

the distinct idioblasts of certain species provide a useful clue for identification of the taxa. A few striking instances are mentioned here.

Bentham⁶ is of the opinion that *P. mitchellii* Meisn. resembles *P. sericea* to such an extent that *P. mitchellii* may be considered a variety of *P. sericea* A. Cunn. This is supported by the findings of only tracheoids in *P. sericea* and gnarlyform sclereids in *P. mitchellii*. *P. confertiflora* referred by Mueller and Meisner to *P. ferruginea* which they resemble at first sight but the ovary is perfectly glabrous and the affinity appears to be much greater with *P. lanceolata*. The presence of sclerocysts or sclereids-in-aggregates in *P. confertiflora* and diffuse rhizosclereids in *P. lanceolata*, however is significant. The presence of idiofibrosclereids in *P. ferruginea* and sclerocysts in *P. confertiflora* does not uphold their similarity. The non-idioblastic tissue composed of tightly packed sclereid like cells grouped under dermal pattern is a characteristic feature in *P. scabrella*. This feature is not a wide spread phenomenon in Angiosperms⁵. Bentham's opinion is that *P. rigida* R. Br. sometimes resembles *P. sericea* A. Cunn. in external features. It is found however, that the presence of sclerotracheoids-in-aggregate in both the species there is also a good deal of similarity in their endomorphic features.

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TWO NEW COMBINATIONS IN THE GENUS USNEA

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INVESTIGATIONS on the type specimens of certain taxa of the genus *Usnea* from India, have necessitated two new combinations at the specific level as discussed below. The method of Walker and James¹ has been adopted for thin layer chromatography.

The taxon *Chlorea rigidula* Stirt., described by Stirton² was diagnosed "Thallus pallide lutescens vel albidocinereascens elongatus, nonnihil angulosus praesertim infra et axillis compressus, ramosissimus, apicibus attenuatis et plerumque fibrilloso-contextis. Axis crassus vel crassiusculus, pallidus vel saepe et praesertim infra pallide rufescens, solidus, fibrillae medullares compactae albae, K flaventes dein rubentes vel rufo-ferrugineae, I—".

Motyka³ discussed the taxon *Chlorea rigidula* Stirt. under *Usnea indica* Mot. and remarked "E descriptione inclarum, qua ratione haec planta sit *Chlorea*, dum apothecia non commemorata et secundum descriptionem est typica *Usneae* species. Ut plerumque e descriptione species non diagnoscenda; sat autem exacte respondit *U. indicae*, saltem melius quam alicui aliae possibileque haec est species. In Museo Britanico deest specimen Stirtoni huius speciei. Sit id revera, tum nomen Stirtoni restituendum."

The taxon *Chlorea rigidula* Stirt. was based on the two syntype collections: (1) India, Nilgherries, G. Watt 13 (BM) and (2) Canada, Lake Superior, Roy (?). None of the two is preserved at the Stirton's herbarium in GLAM vide Woodward (in litt.). But the syntype material annotated *Chlorea rigidula* Stirton in pencil preserved at BM was borrowed for investigation. The major part of this syntype corresponds with the protologue of *Chlorea rigidula* Stirt. stated above, and intermixed with that there are few fronds of *Usnea himalayana* Bab.

Chlorea rigidula Stirt. has no relationship with *Usnea indica* Mot., as was envisaged by Motyka³. According to the basic branching system in the genus *Usnea* as outlined by Asahina⁴, the former has deliquescent type of branching, while the latter has filamentose type of branching.

Chlorea rigidula is a typical *Usnea*, and in addition, it corresponds with the type collections of *Usnea venosa* Mot. and authentic materials of *U. ceylonica* Mot., and thus the latter two are conspecific with

Chlorea rigidula Stirt., which gets nomenclatural priority in the following new combination:

Usnea rigidula (Stirton) G. Awasthi, comb. nov. —

Chlorea rigidula Stirt., Scott. Natur. 7:75 (1883).

Type: India, Nilgherries (Nilgiri), G. Watt 13, pr. maj. p. (Lectotype here proposed: BM!)

TLC: usnic acid and salacinic acid.

— *Usnea ceylonica* Mot., Lich. Gen. Usnea Stud. Monogr. Pars Syst. :129 (1936–38). Type: Ceylon (Sri Lanka, no precise locality), Rietzner (Holotype: UPS – not seen). Authentic specimens seen: Ceylon (Sri Lanka), Thwaites 17 (BM!, UPS!).

TLC: usnic acid and stictic acid complex (stictic acid, constictic acid, norstictic acid in trace, and grey spot below stictic acid at R_f value 0.26 in solvent A).

— *Usnea venosa* Mot., Lich. Gen. Usnea Stud. Monogr. Pars Syst. :474 (1936–38). Type: Herb. Ind. Or. (no precise locality), Hook. f. & Thomson 1718 B (Holotype: W!; isotype W!).

TLC: usnic acid, salacinic acid and an unknown yellow spot with greenish rim at R_f value 0.46 with grey spot below it in solvent A in holotype specimen; isotype has usnic acid and salacinic acid only.

Several specimens collected in recent years from Nilgiri and Palni hills were found to correspond with the taxon *Usnea rigidula* (Stirt.) G. Awasthi in morphology and anatomy, but with three distinct chemical strains: usnic acid and salacinic acid strain; usnic acid, salacinic acid, unknown yellow spot strain, and usnic acid and stictic acid complex strain. *Usnea rigidula* is distinctive in its rigid isotomic dichotomous branching, irregularly cracked pseudocyphellate cortex, dense medulla and thick axis.

A specimen collected from Himalayas by Hooker and Thomson, no. 1718 (GLAM, BM), was considered close to *Usnea longissima* Ach. by Stirton⁵ and remarked "the axis is a brownish or violaceous black colour, and it gives a negative reaction with I. This lichen is also much more robust than usual, and has a crisped appearance. To this I propose giving the name *Usnea mekista*. It certainly deserves the rank of a subspecies". This clearly indicates that Stirton considered the taxon as only a subspecies of *U. longissima*. But Motyka³ described it as a species without the formal combination in the specific rank. The formal new combination is therefore given below:

Usnea mekista (Stirton) G. Awasthi, comb. et stat. nov. — *Usnea longissima* subsp. *mekista* Stirt., Scott.

Natur. 6:105 (1881). Type: Himalayas (no precise locality), Holotype: Hooker and Thomson 1718 (GLAM!); isotype (BM!).

TLC: usnic acid and fumarprotocetraric acid.

The taxon is distinct from *U. longissima* Ach. in the 5–10 mm long crisped lateral branchlets, filamentose branches annularly cracked, more or less pulverulent and with isidiate and sorediate verrucae on the cortex, the central axis violet brown and negative in reaction to iodine solution.

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DICHLORBENIL ARRESTS ROOT HAIR GROWTH IN RADISH

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DICHLORBENIL (2,6-dichlorobenzonitrile), a broad-spectrum herbicide¹, is a potent inhibitor of cellulose synthesis^{2,3}, and pollen tube growth⁴. Like pollen tube, root hair is characterized by tip growth. This paper reports the effects of dichlobenil on root hair growth in radish.

A stock solution of dichlobenil (98%, Tokyo Kasei Co. Japan) was prepared in boiling water and cooled to room temperature. A 1.4×10^{-4} M solution was nearest to the highest concentration of aqueous sol-