CHAPTER II

REVIEW OF LITERATURE

Although sacred groves are important ecological centres to study the potential vegetation, they are less studied and least understood by the scientific community. Early travellers like Hunter (1879) and Gurdan (1914) have mentioned very conspicuous evergreen groves in the Khasi plateau of Assam. Brandis (1897) had remarked the presence of numerous sacred groves in nearly all the provinces of erstwhile British India, as an indigenous Indian Forestry. Shanmugappa (1966) even included sacred groves while prescribing a working plan for unorganized forests of North Karnataka.

In India, Gadgil and Vartak (1975) are the pioneers of scientific study in this field. They have studied floristic and ethnobotanical aspects of sacred groves of Maharashtra and North Kanara (Gadgil and Vartak 1981a and b; Vartak, 1980 and 1987). Sacred groves are distributed almost throughout India. Religiously safeguarded forests within each village persist even today, in some of the remote corners of the country (Gadgil, 1985).


ORIGIN OF SACRED GROVES

Sacred Grove is a primitive holy place which may have an image and may gradually become an elaborate temple. During pre-Buddhist period no trace of temple was present (Clark, 1934). There is an opinion that they are always situated at a distance from any human settlement, which suggests their origin in the nomadic stage of the society and the presiding deities generally lie open to the sky (Vartak and Gadgil, 1981). Based on human and/or animal sacrifices offered to the
presiding deities in some of the groves in Maharashtra, Kosambi (1962) opines that these features of the cults mark them as primitive, dating from hunting and gathering stage of the society. But these views are not shared in Kerala, where most of the groves have well-built temples in them (Plate. 4), preserved in a serene atmosphere with similar mode of worship and offerings, as in other temples. However, sacred groves are considered as very old institutions, thought to date back several thousand years to at least the pre-agrarian period of hunter societies (World Conservation Monitoring Centre, 1988). Gadgil (1985) and Paranjpye (1987) had described sacred groves as traditional customs for sustained use of common property resources.

According to Gadgil and Guha (1992) religion and custom as ideologies of resource use are perhaps better adopted to deal with a situation of imperfect knowledge than a supposedly scientific resource management.

SACRED GROVES FOR CONSERVATION

Sacred Groves are islands of conservation in denuded landscapes or in degraded and secondary forests. Often they stand out mighty from their surroundings. Two magnificent specimens of *Canarium strictum* which are otherwise present at a distance of about 200 kms far off south were spotted in a sacred grove of Western Ghats of Pune (Gadgil and Vartak, 1976).

While describing a sheltered patch of *Dipterocarpus indicus* in a sacred grove situated on a hill top in the Honavar taluk, amidst secondary evergreen forest, Gadgil and Subashchandran (1989) opined that these groves can still form effective nuclei for the regeneration of disrupted ecosystem of the region. Presence of a new woody climber (*Kunstleria keralansis*) had been reported from a sacred grove by Mohanan and Nair (1981). Four threatened species (*Blepharistemma membranifolia, Buchanania lanceolata, Pterospermum reticulatum, Syzygium travancoricum*) were reported from the sacred groves of Quilon District (Nair and Mohanan, 1981). Nair (1985) had located *Dalbergia benthami* for the first time in Kerala from a sacred grove.

Realising the conservation aspects of sacred groves as highlighted by the above authors, Archana Sadhale (1991) has even suggested that some undisturbed vegetation patches can be formulated as sacred groves, which in turn will be protected by villagers themselves.

Literature pertaining to sacred groves are few and far in between. No detailed ecological investigations have so far been carried out in any of the sacred groves and since this ecological treatise deals with various aspects, literature are treated subject-wise.
Plate 3 Wind fallen tree left to nature (Iringle kavu grove N°236)

Plate 4 Temple in Karakka Kavu, Karivellooor (grove N°341)
FLORA

The first published work on Indian plants - Van Rheed's (1678-1683) Hortus Indicus Malabaricus is a landmark on plant resource studies in this part of the country; followed by Wight and Arnott (1834), Wight (1838-53 and 1840), Bentham and Hooker (1862-1883), Beddome (1868-74 and 1869-74), Hooker (1872-1897 and 1904), Cooke (1901-1908), Blatter (1906), Bourdillon (1908), Rama Rao (1914), Gamble (1915-1936), Lushington (1915), Fischer (1921), Fyson (1932) and Burkll (1965).

After these works, explorations in South India were undertaken by Botanical Survey of India (BSI), Coimbatore. This has resulted in the discovery of several new and interesting species which was compiled by Karthikeyan and Sharma (1983). Despite these, new species continue to be discovered (Sasidharan, 1992; Ramesh and De Franceschi, 1993) and new records continue to be added for the state (Balakrishnan, 1965, Shetty and Vivekananthan, 1972, Ramachandran et al, 1984). With the objective of revising Flora of India, B.S.I. had initiated studies on revenue districts, and in Kerala the flora of most of the districts have been studied by Manilal and Sivarajan (1982), Mohanan (1986), Ramachandran and Nair (1988), Babu (1990), Vajravelu (1990), Mohanan and Henry (1994), Phillip and Sivarajan (1996) and Sasidharan and Sivarajan (1996). But the boundaries of such revenue districts are liable for change due to administrative reasons and since the ecological niche is not mentioned, it is not of much use for ecologists.

PHYTOGEOGRAPHY

Different floristic provinces of India were described in detail by Clarke (1897), Hooker (1907), Gaussen (1933), Chatterjee (1939), Razi (1955a and b) and many others. Meher-Homji (1984) also proposed biogeographical classification based on the distribution of vegetation types. To explain the enigmatic problem of disjunctive distribution of certain taxa, various hypotheses had been put forward by different authors to establish the migratory routes of different floristic elements. [Medlicot and Blanford (1879), Burkll (1924), Auden (1949), Dey (1949), Hora (1949), Legris (1963) and Meher-Homji (1972)].

Based on the plant fossils in the Cuddalore Sandstone series, the Warkalli deposits and Quilon beds on Kerala, the Deccan Intertrappean Series of Central India, North-East India, Bengal Basin, Kutch, Rajasthan and Siwaliks, Meher-Homji (1983) placed another school of thought that Tropical Wet Evergreen
Forests existed throughout Peninsular India, during Miocene - Pliocene period. The northward movement of the Indian plate, the uplift of the Himalayas and the Western Ghats contributed towards the onset of a drier climate and replacement of evergreen forests by deciduous ones over the greater part of the Peninsula during the late Tertiary. Consequently, the evergreen species could survive only in suitable humid regions like the North-Eastern and South-Western India and in the moist pockets of Eastern Ghats as relict species. Legris and Meher-Homji (1968) have marked out the Indomalesian elements as the west coast evergreen forests (26%) semievergreen (31%) and deciduous forest (30%).

Vegetation of Peninsular India shows close affinity with that of Sri Lanka. There are 27 genera that are endemic to Peninsular India and Sri Lanka (Nayar and Ahmedullah, 1984).

About 5000 species of flowering plants are expected to be endemic in the country (Jain and Rao 1983). Publications on endemism of Indian species had been made by Blasco (1971), Santapau and Henry (1973), Saldanha and Nicolson (1976), Nayar (1980) and Ahmedullah and Nayar (1987). Takhatajan (1969) included the Malabar coast as part of Indomalesian sub-kingdom. This sub-kingdom has no endemic families but has less than 150 genera (Puri et al. 1983).

Chatterjee (1939) has compiled a list of 133 dicotyledonous genera endemic to India, Burma and Sri Lanka. Blasco (1971) recorded 1268 endemic dicotyledonous species from South India. India with its vast area coupled with geographic and topographic diversities hosts 61% of endemic species out of which Peninsular India alone constitutes 32%. Western Ghats is one of the most important centres of endemism (Ramesh and Pascal, 1991). Arora (1964) estimated that among the woody Angiosperm families, 98 among the available 110 in Assam and 103 in Western Ghats are common to both. All these affinities indicate that there has been an ancient linkage in the floristic diversity of Western Ghats (Nair and Daniel, 1986).

Ahmedullah and Nayar (1986) estimated that there are 1932 taxa (1788 species and 144 infra-specific taxa) endemic to Peninsular India, most of which are confined to Western Ghats. Subsequently a few more taxa have been described. They had mentioned Rubiaceae as the dominant family with 46% endemic species, followed by Acanthaceae 41%, Balsaminaceae 40%, Asclepiadaceae 29.6%, Lamiaceae 18%, Poaceae 14.6%, Orchidaceae 11.6% and Leguminosae 10.3%.
RARE AND THREATENED PLANTS

Estimates of endangered species of flowering plants in India have sharply risen from a few hundred to a few thousand species, and it is now feared that 15-20% of the vascular flora (2500 species) now fall in one or the other category of threatened species (Jaln, 1992). About 1000 taxa of plants have so far been enumerated as rare or endangered in India, based mainly on the works of Joseph (1977), Henry et al. (1978), Jain and Sastry (1980 and 84) Jain and Rao (1983), Vajravelu (1983), Vajravelu and Daniel (1985) and Nayar and Sastry (1987, 1988 and 1990). Over exploitation and habitat destruction are the major causes for rarity.

WILD RELATIVE OF CULTIVARS

Wild relative of a cultivated crop is part of the gene-pool of that crop and the relationship between various members of gene-pool of any cultivated crop is essentially based on genetic perspective and genetic focus (Harlan and de Wet, 1971).

Vavilov (1951) has identified 12 main centres of diversity and the Indian subcontinent forms one such centre having 152 economic species (Koshoo, 1987). In India, the maximum diversity is believed to be in North-Eastern hills, Western Ghats, Eastern Ghats and to limited extent in the Western Himalayas.

Arora and Nair (1984) have enlisted 145 important wild crop relatives belonging to 66 genera from Western Peninsular region. Heritable genetic wealth of economic plant species, crop plants and the wild and needy relatives are under constant threat of severe genetic erosion due to indiscriminate habitat destruction and changes in farming systems.

DISTURBANCE-REGENERATION OF EXOTICS

Dense growth of a fastgrowing, exotic species in a disturbed area, was studied by Marks (1974) and he suggested this as an effective mechanism to prevent nutrient loss by rapid accretion of biomass. This biotic regulation of nutrients by fastgrowing, early successional weeds in diverse sites was confirmed by Mishra and Ramakrishnan (1983) and Ramakrishnan (1989). Increased resource availability and open space in the gaps and ridges allow many species to recruit themselves (Hartoshon, 1989).