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sparsely hairy or glabrous, green to purplish; pedicels 1-8 mm long, slender, wavy, dilated at apex; glumes broadly ovate or orbicular, subequal, 1.75-2 × 1.5-2 mm, chartaceous, 9-11-nerved, setose hairy. Lower floret male: lemma broadly elliptic or ovate, 1.75-2 × 1-1.25 mm, obtuse, chartaceous, faintly 5-7-nerved, glabrous, margins inturned, hyaline; palea broadly ovate, 1.5-1.75 × 1-1.25 mm, obtuse, delicate, glabrous, margins 2-keeled, hyaline; stamens 3, anthers 1.5-2 mm long, filaments short. Upper floret bisexual: lemma orbicular, 1.25-1.5 × 1.25-1.5 mm, obtuse, coriaceous, faintly 5-7-nerved, glabrous; palea orbicular, 1-1.5 × 1-1.25 mm, obtuse, coriaceous, 2-keeled, glabrous, margins inturned, hyaline; stamens 3, anthers 0.75-1 mm long, filaments short; ovary oblong, 0.1-0.25 mm long, styles c. 0.25 mm long, stigmas feathery, 0.25-0.5 mm long.

Holotype: KERALA. Wynad District: Poothumoola, Hiladale R. F., ± 700 m, 13th November, 1981, S. R. Srinivasan 72358 (CAL). *Isotypes* in K, & MH (acc. Nos. 138695, 138696, 138697 & 138698).

Occasionally grows along the bunds of paddy fields.

This species is allied to *Isachne miliacea* Roth ex Roem. & Schult., but markedly differs from it as shown in the table.

TABLE

| <i>Isachne miliacea</i> | <i>Isachne henryi</i> sp. nov. |
|--|---|
| 1. Leaves ovate-lanceolate, up to 3 cm long | Leaves linear-lanceolate or lanceolate, up to 8 cm long |
| 2. Glumes 5-7-nerved, glabrous | Glumes 9-11-nerved, setose-hairy |
| 3. Anthers of the lower floret 0.5-1 mm long | Anthers of the lower floret 1.5-2 mm long |
| 4. Pedicels up to 3 mm long | Pedicels up to 8 mm long. |

The specific epithet is after Dr. A. N. Henry, Scientist D, Botanical Survey of India, Coimbatore in recognition of his significant contributions to the taxonomy and nomenclature of Indian plants.

ACKNOWLEDGEMENTS

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A NEW SPECIES OF *NOTOTHYLAS* SULL. (BRYOPHYTA) FROM NEPAL¹

D. K. SINGH²

(With twenty eight text-figures)

The genus *Notothylas* Sull., in the present state of our knowledge, is represented in the world by 17 species. Interestingly, the South-

East Asian countries and Japan together account for the distribution of 14 species. Off these 12 species are confined to this region only whereas two species *Notothylas breutelii* (Got.) Got. and *N. dissecta* St. exhibit discontinuous distribution between South-East

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² Botanical Survey of India, Eastern Circle, Shillong-793 003.

Asia on one hand and the American land-mass on the other (Singh 1979, Udar & Singh 1979). Recently, during the course of a monographic study on Indian Notothylaceae some interesting specimens, belonging to the non-columellate section of the genus, represented in the collections of British Museum expedition to Central Nepal during 1949 and 1952 and partly deposited in the hepatic herbarium of the Lucknow University (LWU), were studied. A critical morpho-taxonomic investigation showed that they were distinct from hitherto known species of the genus. Hence, it is described in the present communication as *Notothylas nepalensis* sp. nov. The only other species of the genus, recorded from Nepal so far, is *N. levieri* Schiffn. (Hattori 1966, Singh 1979, in press).

***Notothylas nepalensis* sp. nov.**
(Figs. 1-28)

Plantae dioeciae; thalli prostrati parvi, tenelli, 2-4 cellulis crassi, cellulis strati mediani majoribus; plantae feminae 2-4.5 mm longae, 0.7-3.5 mm lati; involucria submarginalia, ultra marginem thalli protrudentia; capsula cylindrica, involucrium leviter superans, longitudinaliter secus suturum dehiscens, cellulis specialibus secus marginem valvae in serie una dispositis, pariete capsulae nonstomatifera, tristratosa; columella carens; sporae flavo-brunneae, ovali-sphaericae, 32.4-46 μm , superficie glabra, signo triradiato distincte notata.

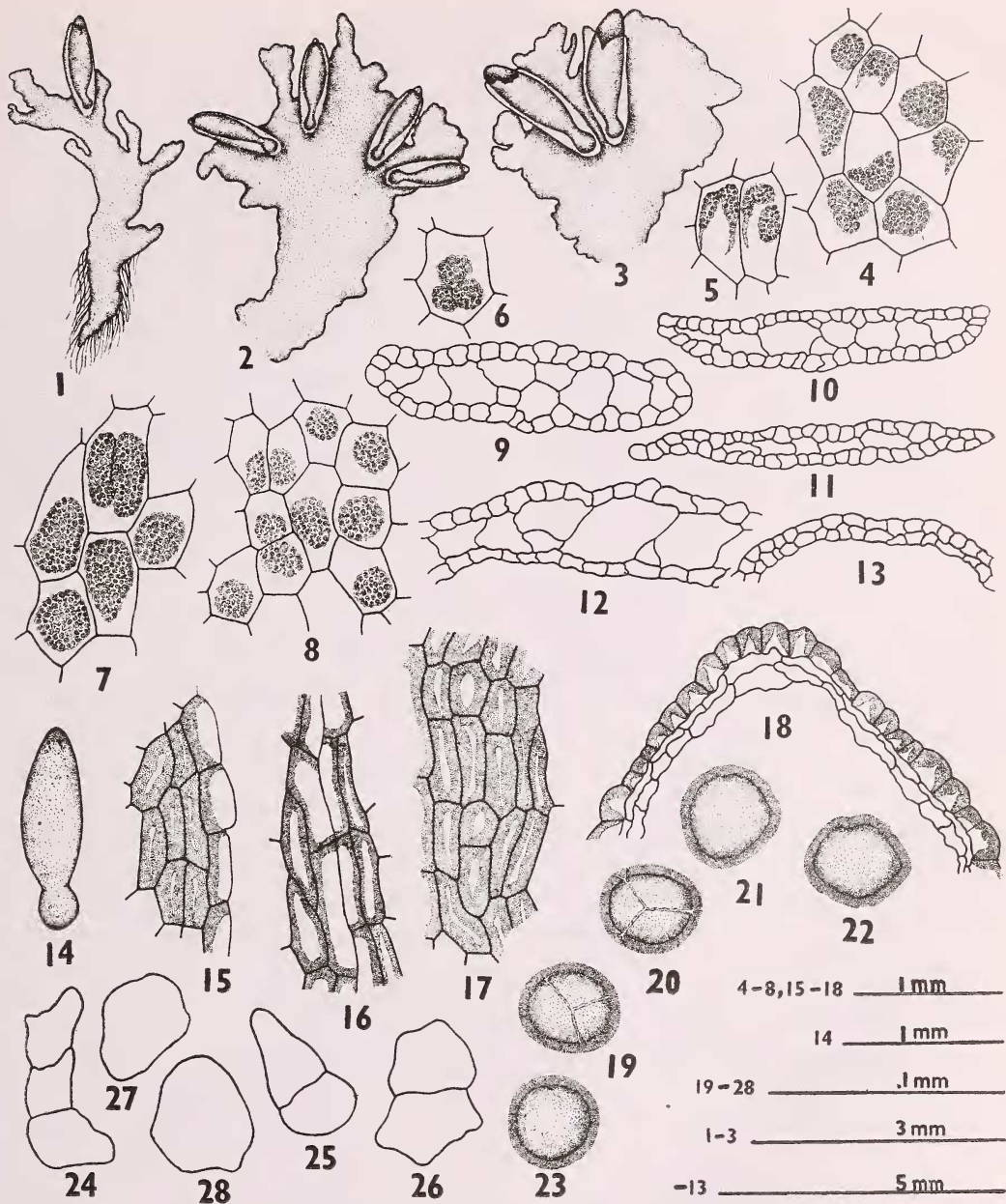
Typus positus in Herbario Hepatico, sectionis botanices, Univ. Lucknow, Lucknow, India. Numero 3125 pro parte (Ex Herbaria Musei Britannici). *Notothylas nepalensis* sp. nov., *Anthoceros stephanii* Khanna consociata, Garhigaon prope Jumla (alt. 2879 m). leg. O. Polunin, W. R. Sykes et J.H.J. Williams, September 1952. det. D. K. Singh.

Plants prostrate, delicate, dichotomously

branched, usually not forming rosettes, caespitose, linear — obcordate, small 2-4.5 mm long, 0.7-3.5 mm broad, lobes ecostate, broad, dorsal surface smooth, thalli compact, 3-4 cell layers thick in the middle, 1-3 cells thick at the margins; dorsal epidermal cells nonprotuberant, subquadrate — rectangulate, (24.3) 40.5-67.5 \times (21.6) 29.7-46 μm towards apex, with 1(2-3) discoid to more or less 'U' shaped chloroplasts free from the inner cell walls, stroma reticuloid, pyrenoid region lacking; cells from the middle region of the thallus elongated rectangulate, 45-97.5 \times 32-51.5 μm , with 1(2) discoid — ellipsoid chloroplasts free from inner cell walls; cells from the posterior part of the thallus rectangulate, (32-) 64.5-97.5 \times 27-59.5 μm , with single chloroplast free from the inner cell walls; cells of the hypodermal layer much larger, often filled with mucilage, usually devoid of chloroplasts; cells from the lower epidermis subquadrate — rectangulate, (40.5) 54-81 \times 32-50 μm towards apex with 1-3 discoid chloroplasts similar to those in dorsal epidermis, cells from the middle region of the thallus rectangulate, 43-86.5 \times 18.5-43.5 μm with 1(-2) large, discoid — ellipsoid chloroplasts, cells from the posterior region of the thallus highly elongated, 64.5-110.5 \times (24-) 29.5-43.5 μm , with single discoid to elongated chloroplast. *Nostoc* colonies not observed.

Rhizoids smooth walled, ventral scales and tubers lacking. Dioecious (?) male plants not seen. Involucries horizontally deflexed, submarginal, single or geminate, situated at the sinuses between the two lobes, usually not concealed by the latter, anterior part projecting well beyond the thallus margins, uniformly 2-cell layers thick towards base, 1-cell thick towards apex. surface smooth; sporogonia emergent, one in each involucrie, 0.75-1.5 mm long, differentiated into a large bulbous foot, a subconspicuous meristematic zone and more or less ellipsoidal, yellowish brown capsule with

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Figs. 1-28. *Notothylas nepalensis* sp. nov.

1-3. Habit sketches of plants in dorsal view; 4-6. Chloroplasts from the upper epidermal cells (towards the anterior part of the thallus); 7. The same from the middle region of the thallus; 8. Chloroplasts from the lower epidermal cells; 9-12. Cross-section of the thallus; 13. Cross-section of the involucre; 14. A complete sporogonium; 15-17. Epidermal cells of the capsule wall (figure 16 showing special cells bordering the line of dehiscence); 18. Cross-section of the capsule wall; 19-20. Spores in proximal view; 21-23. Spores in the distal view. 24-28. Pseudoelaters.

obtuse apex; capsule dehiscing longitudinally from apex downwards, sutures 2-4(-5), cells thick, capsule wall nonstomatiferous, 3-4 cell layers thick, cells of the epidermal layer yellowish brown, subquadrate — rectangulate, $24-40.5 \times 27-35.5 \mu\text{m}$ towards apex rectangular, $32-94.5 (-121.5) \times 16-27 \mu\text{m}$ towards posterior part, with sheet-like thickenings present on transverse and radial walls, radial wall thickenings extending over outer tangential walls also, special cells bordering the margin of each valve in 1-2(3) rows, $18.5-32.5 \times 18-35.5 \mu\text{m}$ at apex, $(27-40.5) 48.5-121.5 \times 8-27 \mu\text{m}$ towards base, thick walled, deeply pigmented, cells of the inner layers thin walled, hyaline, devoid of any thickening; columella absent, spores tetrahedral ($32-50 \mu\text{m}$ in diameter) — oval ($40.5-50 \times 36.5-40.5 \mu\text{m}$), yellowish brown, with a conspicuous equatorial crassitudo devoid of flange, exine surface obscure, proximal surface with conspicuous tortuous triradiate mark often continuous with equatorial girdle; pseudoelaters scarcely present, 1-3 celled, $45-69.5 \times 16.5-47 \mu\text{m}$ in size, hyaline, devoid of thickening bands.

Type specimen represents the part of collections of British Museum Expedition to Central Nepal. The duplicate deposited in the Hepatic herbarium, Department of Botany, University of Lucknow, Lucknow (LWU) No. 3125. *Notothylas nepalensis* sp. nov. growing in fallowed field with *Anthoceros stephanii* Khanna. Loc. Garhigaon, S.E. of Jumla (alt. 2879 m). leg. O. polunin, W. R. Sykes and J.H.J. Williams, September 1952. det. D. K. Singh.

Other specimen examined: No. 173. Ex Herbario Musei Britannici. British Museum Expedition to Central Nepal, 1949. The duplicate deposited in the Hepatic herbarium, Department of Botany, University of Lucknow, Lucknow (LWU). *Notothylas nepalensis* sp. nov. grows on walls in association with sterile,

tuber bearing, plants of *Phaeoceros himalayensis* (Kash.) Prosk. Loc. Langtang village area (alt. c. 3030 m). leg. O. Polunin, August 1949. det. D. K. Singh.

Characteristics of the species: 1. Plants dioecious; 2. Chloroplast stroma reticuloid, pyrenoid region lacking; 3. Involucre projecting well beyond the thallus margin, surface smooth; 4. Columella absent; 5. Yellowish brown spores with obscure exine surface and devoid of flange; 6. Pseudoelaters scarce, devoid of thickening bands.

Notothylas nepalensis, occurring at an altitude of c. 2879-3030 m, is a truly temperate species and is interesting in its vegetative as well as sporophytic features. In a fairly large number of specimens, from both the localities, a tendency to form rosettes is lacking. The plants are delicate and quite distinctive as the thallus is usually only 3-cell layers thick with the middle layer comprising of enormously large cells (Figs. 9-12) usually filled with mucilage. It is also remarkable in its chloroplast structure which apparently consists of numerous, discoid starch bodies (Figs. 4-8) separated from each other by hyaline streak — presumably 'thylakoids'. Interestingly, in this feature, the present species not only resembles *N. anaporata* Udar & Singh, a columellate species of the genus, but also shows a close analogy with *Megaceros tjibodensis* Campb. (Burr 1970, Kaja 1954, Udar & Singh 1981). Furthermore, while it shows resemblance with the genus *Megaceros* Campb. as well as certain species of the genus *Folioceros* Bharad., in the absence of a central pyrenoid complex from the chloroplast, it differs widely from its allied species (belonging to the noncolumellate section of the genus *Notothylas*) in this feature (Singh 1979, in press; Udar & Singh 1981).

N. nepalensis, in the complete absence of a columella, differs not only from all the persistently columellate species of the genus (e.g.

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N. anaporata, *N. dissecta*, *N. galapagensis* Howe, *N. himalayensis* Udar & Singh, *N. indica* Kash., *N. pandei* Udar & Chandra) but also from such species as *N. breutelii*, *N. depressispora* J. Hasegawa, *N. javanica* (Sande Lac.) Gott., *N. orbicularis* (Schw.) Sull., *N. temperata* J. Hasegawa) which may or may not have columella in their fully matured capsules (see Hasegawa 1979, Singh 1979, Udar & Singh 1981). Amongst its own group, while the present species does not approach directly to any of the taxa, it differs considerably from them in most of the significant morphological details (e.g. thallus anatomy, chloroplast structure, sexuality, features of involucre, capsule wall structure, spore morphology and the spore-

derm pattern, and the pseudoelater characteristics) having a direct bearing on the taxonomy of the genus (Singh 1979, Udar & Singh 1981).

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