

CHAPTER - II

REVIEW OF LITERATURE

i) Work on Fern Palynology in the World :

The comparative study of spore morphology of ferns was initiated by Fischer Von Waldheim (1865). It was followed by Tschistiakoff (1871, 1874), Rauwenkoff (1879) and Weaver (1896). Goebel (1918), Campbell (1911), Hanning (1911) and others recorded useful details regarding the fine morphology of spores of many fern genera. Spore morphologic study of some American ferns was made by Mc Vaugh (1935) and also by Wilson (1934) and Reeve (1935).

Selling (1946) initiated the study of spore morphology of ferns based on acetolysed samples and on modern palynological lines. He described 150 species belonging to 38 genera of Hawaiian pteridophytes. In a series of papers, F.W. Crane (1953, 55, 56, 60) gave an account of spore morphology of Dryopteris and proposed a key to American Dryopteris species based on characters of perispore. ch.  
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Harris (1955) made an extensive study of ferns from New Zealand. He described 170 species spread over 50 genera. His study was based mainly on spores mounted in glycerin jelly and treated with lactophenol - aniline blue. Excellent detailed illustrations of spores over 100 genera of Pteridophytes were published by Erdtman (1957). His study was based on acetolysed preparations. ✓



Bladsell (1963) gave a monographic study of fern genus Cystopteris. Lugardon (1963) studied spore morphology of some pteroid ferns of France. Those of Madagascar and Mascarene islands were studied by Tardieu - Blot (1963, 1966 a, 1966 b). Spore morphology of Aspidiaceae of Japan was studied by Nayar and Devi (1963). Nayar et al. (1964) studied spore morphology of some Filicinae from West Africa. Tschudy and Tschudy (1965) described the modern fern spores of Rancho Grande.

Oliver (1968) studied the spore characteristics of the ferns of Indiana. He carried out his work to assess the value of spores as a means for the identification of ferns indigenous to Indiana.

Knobloch (1969) published a paper describing the spore pattern in some species of Cheilanthes. Kawasaki (1968) described the external figures of spores in the family Polypodiaceae and their phylogenetic significance. Welman (1970) described South African fern spores in details.

Devi, Nayar and Knobloch (1971) described the spore morphology of some American species of Cheilanthes (17 species) and Notholaena (10 species). A conspicuous feature of spore morphology of American species was that among these, there was none which had conspicuously wrinkled perine as found in Indian species. In the same year Jermy and Harper described

the spore morphology of Cryopteris fragilis complex while Knobloch, Spink and Fulfs described the spore wall of some cheilanthoid ferns with scanning electron microscope.

Mitui described the spore ornamentation of Japanese species of Lepisorus in 1971 and that of Dryopteris in 1972. Tryon (1971) gave an account of structure and variation in spores of Thelypteris palustris. In 1972, the spores of five species of North American Dryopteris were studied by Britton with the help of scanning electron microscope. Spine density and spine morphology were found to be variable within them. Britton (1973) also published a paper regarding spore ornamentation in Dryopteris spinulose complex. Tryon and Tryon (1973) described geography, spores and evolutionary relations in the cheilanthoid ferns while Wood (1973) described the spore variations in the family Thelypteridaceae.

In 1974, Britton and Jermy wrote a paper describing the spores of Dryopteris filix-mas and related taxa in North America with the help of electron microscopy. North American Dryopteris filix-mas was compared with the European species and the origin of this tetraploid was discussed using available evidence from spore morphology, cytogenetics and chromatography. Mikel (1974), in his paper "A redefinition of the genus Hemionitis", showed that certain species of Hemionitis had spores closely resembling the spores of Gymnopteris.

Gastomy (1974) gave the spore morphology of Cyatheaceae. Lloyd (1976) gave an account of spore morphology of the Hawaiian genus Sadleria with the help of scanning electron microscope. Hill studied the spore morphology of Anemia subgenus Coptophyllum (1977) and subgenus Anemia (1979) using scanning electron microscope. Gomez and Walker (1980) described the double spore wall in Macroglossum with SEM. In it, the outer exine layer was cracked to reveal a smaller but morphologically perfect spore inside. Such spore was referred to as Angiospore. Shing (1983) gave a reclassification of fern genus Pyrrosia.

ii) Work on Fern Palynology in India :

In India, the eminent workers in the field of fern palynology are Nayar, Devi, Bir, Verma etc. In 1964, Nayar and Devi described over 300 species of Indian ferns belonging to Aspidiaceae, Aspleniaceae, Blechnaceae, Polypodiaceae and Grammatidaceae. Nayar and Surjit Kaur (1964) studied the spore morphology of Tectaria (Aspidium). On the basis of spore morphology, different species of Tectaria had been segregated. They also gave an account of spore morphology of Lomariopsidaceae (1963, 65).

Nayar and Prakash Chandra (1966) reported the occurrence of tetrahedral spores in the species of Lastrea (Thelypteridaceae). Rao and Shrivastava (1966) studied the members of the family Hymenophyllaceae from the point of view of spore morphology. Bir

and Shukla (1966) gave the Pteridophytic flora of Simla hills belonging to family Athyriaceae. Twenty-one species were described and illustrated. The members were segregated on the basis of spore characteristics.

In 1966-67, Bir described the role of spore morphology in the taxonomy of family Aspleniaceae. Nayar (1967) gave an account of morphology of spores and prothallus of Christiopteris tricuspis. The fertile material of this rather rare genus was not easily available. Verma (1966, 67) gave the contributions of spore morphology to fern cytotaxonomy, with particular reference to some pteridaceous members. Bir and Shukla (1968, 69) gave the pteridophytic flora of Simla hills as regards to the families Aspleniaceae, Blechnaceae, Loxogrammaceae and Polypodiaceae along with spore morphology. Bir and Trikha (1968, 69) published a paper regarding the taxonomic revision of Polypodiaceous genera of India. According to them, the species of Lepisorus were separable mainly on the basis of outline and structure of scales and spores.

Panigrahi and Dixit (1968) worked with the nomenclature of three species of Gleichenia on the basis of spore morphology. In 1969, they gave an account of Indian Pteridophytes belonging to the family Marattiaceae along with spore morphology.

Nayar (1969) gave a comparative account of spore morphology of Ceratopteris, Anemia and Mohria and its bearing

on the relationship of the family Parkeriaceae. Nayar and Nisha Bajpai (1970) reinvestigated the morphology of Hypodematium crenatum along with the palynology to give some additional clues as to the relationship of the genus. Sunanda Pal and N. Pal (1970) studied the spore morphology and taxonomy of Polypodiaceae family with five genera and eight species.

Prakash Chandra (1973) described tetrahedral spores in another species of Lastrea (L.tenericaulis) from the family Thelypteridaceae which characteristically has monoletic bilateral spores with well developed variously folded perine. Shanta Devi (1973) did elaborated work of spore morphology of 700 species of ferns belonging to 185 genera. The significance of spore morphology in the understanding of the phylogeny and relationships of the ferns was discussed from this comparative study. Bir and Trikha (1973) gave the taxonomy of the Indian species of the genus Ceratopteris. In 1974 they published a paper describing the taxonomic revision of Polypodiaceous genus, Lepisorus excavatus. In the same year, they contributed to the knowledge of spore morphology of 70 species of Polypodiaceous ferns spread over 12 genera from India. In this paper, the significance of spore morphology in the taxonomy of Indian polypods was discussed.

Shanta Devi (1975) studied the spore morphology of 10 species of two vittarioid ferns. According to her, the

vittarioid ferns were probably not derived from Adiantum as often believed. They appear to have evolved from a schizaeoid stock independently. In another paper, she gave scanning electron micrograph of the spores of some members of schizaeaceae.

Verma and Khullar (1978) gave an account of spore biology of Eusporangiate ferns in which they segregated 15 species of Ophioglossum on the basis of spore morphology.

The review of literature on the morphology of spores of ferns from India indicates that though Western Ghats have wealth of forest, in which variety of ferns are available, no data on spore morphology is available. The ferns from Western Ghats are studied mainly for morphology of sporophytes only. The data available on spore morphology and gametophytic study indicate that they are useful criteria in the identification of ferns. So in order to collect the information on spore morphology of ferns from Western Ghats, collections of ferns were done for three successive years from 1981 - 1983. Nearly 46 genera and 106 species of ferns were collected from different localities in the Western Ghats distributed in the states of Maharashtra, Karnataka, Kerala and Goa territory. Of these 50 species of ferns belonging to 34 genera are described palynologically in the foregoing account.

Tarakan Patankar's work in spore morphology of plants should be <sup>in</sup> palynology. (1980) ?