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ORIGINAL RESEARCH ARTICLE

Electron micrographs of five fern species from Dehradun district, Uttarakhand, India.

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Abstract: Electron micrographs of five species of ferns for the study of spore morphology collected from Dehradun district are being given. These are *Adiantum venestum* D. Don, *Onychium cryptogrammoides* Christ, *Gymnopteris vestita* (Hook.) Underw., *Microsorum membranaecum* (D. Don) Ching.

Key words: Electron micrographs; Five; ferns; Dehradun.

Introduction

Dehradun is one of the most beautiful valley enclosed by Siwalik hills and the outer scraps of the Himalyas. The Doon valley has natural boundaries, the Himalayas on the north, the West the Chakrata. The altitude of the district varies from 250m to 2850m, Kharmba and Devban in north of Chakrata are the highest point. The earlier work done on the ferns of the district find mention in Khullar *et al.,* 1982, 1987, 2005 and Dixit 1992; Mehra 1939; Pande and Pande, 2002-2003.

The present paper deals with the study of spore morphology through electron micrographs of *Adiantum venestum* D. Don, *Onychium cryptogrammoides* Christ, *Gymnopteris vestita* (Hook.) Underw., *Microsorum membranaecum* (D. Don) Ching long with the habitat study. The measurement of the spore is also mentioned which will provide accurate information about the size of the spore. The present study collections are deposited at BSI, Dehradun.

Observations

***Adiantum venustum* D. Don**

Habitat – Most common lithophytes on exposed boulders, sheltered forests, 1500-2000m. CS-645 [BSD]. (Fig 1)

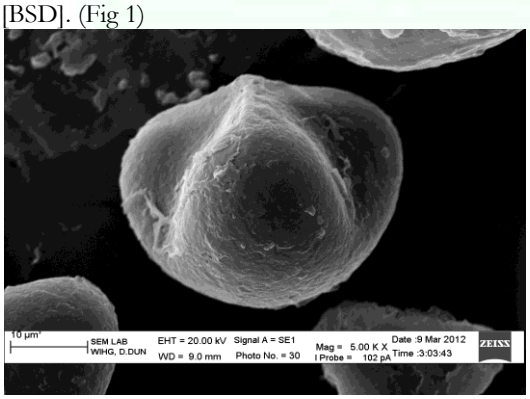

Fig. 1: *Adiantum venustum*

Spore description- Sori 1- 2 in each pinnule, indusate at upper margin; indusium orbicular, sub –membranous, margins smooth. Sporangia- annular. Spores are tetrahedral, triradiate mark; exine smooth, 37.142µm-34.285µm.

Distribution– Cloud-end; Mussoorie. Mussorie-Chakrata highway. Tiger falls; Chakrata.

***Gymnopteris vestita* (Hook.) Underw.**

Habitat- Uncommon, on rich rocks as well as on big boulders exposed to intense sunlight, on exposed ridges, 2500m. CS-713[BSD]. (Fig 2)

Spore description – Sori globose, exindusate. Spores dark brown, tetrahedral to globose; exine thick, 41.379µm–48.379 µm.

Distribution – Cloud-end; Mussoorie. Kanasar rest house; Chakrata

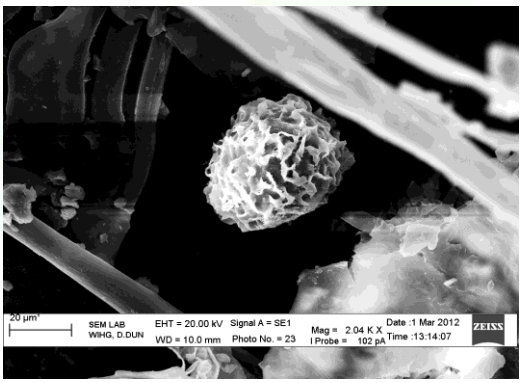

Fig. 2: *Gymnopteris vestita*

***Microsorum membranaecum* (D. Don) Ching**

Habitat – Epiphytic, Common, growing on slopes which are marshy, humus rich forest floor, 1000-1500m. CS-406 [BSD]. (Fig 3)

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Spore description - Sori morphologically round, exindusate. Sporangia globose, paraphysis present; 33.34 µm– 60 µm.

Distribution –Kolukhet & Bhatta falls; Mussorie. Chakrata

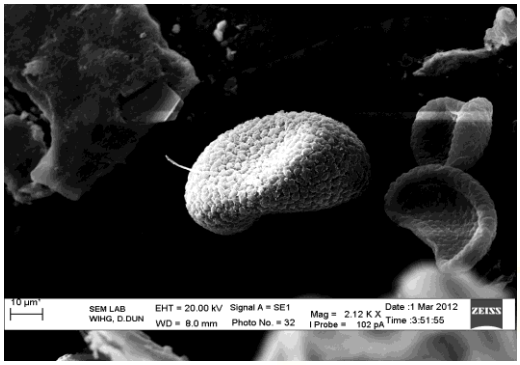

Fig. 3: *Microsorum membranaecum*

***Onychium cryptogrammoides* Christ**

Habitat– Common, terrestrial ravine plant, along riverside, near water channels. Forest, meadows, 2000 m. CS-592[BSD]. (Fig 4)

Spore description- Sporangia stalked. Spores light brown, tetrahedral, trilete; exine, tuberculate with ridges like projection giving appearance of rugose, 52 µm – 53.2 µm.

Distribution-Hathipaua forest, Company garden, Cloud end forest; Mussorie. Chakrata.

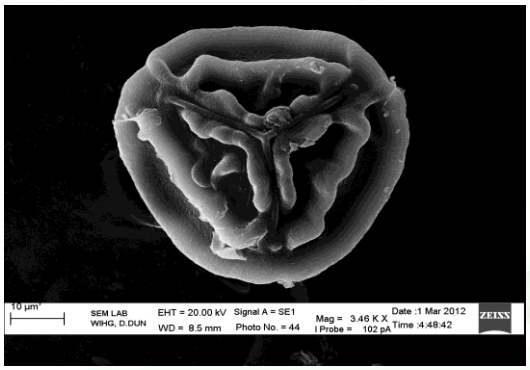

Fig. 4: *Onychium cryptogrammoides*

Polystichium stimulans. C. Presl.

Habitat – Uncommon, found growing on moist shaded rocks, rock–crevices, along water channels. CS-618[BSD]. (Fig 5)

Spore description – Sori large, indusiate, circular, close to the costa; indusium irregularly lobed, peltate, deciduous at maturity. Spores ovate to globose: perinate; perine brown, loosely coiled; exine smooth, 41.17 µm -34.70 µm.

Distribution–Tiger falls; Chakrata. Mossy falls; Mussoorie

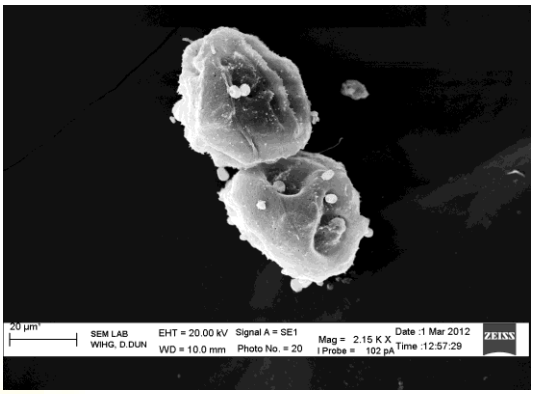

Fig. 5: *Polystichium stimulans*

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