

Spore Study and Gametophytes in *Dryopteris Cochleata*

Dr. Shabnam Begum

B.R.A. University Muzaffarpur, West Champaran, Bihar

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DRYOPTERIS COCHLEATA (D.Don)
c.cho Eastern Himalayan-spore and gametophyte..

ABSTRACT

DRYOPTERIS COCHLEATA collected from Eastern Himalayan spore and gametophytes have been made. Spores are bilateral type and per innate. The perin is wrinkled Photographs. The exine and perine are both ornamented. The ornamentation blentinox or spinulose. Spore termination is like vittaria types. The common pattern is of aspidium types. The sex organs i.e. Antheridia and archegonia are similar to other Leptosporangiate ferns .

1. Introduction

Dryopter is in India is presented by 56 species. Dryopter is chocleata (D.Don) C.Chr is represented in Eastern Himalayas. Dryopteris shows reticulated evaluation with a good number of hybrids. Reticulated evaluation is well seen in northern America species. Rhizome erect or semi-erect, stout, densely covered with scales; scales broad, thick, blackish-brown, margin pale-yellowish, ovate-lenciolate, acuminate, about 1.6 x 0.3 cm or more, intermixed with large, ovate ones. Stipes 22-50cm long, tufted, densely scaly at base, sparsely above, mixed with dark-brown ramentae; lamina 30-60 x 15-32 cm, bipinnate, ovate-lanceolate; pinnae numerous, alternate, petiole, slightly tapering to the base, the lower most basal pinnae much shorter than those in the above, gradually tapering to a long lanceolate-acite apex, largest pinnate 15-22 x30-60 cm, linear, oblanceolate, shortly stalked, slightly unequal at base, acuminate at apex; pinnules numerous, alternate, very shortly stalked; largest pinnule upto 2.5 x 1.0 cm, along, auricled at the upper basal region, slightly cuneate at lower base, blunt or slightly acute at apex, margin toothed, each tooth ending in a stiff point, texture soft more or less coriaceous, pale-green when dry, glabrous above, very sparsely pubescent on the under surface; rachis and costae more or less densely clothed with dark-brown, lanceolate scales; veins free forked in the segment of the pinnules. Sori on the veinlets, margin slightly loberd, spores round, brown, exine smooth, fertile under favourable climatic condition.

2. Materials and methods

Morphology, spore nature their germination and Prothallus structure have been taken as prime parameters for analysis, Association of Dryopteridaceae with other ferns and phenological changes were also traced. Mature spores were also collected in small tube and were processed for germination in knop's solution.

The composition of knop's solution are as follows:-

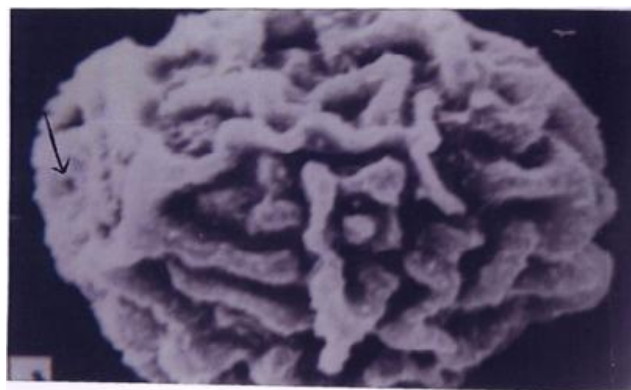
Ca(NO ₃) ₂ 4H ₂ O	0.8 Salt gm/litre.
KNO ₃	0.2 gm
K ₂ HPO ₄	0.2 gm
MgSO ₄ 7H ₂ O	0.2 gm
FePO ₄	Traces.

For the study of vein pattern or venation pattern, after collection the fronds were cleared with 5% NaOH and chloral hydrate, thoroughly washed and stained with safranin (Mohan Ram and Nayyar 1978).

Busby A.R. (1984) cultivated fern spore on the suitable compost medium, which gives excellent results using the following mix: 1/3 part sphagnum moss which has been passed through a 1/4 inch sieve and 1/3 part sharp sand. All parts by volume. I used 5 inch pot as a volumetric measure. To the above mix put add a handful of charcoal.

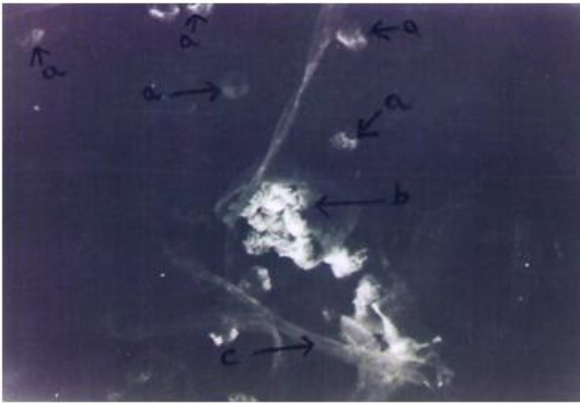
3. Observation

In *Dryopteris Cochleata* spore possess entine and exine layer. Third layer is found in some members. The stage wise termination pattern has been observed in some member of Dryopteris. The germination pattern is similar to all homosporous pteridophytes which form exosporic gametophyte. Spores are bilateral type and perinnate. The perine is wrinkled and parine are both ornamented. The ornamentation is grandiose or spinulose and spore germination is like vittaria. The common pattern is like Aspidium. The prothallus is cordate thalloid, thin and green. It is generally symmetrical broader than longer with lobes or wings on the underside of the prothallus numerous cylinder rhizoids grow out from cells. As observed the grown prothallus is 2 to 7 mm in diameter. In the upper part their is well dipper grove or notch.



PHOTOGRAPH NO.1

Spore of *Dryopteris* sps. (*D. cochleata*) 40 x 15 = 600 showing exine and perine surface wrinkled with zig zag linings, upper polar of one end of the surface marked with PHOTOGRAPH NO. 2



PHOTOGRAPH NO. 2

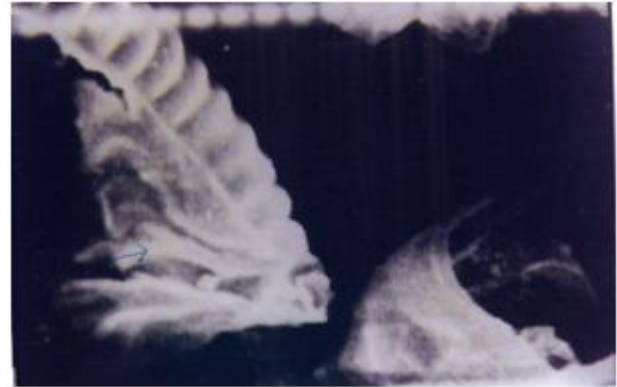
SEM photographs of (*Dryopteris* sps.) Sporangium Showing

- (a) Scattered Spores
- (b) Spores in Clusters
- (c) Sporangium inner wall thin layer



PHOTOGRAPH NO.3

- SEM Photographs of broken Sporangium Showing
- (a) Single spore side vein
 - (b) Annulus
 - (c) Broken Wall of sporangium.
 - (c) Lateral veins of spore (single) appears shrank during processing.
 - (e) Stalk of sporangium.



PHOTOGRAPH NO.4

- SEM Photographs of broken Sporangium showing
- (a) Annulus upper wavy layer.
 - (b) Inner cell content of sporangium.

4. Discussion

Family *Dryopteridaceae* has been include under the order *Aspidias*. The family has been recognized and classified by F.O. Brower (1923) , Copeland E.B (1947), Holttum R.E. (1949, 1973), R.E.G. Pichisermoli (1958), D.W. bierhorst (1971) and Banget W.I.Jr. (1980).

The sporoderm layer of the spore has been worked by different workers.

	Erdtman (1963)	Fægri (1956) Fægri et Iversen(50)	Kuprianova (1958)	Talinger et Petrovs Kojá Baranová(50)	Tardieu- Blot(1963)	Coram Ström H. et Loubé (1963)	Tanovic (1960)	Seed (1963b)
1 (Perispor)	Perina (Perispor)			Perina				
2	Supratrigone Processes	(Supra)						
3	Tegillum	Tectum		Tectum	Ectexine		Ecto- Saxine	Ektosaxine
4	Endosaxine	Columellariform		Columellae			Endosaxine	Endosaxine
5	Nexine 1							Nexine
6	Nexine 2							Ektomedina
7	Nexine 3							Endomedina
8	Intine	Ektintine						
9	Endospor	Endintine	Intine					Intine

a) Potania(1934) b) Erdtman(1943), Iversen et Pöckl Smith (1950), Fægri et Iversen (1950)

The spores are bilateral, It is clear that spores have wrinkled, exine of prime layer. Under favorable condition the spores germination in nature. Artificially spore germination have been observed by the techniques of different workers. The spore germination is identical to other member *Vittaria* and the prothallial development is typical identical with *Aspidium*. In spore germination and prothallial development it follows, *Vittaria* type and *Aspidium* type. Prothallus is of cordate like

other ferns with rhizoids in lower parts. Sex organs i.e. Antheridium and Archegonium is similar to other *Leptosporangiate* ferns.

Nayar and Kaur 1971 has written with regard to spore germination, It is suggested Nayar and Kaur (1965) that the *Vittaria*- type of germination is the most advanced and the Amorphous-type, resulting in the formation of a mass of cells, the most primitive characteristic of all the more advanced

group of homosporous ferns, i.e., groups which represent the distal branches of the evolutionary tree. In contrast Amorphous-type of germination is restricted to the most primitive groups like the Ophioglossida, Marattiidae, some Texas of the Gleicheniaceae and some of the Schizaceae. The Amorphous-type, in which cell divisions occur in all the three planes and thus results in the formation of a nearly globose mass of cells as in the Ophioglossidae (Possibly also in

Stromatopteris), is apparently the most primitive. Partial suppression of cell divisions by walls parallel to the equatorial plane of the germinating spore results in a dorsiventral circular mass as found in the Marattiidae. The Mecodium and Hymenophyllum-types of generation are apparently derived from this by suppression of the cell division in the equatorial plan.

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