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## Two New Varieties of *Polystichum squarrosus* (D. Don) Fee (Dryopteridaceae-Pteridophyta) from Western Ghats, South India

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### Abstract

On the analysis of the spore morphology of 20 specimens of *Polystichum squarrosus* (D. Don) Fee, two distinct types of perine is observed. These two variants with no intermediates are treated as varieties.

### Introduction

*Polystichum squarrosus* (D. Don) Fee is a tropical fern (Fig. 2) of the family Dryopteridaceae. The family Dryopteridaceae with 464 species is distributed with 20 genera worldwide (Groombridge, 1992). The genus *Polystichum* comprises 160 (Tryon and Tryon, 1982) to 200 species (Mickel and Beitel, 1988) and is nearly worldwide in distribution. Under this genus Dixit (1984) has listed 36 species for India while Manickam and Irudayaraj (1992) have encountered about 5 species from Western-Ghats, South India. Morphological diversity and taxonomic complexity are widespread in *P. squarrosus*. This species has been observed to have very limited distributional range, found mostly in the Indian subcontinent (Rajkumar, 1996). Presently *P. squarrosus* has been collected only from Nilgiris (Fig. 1) for Western Ghats, between the altitudes of 2100 -2650 m. Even within this short range of distribution remarkable variation has been observed and specially the perine structure has been found varying.

### Materials and Methods

The present study is mainly based on the specimens collected from Nilgiris of Western Ghats South India in the year 1991. The objective of the present study is to assess the extent of variation in the perine morphology of the spores. About 20 specimens have been studied. All the vouchers are in St. Xavier's College Herbarium (XCH), Palayamkottai. For spore morphology spores were mounted in glycerine and observed under a compound research microscope.

**Specimens observed:** Thottabetta road, 2500 m, 6-9 - 91 (XCH 9); Ooty - Naduvattam road, 2300 m, 14 - 10 - 91 (XCH 241); Shola before diversion to parson valley, 2300 m, 14 - 10 - 91 (XCH 297, 307); Thottabetta road, 2400 m, 14 -10 - 91 (XCH 319, 320); Stream after Pykara, 2250 m, 15 - 10 - 91 (XCH -350); Thottabetta, 2650 m, 24 -10 - 91 (XCH 415, 419, 434); Terrace estate road, 2200 m, 25 -10 - 91 (XCH 443, 470); Shola between P.R Bazar and Bellvue, 2200 m, 27 - 10 - 91

(XCH 561); Ooty-Governor Shale, 2200 m, 19 - 11 - 91 (XCH 713); Stream after Muthorai, 2100 m, 20 - 11 - 91 (XCH 738), Avalanche, 2100 m, 7 - 12 - 91 (XCH 867, 897) and Round road on the Plateau via upper Bhavani, 2200 m, 8 -12 - 91 (XCH 922).

### Results and Discussion

In *Polystichum squarrosus* the spore size has been observed to be more or less similar in all the specimens ranging between 33.8 - 40.6 x 20.3 - 25.4 pm. Variation has been observed regarding the perine structure. Typical perine has been observed to occur in Dryopteridaceae, Blechnoideae and Asplenoidae with variation - smooth, tuberculate, cristate, reticulate and spinate (Wagner, 1980). *Polystichum squarrosus* being a Dryopteroid fern has the typical perine with marked deviations. The perine has been observed to be winged. The winged perine has been either smooth hyaline or crescent dark brown. The smooth hyaline perine (Fig. 3) has been observed in five specimens (XCH, 241, 350, 419, 897, 922) whereas the crescent dark brown perine (Fig. 3b) has been observed in fifteen specimens (XCH 9, 297, 307, 319, 320, 415, 434, 443, 470, 561, 684, 713, 738, 824, 867). The above such observations have been made by Manickam and Rajkumar (1999) but they have not given any infraspecific rank to these variants hence in the present study such ranks have been construed.

*Polystichum squarrosus* (D. Don) Fee, Gen. Fil. 278 (1852); Nayar & Kaur, Comp. Beddome Handb. 49 (1974); Dixit, Cens. Ind. Pterid. 160 (1984); Manickam, Fern F.I. Palani hills, 128 (1986); Chandra & Kaur, Nom. Guide Beddome F. S. I. & F. B. I., 15 (1987); Manickam and Irudayaraj, Pterid. F. Western Ghats - South India (1992).

Rhizome erect, 6 cm thick. Scales elliptic lanceolate, darkbrown. Stipes tufted up to 30 cm, covered by filiform brown scales at the base and large scales above. Lamina bipinnatifid to trifinnatifid, lanceolate, up to 90 x 40 cm, pinnae up to 30 pairs, opposite, subopposite or alternate, sessile, largest 25 x 6 cm, oblong - lanceolate, pinnules ovate up to 3 x 1 cm. Veins up to 5 pairs at basal acroscopic lobe. Texture coriaceous; Rachis costa, costules

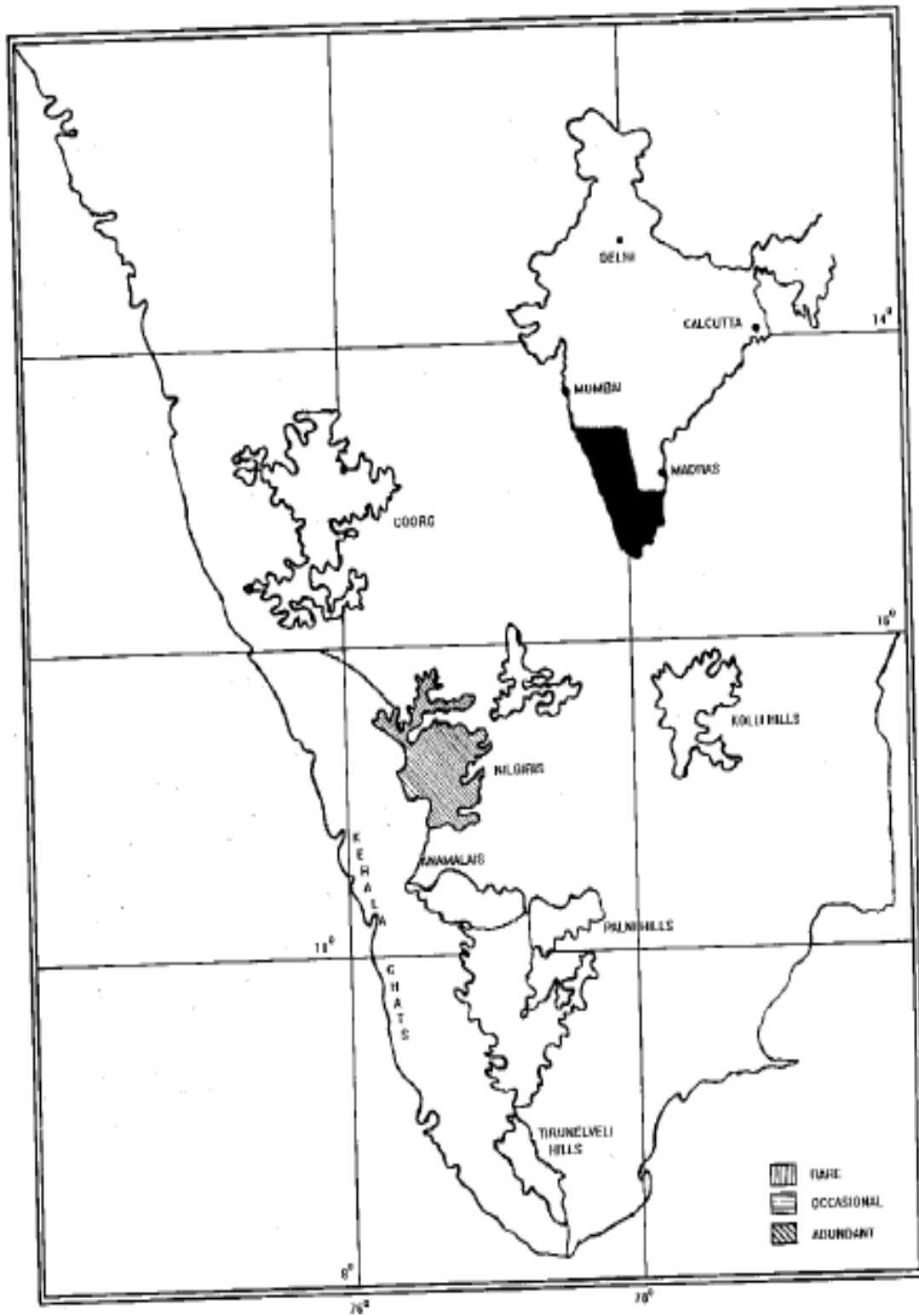


Fig. 1: Distribution of *Polystichum squarrosun* (D.Don) Fee in Western Ghats of South India

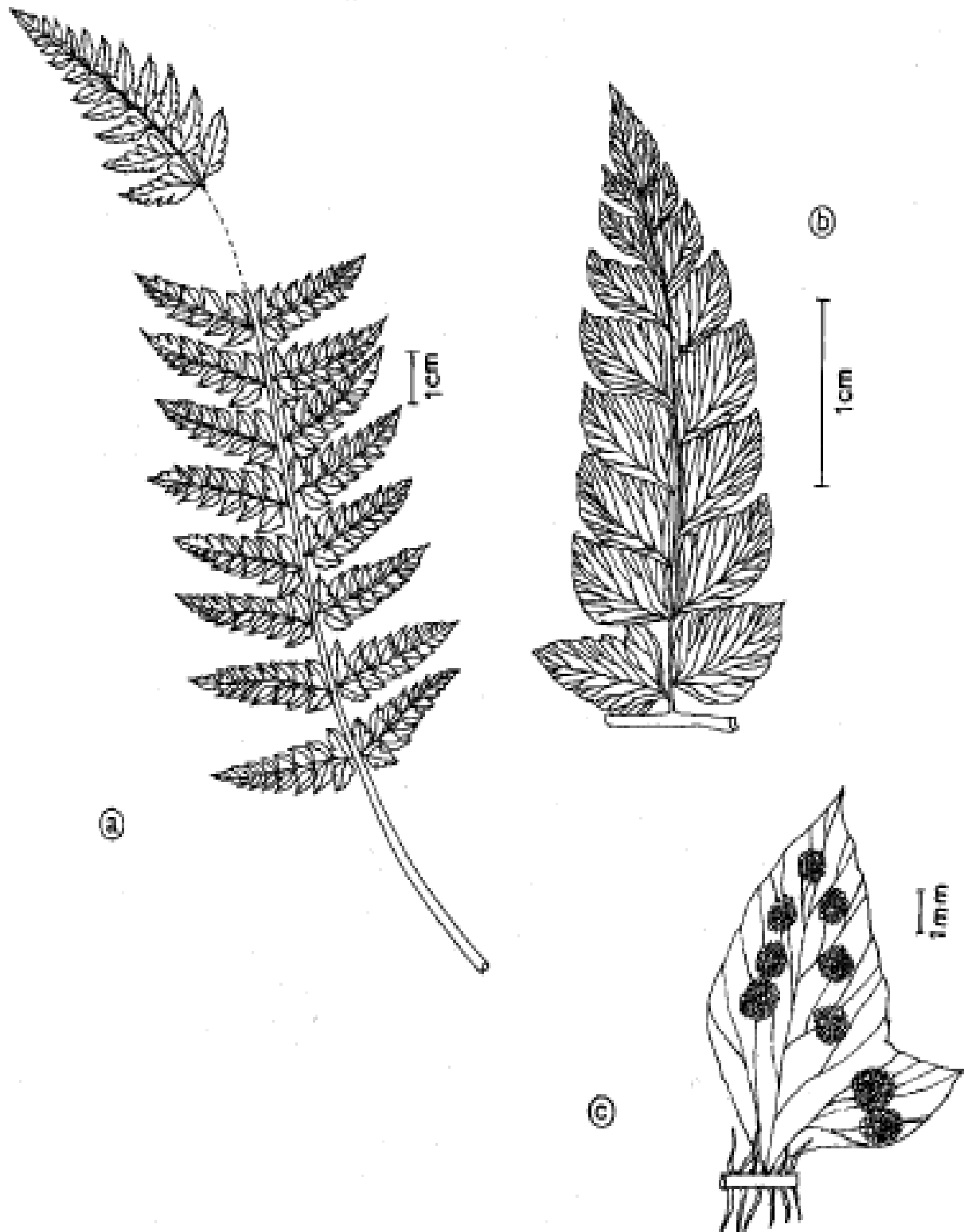


Fig. 2: *Polystichum squarrosum* (D.Don) Fee a. Habit, b. Pinna enlarged, c. Pinnule enlarged showing the venation pattern and sori arrangement

**Rajkumar and Manickam:** *Polystichum*, winged perine, variety, western ghats, South India

with dense branchial hairs, sort in two submarginal rows, borne at the end of the veinlets. Indusia glabrous, spores reniform (Fig. 2).

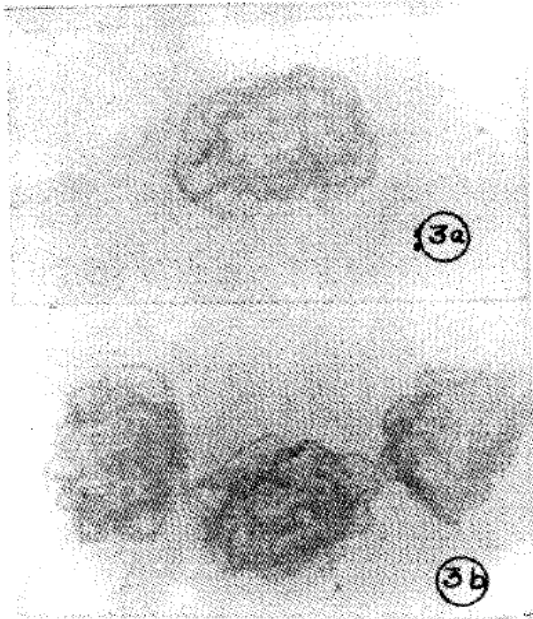


Fig. 3: Spore with smooth hyaline perine, X 450, b. Spore with crescent dark brown perine, X 450

***Polystichum squarrosus* (D. Don) Fee *squarrosus* Manickam et. Rajkumar var. nov.:** Lamina 90 x 40 cm, bipinnatifida ad trifinnatifida, lanceolate; pinnae usque ad 30 paria, opposite, subopposita vel alternate, grandissima 25 x 6 cm. Sori in duo seriales; sporae reniformes, atrobunneae. Lamina 90 x 40 cm, bipinnatifid to trifinnatifid, lanceolate; pinnae up to 30 pairs, opposite, subopposite or alternate, largest 25 x 6 cm. Sori in two sub marginal rows; spores reniform, perine crescent dark browns.

***Polystichum squarrosus* (D. Don) Fee *beddomei* Manickam et Rajkumar var. nov.:** Lamina 78 x 30 cm, bipinnatifida vel bipinnata, lanceolate; pinnae usque ad 24 paria opposite vel subopposita, grandissima 28 x 4 cm, sori in duo seriales; sporae reniformes, laeves - hyalinae. Lamina 78 x 30 cm, bipinnatifid or bipinnata, lanceolate, pinnae up to 24 pairs, opposite or subopposite, largest 28 x 4 cm sori in two submarginal rows; spores reniform, perine smooth hyaline.

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