoolkavu, Poongottukavu and Thazhekkavu (Kannur), Bhayankavu, Poyilkkavu and Thurayilkavu (Kozhikode) of Malabar have been investigated in detail to study the monthly changes in soil moisture, soil pH, EC, organic carbon, available nitrogen and macronutrients like sodium, potassium, calcium and magnesium during November to June for two consecutive years (2004-06). Changes in the above parameters were monitored by collecting soil samples at 15 cm intervals from the surface to 90cm depth (details are given in Chapter 3). The results are presented in tables 14 to 22 and figures 7 to 137. In general, with very few exceptions, the sacred groove soils manifested higher values compared to the adjacent undistributed control plots with respect to all parameters studied. Results of the present study are discussed below in detail. The values presented in tables 14 to 22 are the mean values recorded for soil samples collected from all depths and the values obtained for two years (2004-06).

As an ecosystem, sacred groves help in soil and water conservation besides preserving biological wealth. The ponds and streams usually adjoining the groves are perennial water sources. Many animals and birds resort to them for their water requirements during summer. These groves are good repositories of humus, which is formed by litter decomposition. The nutrients generated in the groves find their way into the adjoining agro ecosystems like paddy fields, tapioca and rubber plantations (Ramachandran & Mohanan, 1991).

4.2.1 Hydraulic Conductivity

The hydraulic conductivity of soil refers to the readiness with which it transmits water within the soil profile. Hydraulic conductivity in select sacred groves in Kasaragod, Kannur and Kozhikode districts were observed and compared with those in adjacent bare plots (control plots). Its graphic representations are given in figures 7, 8 and 9.

All the sacred grove soils showed relatively high hydraulic conductivity compared to the control plots. This can be attributed to the rich floral wealth, litter fall and the associated humus and organic matter in sacred grove soils compared to the control plots.

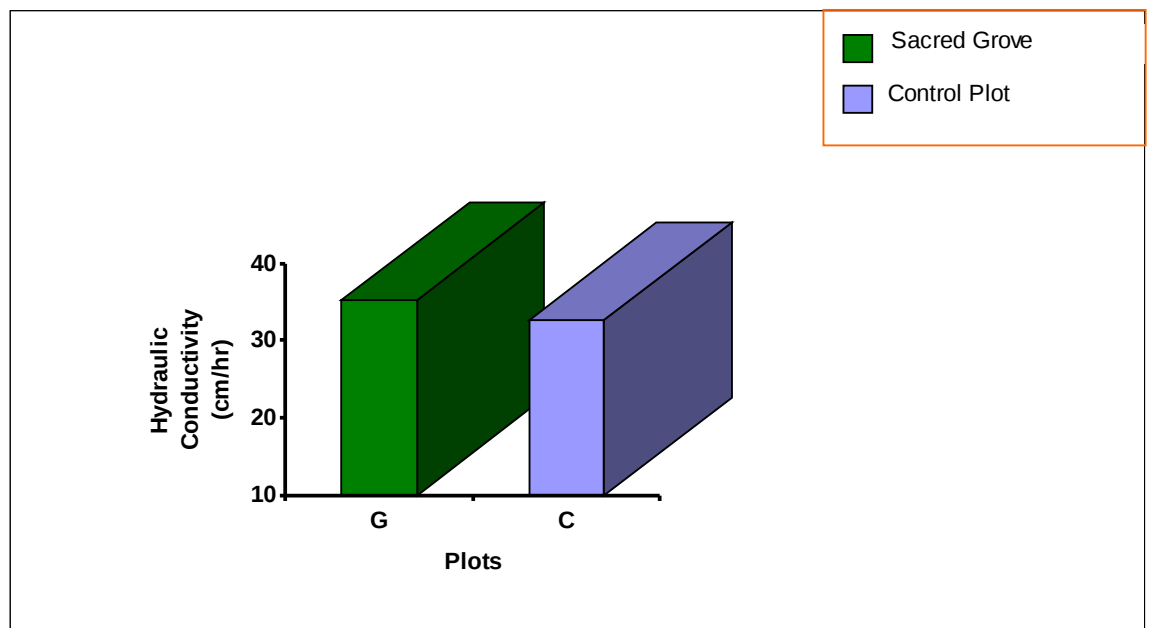


Figure 7. Hydraulic conductivity of Soils of Kammadathukavu (Kasaragod)

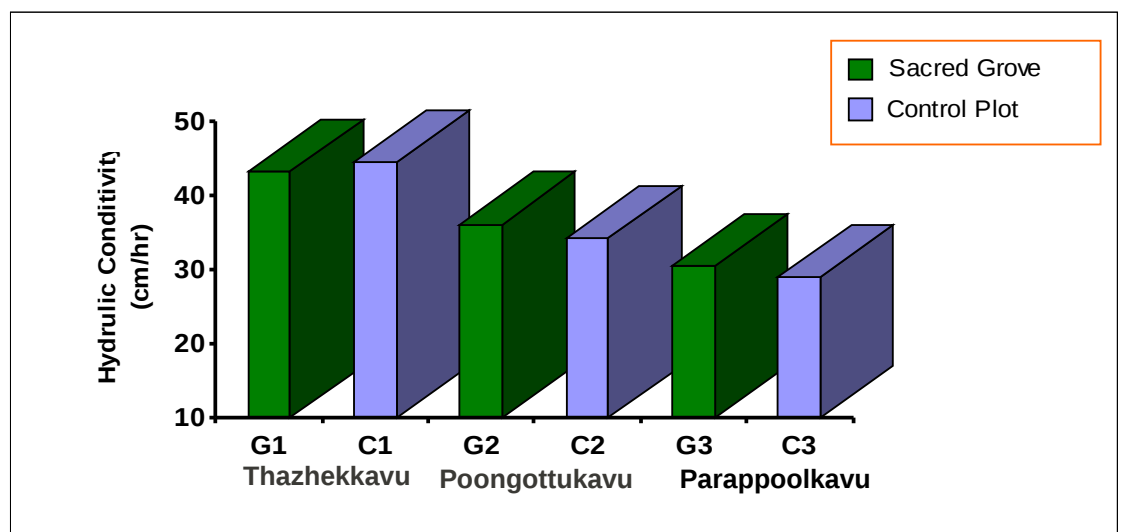


Figure 8. Hydraulic Conductivity of Soils of Sacred Groves of Kannur

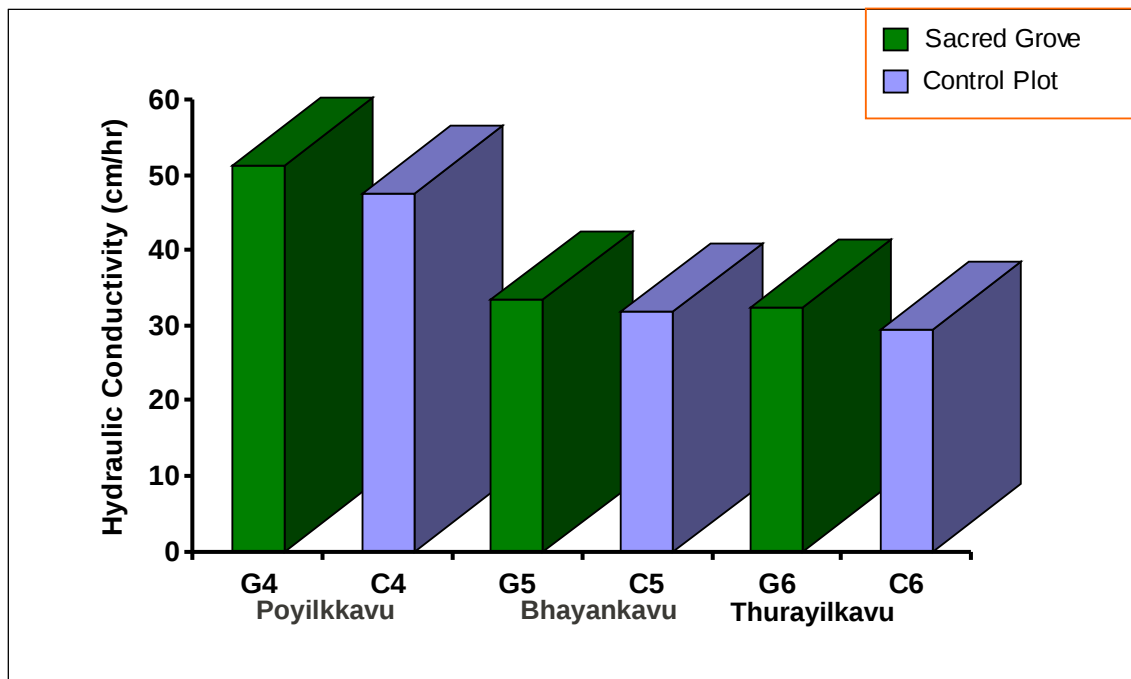


Figure 9. Hydraulic Conductivity of Soils of Sacred Groves of Kozhikode

4.2.2 Soil Infiltration

The entry of water from the surface into the soil is called infiltration. Soil infiltration rates of select sacred groves of Kasaragod, Kannur and Kozhikode districts were compared with adjacent control plots. High infiltration rates were observed in select sacred groves compared to adjacent bare plots (control plots). The results are presented in figures 10, 11 and 12.

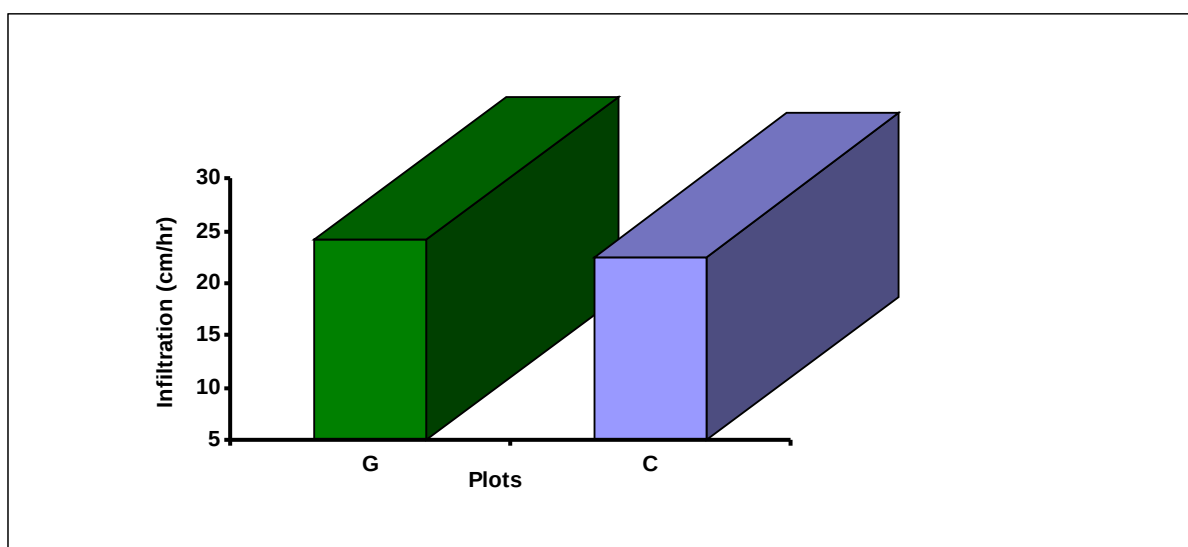


Figure 10. Infiltration Rates of Soils of Kammadathukavu (Kasaragod)

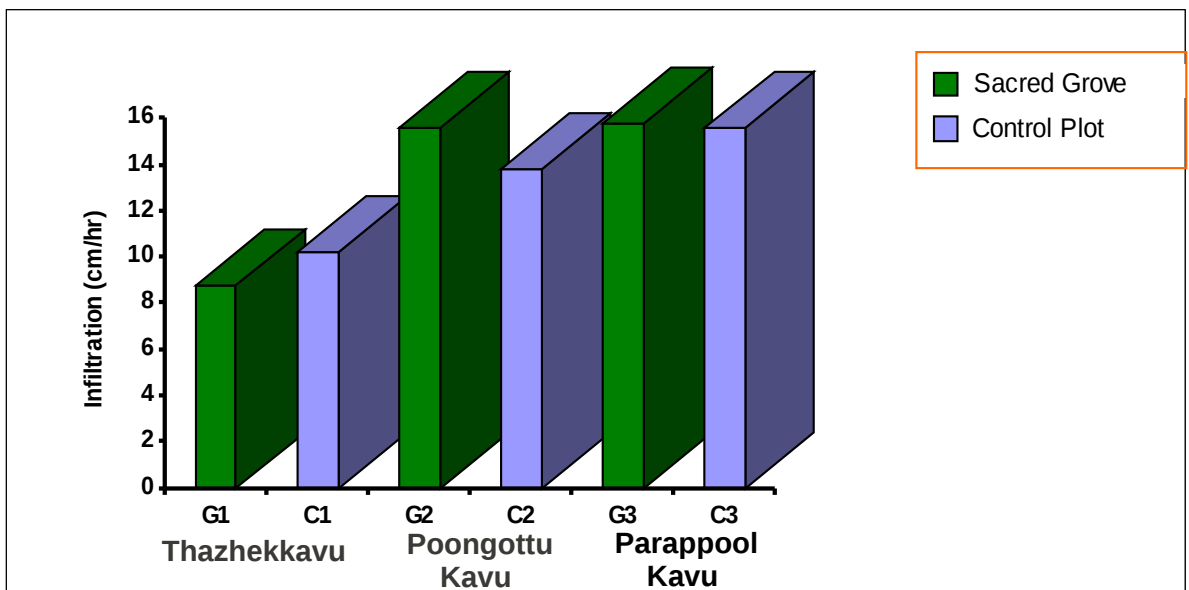


Figure 11. Infiltration Rates of Soils of Sacred Groves of Kannur

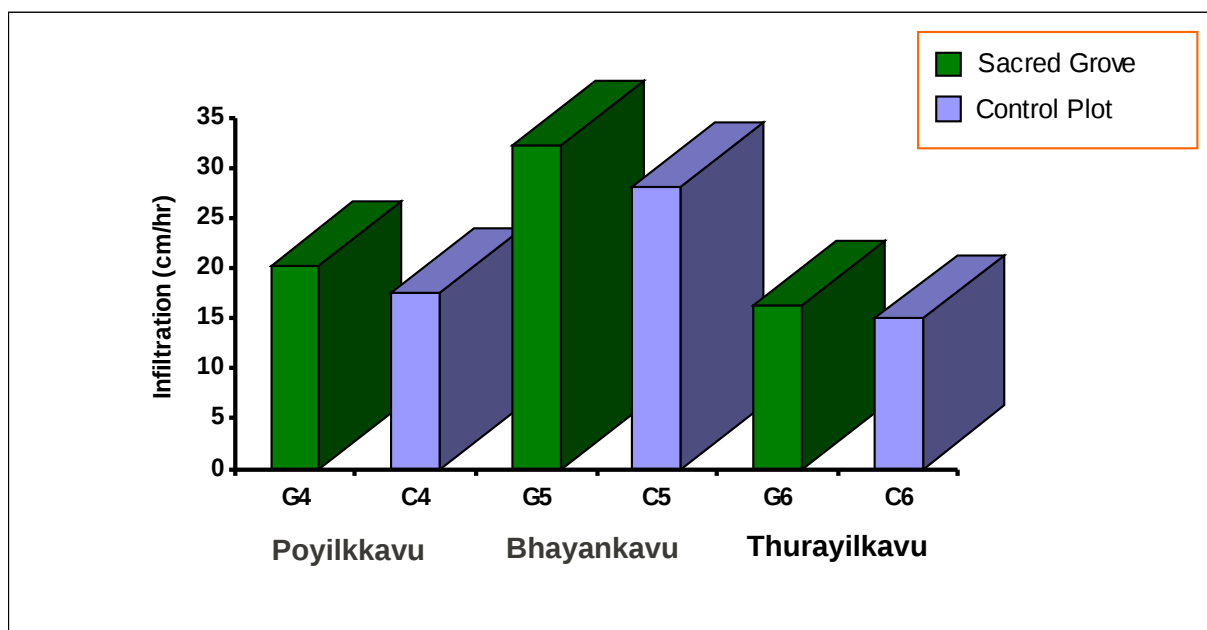


Figure 12. Infiltration Rates of Soils of Sacred Groves of Kozhikode

4.2.3 Soil Moisture

Water in the soil is not only important as a solvent and transporting agent, but also it maintains the texture and compactness of soil and makes it habitable for microbes, plants and animals. The moisture content in soil is mainly from infiltration of the precipitated water,

which always depends on the water holding capacity of the soil and drains out of the soil through percolation, evaporation and absorption by plants, depending upon climatic factors, soil texture, porosity and plant factors such as water potential, transpiration, etc. Changes in soil moisture content in the soils of select sacred groves of Kasaragod, Kannur and Kozhikode are presented in figures 13 to 26.

The moisture retention capacity of sacred grove soils are high compared to the control plots which might be due to the incorporation of organic matter by the degradation of litter as has been documented earlier in the present study. Higher soil moisture retention was observed in the sacred grove soils containing high organic matter. The high moisture content in the sacred groves may be attributed to the presence of high organic matter and humus material in the soil.

Among the seven selected sacred groves, the soil of Bhayankavu, Poongottukavu, Thazhekkavu and Parappoolkavu showed 40% higher soil moisture values compared to control plots. Kammadathukavu and Thurayilkavu soils showed 30% higher soil moisture (Table14). In general, all the seven sacred grove soils maintained higher soil moisture levels compared to control at all depths during the non – raining months of both the years. Studies indicates the higher moisture retention capacity of sacred grove soils compared to control. This may be due to (i) the microclimate of sacred groves reducing the evapotranspiration losses (ii) increased water holding capacity of soil due high organic matter extent to in the soil (iii) changes in soil physical properties due to continues activity of soil microorganisms over the years and (iv) reduction in surface evaporation due to very high litter deposition over the surface soil.

Table14. Soil Moisture Variations in Sacred Groves (mg/kg): 2004-06

Name of Sacred Grove	Treatments	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Mean	Increase/ Decrease (%)
Kammadathukavu	G	21.5	19.3	17.7	17.4	15.4	14.7	14.8	24.7	18.2	36.84
	C	15.2	14.1	12.4	11.8	10.4	9.7	10.1	22.9	13.3	
Parappoolkavu	G	19.6	18.8	15.8	16.3	14.6	13.7	13.9	22.1	16.8	42.37
	C	13.8	12.7	9.9	10.2	9.1	8.2	8.9	21.8	11.8	
Poongottukavu	G	19.0	17.6	15.6	15.6	13.7	13.0	13.2	21.7	16.2	52.83
	C	12.9	11.0	9.2	8.9	7.9	7.4	7.4	20.1	10.6	
Thazhekkavu	G	21.3	20.2	17.8	18.2	16.3	15.4	15.9	26.7	19.0	43.94
	C	15.7	14.1	10.0	12.3	10.4	8.4	9.8	25.2	13.2	
Bhayankavu	G	17.9	17.4	16.8	16.5	15.2	16.4	14.9	20.8	17.0	63.46
	C	13.2	11.2	10.2	9.7	6.4	6.1	6.1	19.8	10.4	
Poyilkkavu	G	22.0	19.7	18.8	17.7	15.4	14.9	15.1	25.6	18.7	16.88
	C	20.7	17.4	15.3	14.4	12.3	11.9	12.0	24.4	16.0	
Thurayilkavu	G	17.5	17.0	15.3	14.7	12.3	12.1	12.0	21.7	15.3	31.90
	C	13.7	12.3	11.2	10.3	9.0	8.3	8.4	19.7	11.6	

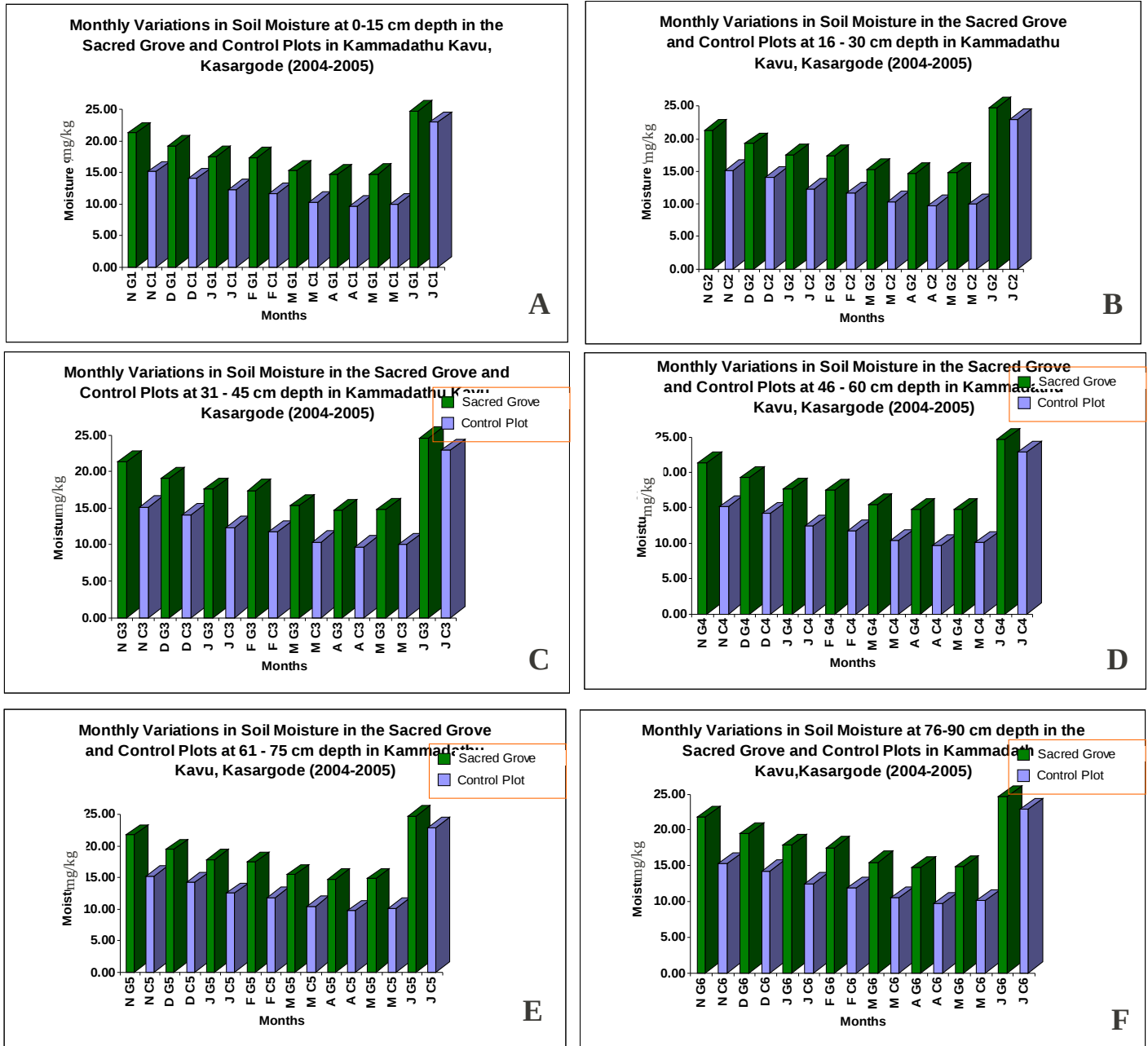


Figure 13 A-F. Monthly Variations in Soil Moisture: Kammadathukavu (2004-05)

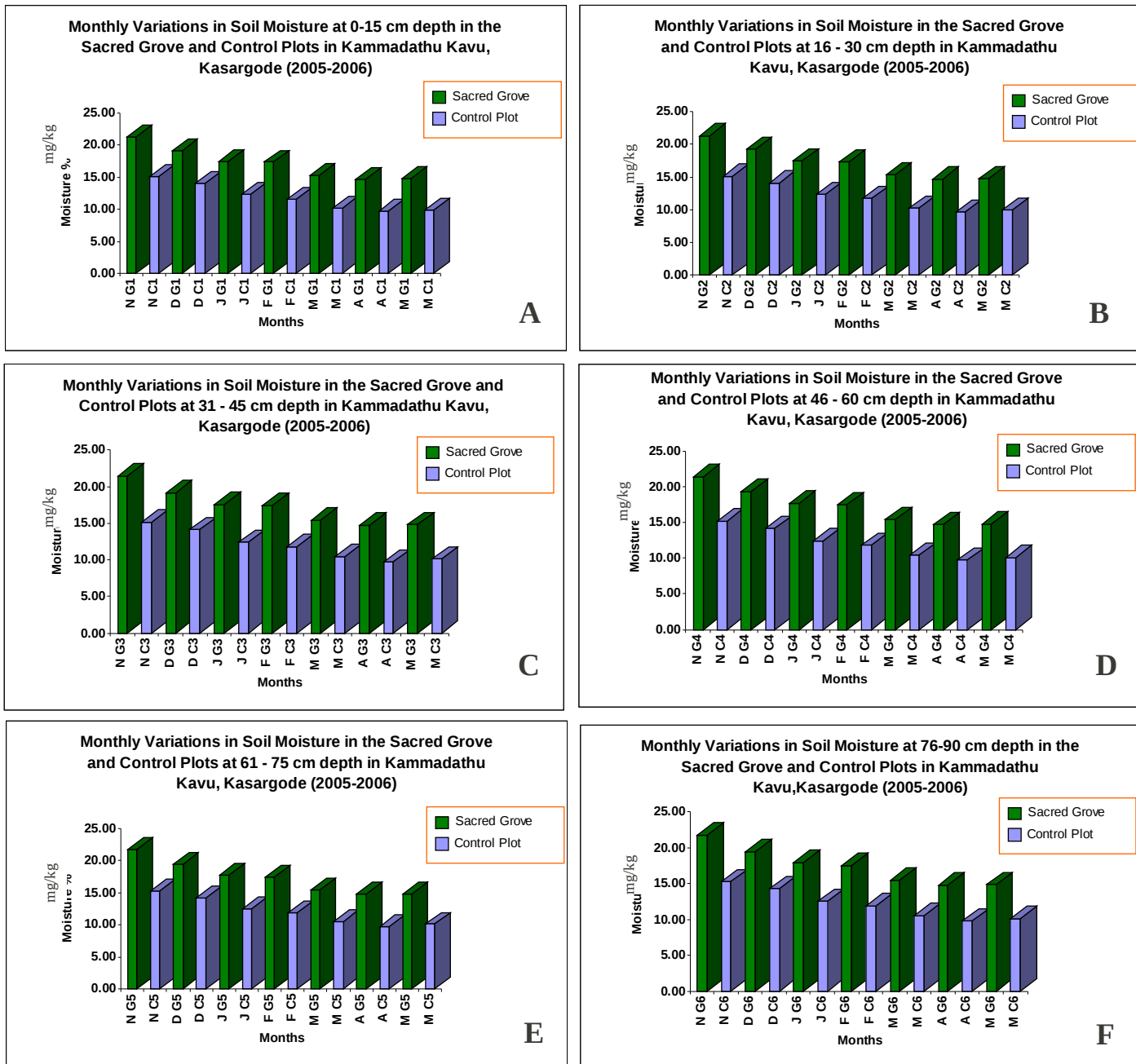


Figure 14 A-F. Monthly Variations in Soil Moisture: Kammadathukavu (2005-06)

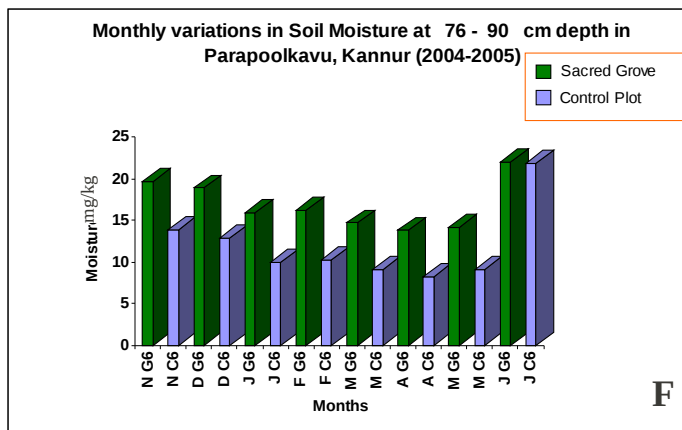
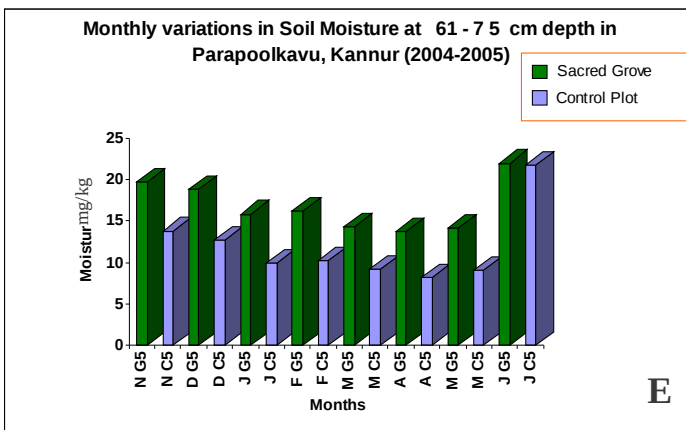
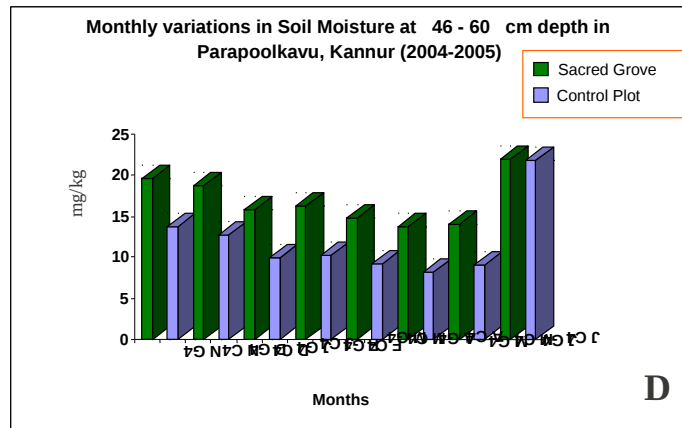
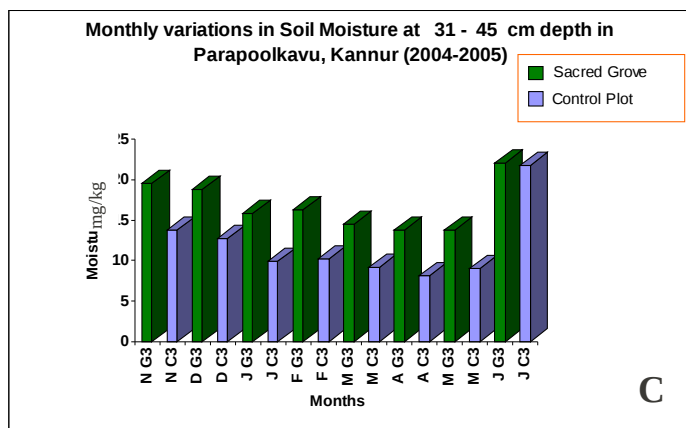
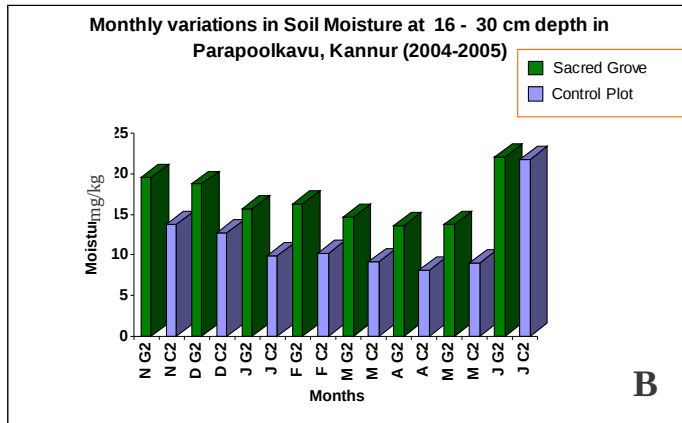
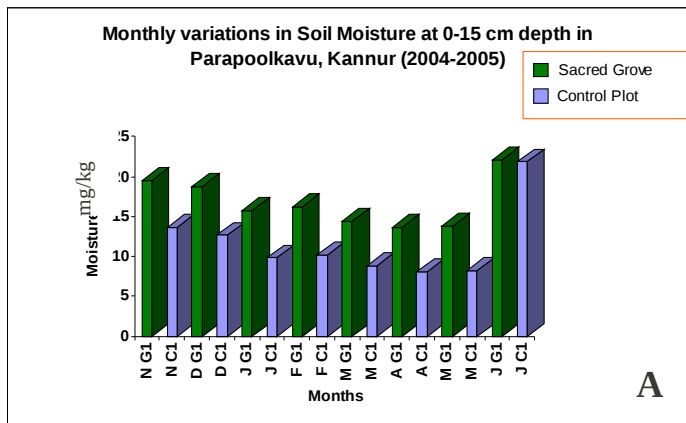


Figure 15 A-F. Monthly Variations in Soil Moisture: Parapoolkavu (2004-05)

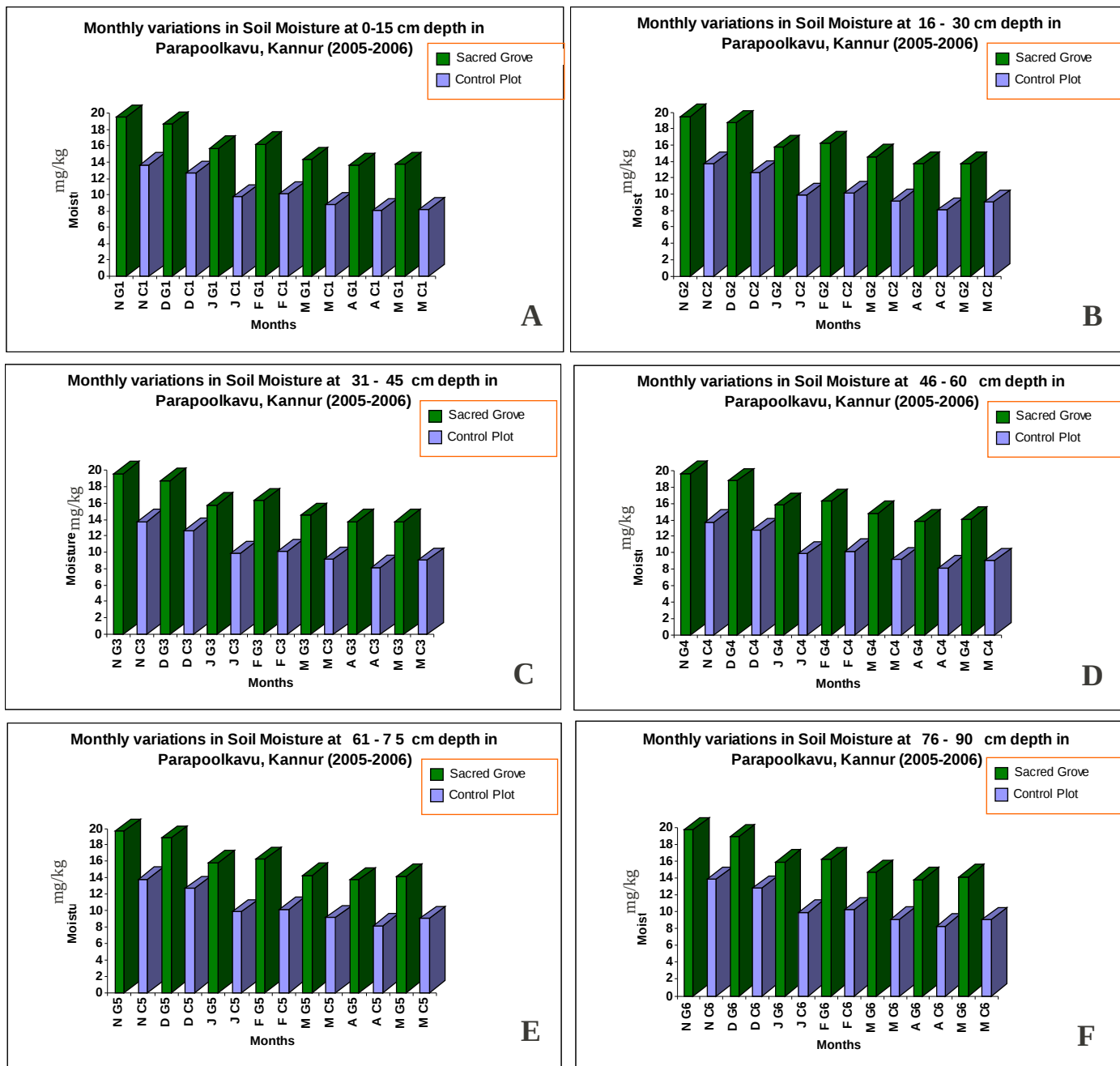


Figure 16 A-F. Monthly Variations in Soil Moisture: Parappoolkavu (2005-06)

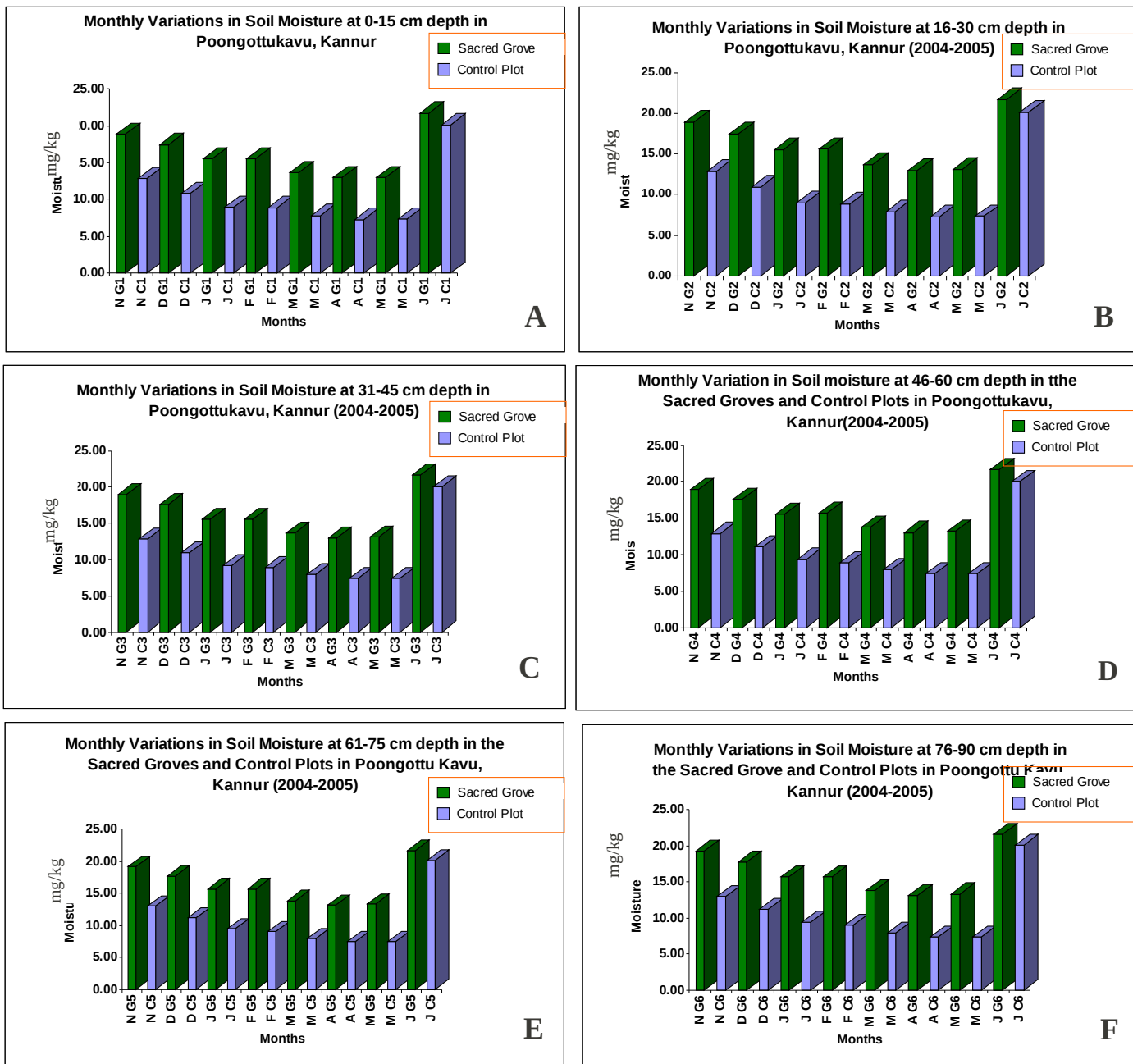


Figure 17 A-F. Monthly Variations in Soil Moisture: Poongottukavu (2004-05)

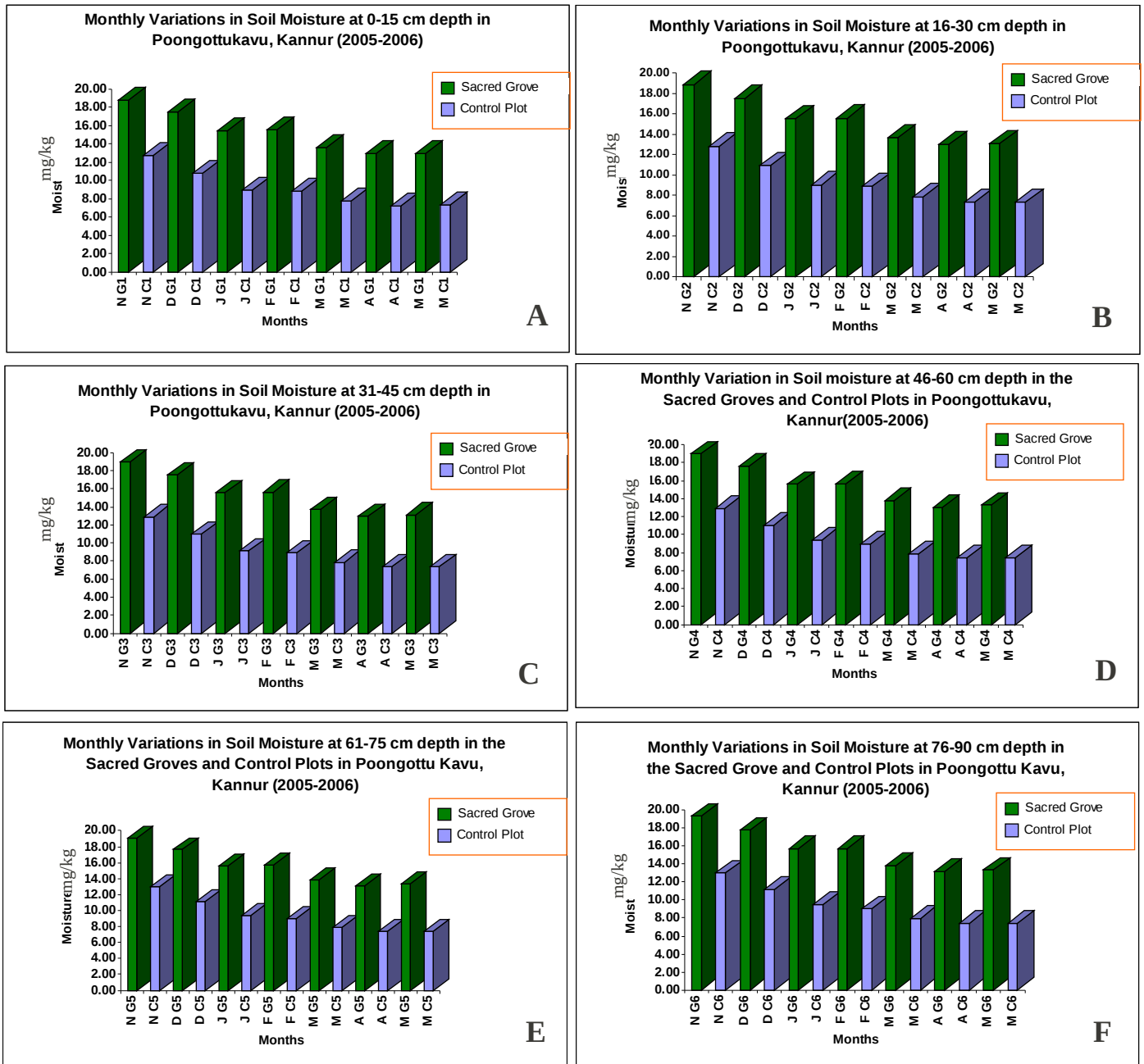


Figure 18 A-F. Monthly Variations in Soil Moisture: Poongottukavu (2005-06)

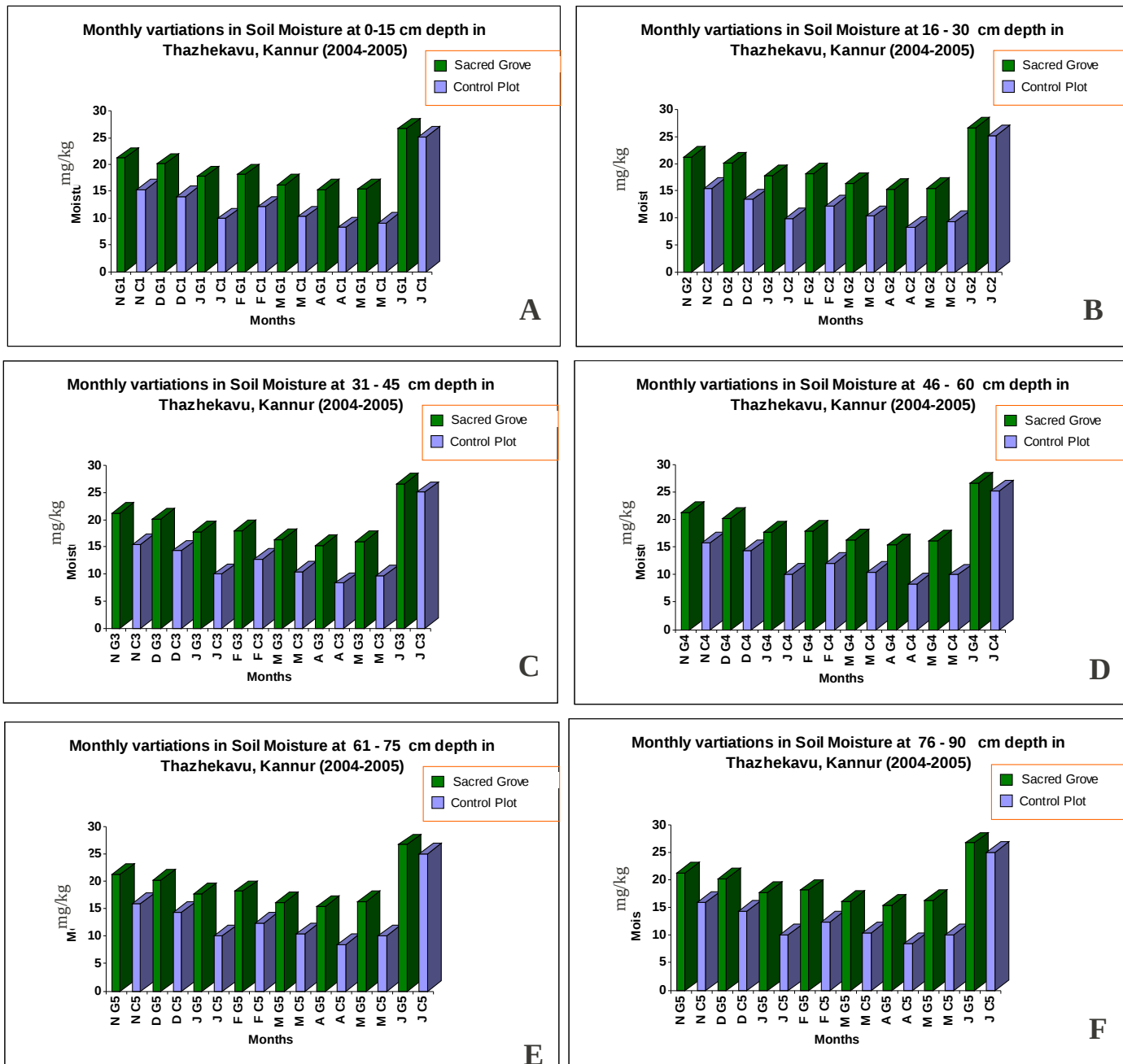


Figure 19 A-F. Monthly Variations in Soil Moisture: Thazhekkavu (2004-05)

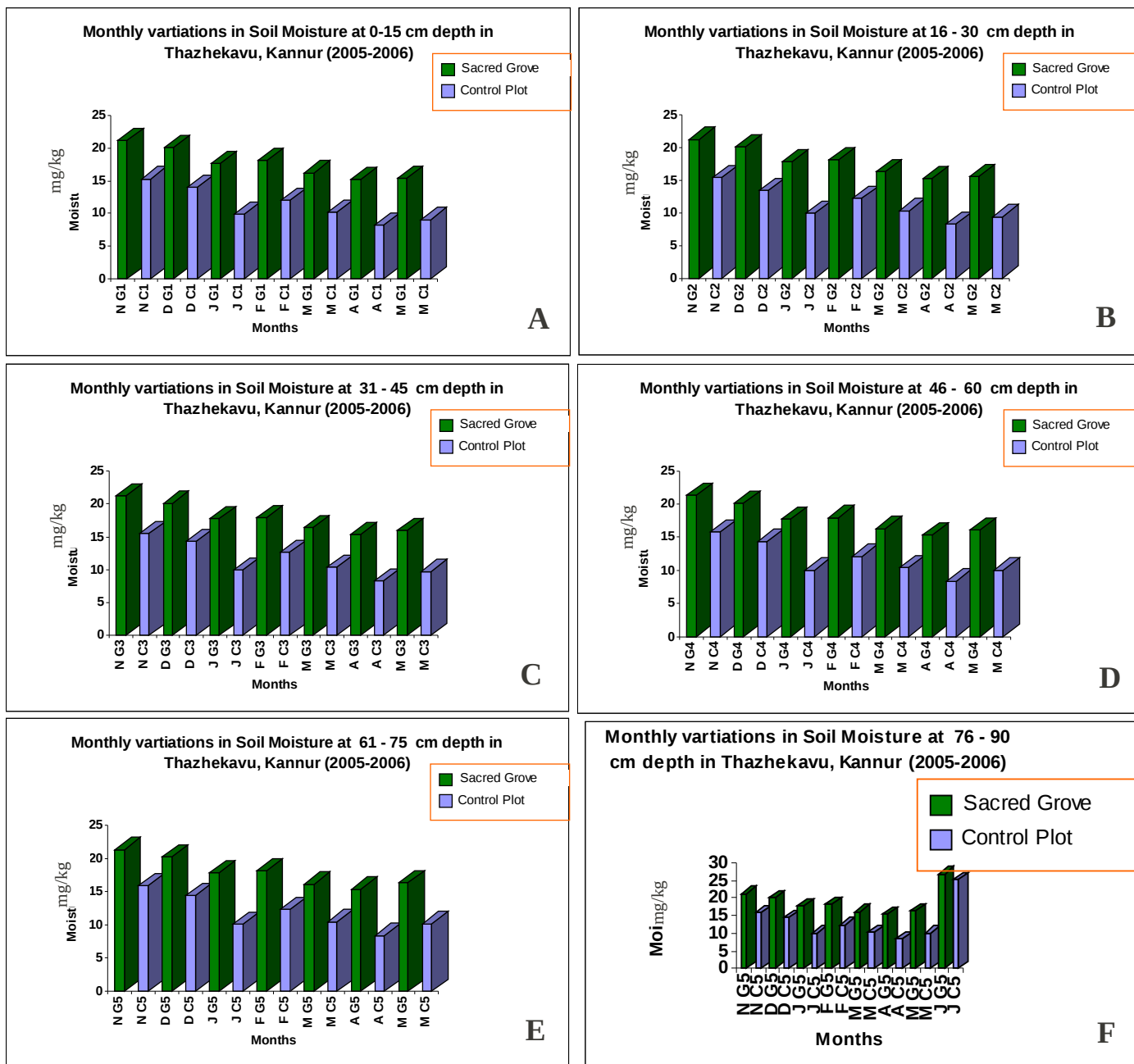


Figure 20 A-F. Monthly Variations in Soil Moisture: Thazhekkavu (2005-06)

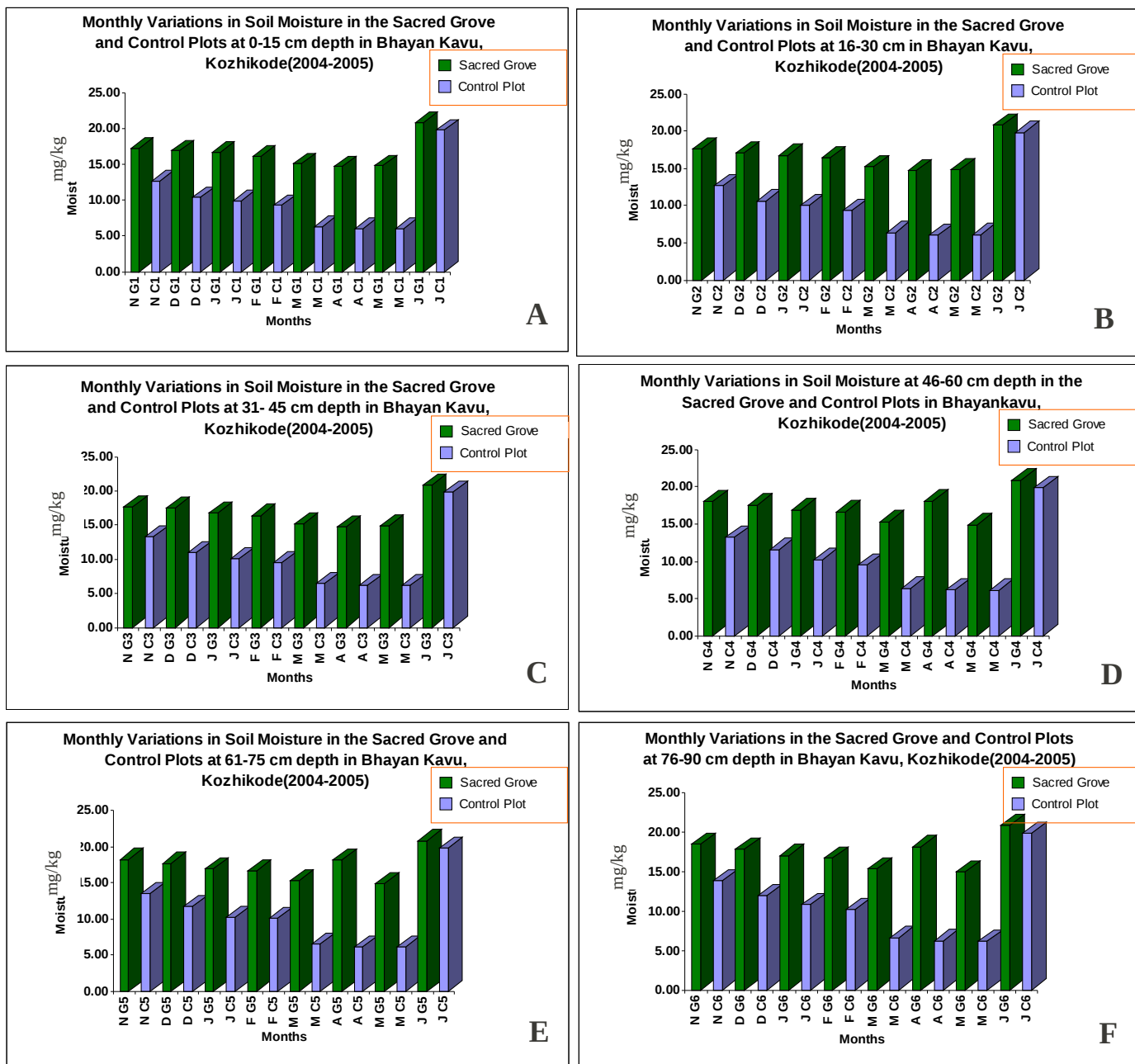


Figure 21 A-F. Monthly Variations in Soil Moisture: Bhayankavu (2004-05)

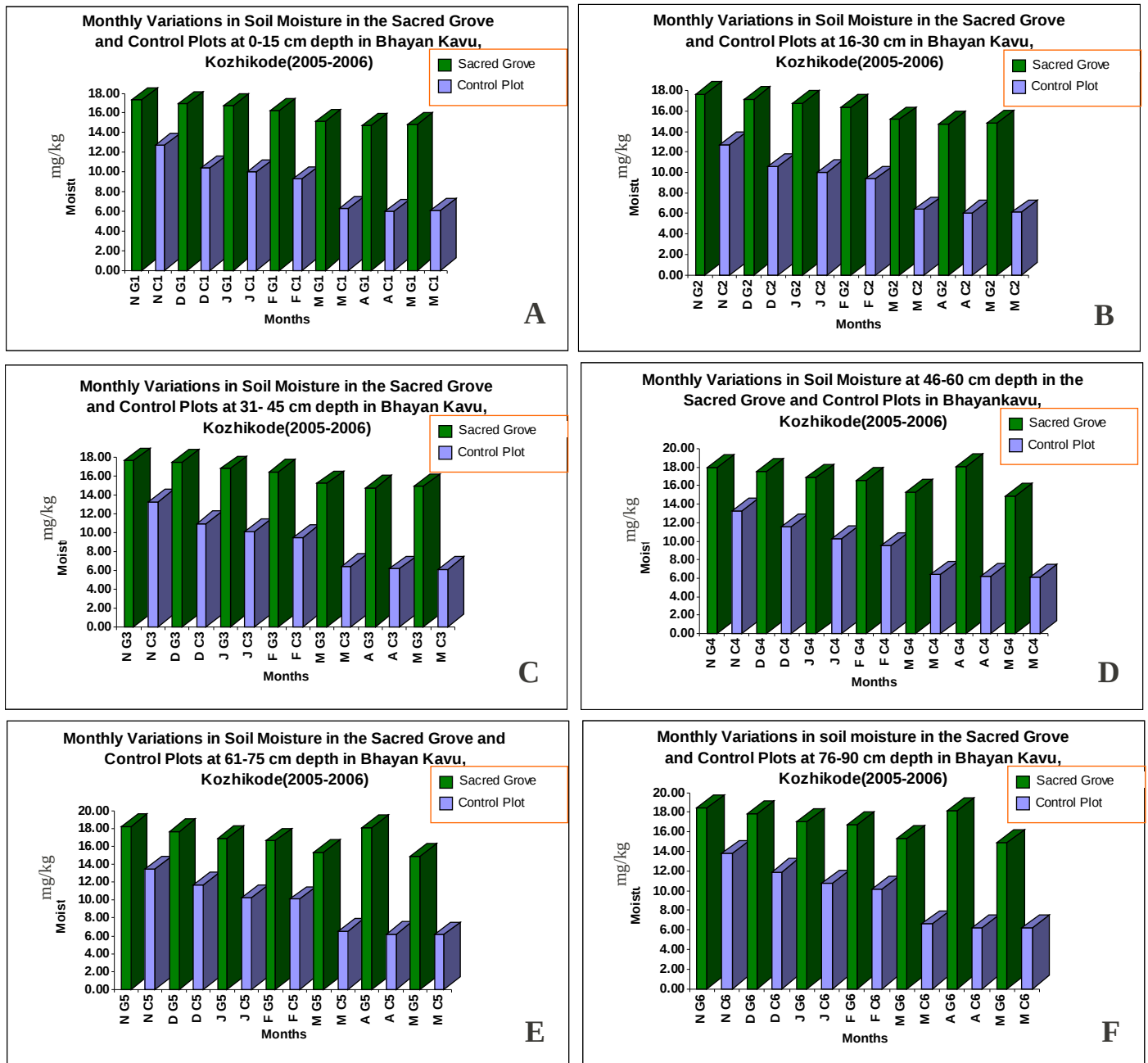


Figure 22 A-F. Monthly Variations in Soil Moisture: Bhayankavu (2005-06)

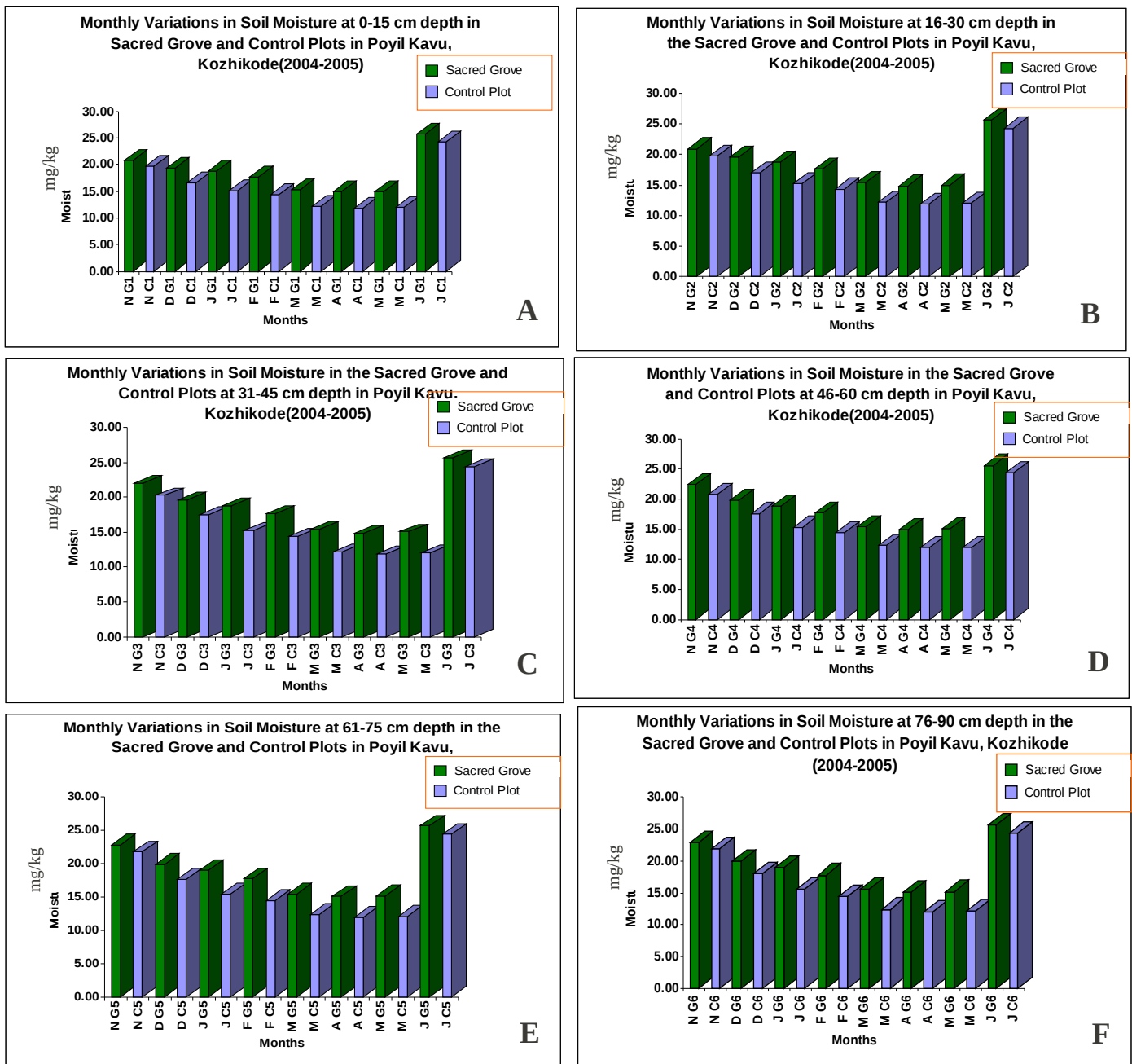


Figure 23 A-F. Monthly Variations in Soil Moisture: Poyilkkavu (2004-05)

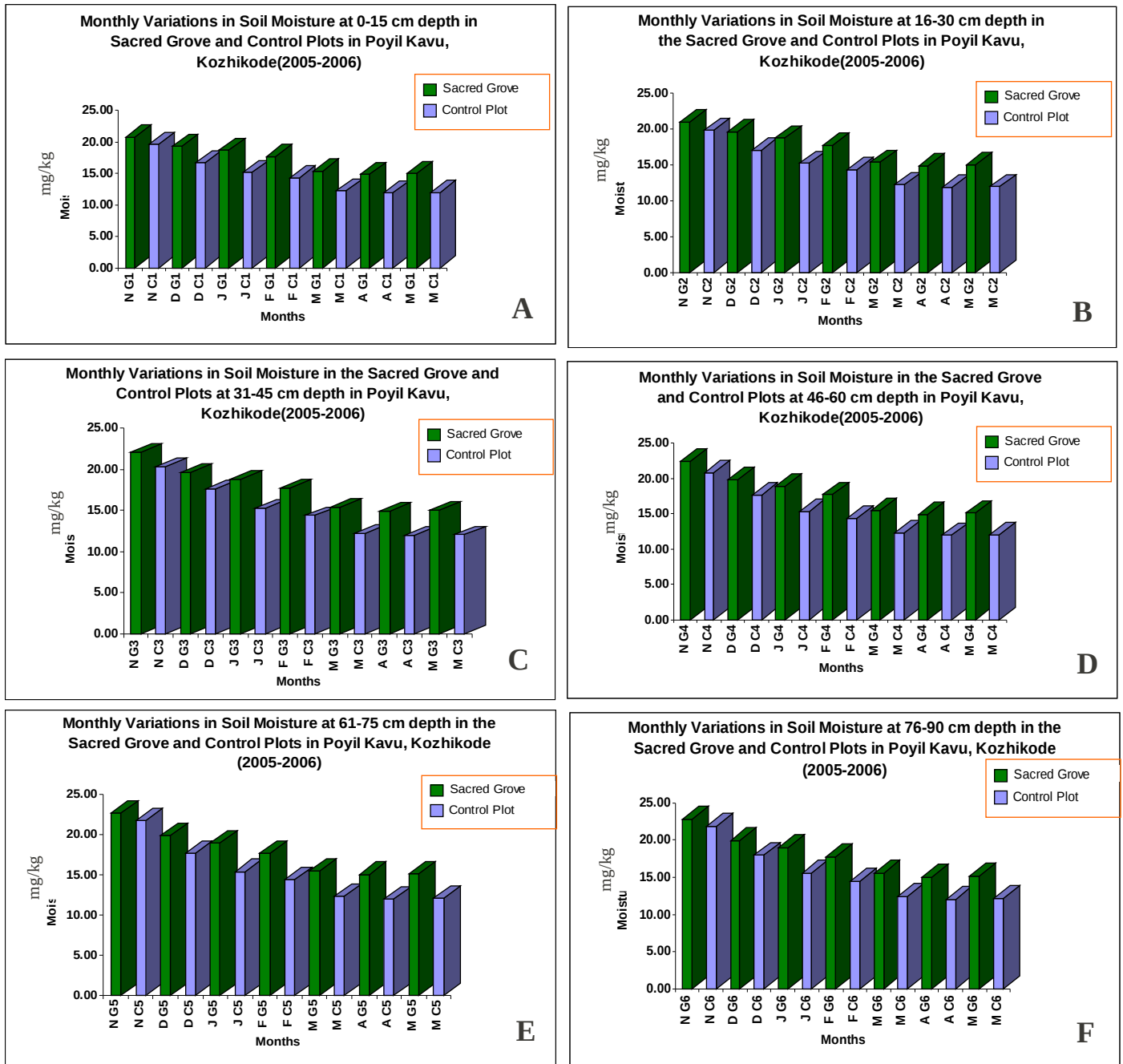


Figure 24 A-F. Monthly Variations in Soil Moisture: Poyilkkavu (2005-06)

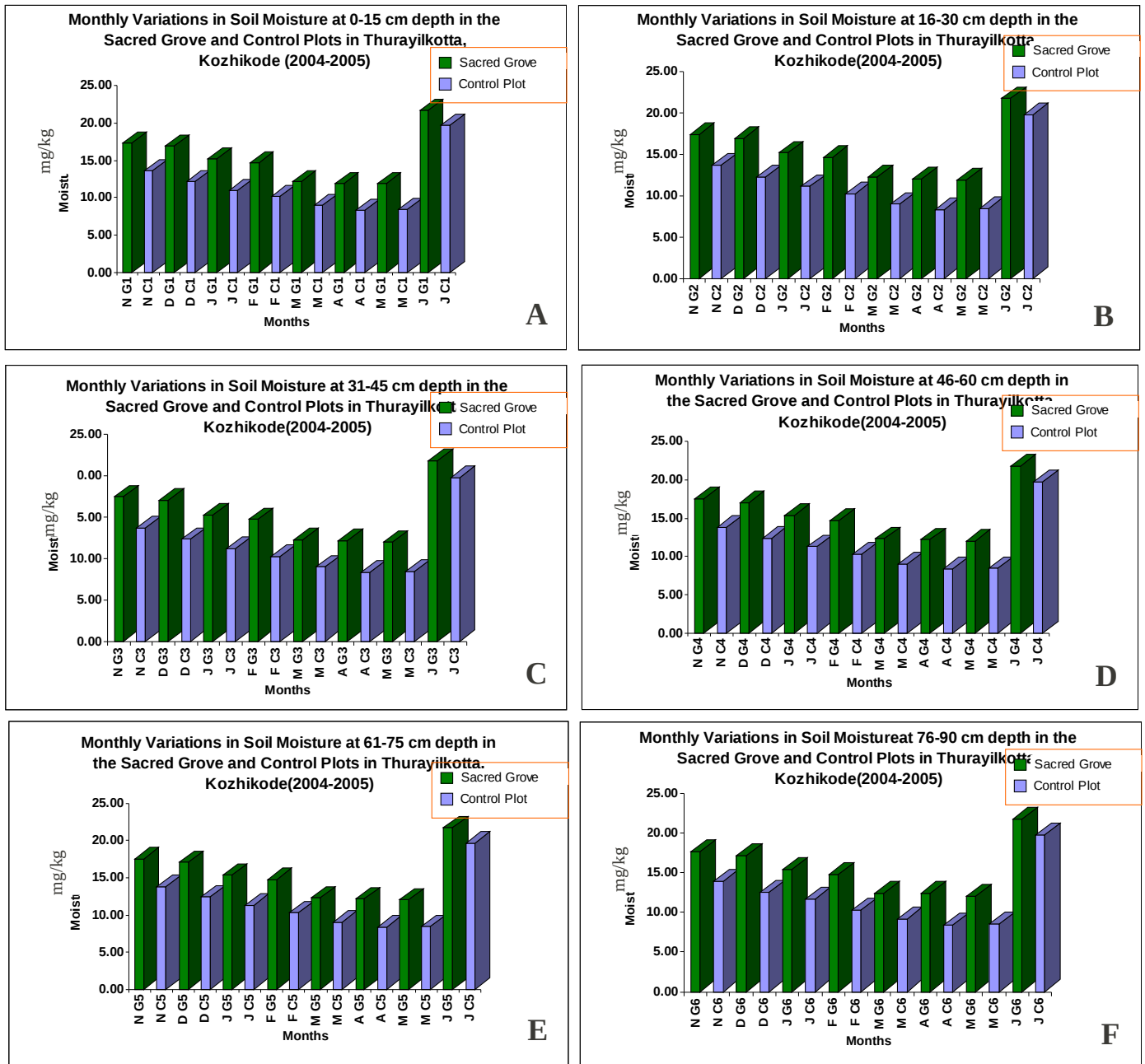


Figure 25 A-F. Monthly Variations in Soil Moisture: Thurayilkavu (2004-05)

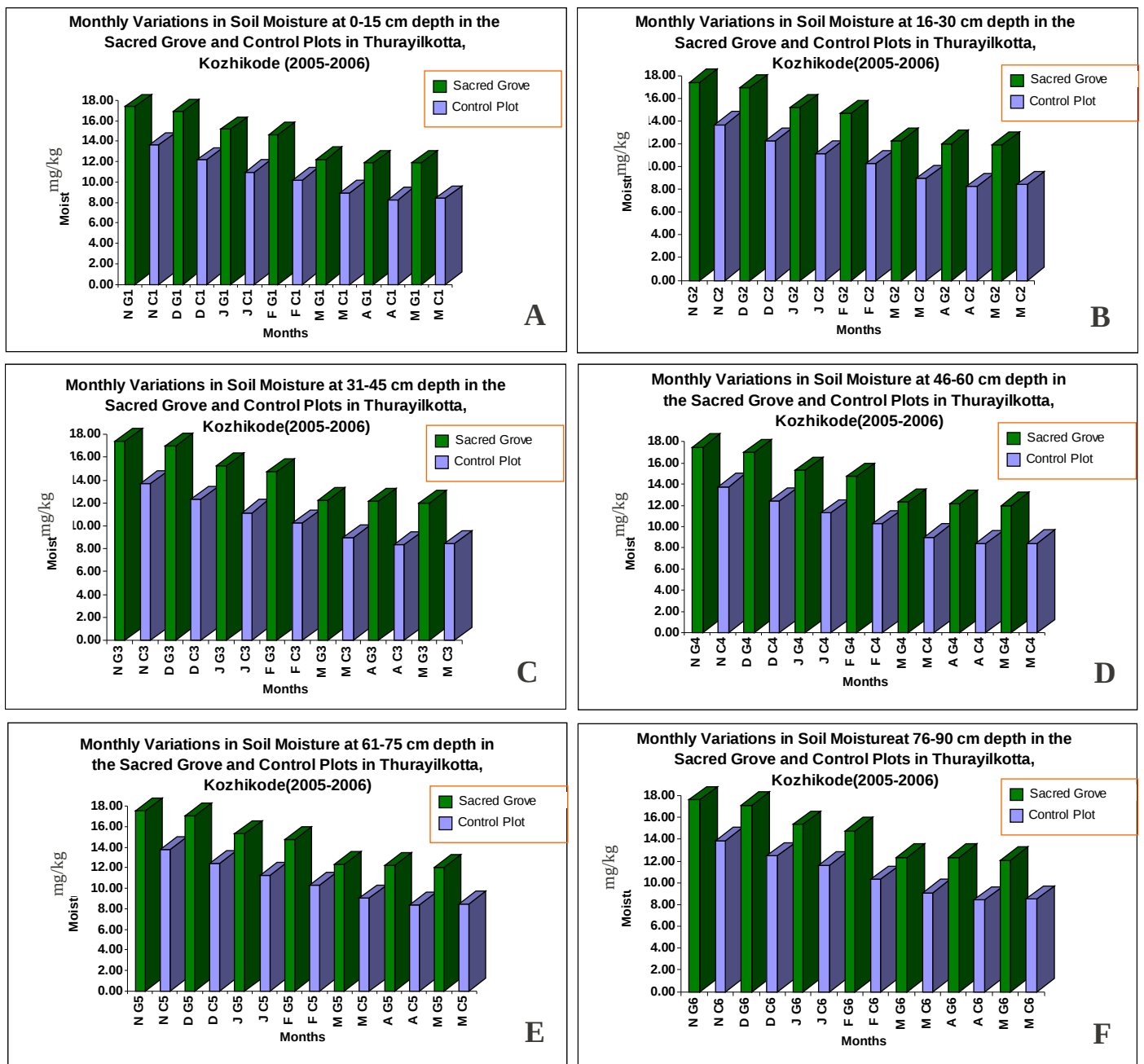


Figure 26 A-F. Monthly Variations in Soil Moisture: Thurayilkavu (2005-06)

4.2.4 pH

pH of the soil is the measure of 'hydrogen ion activity' which depends largely on the relative amounts of the adsorbed hydrogen and metallic ions. It is a good measure of the indication of acidity or alkalinity of a soil–water suspension and provides good identification of the soil's chemical properties (Trivedy & Goel, 1986). The pH values of the sampling sites of sacred groves and control plots are represented in figures 27 – 40.

A study of the changes in soil pH in the seven sacred groves selected, the pH showed a tendency towards the natural side, *i. e.*, pH values above 5.1 to 7.5 (Table 15) compared to control, wherein the pH values were below 5.00. In general, Kerala soils are acidic in nature with a pH range of 4.0 to 5.0 except the acid sulphate soils of *kari* lands of Kuttanad belonging to the Vembanad wetlands; lime or dolomite is added as a soil amendment to reduce the acidic pH to desirable levels for agricultural crops. The higher pH values recorded for the sacred grove soil may be due to (i) increased humus content (ii) decomposition of litter by microbes and (iii) activity of soil micro fauna.

Table15. Soil pH Variations in Sacred Groves: 2004-06

Name of Sacred Grove	Treatments	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Mean	Increase/Decrease (%)
Kammadathukavu	G	6.62	6.69	6.70	6.52	6.55	6.62	6.57	5.55	6.48	8.72
	C	6.26	5.95	6.23	6.23	5.62	6.13	6.16	5.13	5.96	
Parappoolkavu	G	8.52	8.30	8.55	8.55	8.35	8.17	8.22	7.14	8.23	9.59
	C	7.68	7.44	7.75	7.65	7.77	7.53	7.44	6.80	7.51	
Poongottukavu	G	5.04	5.22	5.17	5.29	5.15	5.27	5.26	4.52	5.12	16.89
	C	4.31	4.35	5.06	4.31	4.15	4.34	4.51	3.97	4.38	
Thazhekkavu	G	5.49	5.23	5.30	5.53	5.34	5.55	5.42	4.33	5.27	-14.23
	C	6.16	6.20	6.10	6.17	6.03	6.23	6.19	5.04	6.02	
Bhayankavu	G	6.46	6.55	6.22	6.45	6.14	5.95	5.78	4.73	6.04	18.90
	C	5.19	5.16	5.25	5.26	5.15	5.33	5.18	4.12	5.08	

Poyilkkavu
Thurayilkavu

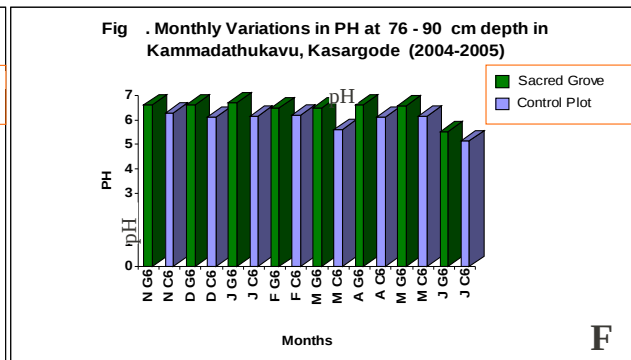
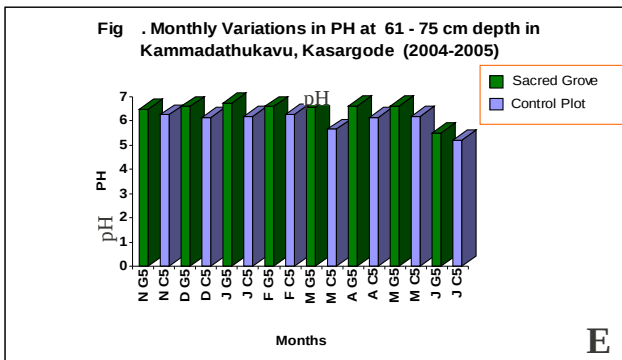
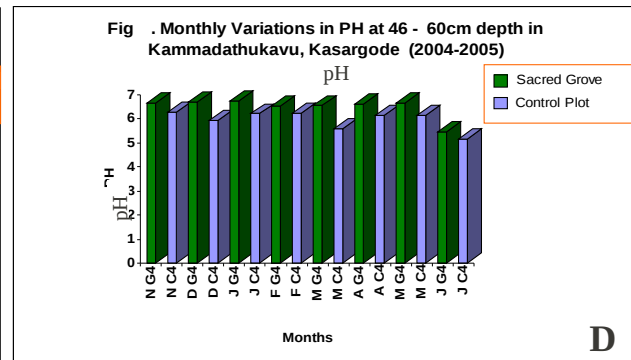
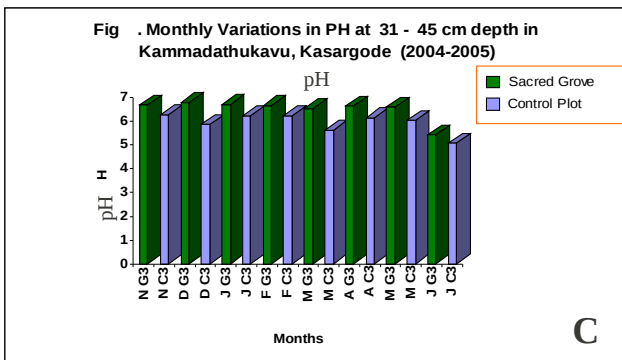
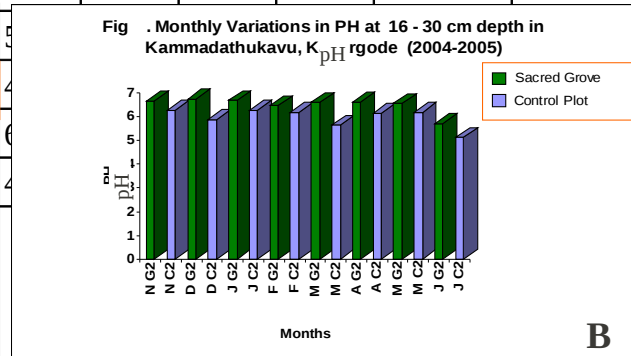
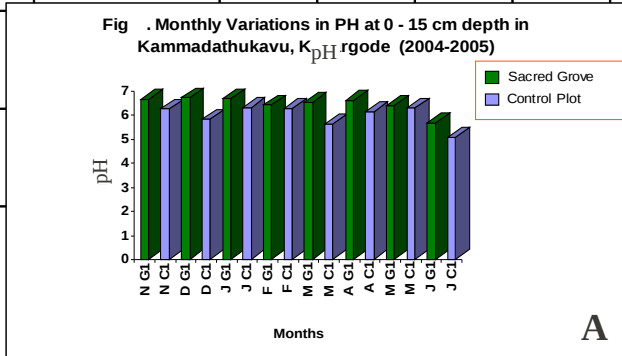


Figure 27 A-F. Monthly Variations in Soil pH: Kammadathukavu (2004-05)

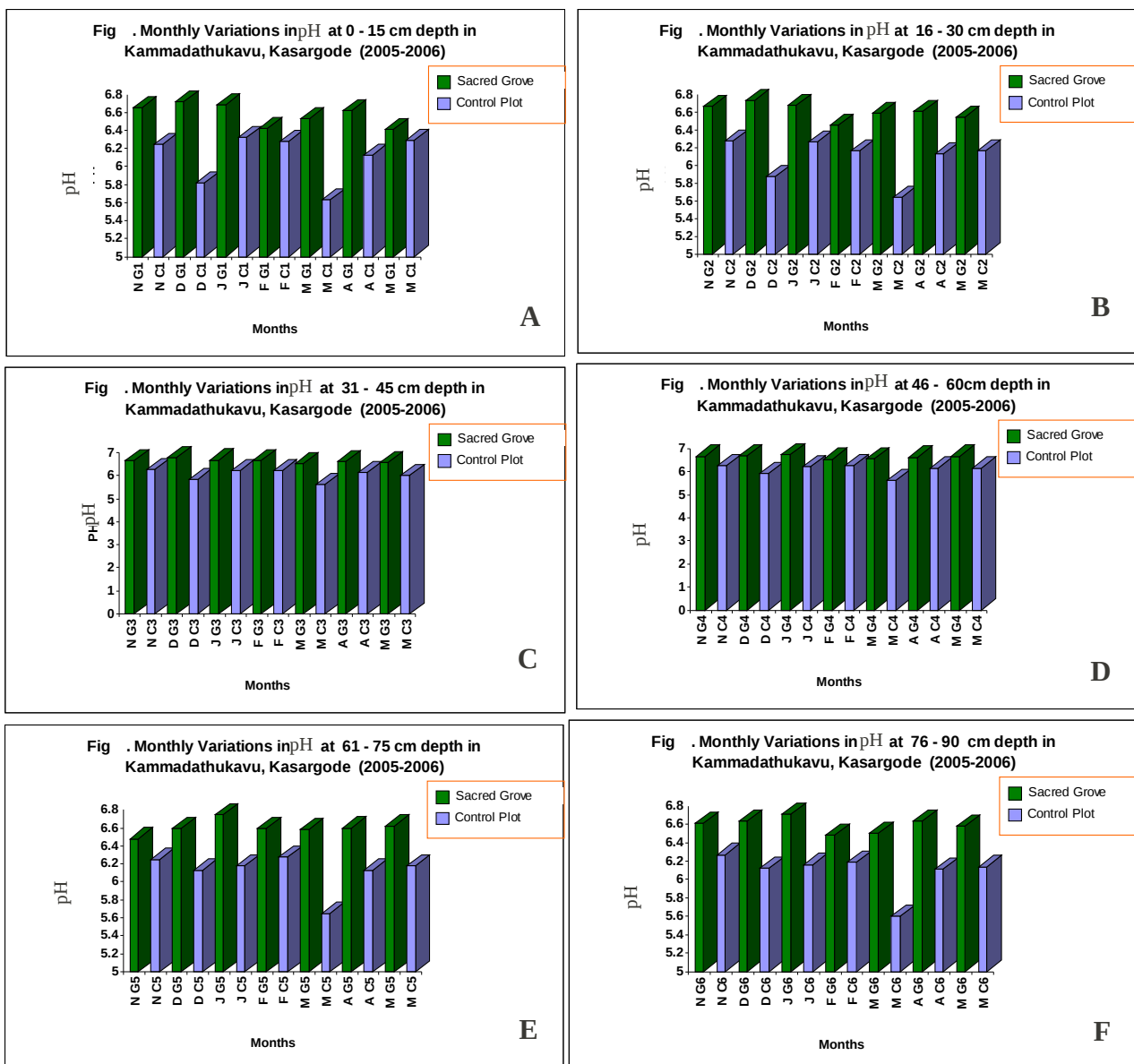


Figure 28 A-F. Monthly Variations in Soil pH: Kammadathukavu (2005-06)

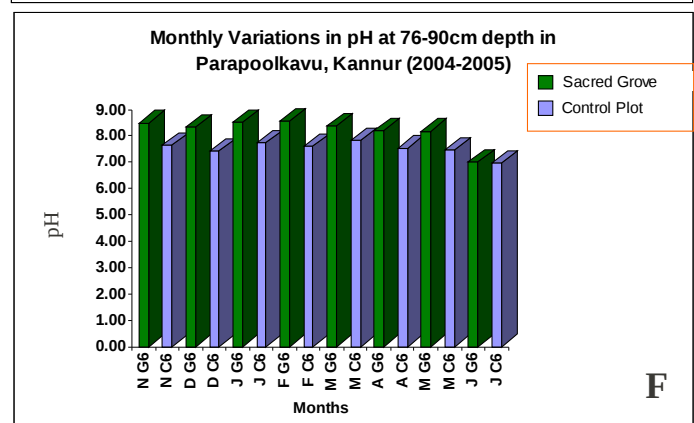
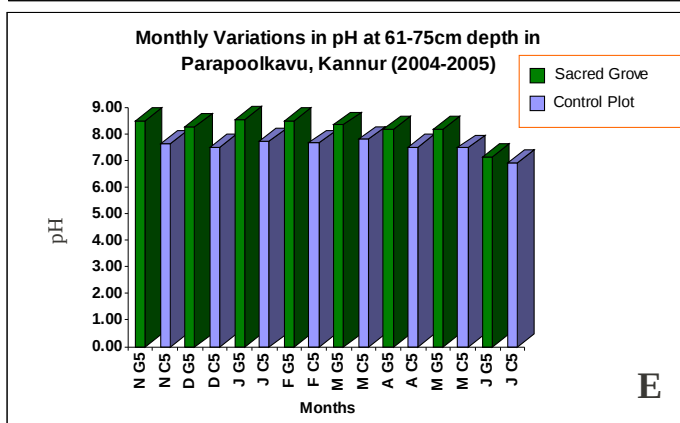
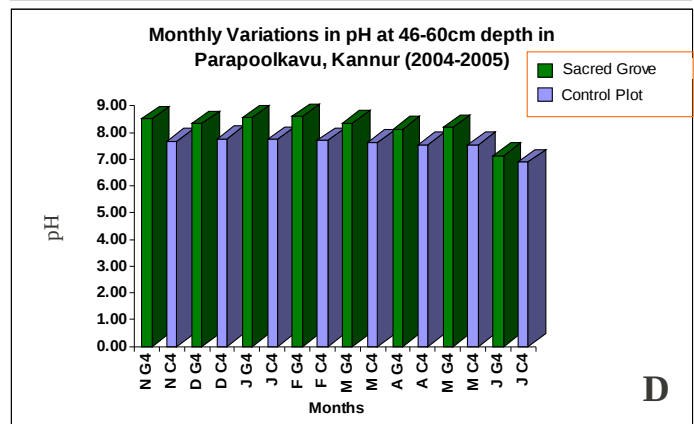
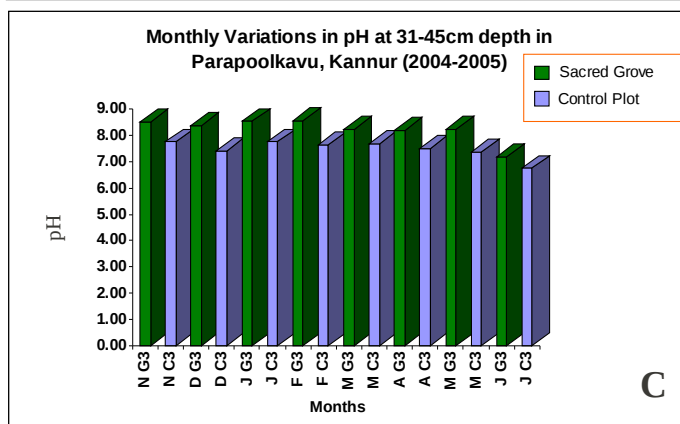
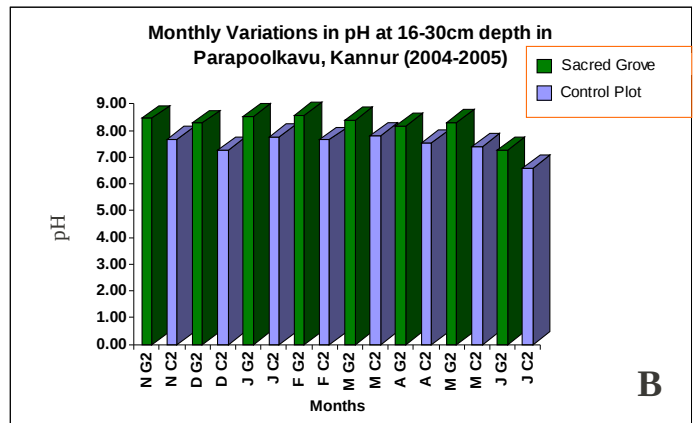
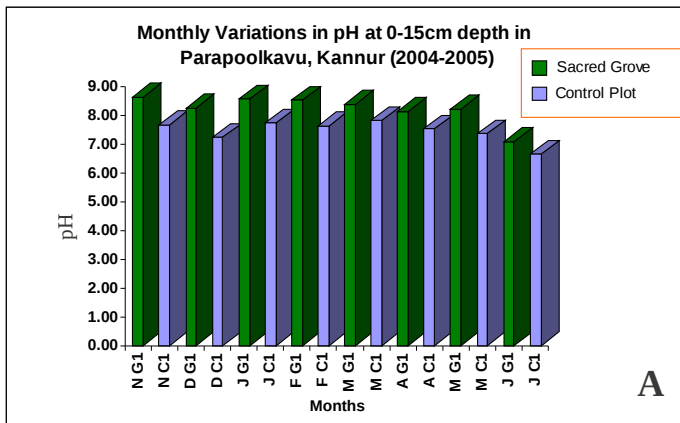


Figure 29 A-F. Monthly Variations in Soil pH: Parappoolkavu (2004-05)

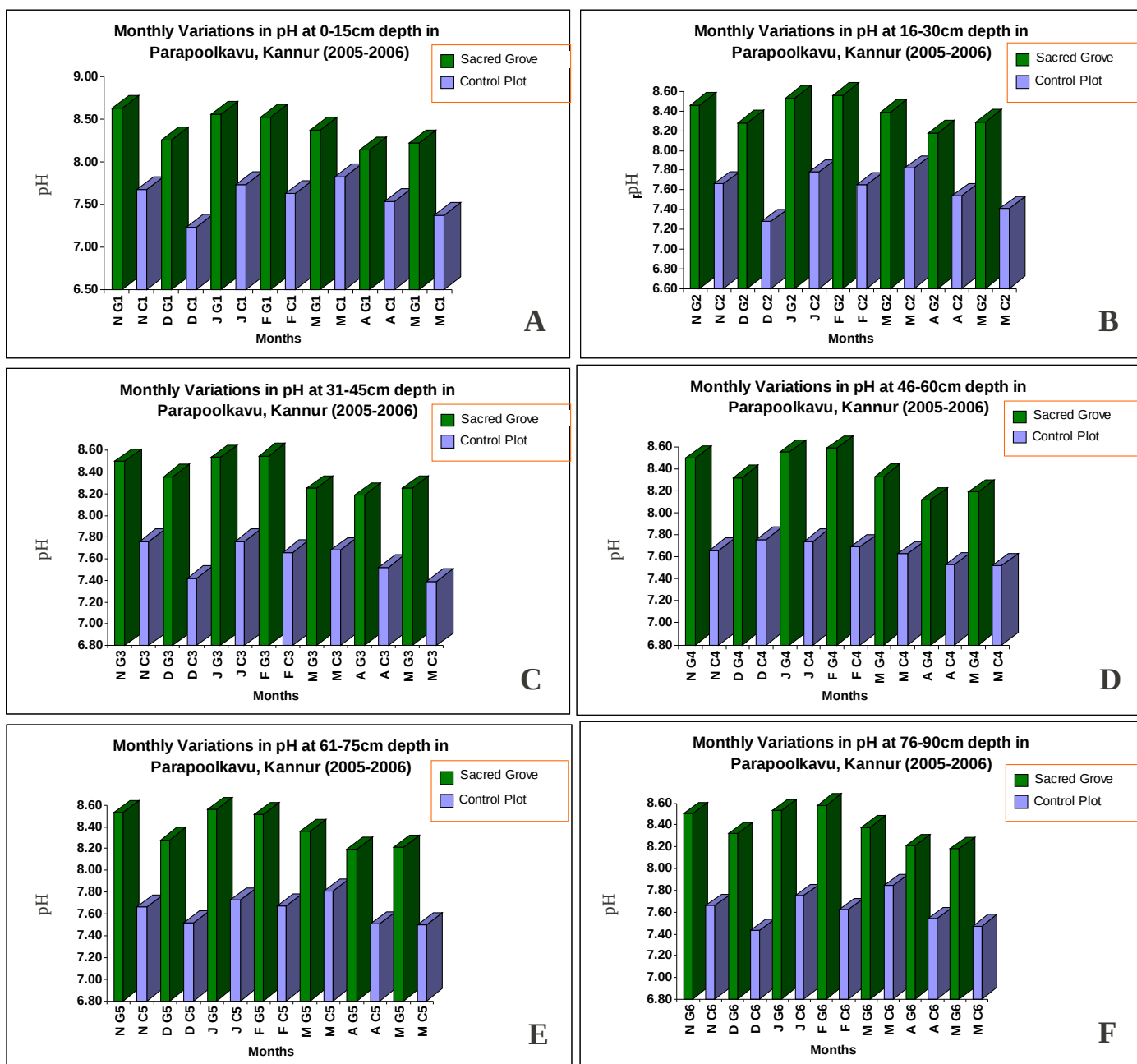


Figure 30 A-F. Monthly Variations in Soil pH: Parapoolkavu (2005-06)

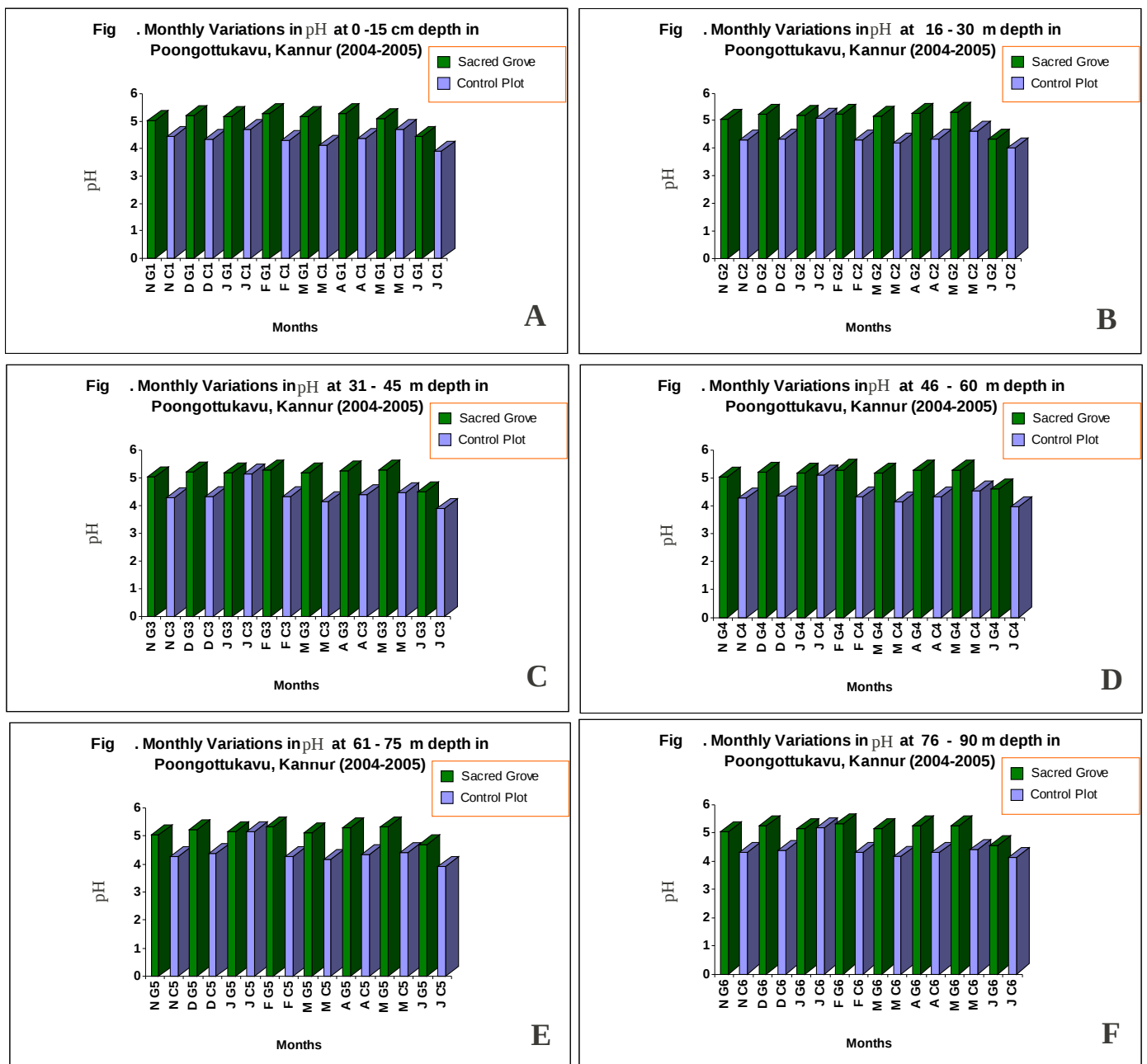


Figure 31 A-F. Monthly Variations in Soil pH: Poongottukavu (2004-05)

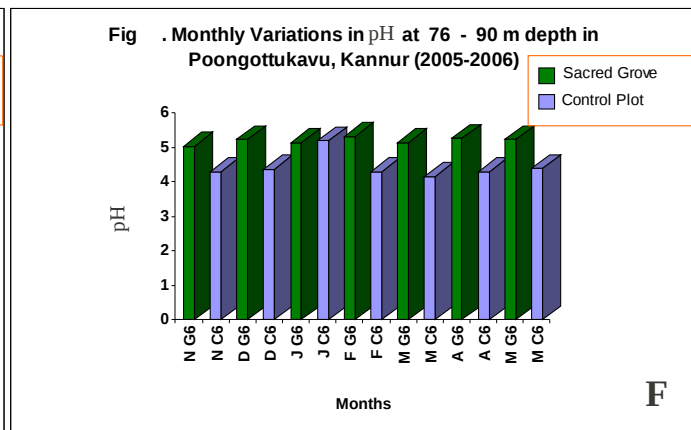
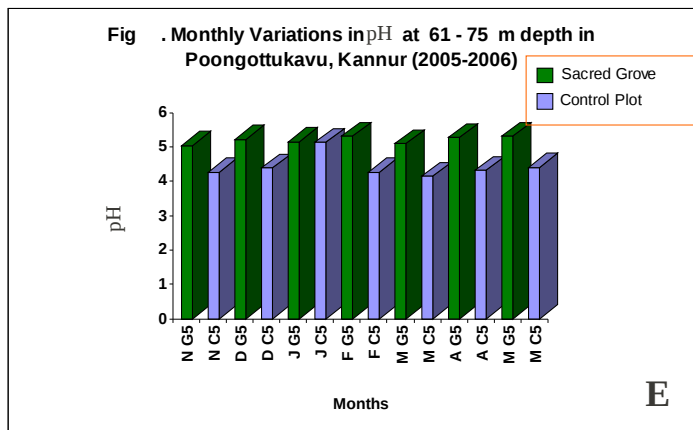
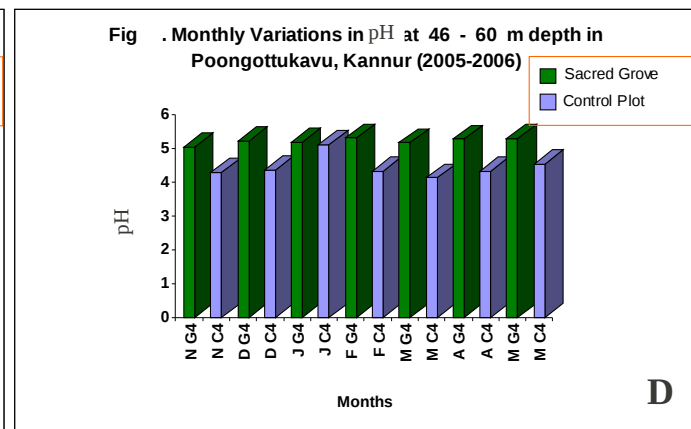
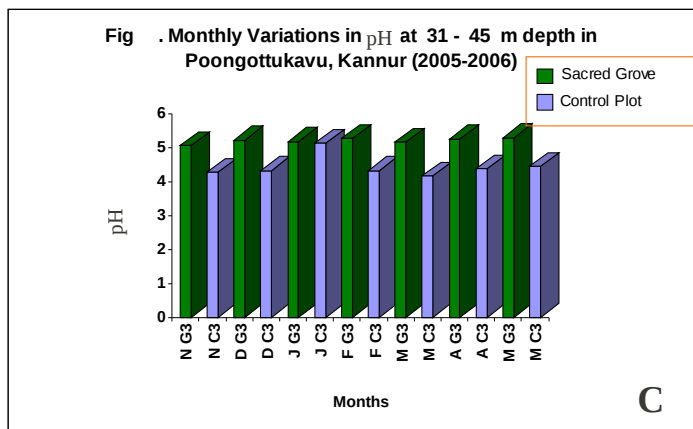
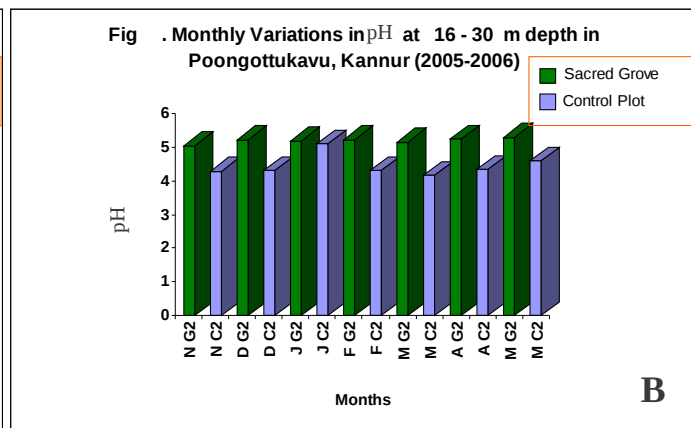
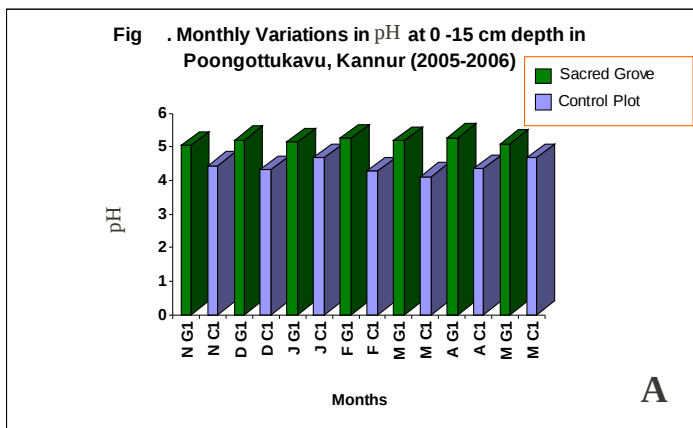


Figure 32 A-F. Monthly Variations in Soil pH: Poongottukavu (2005-06)

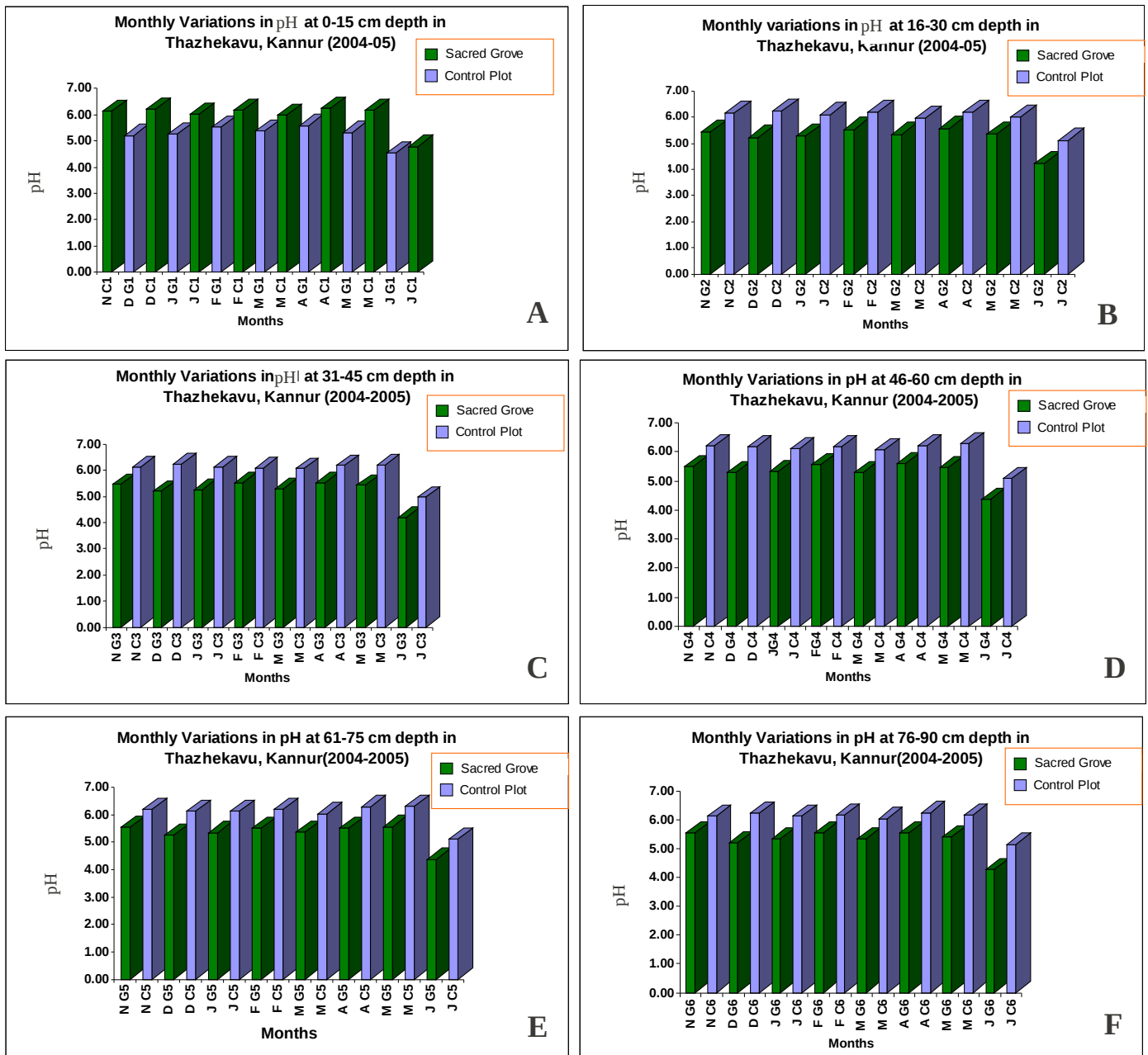


Figure 33 A-F. Monthly Variations in Soil pH: Thazhekkavu (2004-05)

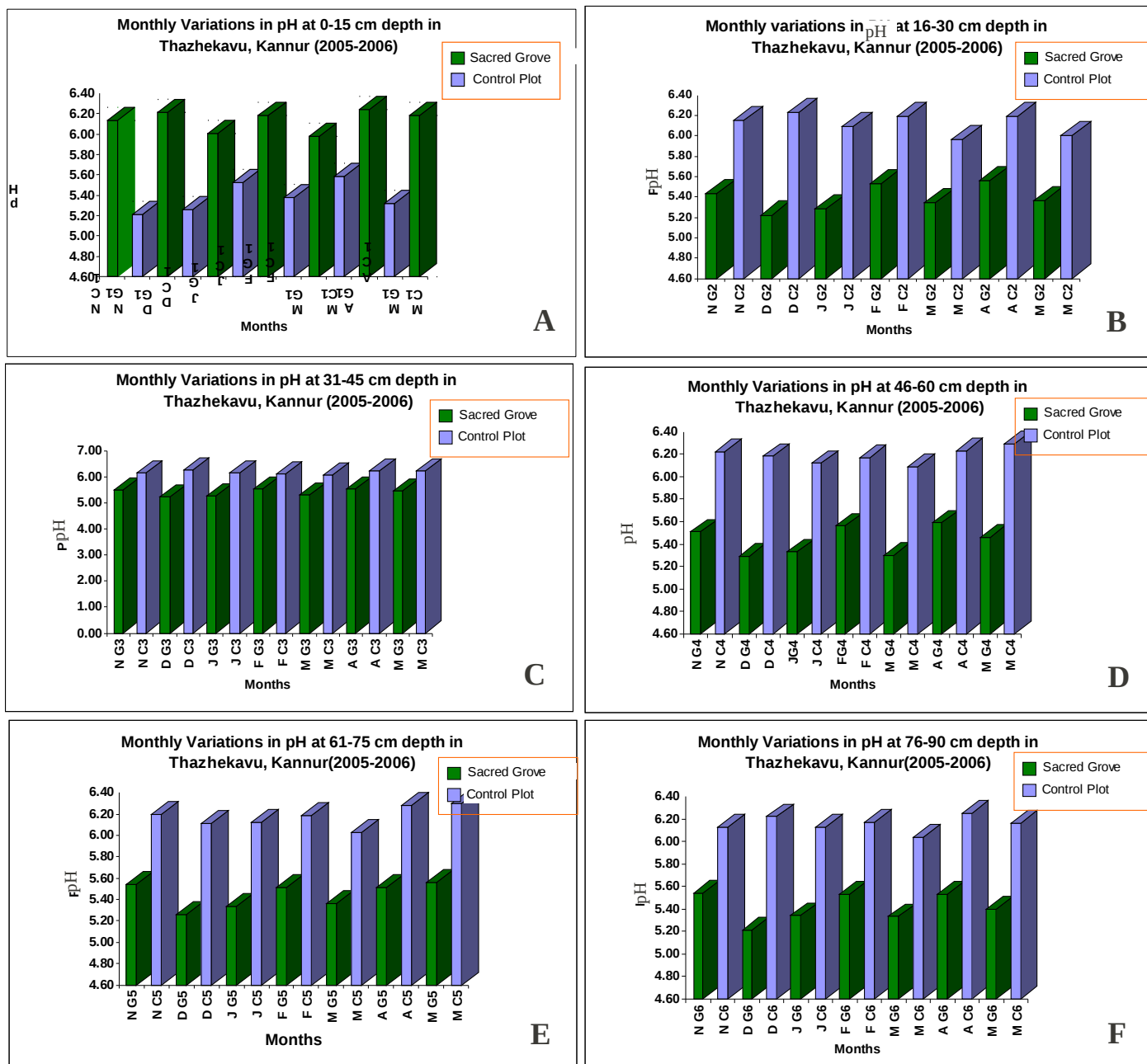


Figure 34 A-F. Monthly Variations in Soil pH: Thazhekkavu (2005-06)

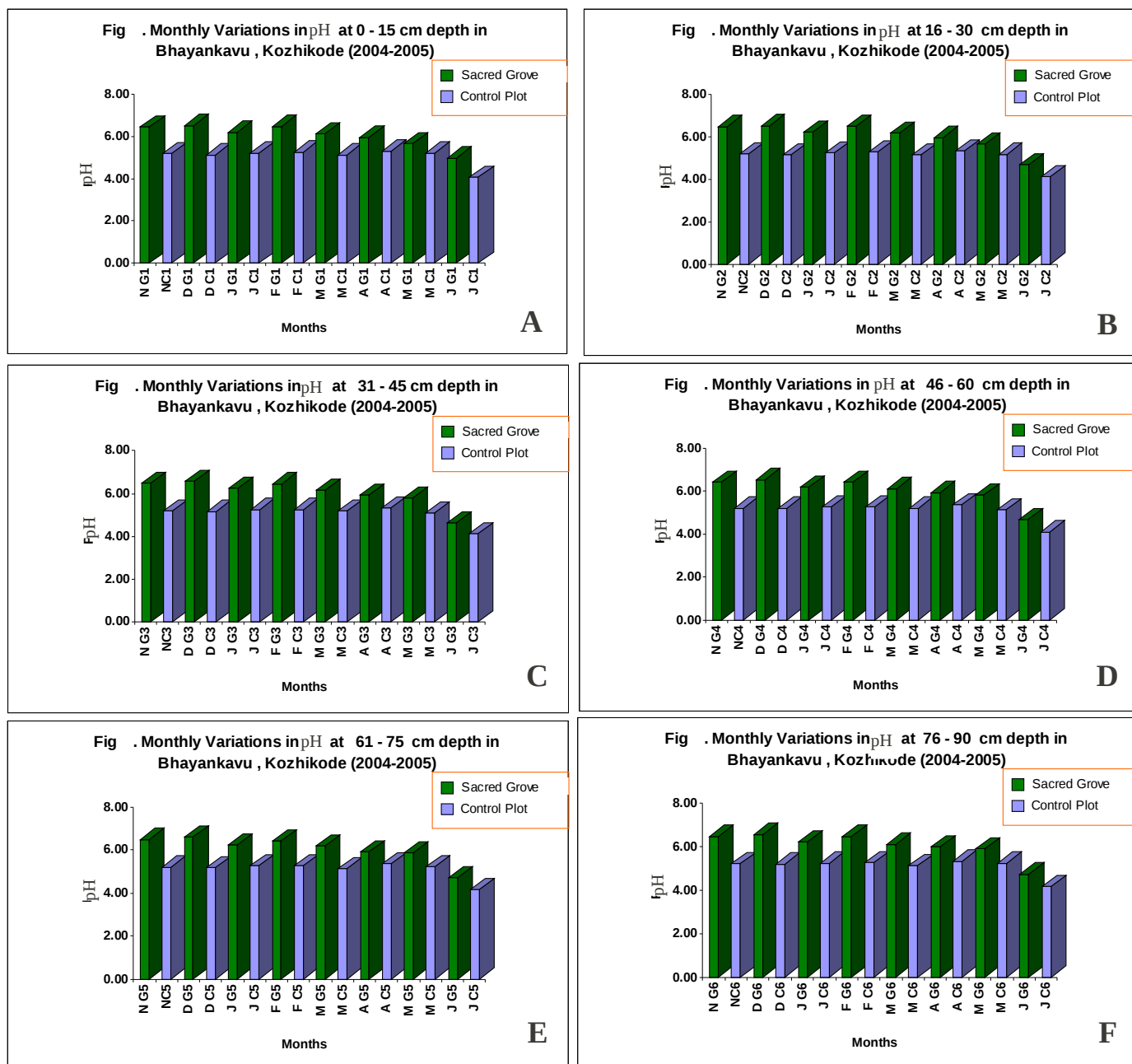


Figure 35 A-F. Monthly Variations in Soil pH: Bhayankavu (2004-05)

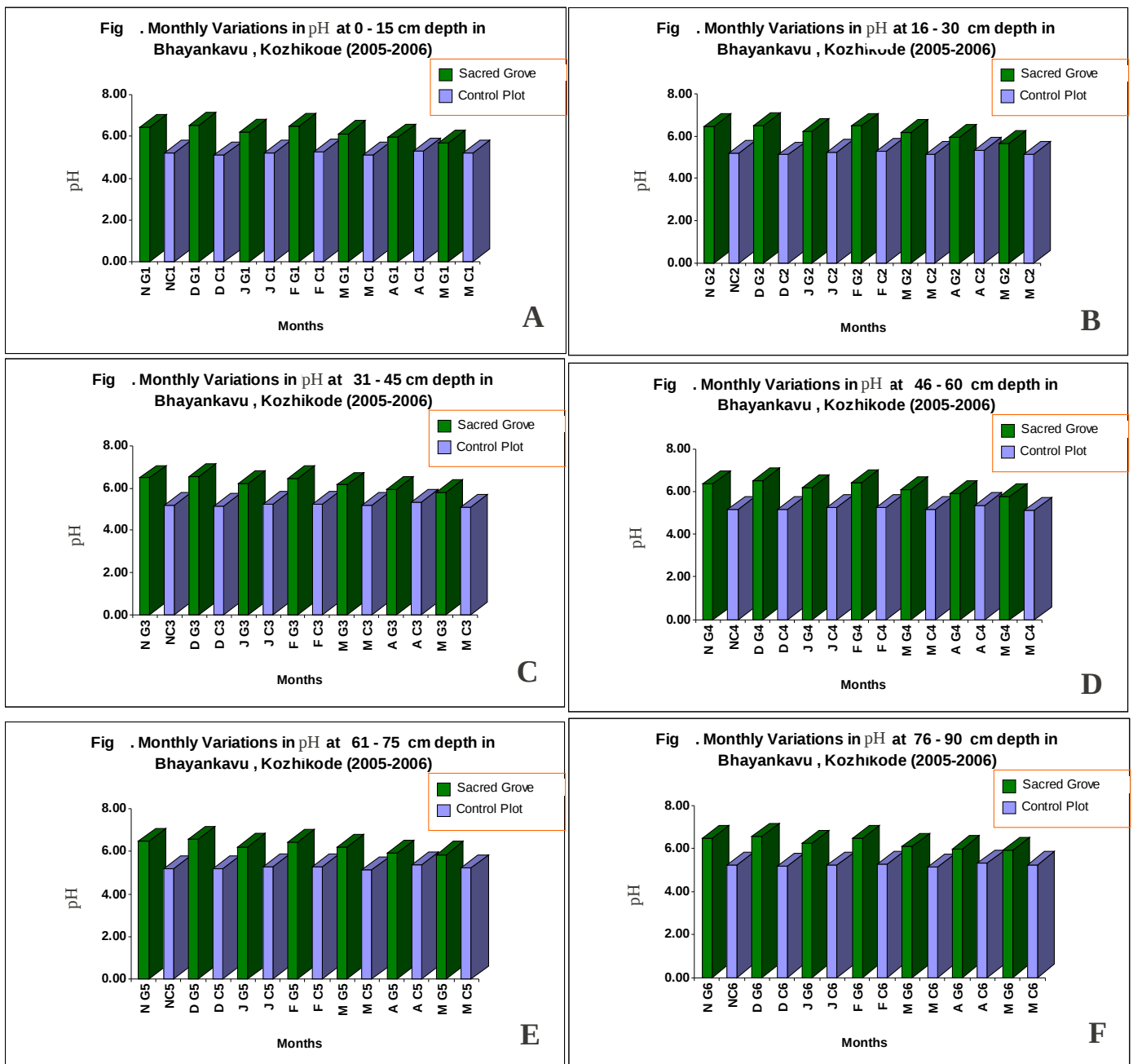


Figure 36 A-F. Monthly Variations in Soil pH: Bhayankavu (2005-06)

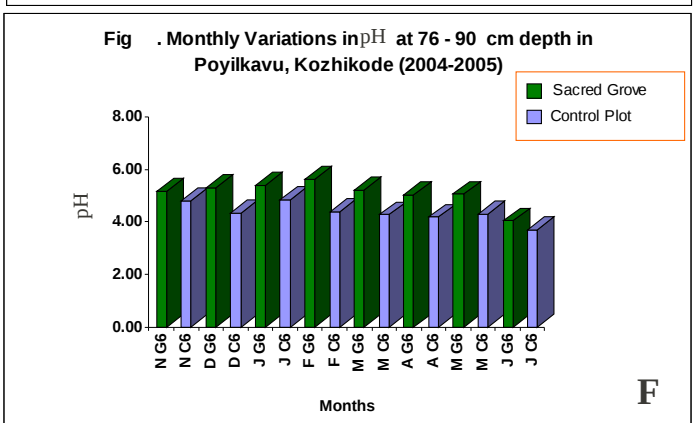
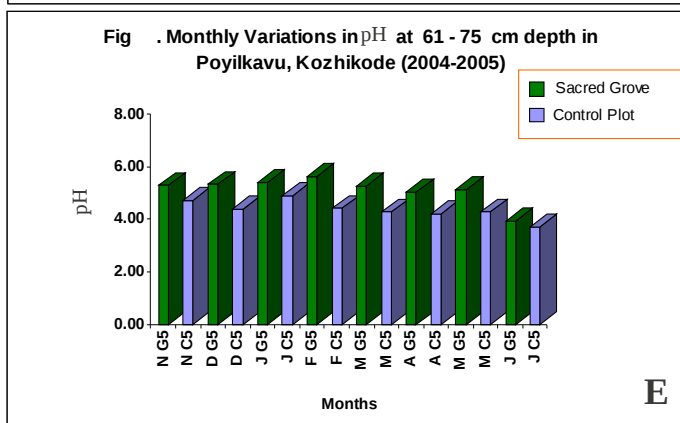
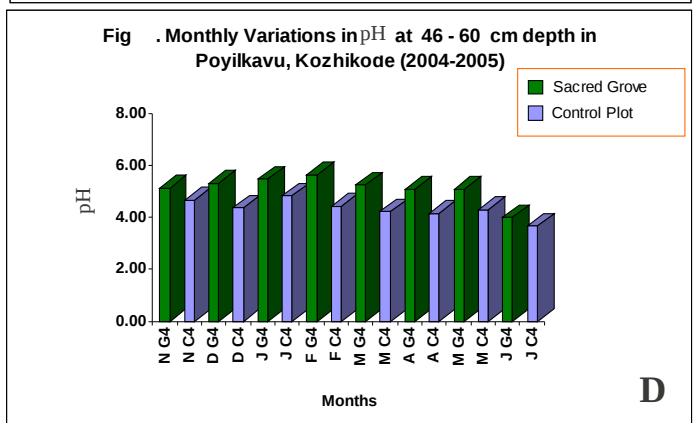
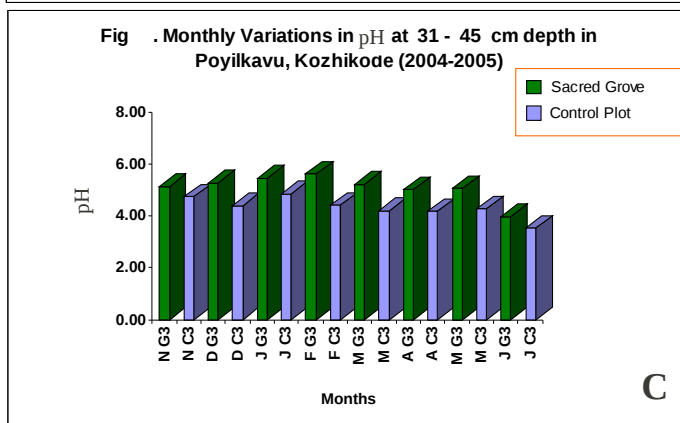
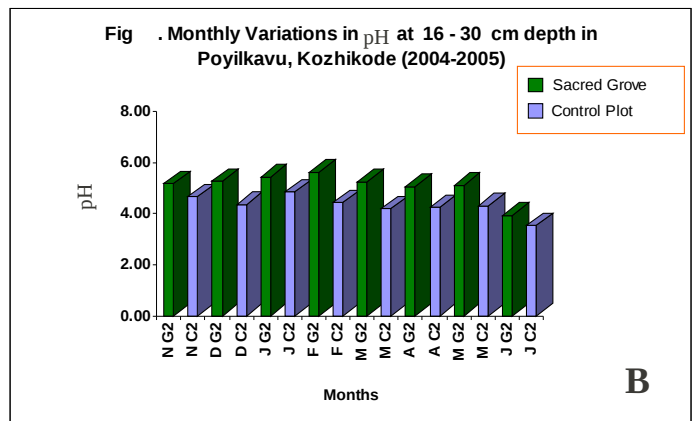
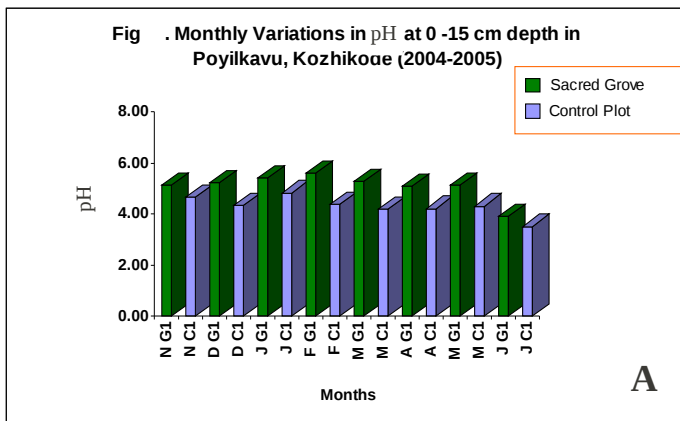


Figure 37 A-F. Monthly Variations in Soil pH: Poyilkavu (2004-05)

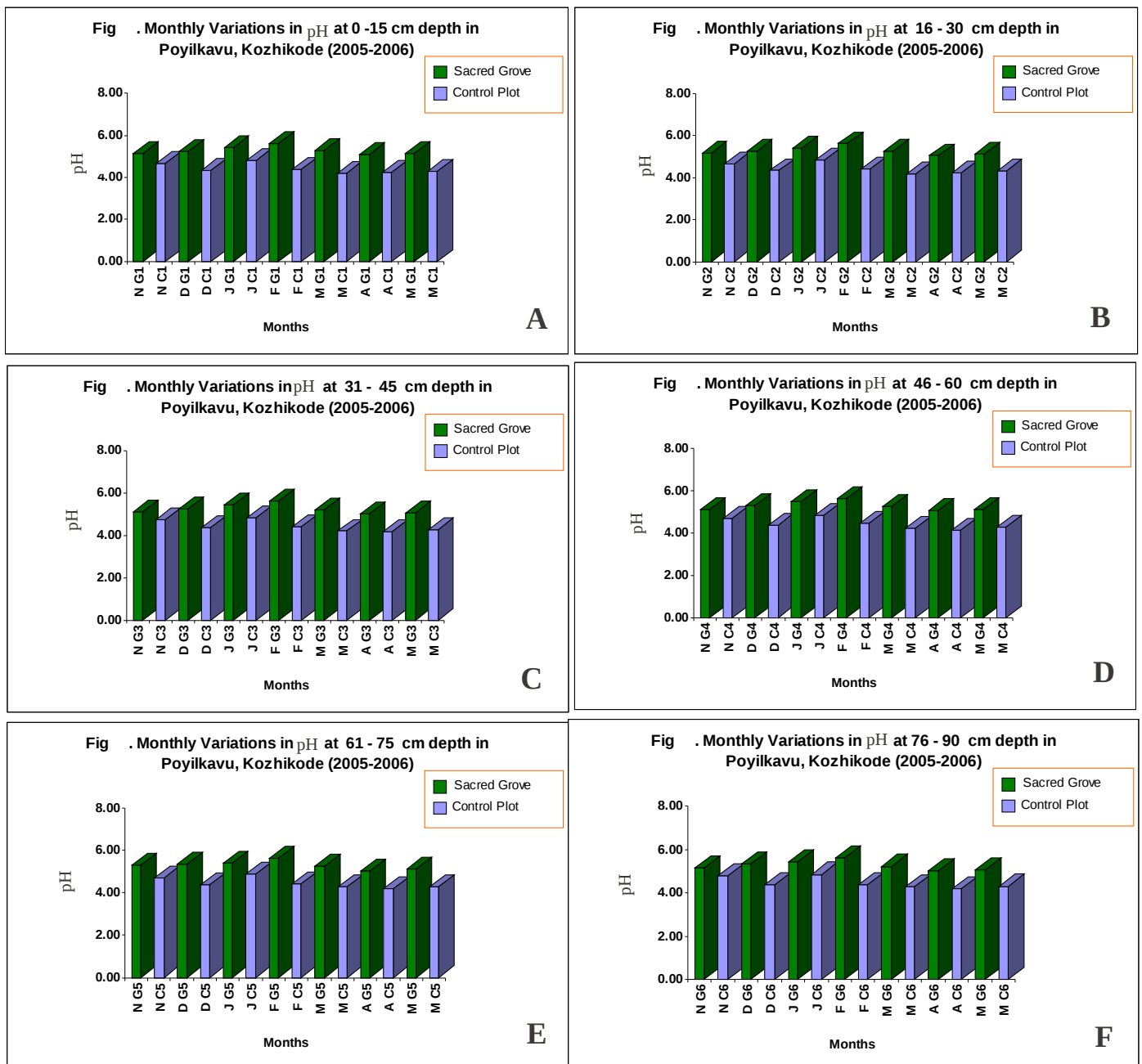


Figure 38 A-F. Monthly Variations in Soil pH: Poyilkkavu (2005-06)

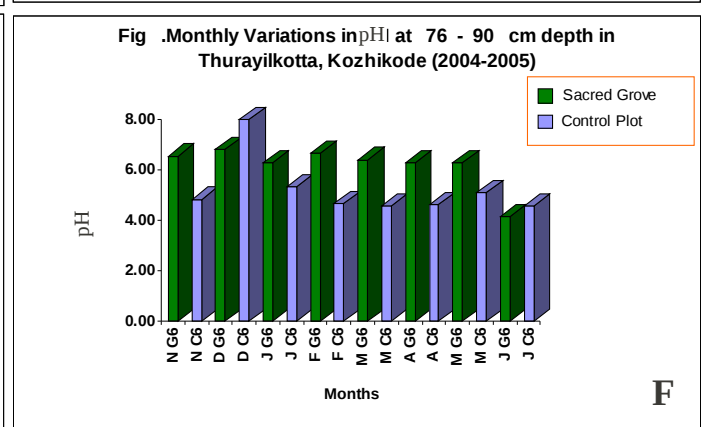
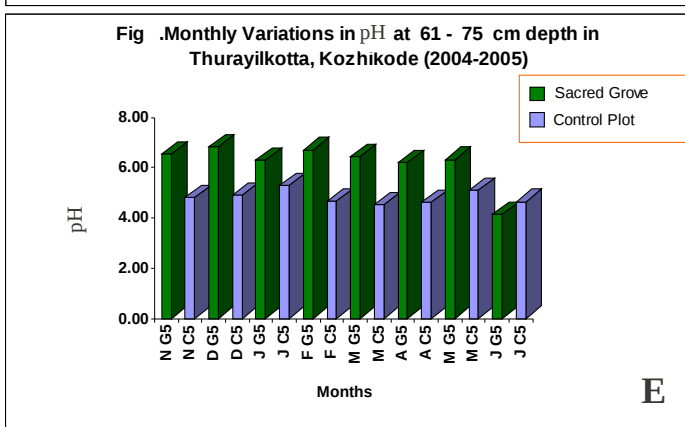
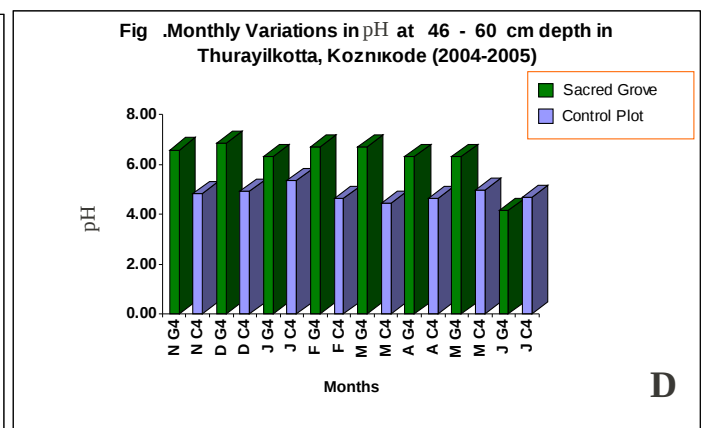
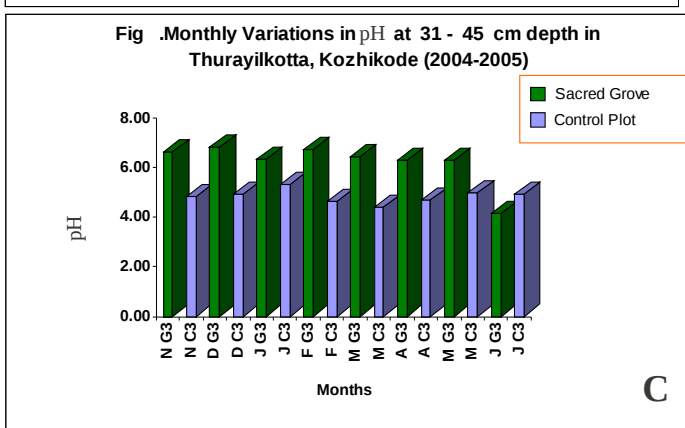
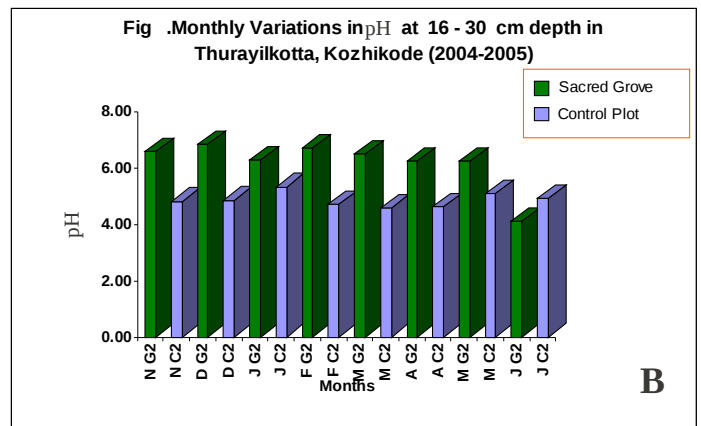
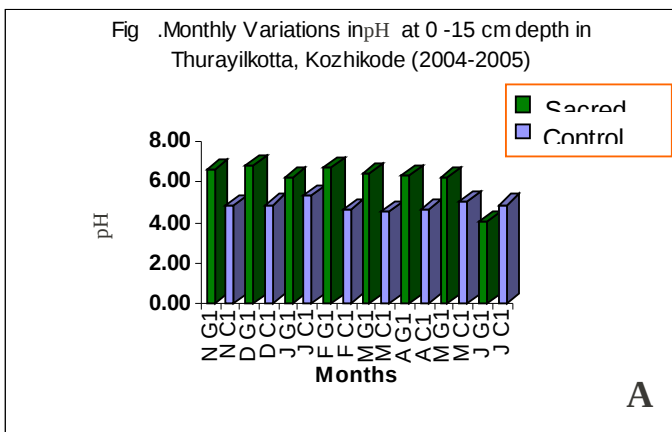


Figure 39 A-F. Monthly Variations in Soil pH: Thurayilkavu (2004-05)

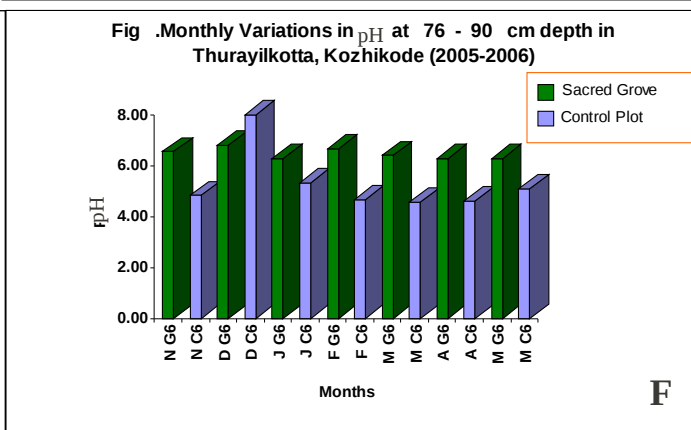
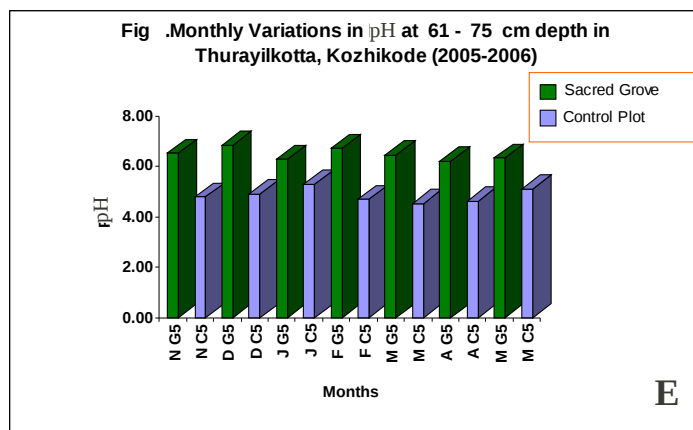
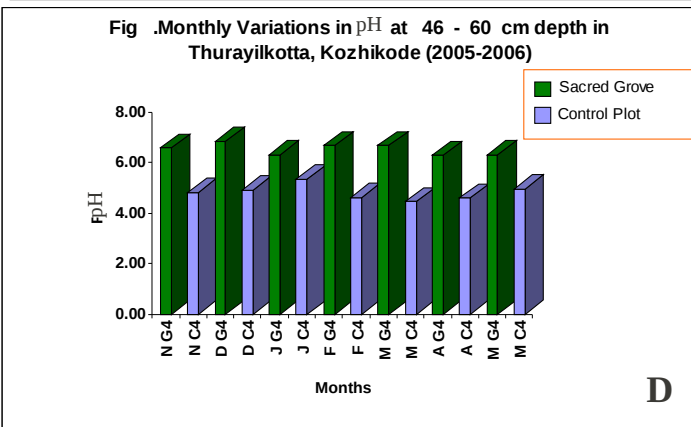
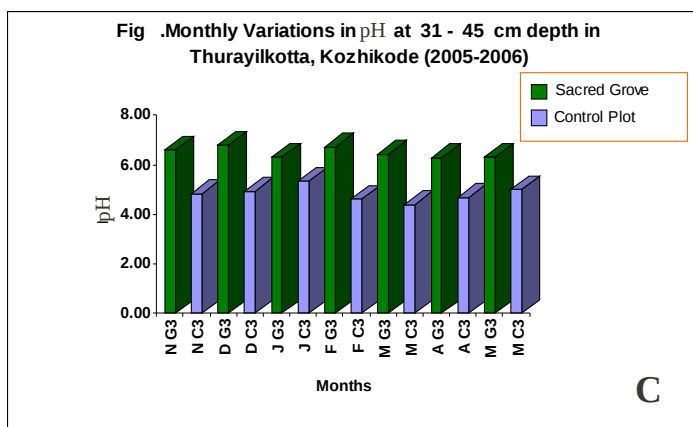
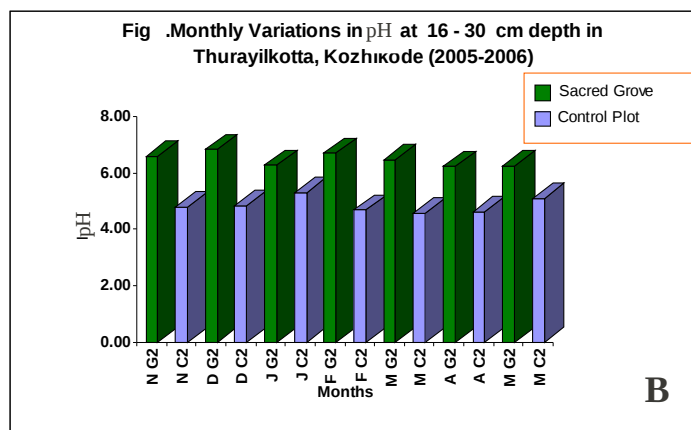
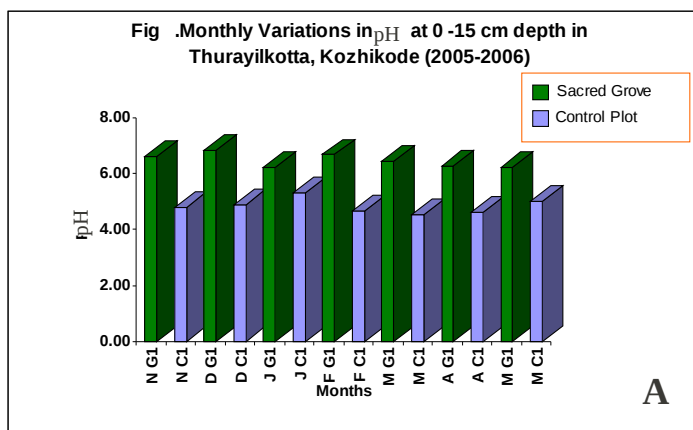


Figure 40 A-F. Monthly Variations in Soil pH: Thurayilkavu (2005-06)

4.2.5 Electrical Conductivity (EC)

Conductivity is the current carrying capacity, which gives a clear idea of the soluble salts present in soil. The EC values of the sampling sites of sacred groves and control plots are represented in figures 41 – 54. Within the seasons studied, higher conductivity values were reported during pre & post – monsoon seasons. The monsoon season recorded lowest EC values, which may be due to dilution by rainwater. The increase in EC in sacred groves can be attributed to high rate of litter decomposition when compared to the control plots.

Increased EC values were also recorded for the select sacred grove soils (Table 16), wherein, the EC values were higher than the control plots, except in Parappoolkavu of Kannur District, where the EC values of sacred groves and control plot soils are almost similar. In the case of Thazhekkavu sacred grove where mangroves are the dominant vegetation and the sacred grove is on the fringes of brackish water, the EC values were 278% higher (EC: 742) than that of the control (EC: 196). This might be due to saline water intrusion into the sacred grove soil which is indicated by the dominance of mangrove vegetation.

Table16. Variations in Soil EC in Sacred Groves: 2004-06

Name of Sacred Grove	Treatments	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Mean	Increase/Decrease (%)
Kammadathukavu	G	51	49	51	51	53	52	51	49	51	59.38
	C	32	31	35	33	32	32	33	31	32	
Parappoolkavu	G	84	81	84	80	79	75	79	66	79	- 1.26
	C	81	80	76	80	81	83	82	75	80	
Poongottukavu	G	35	36	34	35	35	35	36	34	35	9.38
	C	32	31	34	33	34	34	32	30	32	
Thazhekkavu	G	741	823	729	742	733	733	734	699	742	278.57
	C	182	206	172	189	207	212	201	187	186	

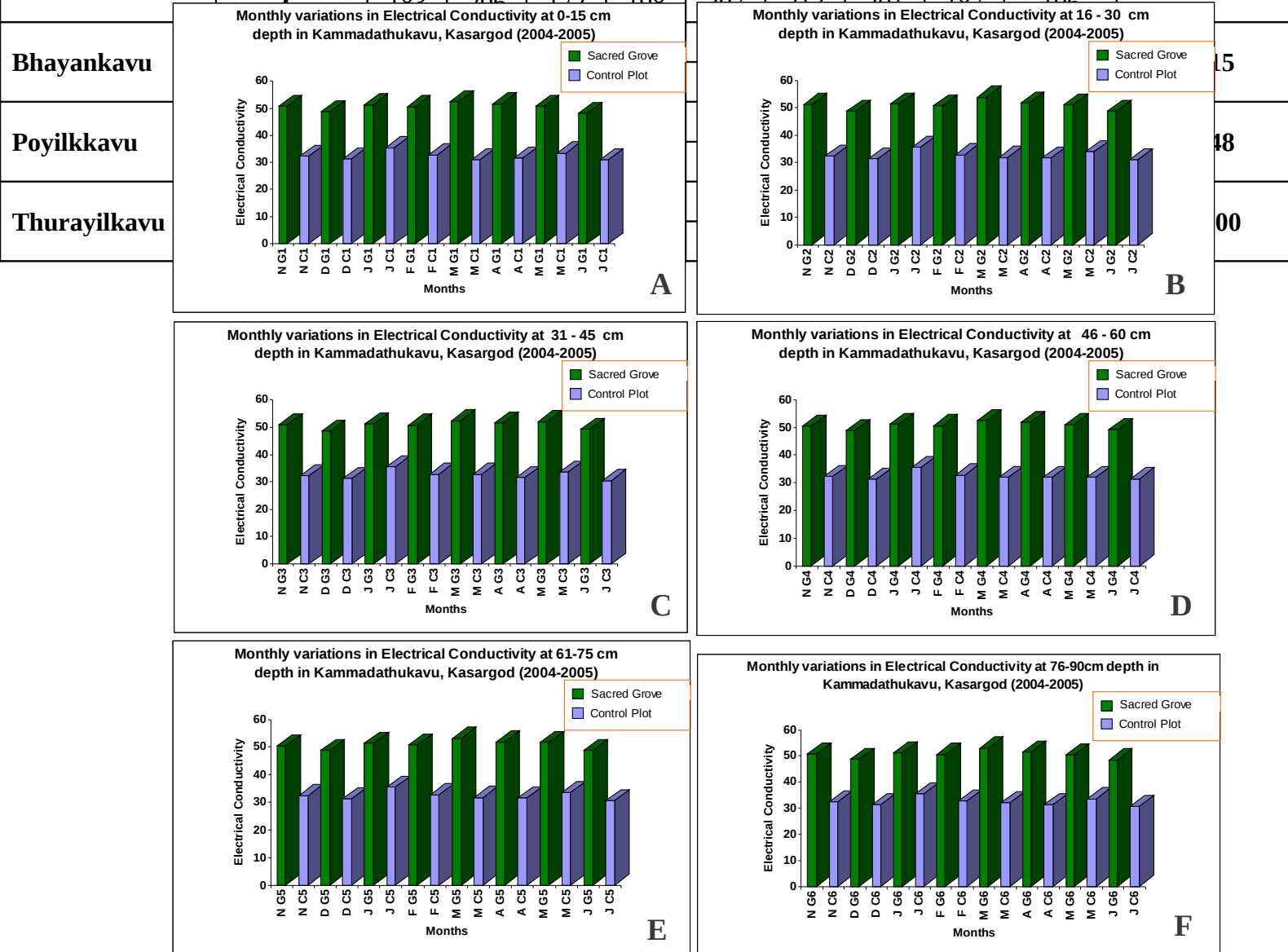


Figure 41 A-F. Monthly Variations in Soil Electrical Conductivity: Kammadathukavu (2004-05)

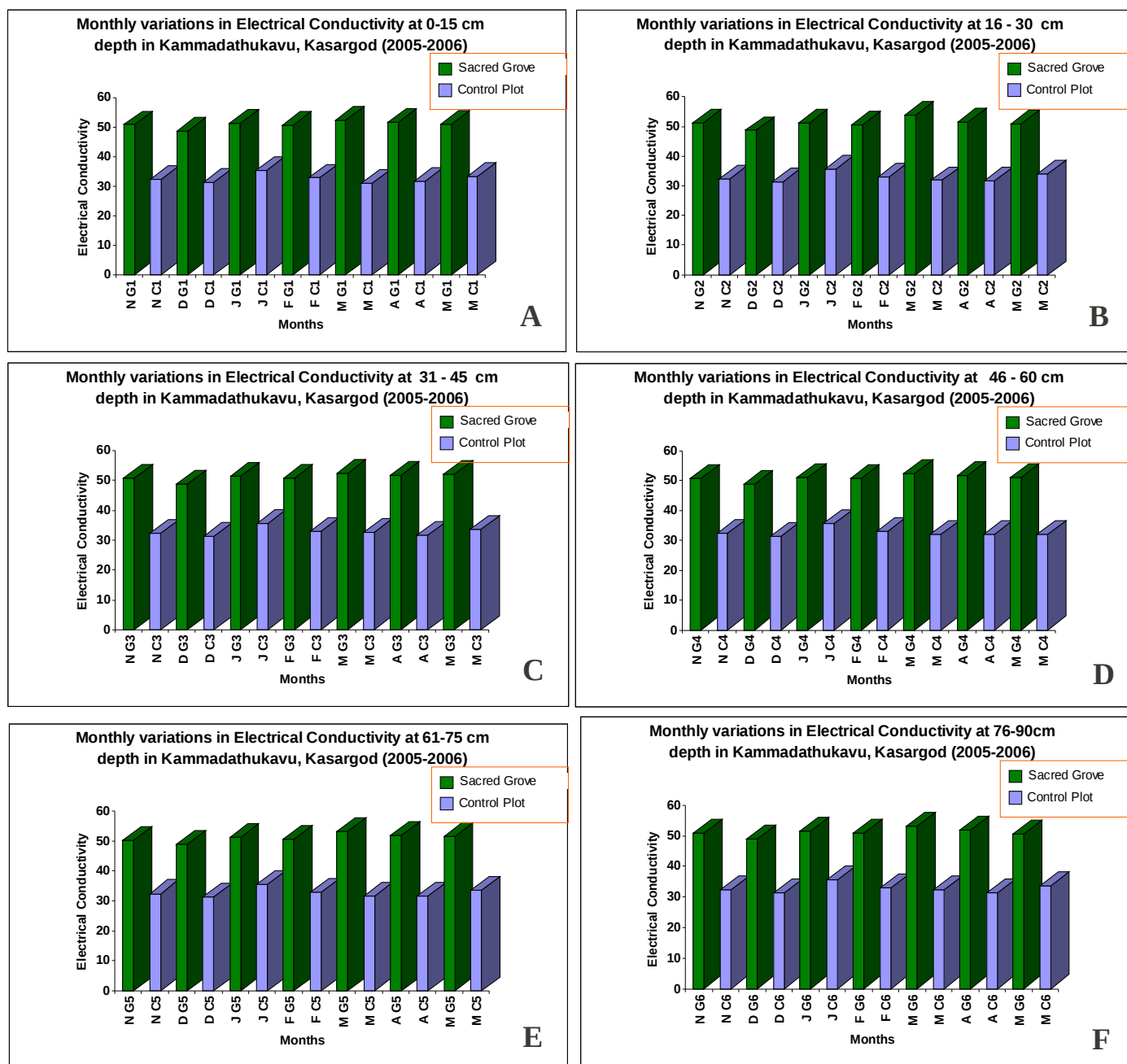


Figure 42 A-F. Monthly variations in soil Electrical Conductivity: Kammadathukavu (2005-06)

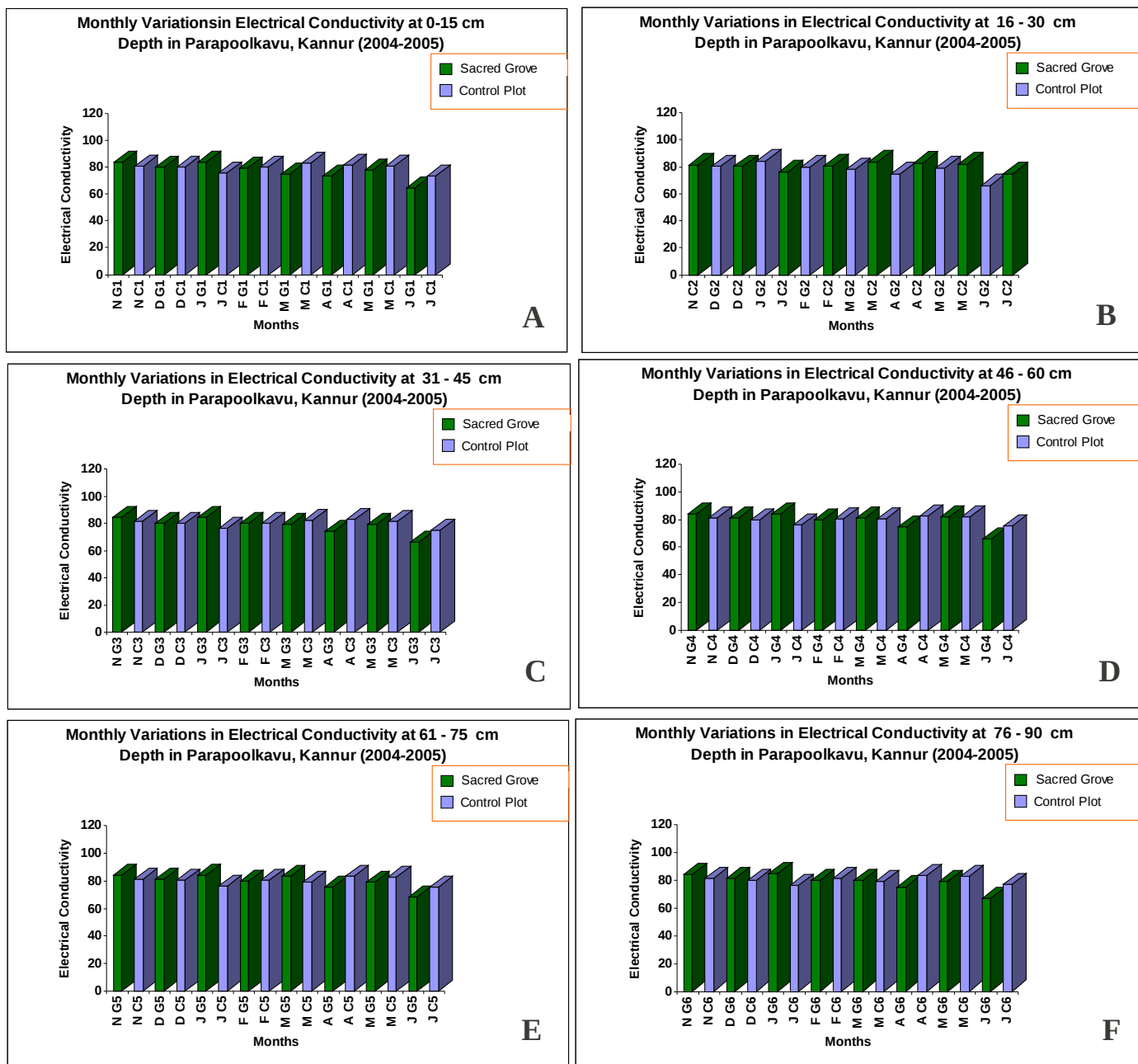


Figure 43 A-F. Monthly Variations in Soil Electrical Conductivity: Parapoolkavu (2004-05)

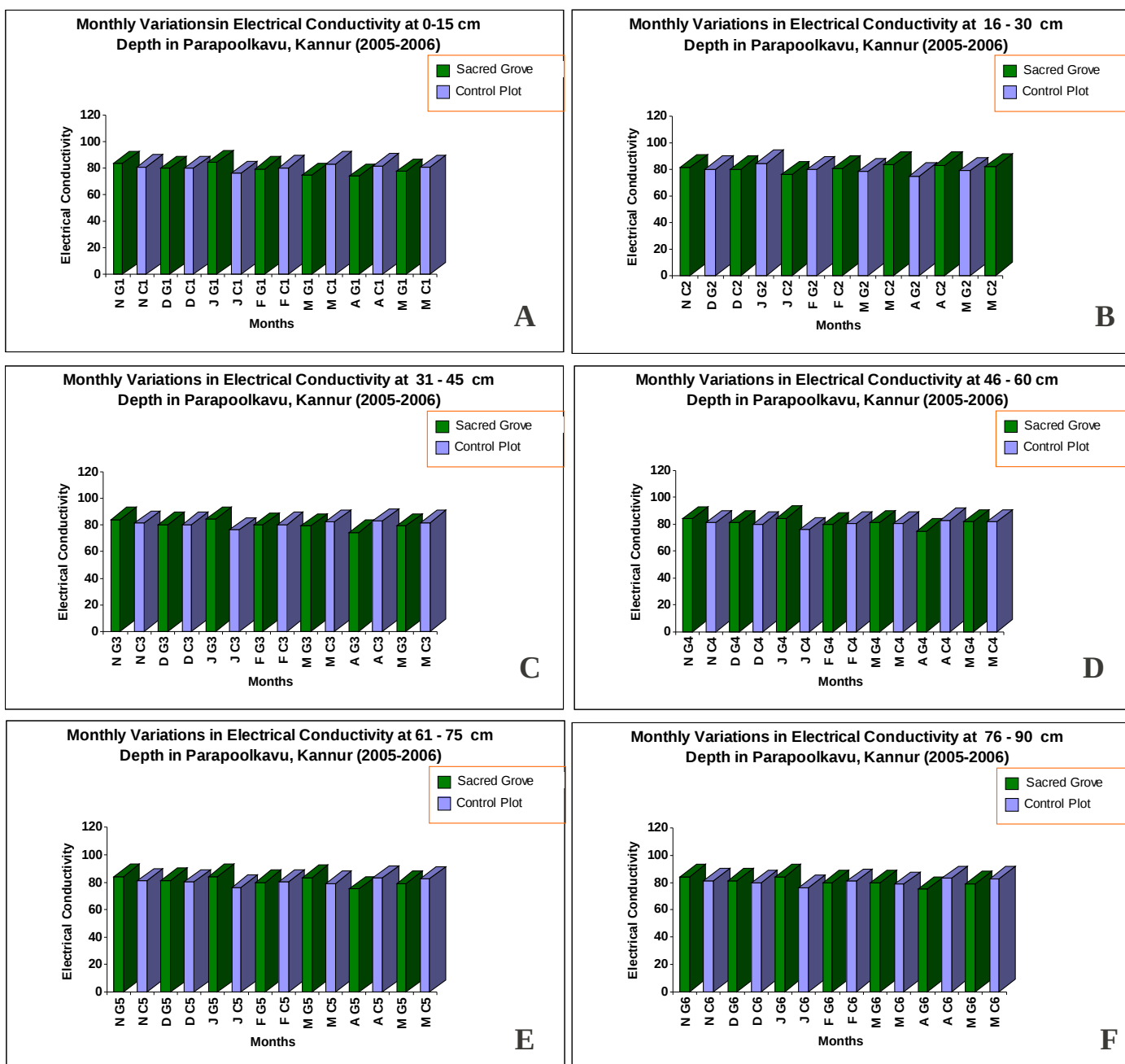


Figure 44 A-F. Monthly Variations in Soil Electrical Conductivity: Parapoolkavu (2005-06)

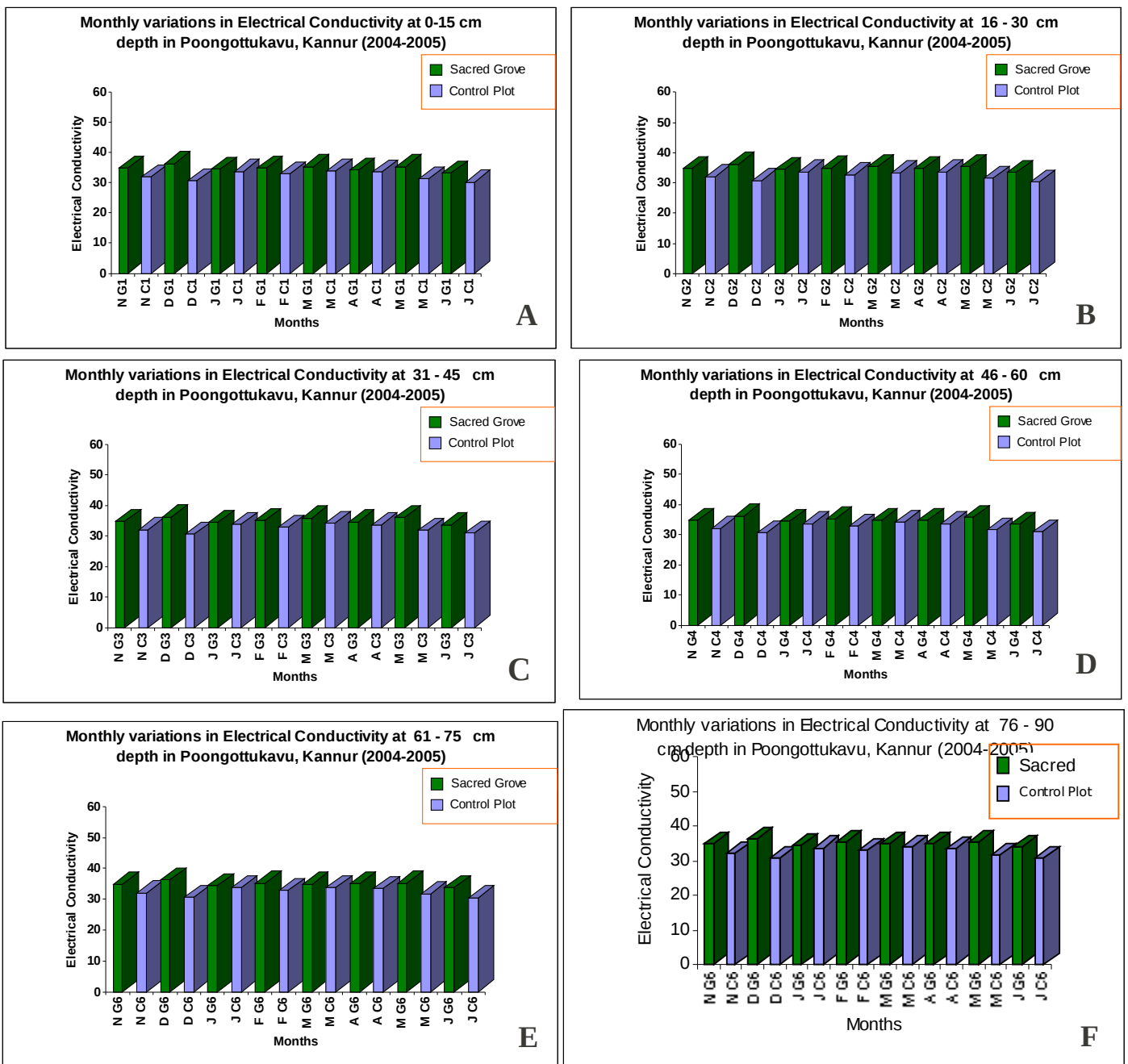


Figure 45 A-F. Monthly Variations in Soil Electrical Conductivity: Poongottukavu (2004-05)

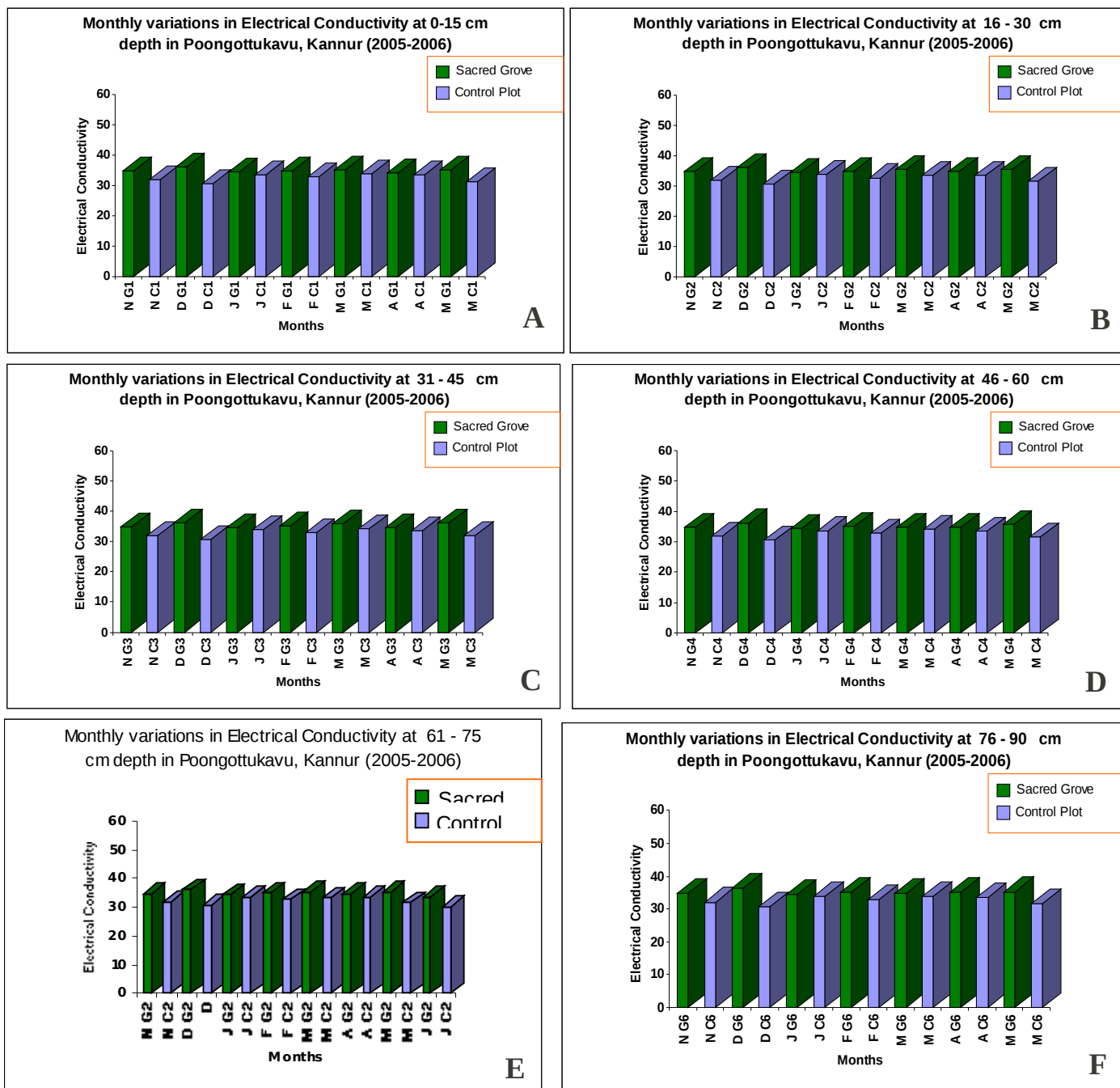


Figure 46 A-F. Monthly Variations in Soil Electrical Conductivity: Poongottukavu (2005-06)

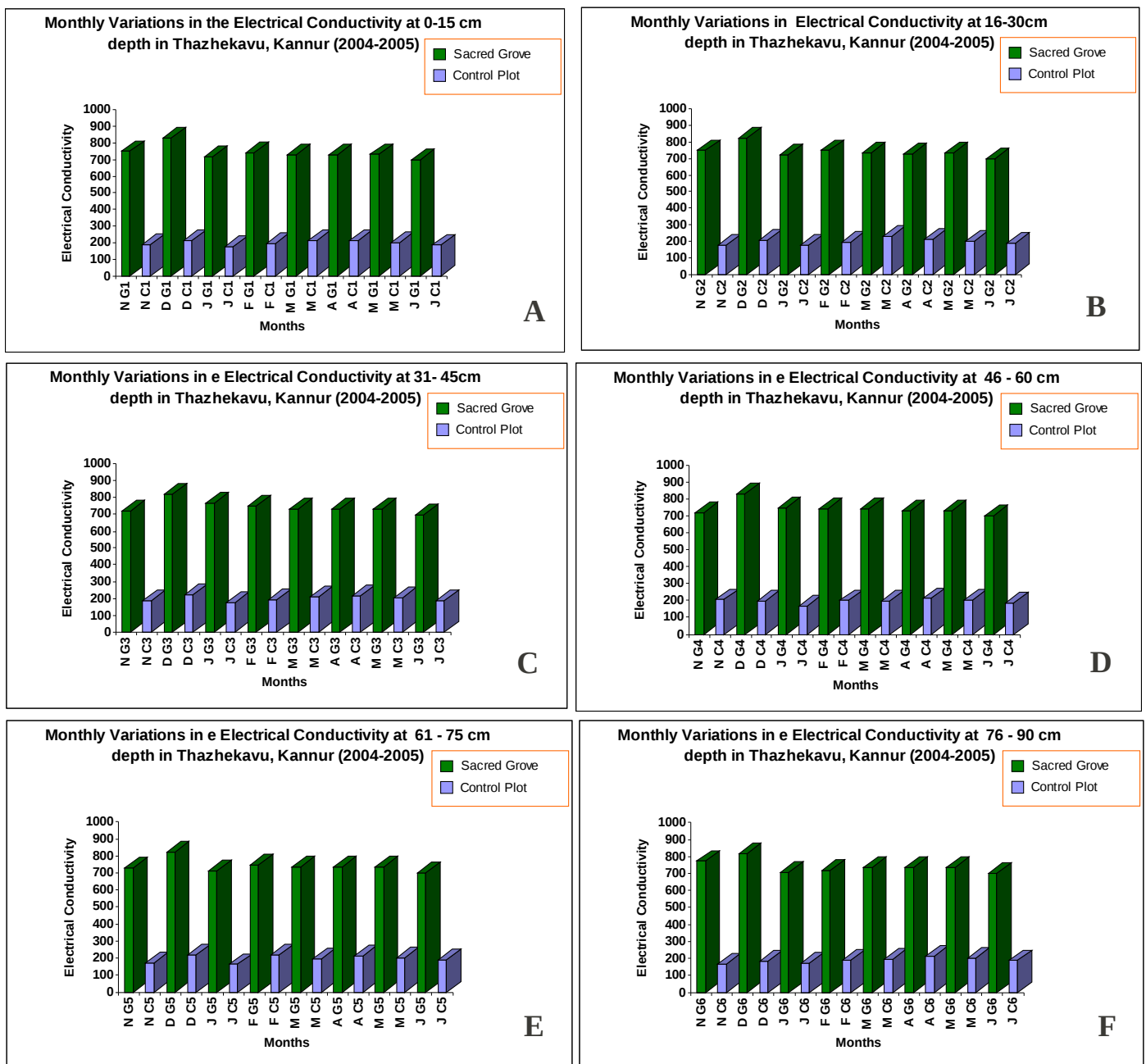


Figure 47 A-F. Monthly Variations in Soil Electrical Conductivity: Thazhekkavu (2004-05)

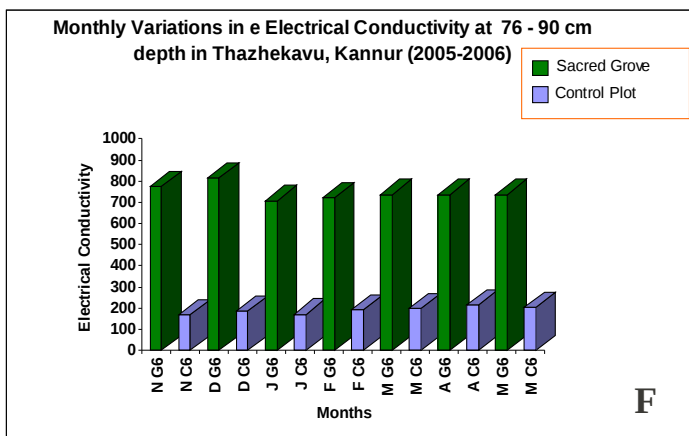
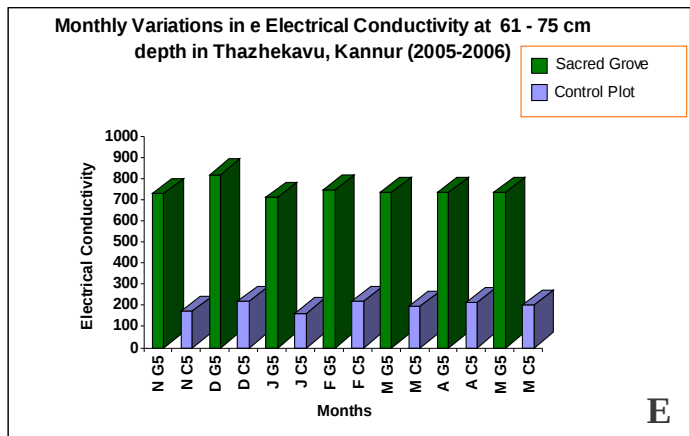
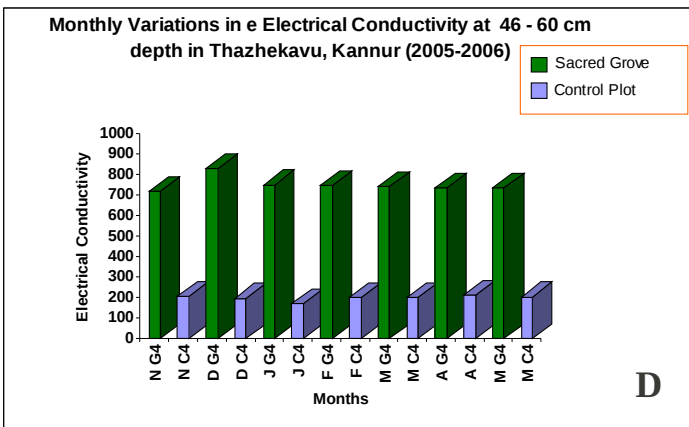
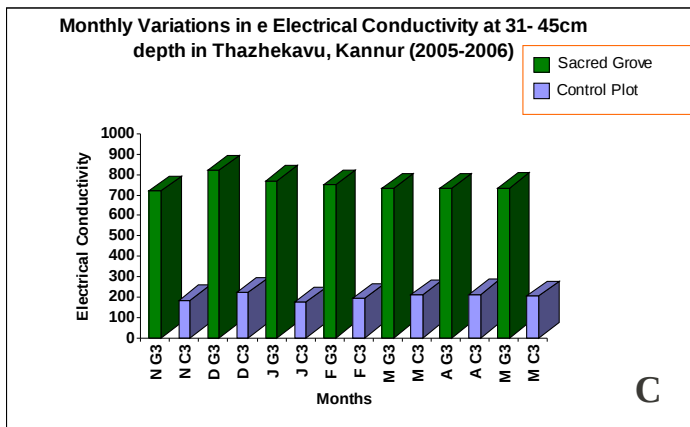
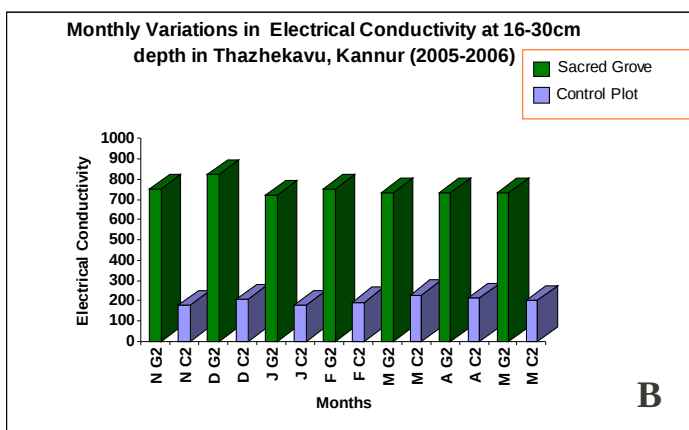
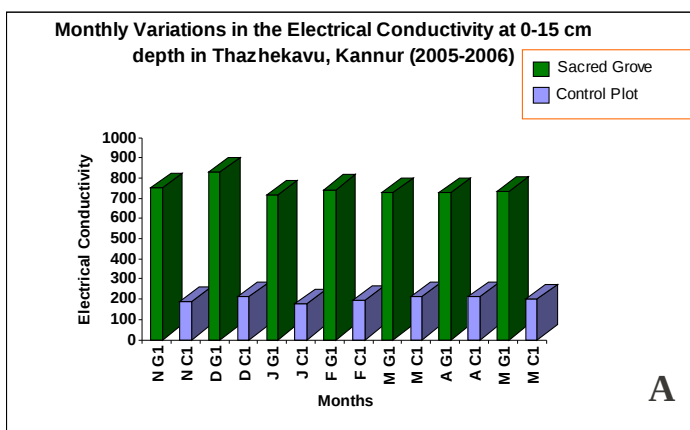


Figure 48 A-F. Monthly Variations in Soil Electrical Conductivity: Thazhekkavu (2005-06)

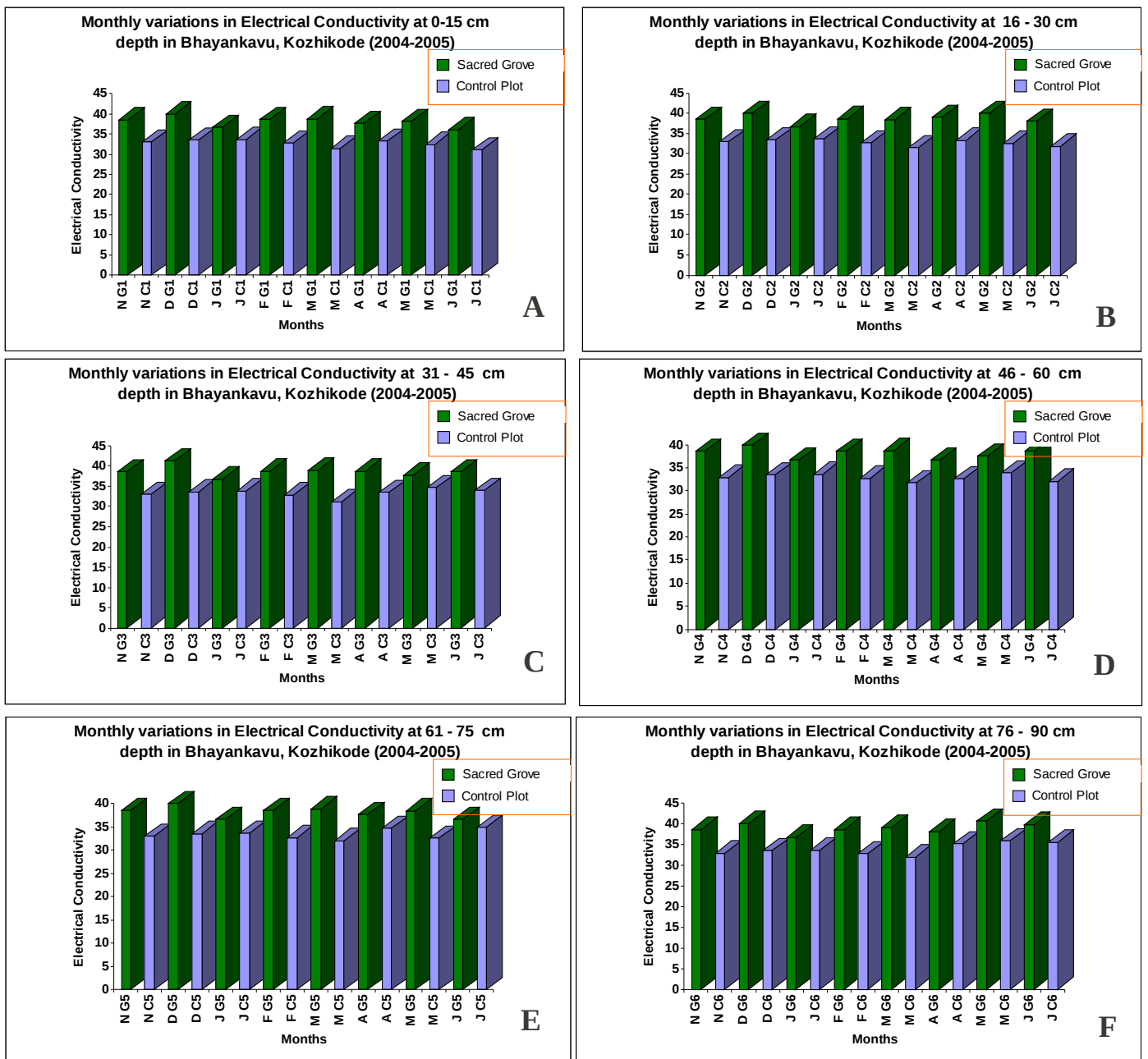


Figure 49 A-F. Monthly Variations in Soil Electrical Conductivity: Bhayankavu (2004-05)

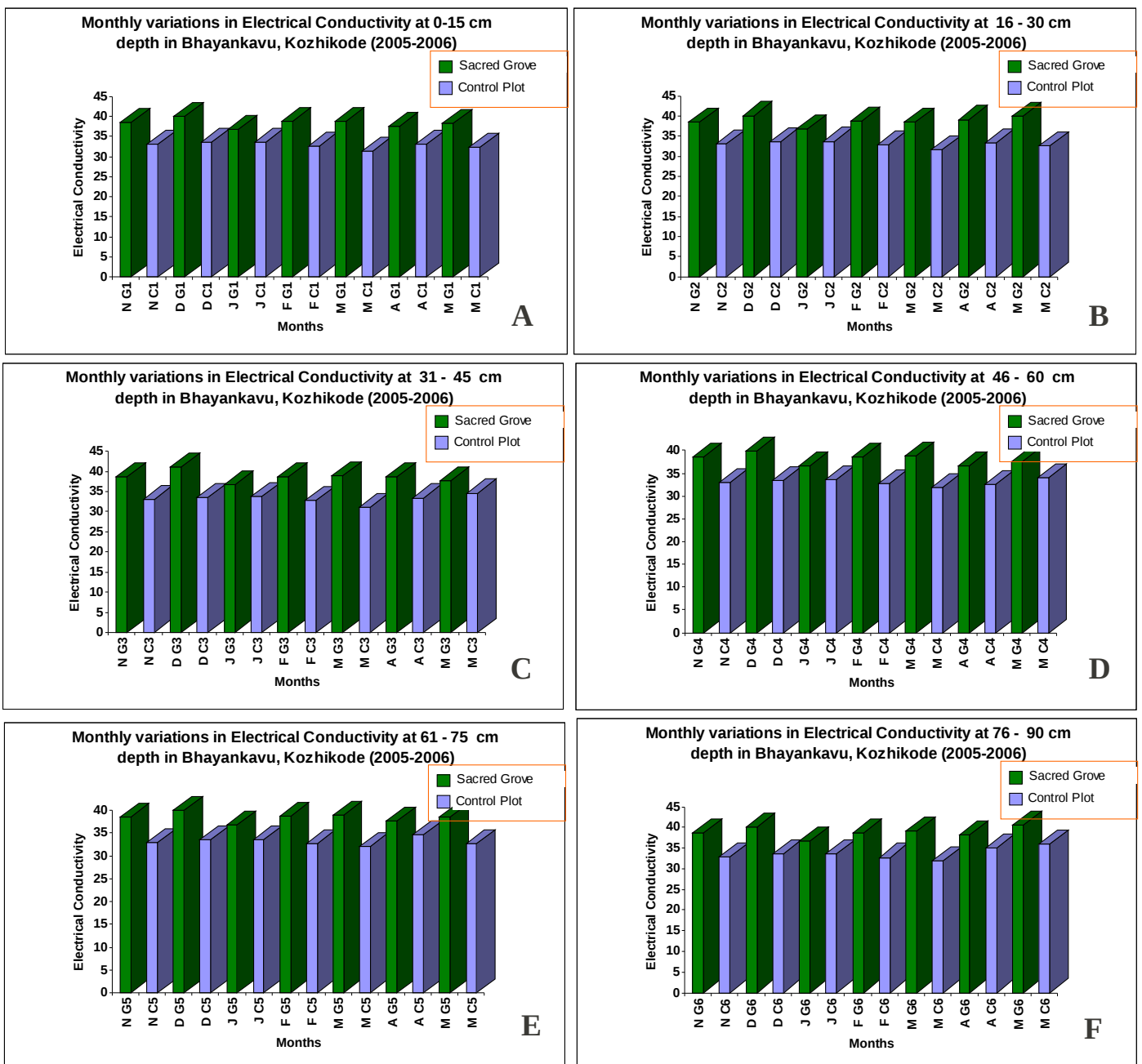


Figure 50 A-F. Monthly Variations in Soil Electrical Conductivity: Bhayankavu (2005-06)

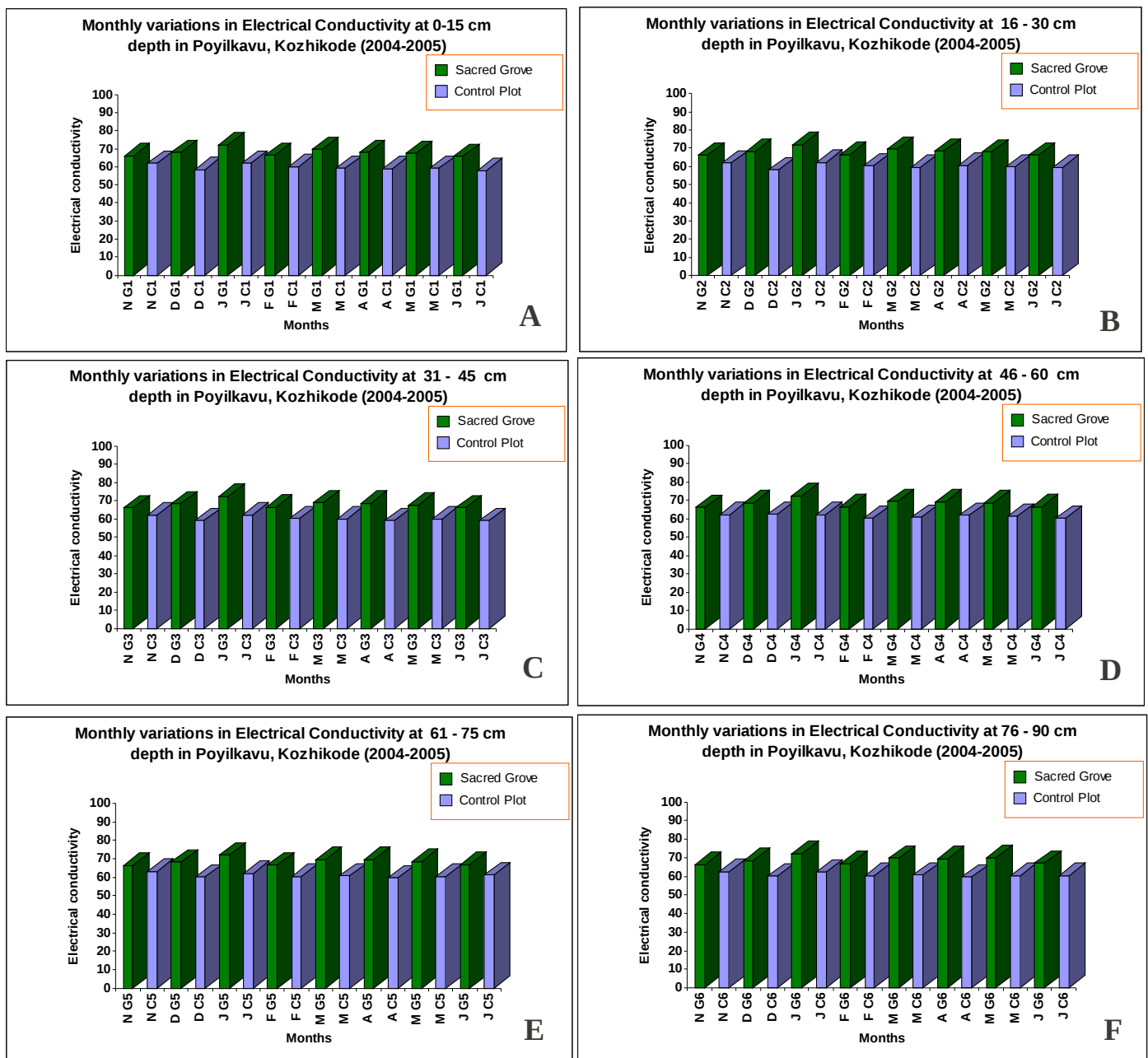


Figure 51 A-F. Monthly Variations in Soil Electrical Conductivity: Poyilkkavu (2004-05)

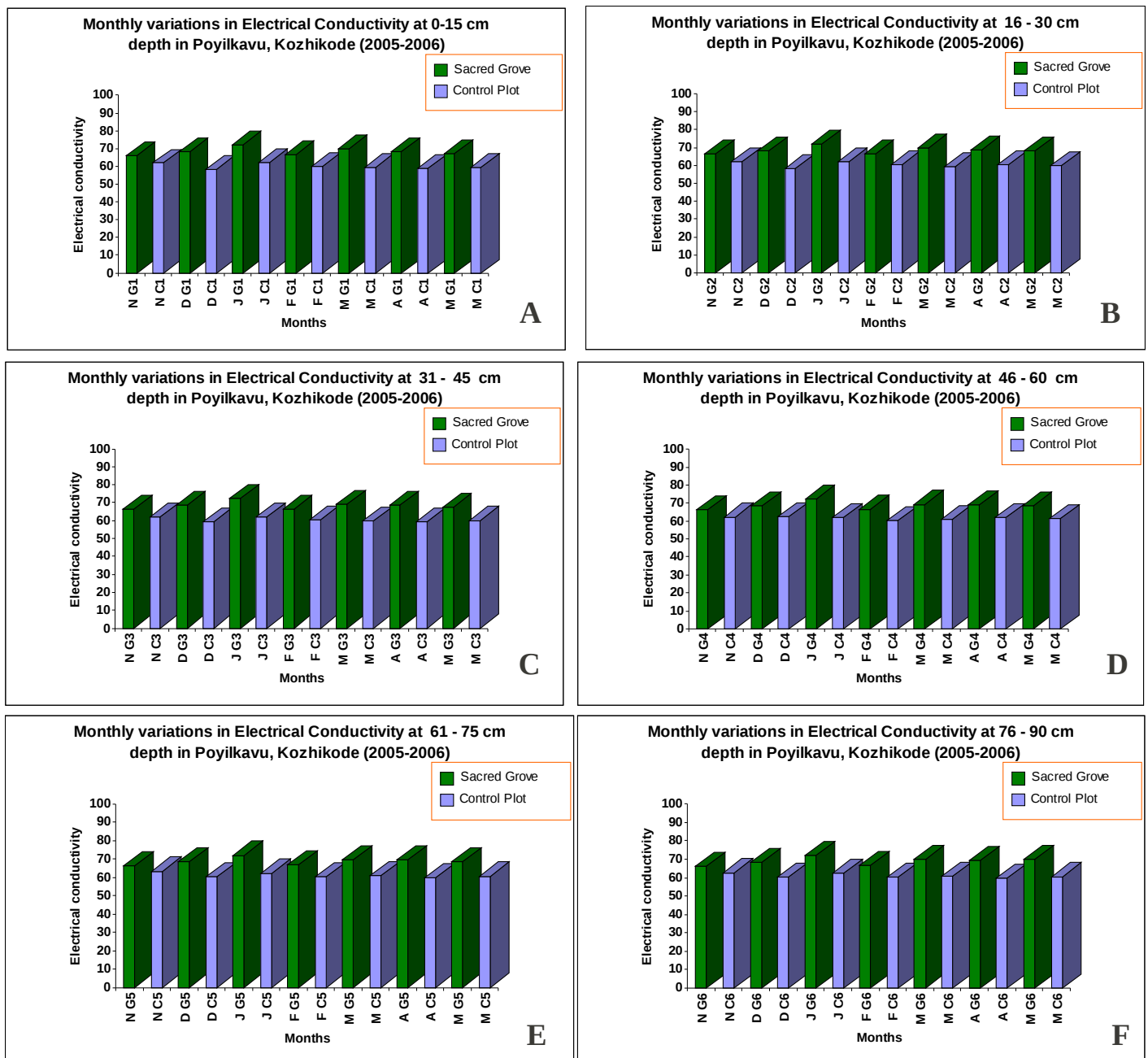


Figure 52 A-F. Monthly Variations in Soil Electrical Conductivity: Poyilkkavu (2005-06)

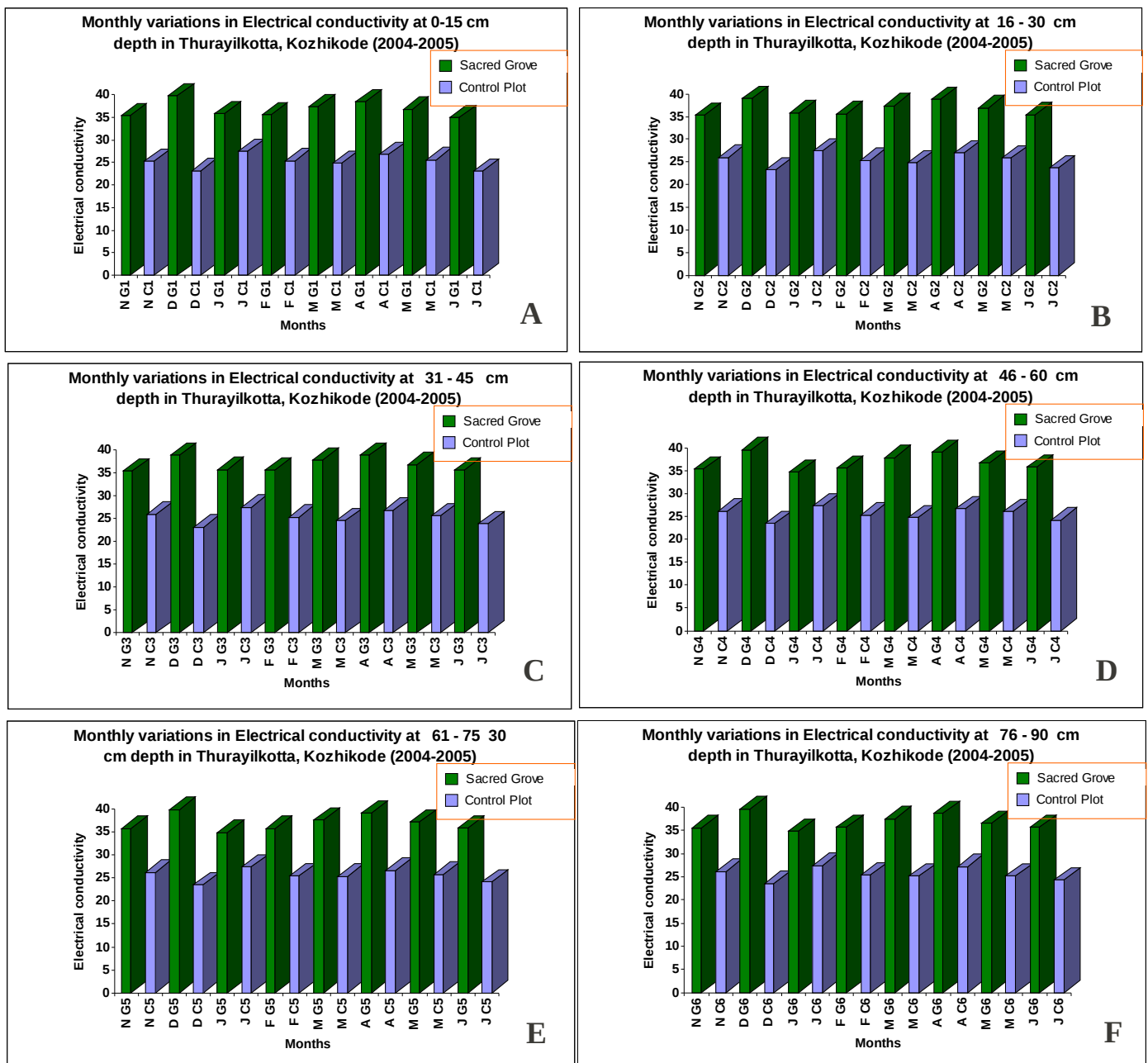


Figure 53 A-F. Monthly Variations in Soil Electrical Conductivity: Thurayilkavu (2004-05)

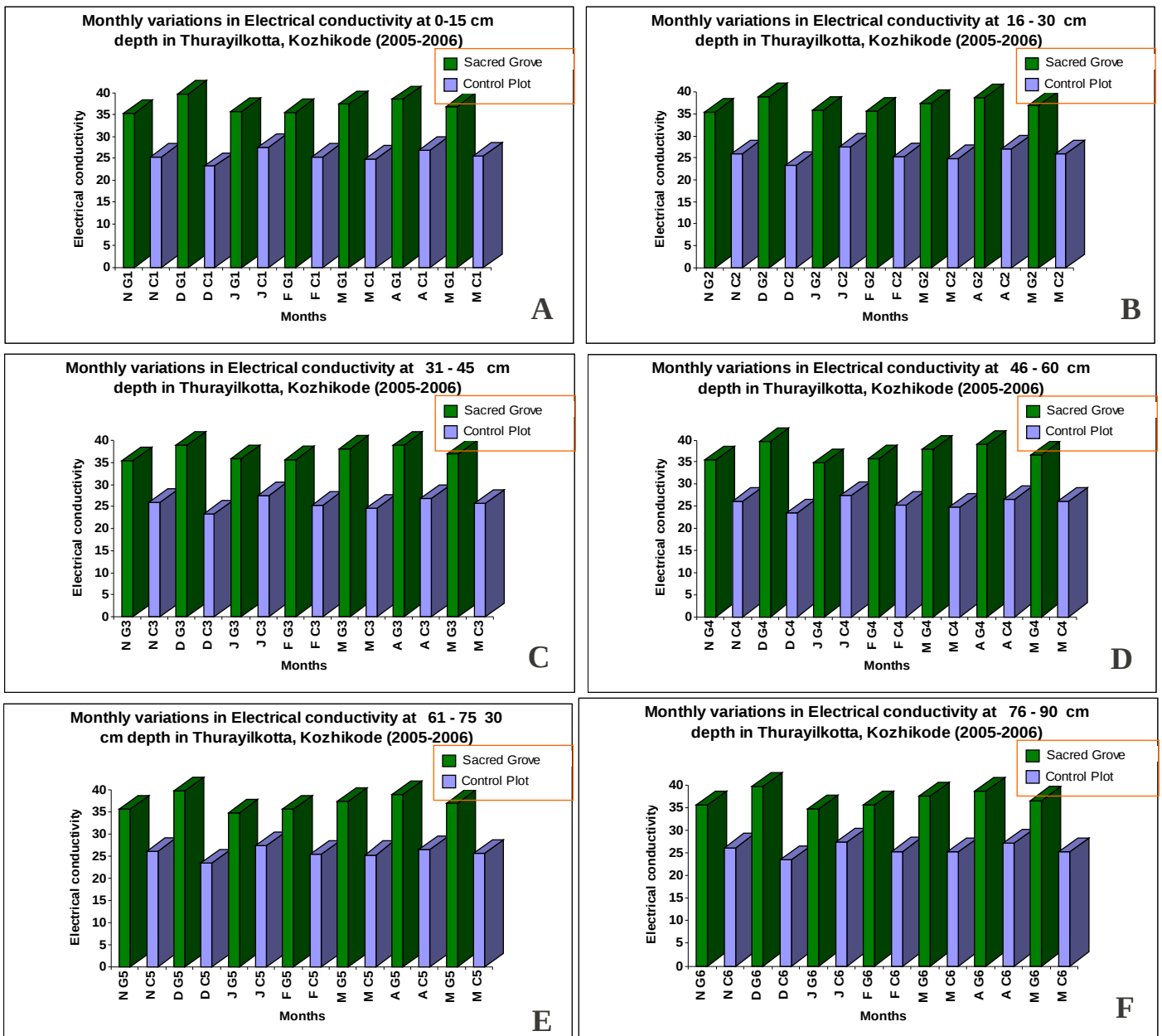


Figure 54 A-F. Monthly Variations in Soil Electrical Conductivity: Thurayilkavu (2005-06)

4.2.6 Organic Carbon

The decay of plant material ultimately gives rise to humic substances. The resultant organic matter contains organic carbon in high concentration. The organic carbon values of the sampling sites of sacred groves and control plots are represented in figures 55 – 68.

The high concentration of organic carbon in the sacred grove soils may be contributed by plant and animal debris and microbial biodegradation of sacred grove litter when compared to the control plots.

Changes in organic carbon in the selected sacred groves showed that the sacred grove soils had higher organic carbon extent ranging from 101% to 400% higher compared to control (Table 17). The soils of Thazhekkavu recorded an increase of organic C by 400% compared to control. This is indicative of typical mangrove habitat, where organic contents have been reported to be very high compared to control (Lakshmi, 2002; Unni & Lakshmi, 2002; Lakshmi *et al.* 2000, 2002; Dagar *et al.* 1991; Phani Bhushan & Amallesh Chaudury, 1987; Shanmukhappa 1987; Kotmire & Bhosale, 1979). This higher organic carbon content is

of high significance in the present context of global warming, wherein, carbon fixation plays a significant role in reducing atmospheric carbon dioxide concentration.

Name of Sacred Grove
Kammadathukavu
Parappoolkavu
Poongottukavu
Thazhekkavu
Bhayankavu
Poyilkkavu
Thurayilkavu

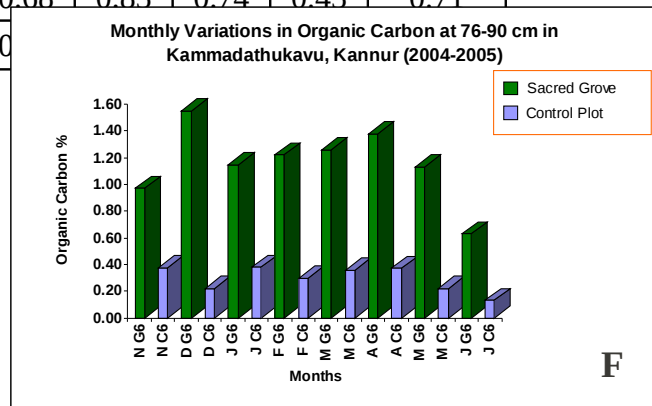
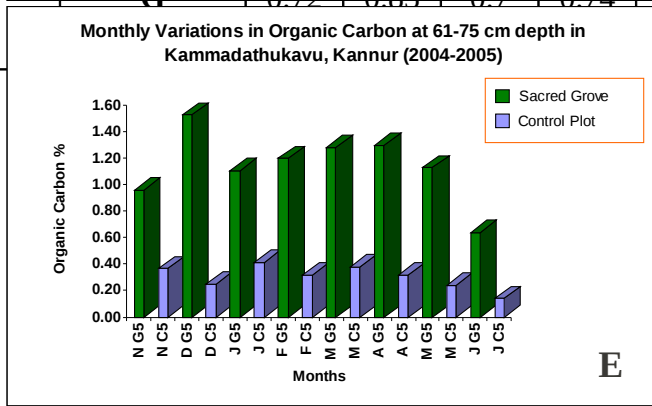
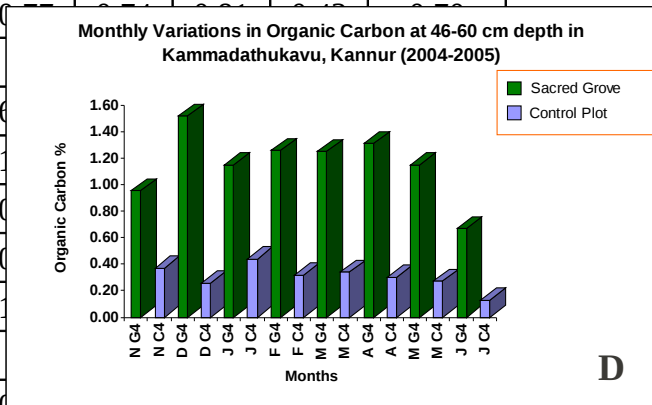
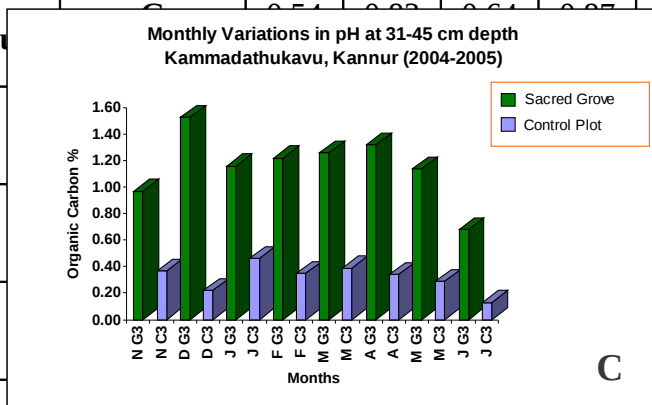
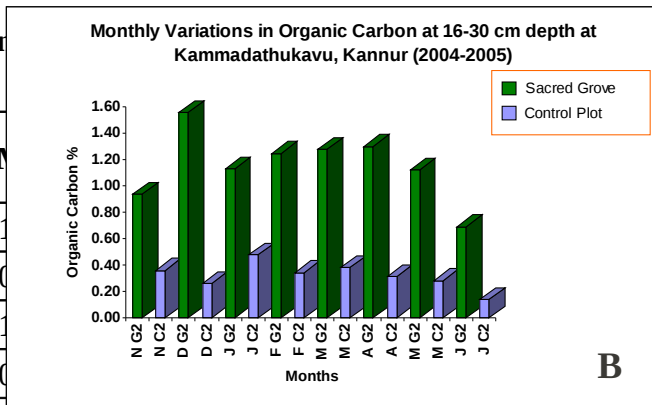
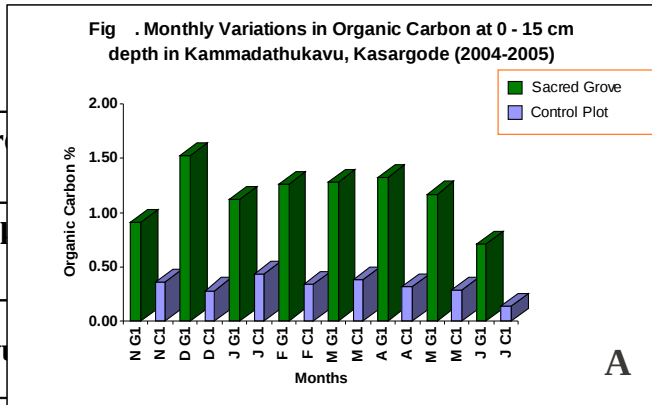


Figure 55 A-F. Monthly Variations in Soil Organic Carbon: Kammadathukavu (2004-05)

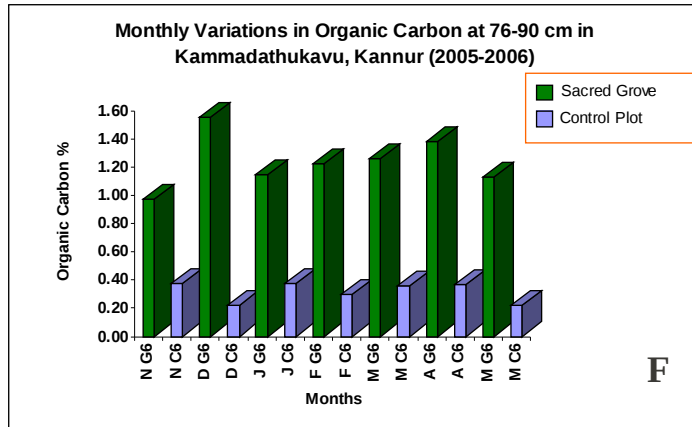
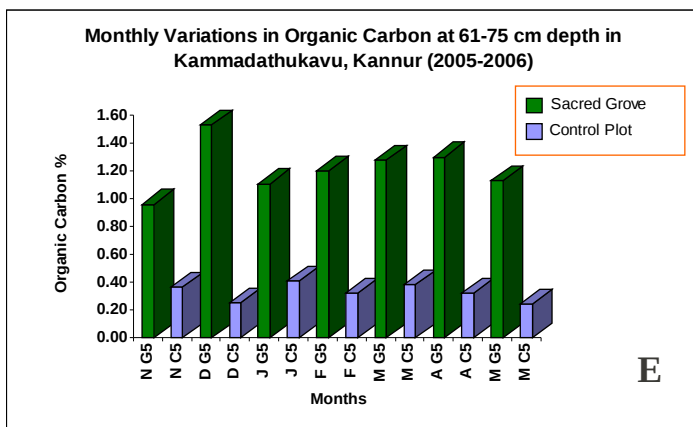
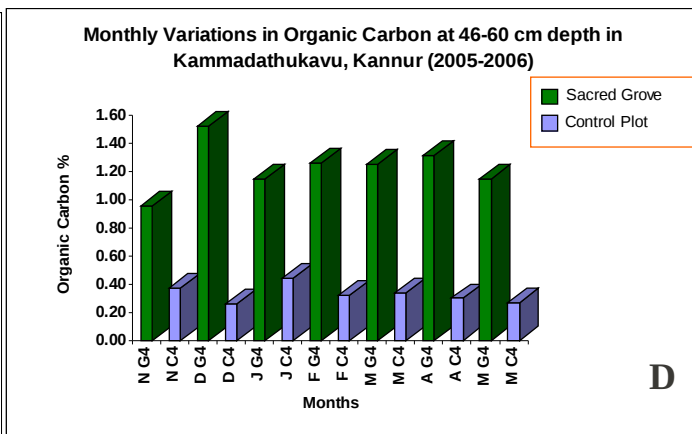
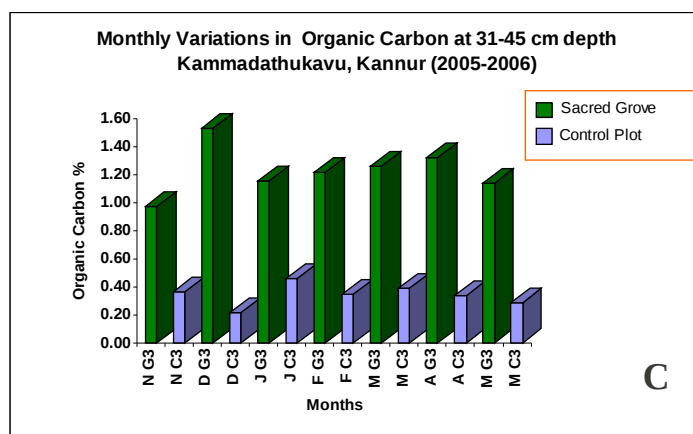
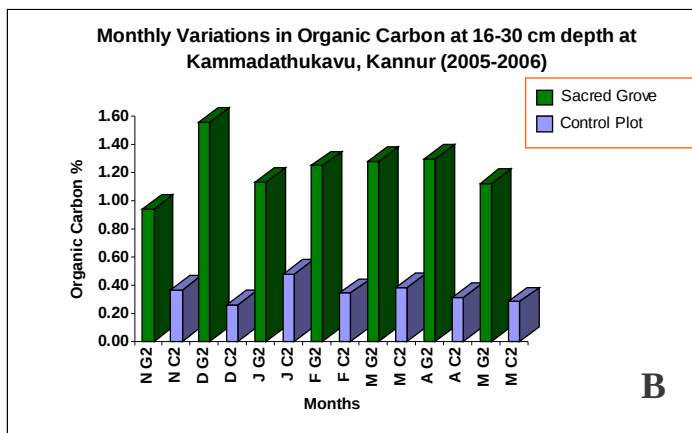
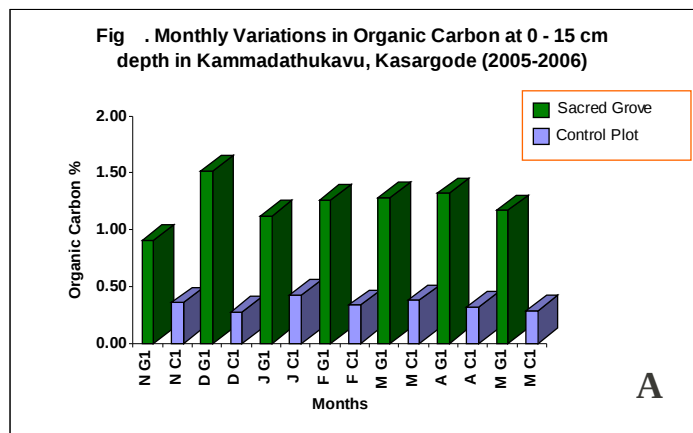


Figure 56 A-F. Monthly Variations in Soil Organic Carbon: Kammadathukavu (2005-06)

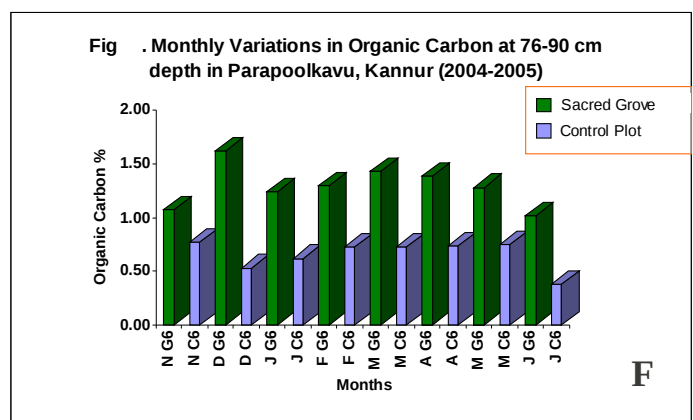
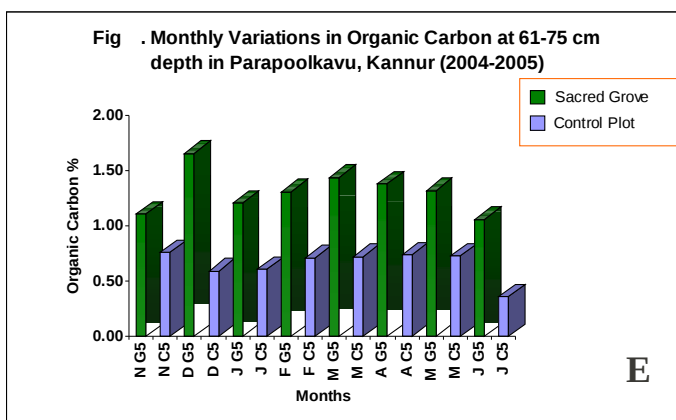
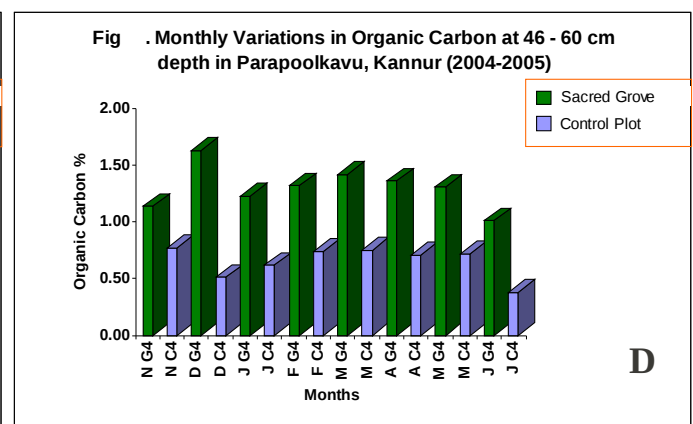
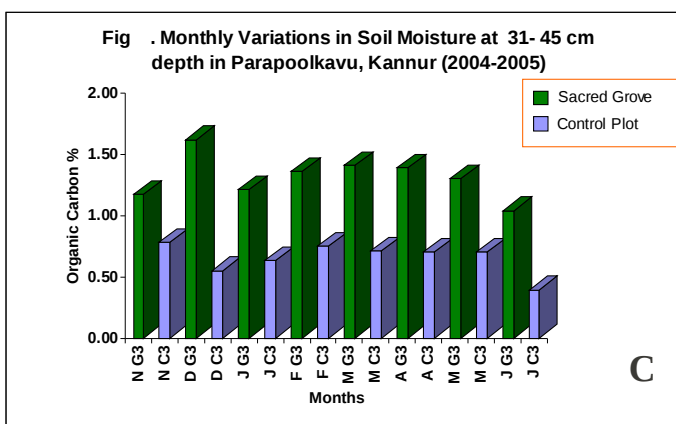
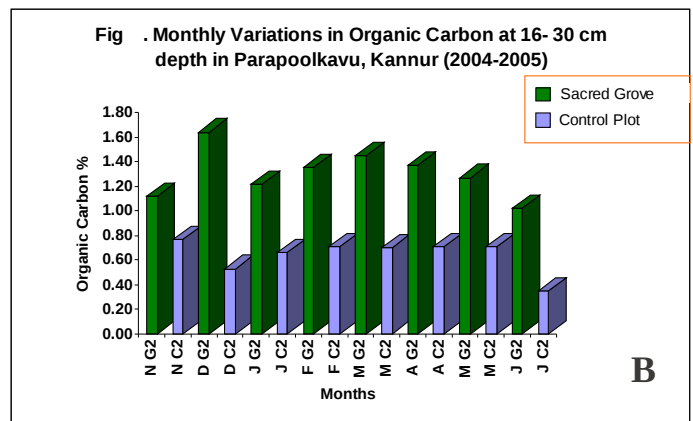
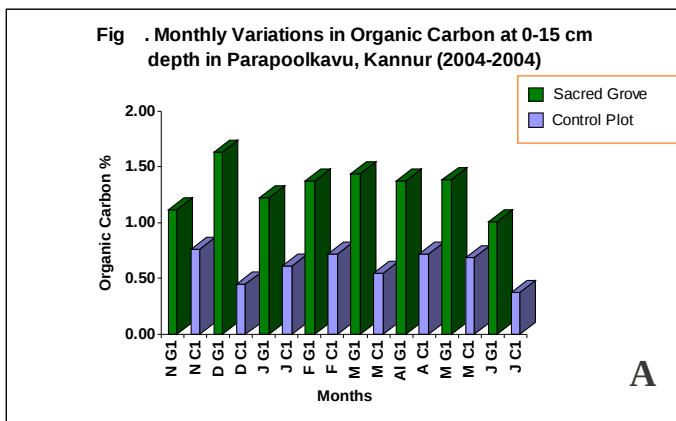


Figure 57 A-F. Monthly Variations in Soil Organic Carbon: Parapoolkavu (2004-05)

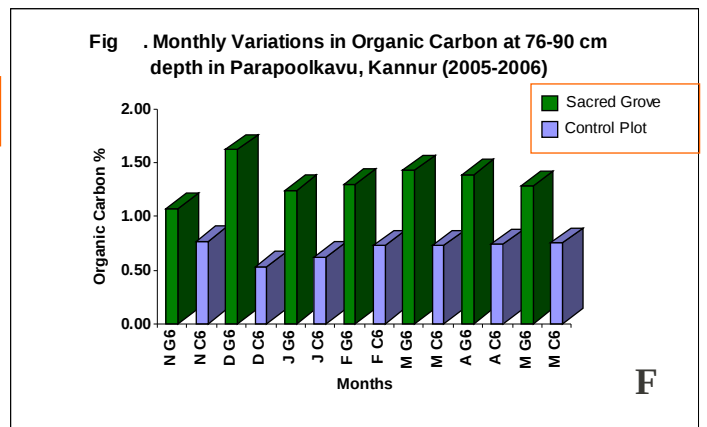
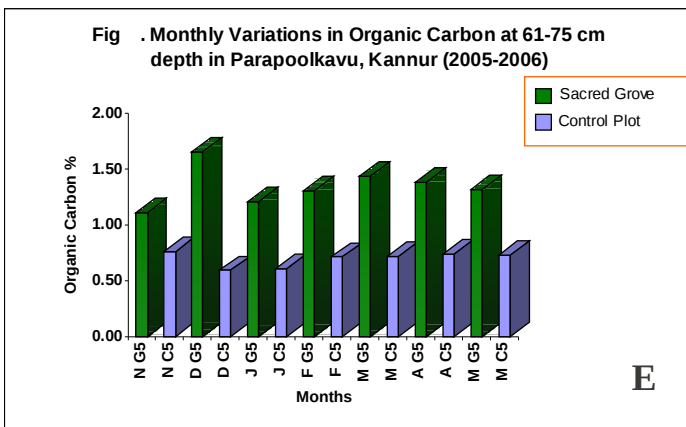
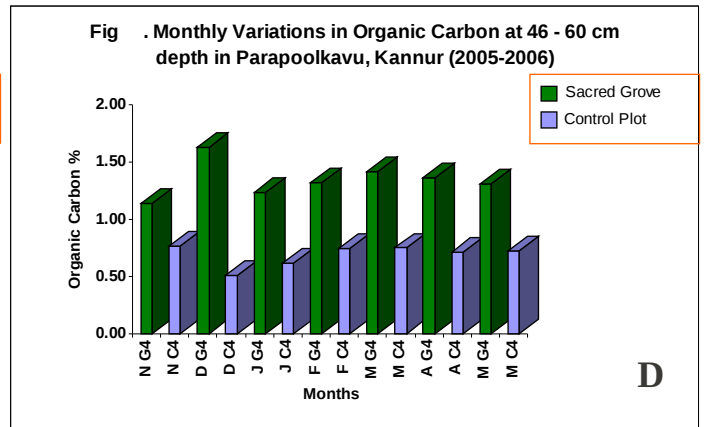
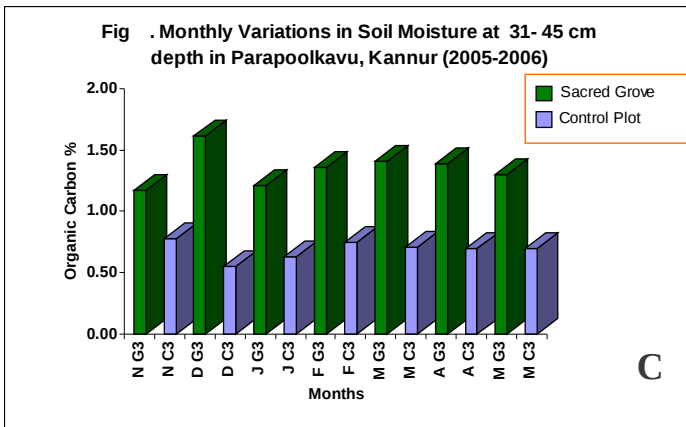
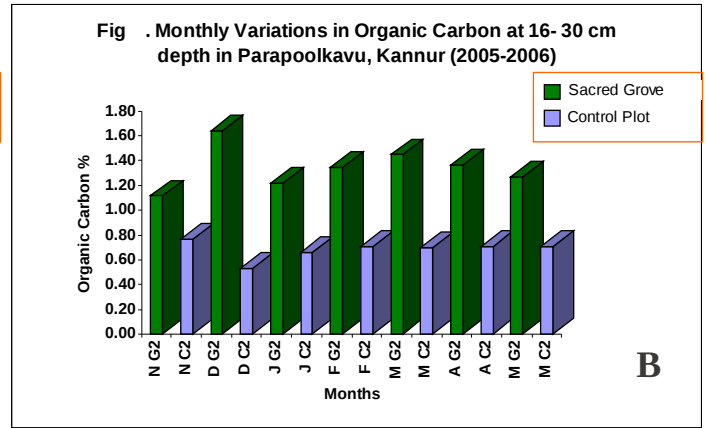
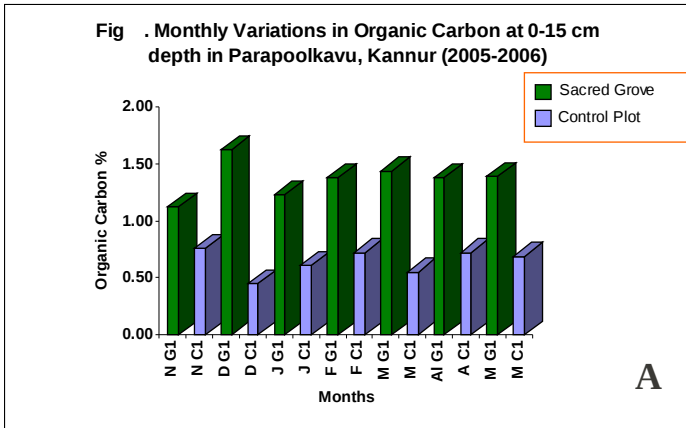


Figure 58 A-F. Monthly Variations in Soil Organic Carbon: Parapoolkavu (2005-06)

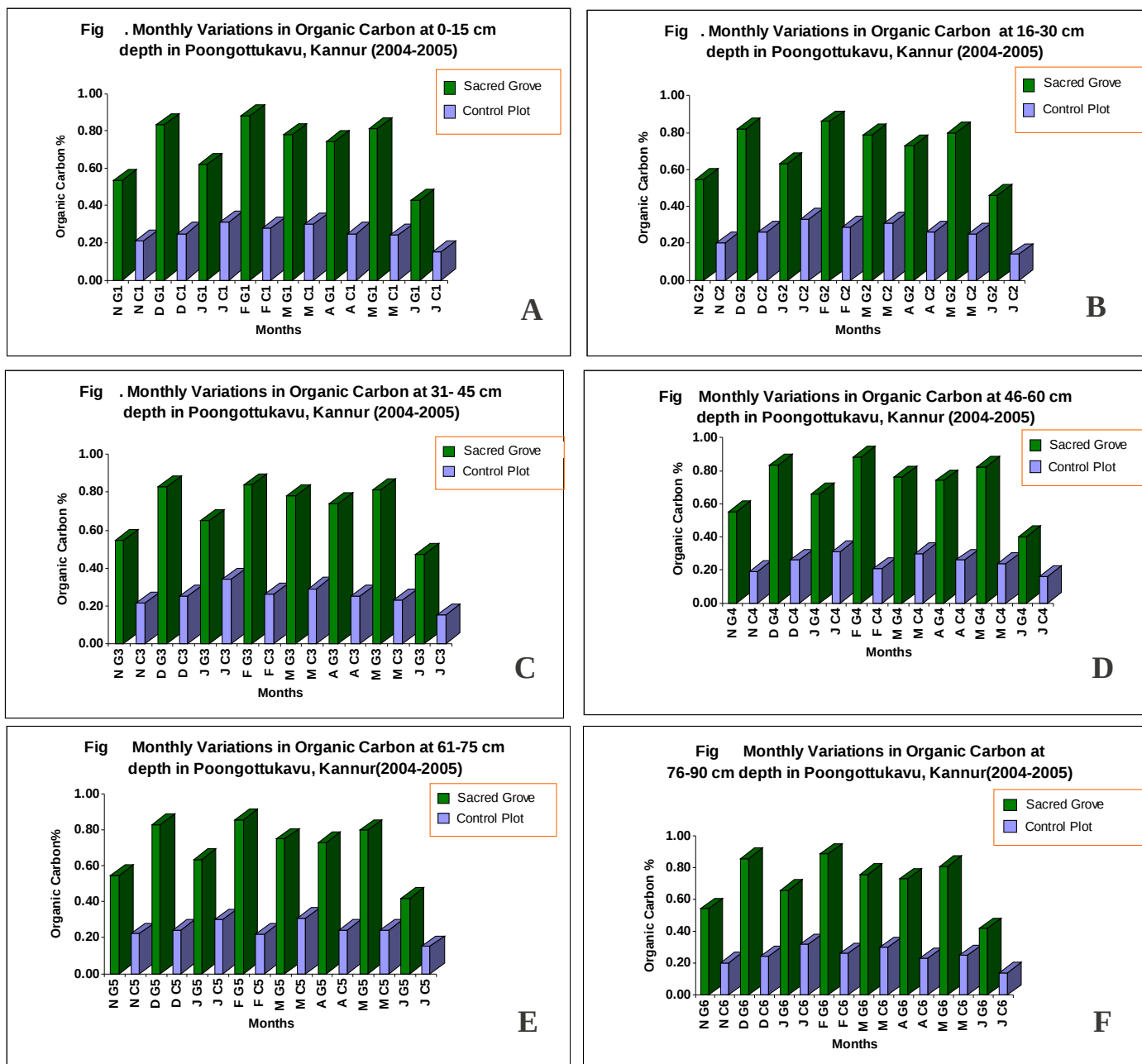


Figure 59 A-F. Monthly Variations in Soil Organic Carbon: Poongottukavu (2004-05)

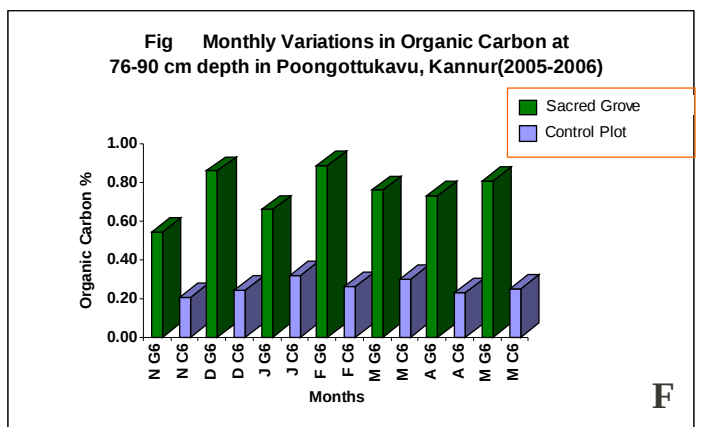
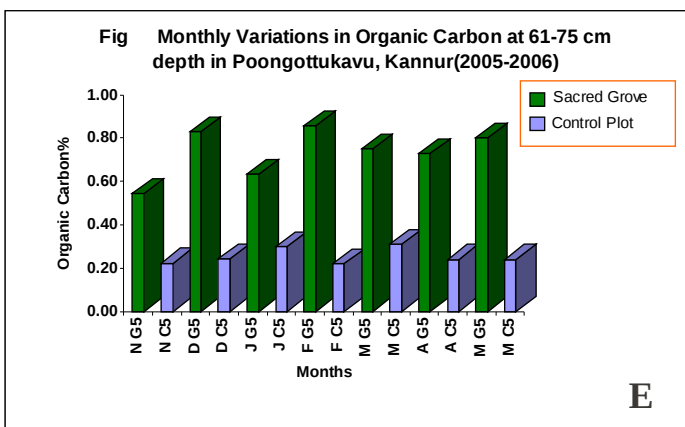
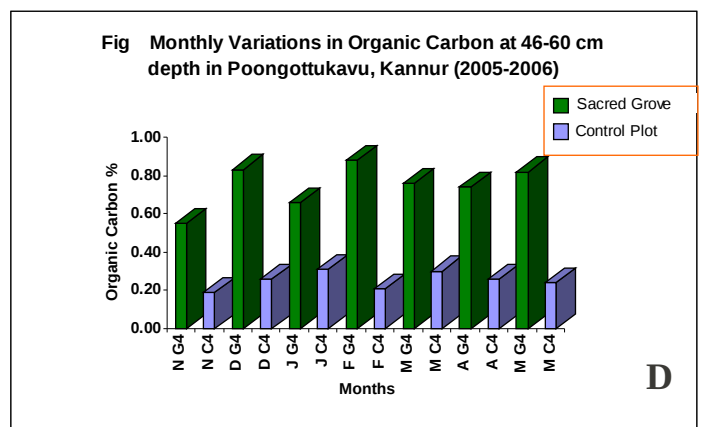
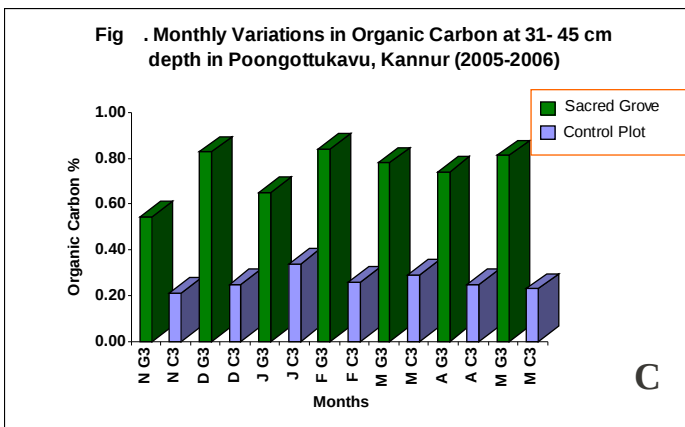
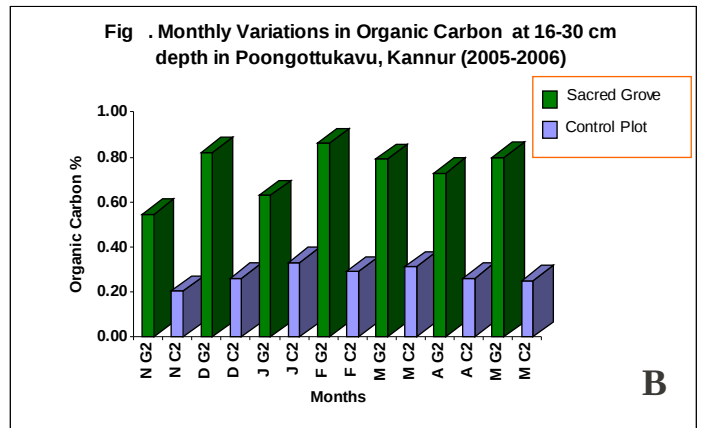
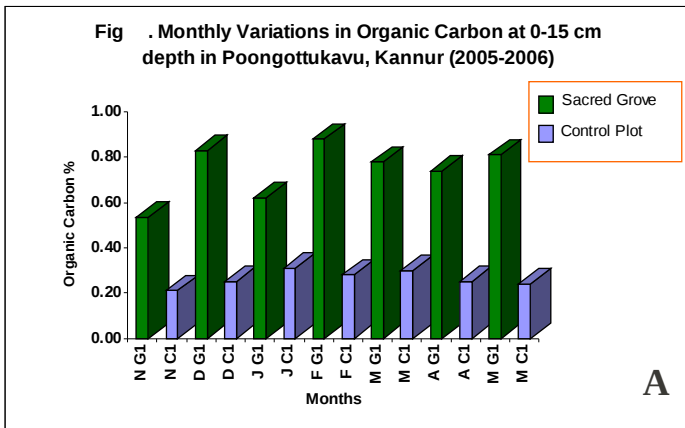


Figure 60 A-F. Monthly Variations in Soil Organic Carbon: Poongottukavu (2005-06)

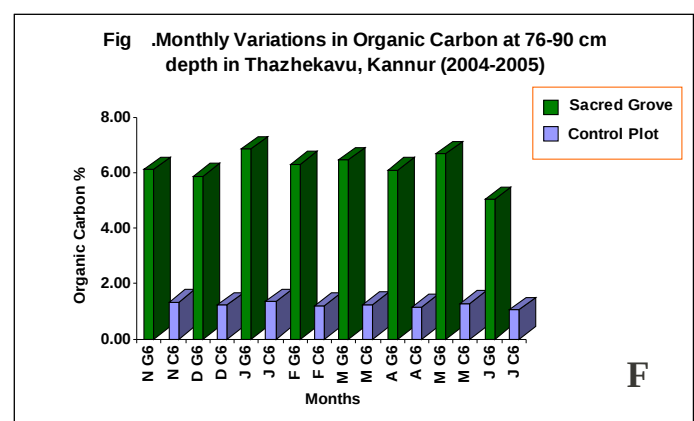
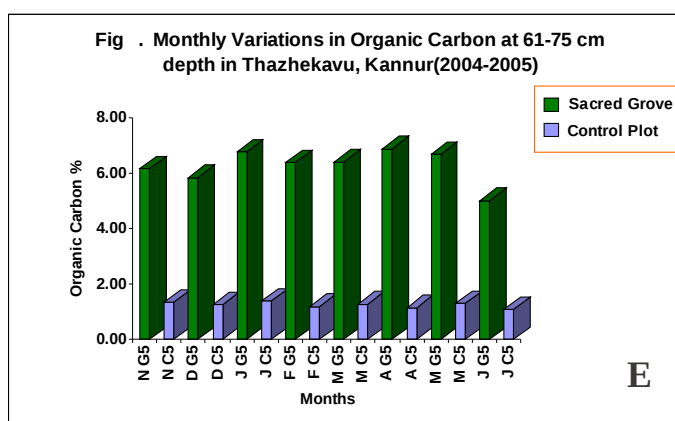
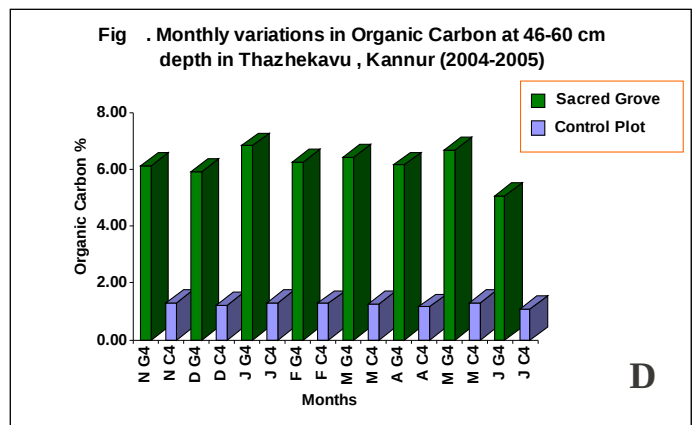
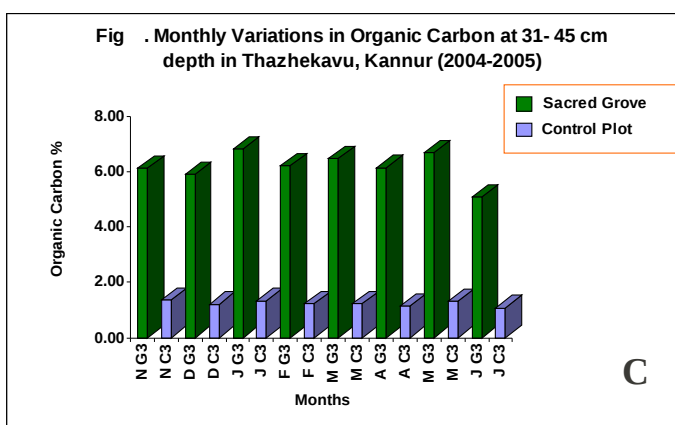
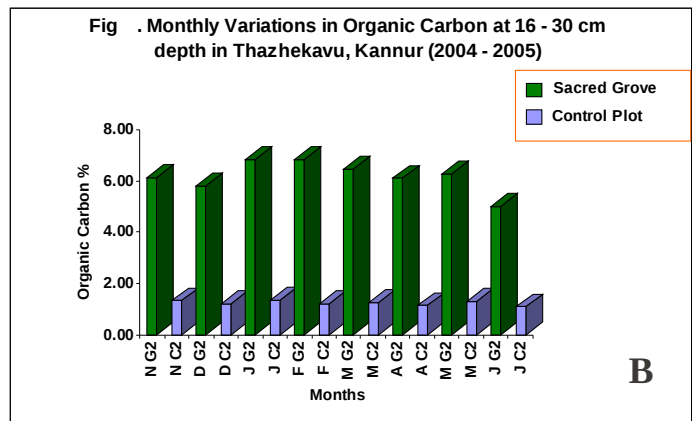
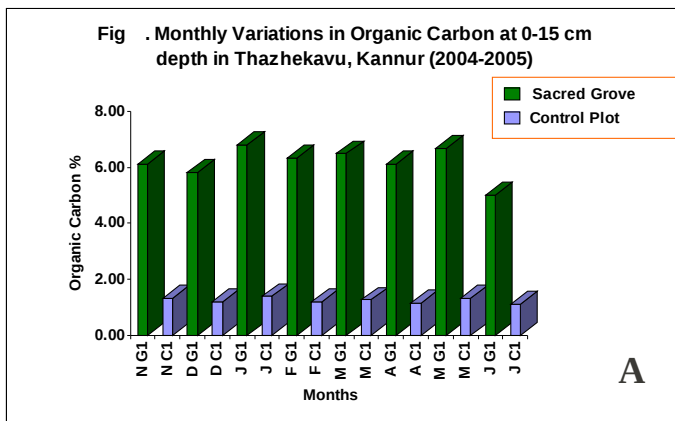


Figure 61 A-F. Monthly Variations in Soil Organic Carbon: Thazhekkavu (2004-05)

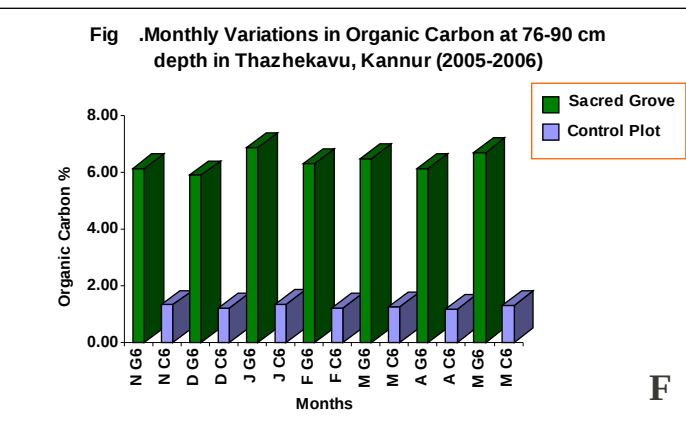
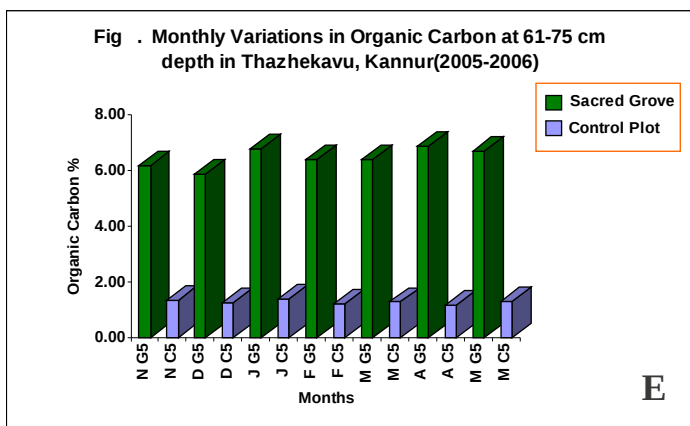
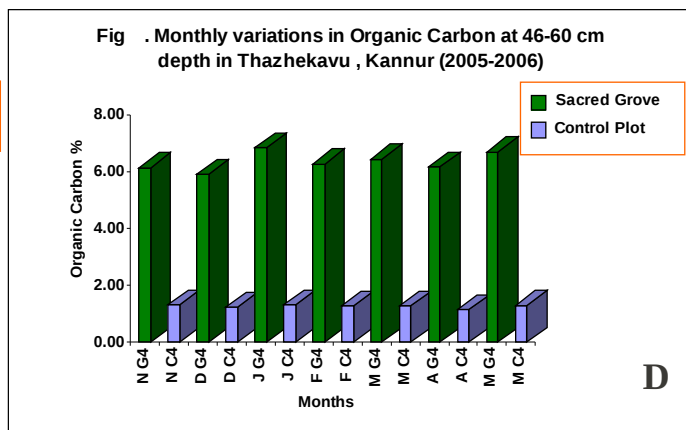
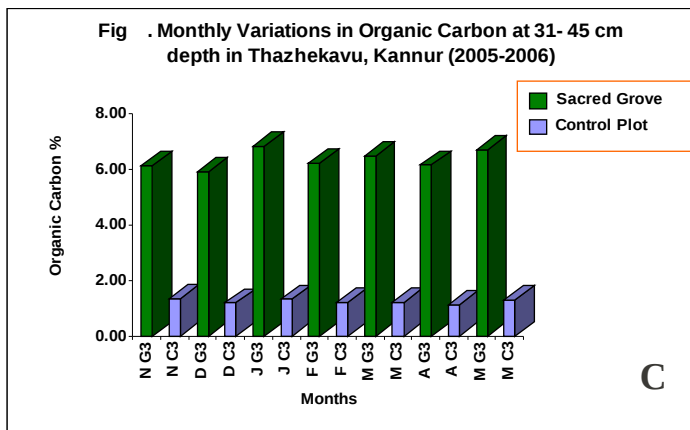
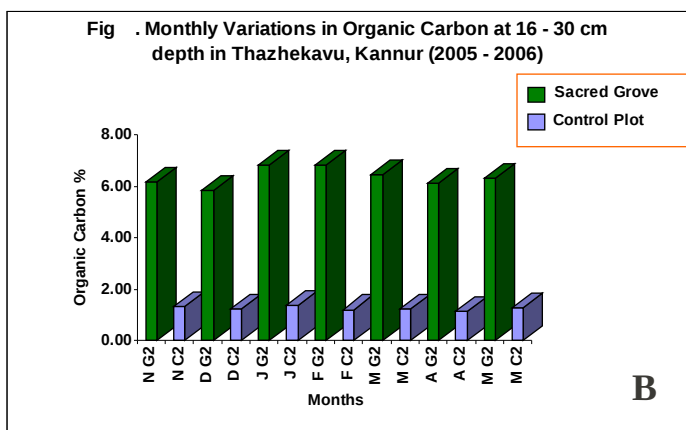
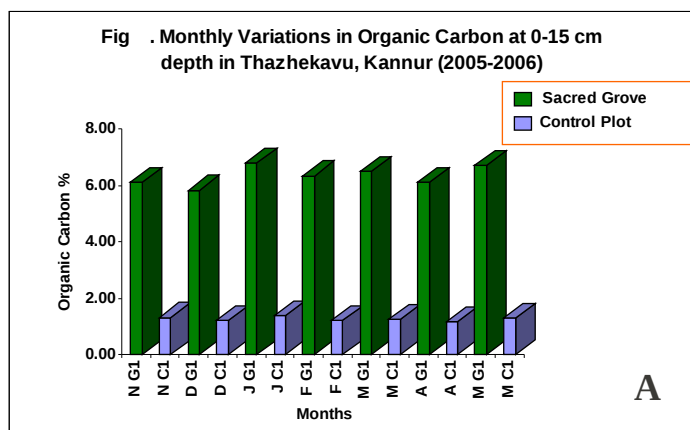


Figure 62 A-F. Monthly Variations in Soil Organic Carbon: Thazhekkavu (2005-06)

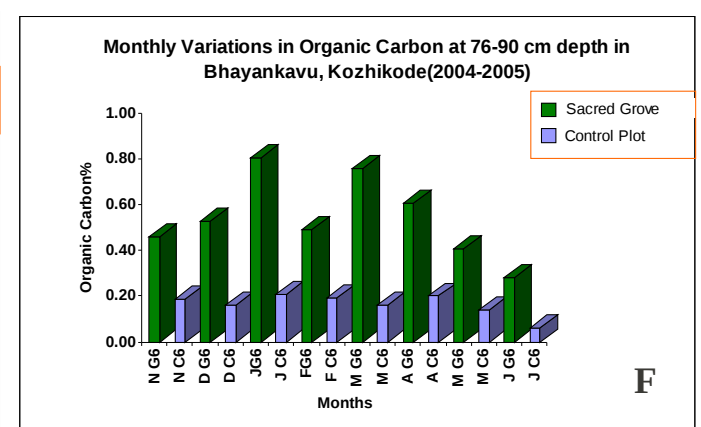
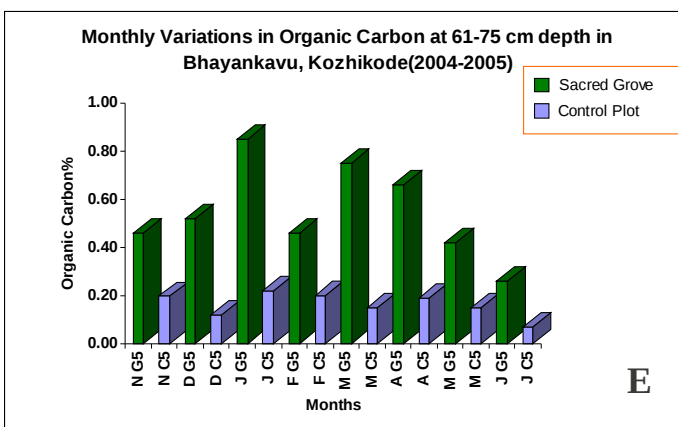
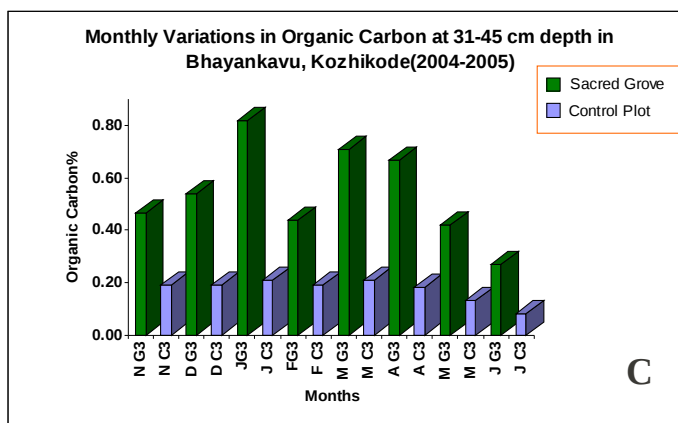
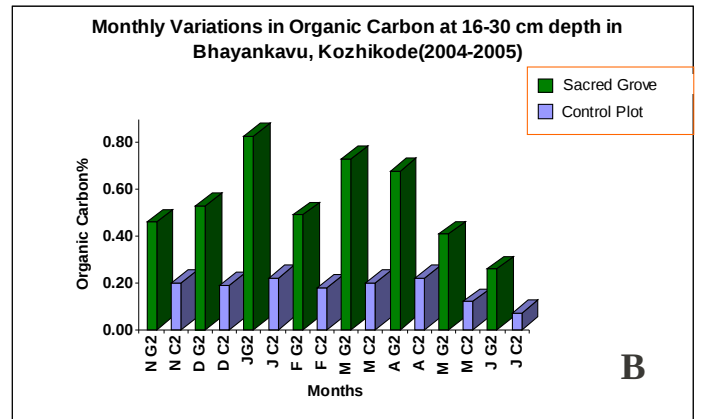
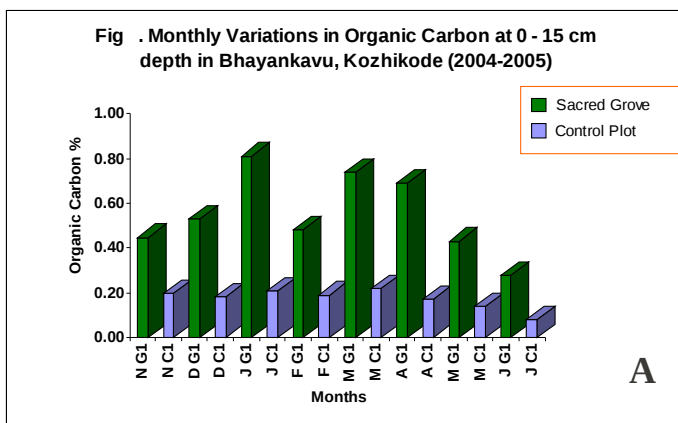


Figure 63 A-F. Monthly Variations in Soil Organic Carbon: Bhayankavu (2004-05)

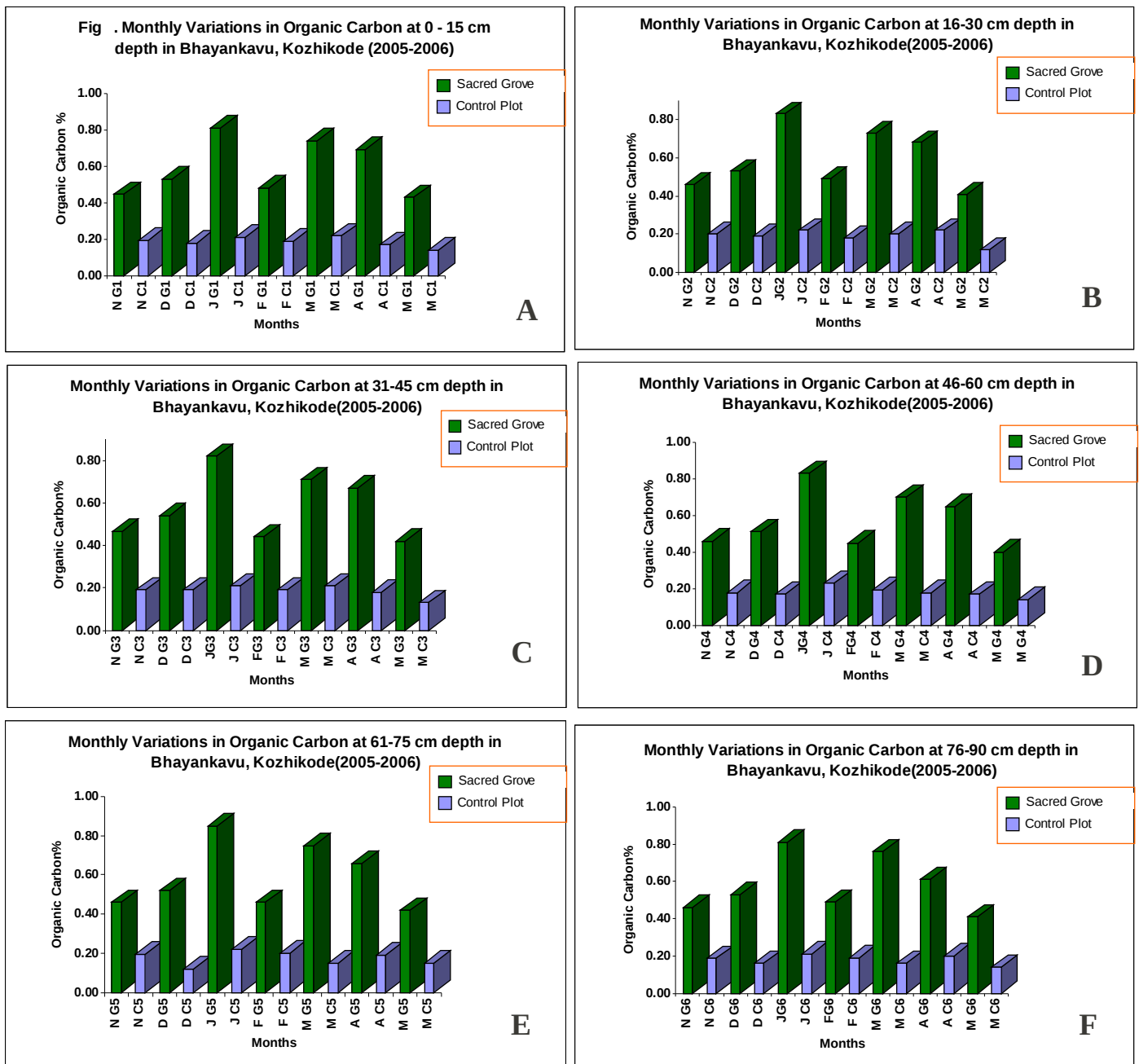


Figure 64 A-F. Monthly Variations in Soil Organic Carbon: Bhayankavu (2005-06)

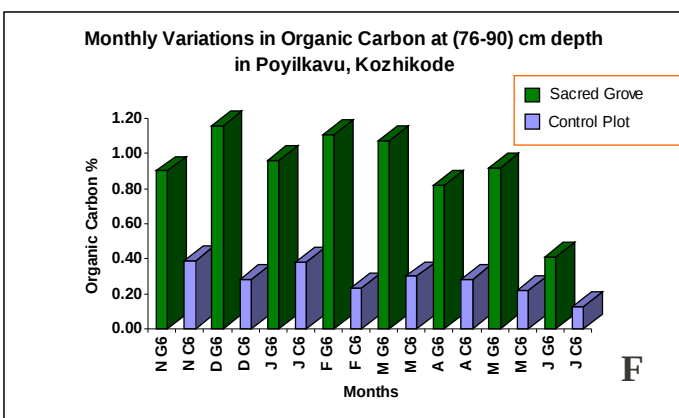
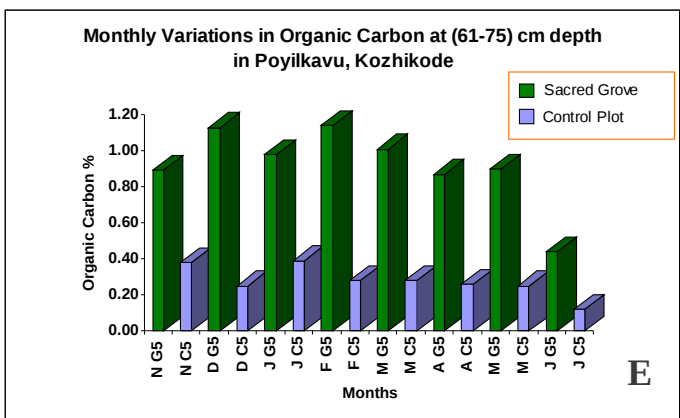
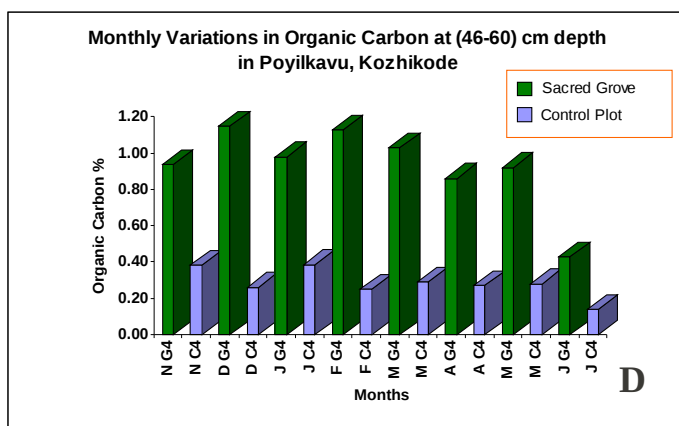
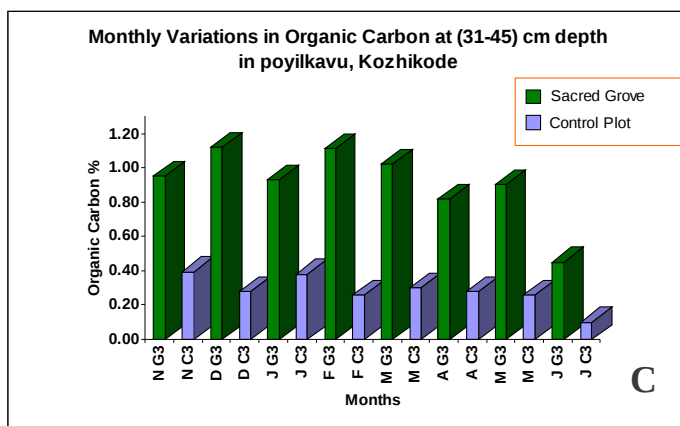
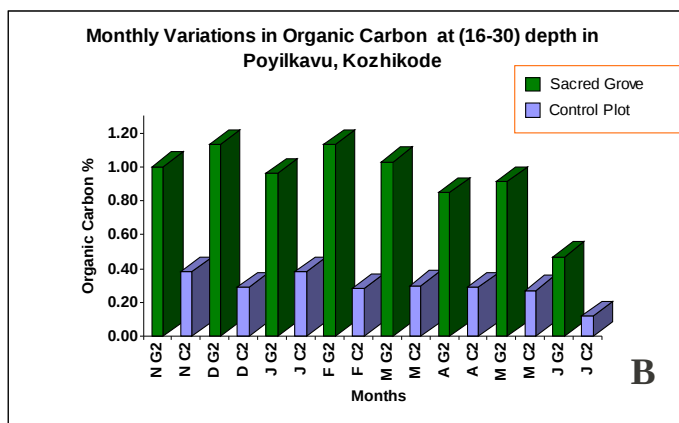
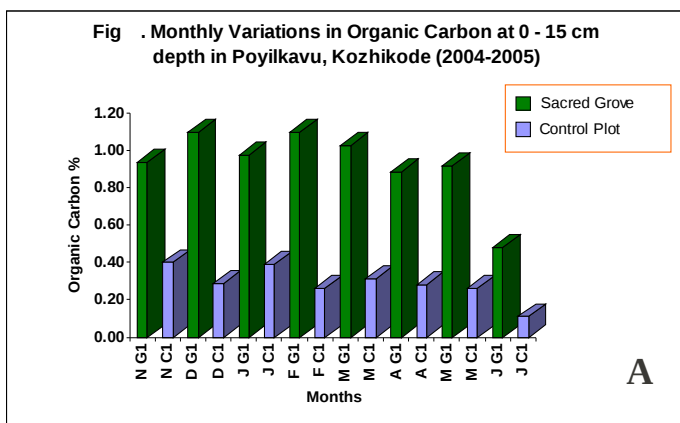


Figure 65 A-F. Monthly Variations in Soil Organic Carbon: Poyilkavu (2004-05)

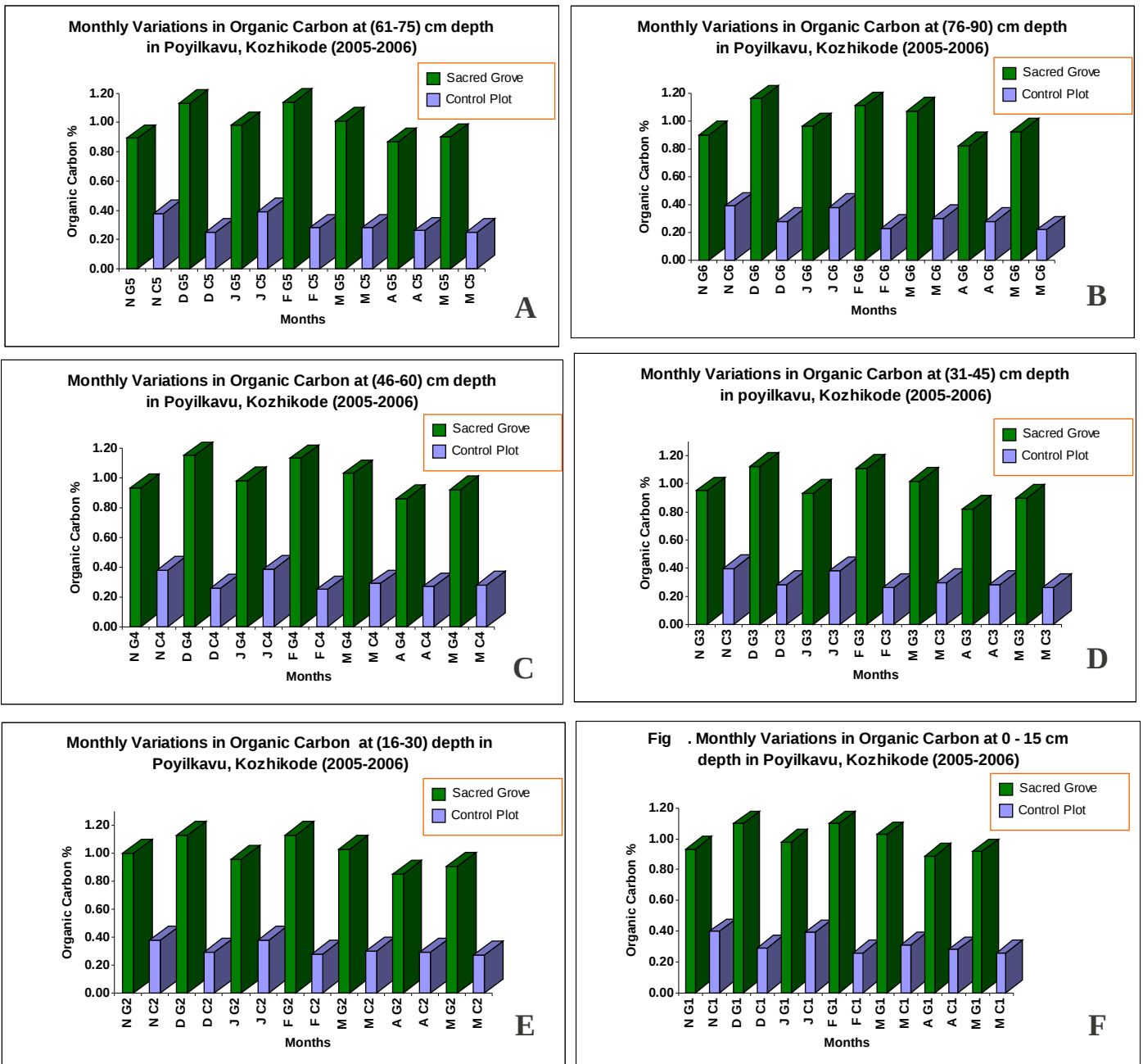


Figure 66 A-F. Monthly Variations in Soil Organic Carbon: Poyilkavu (2005-06)

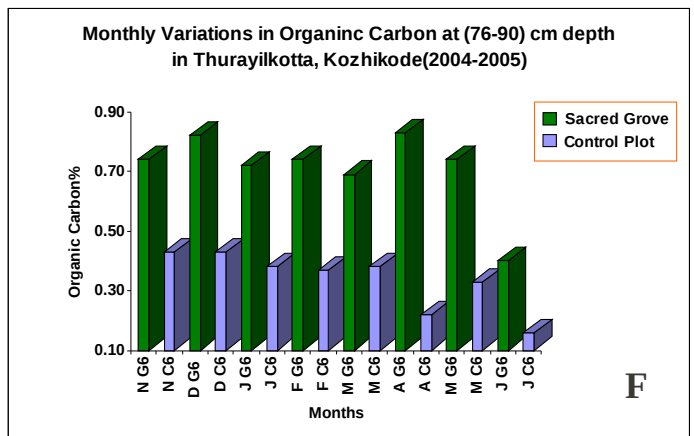
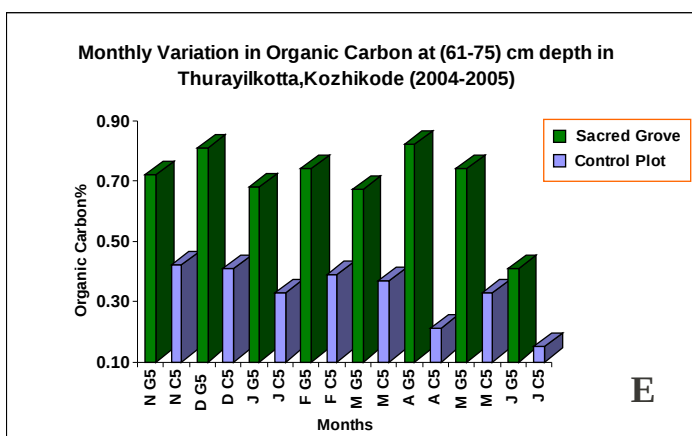
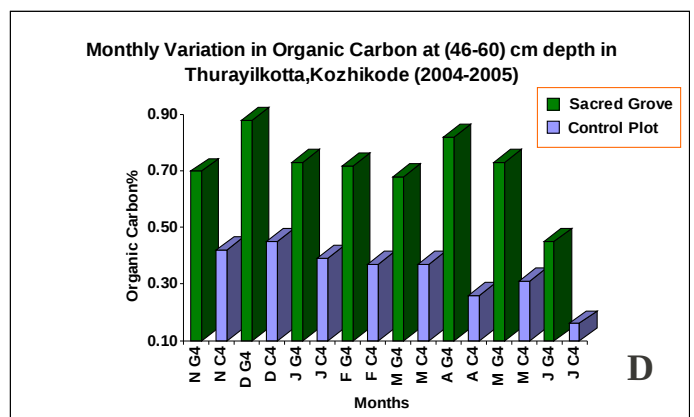
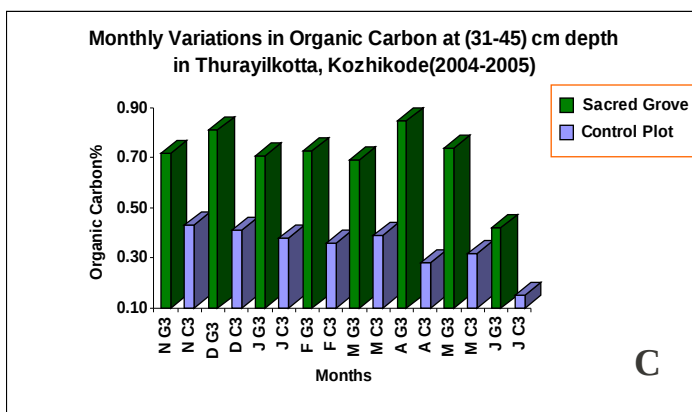
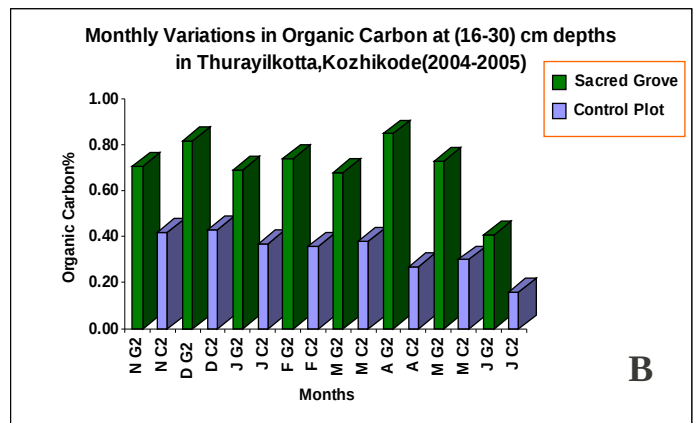
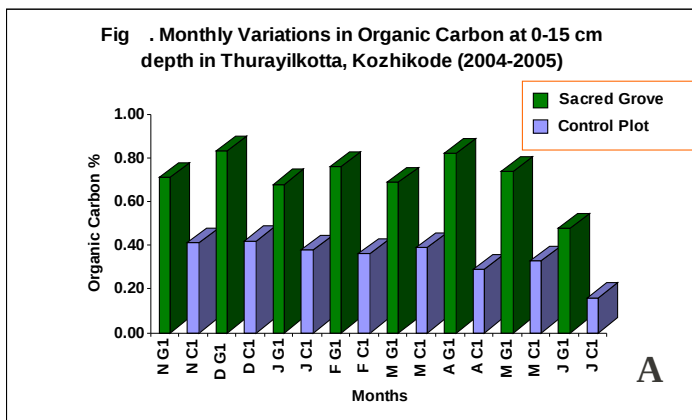


Figure 67 A-F. Monthly Variations in Soil Organic Carbon: Thurayilkavu (2004-05)

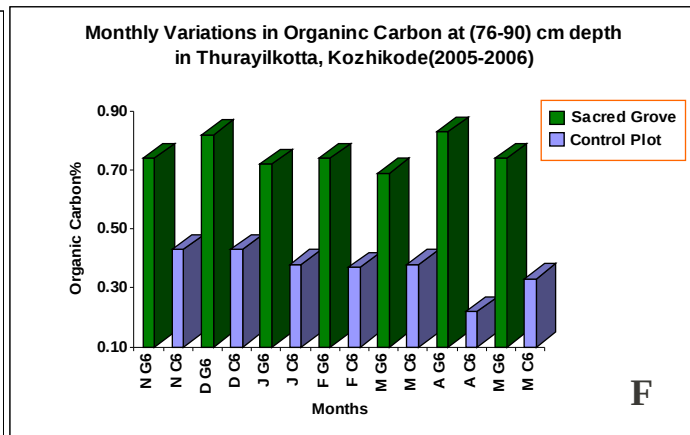
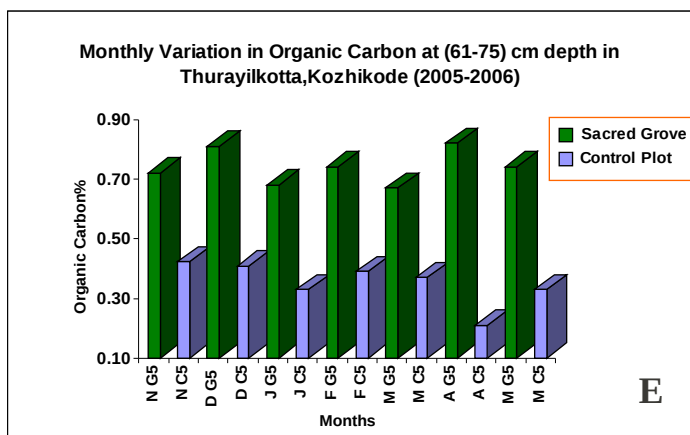
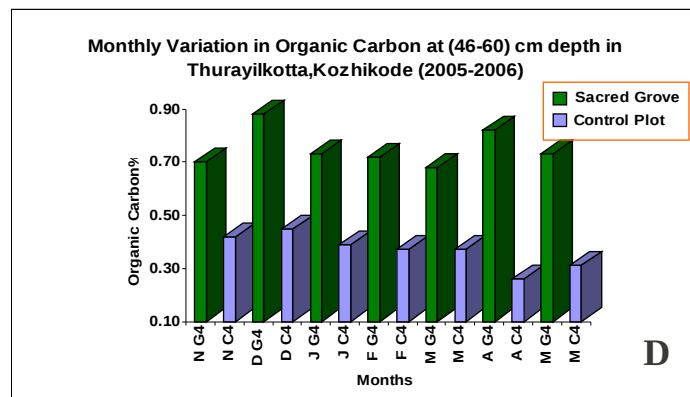
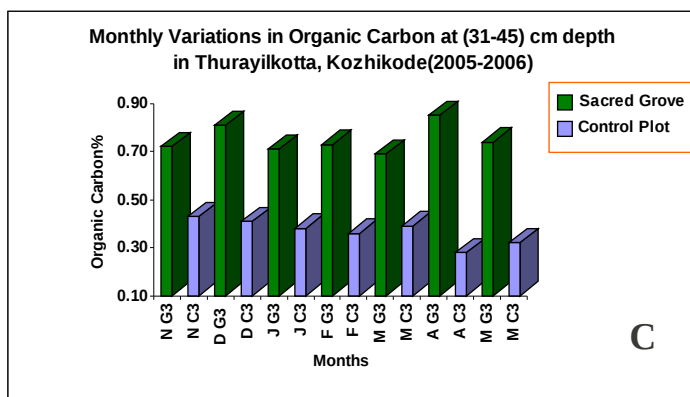
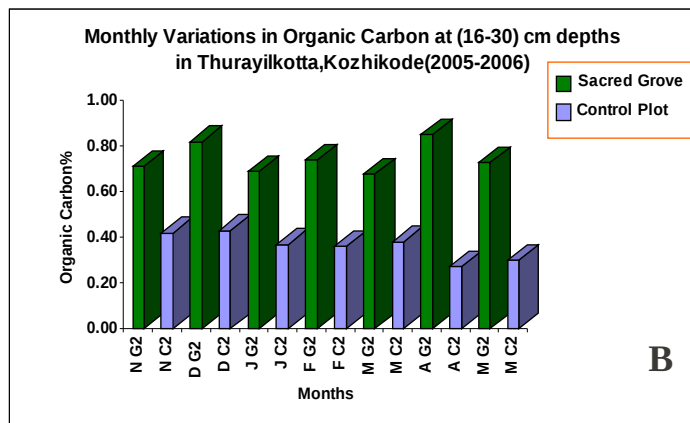
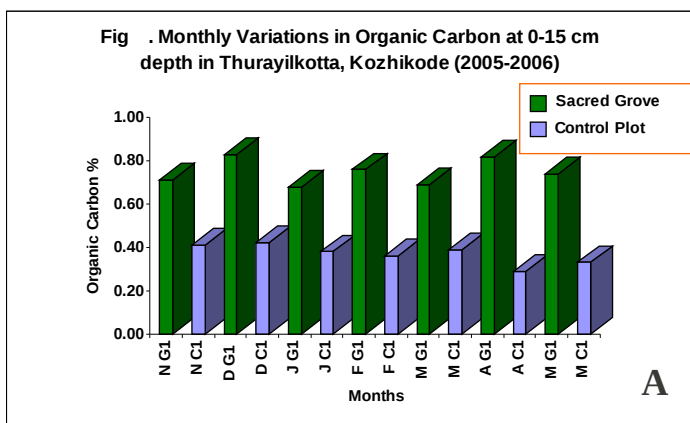


Figure 68 A-F. Monthly Variations in Soil Organic Carbon: Thurayilkavu (2005-06)

.2.7 Available Nitrogen

4.2.7 Available Nitrogen

Available nitrogen in sacred groves and control plots are presented in figures 69 to 82. Higher nitrogen content in the sacred grove sites may be due to high concentration of humic

acids in the soils. The excreta of fauna also are a rich source of nitrogen, contributing to surface layers of the soil.

Available soil nitrogen in sacred grove soils showed an increase from 70 to 350% in various sacred groves studied (Table 18). In the case of Kammadathukavu, Bhayankavu and Thurayilkavu, increase in available N higher than 300% were recorded, while in Parappoolkavu, Poongottukavu and Thazhekkavu, an increase of more than 100% above the control was recorded. In the case of Poyilkkavu, an increase of only 70% available N was recorded. This increase in available N in the sacred grove soils may be due to degradation of organic matter, especially litter accumulated over the years by the denitrifying bacteria and other microorganisms in the soil resulting in the enrichment of the soil with available N. This enrichment of the soil with available N is highly significant in the survival of the sacred groves and enrichment of surrounding soils with nitrogen which may favour the growth of plants within the vicinity of the grove, creating a buffer zone around the sacred groves.

Table18. Variations in Available Soil Nitrogen (mg/kg) in Sacred Groves: 2004-06

Name of Sacred Grove	Treatments	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Mean	Increase/ Decrease (%)
Kammadathukavu	G	0.09	0.08	0.09	0.09	0.09	0.1	0.08	0.08	0.09	350.00
	C	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.02	
Parappoolkavu	G	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	100.00
	C	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	
Poongottukavu	G	1.03	1.01	1.06	1.02	1.03	1.06	2.61	0.99	1.23	108.47
	C	0.55	0.53	0.63	0.63	0.65	0.6	0.63	0.5	0.59	
Thazhekkavu	G	0.1	0.09	0.09	0.1	0.1	0.09	0.09	0.09	0.09	125.00
	C	0.03	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.04	
Bhayankavu	G	0.09	0.09	0.1	0.09	0.09	0.09	0.09	0.09	0.09	350.00
	C	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	
Poyilkkavu	G	0.21	0.23	0.17	0.21	0.22	0.24	0.24	0.24	0.22	69.23
	C	0.11	0.25	0.11	0.1	0.1	0.11	0.12	0.11	0.13	
Thurayilkavu	G	0.08	0.08	0.08	0.08	0.08	0.09	0.08	0.08	0.08	300.00
	C	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.02	

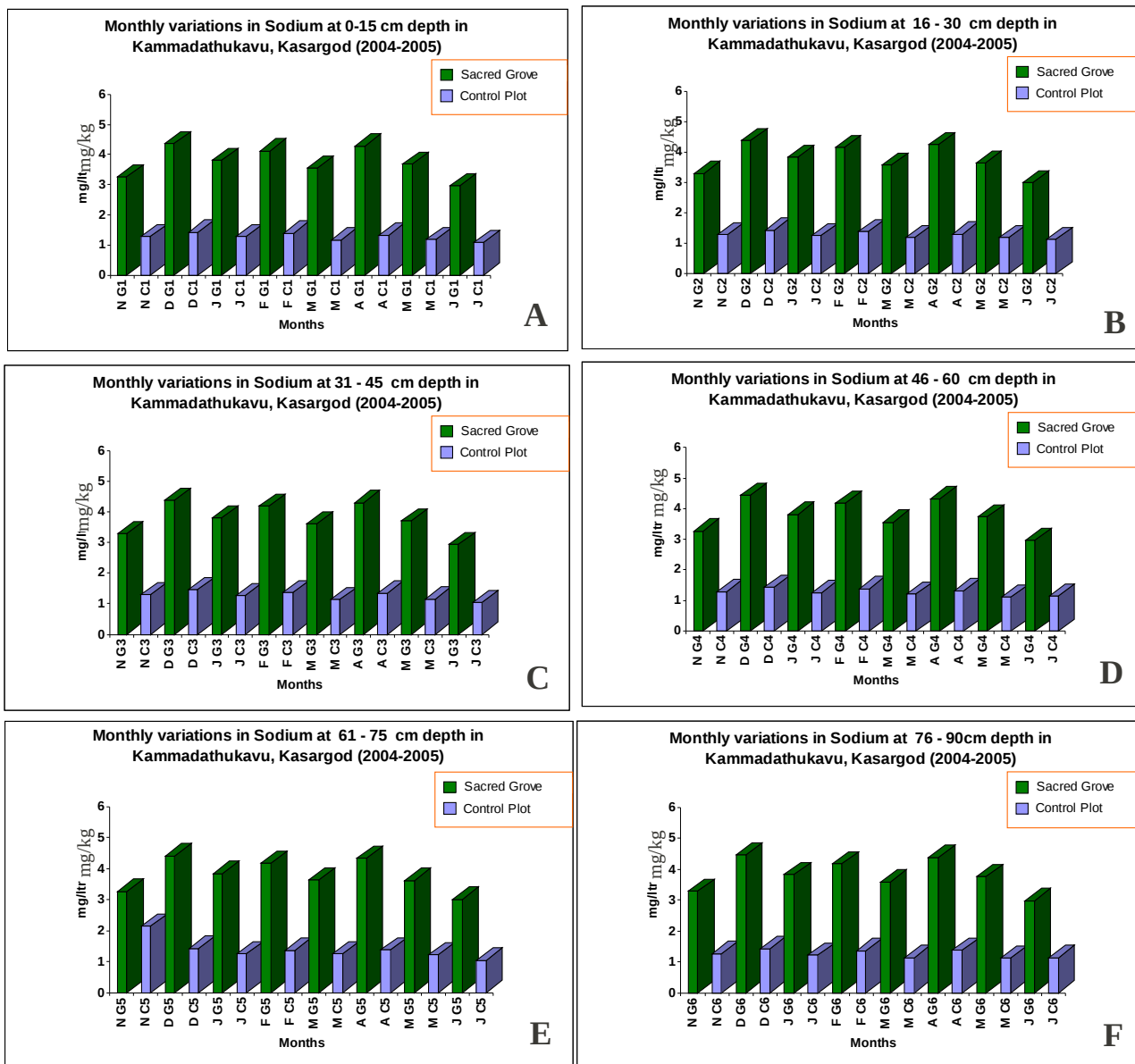


Figure 69 A-F. Monthly Variations in Soil Nitrogen: Kammadathukavu (2004-05)

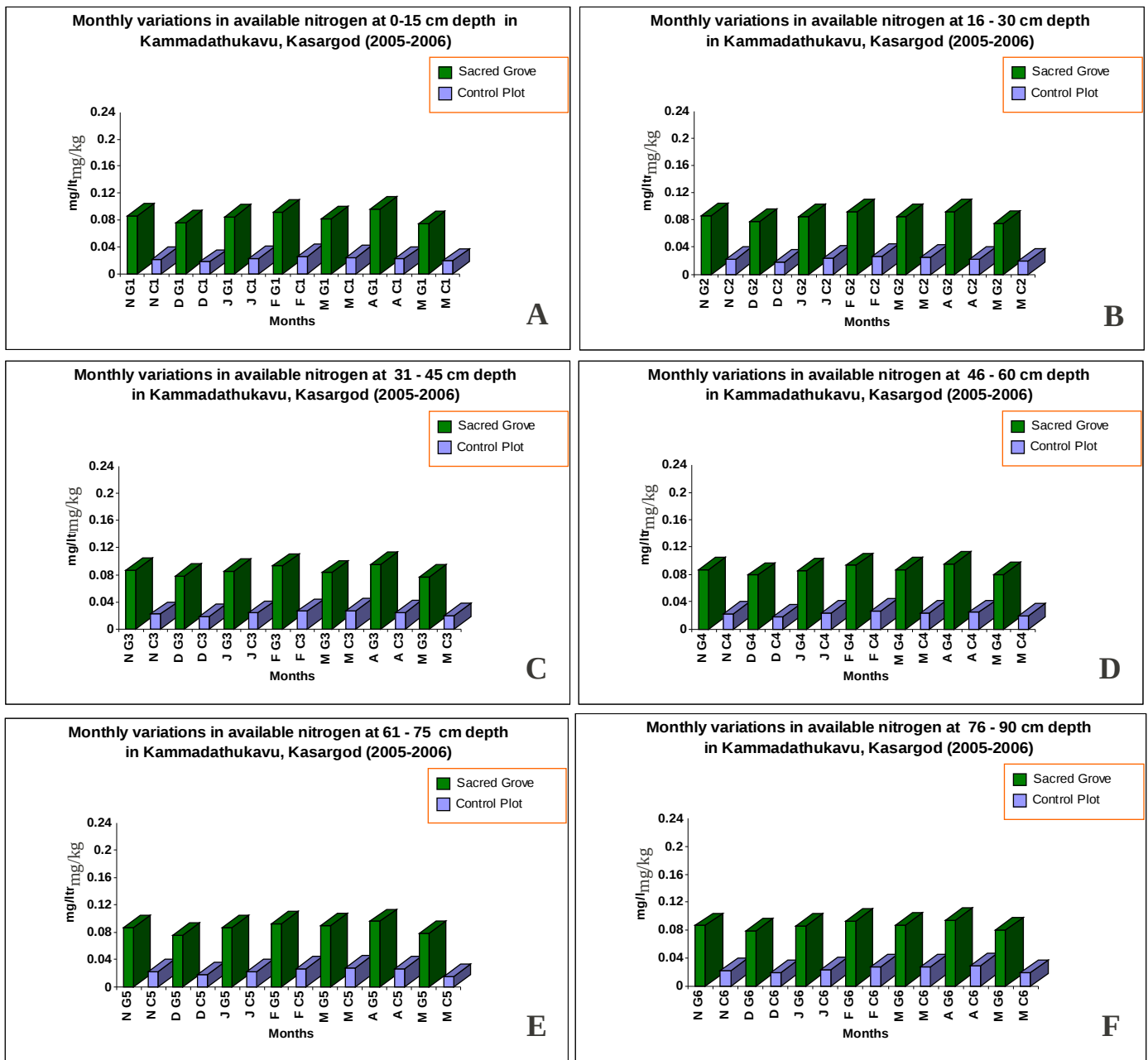


Figure 70 A-F. Monthly Variations in Soil Nitrogen: Kammadathukavu (2005-06)

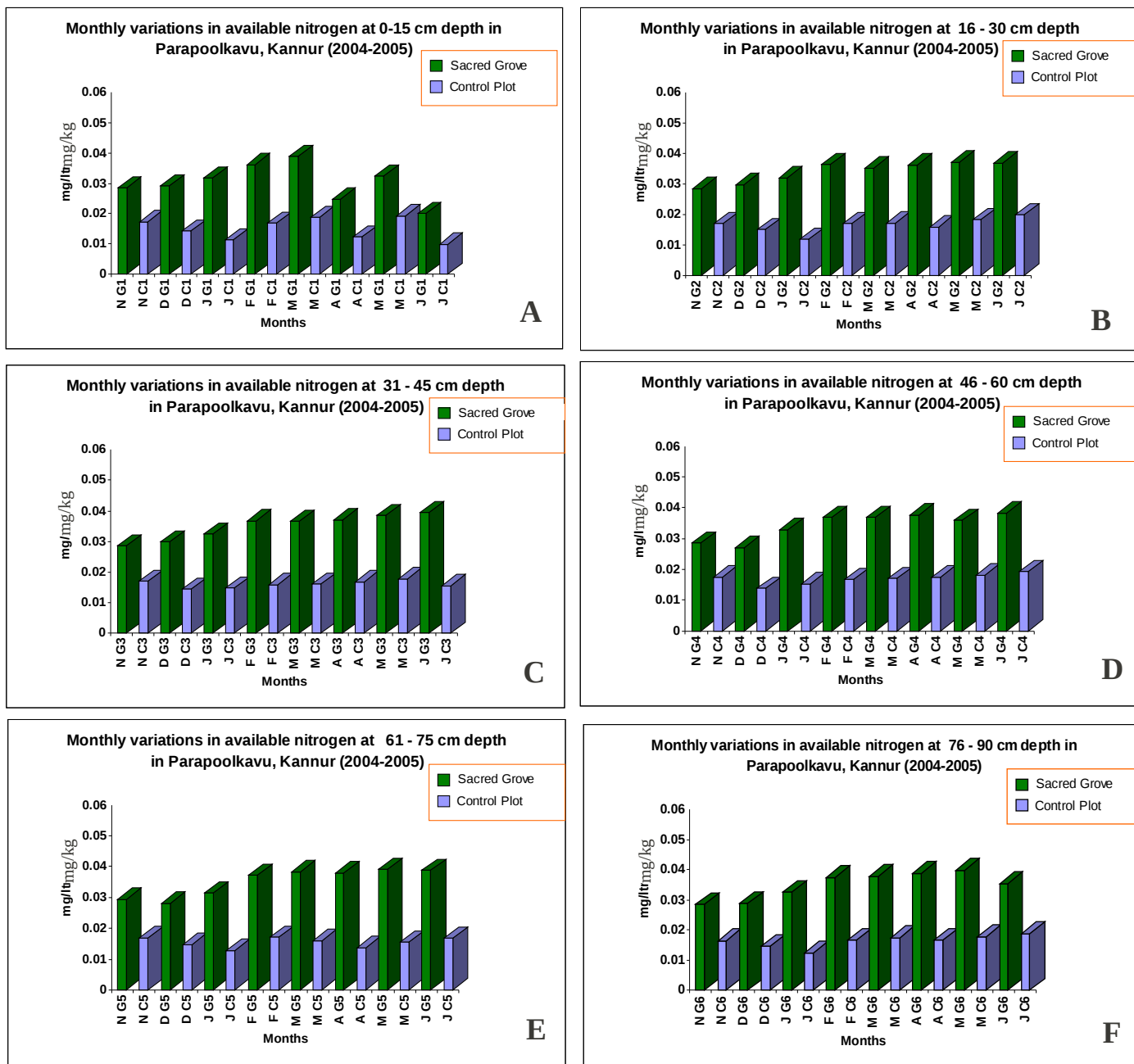


Figure 71 A-F. Monthly Variations in Soil Nitrogen: Parappookavu (2004-05)

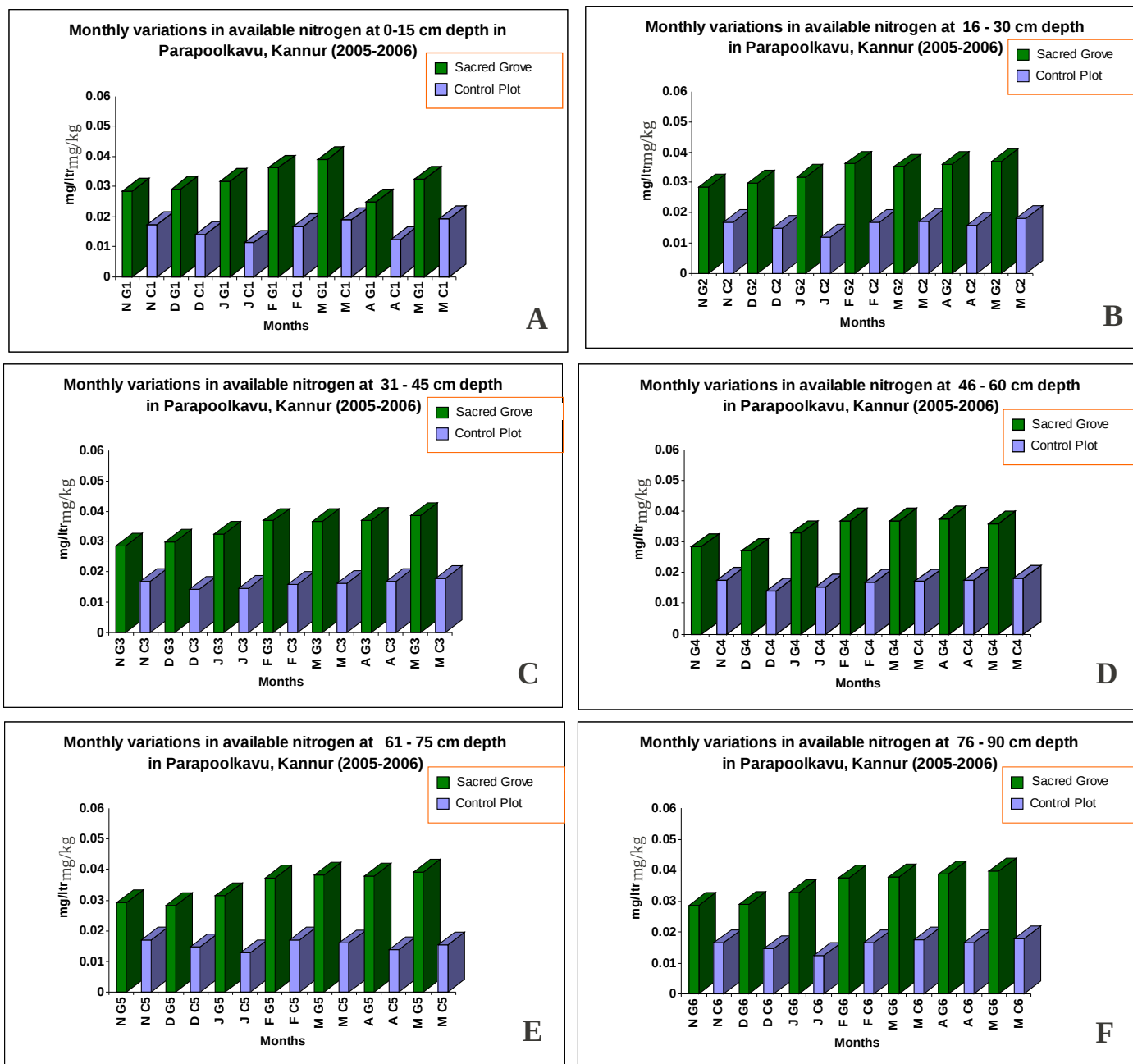


Figure 72 A-F. Monthly Variations in Soil Nitrogen: Parapoolkavu (2005-06)

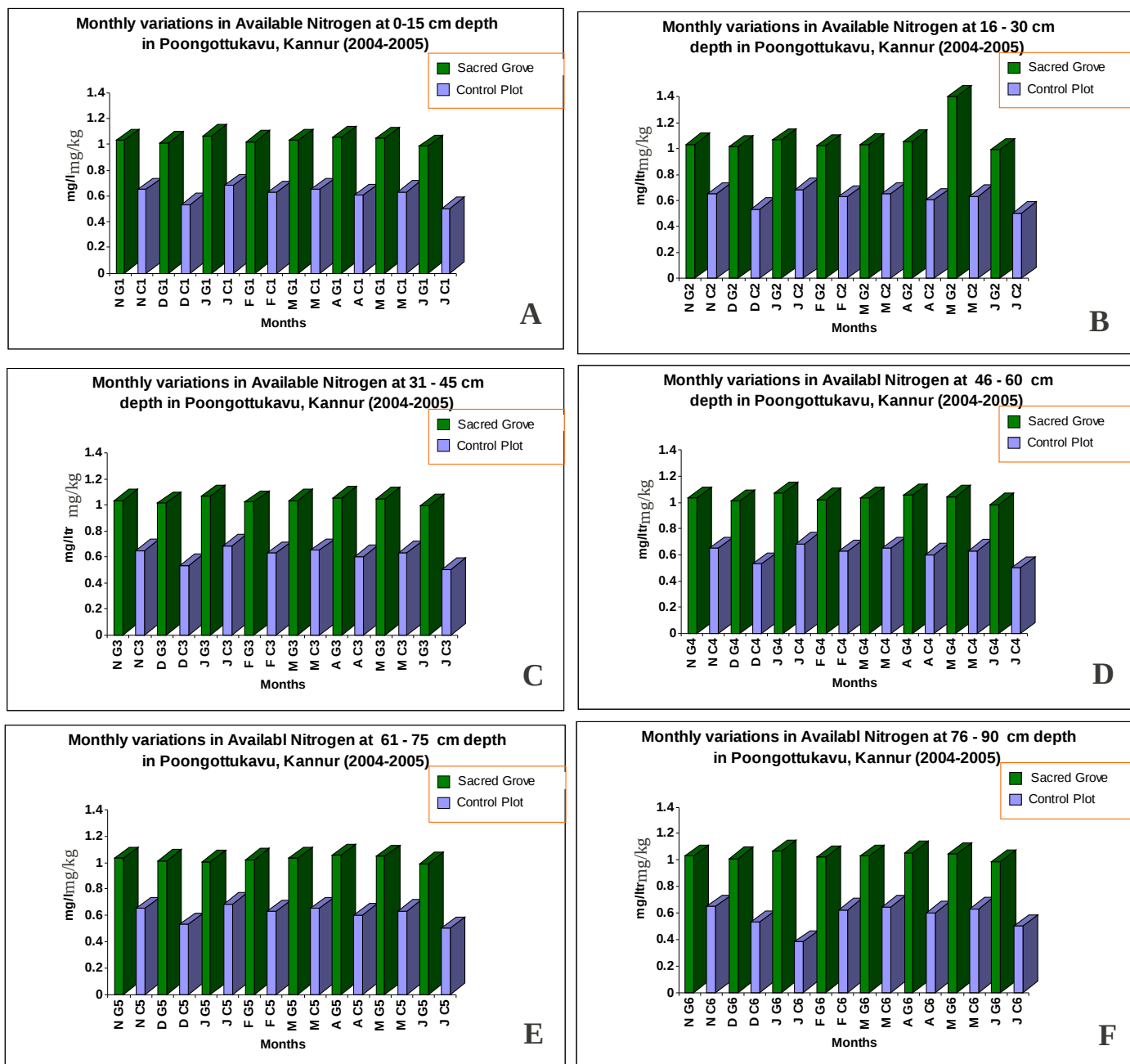


Figure 73 A-F. Monthly Variations in Soil Nitrogen: Poongottukavu (2004-05)

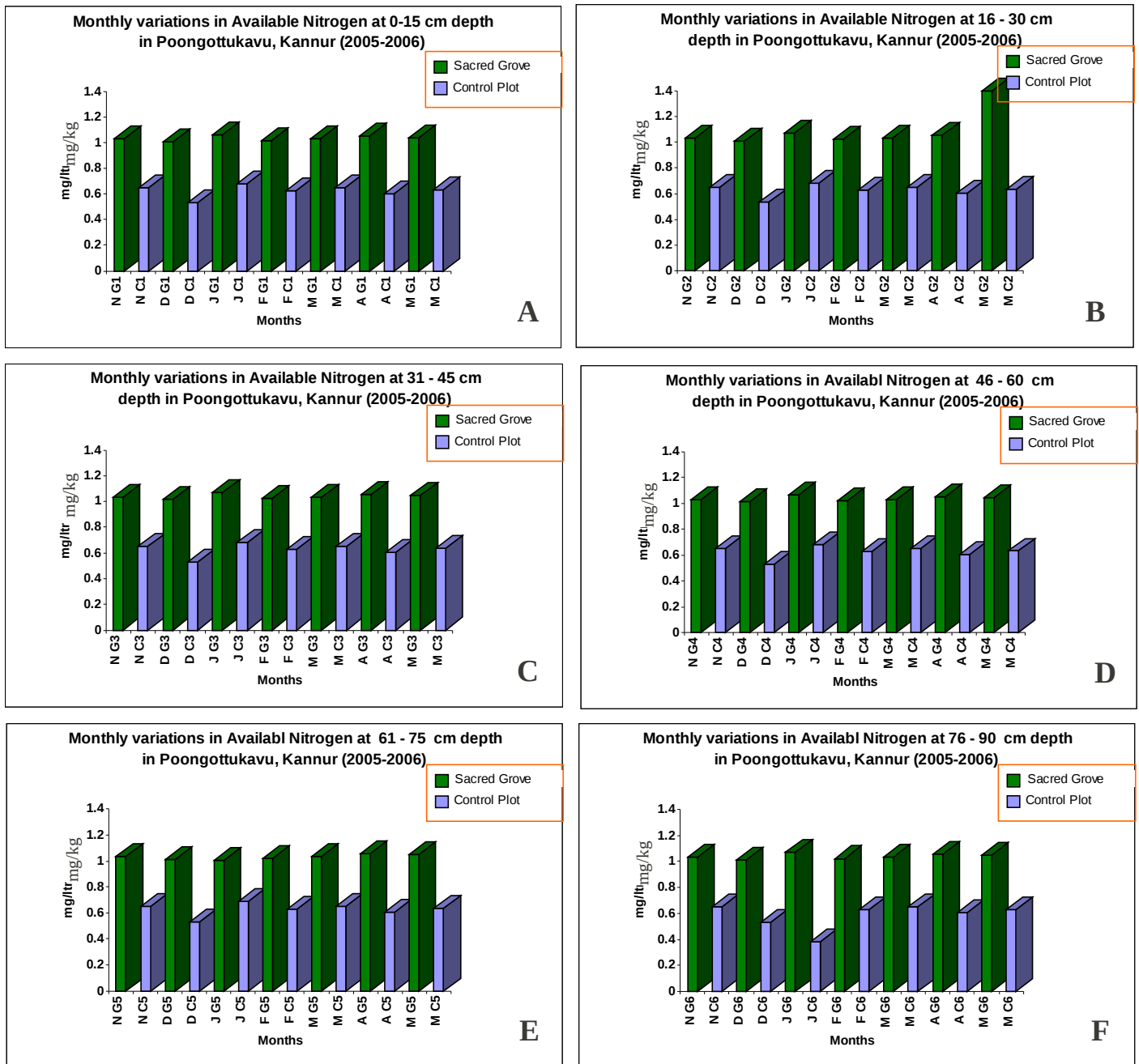


Figure 74 A-F. Monthly Variations in Soil Nitrogen: Poongottukavu (2005-06)

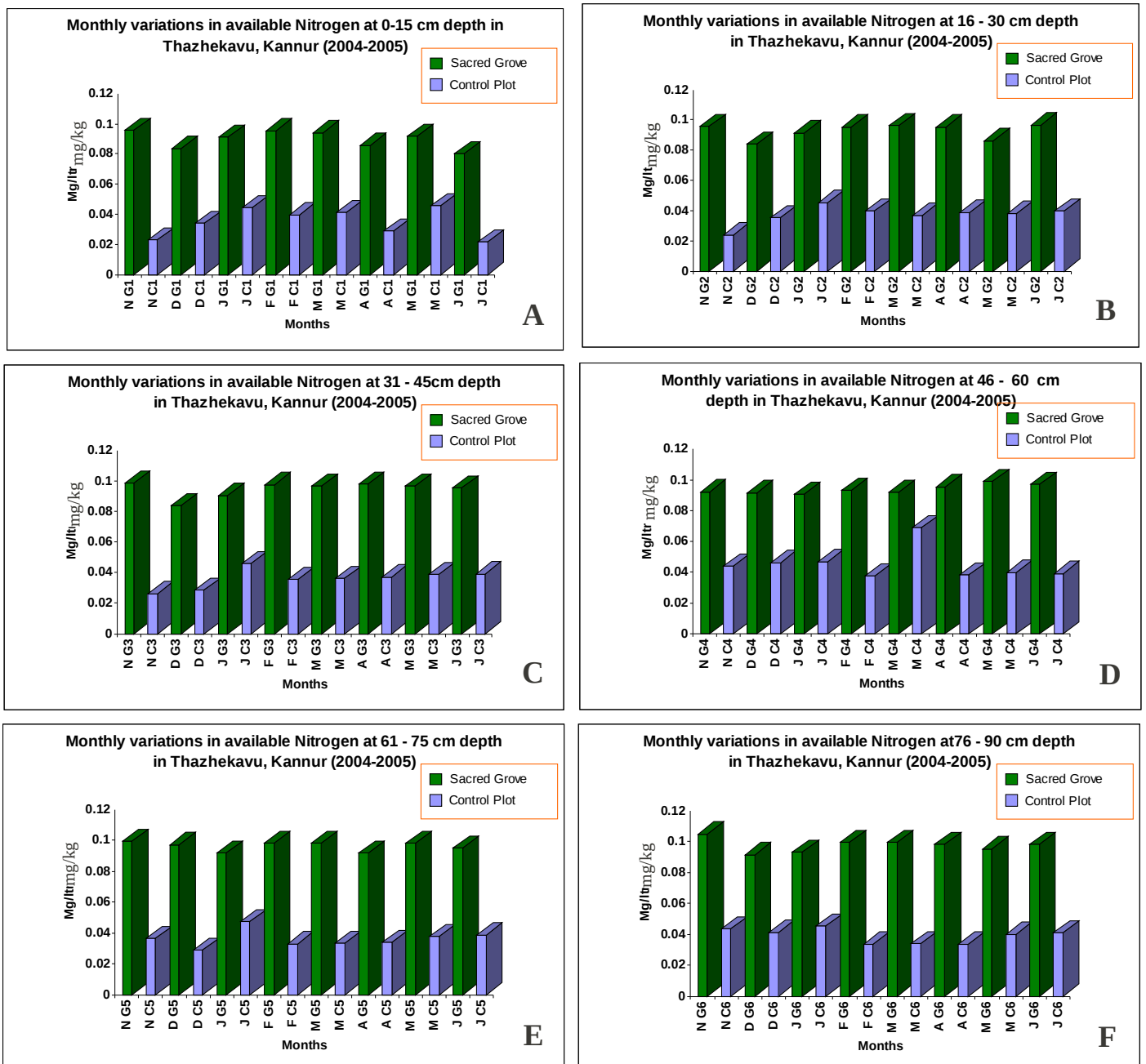


Figure 75 A-F. Monthly Variations in Soil Nitrogen: Thazhekkavu 2004-05)

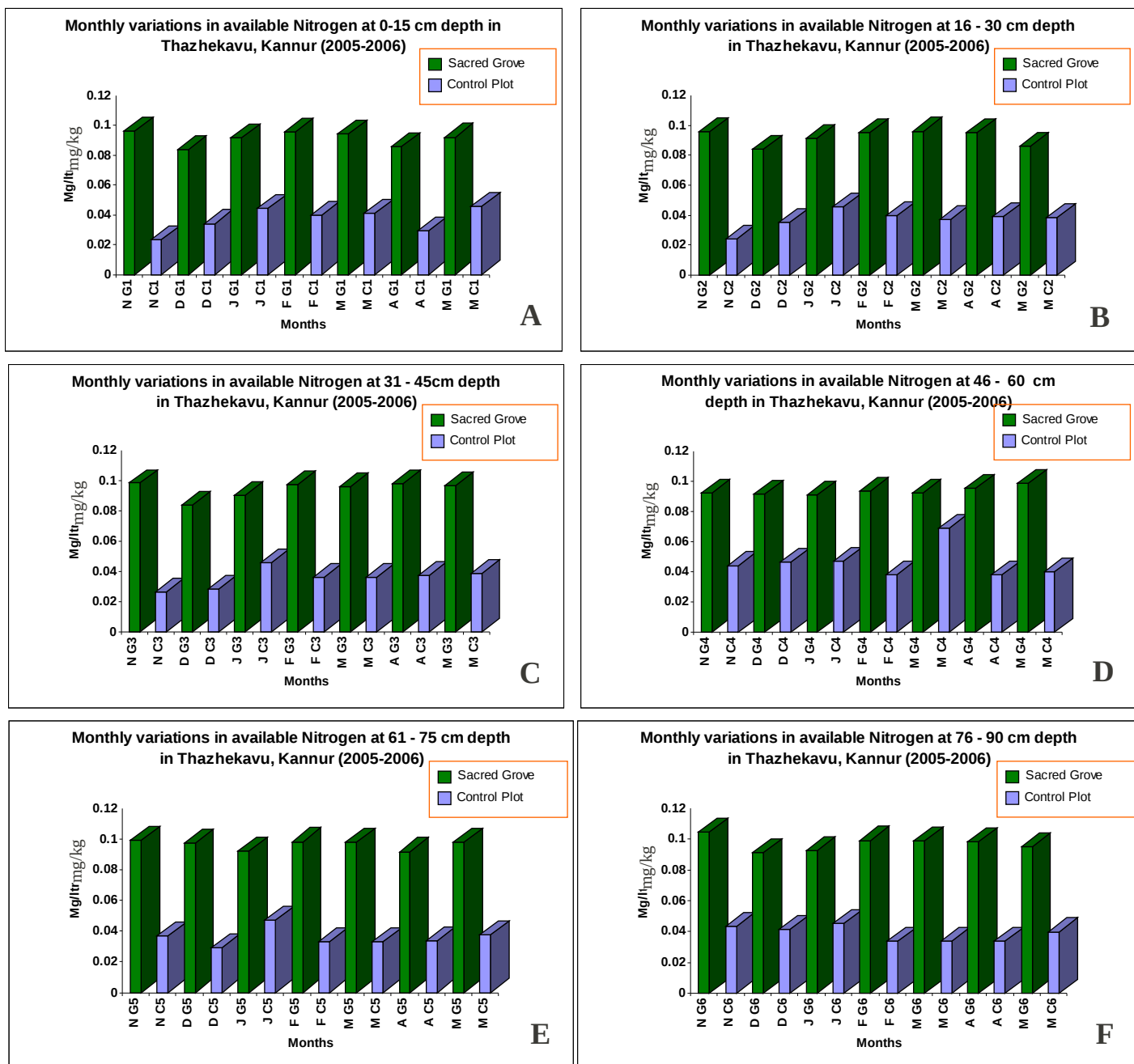


Figure 76 A-F. Monthly Variations in Soil Nitrogen: Thazhekkavu (2005-06)

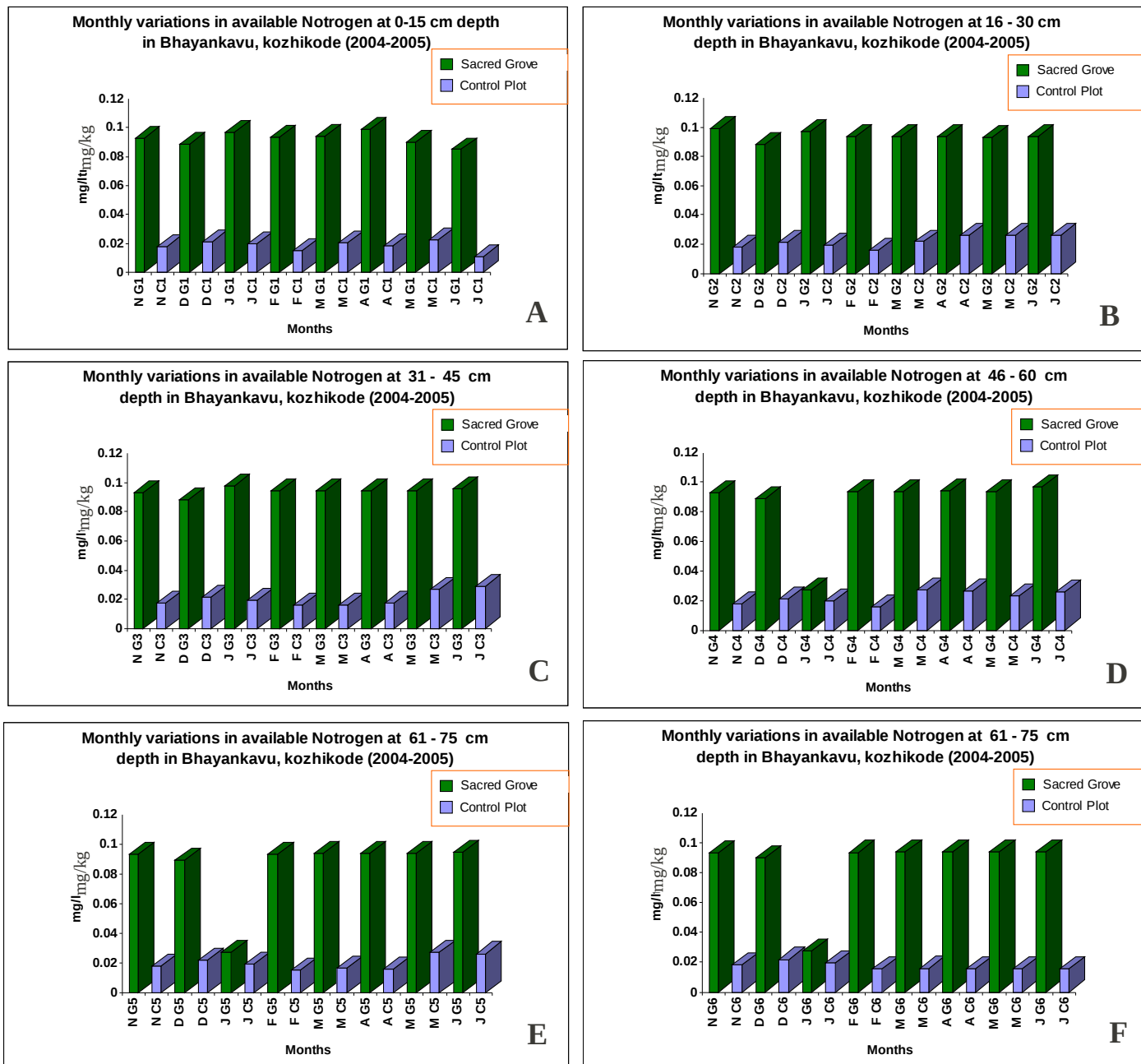


Figure 77 A-F. Monthly Variations in Soil Nitrogen: Bhayankavu (2004-05)

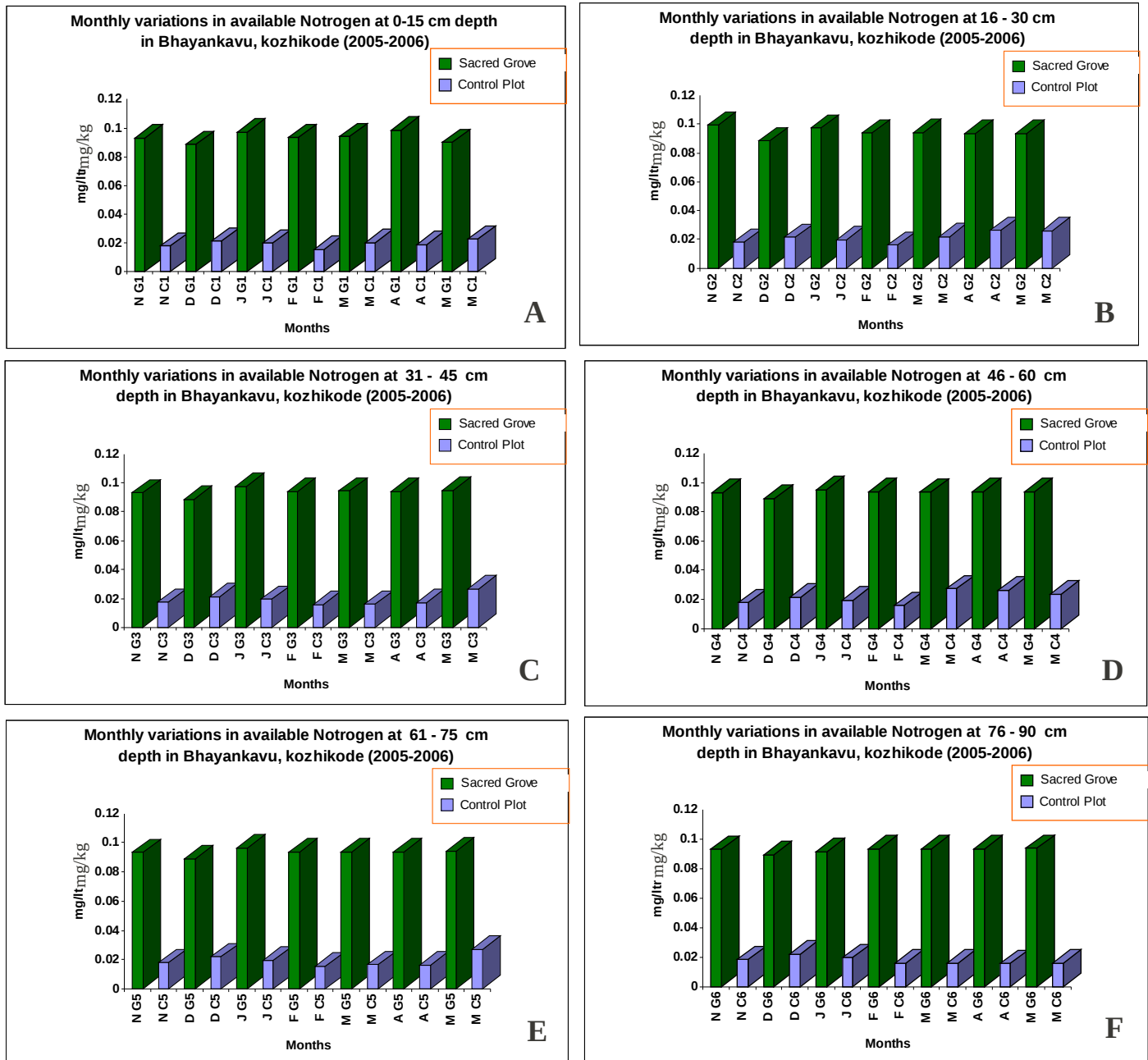


Figure 78 A-F. Monthly Variations in Soil Nitrogen: Bhayankavu (2005-06)

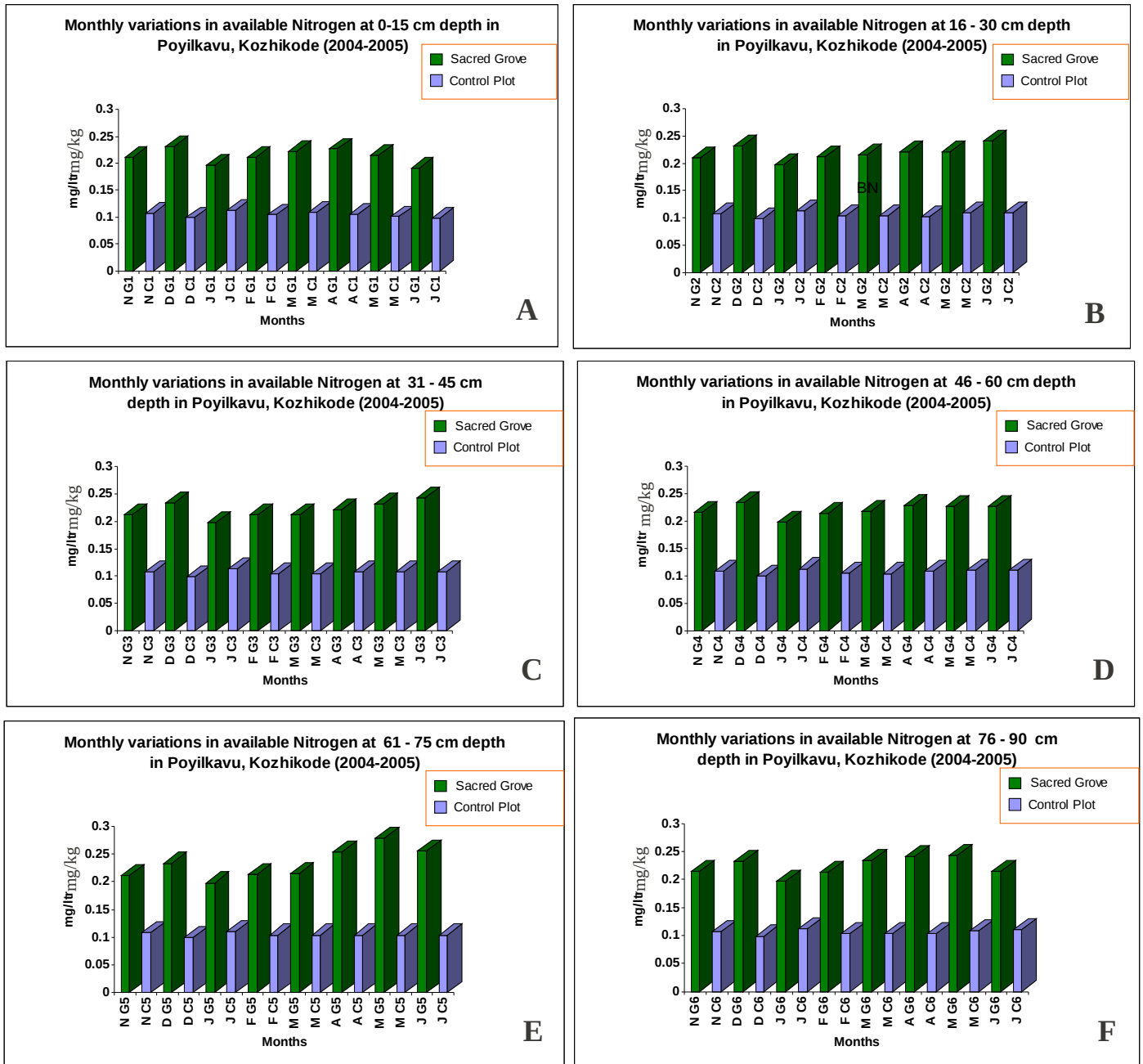


Figure 79 A-F. Monthly Variations in Soil Nitrogen: Poyilkkavu (2004-05)

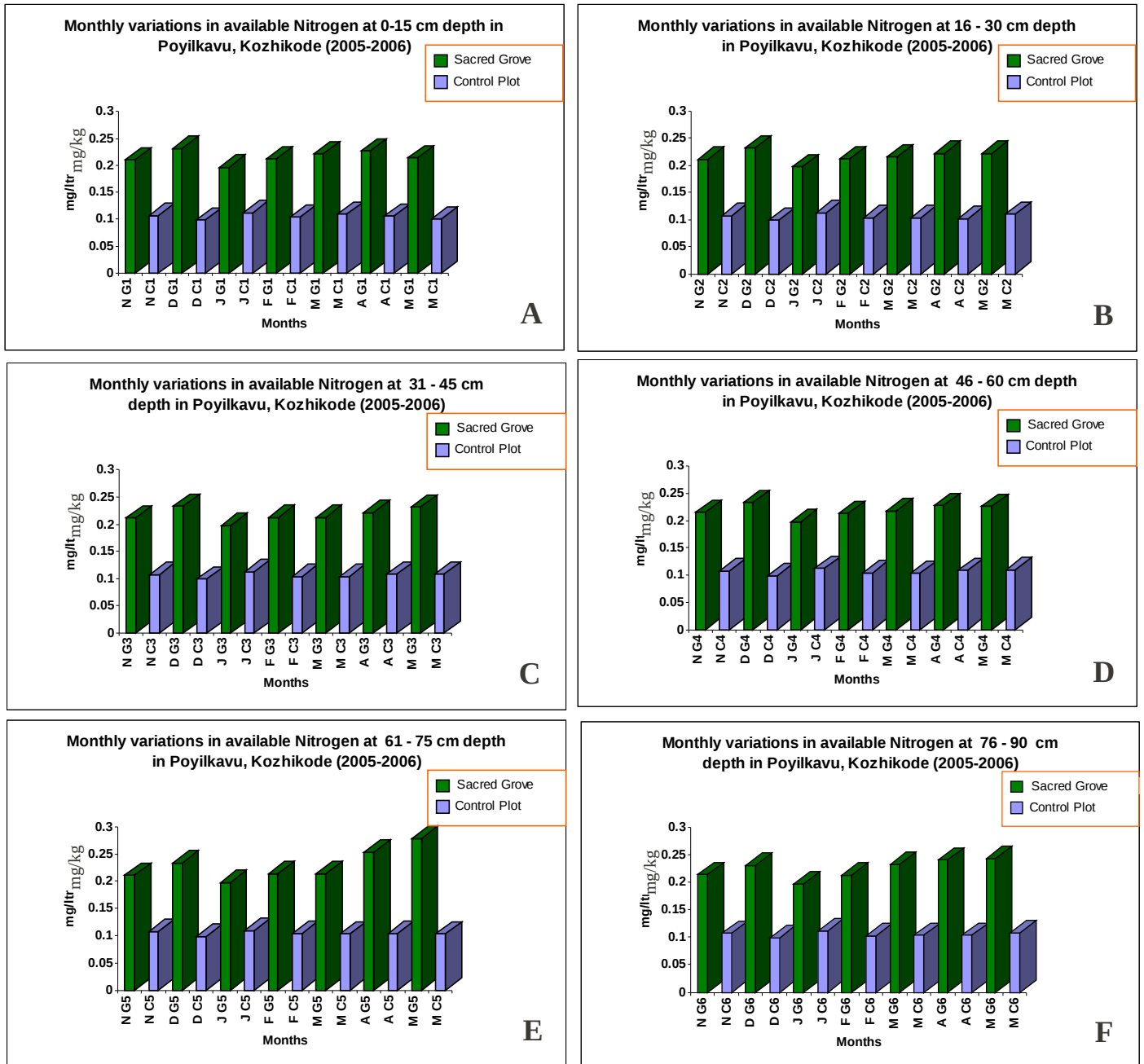


Figure 80 A-F. Monthly Variations in Soil Nitrogen: Poyilkkavu (2005-06)

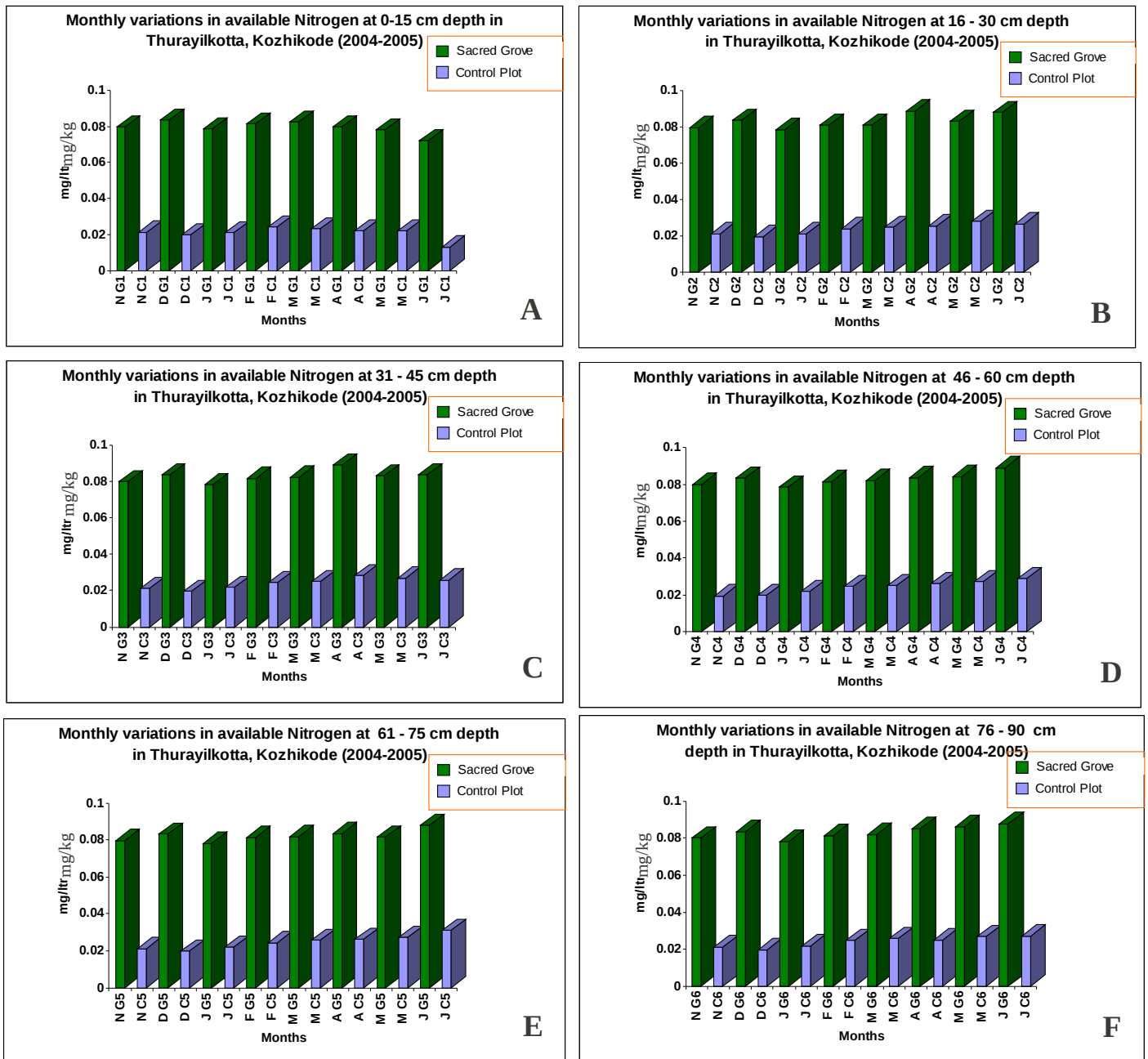


Figure 81 A-F. Monthly Variations in Soil Nitrogen: Thurayilkavu (2004-05)

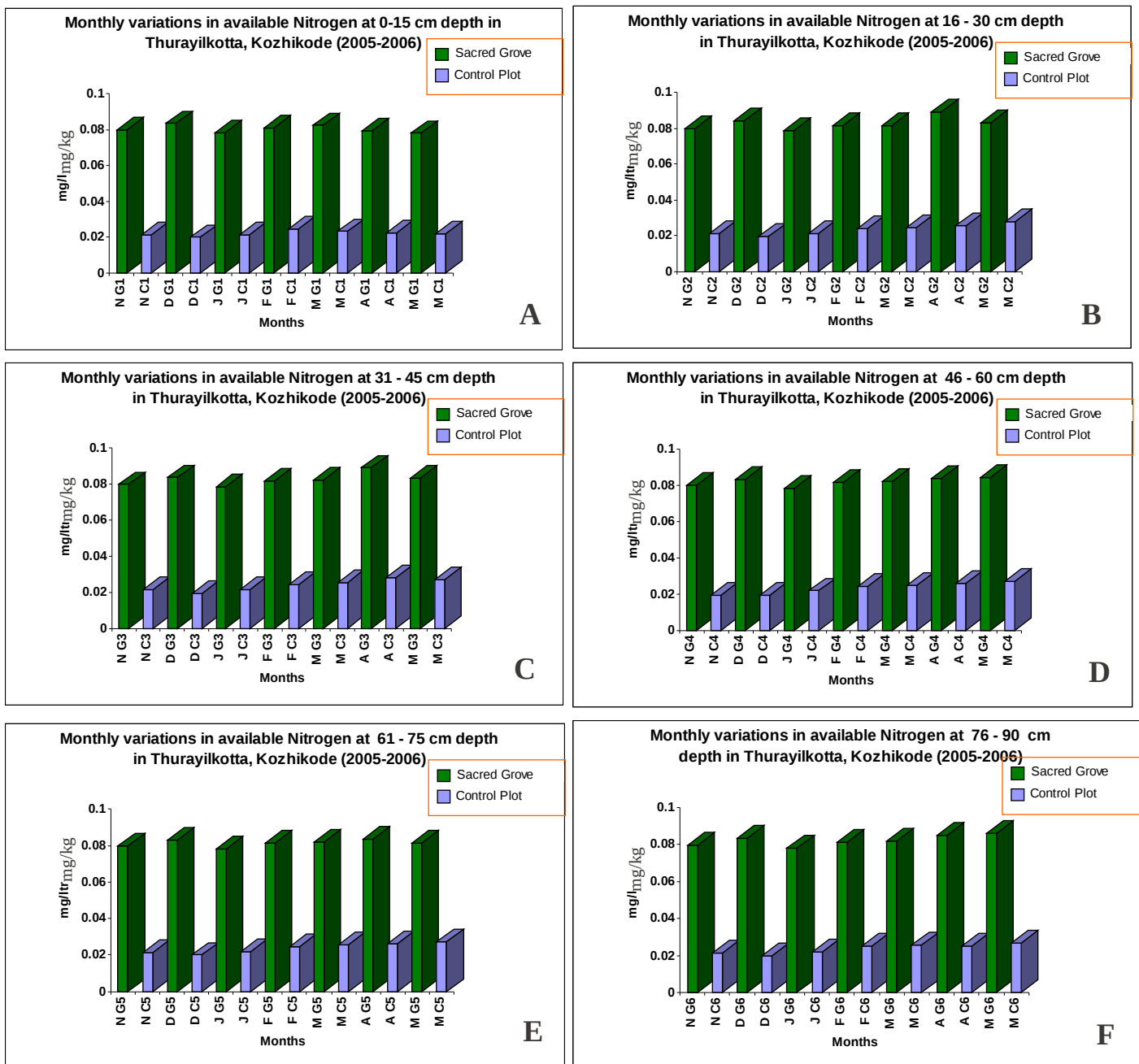


Figure 82 A-F. Monthly Variations in Soil Nitrogen: Thurayilkavu (2005-06)

4.2.8 Exchangeable Sodium

Sodium is the dominant cation in soil. The comparison of sodium content in sacred groves and control plots are presented in figures 83 to 96. Seasonal variations revealed that higher concentration of exchangeable sodium was observed during the pre/post-monsoon seasons. The lowest concentration was observed during the monsoon season. This may be due to the dilution of sodium in rain water. The higher concentration of sodium in sacred grove soils may be attributed to the cation exchange capacity of the soils.

Increase in concentration of sodium from 67% to 207% over the control has been recorded in sacred grove soils of all the seven sacred groves studied (Table 19). From the tables, it is clearly distinguishable that the soil of Thazhekkavu shows very high sodium content (1171 mg/kg soil) compared to control (597.63 mg/kg soil), which is very much higher than the values recorded for other sacred groves. This may be due to the fact that this grove is located in a brackish water area with mangroves as the predominant vegetation. Hence, the soil may contain high amount of sodium due to saline water intrusion. This is also supported by the high EC values in the soils of this grove (Table 16).

Table19. Variations in Soil Na (mg/kg) in Sacred Groves: 2004-06

Name of Sacred Grove	Treatments	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Mean	Increase/ Decrease (%)
Kammadathukavu	G	3.28	4.41	3.83	4.17	3.59	4.31	3.69	2.98	3.78	193.02
	C	1.43	1.44	1.26	1.37	1.18	1.34	1.17	1.10	1.29	
Parappoolkavu	G	2.75	2.83	2.15	2.63	2.27	2.76	2.36	2.75	2.56	67.32
	C	1.66	1.25	1.61	1.63	1.35	1.44	1.66	1.66	1.53	
Poongottukavu	G	4.31	5.84	5.95	4.97	5.71	5.36	4.55	3.95	5.08	96.14
	C	2.45	2.16	2.44	3.00	3.06	2.97	2.86	1.76	2.59	
Thazhekkavu	G	1146	2456	1028	900	946	1061	911	916	1171	95.94
	C	639	634	539	656	643	693	566	411	597.63	
Bhayankavu	G	5.83	4.77	5.23	5.67	5.55	4.89	5.48	4.49	5.24	76.43
	C	1.26	1.56	1.18	1.28	1.44	1.37	14.8	0.88	2.97	
Poyilkkavu	G	12.29	11.56	12.65	12.34	12.47	11.95	12.18	11.17	12.08	201.25
	C	4.44	3.94	3.89	4.25	4.39	3.84	4.26	3.08	4.01	
Thurayilkavu	G	3.00	2.00	2.80	2.60	3.20	3.00	2.20	1.60	2.55	207.23
	C	0.90	0.80	0.90	0.80	1.00	0.90	0.80	0.50	0.83	

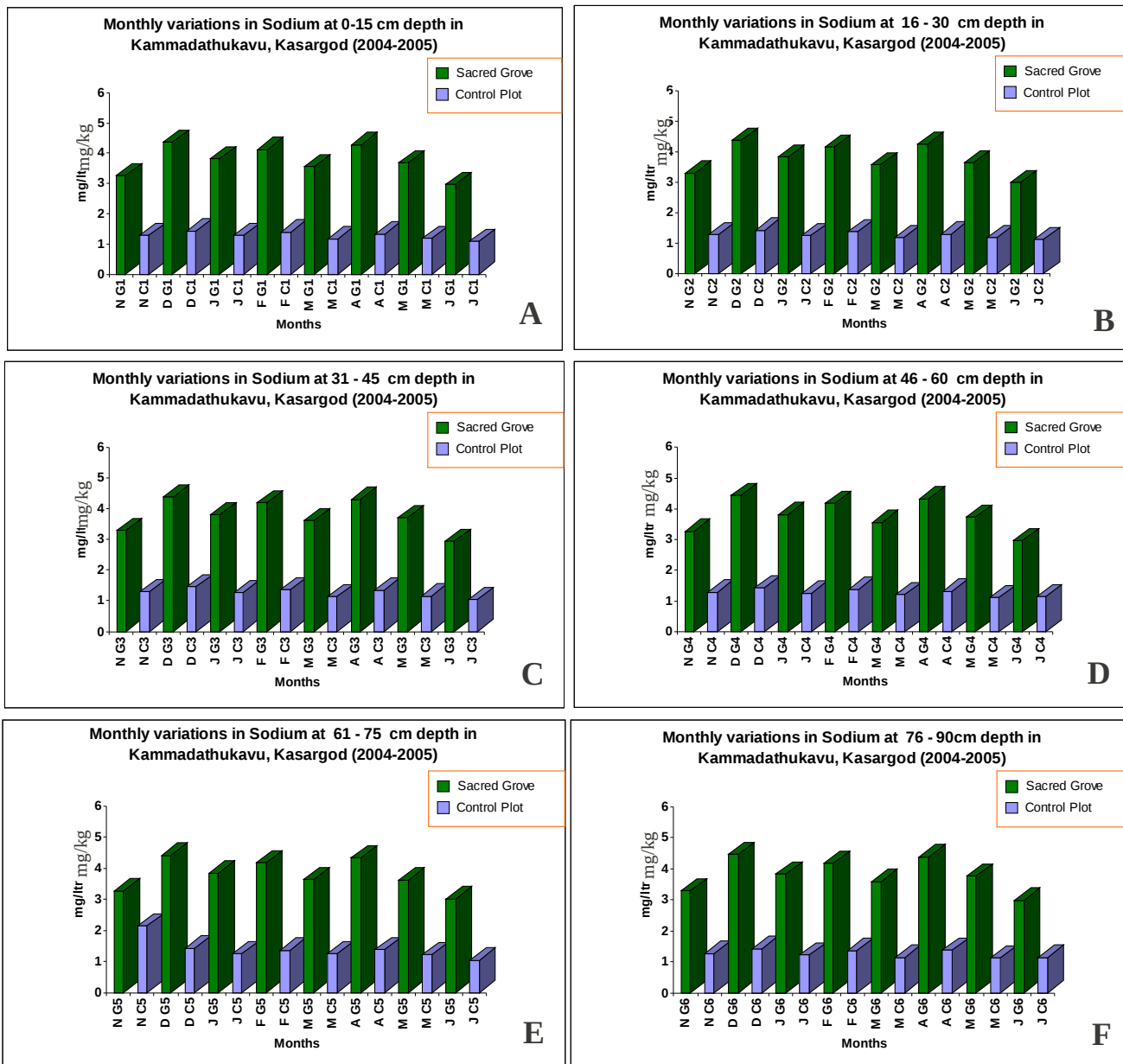


Figure 83 A-F. Monthly Variations in Soil Na: Kammadathukavu (2004-05)

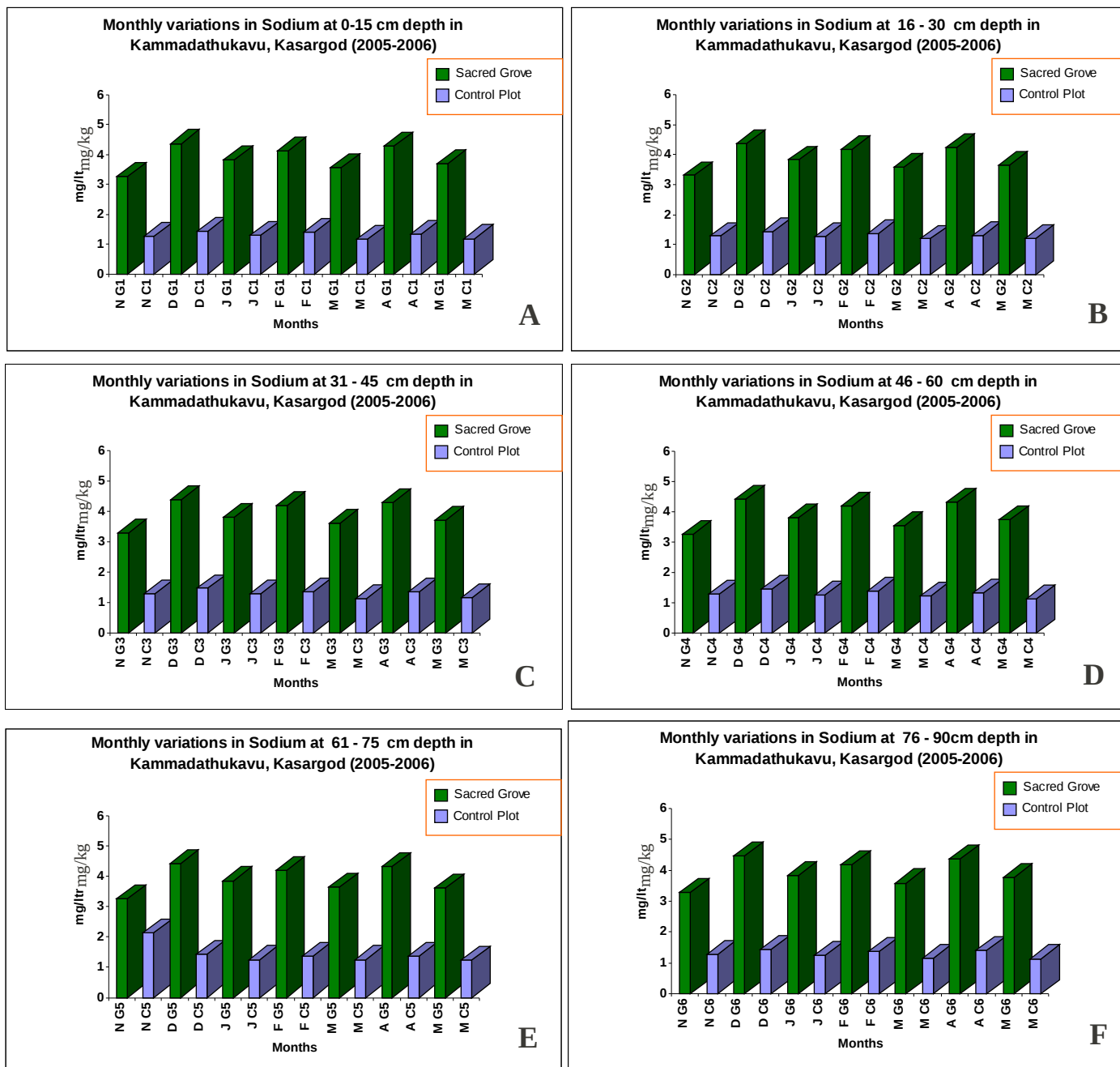


Figure 84 A-F. Monthly Variations in Soil Na: Kammadathukavu (2005-06)

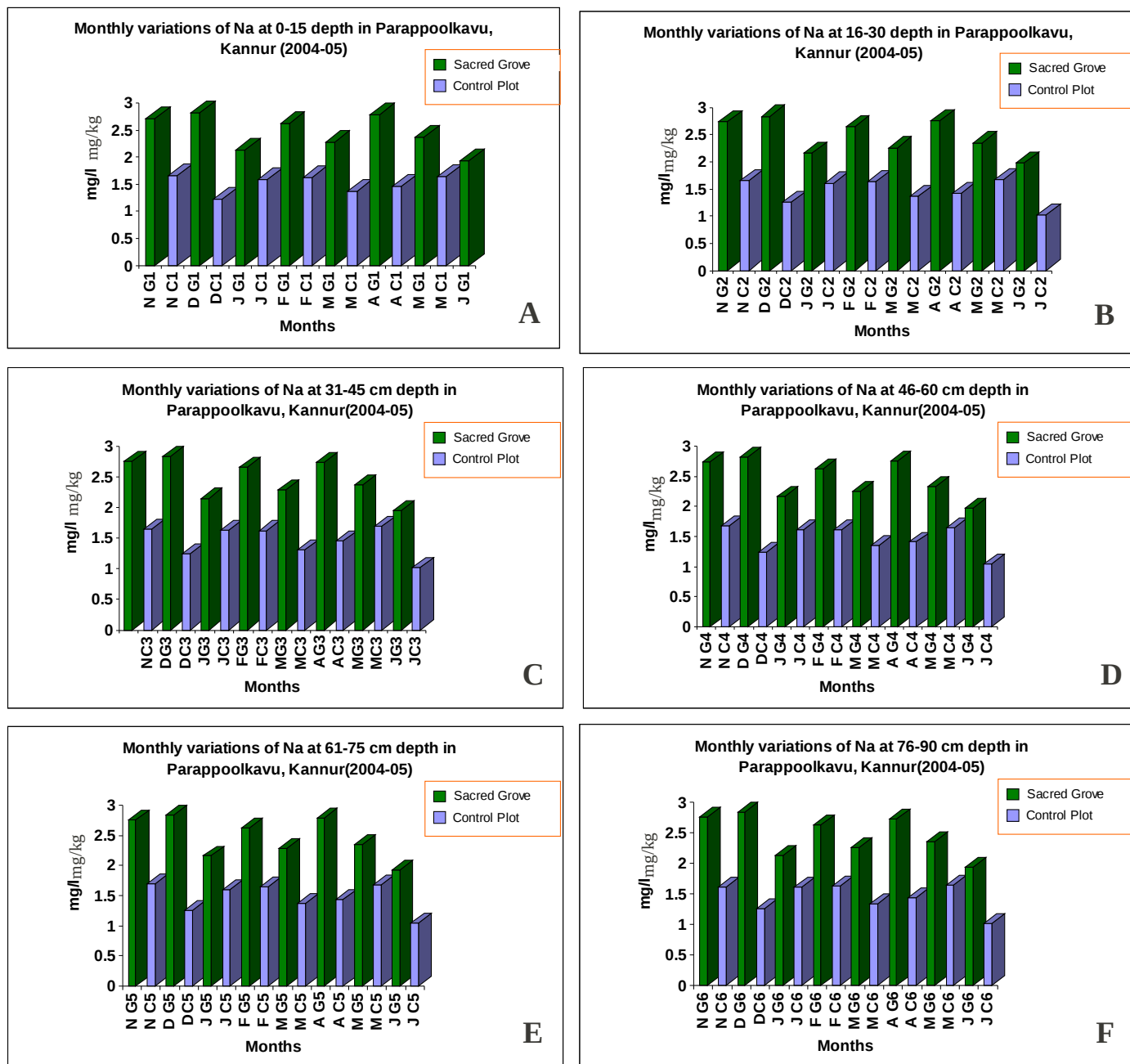


Figure 85 A-F. Monthly Variations in Soil Na: Parappoolkavu (2004-05)

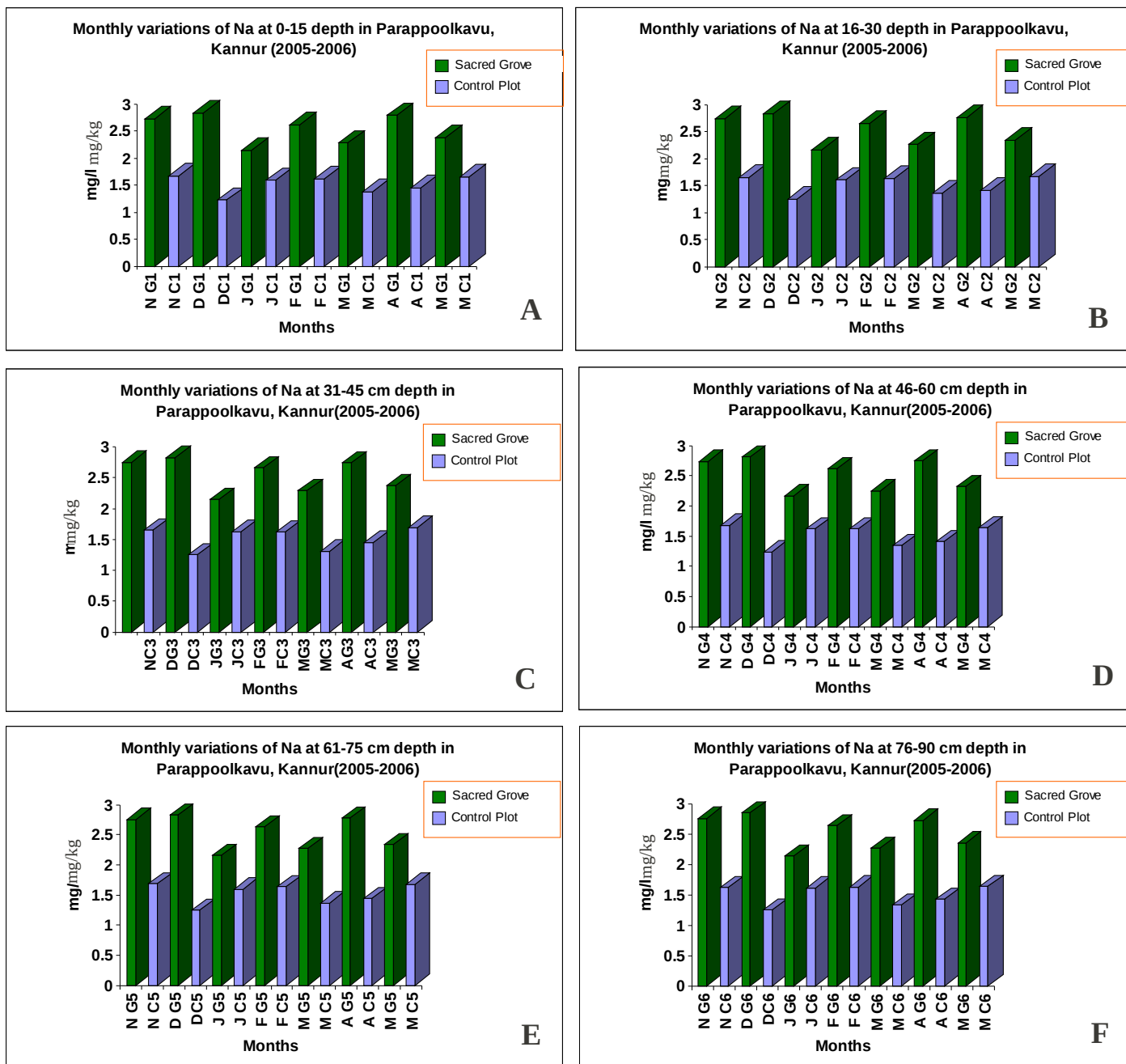


Figure 86 A-F. Monthly Variations in Soil Na: Parappoolkavu (2005-06)

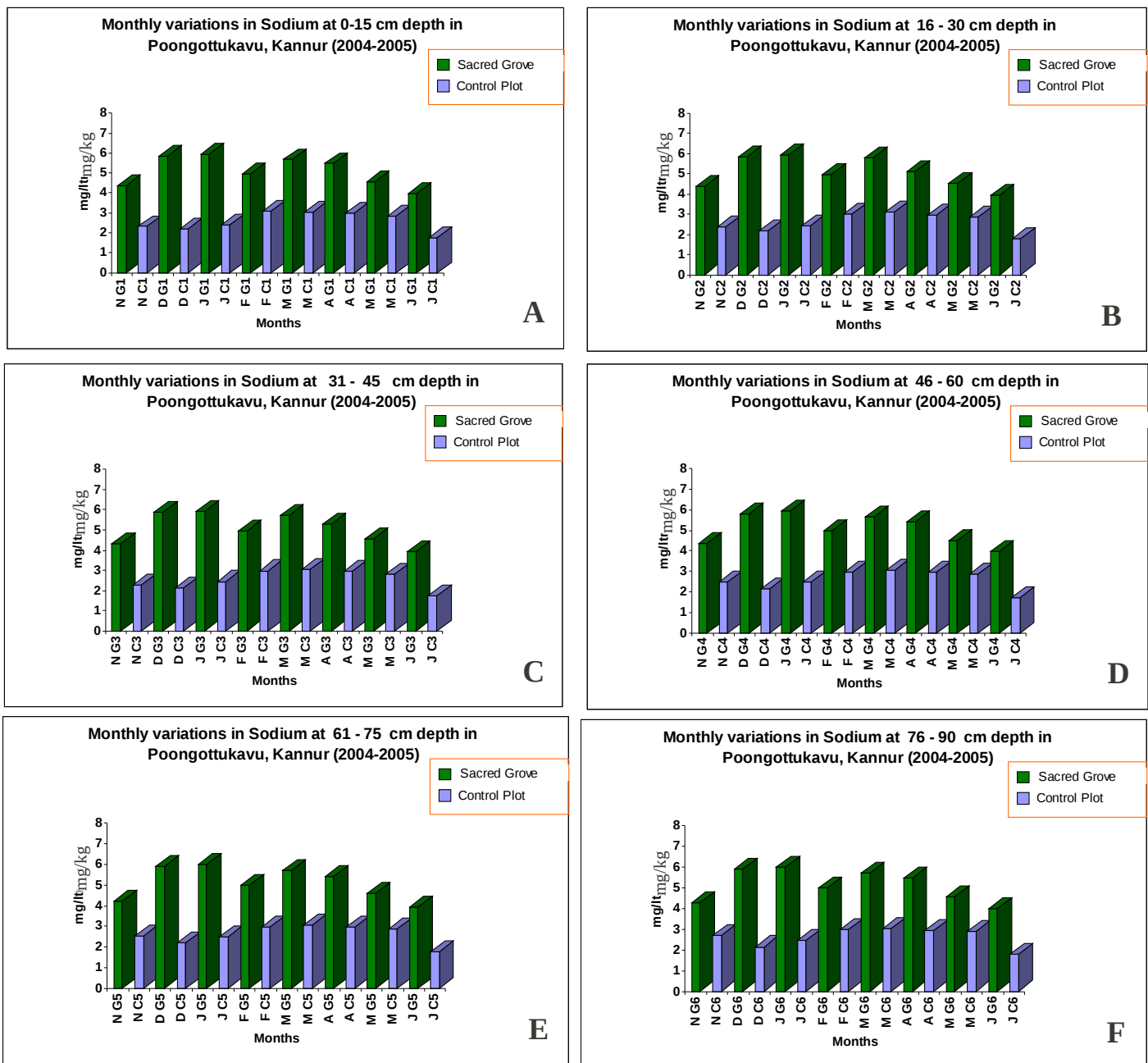


Figure 87 A-F. Monthly Variations in Soil Na: Poongottukavu (2004-05)

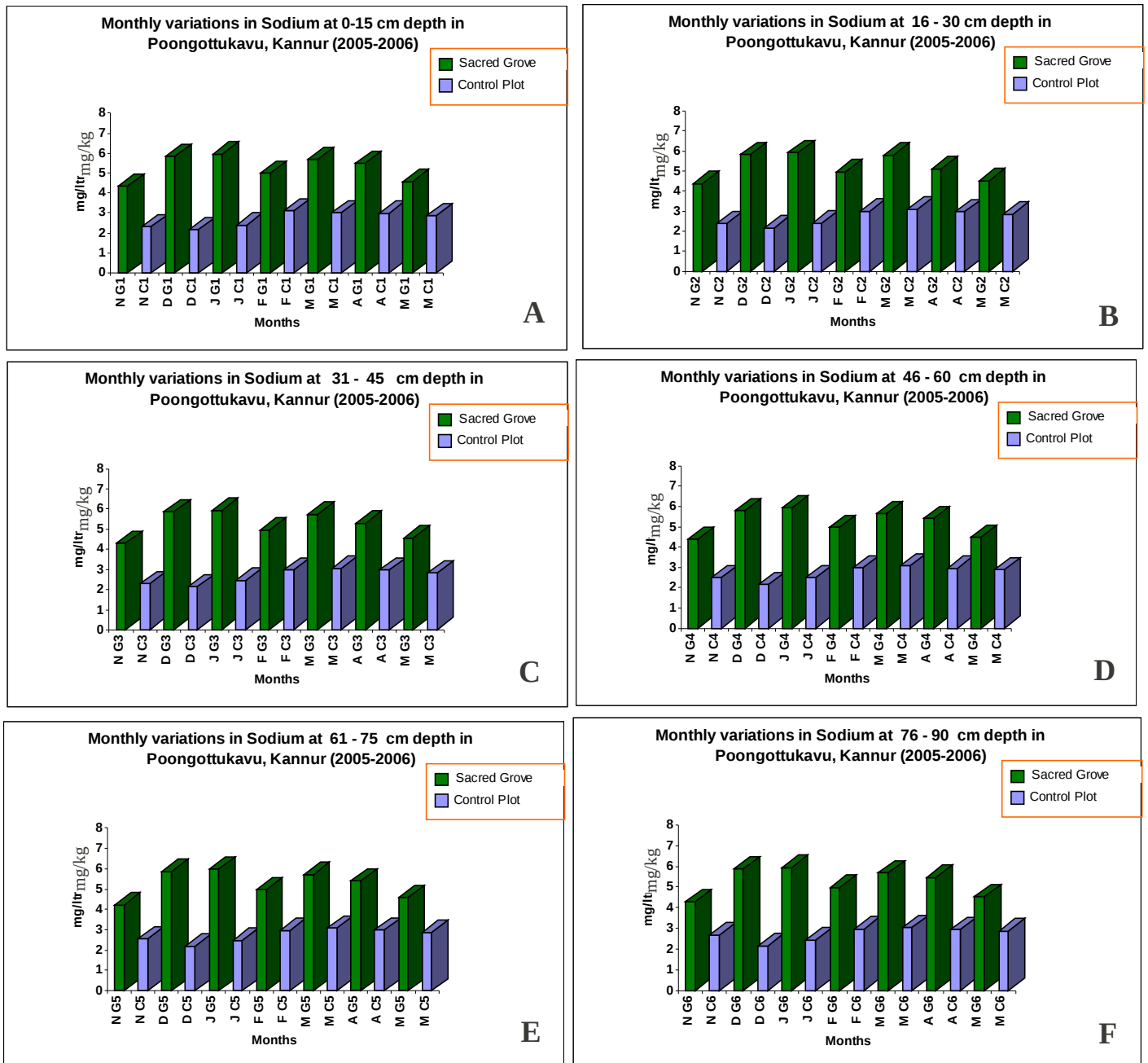


Figure 88 A-F. Monthly Variations in Soil Na: Poongottukavu (2005-06)

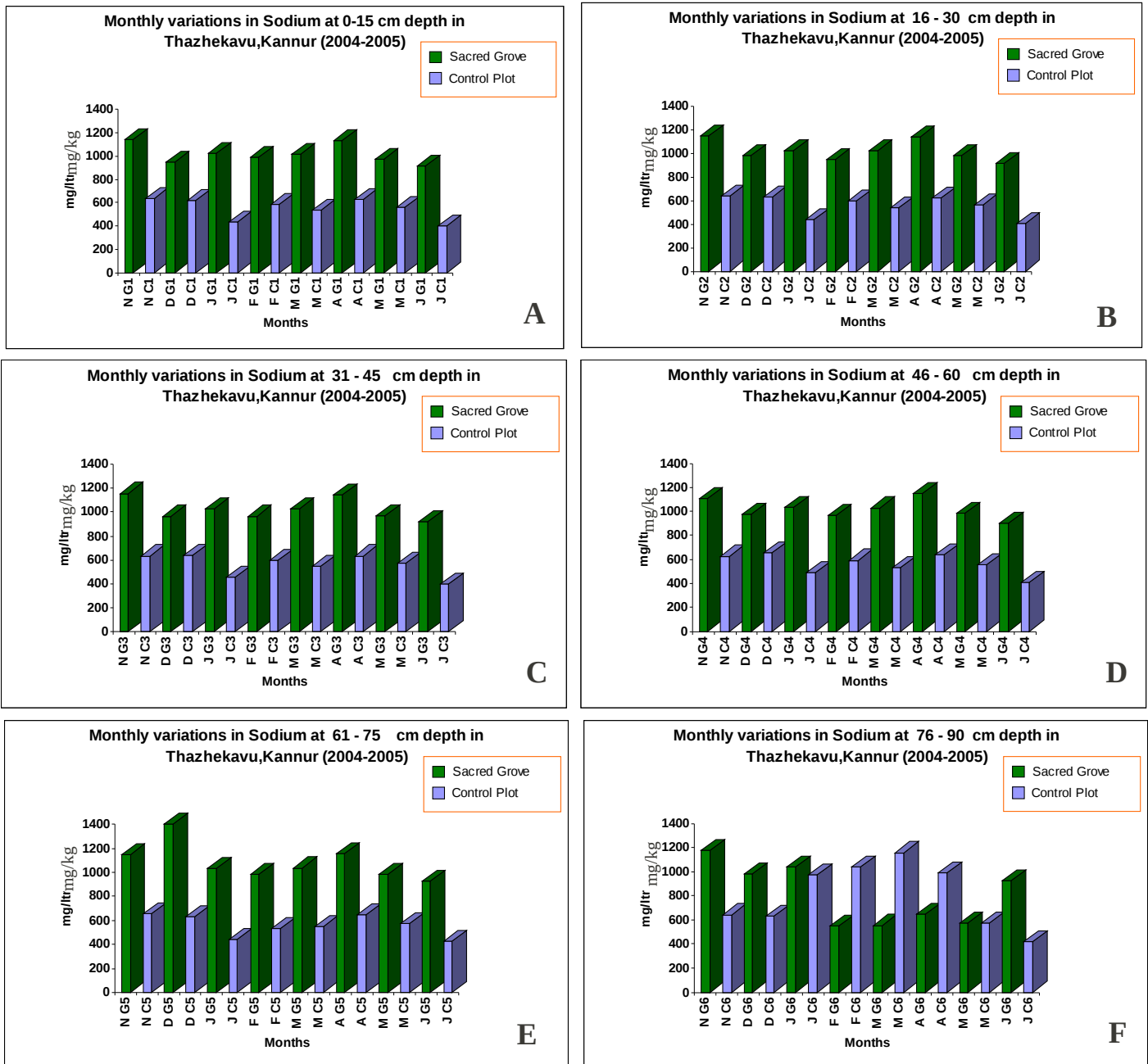


Figure 89 A-F. Monthly Variations in Soil Na: Thazhekkavu (2004-05)

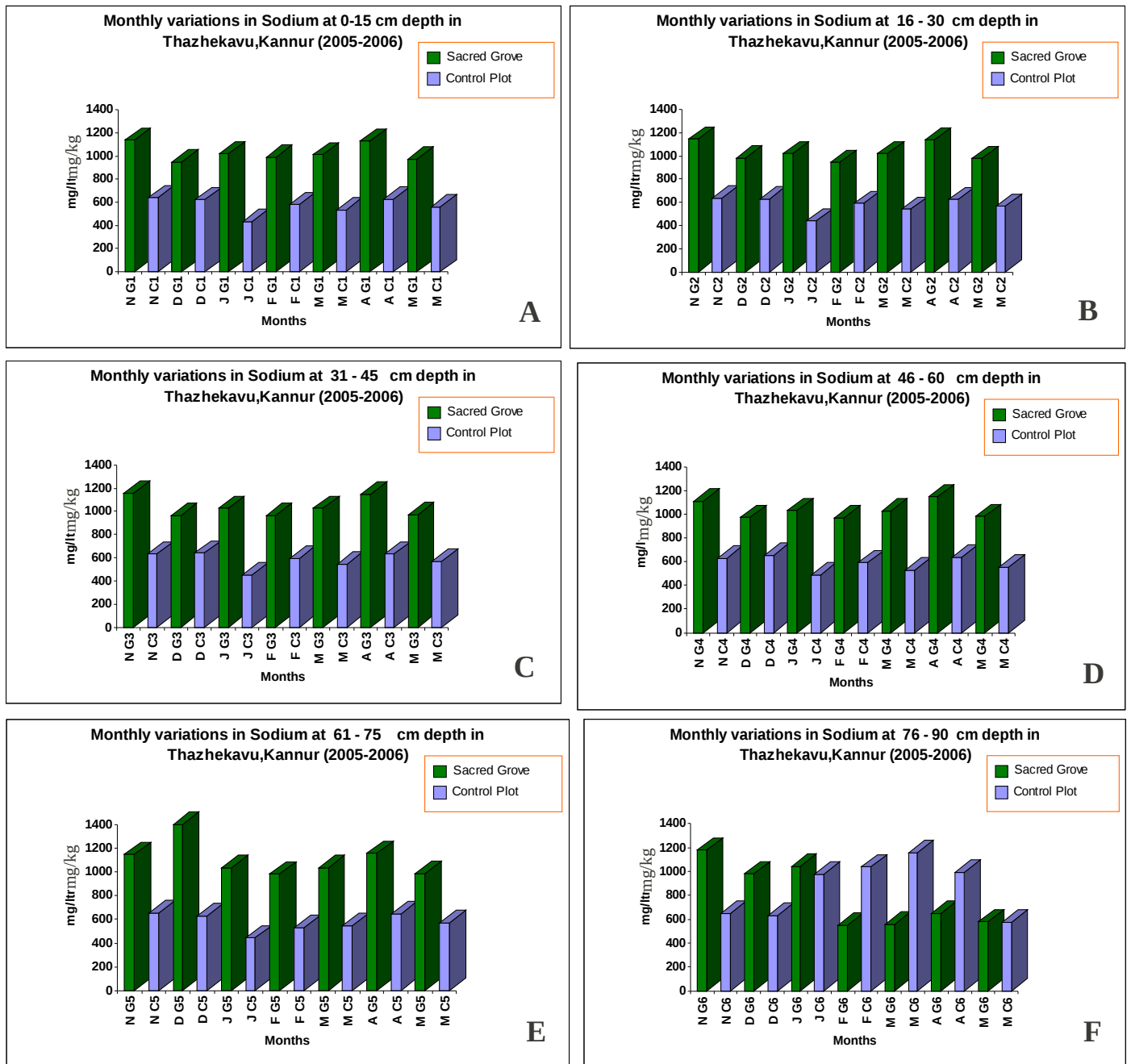


Figure 90 A-F. Monthly Variations in Soil Na: Thazhekkavu (2005-06)

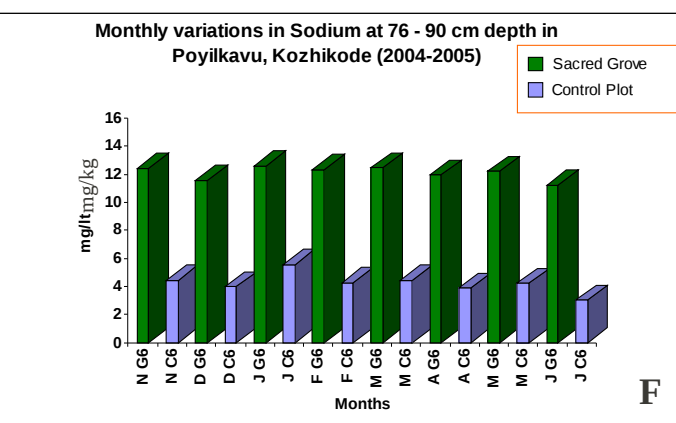
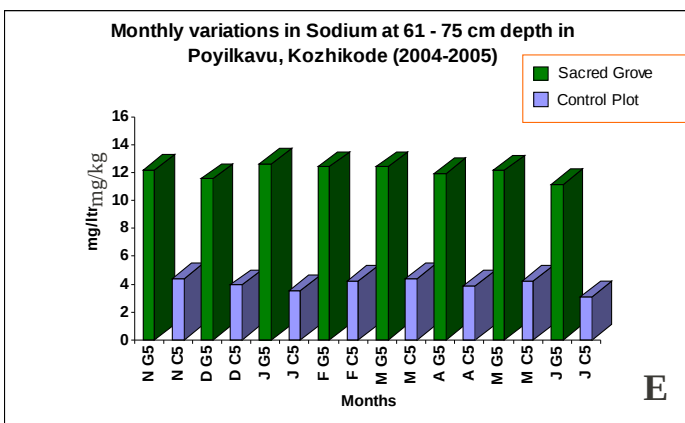
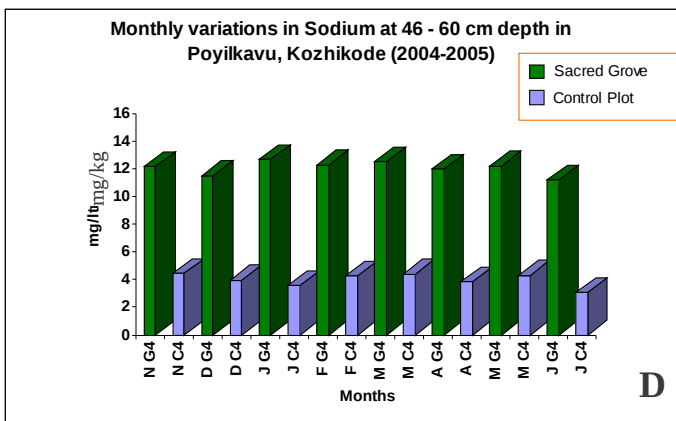
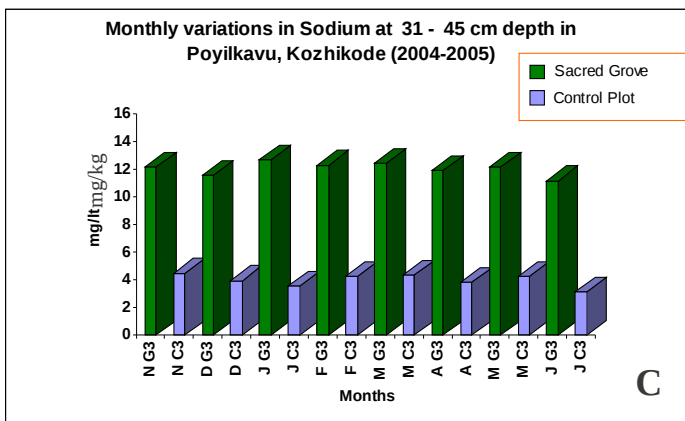
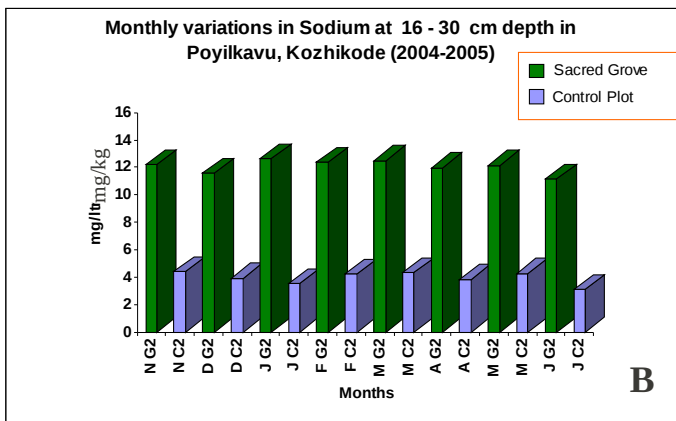
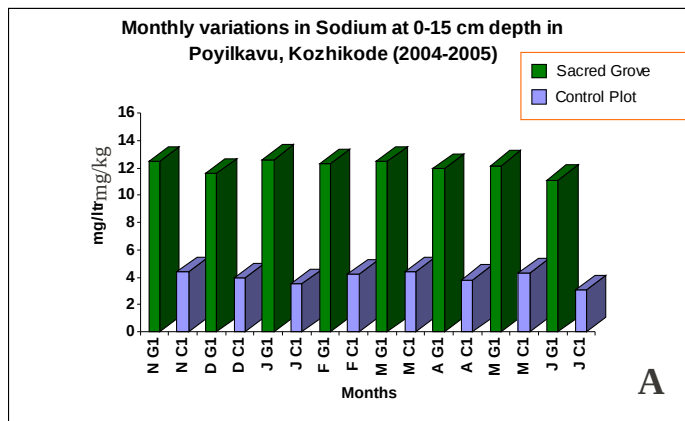


Figure 91 A-F. Monthly Variations in Soil Na: Poyilkkavu (2004-05)

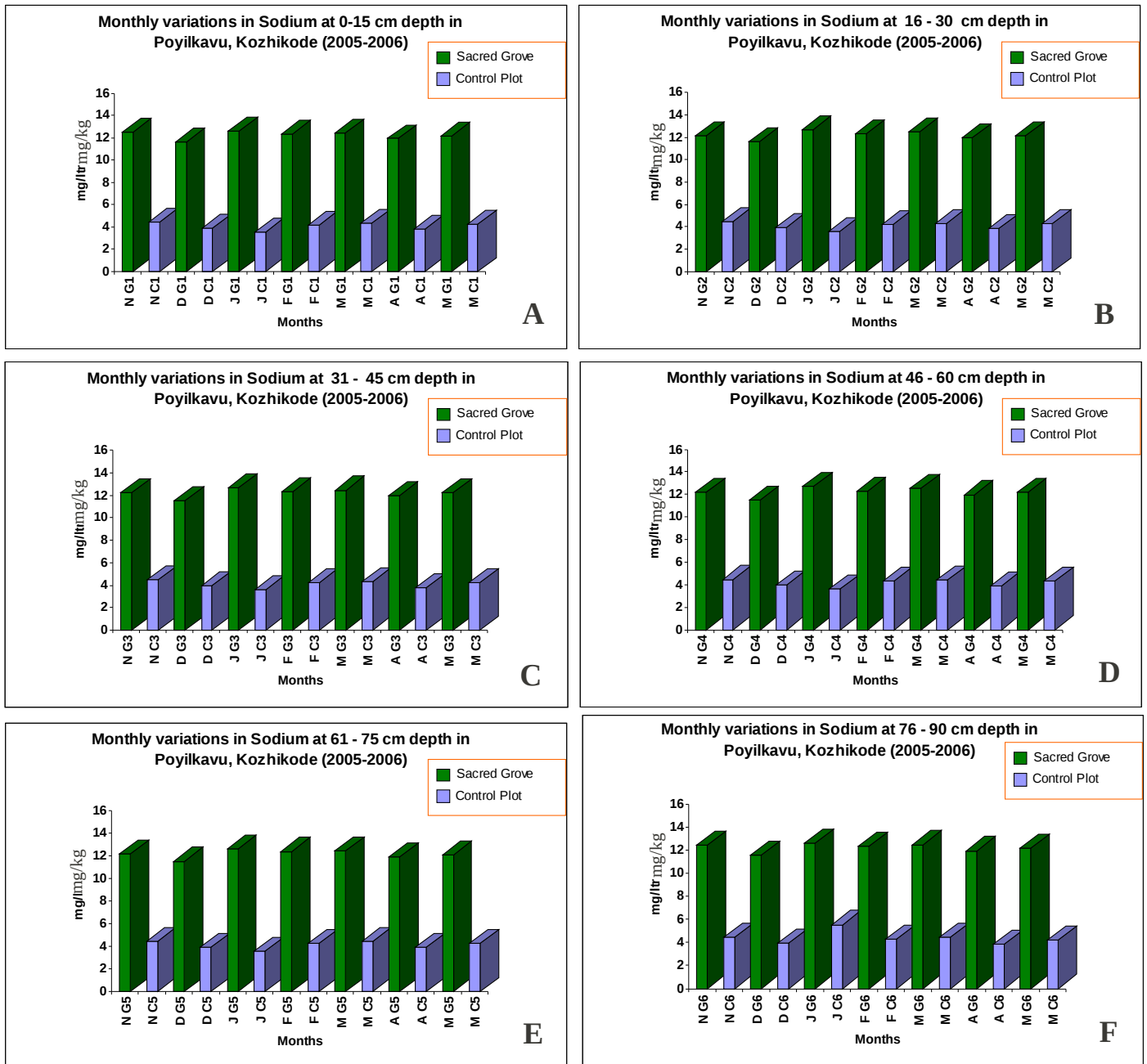


Figure 92 A-F. Monthly Variations in Soil Na: Poyilkkavu (2005-06)

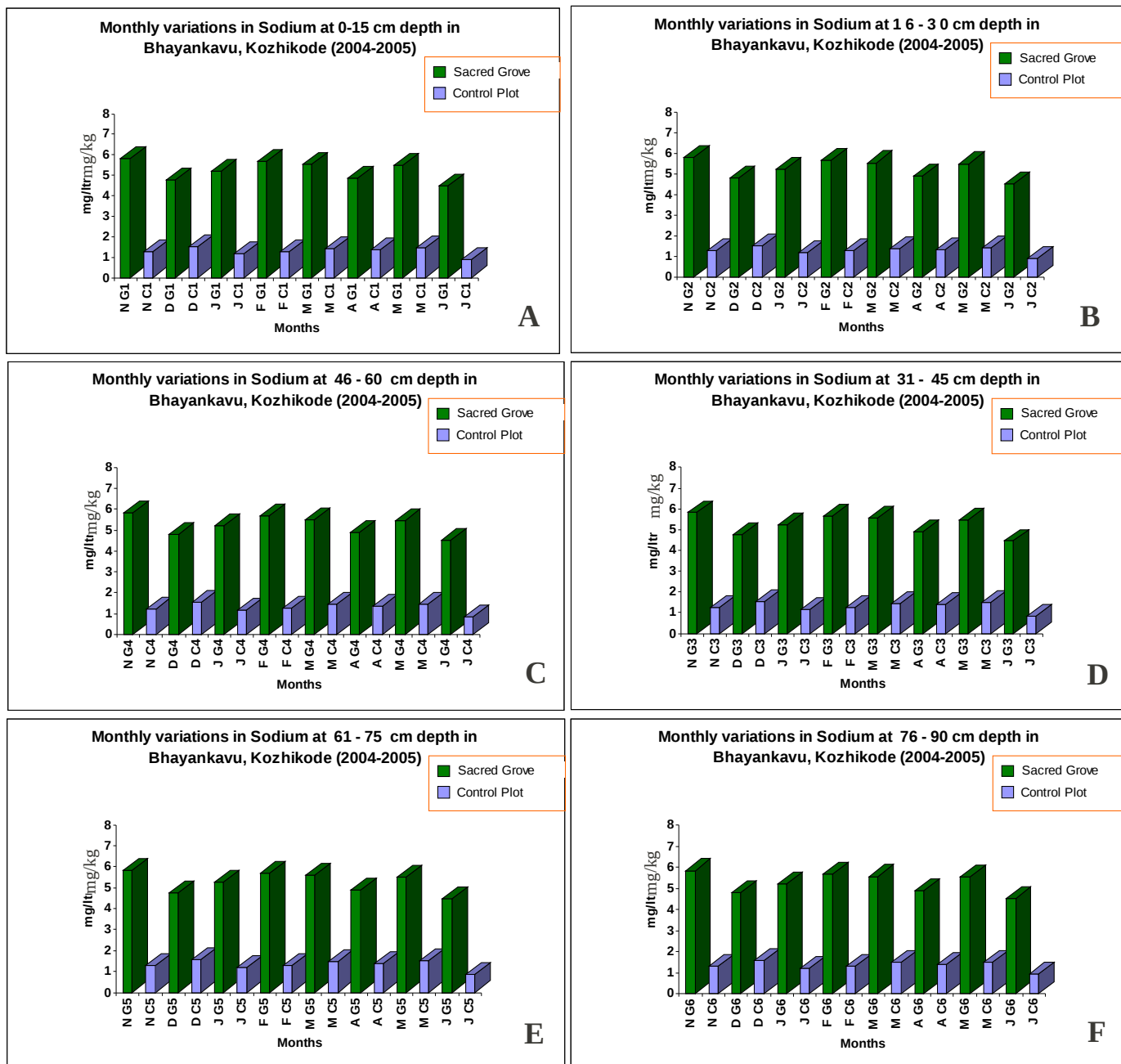


Figure 93 A-F. Monthly Variations in Soil Na: Bhayankavu (2004-05)

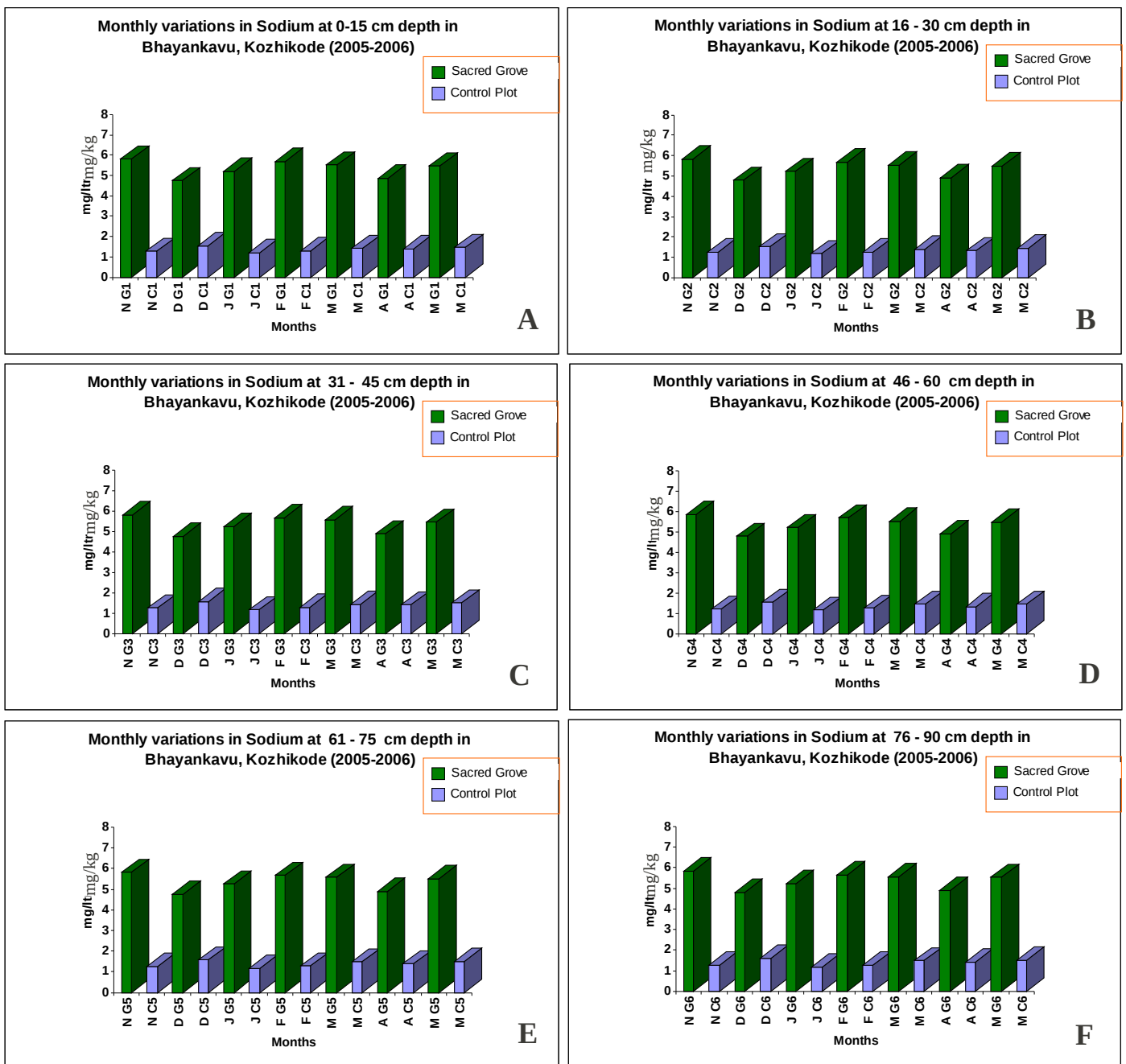


Figure 94 A-F. Monthly Variations in Soil Na: Bhayankavu (2005-06)

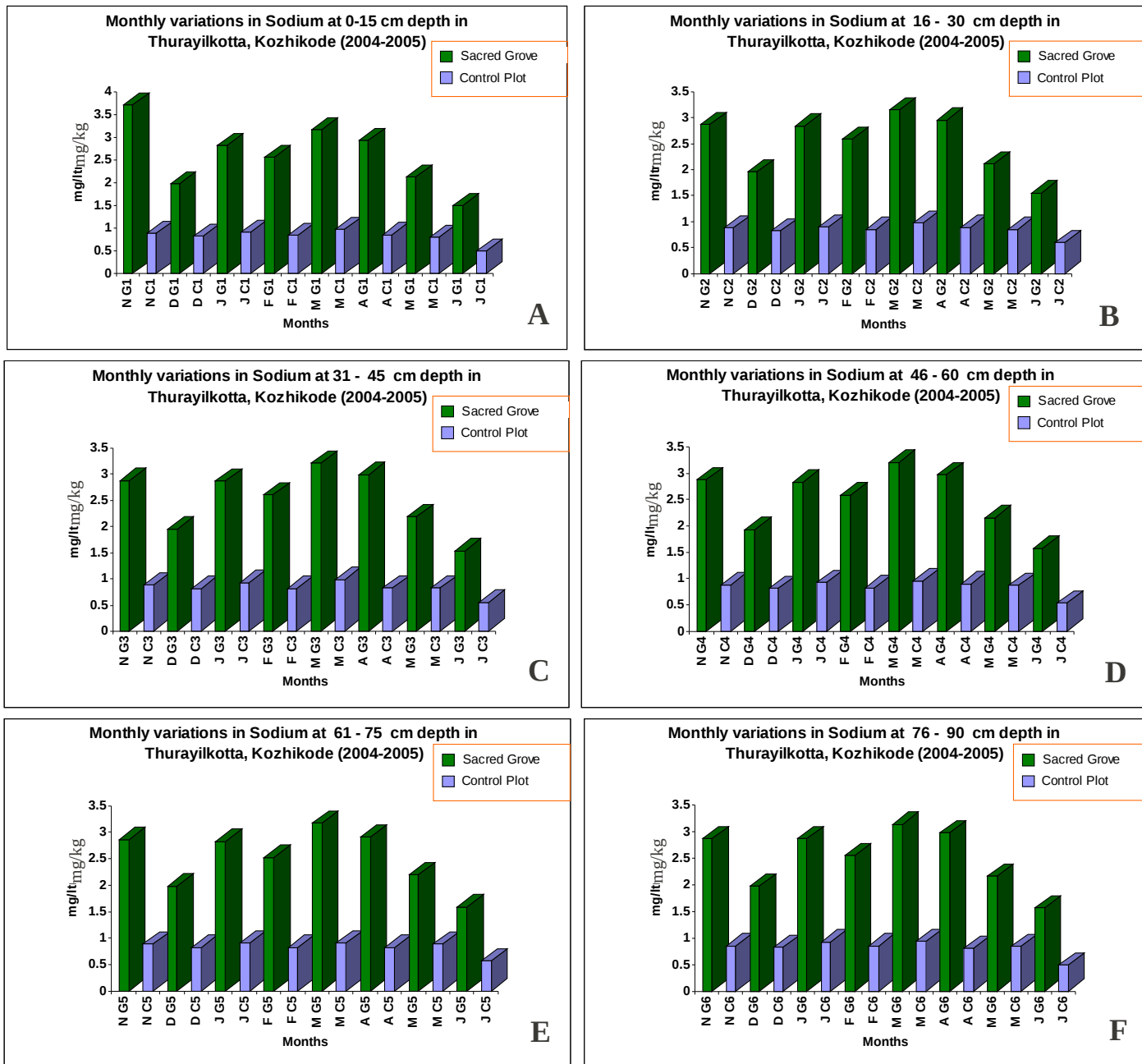


Figure 95 A-F. Monthly Variations in Soil Na: Thurayilkavu (2004-05)

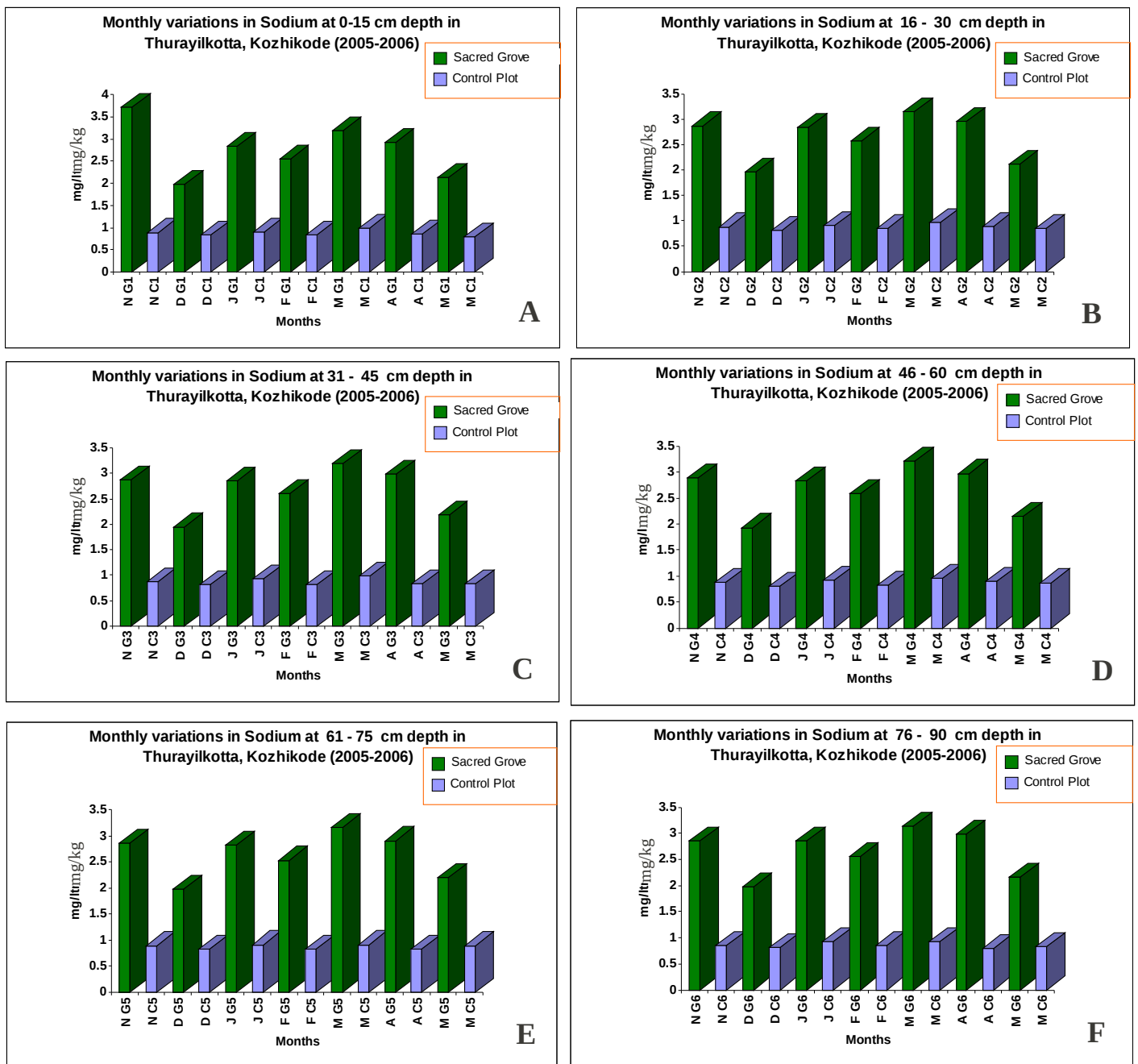


Figure 96 A-F. Monthly Variations in Soil Na: Thurayilkavu (2005-06)

4.2.9 Exchangeable Potassium

The comparison of potassium content in sacred groves and control plots are presented in figures 97 - 110. Among the inorganic constituents of leaves, potassium forms the major constituent in the leaves of sacred grove plants; hence the decay of the leaves liberates potassium, contributing to high values of potassium in the soils. The decomposition of vegetative parts of sacred groves may also contribute significant amount of potassium to the soils. Increase in potassium concentration was recorded during the summer seasons than the monsoon season, which may be attributed to the decay of sacred grove litter, releasing potassium, which may get adsorbed to the soils.

Variations in the soil potassium content shows that the sacred groves soils contain very high K contents in sacred grove soils of all the seven sacred groves studied (Table 20). Increase in potassium contents ranging from 52 to 883% in comparison with the control plots were recorded in the sacred groves studied, with maximum values for Poongottukavu soils (1.37mg/kg soil). This excess K may be derived from the decomposition of litter accumulated over the years in these groves favoured by the microclimate and soil moisture congenial for the increased microbial activity.

Table20. Variations in Soil K (mg/kg) in Sacred Groves: 2004-06

Name of Sacred Grove	Treatments	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Mean	Increase/ Decrease (%)
Kammadathukavu	G	0.83	0.92	0.66	0.87	0.87	0.82	0.75	0.58	0.79	229.17
	C	0.26	0.2	0.29	0.29	0.29	0.27	0.24	0.11	0.24	
Parappoolkavu	G	0.91	1.02	0.87	0.87	0.91	0.91	0.9	0.68	0.88	131.58
	C	0.53	0.35	0.41	0.36	0.38	0.4	0.37	0.25	0.38	
Poongottukavu	G	1.41	1.55	1.26	1.52	1.45	1.36	1.36	1.06	1.37	120.97
	C	0.77	0.67	0.45	0.71	0.69	0.66	0.6	0.38	0.62	
Thazhekkavu	G	1.68	1.55	1.62	1.17	1.16	1.15	1.1	0.95	1.30	54.76
	C	0.9	0.65	1.02	0.91	0.9	0.89	0.82	0.66	0.84	
Bhayankavu	G	0.54	0.64	0.59	0.64	0.67	0.6	0.6	0.45	0.59	883.33
	C	0.05	0.05	0.08	0.05	0.06	0.06	0.06	0.03	0.06	
Poyilkkavu	G	1.62	1.55	1.72	0.63	1.53	1.53	1.6	0.62	1.35	51.69
	C	1.01	0.91	0.83	0.97	0.94	0.92	0.88	0.64	0.89	
Thurayilkavu	G	0.43	0.35	0.55	0.48	0.46	0.46	0.48	0.24	0.43	377.78
	C	0.09	0.09	0.12	0.1	0.09	0.09	0.09	0.07	0.09	

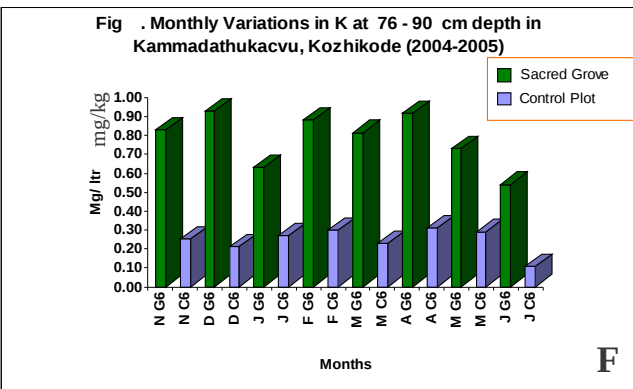
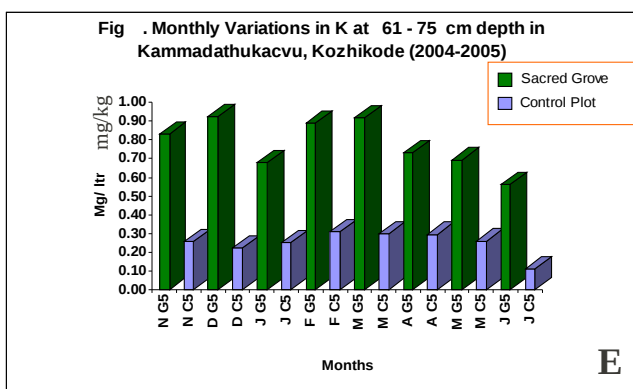
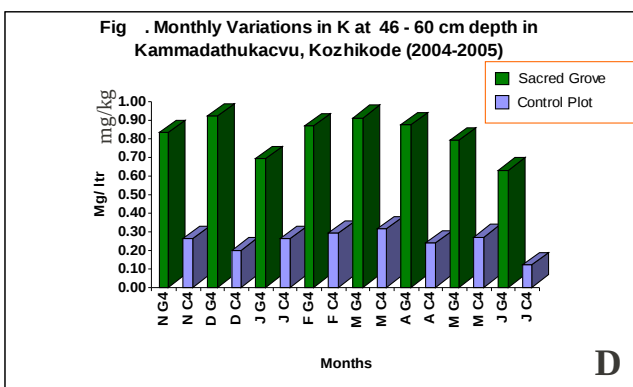
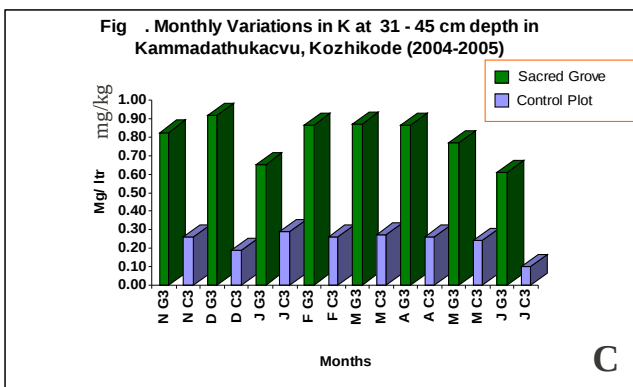
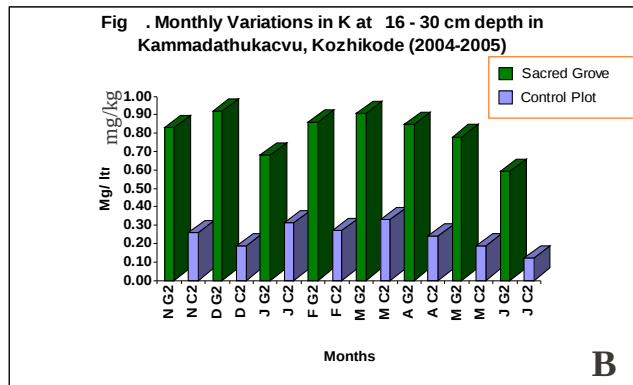
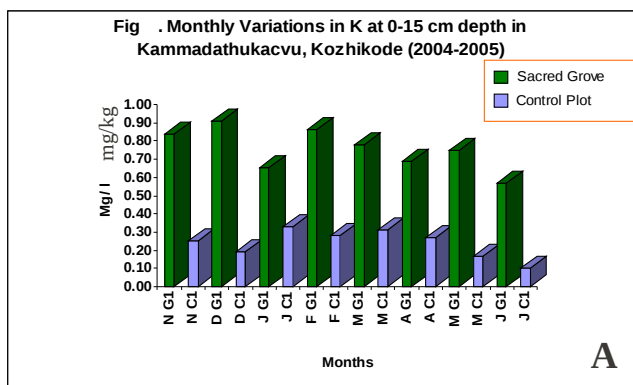


Figure 97 A-F. Monthly Variations in Soil K: Kammadathukavu (2004-05)

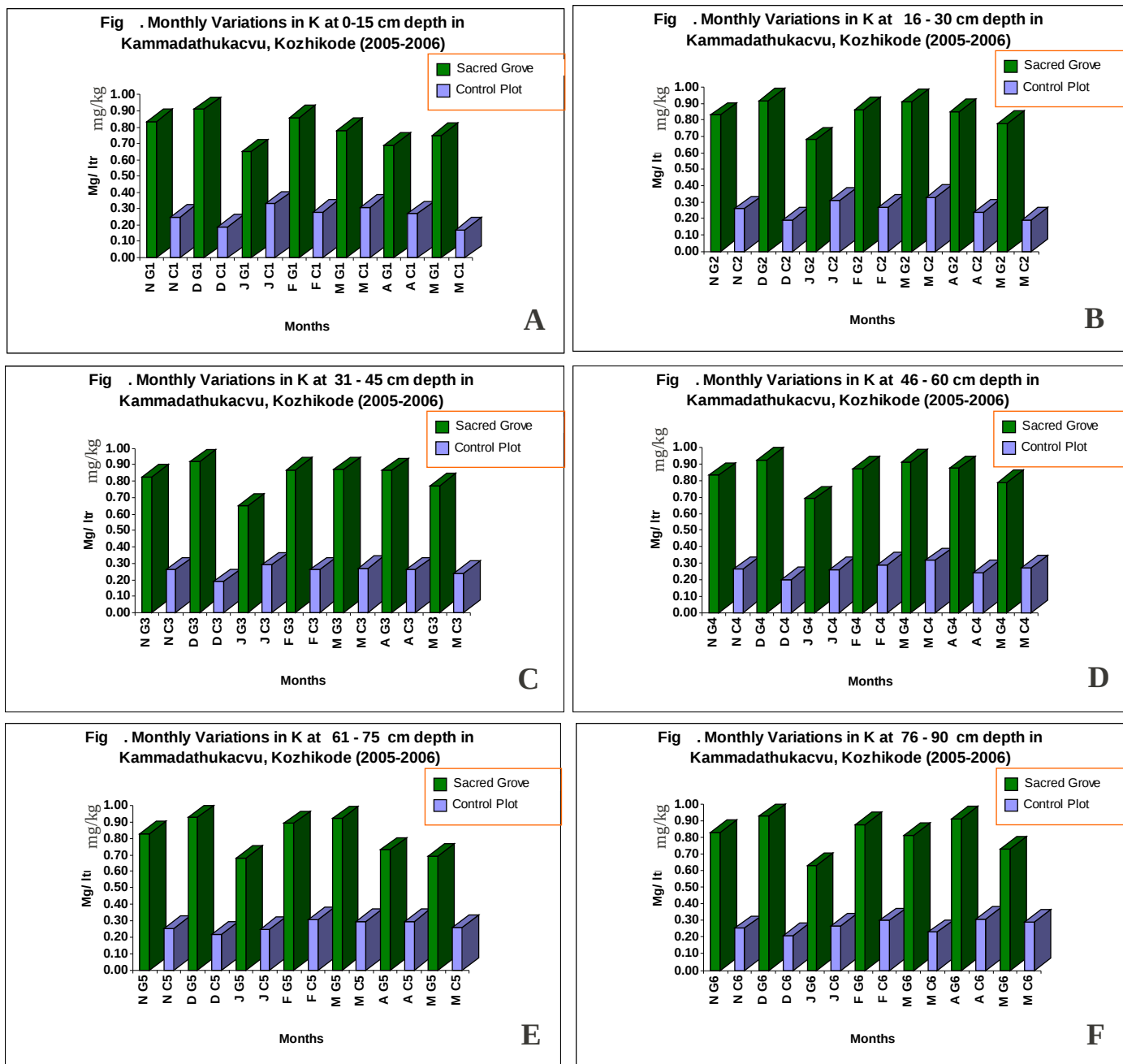


Figure 98 A-F. Monthly Variations in Soil K: Kammadathukavu (2005-06)

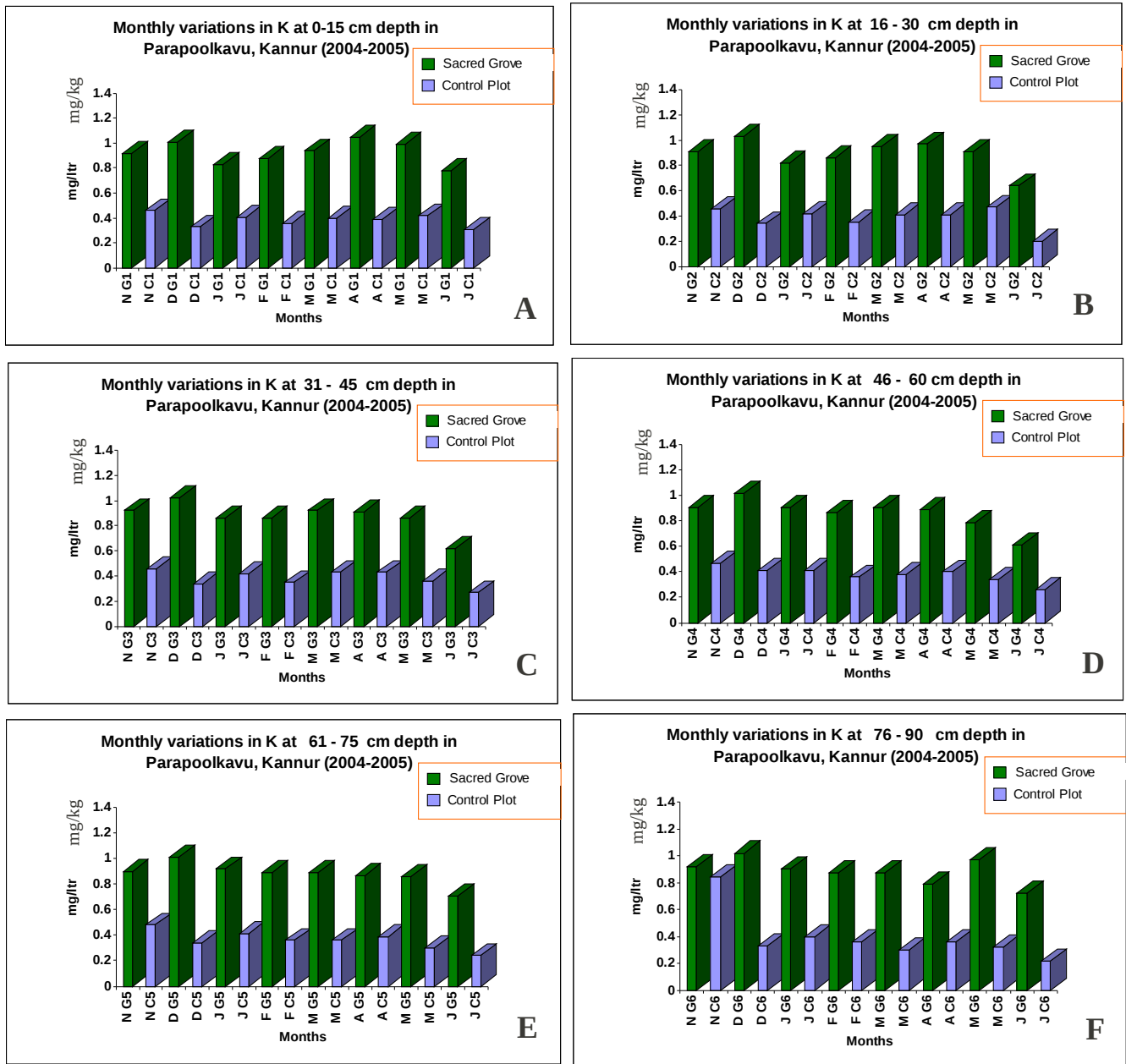


Figure 99 A-F. Monthly Variations in Soil K: Parapoolkavu (2004-05)

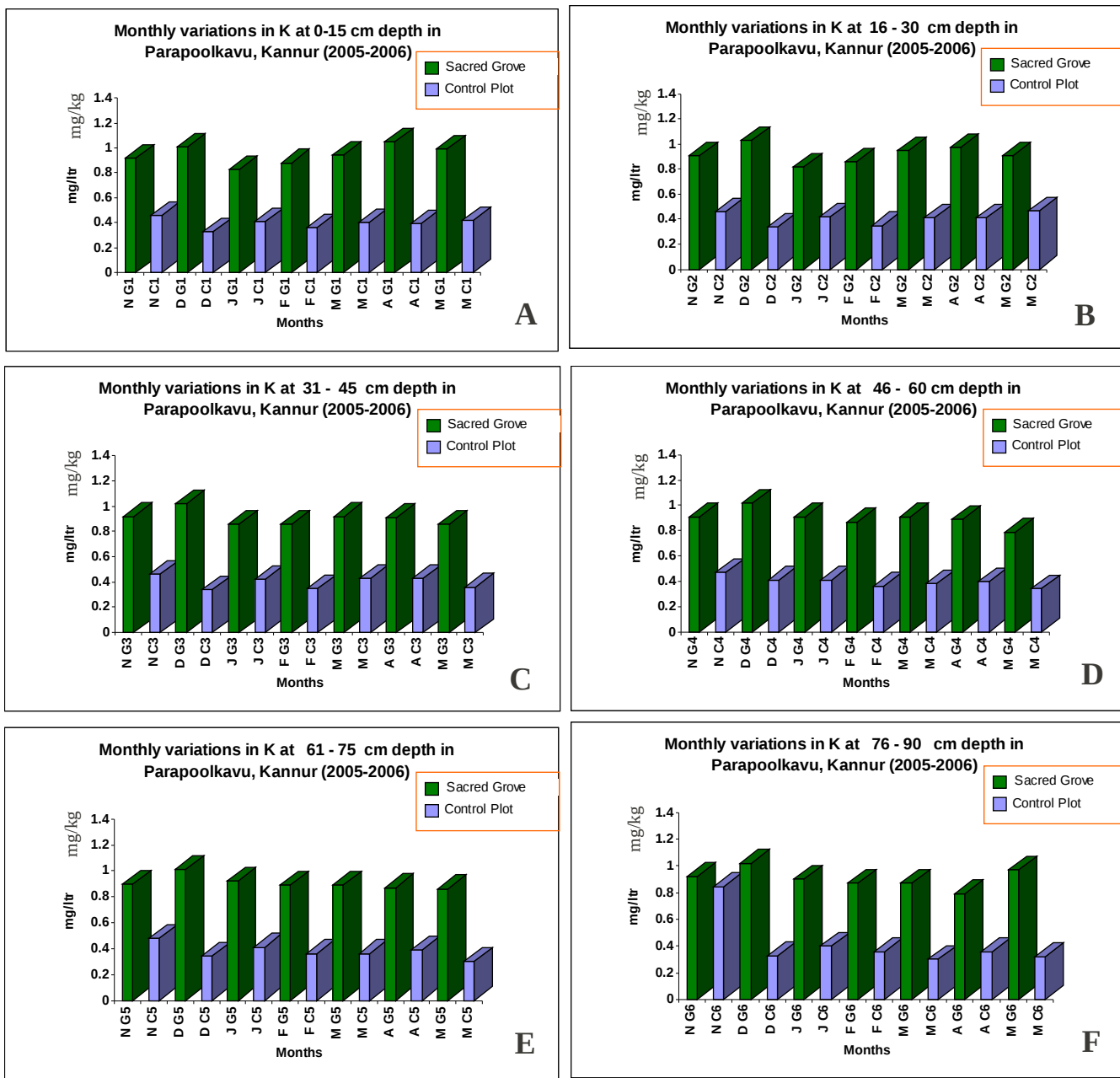


Figure 100 A-F. Monthly Variations in Soil K: Parappoolkavu (2005-06)

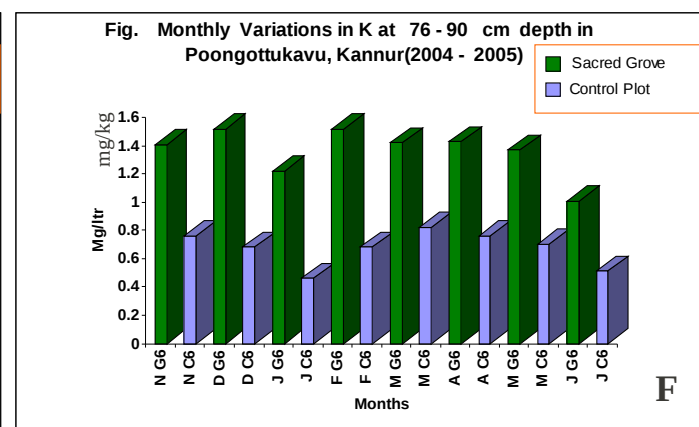
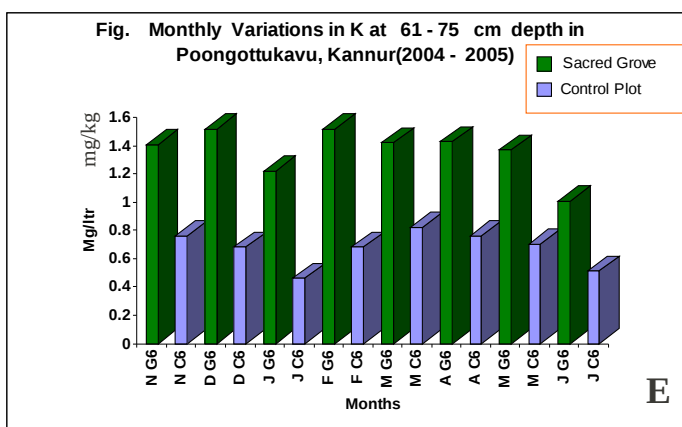
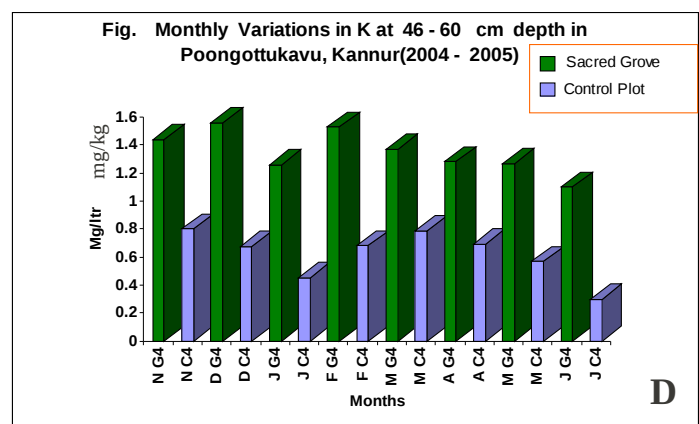
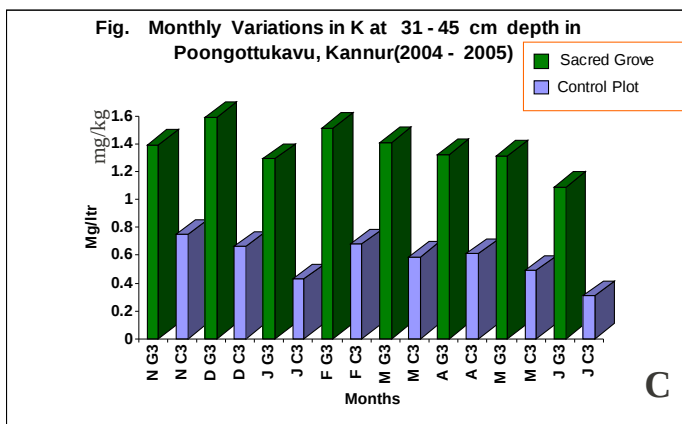
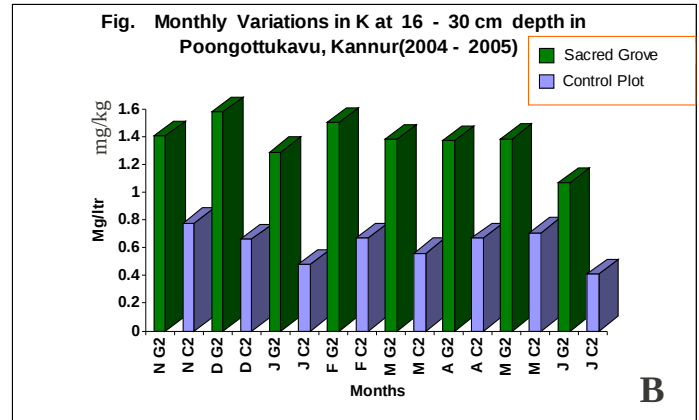
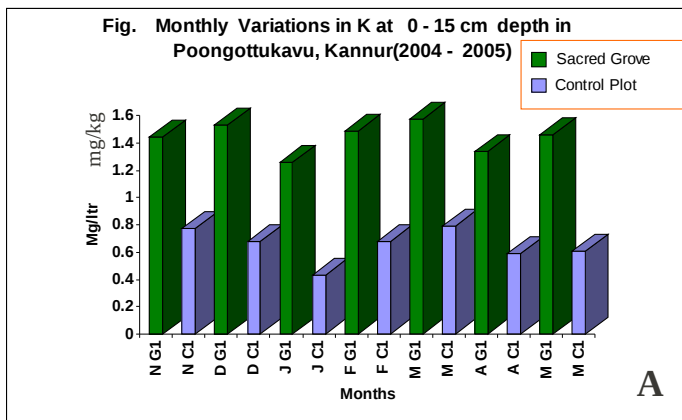


Figure 101 A-F. Monthly Variations in Soil K: Poongottukavu (2004-05)

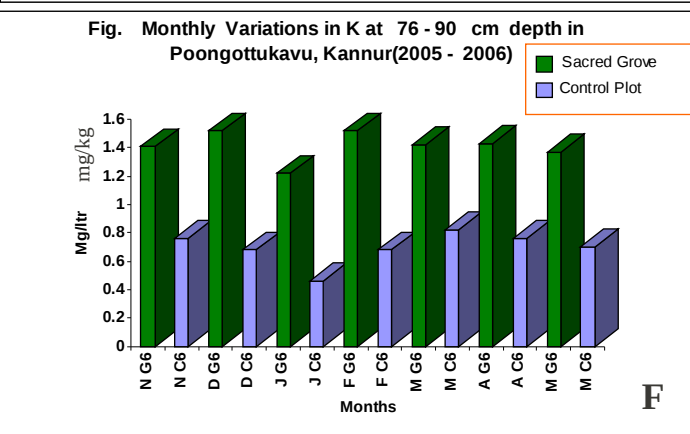
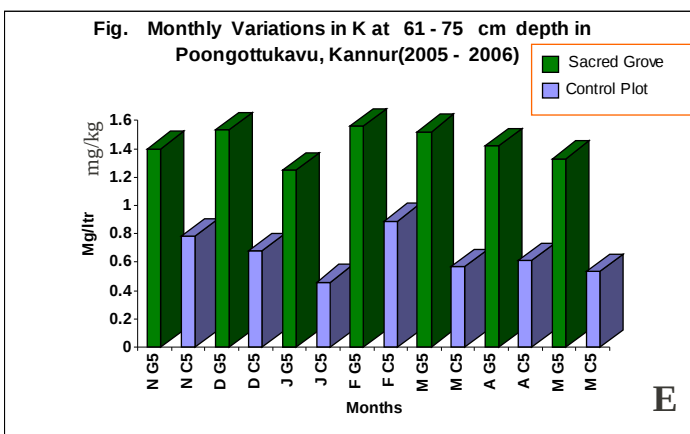
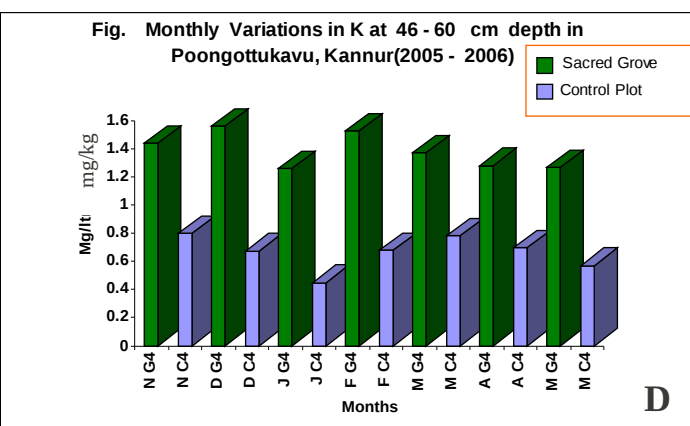
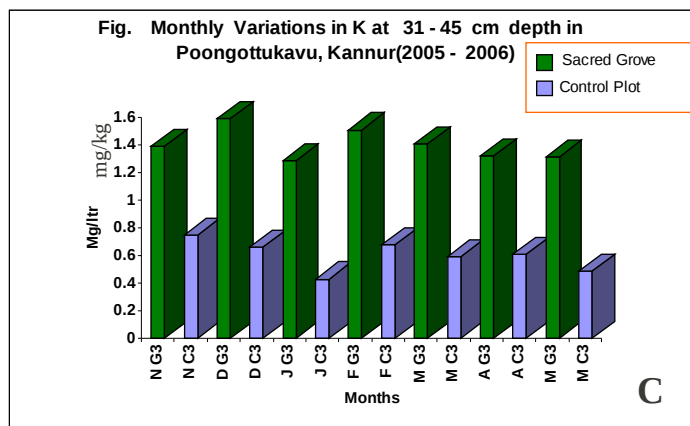
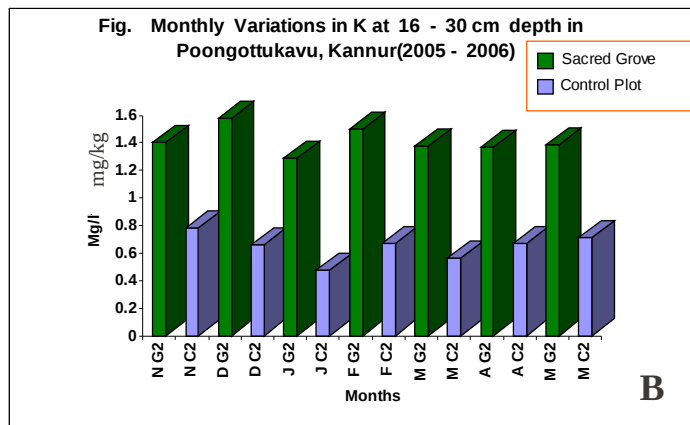
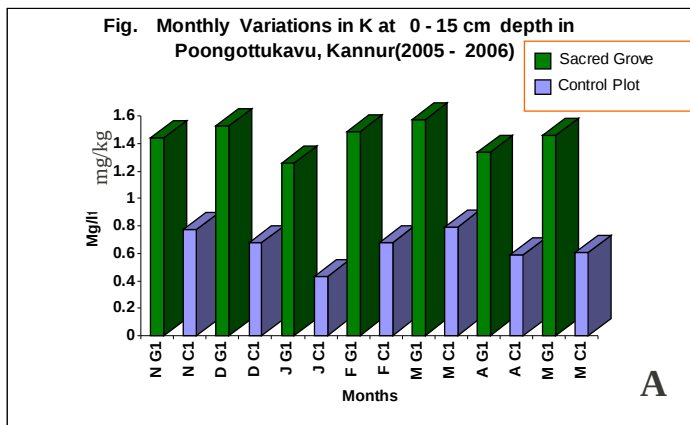


Figure 102 A-F. Monthly Variations in Soil K: Poongottukavu (2005-06)

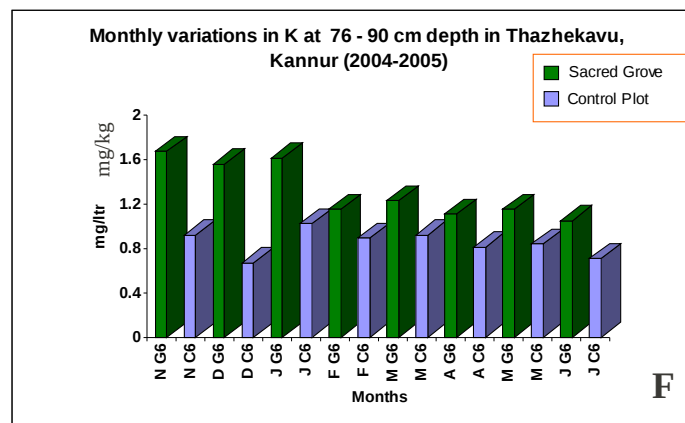
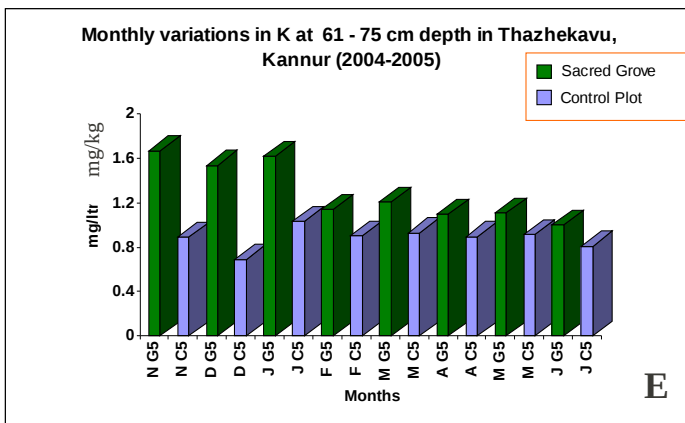
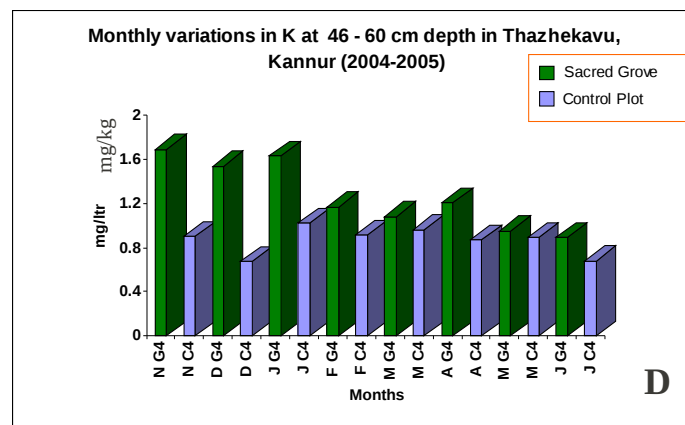
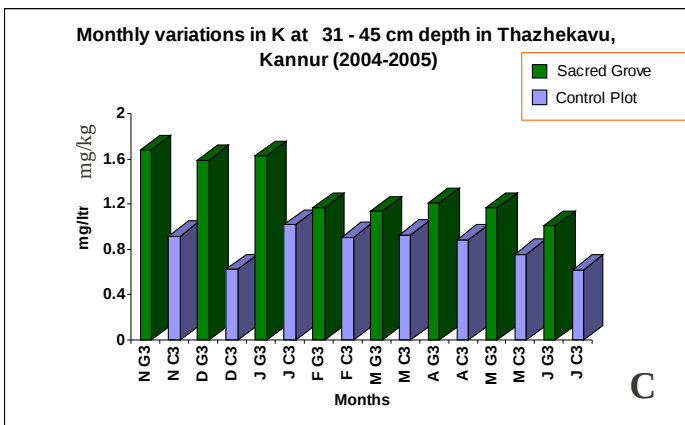
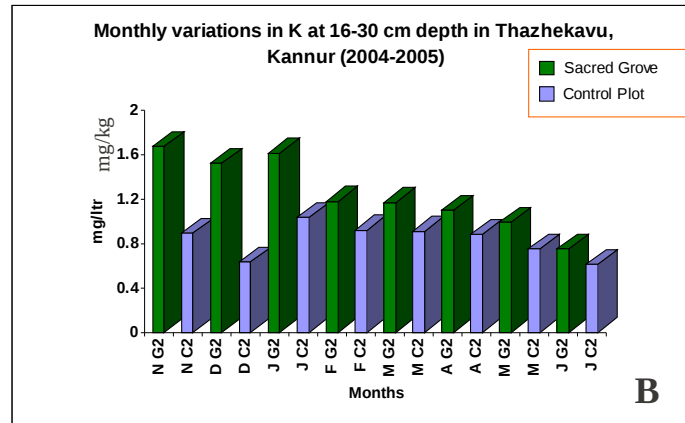
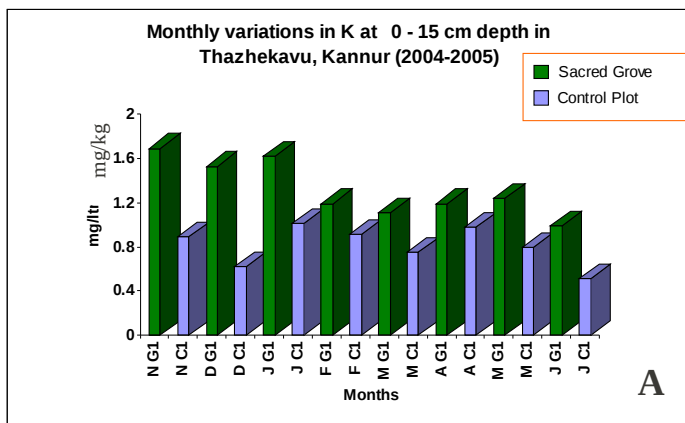


Figure103 A-F. Monthly Variations in Soil K: Thazhekkavu (2004-05)

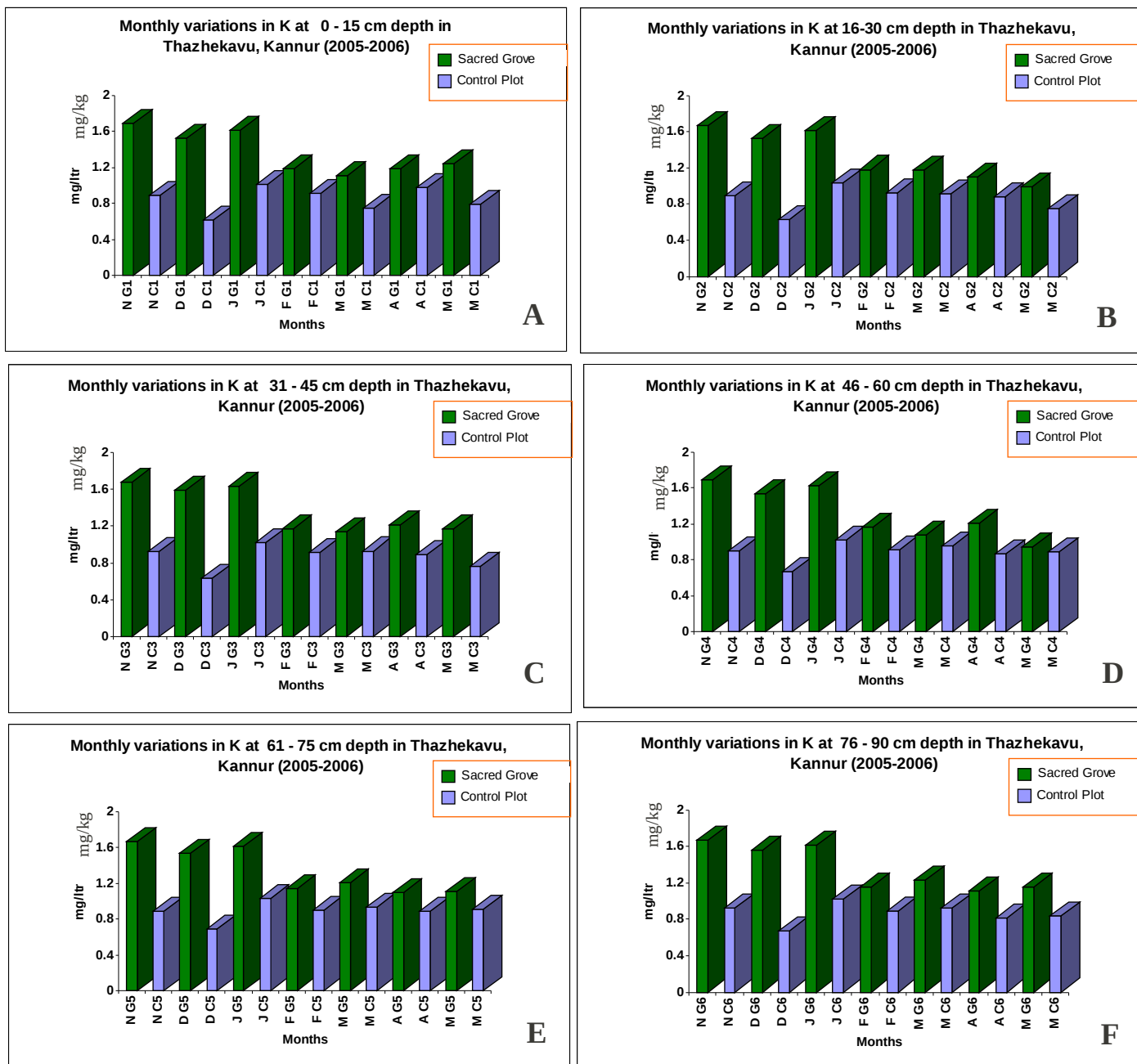


Figure 104 A-F. Monthly Variations in Soil K: Thazhekkavu (2005-06)

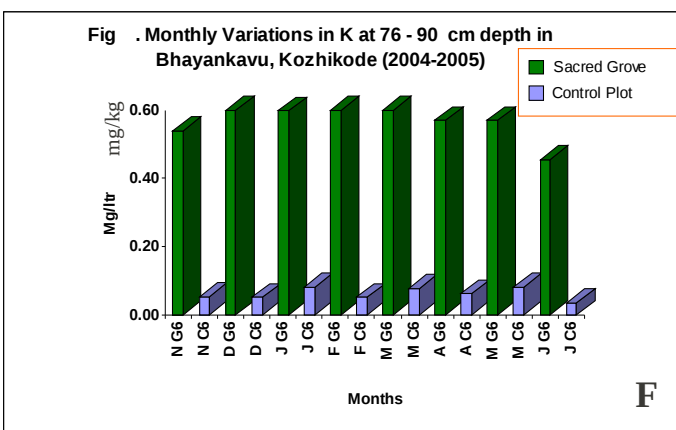
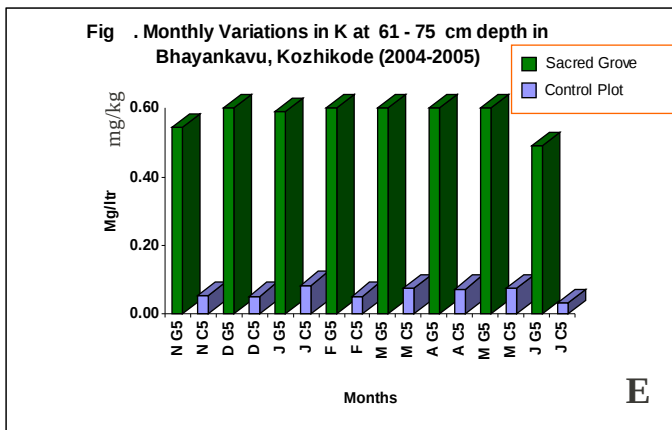
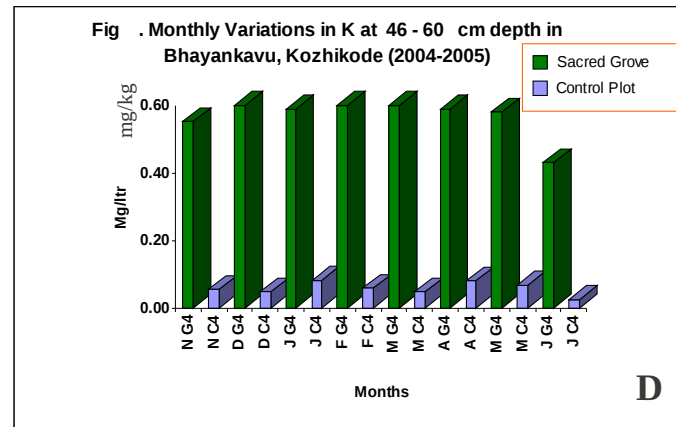
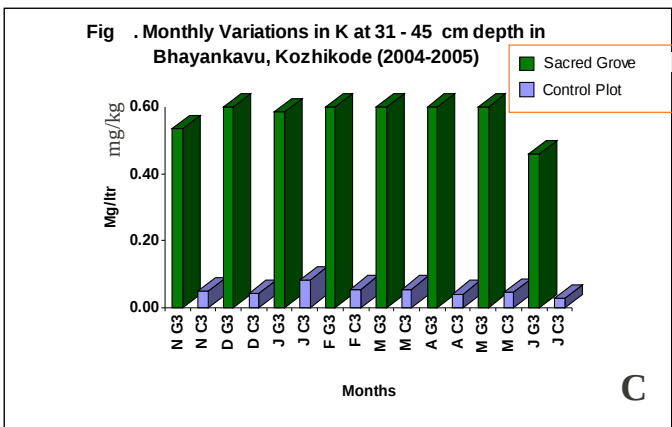
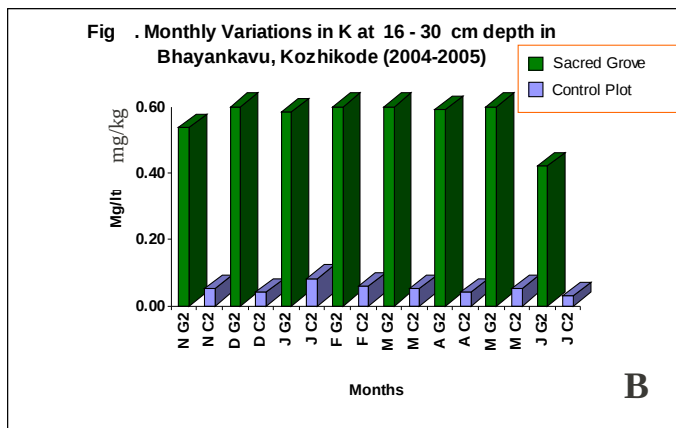
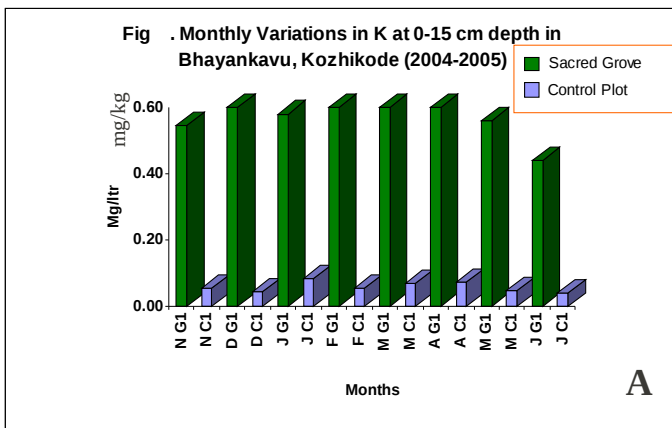


Figure 105 A-F. Monthly Variations in Soil K: Bhayankavu (2004-05)

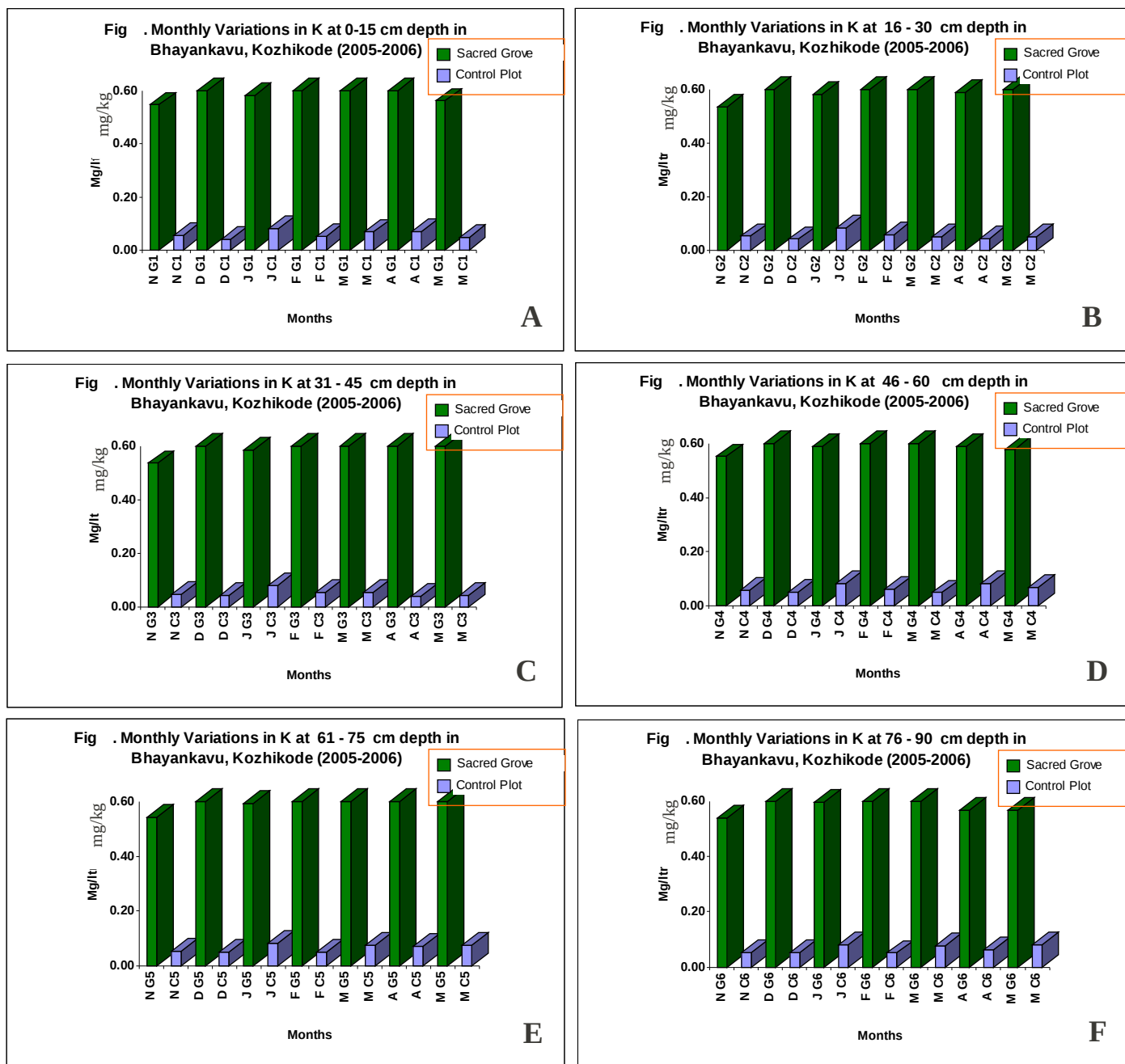


Figure 106 A-F. Monthly Variations in Soil K: Bhayankavu (2005-06)

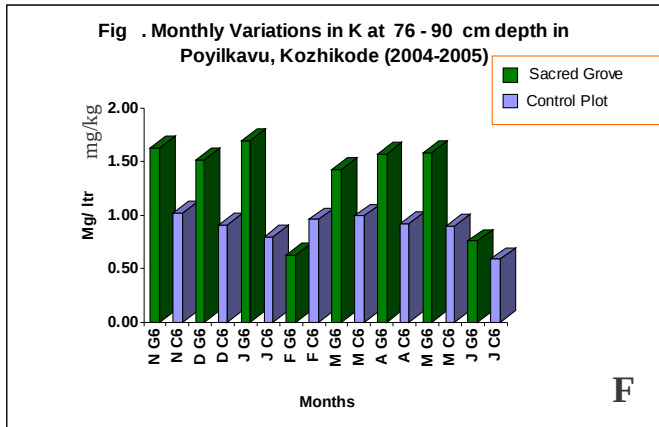
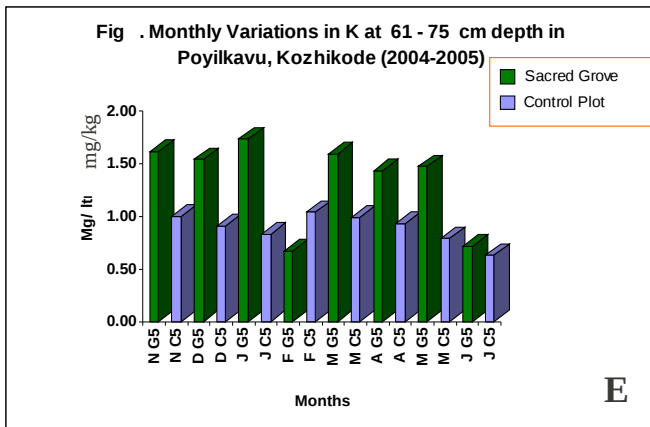
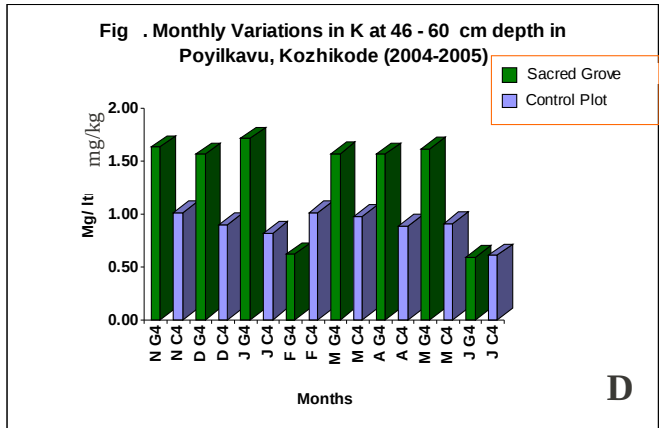
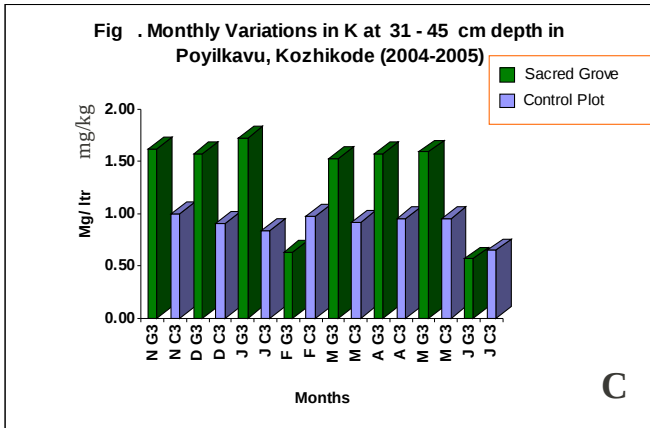
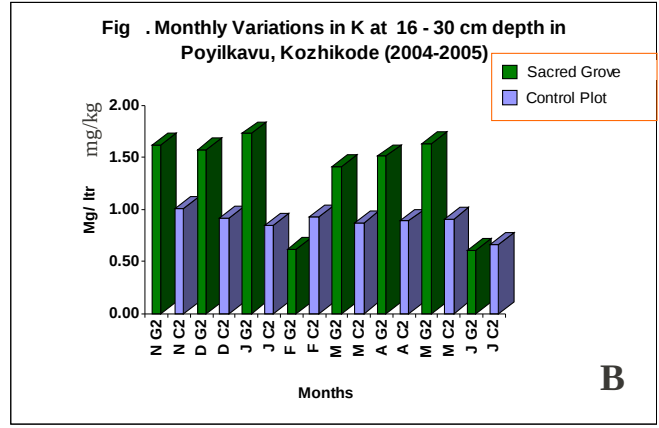
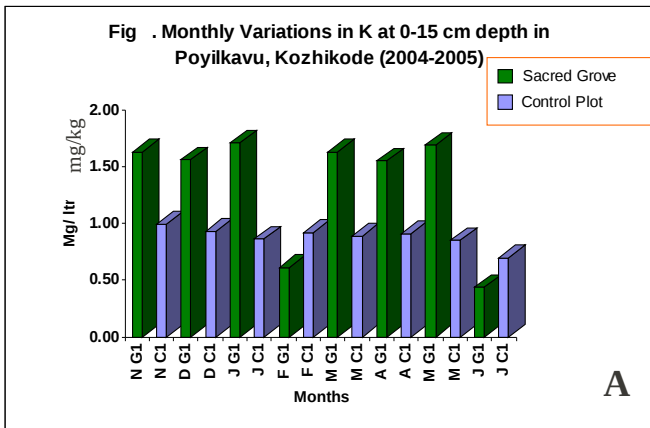


Figure 107 A-F. Monthly Variations in Soil K: Poyilkkavu (2004-05)

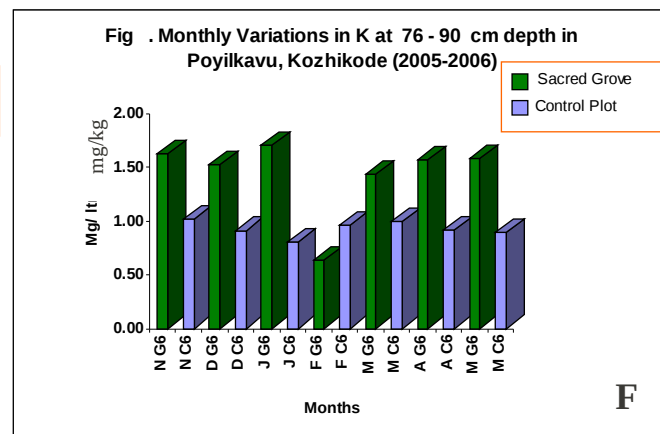
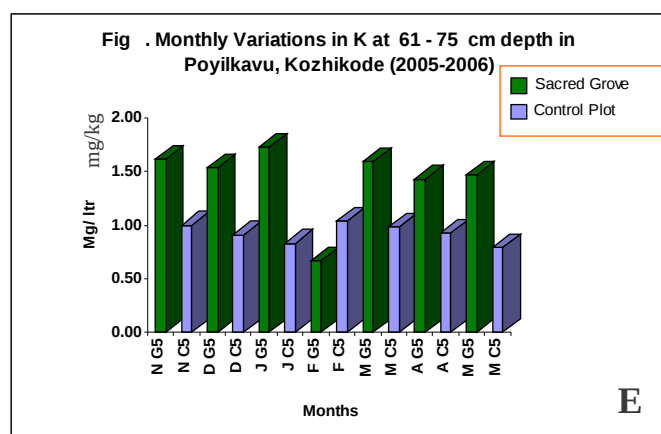
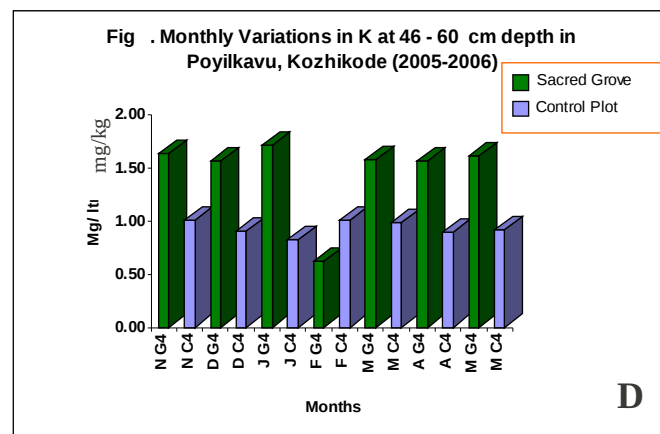
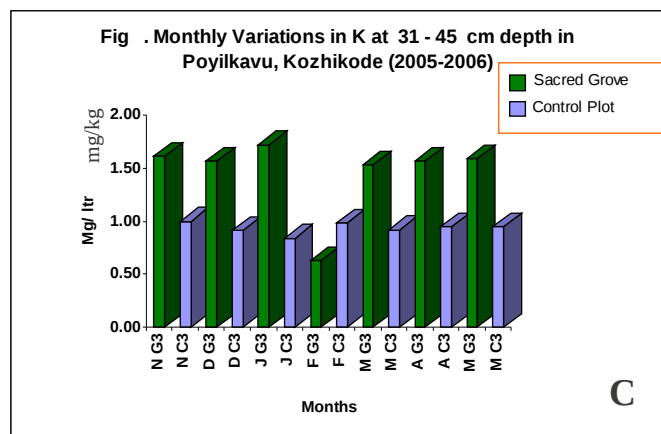
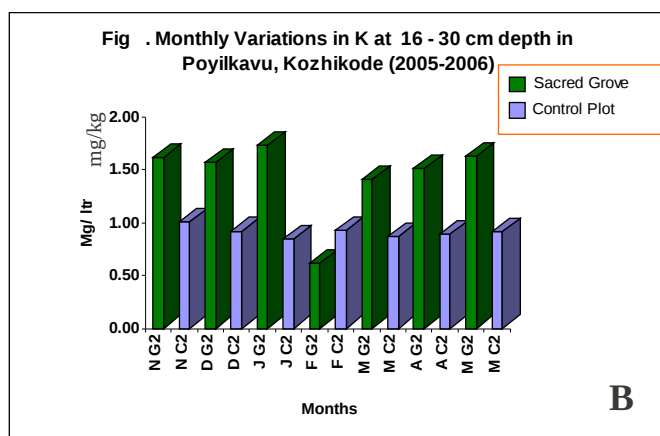
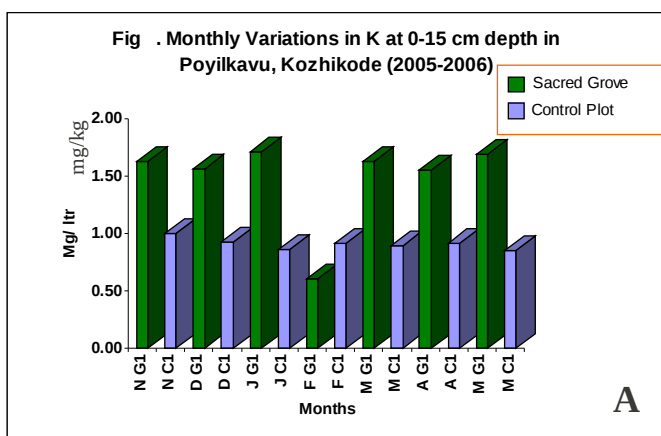


Figure 108 A-F. Monthly Variations in Soil K: Poyilkkavu (2005-06)

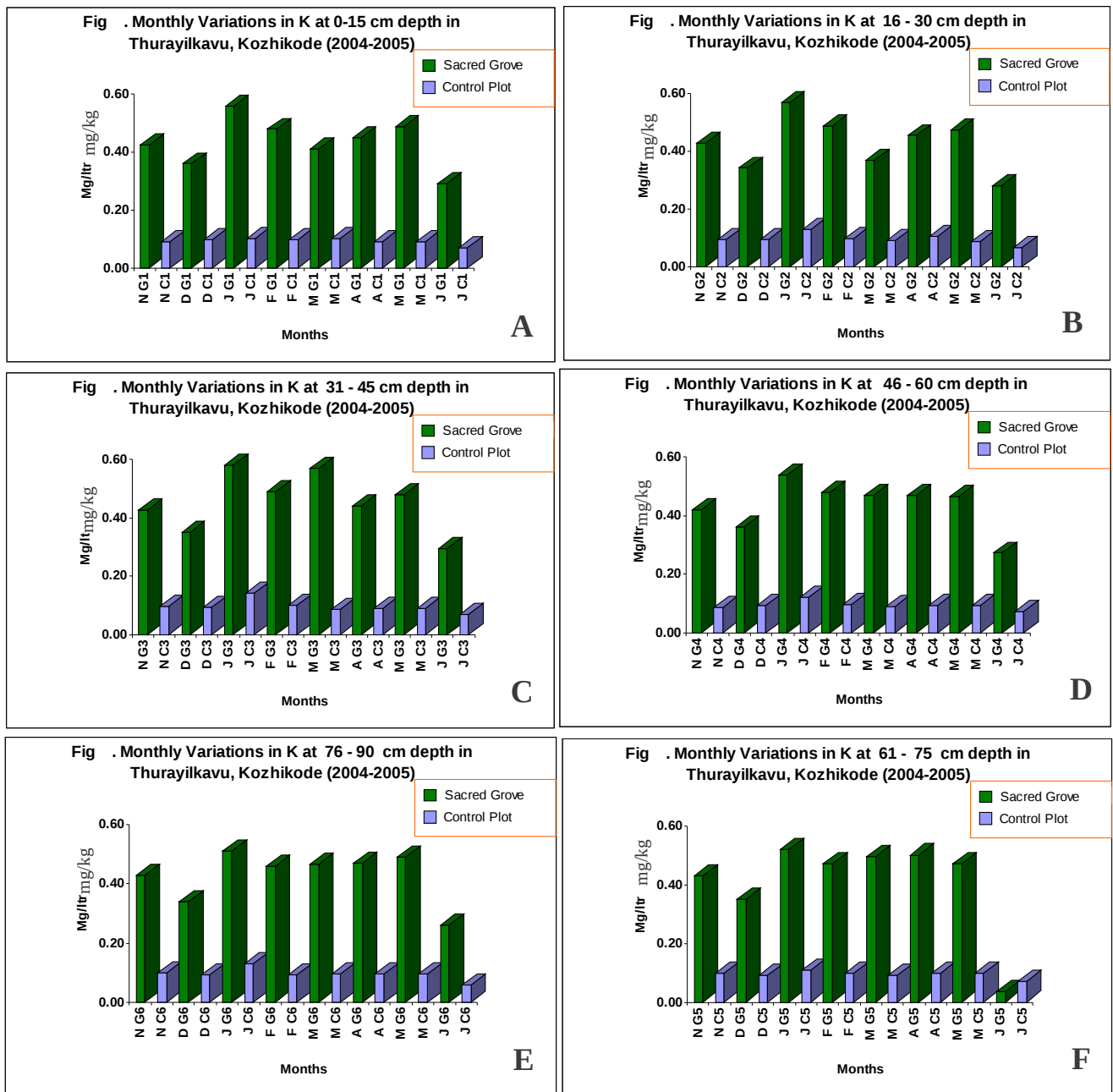


Figure 109 A-F. Monthly Variations in Soil K: Thurayilkavu (2004-05)

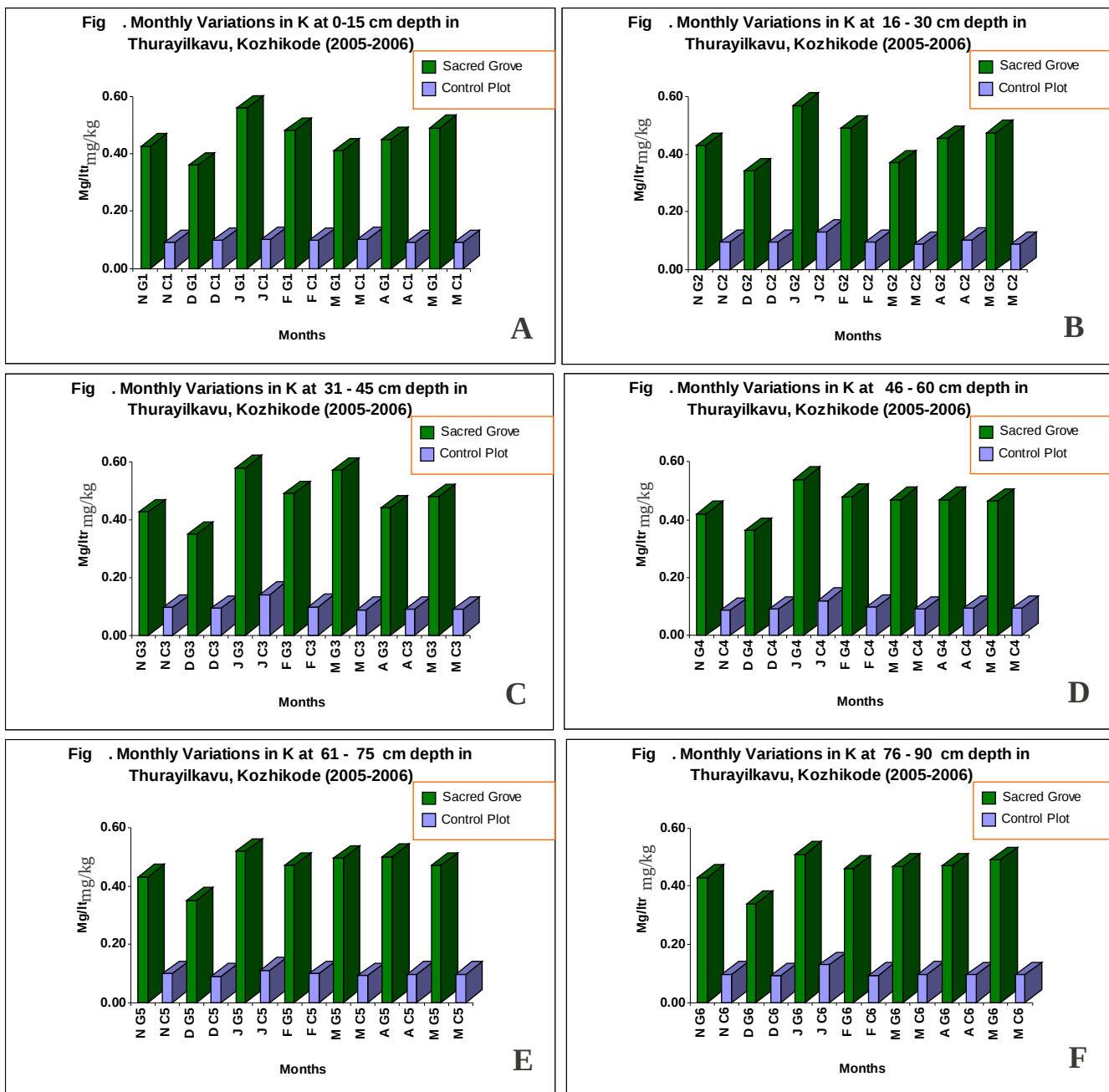


Figure 110 A-F. Monthly Variations in Soil K: Thurayilkavu (2005-06)

4.2.10 Exchangeable Calcium

The comparison of calcium content in sacred groves and control plots are presented in figures 111 to 124. Among the months studied, higher calcium content was recorded during pre and post-monsoon seasons. The monsoon season recorded lowest values, which may due to dilution by rainwater.

Studies on variations in soil calcium recorded higher values for the sacred grove soils of all the seven selected groves in comparison with the control (Table 21). Increase in calcium contents ranging from 126% to 569% were recorded in the sacred groves studied, with maximum values for Thazhekkavu soils (13.18 mg/kg soil). This excess Ca may be derived from the decomposition of litter accumulated over the years in these groves favoured by the microclimate and soil moisture congenial for the increased microbial activity.

Table21. Variations in Soil Calcium (mg/kg) in Sacred Groves: 2004-06

Name of Sacred Grove	Treatments	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Mean	Increase/ Decrease (%)
Kammadathukavu	G	2.62	2.83	2.44	2.82	2.78	2.49	2.81	1.06	2.48	230.67
	C	1.00	0.86	0.97	0.66	0.66	0.71	0.68	0.43	0.75	
Parappoolkavu	G	2.3	2.65	3.12	2.94	2.86	2.91	2.31	1.44	2.57	147.12
	C	1.14	0.96	1.18	1.22	1.14	1.12	0.93	0.65	1.04	
Poongottukavu	G	2.17	3.36	2.65	2.43	2.73	2.84	2.95	1.52	2.58	218.52
	C	0.91	0.89	0.77	0.94	0.84	0.82	0.76	0.51	0.81	
Thazhekkavu	G	12.33	14.7	15.29	14.94	13.27	12.87	13.06	8.98	13.18	223.04
	C	4.33	3.96	4.28	4.67	4.64	4.47	3.9	2.40	4.08	
Bhayankavu	G	1.99	2.37	2.06	2.49	2.37	2.22	2.29	1.07	2.11	559.00
	C	0.37	0.24	0.38	0.34	0.37	0.33	0.35	0.15	0.32	
Poyilkkavu	G	14.23	12.75	14.25	12.33	12.4	12.83	12.21	9.34	12.54	126.76
	C	6.26	4.86	6.75	6.27	6.18	5.63	4.89	3.42	5.53	
Thurayilkavu	G	2.27	2.42	2.24	2.8	2.62	2.65	2.54	1.20	2.34	157.14
	C	1.03	1.03	0.94	0.99	0.95	0.95	0.95	0.41	0.91	

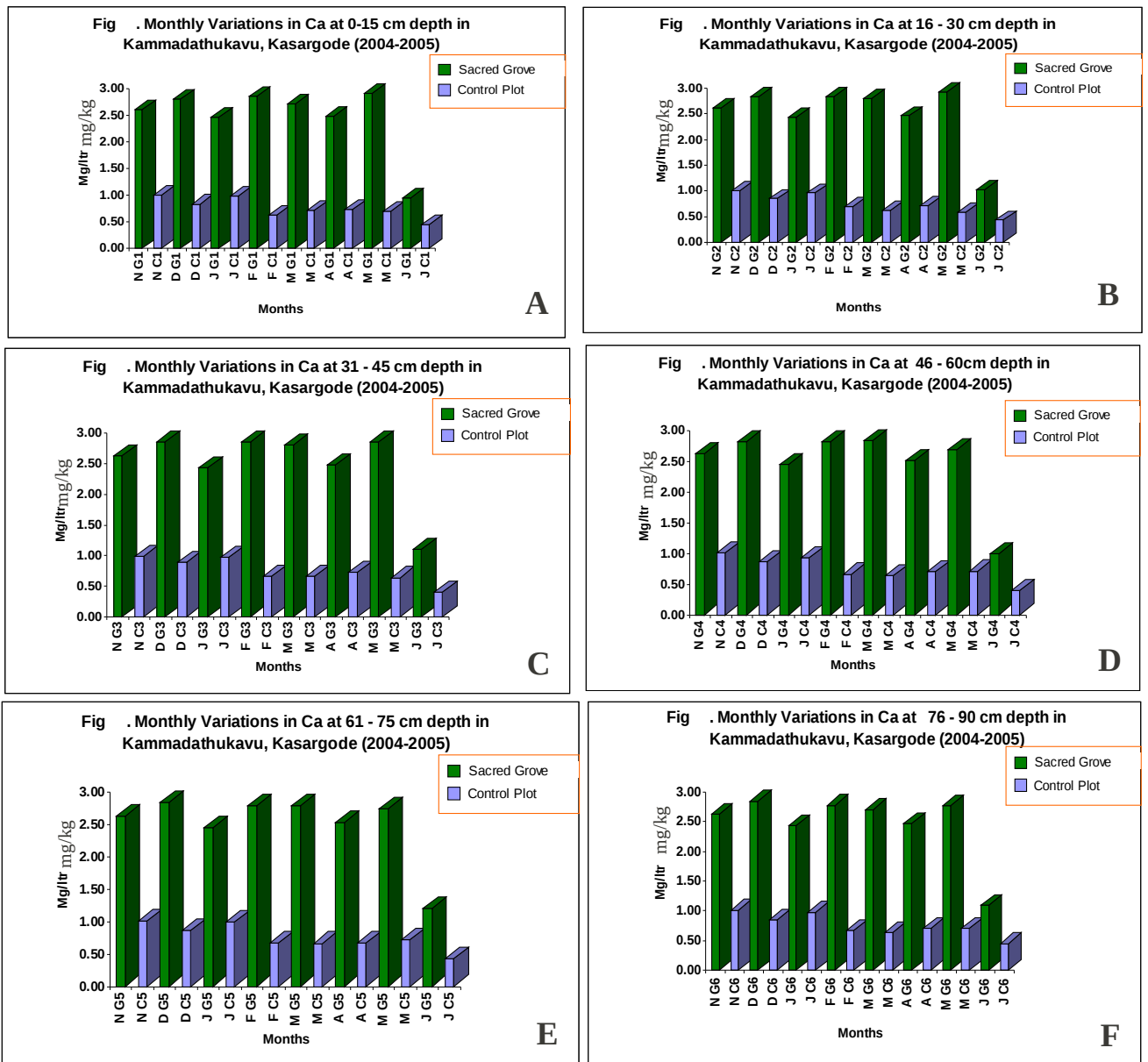


Figure 111 A-F. Monthly Variations in Soil Ca: Kammadathukavu (2004-05)

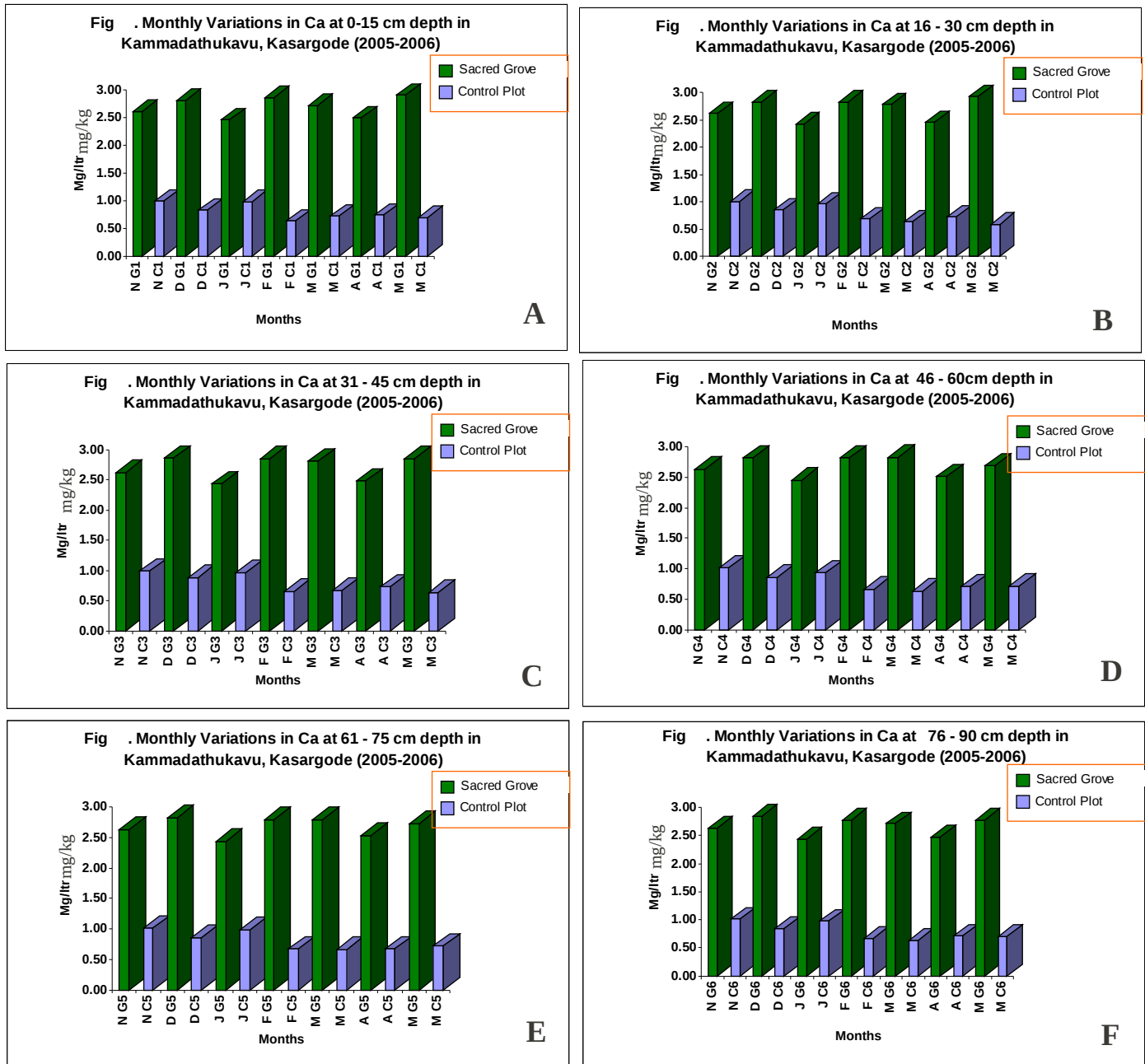


Figure 112 A-F. Monthly Variations in Soil Ca: Kammadathukavu (2005-06)

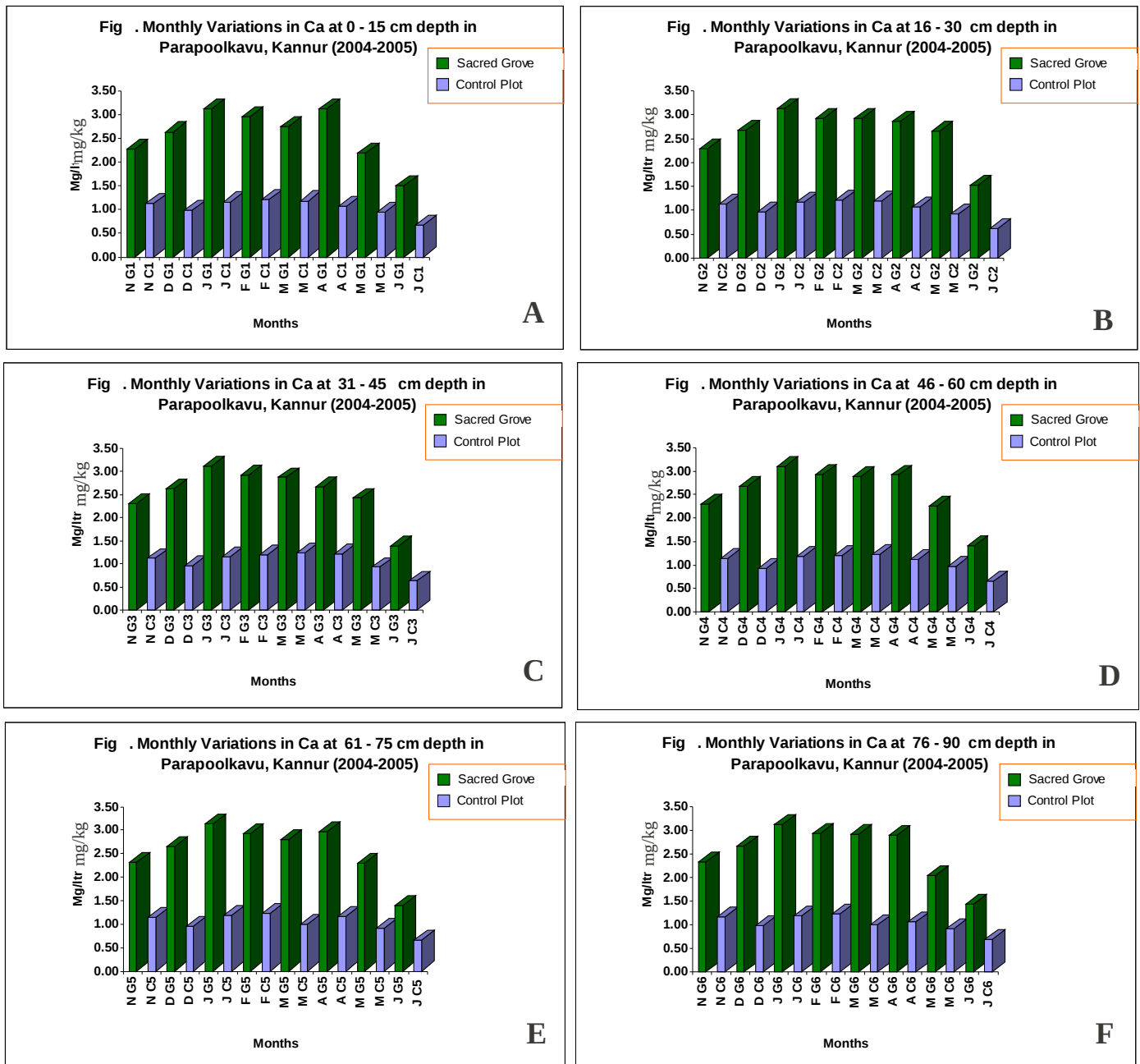


Figure 113 A-F. Monthly Variations in Soil Ca: Parapoolkavu (2004-05)

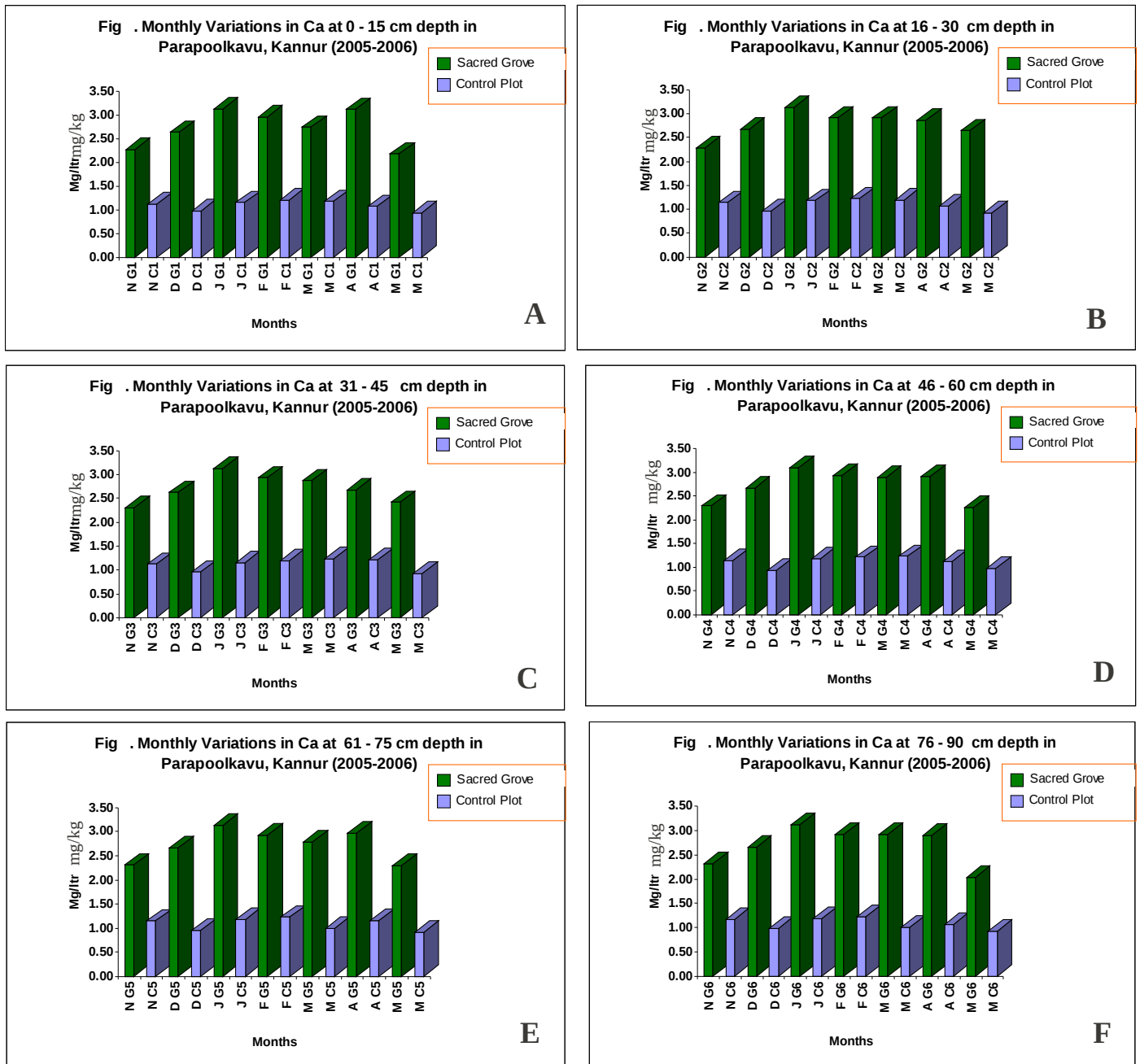


Figure 114 A-F. Monthly Variations in Soil Ca: Parappoolkavu (2005-06)

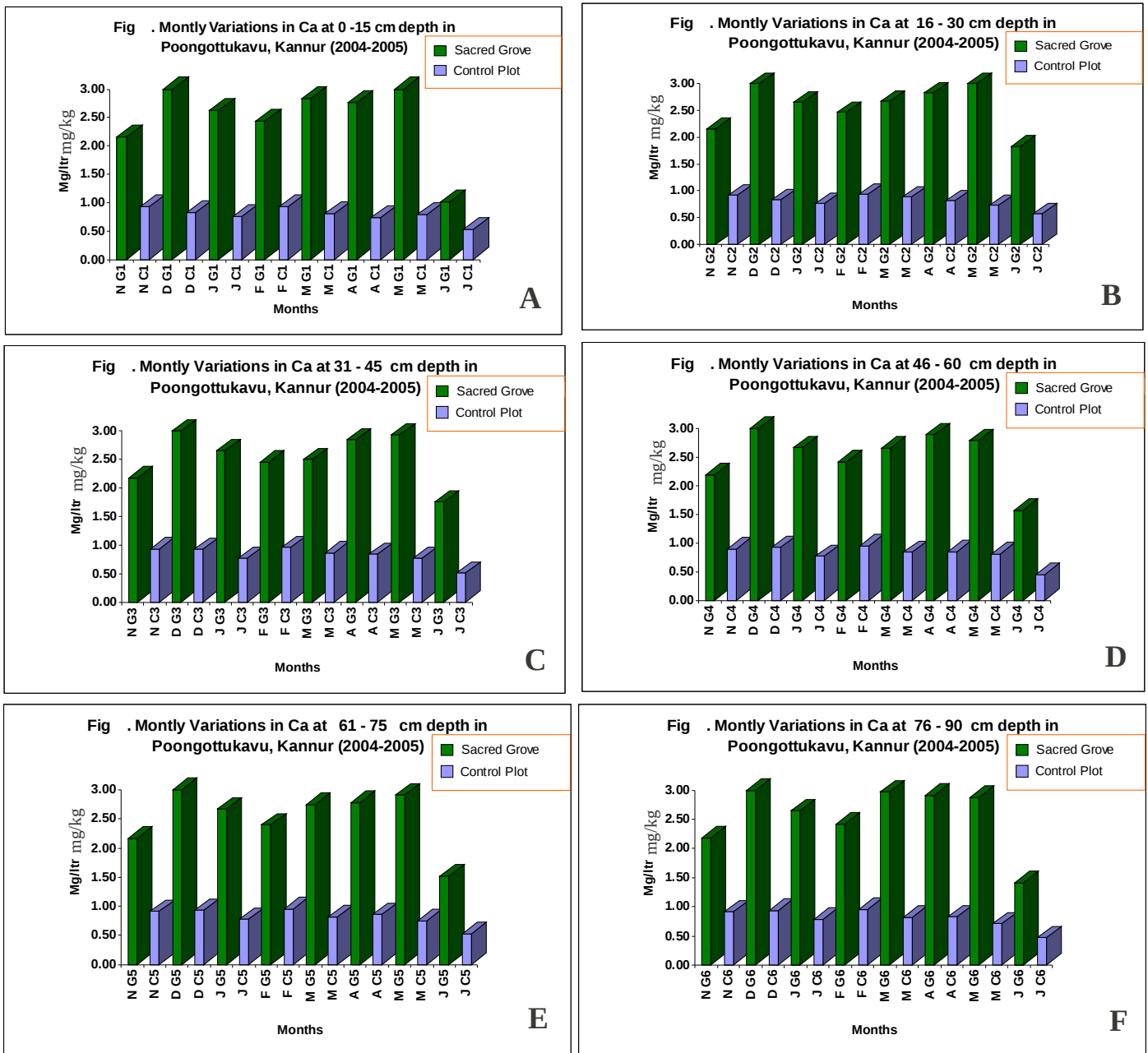


Figure 115 A-F. Monthly Variations in Soil Ca: Poongottukavu (2004-05)

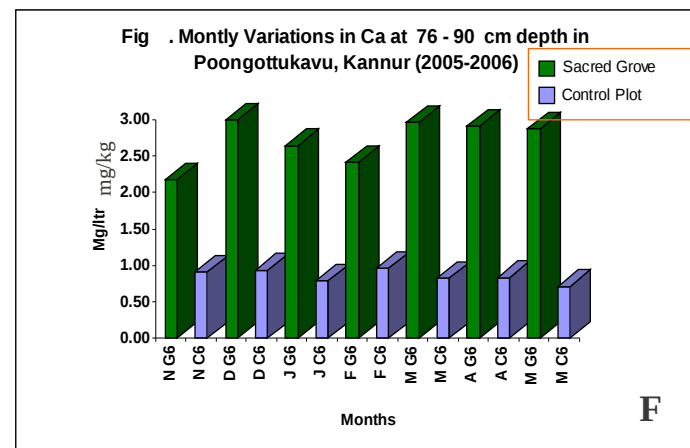
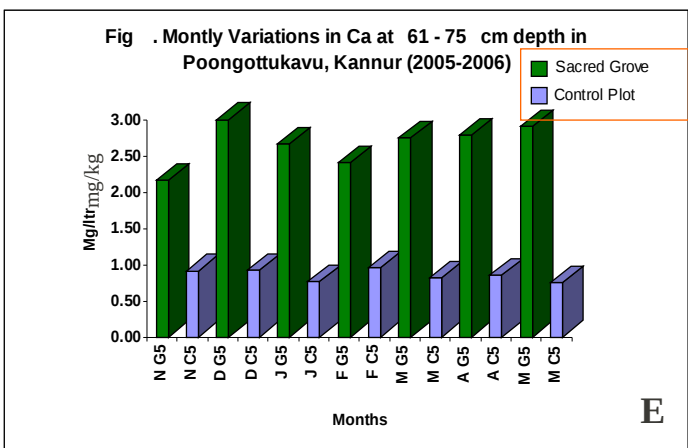
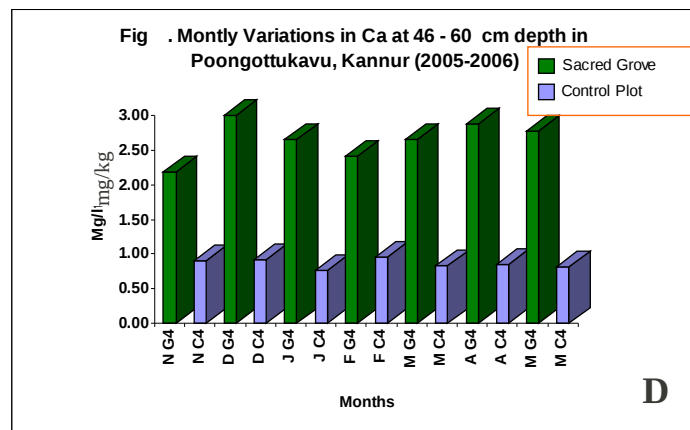
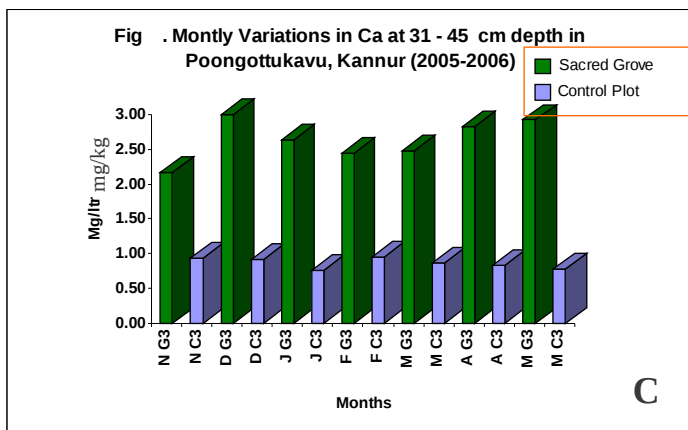
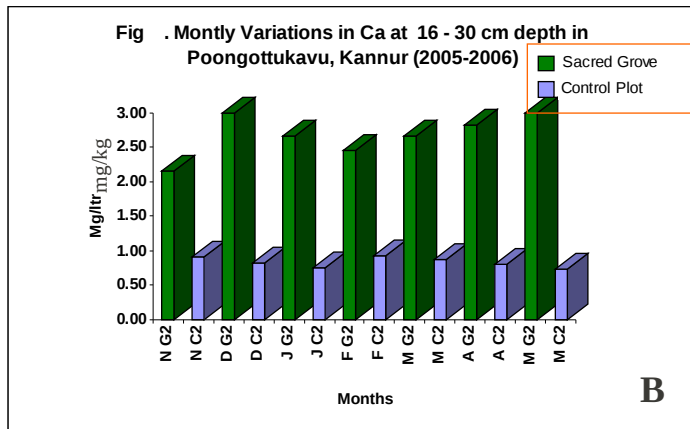
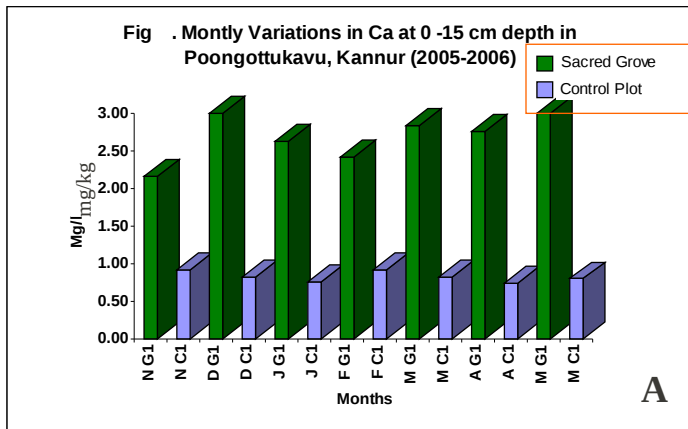


Figure 116 A-F. Monthly Variations in Soil Ca: Poongottukavu (2005-06)

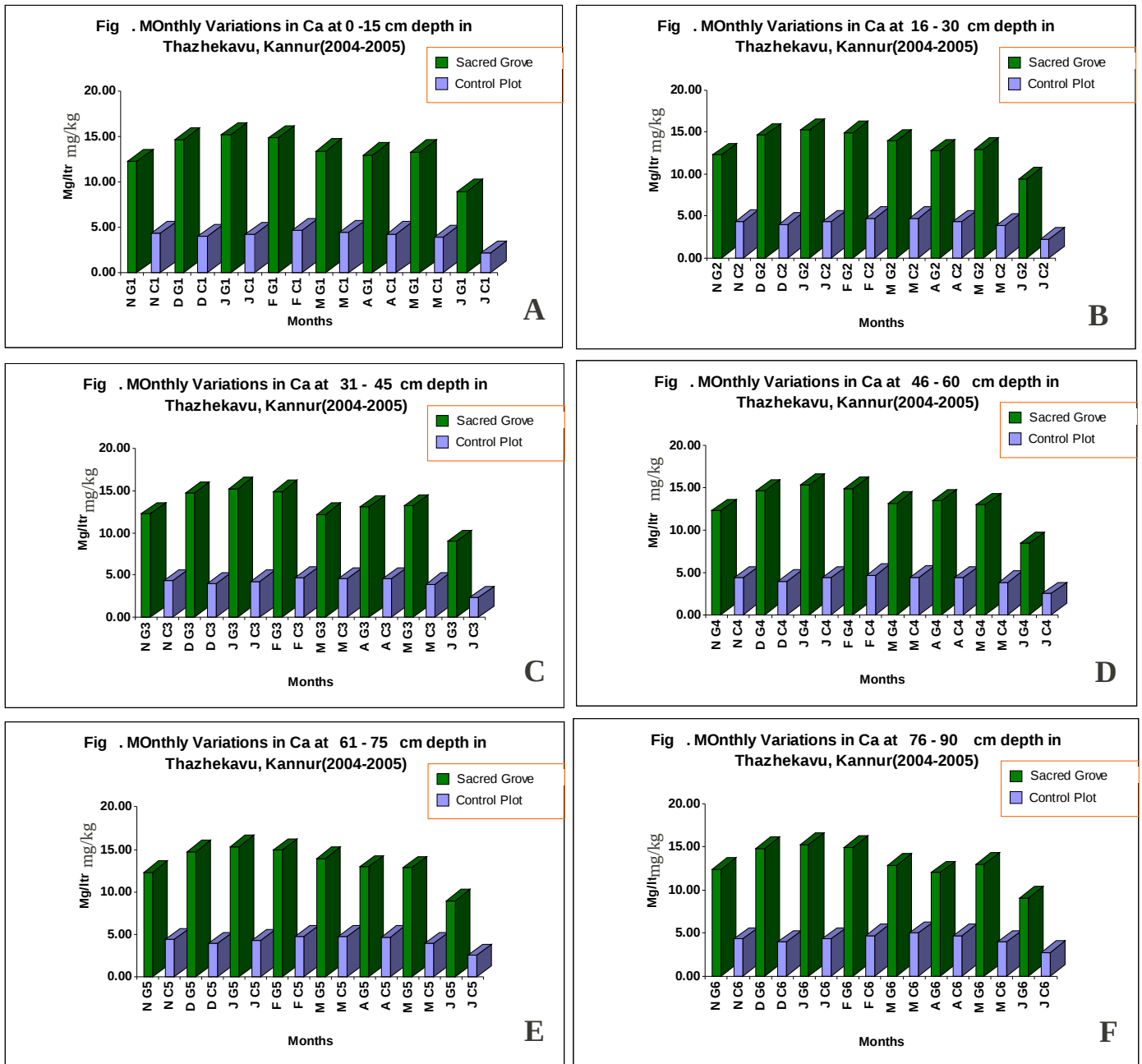


Figure 117 A-F. Monthly Variations in Soil Ca: Thazhekkavu (2004-05)

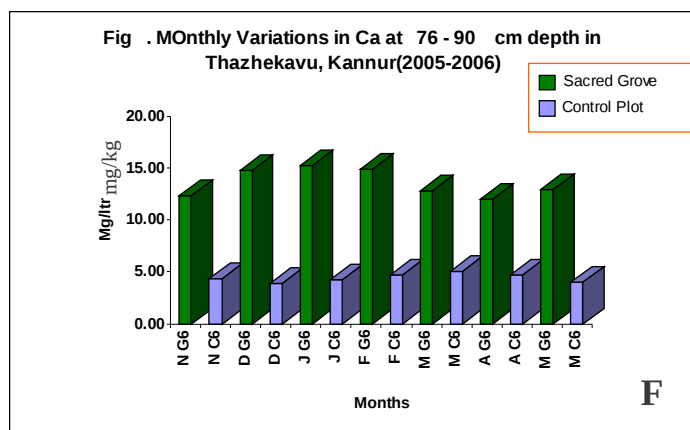
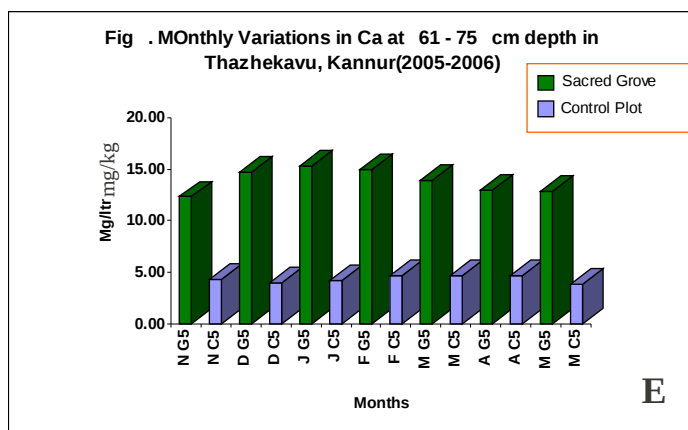
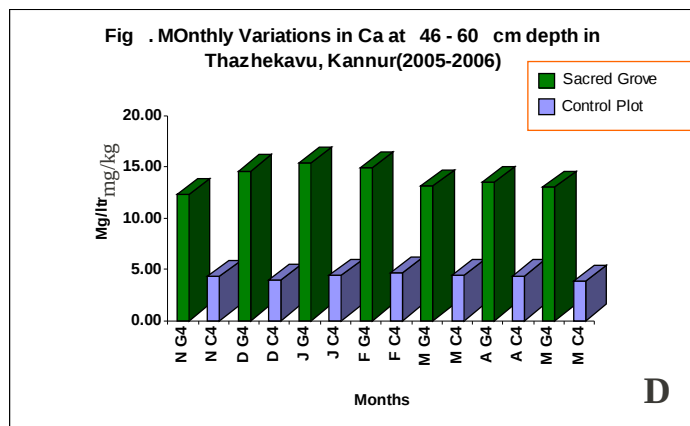
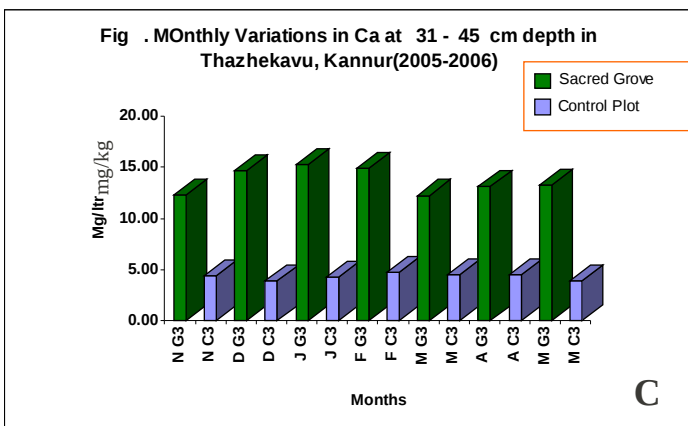
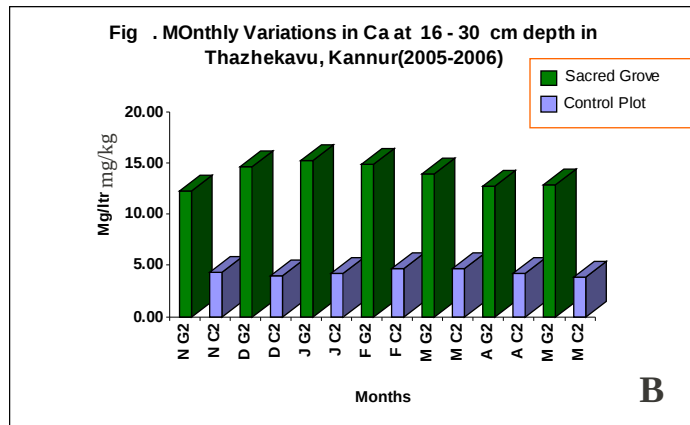
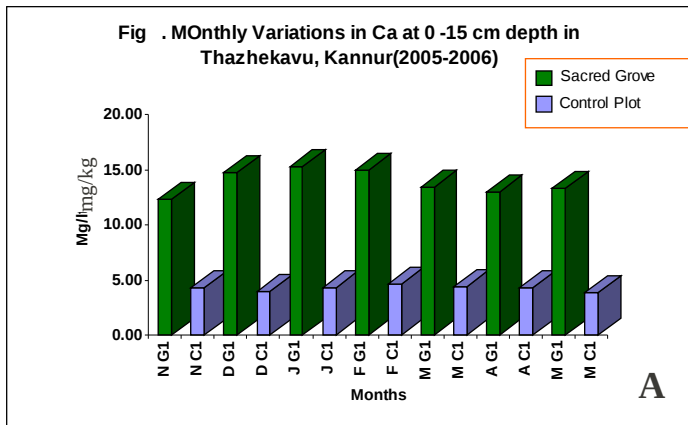


Figure 118 A-F. Monthly Variations in Soil Ca: Thazhekkavu (2005-06)

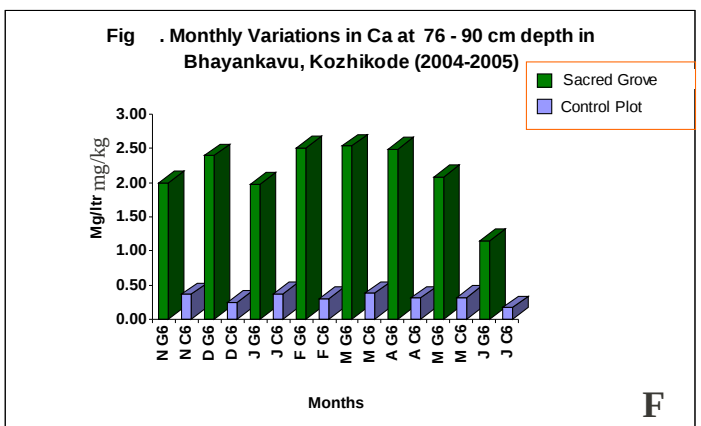
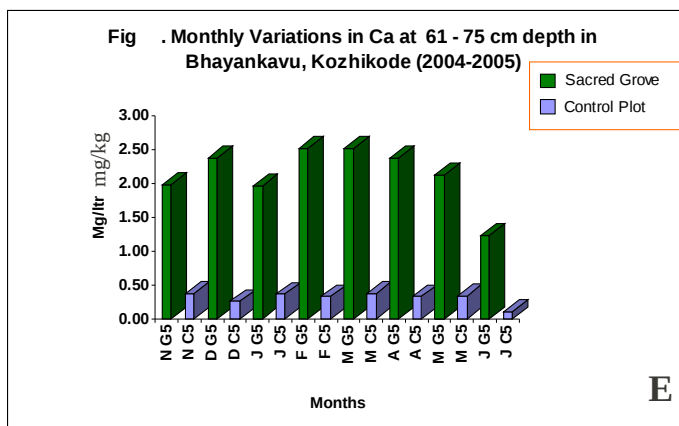
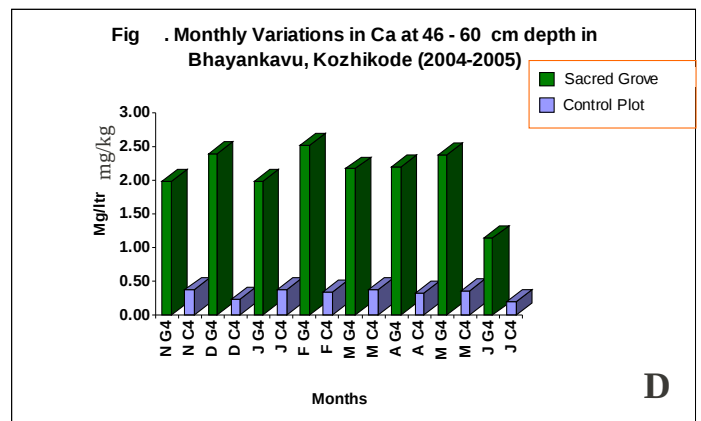
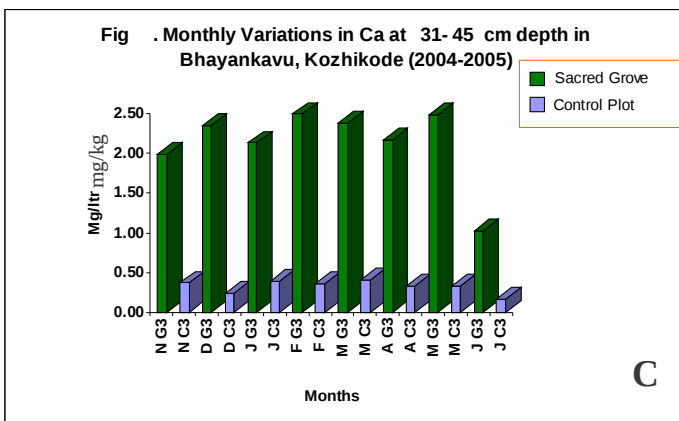
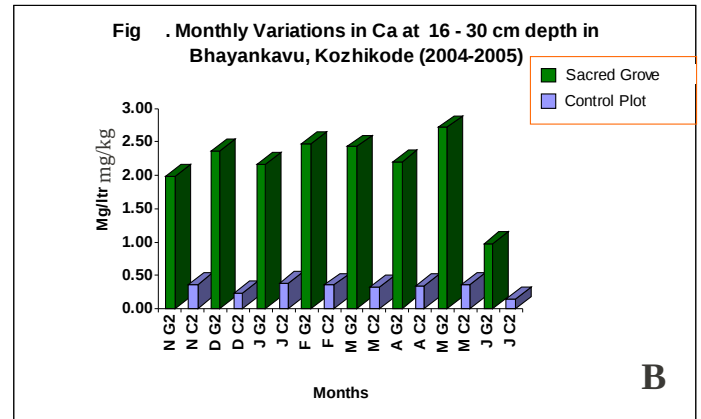
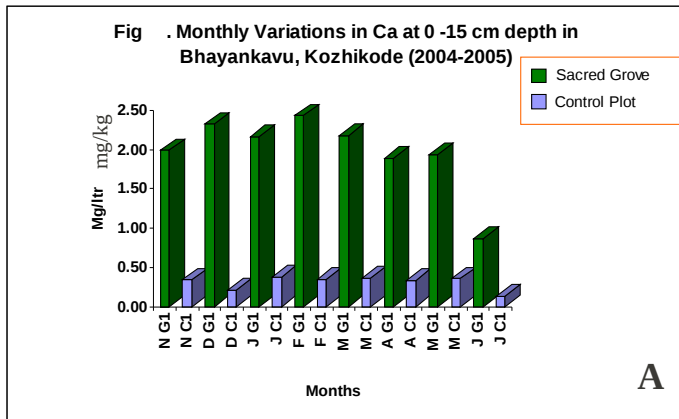


Figure 119 A-F. Monthly Variations in Soil Ca: Bhayankavu (2004-05)

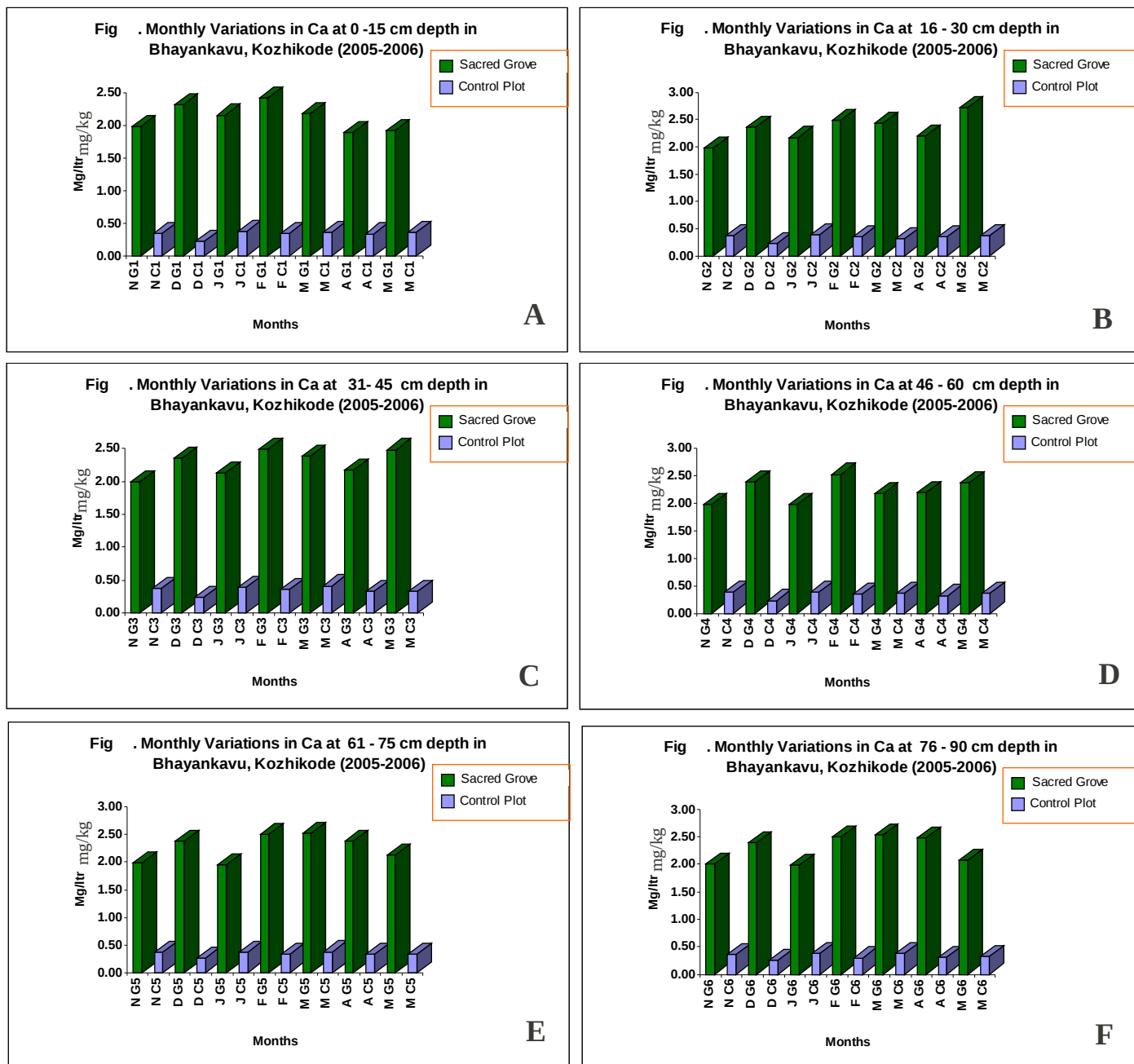


Figure 120 A-F. Monthly Variations in Soil Ca: Bhayankavu (2005-06)

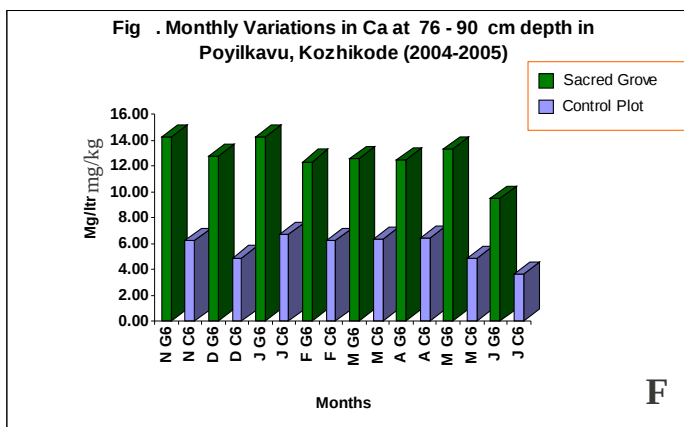
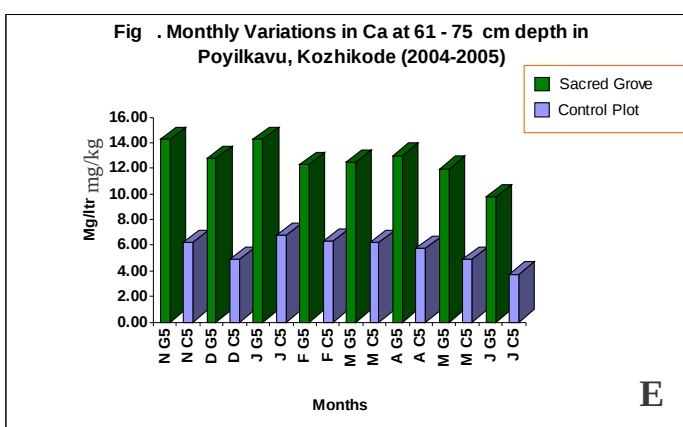
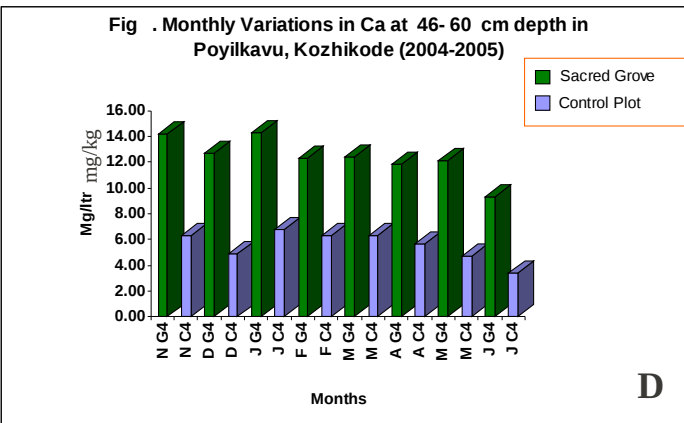
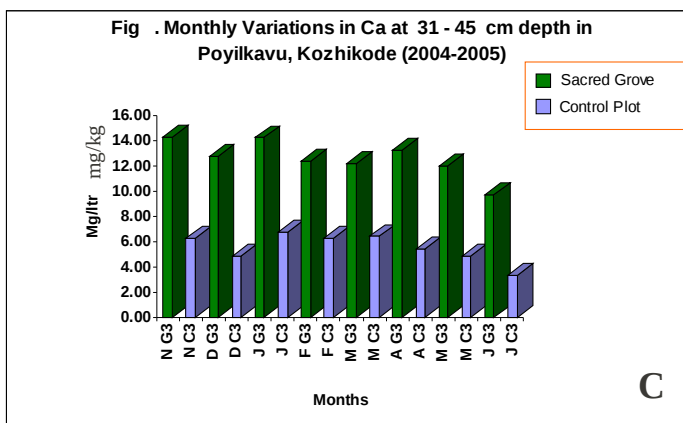
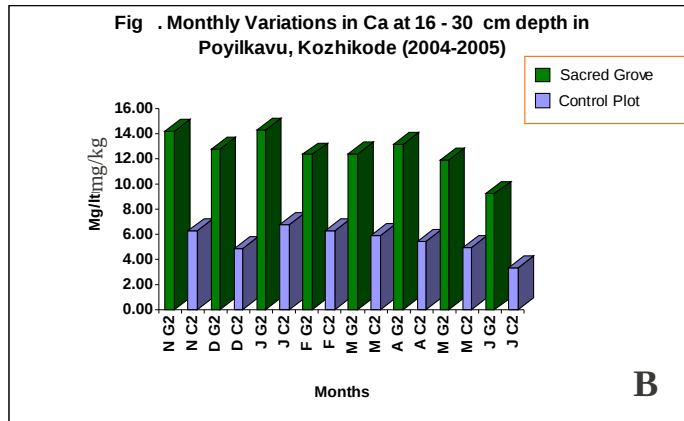
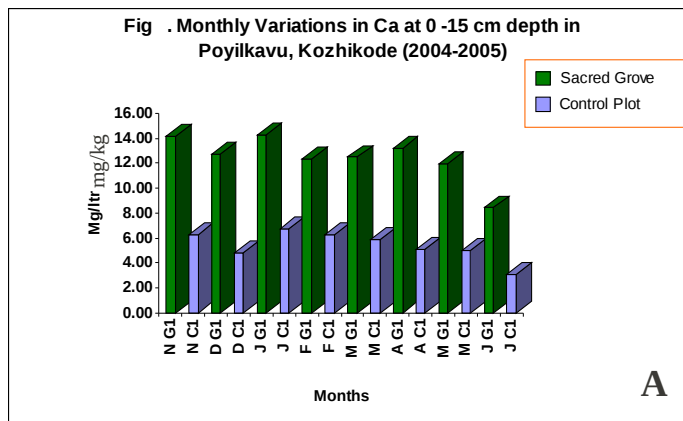


Figure 121 A-F. Monthly Variations in Soil Ca: Poyilkavu (2004-05)

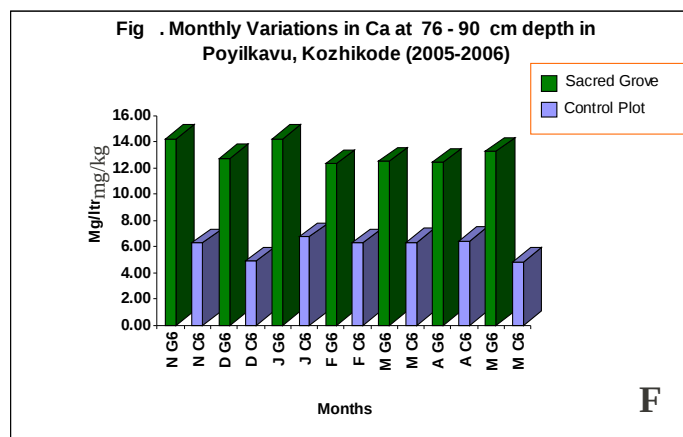
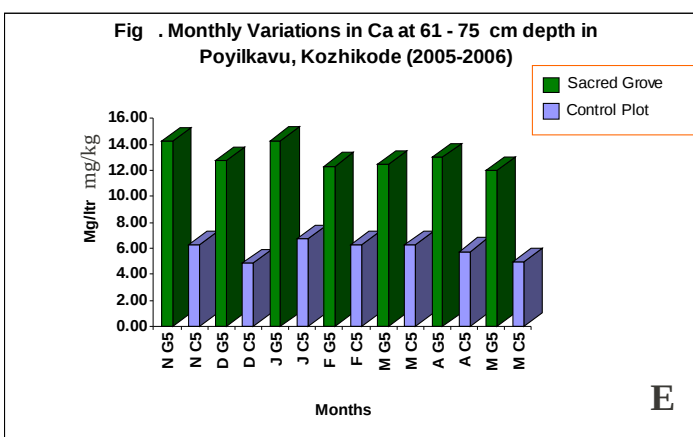
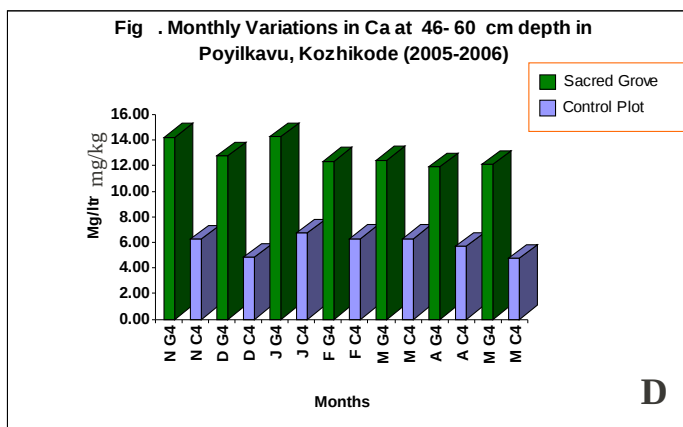
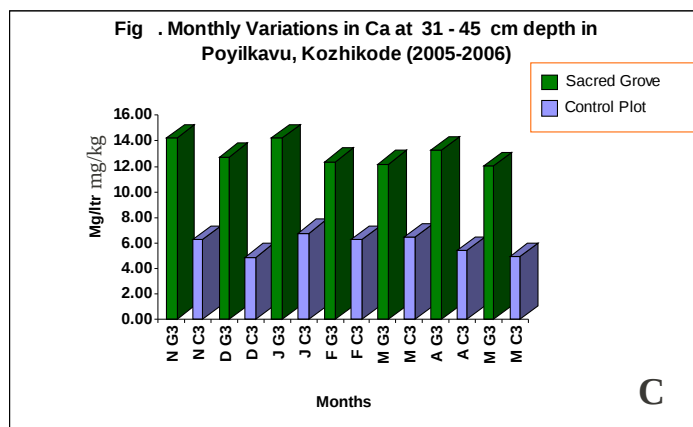
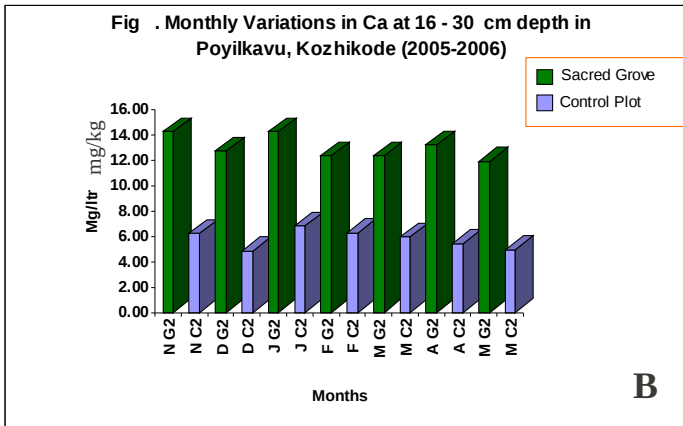
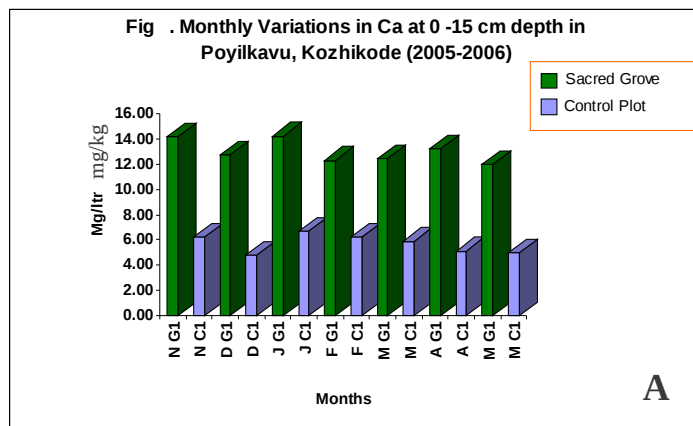


Figure 122 A-F. Monthly Variations in Soil Ca: Poyilkkavu (2005-06)

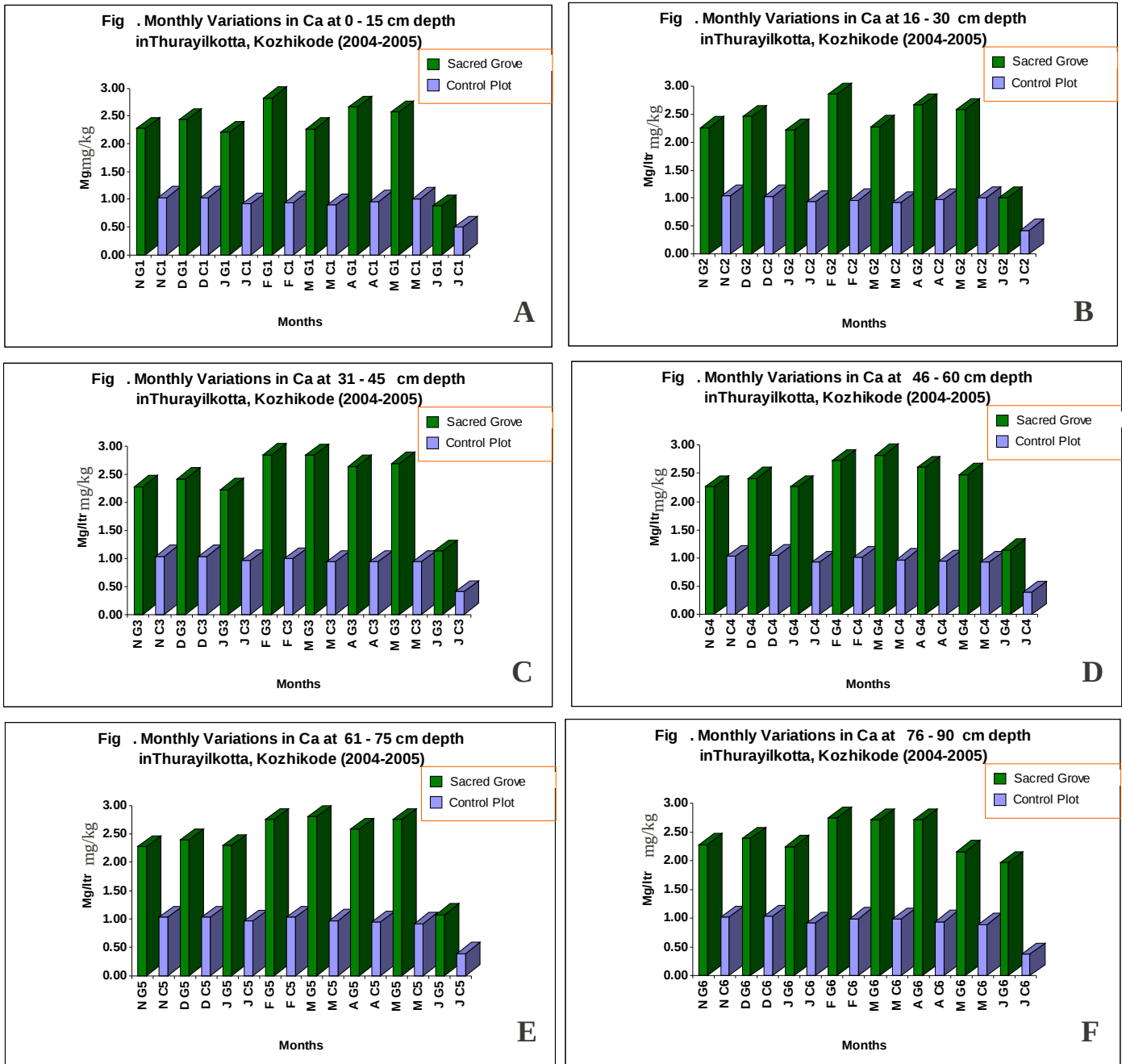


Figure 123 A-F. Monthly Variations in Soil Ca: Thurayilkavu (2004-05)

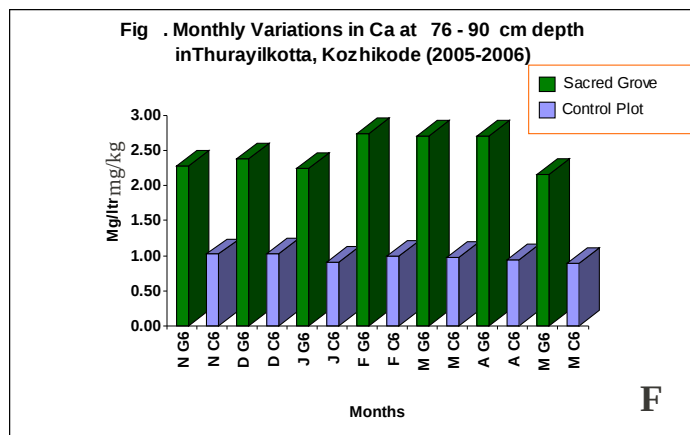
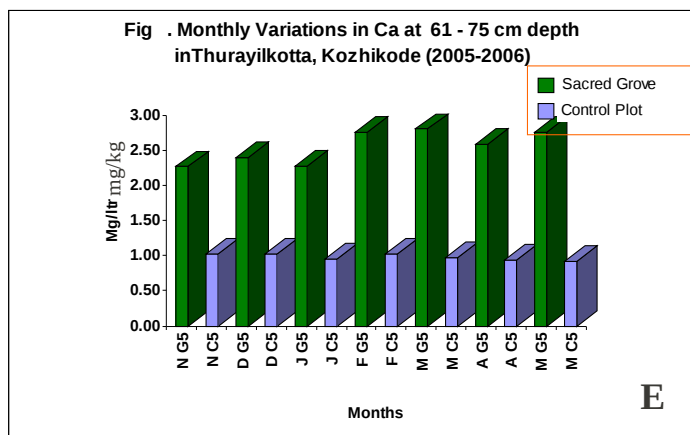
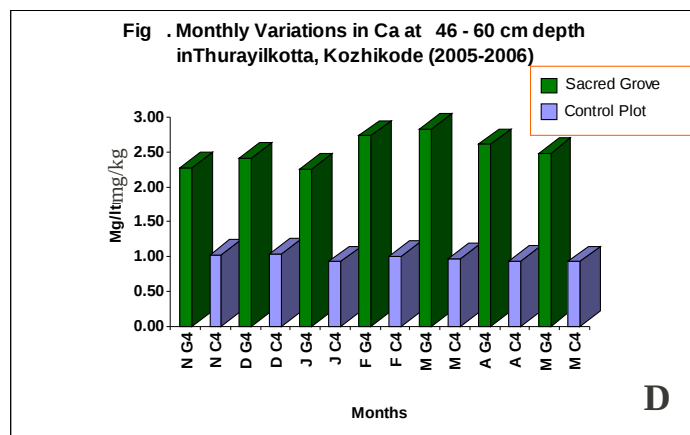
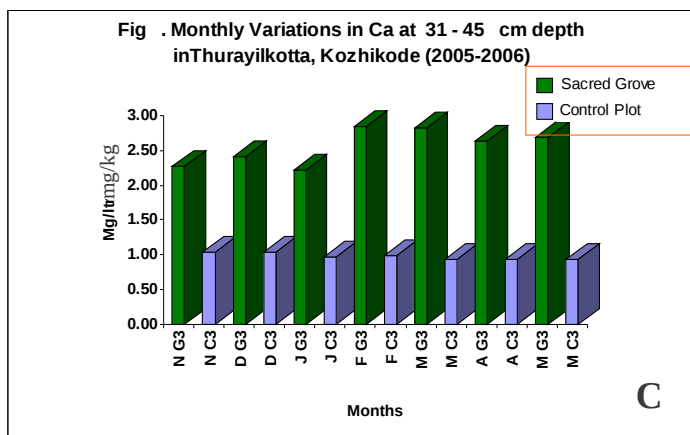
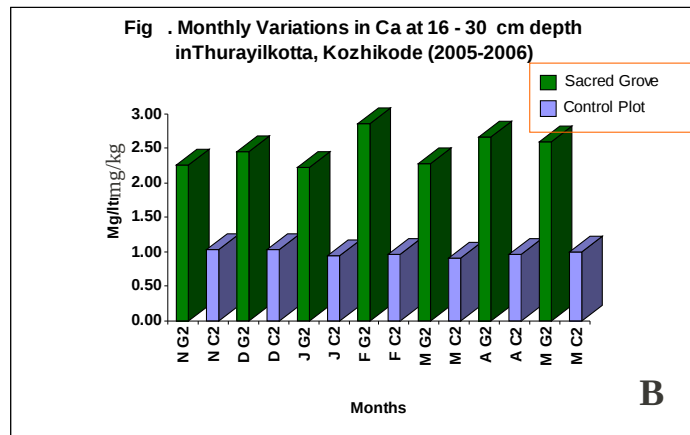
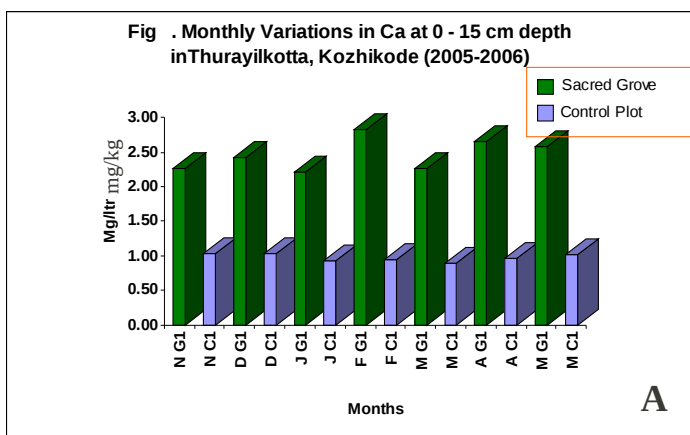


Figure 124 A-F. Monthly Variations in Soil Ca: Thurayilkavu (2005-06)

4.2.11 Exchangeable Magnesium

The comparison of calcium content in sacred groves and control plots are presented in figures 125 to 138. This variation in the magnesium concentration in sacred grove sites may be attributed to the rich flora in sacred groves. The lower concentration of magnesium during the monsoon season may be attributed to dilution by rainwater. Magnesium being an important constituent of the chlorophyll, increased concentration of magnesium is formed due to the decomposition of sacred grove litter.

Studies on variations in magnesium contents in the seven selected sacred groves showed that increased Mg contents ranging from 95 to 435% were recorded for various sacred groves (Table 22) with maximum values for Thazhekkavu (2.44 mg/kg soil). This excess Mg may be derived from the decomposition of litter accumulated over the years in these groves favoured by the microclimate and soil moisture congenial for the increased microbial activity.

Table22. Variations in Soil Mg (mg/kg) in Sacred Groves: 2004-06

Name of Sacred Grove	Treatments	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Mean	Increase/ Decrease (%)
Kammadathukavu	G	0.64	0.86	0.85	0.89	0.83	0.8	0.8	0.51	0.77	185.00
	C	0.25	0.23	0.34	0.27	0.28	0.3	0.31	0.16	0.27	
Parappoolkavu	G	0.97	1.02	0.87	0.98	0.95	0.88	0.84	0.65	0.90	95.80
	C	0.54	0.59	0.44	0.47	0.51	0.49	0.5	0.31	0.48	
Poongottukavu	G	0.89	0.95	1.02	0.96	0.96	0.93	0.94	0.65	0.91	213.79
	C	0.28	0.24	0.34	0.36	0.32	0.33	0.31	0.17	0.29	
Thazhekkavu	G	2.39	2.36	2.65	2.56	2.48	2.59	2.54	1.93	2.44	154.17
	C	1.00	1.02	1.12	0.98	1.00	0.98	0.94	0.66	0.96	
Bhayankavu	G	0.95	0.85	1.05	1.00	0.96	0.9	0.99	0.58	0.91	435.00
	C	0.15	0.16	0.24	0.17	0.19	0.2	0.18	0.1	0.17	
Poyilkkavu	G	1.84	1.94	2.07	1.85	1.89	1.89	1.84	1.46	1.85	112.64
	C	1.03	0.94	0.87	0.95	0.91	0.89	0.86	0.47	0.87	
Thurayilkavu	G	0.65	0.94	0.62	0.96	0.81	0.92	0.7	0.43	0.75	188.46
	C	0.24	0.35	0.29	0.26	0.28	0.25	0.23	0.17	0.26	

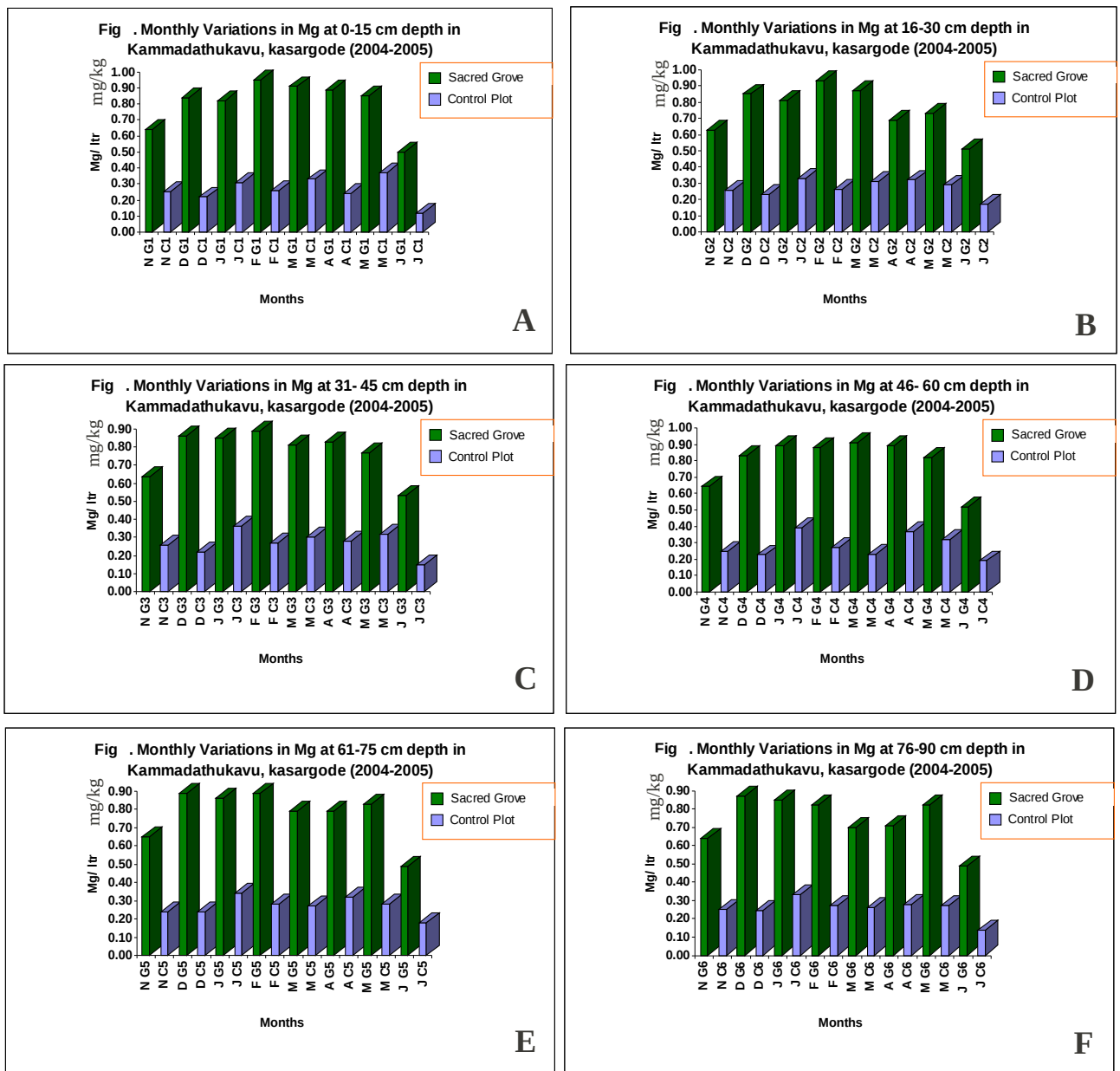


Figure 125 A-F. Monthly Variations in Soil Mg: Kammadathukavu (2004-05)

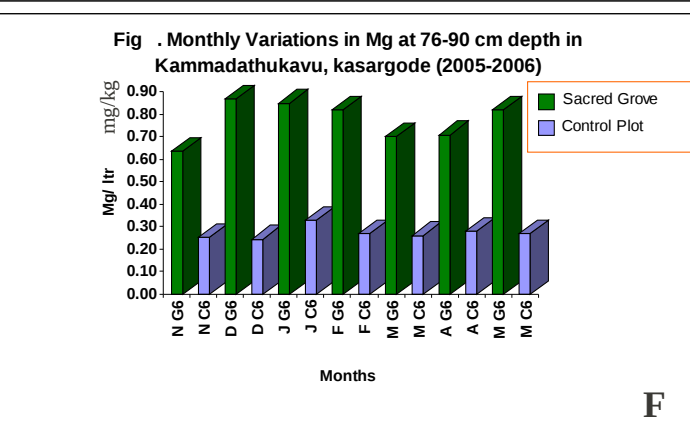
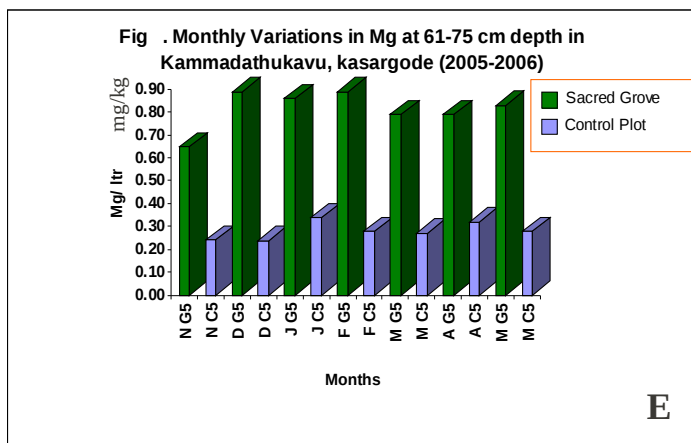
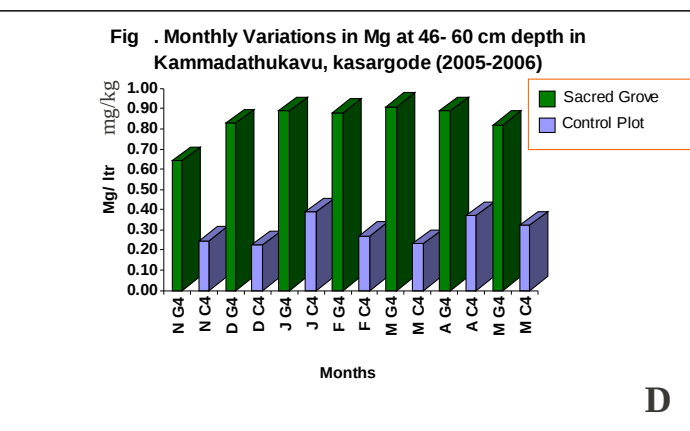
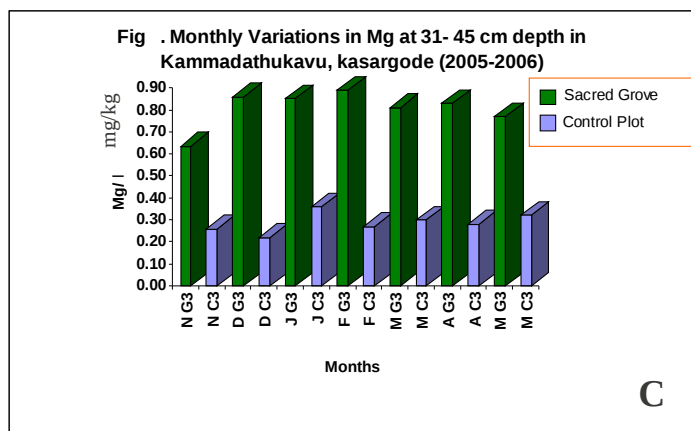
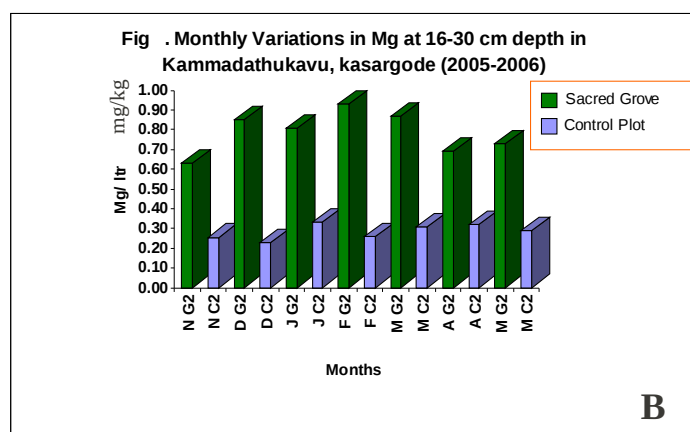
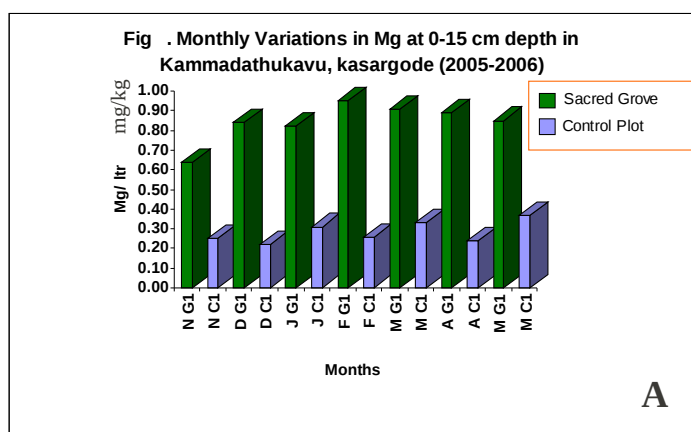


Figure 126 A-F. Monthly Variations in Soil Mg: Kammadathukavu (2005-06)

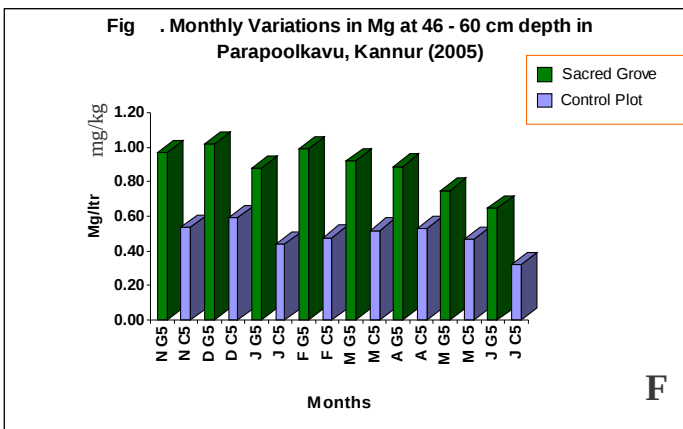
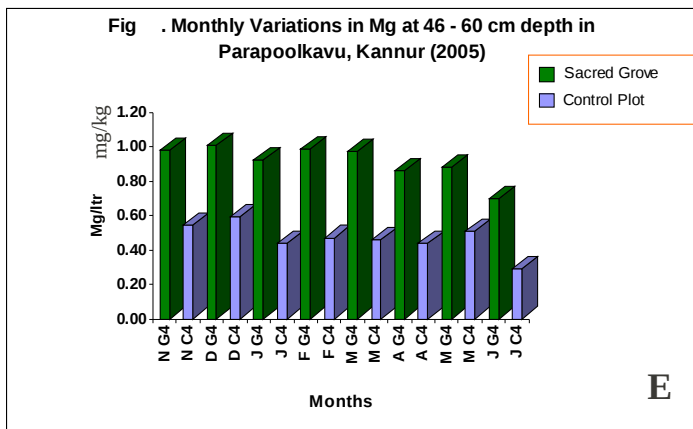
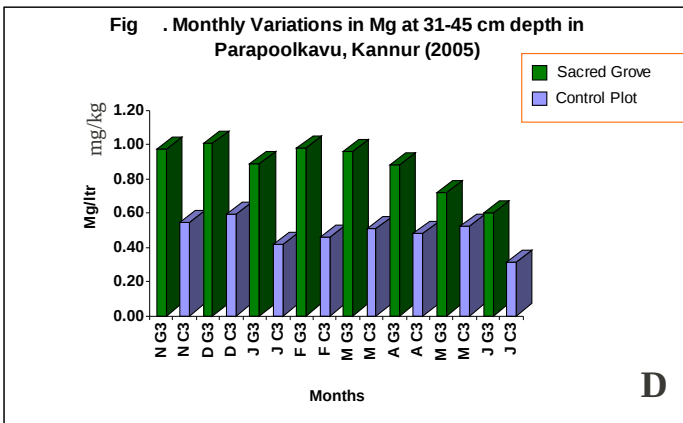
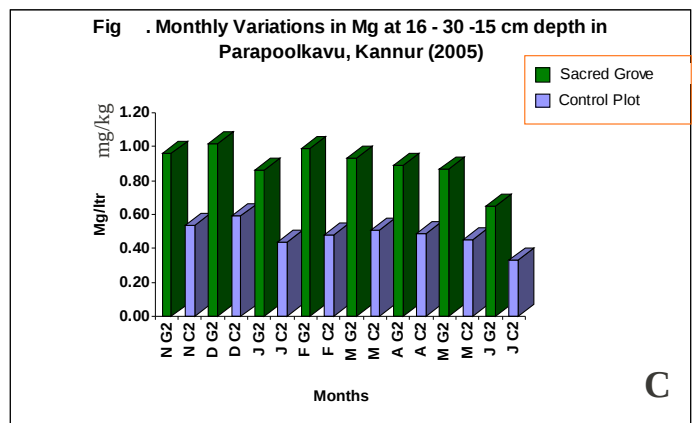
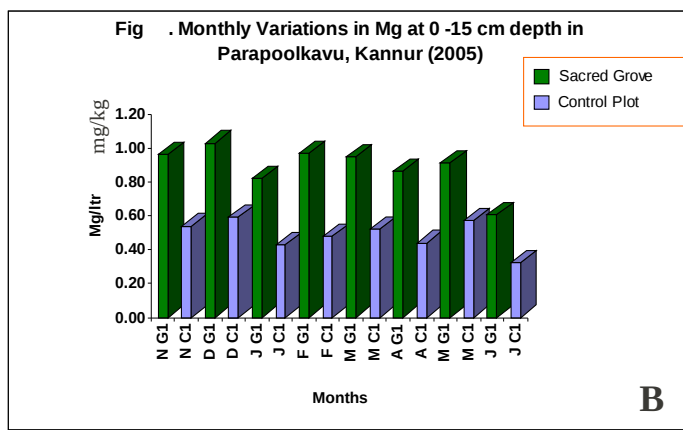
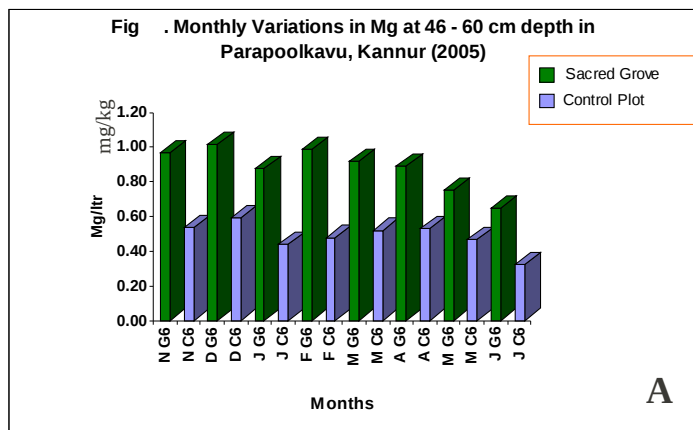


Figure 127 A-F. Monthly Variations in Soil Mg: Parappoolkavu (2004-05)

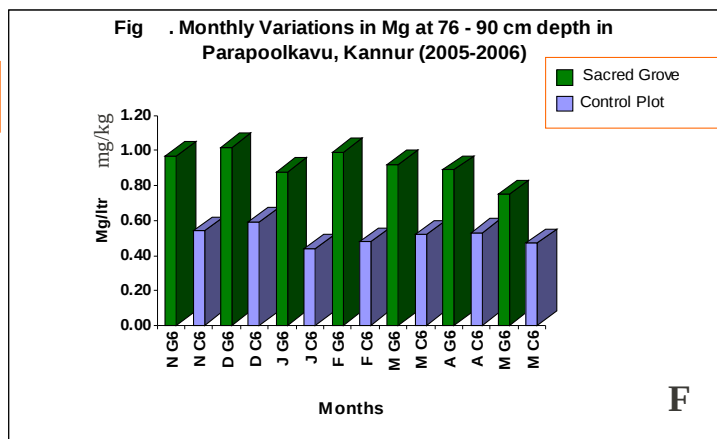
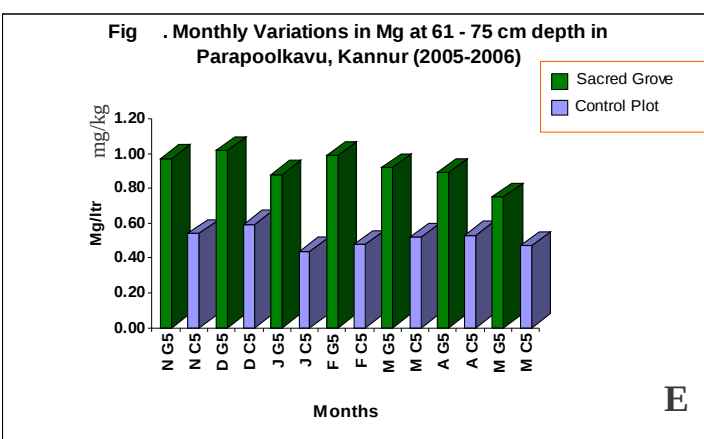
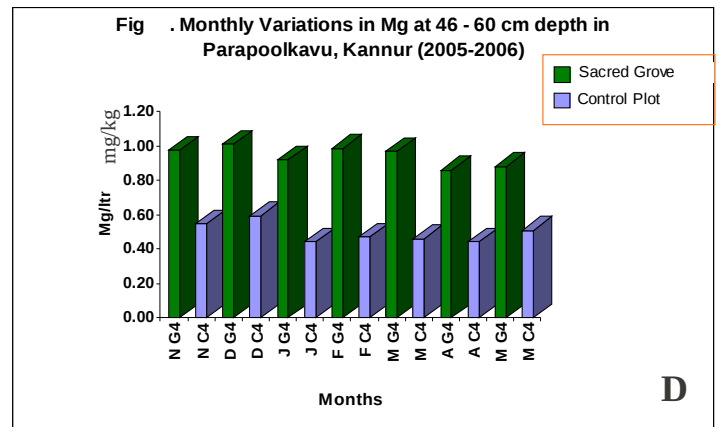
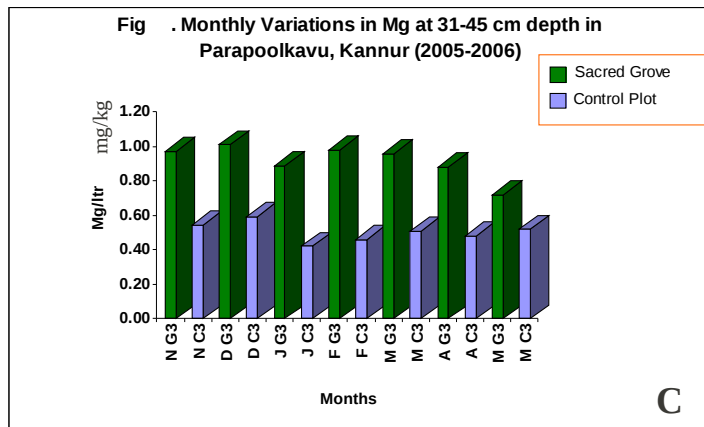
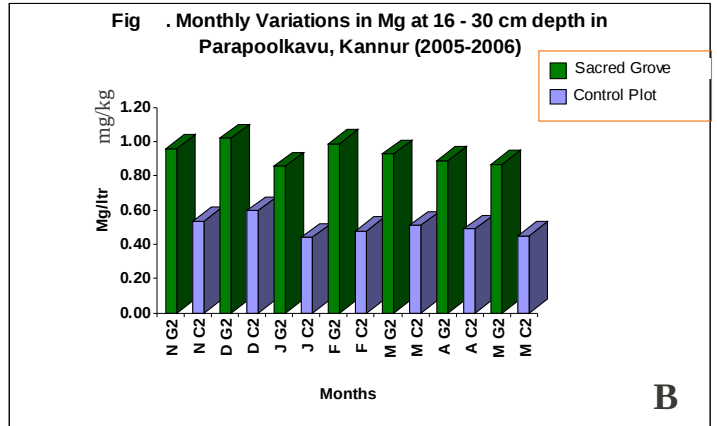
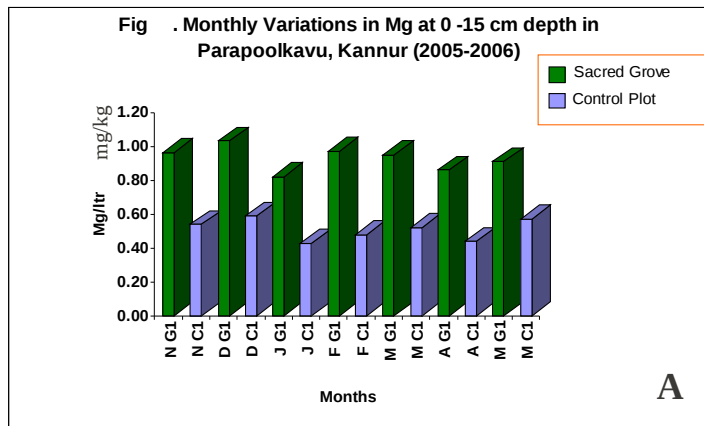


Figure 128 A-F. Monthly Variations in Soil Mg: Parapoolkavu (2005-06)

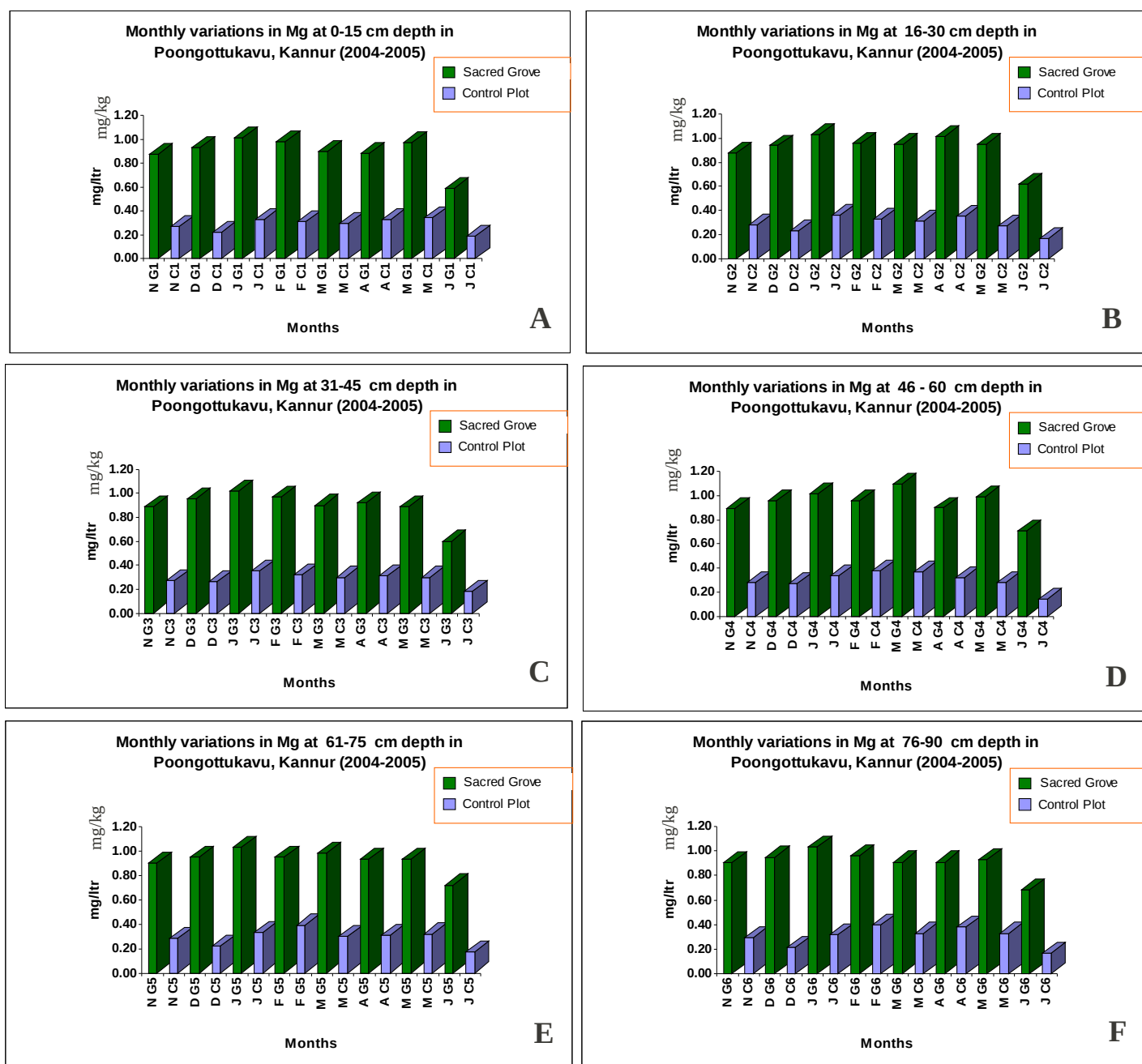


Figure 129 A-F. Monthly Variations in Soil Mg: Poongottukavu (2004-05)

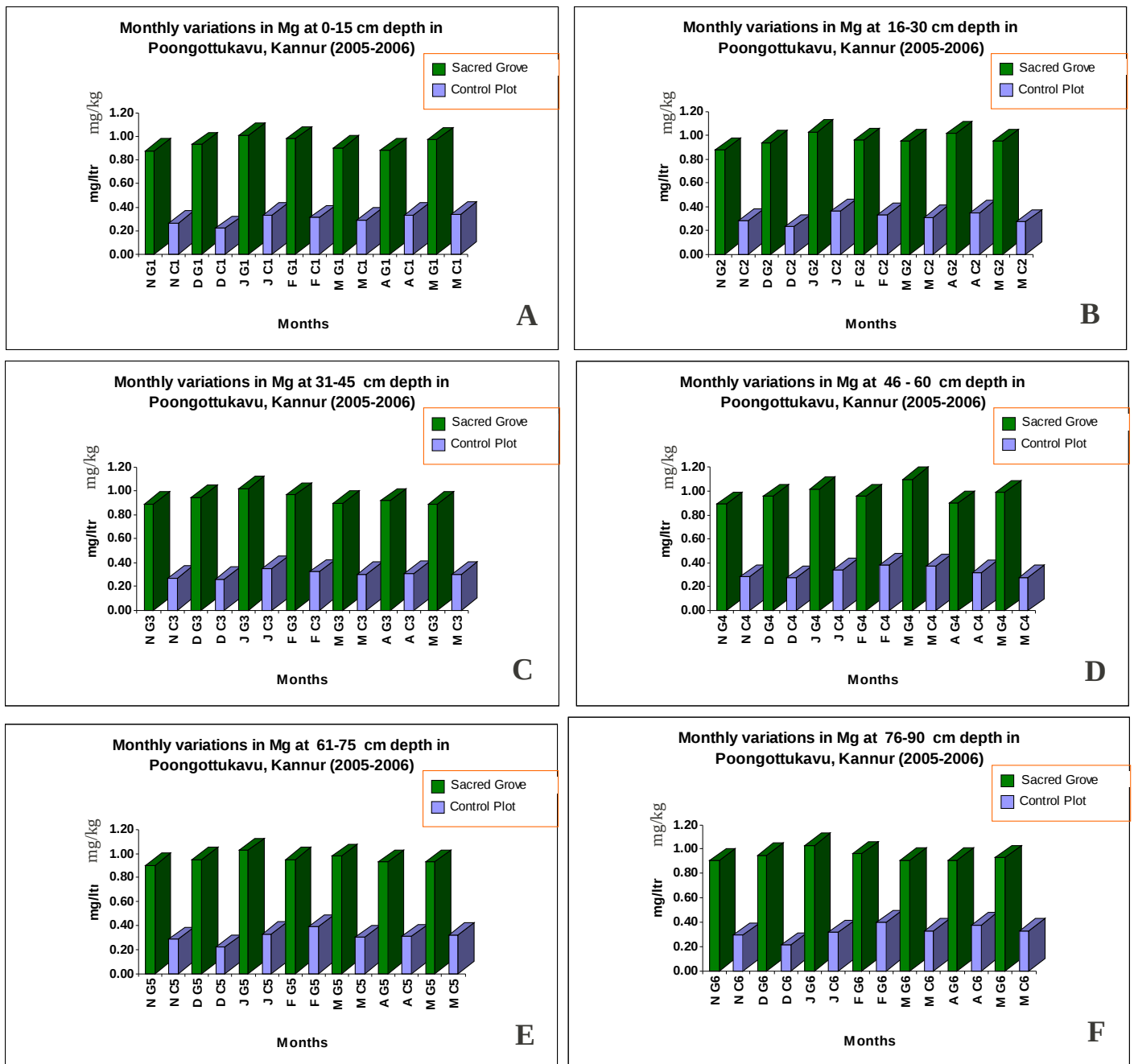


Figure 130 A-F. Monthly Variations in Soil Mg: Poongottukavu (2005-06)

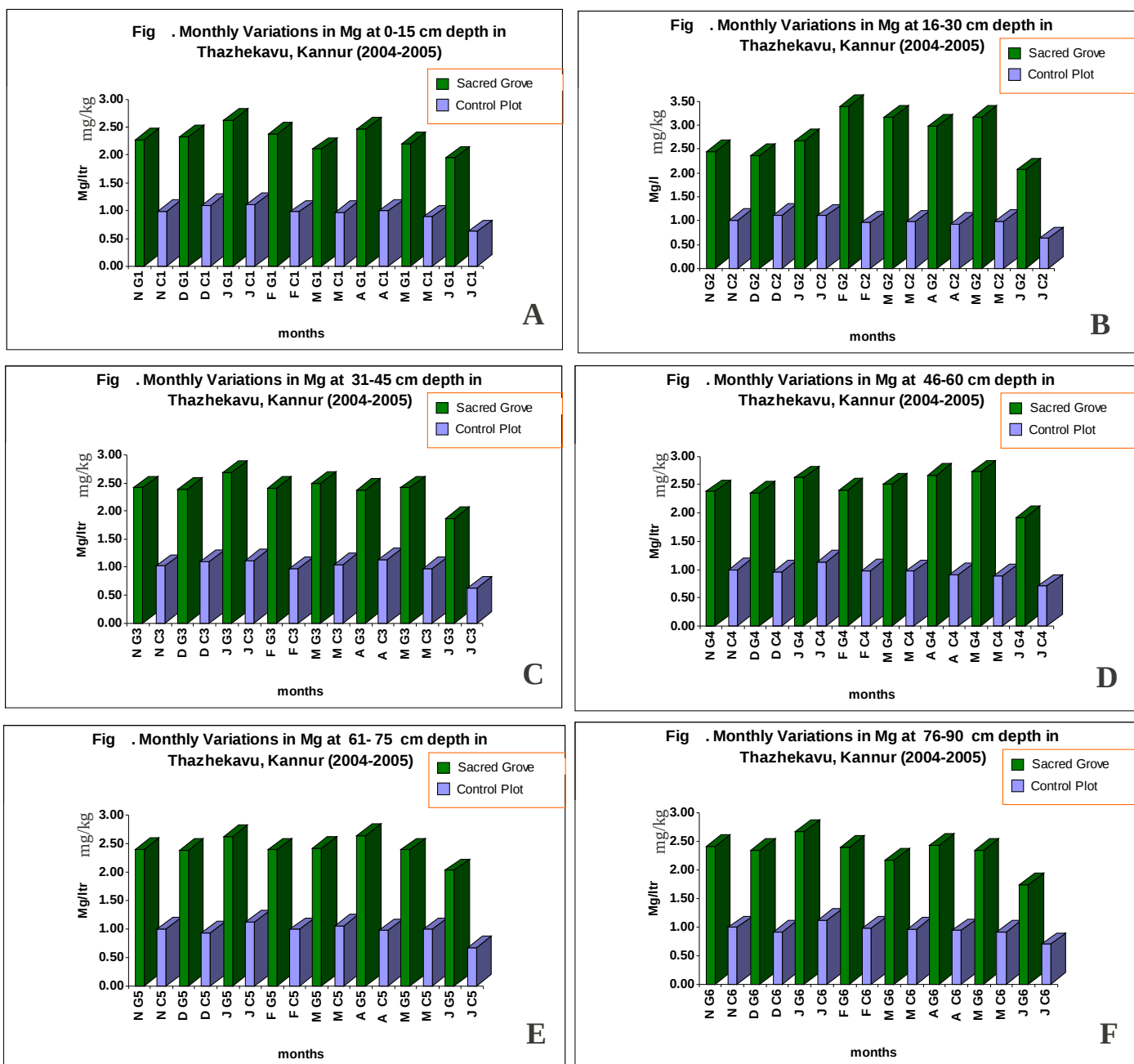


Figure 131 A-F. Monthly Variations in Soil Mg: Thazhekkavu (2004-05)

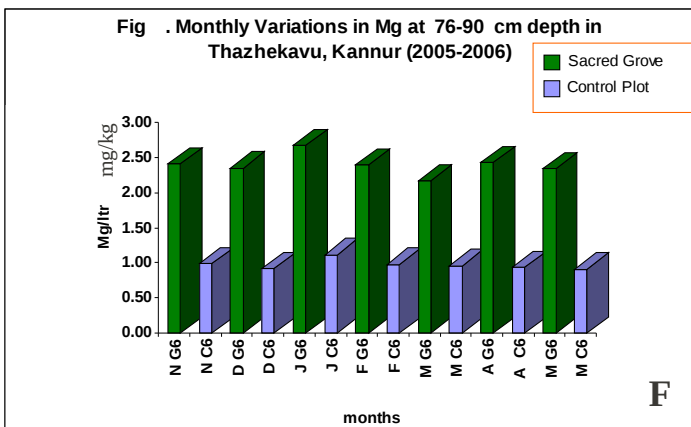
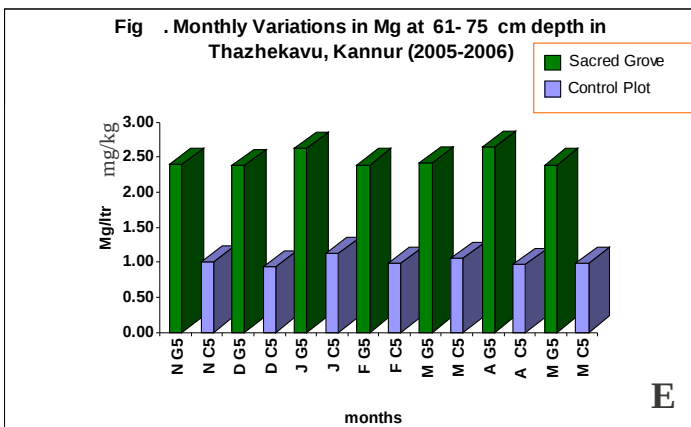
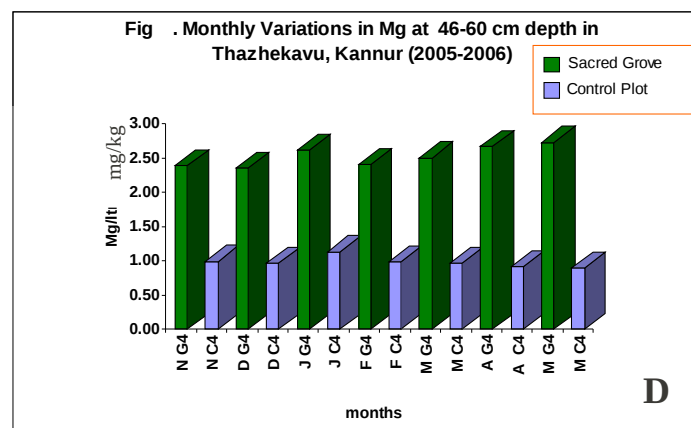
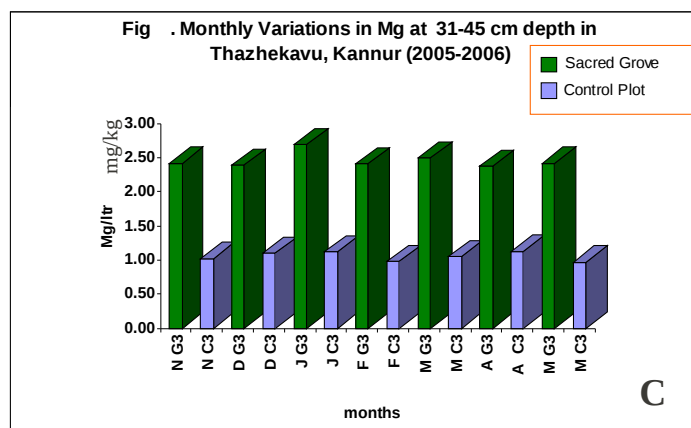
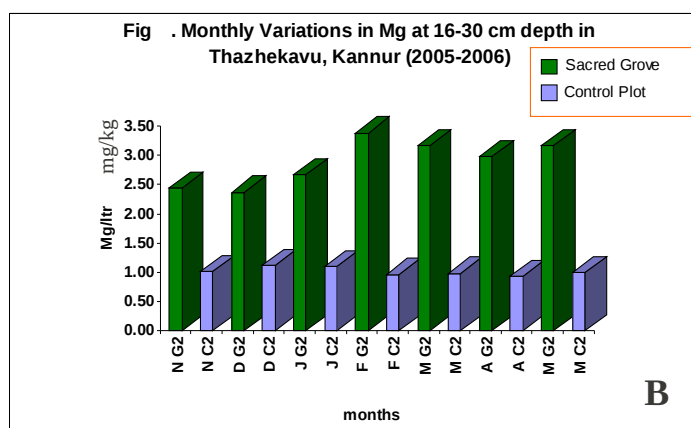
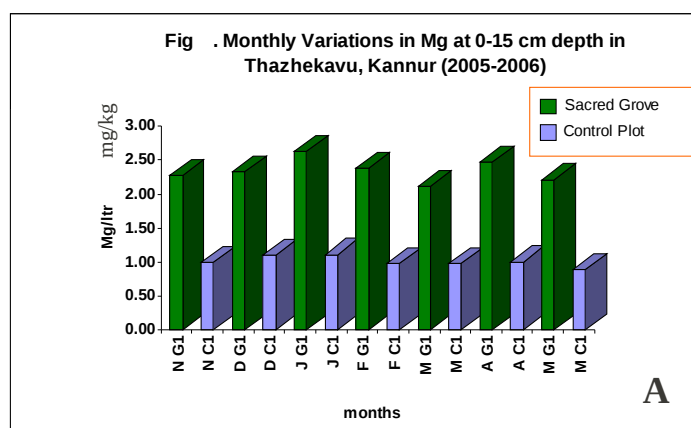


Figure 132 A-F. Monthly Variations in Soil Mg: Thazhekkavu (2005-06)

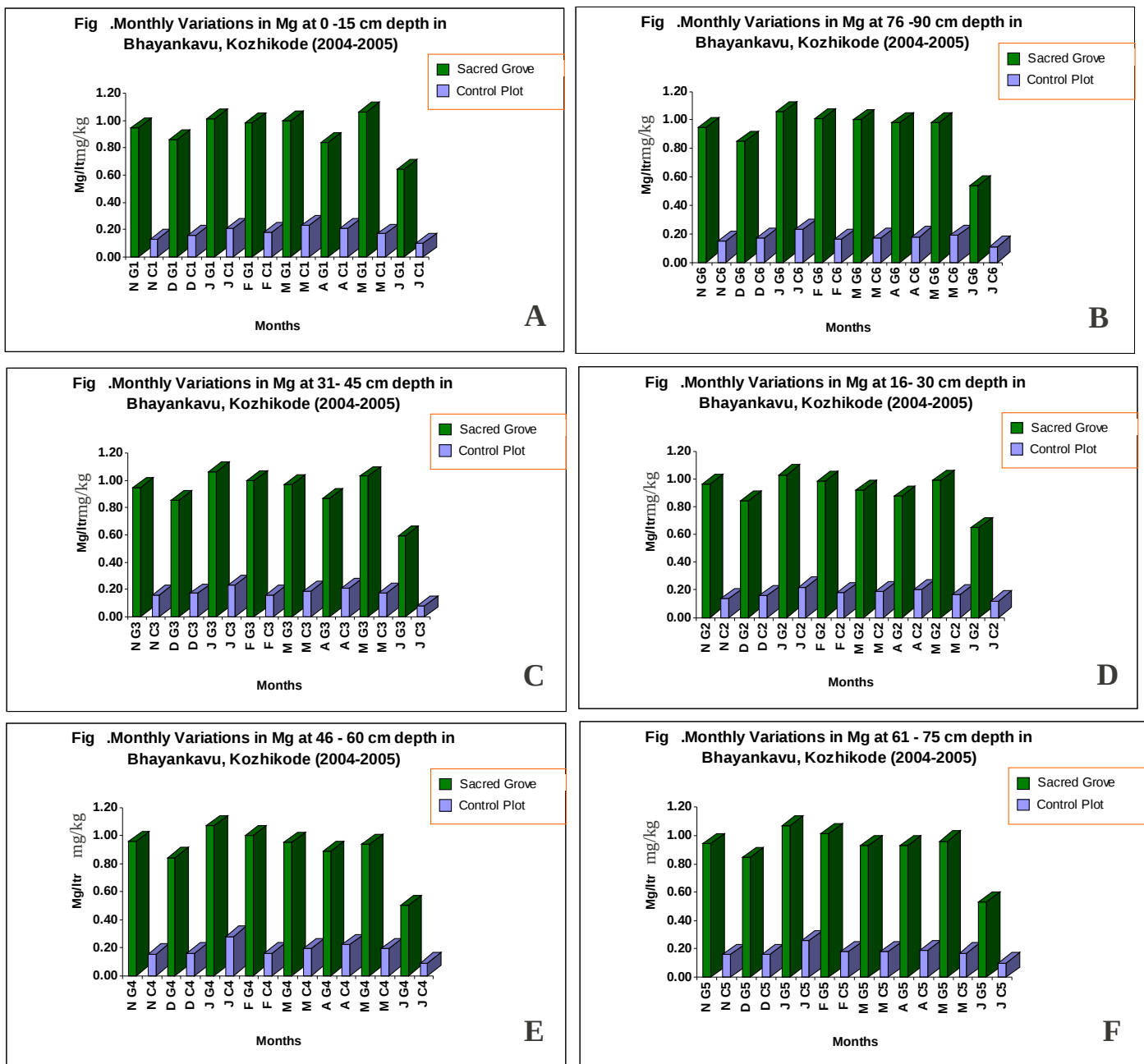


Figure 133 A-F. Monthly Variations in Soil Mg: Bhayankavu (2004-05)

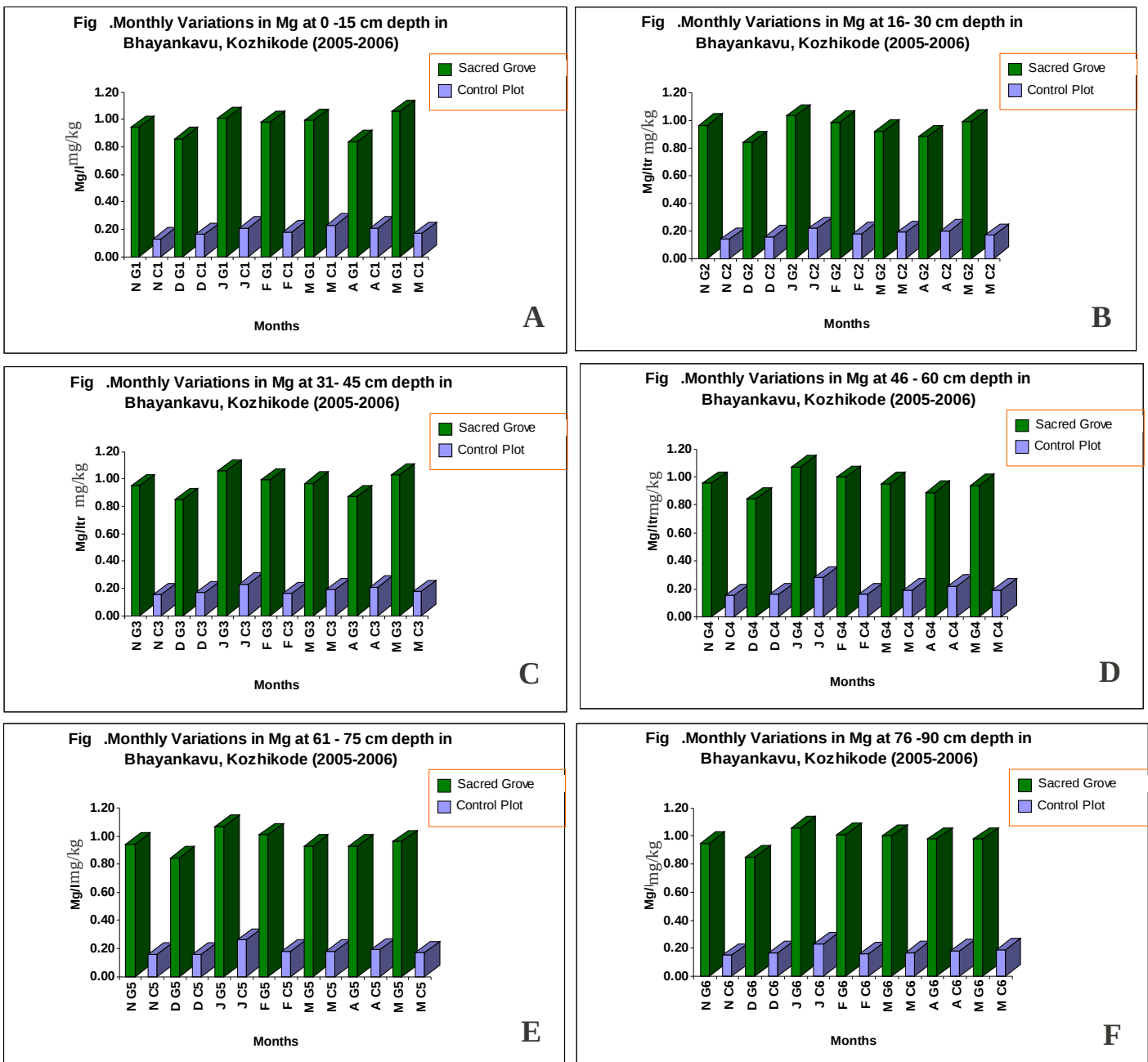


Figure 134 A-F. Monthly Variations in Soil Ca: Bhayankavu (2005-06)

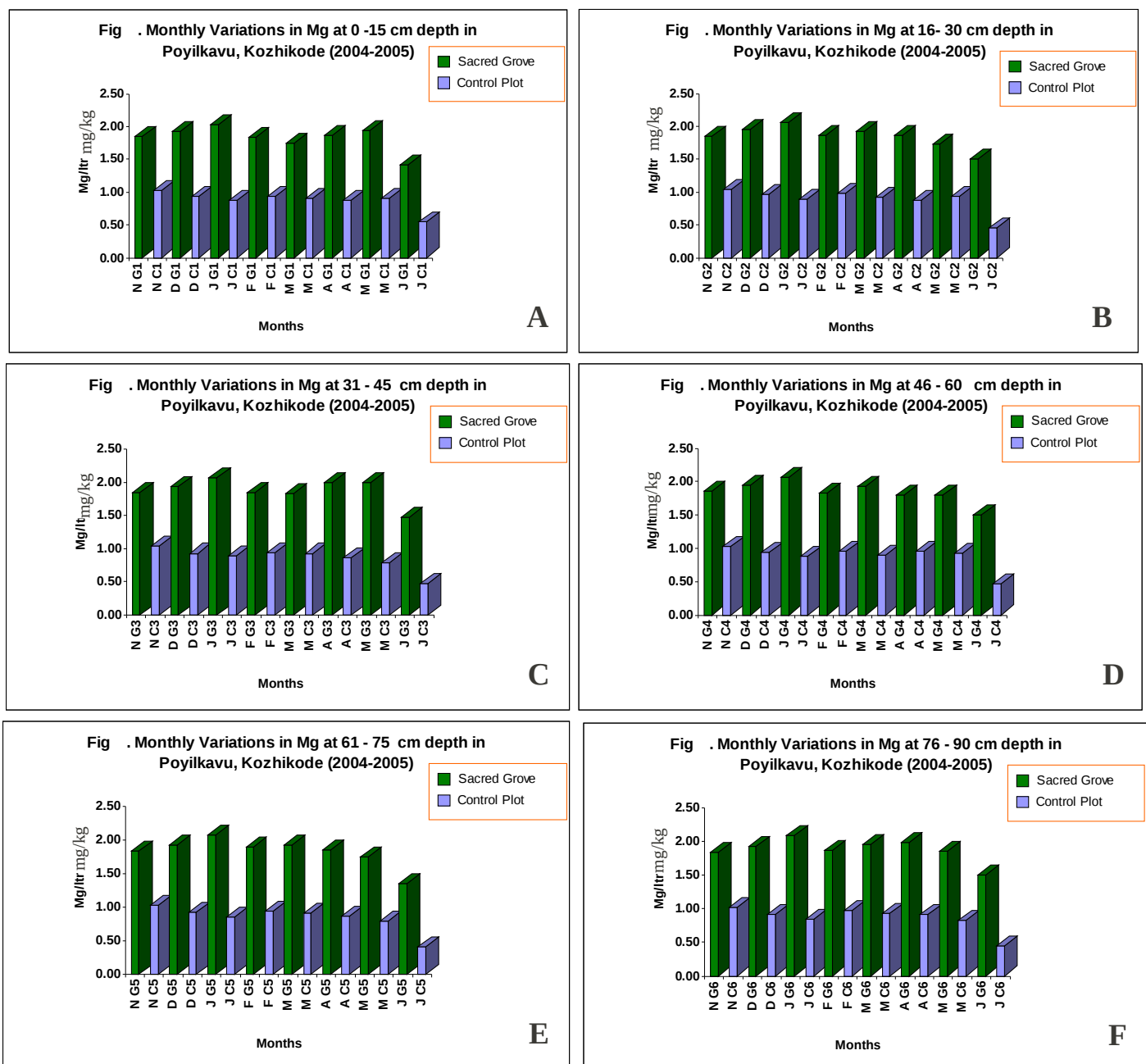


Figure 135 A-F. Monthly Variations in Soil Mg: Poyilkkavu (2004-05)

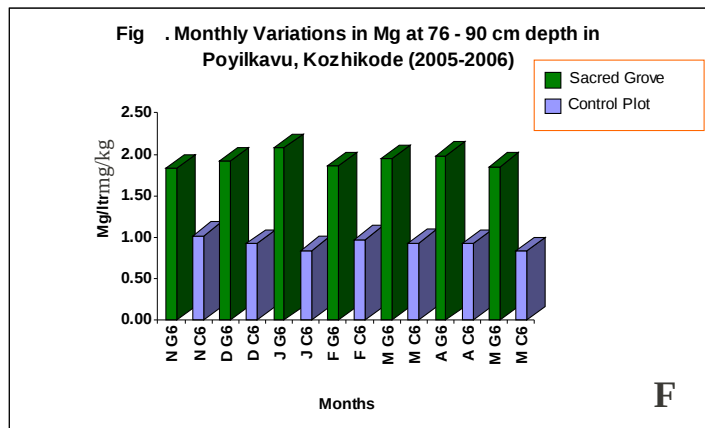
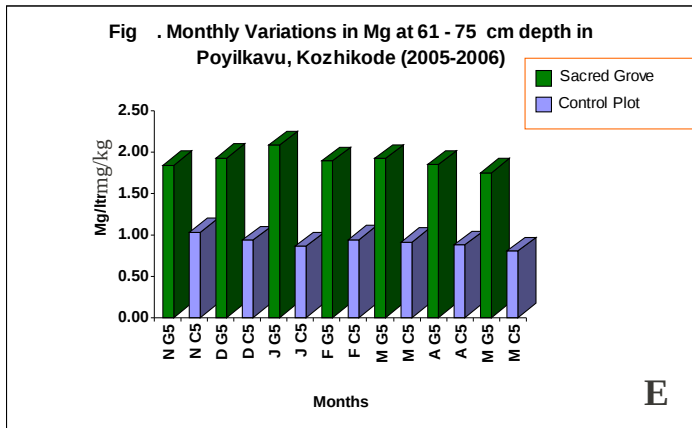
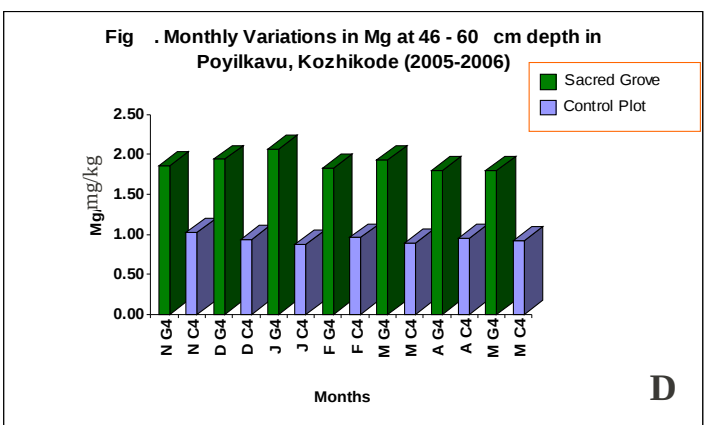
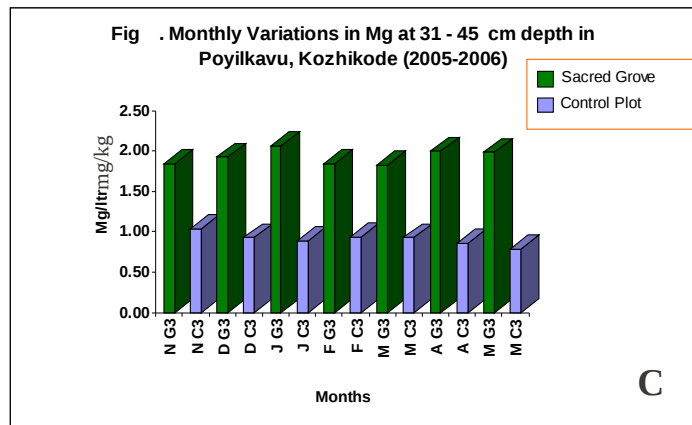
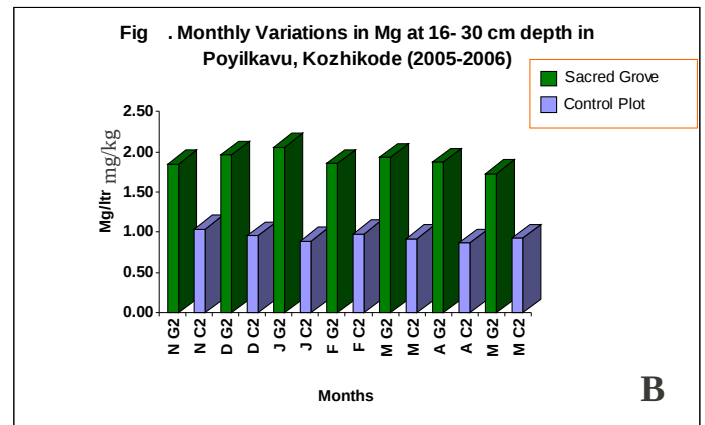
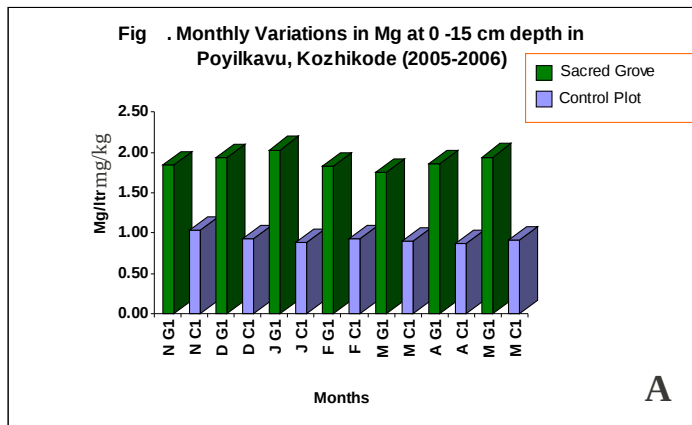


Figure 136 A-F. Monthly Variations in Soil Mg: Poyilkkavu (2005-06)

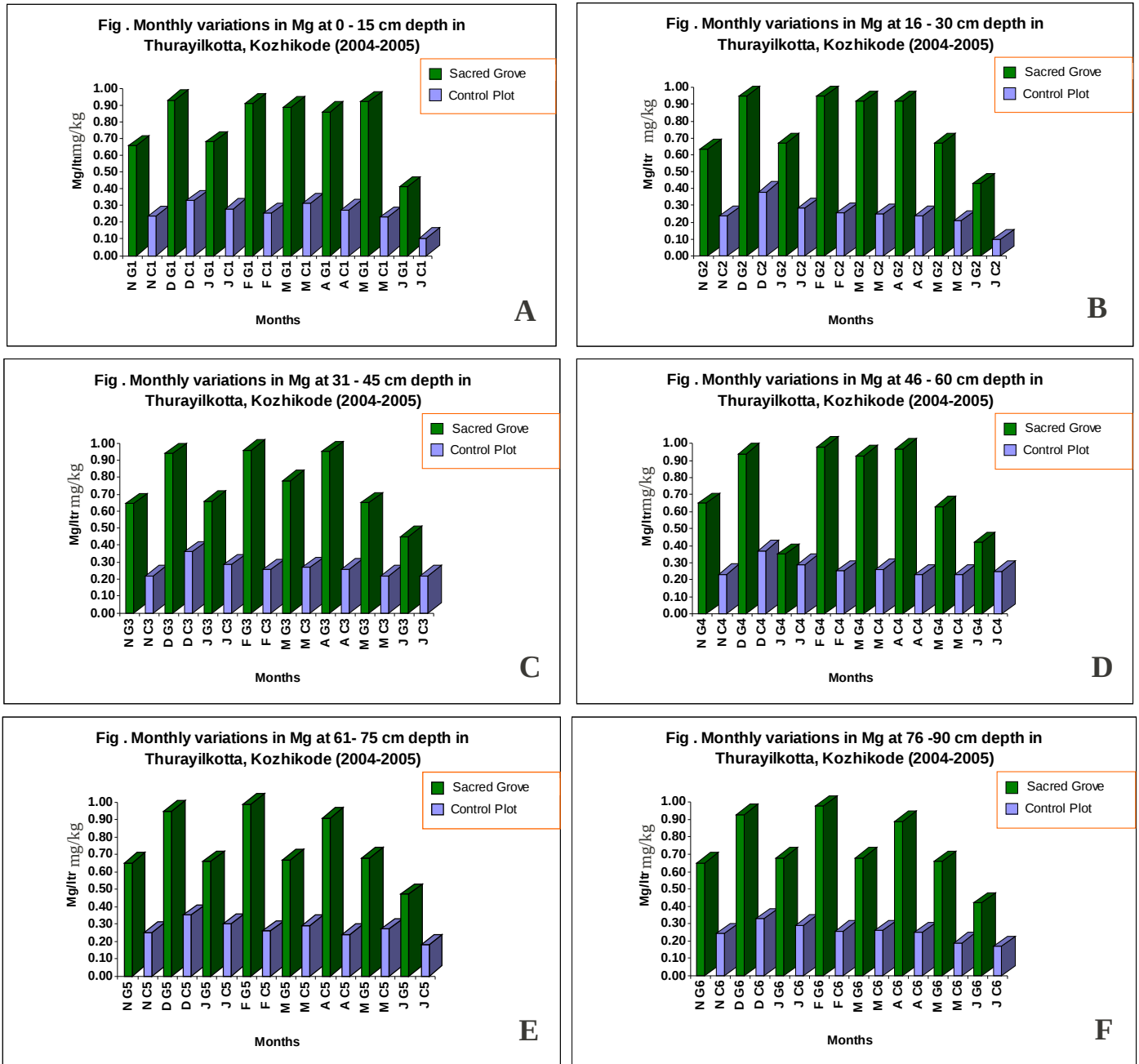


Figure 137 A-F. Monthly Variations in Soil Mg: Thurayilkavu (2004-05)

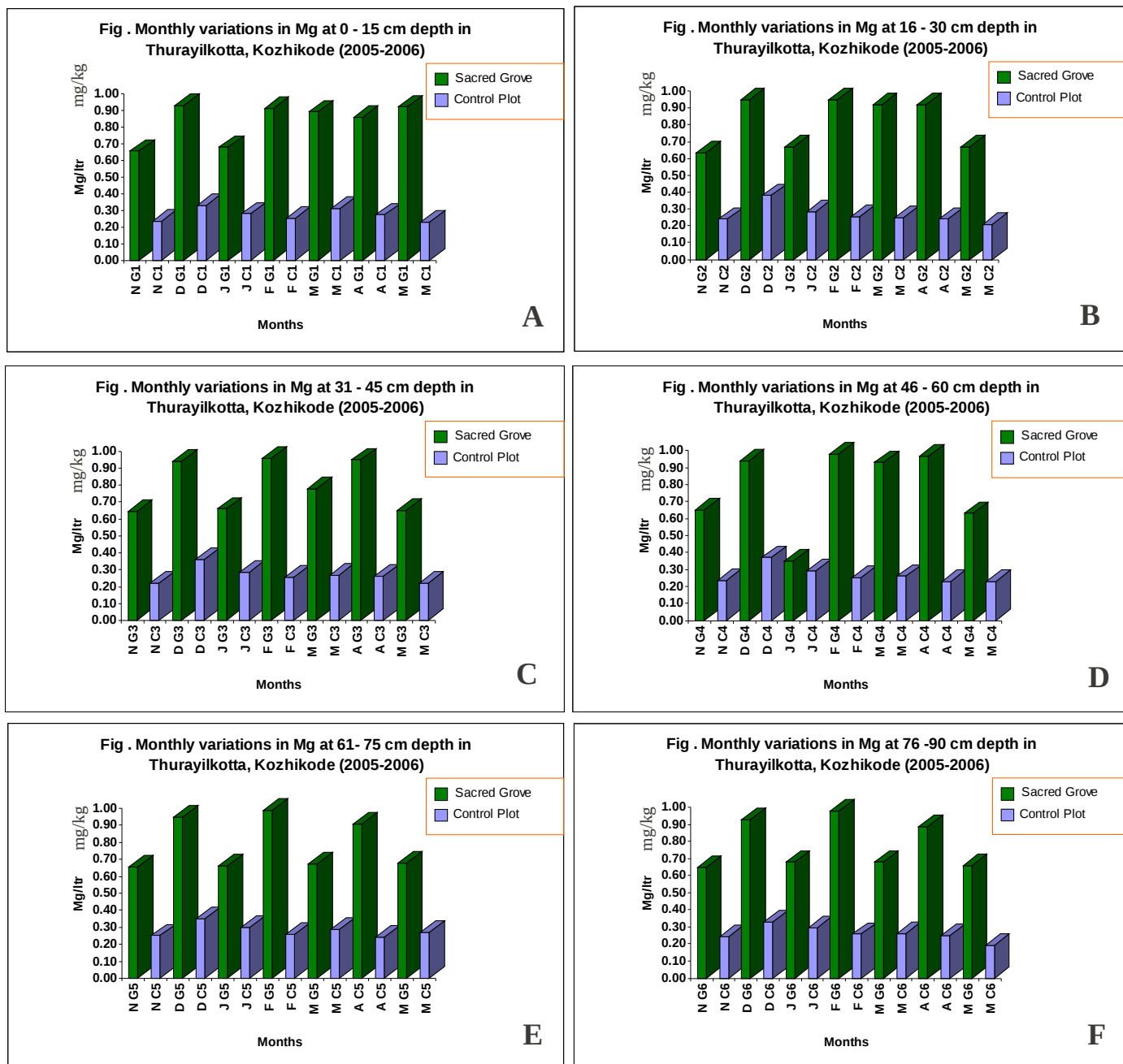


Figure 138 A-F. Monthly Variations in Soil Mg: Thurayilkavu (2005-06)

All these observations conclude that the sacred groves maintain soil moisture and microclimate congenial for the microbial degradation of the thick litter that might have accumulated over the years in sacred groves.

Sacred groves are considered isolated forest patches which had been left undisturbed for generations. The litter accumulated over the years has been continuously subjected to degradation by bacteria and other soil microorganisms. As a result of this, the organic carbon content of the soil shows very high values compared to the control plots. This accumulation of organic carbon in the soil as a result of carbon fixation by trees of sacred groves has immense significance in reducing global warming due to reduction in green house gases. Studies conducted earlier (Guild, 1952) has shown that the annual litter input varies from 4.49 – 6.63 tones/ha. This high accumulation of litter and rapid mineralization of organic matter helps in protecting the soil from the impact of rain and accelerates the gradual infiltration of maximum rain water that reaches the soil through stem flow and through fall.

Aggregated flora in sacred groves and abundant organic matter in the floor during the year round substantially reduces surface run off and impact of rain drops on soil. The microclimate in the sacred groves is also very conducive for reduction in evapotranspiration as well as maximum microbial activity, resulting in high litter turn over per year. Soil of the sacred groves showed low bulk density and high porosity than the soil of the near by area, thereby enhancing the infiltration of maximum amount of water by minimizing surface run-off and soil erosion. In the present study the amount of macro and major micronutrients were found to be high in sacred grove soil. Biotic communities in the soil alter the structural, physical and chemical properties of the soil thereby regulate organic matter decomposition and nutrient cycling. In sacred groves, the termite mound (plate 8 B) acts as a channel to the water table through the macro pores and the large aggregate of earthworm's casts are helpful in withholding maximum amount of water in the soil. Moreover, the nutrient contents of these two "biotic soils are reported to be higher compared to the parental soils, indicating their possible role in rapid nutrient cycling. In short, vegetation cover, litter covering on the floor, microclimate, and faunal activity altogether alter structural, physical and chemical properties of soil, and make the soil nutrient rich and enhance the infiltration of water

resulting in leaching out of nutrients from the ecosystem to near by area. The association of pond ecosystem in the sacred groves also acts as a reservoir for water storage, which may later reach to the flora and fauna of near by area in the form of ground water.

The soil of sacred groves are more nutrient rich than the adjacent soil due to complete degradation and mineralization of humus enhanced by faunal and microbial activity in undisturbed condition. Besides, the birds and fauna inhabiting in the system, enrich the soil with important elements through their excreta. The nutrient rich soil of the sacred groves is well balanced and helps to maintain a chemical equilibrium with in the system by keeping the integrity of soil. Through their burrowing and tunneling activity the soil dwelling animals of the sacred groves, create channels and inter connected pores, which are directly connected to the water table of adjacent aquatic ecosystems. High accumulation of organic materials, intense activity of micro and macro organisms, low bulk density, high porosity and vegetation cover altogether minimize the surface run off and increase the infiltration and percolation of water in to the soil. The infiltration rate also varies greatly with land use and anthropological activities. The channels and feeding galleries increase infiltration and water transmission. Guild (1952) observed that soil with earthworms helps water infiltration 4 to 10 times faster than soil without earthworms. This passive role of earthworms is very helpful in restoring the integrity of degraded soil due to the cultivation and other practices.

Nevertheless, the fact that Kerala is endowed with sufficient water resources, the rivers are generally short, steep, fast flowing and monsoon fed due to the peculiar agro-climatic and topographic features. This may lead to the loss of rain water within short time through surface runoff, leaving only very little retention time for infiltration. In this context' the role of sacred groves in management of rain water during monsoon cannot be overlooked. It is observed that the infiltration rate of rich humus soils of the sacred groves is very high due to vegetation cover, year round litter input, and its complete mineralization. The undisturbed soil with high faunal activity enhances the infiltration of water. Improved hydrological properties along with established chemical equilibrium altogether help in minimizing the surface run off of water by accelerating the infiltration of rain water. This infiltrated water recharges the associated aquatic ecosystem and maintain a better water table, during summer months catering to the needs of associated flora and fauna of the sacred groves and the vicinity. This is of utmost importance in the management of sacred groves and

warrants adoption of necessary conservation measures to save these evergreen patches in the back drop of rampant biodiversity loss due to various anthropogenic disturbances.

The litter accumulated within the sacred groves is rich in minerals and organic matter which undergoes degradation due to microbial activity. This leads to increase in the amount of organic carbon and macronutrients like N₂, Na, K, Ca, and Mg during all seasons of the year at all depths compared to the control plots.

During the rainy season, through stemflow and throughfall, the rainwater percolates deep in to the soil strata enhanced by the deep roots of trees in the sacred groves. This supplemented with the activity of termites and earthworms increases soil infiltration and soil moisture in the sacred grove soils. This high soil moisture regimes and available water are important edaphological factors in the ecology of sacred groves which considerably enhances the favourable microclimate of the ecosystem, which may result in maintenance of water levels in the wells and ponds within the vicinity of the sacred groves.

This is evident from the results of the present study of the physical properties of sacred grove soils, where high infiltration rates and hydraulic conductivity has been recorded in sacred grove soil compared to the control plots, which is an indication of the water retention properties of sacred grove soils. A study of the soil moisture variations in select sacred groves during the post monsoon season (November to June) during 2004 – 06 (Table 14) indicate that the sacred grove soils maintained a mean of 30% higher moisture levels during the peak summer months (March, April and May).

Sacred groves are considered remnants of a forest ecosystem which existed earlier in the locality. Hence these forest patches maintain the biodiversity and microclimate comparable to a partially degraded forest ecosystem. A study was conducted earlier at Centre for Water Resources Development and Management (CWRDM) on the impact of deforestation on the hydrological parameters in the Western Ghats region of Kerala (CWRDM, 1988) with special reference to soil moisture, infiltration and water balance. Results show that this soil moisture at all depths (up to 100 cm), maximum soil moisture is maintained in the dense forest and the soil moisture at 50-100 cm depth is maximum in all the catchments during northeast monsoon, after which it steadily decreases. Infiltration rate is also high in the dense forest catchments. Water balance studies indicate that the water deficit during summer months (January-May) is high for exploited forest catchments in comparison

with dense forest catchments. Considering the sacred groves as partially degraded forest patches, the results of the present study are in agreement with the above findings.

SUMMARY AND CONCLUSIONS

Sacred groves are considered the relics of evergreen forest vegetation which once existed in the locality and later lost due to anthropogenic interventions like shifting cultivation, overexploitation of forest produce, cattle grazing and changes in land use by converting forests to monoculture plantations like tea, coffee, cardamom, rubber, teak, eucalyptus, etc., agricultural lands and dwelling sites. These activities have been continuing ever since man started cultivation and exploitation of natural resources for livelihood. But, these isolated undisturbed forest patches have been protected by the society in the name of worship of deities which has resulted in the conservation and management of these micro ecosystems designated as sacred groves. Having left undisturbed and unexploited for years, these sacred groves even now remains a treasure of biodiversity and gene pool conserving many endemic and endangered plants and animals of economic and scientific importance which does not exist elsewhere. Due to anthropogenic activities and consequent disturbances and changes in the microclimate, Kerala, once endowed with numerous sacred groves have been dwindled considerably at present with only about 568 sacred groves of appreciable extent and biodiversity. In this context, it was felt that detailed systematic information regarding the floristic diversity, hydrology and soil physicochemical properties is to be studied in detail, which is expected to serve as a scientific data base highlighting the need for their conservation. Hence, the present study was undertaken in select sacred groves of Malabar, where enormous sacred groves ranging from less than 0.5 ha to very large sacred groves covering more than 20 hectares.

A preliminary survey of sacred groves in Malabar was carried out and seven sacred groves were selected for detailed study. The select sacred groves are Kammadathukavu (21.8 ha) in Kasaragod District, Thazhekkavu (7.3 ha), Parappoolkavu (4.0 ha), and Poongottukavu (14.0 ha) in Kannur District, Poyilkkavu (4.4 ha), Bhayankavu (3.2 ha) and Thurayilkavu (4.0 ha) in Kozhikode District.

Plant specimens were collected and identified with the help of the Floras, Manuals, Revisions, etc. Soil samples were collected at monthly intervals from the seven select sacred groves at depths varying from 0–90cm depth at 15.0 cm intervals during the non-monsoon period (November to June) during 2004-06. The collected samples were analyzed for soil physicochemical properties such as soil moisture, soil infiltration, hydraulic conductivity, pH, electrical conductivity, organic carbon, available nitrogen, exchangeable sodium, potassium, calcium and magnesium following the standard methods of soil analysis. Adjacent comparable open areas within the vicinity of the groves served as control.

5.1 SALIENT RESULTS

5.1.1 Floral Diversity

The flora of seven sacred groves viz., Kammadathukavu (Kasaragod), Parappool kavu, Poongottukavu and Thazhekkavu (Kannur) and Bhayankavu, Poyilkkavu and Thurayilkavu (Kozhikode) has been studied with special reference to angiosperms in detail. The consolidated lists of flowering plants of these sacred groves are presented in Tables 7-13, with details on their taxonomic position and vernacular name .A total of 171 Plants have been listed consisting of 10 monocots 159 dicots and 2 gymnosperms. The 10 species of monocots belong to 8 families dominated by the members of Orchidaceae. The 159 species of dicots belongs to 72 families included under 20 orders, dominated by the members of Rubiaceae, Apocynaceae, Dipterocarpaceae and Euphorbiaceae. Among the species listed, many are of medicinal and economic value. Among them species such as *Diospyros paniculata*, *Elaeocarpus munronii* and *Ophiorrhiza brunonis* are threatened species and many of them are endemic to Western Ghats. Many of these species are common in all the seven sacred groves studied, hence, their general systematic description have been given in detail.

In most of the sacred groves of Malabar, the first storey of vegetation mainly consists of *Hopea parviflora*, *Hopea ponga*, *Alstonia scholaris*, etc. The second storey consists of *Mimusops elengi*, *Hydnocarpus pentandra*, *Holigarna arnottiana*, etc. *Chasalia curviflora*,

Ixora coccinea and *Ixora bracteata* are constituents of the shrubby layer. The ground layer is usually formed of seasonal species such as *Geophila repens*, *Centella asiatica*, *Aerva lanata*, *Andrographis paniculata*, and *Biophytum sensitivum*. Common climbers are *Calamus hookerianus*, *Calycopteris floribunda*, etc. Other climbers commonly found in these groves belong to Vitaceae, Menispermaceae, Asclepiadaceae and Apocynaceae. Total parasites like *Cassytha filiformis* and semi parasites like *Loranthus spp.*, are also common. Common constituents of the shrubby layer include species like *Memecylon umbellatum*, *Pavetta indica*, *Chassalia curviflora*, *Ixora spp.*, etc. The ground layer is usually thickly populated with species, which prefer humus and love shade. Along with few angiosperms, ferns, Selaginellales and many macro fungi like species of *Agaricus*, *Phallus*, etc., occur. Dead trunks of fallen trees harbour varieties of Polyporales, especially species of *Fomes* and *Polyporus*.

Typical evergreen elements of the tree layer of these sacred groves are *Artocarpus hirsutus*, *Hopea parviflora*, *Vateria indica*, *Ficus spp.*, etc. There are a few semi evergreen representatives like *Fagraea ceylanica*, *Scleropyrum pentandrum* etc. A few deciduous and semi deciduous members are also common. Some of the common semi-deciduous representatives are *Cinnamomum malabatum*, *Litsea coriacea*, *Mangifera indica*, etc. *Mallotus philippensis* and *Trema orientalis* are some of the deciduous species. Semi-evergreen representatives like *Pavetta indica*, *Nephrolepis spp.*, etc. are also found among the undergrowth. Epiphytic orchids like *Acampe praemorsa* and *Bulbophyllum sterile* are also common.

Some characteristic morphological adaptations accompany the members of the sacred groves. Broad prominent buttresses are seen in most of the trees like *Ficus spp.*, *Hopea parviflora*, etc., which attain enormous heights with tall bole, the branches confining to the top most region. A very interesting constituent of the sacred groves of Malabar is the typical *Myristica* swamps found in evergreen swampy sacred groves of Kannur and Kasaragod viz., Kammadathukavu (Kasaragod) and Poongottukavu (Kannur) represented by *Myristica beddomei* with dense prominent stilt and breathing roots. The common representative members are *Myristica beddomei* and *Hydnocarpus pentandra*. In the sacred groves, a microclimate with a high soil moisture and humidity profile favour the luscious undergrowth of members of Araceae, Zingiberaceae, Urticaceae, Acanthaceae, etc. The ecophysiological

implication of this high humidity may be attributed to the high rates of transpiration of the trees, rich soil humus, soil moisture and shade under the canopy.

The sacred groves harbour many rare endemics of the Western Ghats and serve as a nursery and storehouse of many ayurveda, tribal and folk medicines. Though most of the sacred groves have many trees of high timber and economic value, they are not exploited for timber due to their sacredness. As a result, the trunks of fallen giant trees lie as such on the ground untouched and slowly attacked by wood-rotting fungi.

5.1.2 **Soil Physicochemical Properties**

The soils of Kammadathukavu (Kasaragod), Parappoolkavu, Poongottukavu and Thazhekkavu (Kannur), Bhayankavu, Poyilkkavu and Thurayilkavu (Kozhikode) of Malabar have been investigated in detail to study the monthly changes in soil moisture, soil pH, EC, organic carbon, available nitrogen and macronutrients like sodium, potassium, calcium and magnesium during the non-rainy months (November to June) for two years (2004-06). Changes in the above parameters were monitored by collecting soil samples at 15 cm intervals from the surface to 1 m depth. In general, with very few exceptions, the sacred groove soils manifested higher values compared to the adjacent undistributed control plots with respect to all soil physicochemical parameters studied.

Hydraulic Conductivity

The hydraulic conductivity of soil refers to the readiness with which it transmits water with in the soil profile. All the sacred grove soils showed relatively high hydraulic conductivity compared to the control plots. This can be attributed to the rich floral wealth, litter fall and the associated humus and organic matter in sacred grove soils compared to the control plots.

Soil Infiltration

The entry of water from the surface soil into the subsurface soil is called infiltration. High infiltration rates were observed in the select sacred groves compared to adjacent control plots, which may be due to the existence of large trees with deep root system, heavy litter fall and the accumulated humus and organic matter in sacred grove soils compared to the control plots.

Soil Moisture

Among the seven selected sacred groves, the soil of Bhayankavu, Poongottukavu, Thazhekkavu and Parappoolkavu showed 40% higher soil moisture values compared to control plots. Kammadathukavu and Thurayilkavu soils showed 30% higher soil moisture. In general, all the seven sacred grove soils maintained higher soil moisture levels compared to control at all depths during the non-rainy months of both the years. Studies indicate the higher moisture retention capacity of sacred grove soils compared to control. This may be due to (i) the microclimate of sacred groves reducing the evapotranspiration losses (ii) increased water holding capacity of soil due high organic matter extent to in the soil (iii) changes in soil physical properties due to continues activity of soil microorganisms over the years and (iv) reduction in surface evaporation due to very high litter deposition over the surface soil.

Electrical Conductivity (EC)

Electrical conductivity of soils gives clear ideas of the soluble salts present in soil. Within the seasons studied, higher EC values were reported during pre- and post-monsoon seasons. The monsoon season recorded lowest EC values, which may due to dilution of soluble salts by rainwater. Increased EC values were recorded for the select sacred grove soils, wherein, the EC values were higher than the control plots, except in Parappoolkavu of Kannur District, where the EC values of sacred groves and control plot soils are almost similar. The increase in EC in sacred groves may be attributed to high rate of litter decomposition in sacred grove soils compared to control plots. In the case of Thazhekkavu sacred grove where mangroves are the dominant vegetation and the sacred grove is on the fringes of brackish water, the EC values were 278% higher (EC: 742) than that of the control (EC: 196). This might be due saline water intrusion into the sacred grove soil which is indicated by the dominance of mangrove vegetation.

Organic Carbon

The decay of plant material ultimately gives rise to humic substances. The resultant organic matter contains organic carbon in high concentration. Changes in organic carbon in the selected sacred groves showed that the sacred grove soils had higher organic carbon extent ranging from 101% to 400% higher compared to control plots. The high concentration of organic carbon in the sacred grove soils may be contributed by plant and animal debris and microbial biodegradation of sacred grove litter when compared to the control plots. The soils of Thazhekkavu recorded an increase of organic C by 400% compared to control. This is

indicative of typical mangrove habitat, where organic contents have been reported to be very high compared to control. This higher organic carbon content is of high significance in the present context of global warming, wherein, carbon fixation plays a significant role in reducing atmospheric carbon dioxide concentration.

Available Nitrogen

Available soil nitrogen in sacred grove soils showed an increase from 70 to 350% in various sacred groves studied. In the case of Kammadathukavu, Bhayankavu and Thurayilkavu, increase in available N higher than 300% were recorded, while in Parappoolkavu, Poongottukavu and Thazhekkavu, an increase of more than 100% above the control was recorded. In the case of Poyilkkavu, an increase of only 70% available N was recorded. This increase in available N in the sacred grove soils may be due to degradation of organic matter, especially litter accumulated over the years by the denitrifying bacteria and other microorganisms in the soil resulting in the enrichment of the soil with available N. The excreta of fauna also are a rich source of nitrogen, contributing to surface soil. This enrichment of the soil with available N is highly significant in the survival of the sacred groves and enrichment of surrounding soils with nitrogen which may favour the growth of plants within the vicinity of the grove, creating a buffer zone around the sacred groves.

Exchangeable Sodium

Sodium is the dominant cat ion in soil. Seasonal variations revealed that higher concentration of exchangeable sodium was observed during the pre/post-monsoon seasons. The lowest concentration was observed during the monsoon season. This may be due to the dilution of sodium in rain water. The higher concentration of sodium in sacred grove soils may be attributed to the cat ion exchange capacity of the soils. Increase in concentration of sodium from 67% to 207% over the control has been recorded in sacred grove soils of all the seven sacred groves studied. It is clearly distinguishable that the soil of Thazhekkavu shows very high sodium content (1171 mg/kg soil) compared to control (597.63 mg/kg soil), which is very much higher than the values recorded for other sacred groves. This may be due to the fact that this grove is located in a brackish water area with mangroves as the predominant vegetation. Hence, the soil may contain high amount of sodium due to saline water intrusion. This is also supported by the high EC values in the soils of this grove.

Exchangeable Potassium

Among the inorganic constituents of leaves, potassium forms the major constituent in the leaves of sacred grove plants; hence the decay of the leaves liberates potassium, contributing to high values of potassium in the soils. The decomposition of vegetative parts of sacred groves may also contribute significant amount of potassium to the soils. Increase in potassium concentration was recorded during the summer seasons than the monsoon season which may be attributed to the decay of sacred grove litter, releasing potassium, which may get adsorbed to the soils. Variations in the soil potassium content shows that the sacred groves soils contain very high K contents in sacred grove soils of all the seven sacred groves studied. Increase in potassium contents ranging from 52 to 883% in comparison with the control plots were recorded in the sacred groves studied, with maximum values for Poongottukavu soils (1.37mg/kg soil). The excess potassium recorded in sacred grove soils might have derived from the decomposition of litter accumulated over the years favoured by the microclimate and soil moisture congenial for the increased microbial activity.

Exchangeable Calcium

Among the months studied, higher calcium content was recorded during pre and post-monsoon seasons. The monsoon season recorded lowest values, which may due to dilution by rainwater. Studies on variations in soil calcium recorded higher values for the sacred grove soils of all the seven selected groves in comparison with the control. Increase in calcium contents ranging from 126% to 569% were recorded in the sacred groves, with maximum values for Thazhekkavu soils (13.18 mg/kg soil). This excess calcium recorded in sacred grove soils might be derived from the decomposition of litter accumulated over the years favoured by the microclimate and soil moisture congenial for the increased microbial activity.

Exchangeable Magnesium

Studies on variations in magnesium contents in the seven selected sacred groves showed that increased Mg contents ranging from 95 to 435% were recorded for various sacred groves with maximum values for Thazhekkavu (2.44 mg/kg soil). This excess Mg may be derived from the decomposition of litter accumulated over the years in these groves favoured by the microclimate and soil moisture congenial for the increased microbial activity. The lower concentration of magnesium during the monsoon season may be

attributed to dilution by rainwater. Magnesium being an important constituent of chlorophyll, increased magnesium concentration in sacred grove soils may be due to the decomposition of sacred grove litter.

All these observations conclude that the sacred groves maintain soil moisture and microclimate congenial for the microbial degradation of the thick litter that might have accumulated over the years in sacred groves. The soil serves as a nutrient sink and source for the growth and maintenance of luxuriant vegetation in the grove.

The high accumulation of litter and rapid mineralization of organic matter helps in protecting the soil from the impact of rain and accelerates the gradual infiltration of maximum rain water that reaches the soil through stem flow and through fall. Aggregated flora in sacred groves and abundant organic matter in the floor during the year round substantially reduces surface run off and impact of rain drops on soil. The microclimate of in the sacred groves is also very conducive for reduction in evapotranspiration as well as maximum microbial activity, resulting in high litter turn over per year.

5.2 MAJOR THREATS

A preliminary survey of the sacred groves during the study revealed that the major threats faced by the sacred groves of Kerala are: *(i) Break-up of joint families and disappearance of the tharavadu system; (ii) Weakening of faiths, beliefs and taboos relating to the sacred groves; (iii) Collection and removal of biomass from sacred groves; (iv) Exclusion of local people from the forests leading to increase in pressure on sacred groves for natural resources; (v) Increasing demand for land resulting in the reduction in area and partial clearing of the sacred groves; (vi) Invasion of exotic weeds; (vii) Unplanned developmental activities; and (ix) Lack of awareness on the importance of sacred groves, especially in groundwater recharge and biodiversity conservation.*

5.3 SUGGESTED CONSERVATION STRATEGIES

The following conservation/management strategies are suggested for effective conservation of sacred groves.

1. *Provide necessary financial, legal management and support to sacred grove managers to afford total protection from encroachment, illegal biomass harvest, trespassing, unscientific developmental programmes which are detrimental to their biodiversity and effective management.*

2. *Provide incentives in the form of awards or financial rewards as the case may be, to encourage local communities/management involved in effective conservation of sacred groves.*
3. *Survey all sacred groves and mark their boundaries in the cadastral map to avoid further encroachment.*
4. *Entrust responsibility of each sacred grove to the local community that could act in a cohesive fashion in its management and conservation with the involvement of local self government, protecting the religious interests of the owner/community. Generally, local bodies such as Panchayath, very often are amalgamation of heterogeneous communities with entirely different concepts on management of natural resources and development.*
5. *Organize capacity building/training programmes for sacred groves managers for the effective management of sacred groves.*
6. *A thorough floristic survey of all sacred groves of Kerala should be done immediately to prevent further loss of endangered species, as the sacred groves are invaluable repositories of biodiversity harbouring many rare, endemic and endangered species.*
7. *Encourage research institutions/educational institutions to take up inventory and documentation of biodiversity and traditional knowledge related to plants of sacred groves. Data on autecology and reproductive biology of endangered species need to be generated to plan and implement effective conservation programmes.*
8. *Include the study of sacred groves in the curricula of Universities to intensify research programmes on sacred groves.*
9. *Document all available information pertaining to the extent, background history, biodiversity, threats, problems of management, etc. of all the sacred groves of the State.*
10. *Prioritize the endangered species to be conserved and select sacred groves based on evaluation of their natural population in the sacred groves.*
11. *Strengthen and promote research studies in the fields of biodiversity assessment, ecology, socio-culture, eco-folklore and legal aspects related to sacred groves of the State.*
12. *Provide necessary technical know-how and planting materials of suitable species and other support for the rehabilitation of degraded forests of sacred groves.*
13. *Effective awareness/extension programmes such as workshops, nature camps, field visits, etc., are to be organized at Panchayath level to create awareness among the local people on their significance in preserving the environment and biodiversity and the need for conservation of sacred groves. State government departments, local social/cultural associations, nature clubs, and NGOs should lead the programme.*
- 14.** *Select sacred groves of appreciable extent and rich biodiversity should be declared as 'genetic resource centres' and conserved by notifying them as protected areas under the Forest Protection Act, as they are a precious treasure of biodiversity.*
15. *Illegal poaching of animals, cutting of trees and conversion to other land uses like agriculture and human settlements should be banned.*
16. *As many of the sacred groves are under private ownership, people's participation should be ensured for protecting the sacred groves for future generations.*

17. *A secular movement should be on for the conservation of sacred groves with people's participation, without sacrificing religious customs and practices and causing communal conflicts.*

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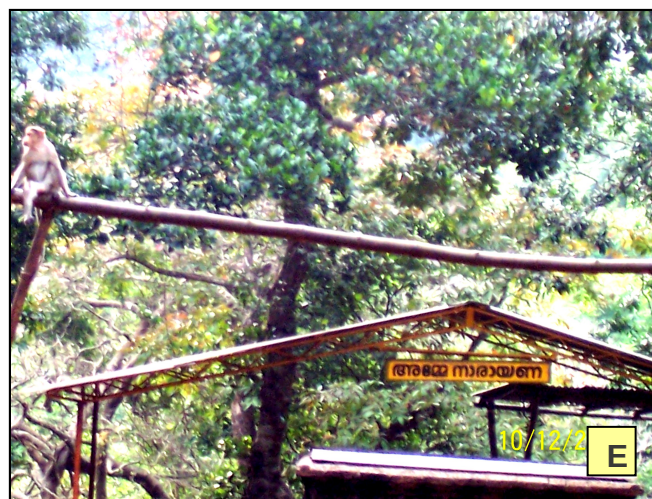


Plate 1. A. Thurayilkavu showing the entry point to the Sacred Grove; B, C & D. the Shrine; and E. Bonnet Monkeys moving freely all around the Shrine



Plate 2. A & B. Thurayilkavu showing the perennial water pool during the summer season; C. Polyporaceous fungi; D. *Geophila reniformis* D. Don; and E. Woody climbers

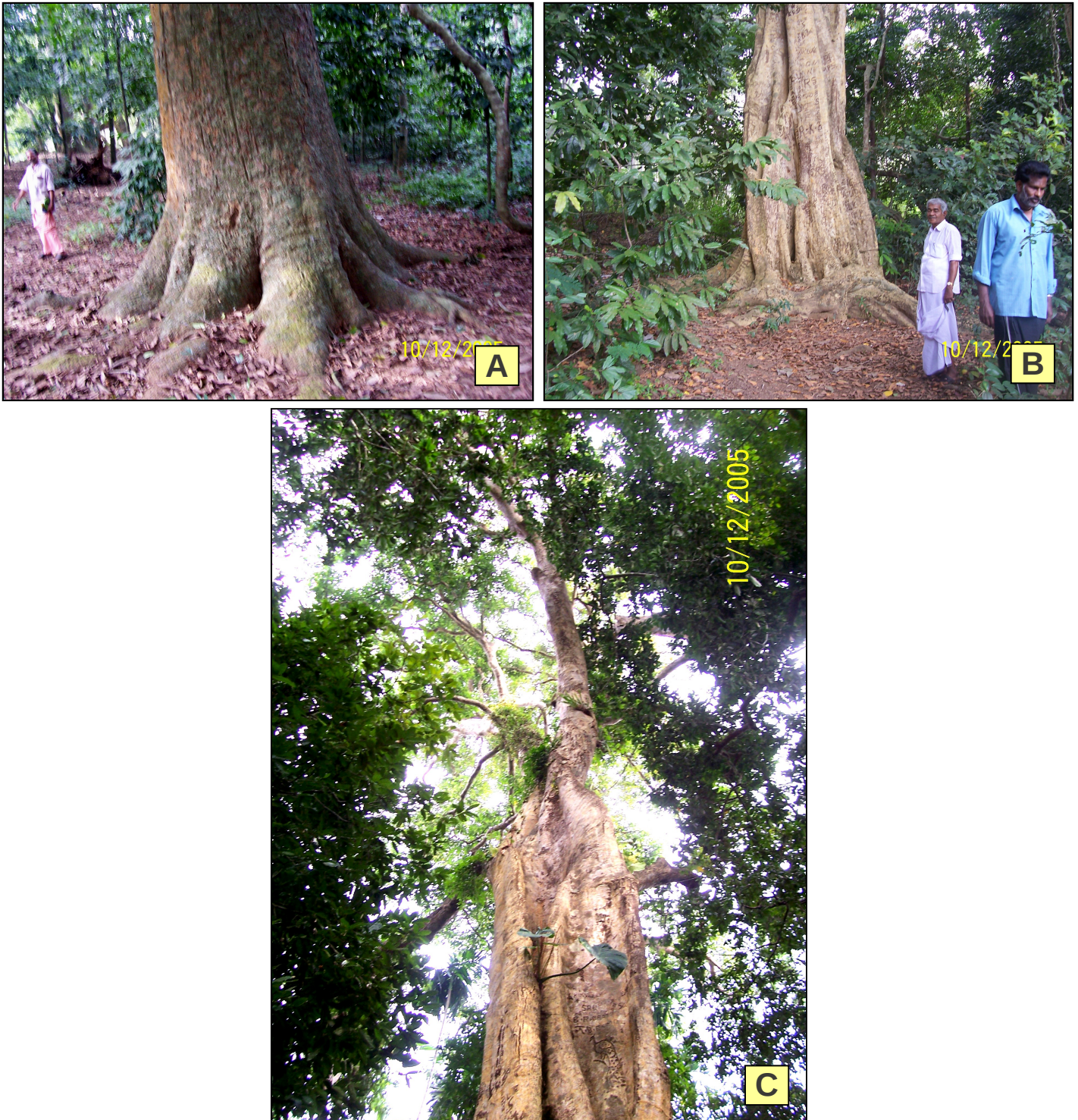


Plate 3. Trees of Thurayilkavu, Kozhikode. A & C. *Hopea parviflora* Bedd. (Dipterocarpaceae) (DBH - 5.5 m) and B. *Adina cordifolia* (Roxb) H. K. f. ex Brand. (Rubiaceae) (DBH - 5.2 m) growing luxuriantly in the grove

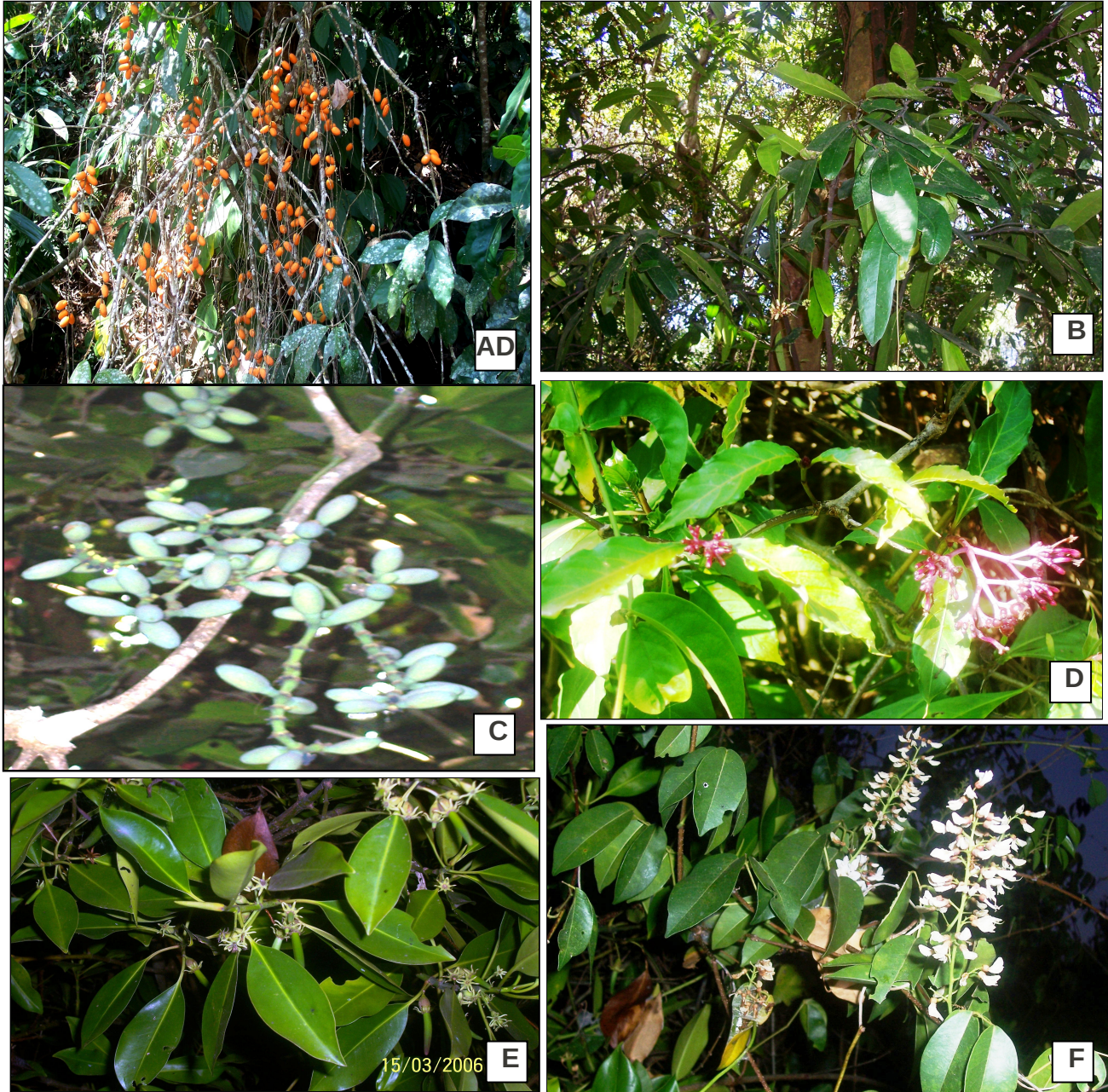


Plate 4. A. *Sarcostigma kleinii* Wight & Arn.; B. *Samadera indica* (Gaertn.) Nootb.; C. *Gnetum edule* (Willd.) Blume; D. *Psychotria curviflora* Wall.; E. *Bruguiera cylindrica* (L.) Blume.; and F. *Derris trifoliata* Lour.



Plate 5 A & B. A sacred grove showing the dense vegetation and the thick litter cover; and C. the deity represented by the Naga (yellow arrow) and the Chitrakootakkallu (red arrow)



Plate 6 A. Poyilkkavu, Kozhikode showing the temple; B. Shrine of the snake gods inside the grove; C. Thazhekkavu, Mattool, Kannur showing the shrine with mangroves in the background; and D. Mattool River flowing in front of the temple



Plate 7. Kammadathukavu in Neeleshwar, Kasaragod. A. Entry point to the sacred grove; B, C, D & E. The sacred grove showing the *Myristica* swamps with perennial streams and rocky terrain; and F. Soil sampling in the sacred grove



Plate 8. Parappoolkavu, Thaliparamba, Kannur. A. Temple; B. Termite mounts inside the grove. C. A paved perennial pond inside the temple; and D. Shrine of Bhagavathy outside the temple.



Plate 9. Poongottukavu, Sivapuram, Kannur. A. Entrance to the grove; B. Shrine; C and D. Stream in the grove embanked with the roots of *Myristica* trees; and E. *Myristica* swamps in the grove showing the breathing roots



Plate 10. Bhayankavu, Kozhikode. A & B. Way to the shrine bordered with luxuriant vegetation



Plate 11 A, B, C & D. Bali Theyyam performed at Poyilkkavu



A



B



C



D

Plate 12 A, B. Puthiya Bhagavathy Theyyam performed at Poyilkkavu;
C. Bappiriyam; D. Thottam Pattu



Plate 13. Different Theyyam performances of Malabar. A. Chamundi; B & C. Raktha Chamundi; and D. Muthappan Theyyam performed at Parassinikkadavu Madappura



Plate 14. Different Theyyam performances of Malabar. A. Kanangattu Bhagavathy; B. Vettakkorumakan; C. Dhaivathar Eeswaran; and D. Bhagavathy (Valiya Mudi).



A



B



C

Plate 15. Different Theyyam performances of Malabar A. Pottan Theyyam; B. Vellattam; and C. Thee Chamundi leaning on the heap of fire



Plate 16. A & B. Mukhathezhuthu (facial make up); C-H. Different types of head dresses for Theyyam performance in sacred groves of Malabar