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## TAXONOMIC NOTES ON NEW ZEALAND MONOCOTYLEDONS

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### SUMMARY

In Orchidaceae *Microtis oligantha*, *Thelymitra hatchii* and *T. dentata* are described as new species, while *T. aemula* Cheesem. is regarded as probably synonymous with *T. ixioides* Swartz; *Pterostylis trullifolia* Hook. f. as typified includes *P. trullifolia* var. *gracilis* Cheesem. and *P. rubella* Col. as synonyms while *P. brumalis* L. B. Moore sp. nov. and *P. alobula* (Hatch) L. B. Moore comb. nov. replace names used by Hatch at varietal rank within *P. trullifolia*. In Liliaceae *Xeronema callistemon* W. R. B. Oliver is typified and var. *bracteosa* L. B. Moore var. nov. is differentiated on the basis of green foliaceous bracts subtending the flowers.

In the course of a review of some monocotyledonous families for the second volume of "Flora of New Zealand", unnamed species have been recognised in *Microtis* and *Thelymitra* (Orchidaceae) and a variety in *Xeronema* (Liliaceae); some alterations in rank appear necessary in the orchid genus *Pterostylis* and certain names fall into synonymy. In this paper the new taxa are formally described and some associated species are discussed.

Living plants and fresh flowers have been studied in conjunction with liquid-preserved and pressed material. Specimens from herbaria other than that of Botany Division, D.S.I.R. (CHR) are indicated by the following abbreviations:

Auckland Institute and Museum	AK
Canterbury Museum, Christchurch	CANTY
Royal Botanic Gardens, Kew	K
Dominion Museum, Wellington	WELT

### ORCHIDACEAE

#### MICROTIS R. Br.

***Microtis oligantha* L. B. Moore sp. nov.** (Fig. 1)

Planta parva, 3-15 cm alta, rarissime altitudinem 25 cm attingens. Inflorescentia c. 2-10-flora, plerumque <3 cm longa. Sepalum dorsale subacutum vel obtusum, haud recurvatum; sepala lateralia dependentia, raro circinata. Labellum abrupte

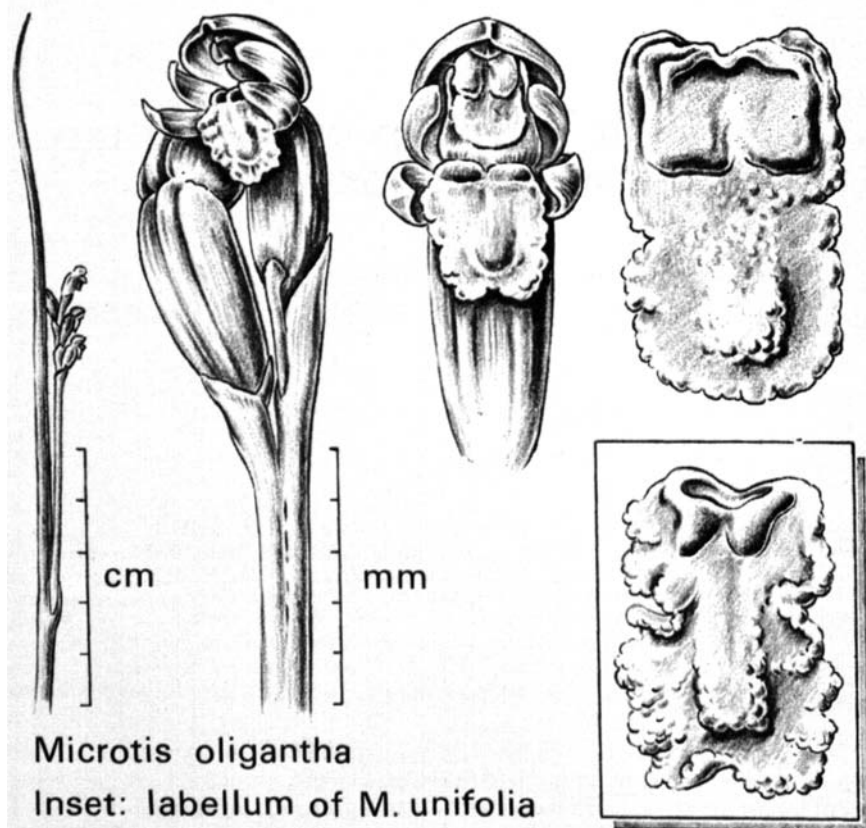


FIG. 1—MICROTIS. *M. oligantha* L. B. Moore from Lake Tekapo, cultivated at Lincoln: inflorescence, flower, labellum. Inset: *M. unifolia* (Forst. f.) Reichb. f. from Lincoln, selfsown: labellum. Drawn by J. B. Irwin.

deflexum, apice truncatum sine apiculo, marginibus leviter crenatis; callus anterior verrucosus, magnitudine variabilis; calli basales quadrati, complanati, labelli totam latitudinem fere occupantes.

TYPUS: CHR 150775, Lake Roundabout, Ashburton Valley, Canterbury, edge of lake, just above water level but very damp, *J. Clarke* 3 Feb 1966.

Plant small, when growing in shade reaching a height of *c.* 25 cm, generally much less. Tubers on long axes, to 8 cm from parent plant. Inflorescence for the most part less than 3 cm long, flowers few, usually 2–10, often widely spaced. Dorsal sepal *c.* 2.5 mm long, its margin evenly rounded and lacking recurved tip; laterals deflexed, usually lying parallel to ovary. Labellum also sharply deflexed; tip squarely truncate to slightly emarginate, not apiculate; margins shallowly crenate, sometimes thickened but rarely undulate; anterior callus wart-like, variously developed, often low and broad; two basal calli

smoother, squarish, flat rather than convex, together occupying most of the width of the labellum.

**DISTRIBUTION:** Widespread and locally abundant in Canterbury foothills in tussock grassland where other plants form a short close turf, occasionally amongst moss in tall grass; occurs also in Marlborough, Nelson and Otago and probably in the high country of central North Island. Fl.: Dec-Feb.

**REPRESENTATIVE SPECIMENS:**

Canterbury: Cass, 1,800 ft, *N. R. Foy*, s.d.; Rakaia Gorge, in deep moss and tall grass, *A. J. Healy*, 17 Jan 1968; Fagan's Downs, Ashburton Valley, short grassy sward at margin of tarn, *R. and E. F. Melville* (6189), 29 Jan 1962; Mt Hay, Lake Tekapo, in fibrous turf, *A. J. Healy*, 7 Jan 1965; Tasman Valley, near Glentanner, *T. F. Cheeseman*, Jan 1898 (AK 3454); Lake Pukaki, *P. Hynes*, 23 Jan 1965 (AK 104839).

Other areas: Rainbow Station, Wairau Valley, Marlborough, river flats, *P. Hynes*, 19 Apr 1965 (AK 105238); Gorge of Ure River above Blue Mt Station, Marlborough, damp bank, *D. R. Given*, 31 Jan 1966; Maungatua, Otago, tussock land c. 2,000 ft, *J. Shand*, 4 Feb 1968; Macrae's, *D. Petrie*, s.d. (WELT 18747); Eden Vale, Mt Earnslaw, *T. Kirk*, 22 Jan 1885 (WELT 18762); Manapouri, *G. Simpson*, 1945 (AK 24569).

In cultivation short plants of *M. oligantha* from the wild increased their stature 2–3-fold, reaching a height of 20 cm but retaining their distinctive raceme and flower characters. Voucher specimens are: from the wild—CHR 141205, Mt Hay, 7 Jan 1965; from a similar turf collected in the same locality 11 Dec 1965 and grown on in shade house at Lincoln—150772, 1 Feb 1966; 141485, 15 Dec 1966; 181672, 19 Dec 1967. Adjacent plants of *M. unifolia* remained quite distinct. The two species have occasionally been found growing together in Canterbury.

*M. unifolia* (Forst. f.) Reichb. f. not only attains much greater sizes but even in small plants differs from *M. oligantha* in its denser inflorescence and more acute dorsal sepal; its labellum (Fig. 1, inset) is relatively longer, often narrowest about mid-length, marginally usually both crenate and undulate, and the basal calli are oval and prominently convex. Both *M. longifolia* Col. (1885, p. 247) and *M. papillosa* Col. (1886, p. 269) are described as relatively large plants and both names appear to fall into synonymy under *M. unifolia*. Two specimens (WELT 24277 and AK 3452) are labelled by Cheeseman as "Type of *M. longifolia* Col." but neither of these has a Colenso label. No specimen of *M. papillosa* has been found.

In its uniformly small size *M. oligantha* resembles only *M. atrata* Lindl. (1840, p. liv), but in that Australian species the labellum lacks callosities and has an entire margin.

Hatch (1963, pp. 187–8) recognised these small plants as specifically distinct from *M. unifolia*. He determined them as *M. magnadenia* R. S. Rogers in *Trans. R. Soc. S. Aust.* 54, 1930, 44, a species based on a single collection ("New South Wales. Lake Wonboyn, near

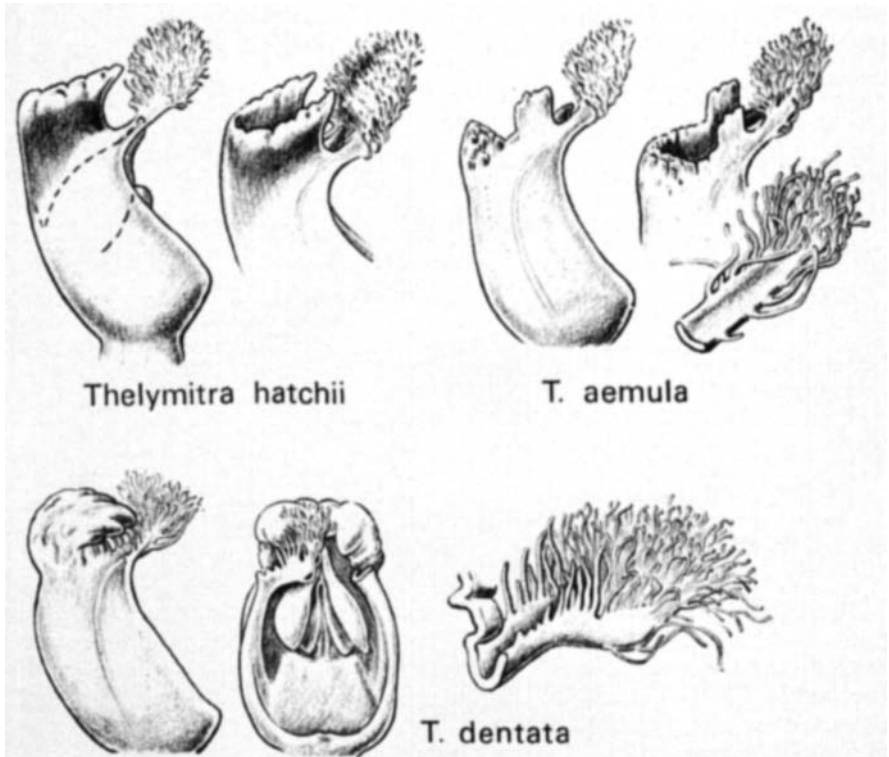


FIG. 2—THELYMITRA columns. *T. hatchii* L. B. Moore from Arthur's Pass (dotted lines indicate position of anther); *T. aemula* Cheesem. from Karekare; *T. dentata* L. B. Moore from Kaitoke. Drawn by J. B. Irwin.

Prince's Highway, Nov 1929"), for which the description reads in part: "A tall plant, sometimes 45 cm high. Leaf lamina reaching to the base of the inflorescence. The inflorescence about 13 cm in length, loosely multiflowered. Flowers large for the genus. Lateral sepals *not recurved*, divergent, horizontally spreading beneath the labellum. Labellum about 3 mm long, provided with a very large pale greenish *conspicuously-raised* subconical callus near the apex and two very large *conspicuously-raised* confluent dark green calli at the base." (Original italics.)

Through the courtesy of Dr H. J. Eichler, Keeper of the State Herbarium of South Australia, it has been possible to examine a flower from the type specimen, together with photographs and notes made by Dr Rogers from the fresh flowers. Obvious differences from the plant now named *M. oligantha* are, in addition to size and number of flowers, the erect apiculate dorsal sepal, spreading lateral sepals, and patent labellum with three roundly prominent calli, the anterior one much larger than any seen in New Zealand; the pedicels in the type specimen are not slender, though Hatch lists this feature in a four-point

comparison between *M. magnadenia* and *M. unifolia*. In *M. oligantha* pedicels range from long and thin to short and thick.

THELYMITRA J. R. et G. Forst.

**Thelymitra hatchii** L. B. Moore sp. nov. (Fig. 2)

Folium lineare, canaliculatum, plus minusve carinatum. Inflorescentia pauciflora. Perianthium purpurascens, nec striatum nec maculatum. Sepala, petala labelleumque elliptica, acuta. Columnae brachia teretia, ciliis numerosis sulphureis vel cremeis ornata; lobus post antheram ascendens erectus, antheram superans, recte vel oblique truncatus. laevis, rubescens, margine luteo plus minusve denticulato non involuto.

TYPUS: CHR 181661, View Hill, Oxford, Canterbury, grassy hillside, *L. B. Moore* 17 Dec 1967.

The specific epithet is derived from the name of Mr E. D. Hatch who reviewed and illustrated the orchids of New Zealand in a comprehensive series of papers from 1945 to 1952, and has since continued to grow and study these plants.

Plant at flower to c. 40–50 cm tall. Leaf c. 5–15 mm wide, channelled and more or less keeled, forming rather well-defined V in T.S. Flowers few, usually 1–6. Perianth c. 15 mm long, colour between pink and blue, without stripes or spots. Sepals, petals and labellum subsimilar, elliptic, sepals more acute. Column-arm terete or plano-convex in T.S. with abundant cilia from sides, back and top; cilia usually very pale yellow, mostly standing erect and above post-anther lobe; post-anther lobe tall, overtopping anther at least at sides, erect, squarely to obliquely truncate, sometimes forming a deep cleft at back, usually dark red towards top, margin usually yellowish, more or less denticulate but not thickened or involute, often ending in front in two small, more or less inturred horns.

DISTRIBUTION: North and South Islands, widespread from about lat. 38° southwards, in open and grassy places. Fl.: Nov-Dec.

REPRESENTATIVE SPECIMENS (all at CHR):

North Island: Eastern Tongariro, kanuka/manuka scrub, *G. C. Kelly*, 25 Jan 1964; NW Ruahine Range, c. 3,500 ft, tussock grassland, *A. P. Druce*, Jan 1948; Egmont, 2,000 ft, scrub, *A. P. Druce*, Dec 1959; Wallaceville Hill, Hutt Valley, *A. P. Druce*, 17 Dec 1964.

South Island: Mt Isobel, near Hanmer, c. 4,000 ft, *B. H. Macmillan*, 11 Jan 1966; Arthur's Pass Village, *D. R. Given*, 22 Dec 1965; Near Roa Mine, Westland, trackside, *Moore, Clarke, Robins*, 18 Dec 1965; Upper Taylorville, Grey Valley, Westland, pakihi land, *L. B. Moore*, 4 Dec 1967; Leith Saddle, Waikouaiti County, *M. Baxter*, Dec 1965; Bluff, SW side of Peninsula, swampy manuka scrub, *A. H. Whitaker*, 3 Dec 1966; Fiordland, near Crombie Stream, in forest c. 100 ft, *P. K. Dorizac*, 28 Dec 1966.

This is the plant well illustrated by Hatch (1952, Pl. 79, D–H) with the name *T. pachyphylla*, the figures based on drawings by J. Bruce Irwin of plants collected at Waitaanga, between Mt Messenger and

Ohura, in Taranaki. *T. pachyphylla* Cheesem. (1906, p. 1,151) differs in many features, including striped flowers, and broad flat column-arms which are reddish and toothed at the base and ciliate, if at all, only near the top, the cilia sparse, bright yellow, and relatively coarse; these features all, incidentally, tending to bring *T. pachyphylla* into synonymy under *T. pulchella* Hook. f. (1853, p. 244).

Considering other possible earlier names in chronological order, *T. hatchii* falls near to the Australian *T. nuda* R. Br. (1810, p. 314) but the latter species has been regarded (e.g., in Willis, 1962, p. 348 and in illustrations there quoted) as having a definitely hooded column and white or pink cilia, so approaching more nearly to *T. pauciflora* R. Br.

*T. intermedia* Bergg. (1878, p. 21, t. 5) originally came from Bay of Islands, which is further north than the known range of *T. hatchii*. Plants from North Auckland that can be regarded as belonging to *T. intermedia* differ from *T. hatchii* in having white cilia and a column margin which inclines forward and is often jagged and inrolled without being truly hooded.

In *T. formosa* Col. (1884, p. 338), behind a column-arm "densely fimbriated with yellow fimbriae", there are "long subulate erect points at top and crenulated fleshy pink edges on back slope running down to a deep notch at the back, exposing top of column". In *T. hatchii* when the top of the post-anther lobe is very obliquely truncate the resemblance to *T. formosa* increases though in general *T. hatchii* is quite distinct from plants that match Colenso's description.

*T. truncata* R. S. Rogers (1917, p. 343, t. 17) was described, from South Australia, as having "a single yellow glandular lobe in the form of a truncated cone between the outer penicillate lobes", but its blue spotted petals, white cilia, and tuberculate column-back suggest *T. decora* Cheesem. (1906, p. 1,151) rather than *T. hatchii*.

### ***Thelymitra dentata* L. B. Moore sp. nov.**

(Fig. 2)

Folium lineare, plus minusve canaliculatum, crassum. Inflorescentia pauciflora. Perianthium purpurascens, lineis saturioribus striatum. Sepala petalaeque lata. labellum oblongum vel obovatum. Columnae brachia basin versus applanata et plus minusve canaliculata, margine lobis, dentibus vel fimbriis instructa, apicem versus ciliis numerosissimis lutescentibus demum ferrugineis ornata; lobus post antheram ascendens, plus minusve cucullatus, antheram obtegens, rubescens, marginem versus subtuberculatus, luteus.

TYPUS: CHR 168063, Puffer Track, Kaitoke, Wellington, *L. B. Moore, I. M. Morice*, 13 Dec 1965 (Fig. 2).

Plant at flower *c.* 15–40 cm tall. Leaf 10–20 mm wide, shallowly channelled, thick. Inflorescence few-flowered. Perianth *c.* 15 mm long, pinkish to very pale lavender or blue with strong blue stripes, especially on petals. Sepals and petals subsimilar, broad, slightly obovate. Labelum more oblong-obovate. Column-arms thickened about the nerve, flanged towards the base with delicate pinkish lobes, teeth or fimbriae

that sometimes extend down the front margin of the column-wing; the arms bent inwards so that the two globose bunches of crowded cilia meet just above the anther-tip; cilia at first pale yellow, turning brown with age, in old flowers standing more erect; post-anther lobe taller than anther and more or less hooded over it, usually dark red and more or less tuberculate towards the yellowish margin.

**DISTRIBUTION:** North and South Islands, on clay and peaty soils. Plants have been found only in small numbers but specimens from widely scattered localities are remarkably uniform. Fl.: Nov-Jan.

**REPRESENTATIVE SPECIMENS** (all at CHR):

Puffer Track, Kaitoke, *A. P. Druce*, 17 Dec 1964 (annotations indicate a suspected hybrid between *T. pulchella* and *T. pauciflora*); Black's Point Mine, Inangahua County, in sphagnum, *D. Wellman, G. C. Kelly*, 31 Dec 1965; Irishman's Creek, near Lake Brunner, pakihi land with *Cladium teretifolium*, *J. Clarke*, 19 Dec 1965; also recorded in water-colour sketch and notes by *J. B. Irwin*, 16 Nov 1949, from plant from Kaikohe, North Auckland, collected by *J. Jones*.

The denticulate margin of the flanged column-arm (to which the specific epithet refers) distinguishes *T. dentata* from all other New Zealand species with tall post-anther lobes except *T. pulchella* Hook. f. in which the yellow cilia do not form close globose masses, and the column is less inclined to be hooded. The striped perianth gives a strong superficial resemblance to *T. pulchella*.

Three Australian species in which the column-arm is toothed or lobed near its base are *T. luteocilium* Fitzg. (1882, p. 495), *T. chasmogama* R. S. Rogers (1927, p. 4), and *T. irregularis* Nicholls (1946, p. 126, f. A-C); in each the perianth is described or depicted as pink without mention of stripes, and the post-anther lobe of the column is significantly different from that of *T. dentata*.

*T. nervosa* Col. (1888, p. 207) appears to have been a different plant. Its type locality was "High lands base of Mount Ruapehu (Tongariro Range). County of East Taupo; whence specimens were brought by a visitor in 1879". Dark coloured flowers with much veined segments and labellum larger than the other tepals agree with *T. dentata* (and with some other species) but "A striking character is the low branching of its slender staminodia or lateral lobes of the column which are also elongated"; the long slender arm is described as "largely plumose at top in a globular ball". No specimens have been found in Colenso's or any other herbarium.

**Thelymitra aemula** Cheesem. in *Trans. N.Z. Inst.* 51, 1919, 94.

From the protologue\*: "the wing extending behind the anther and free from it except at the base, 5-lobed; the two lateral lobes twice the length of the others, flattened, fringed with cilia for the greater part

\* Protologue: "everything associated with a name at its first publication, i.e., diagnosis, description, illustrations, references, synonymy, geographical data, citation of specimens, discussion, and comments". (International Code of Botanical Nomenclature, 1966:71.)



of their length; middle lobe short and broad, thickened and denticulated at the tip, but smooth at the back; the two intermediate lobes distinct from the central one, reaching half the height of the lateral lobes, broad, thick, and fleshy, jagged at the top. Anther broad, produced into a pointed tip that just overtops the level of the median lobe of the column-wing. . . . It is doubtless very closely allied to *T. ixioides* and the Australian *T. canaliculata* but appears to constantly differ in the lateral lobes of the column being much longer, flattened, and more copiously penicillate; and the middle lobe, although denticulate at the top, is not at all warted or crested at the back. The flowers appear to be invariably blue; but the column is surrounded by a narrow band of violet just below the lobes, above which the colour is bright yellow." "Hab.—North Island: *Leptospermum* scrub at Birkdale, near Auckland; H. B. Matthews!"

Lectotype: The lectotype selected by Hatch (1952, p. 394), AK 3364, Birkdale, 11.1920, *H. B. Matthews*, is not acceptable since it was, like all the specimens now in Herb. Cheeseman, collected after the species name had been published; Cheeseman's paper was issued separately on 14 May 1919. In the herbarium of the Canterbury Museum (CANTY) are three collections made by H. B. Matthews in the Birkdale-Glenfield area and named and annotated by him as *T. aemula*, the earliest date, 14.11.18, being that of two poor plants, 547/3 in Herb. Carse. Together these collections comprise some dozens of flowers which agree well with Cheeseman's description except that most have some calli on the post-anther lobe, as indeed have the very similar specimens in Cheeseman's own herbarium. The figures of Hatch (1952, Pl. 78, J-M) are of quite different columns, in which the wing is in no way five-lobed; in his diagrammatic section (Pl. 81, H), on the other hand, three of the five lobes are clearly indicated.

Recently collected specimens (e.g., CHR 181607, Karekare, *A. D. Mead* 12 Nov 1967, see Fig. 2) that match Cheeseman's description and specimens of *T. aemula* seem to differ from New Zealand specimens of *T. ixioides* in little except unspotted perianth. Swartz (1800) first used the name *T. ixioides* (on p. 228) without description but with a footnote stating: "Ex Nova Hollandia communicata a Cel. Smith"; on p. 253 appears the legend to t. 3, fig. L which shows a flower of *T. ixioides* at natural size and enlarged views of the column of this species and of that of "*T. Forsteri*" for comparison. These figures are barely adequate to validate the name but further information is added by Smith (1804, p. 55, t. 29) about the new species which "the excellent Swartz . . . received through my hands from New South Wales and of which we are enabled to exhibit the annexed figure, by means of specimens and coloured drawings sent by Dr. White". Smith's t. 29 shows the "singular hood which envelops the organs of fructification, and whose top is jagged and fringed, bearing a pair of feathery tufts elevated on stalks"; pointed side lobules, not shown in Swartz's small drawing, are recognisable and have subsequently been accepted as a character of this species (corresponding

to the intermediate lobes of Cheeseman's *T. aemula*). The first reference to spots seems to be by Brown (1810, p. 314) who would have seen fresh flowers and who says of Smith's t. 29: "sed caret maculis saturatoribus perianthii".

The name *T. canaliculata* was undoubtedly used by Cheeseman for the Eastern Australian plant now known as *T. media*. Nicholls (1929, p. 32) gives convincing evidence that Robert Brown's type of *T. canaliculata* was collected at King George's Sound in Western Australia. Some recently collected specimens comparable with Cheeseman's *T. aemula* match rather precisely *T. media* R. Br. as depicted by Fitzgerald (1878, t. 1) or by Nicholls (1929, p. 31) or by Green (1930, Pl. 8). Green's excellent photographs show how very much alike the columns of *T. media* and *T. ixioides* can be. Brown's diagnosis of *T. media* states: "perianthio patulo, cuculli laciniis extimis penicillatis; intermedia dorso nudo trifida; lobulo dimidio brevior emarginato, spica multiflora" and the type locality is the vicinity of Port Jackson, New South Wales.

Willis (1962, p. 349) distinguishes *T. media* from *T. ixioides* on the basis of "Perianth without spots; mid-lobe of column sparsely and irregularly crested, tripartite and very deeply cleft". New Zealand specimens examined do not demonstrate clearly that these characters are positively correlated but if they should prove to be so then the plants determined by Cheeseman as *T. aemula*, endemic to New Zealand, might be regarded as belonging to the Australian *T. media*. On present information it seems best to include unspotted flowers under the older name *T. ixioides*. Such a course would not extend the range of column-form in this species beyond what commonly occurs within large populations of some other species. Rupp (1943, p. 6) says of *T. ixioides*: "Dorsal sepal and petals usually (but not invariably) dotted with dark blue spots".

#### PTEROSTYLIS R. Br.

**Pterostylis trullifolia** Hook. f. *Fl. N.Z.* 1, 1853, 249.

From the protologue: "Radical leaves broadly ovate, cordate, triangular or the form of a trowel,  $\frac{1}{3}$  inch long, on slender petioles  $\frac{1}{2}$ –1 inch long. Scape with two or three small bracts. Perianth  $\frac{1}{2}$  inch long [=c. 13 mm]. . . . HAB. Bay of Islands, Edgerley, Colenso, etc. Auckland, Sinclair."

Lectotype: K, Colenso, New Zealand.

Synonyms: *P. trullifolia* var. *gracilis* Cheesem.; *P. rubella* Col.

Annotations to herbarium specimens show that H. Carse and various members of the Matthews family, with their unrivalled knowledge of the Auckland and especially the far northern orchids, had recognised by 1920 three distinct entities within *P. trullifolia* (*sensu lato*). Cheeseman's naming of var. *gracilis* in 1915 did not resolve the difficulties.

TABLE 1—*Pterostylis trullifolia* and Related Species.

	<i>P. trullifolia</i>	<i>P. brumalis</i>	<i>P. alobula</i>
Petiolate leaves: veins	± embossed	smooth	smooth
Uppermost leaf: at flower	below top of ovary	overtops ovary	overtops ovary
Galea: height (mm)	rarely >15	often >20	often >20
Petals: exposed margins	narrow	broad, patent	medium
Lateral sepals at junction: Side view	abruptly projecting	abruptly projecting	smoothly rounded
Front view	open U to slight W	open U to slight W	more V
Labellum: Shape	evenly tapering	evenly tapering	± linear in distal third
Tip	narrow subacute	narrow subacute	narrowly truncate
Geographical range	North Island	North Island	North and South Islands
Southernmost confirmed limit	c. lat. 41°10'S	c. lat. 37°30'S	c. lat. 41°20'S

Hatch (1949, p. 244) regarded *P. trullifolia* as a compound species of three closely related jordanons and stated: "The original description gives no indication as to which of the forms was the specific type". The three "jordanons" he discussed under the names: (a) *P. trullifolia* var. *rubella* (Col.) Hatch comb. nov. Pl. 30, fig. 1, A-D, J, K; (b) *P. trullifolia* var. *gracilis* Cheesem. Pl. 30, fig. 2; (c) *P. trullifolia* var. *alobula* Hatch var. nov. Pl. 30, fig. 3, E-H.

Differences in morphology and in geographical distribution, combined with the fact that the three remain distinct where they meet, suggest that species rank is more appropriate than varietal. (Table 1)

The primary nomenclatural problem could be solved only by the choice of a lectotype from amongst such of Hooker's syntypes of *P. trullifolia* as might be available. Specimens preserved in liquid and representative of the three taxa were sent to Kew, together with a summary illustrating contrasting characters. A firm recommendation regarding choice of lectotype was received from Mr A. S. George, Australian Liaison Officer at Kew, in a letter dated 13 Mar 1968:

"I think the problem is best solved by selecting as Lectotype a collection by Colenso, labelled simply 'New Zealand'. This sheet bears 15 specimens, more or less uniform in floral morphology, although 4 of them are past flowering. The specimens agree with the preserved specimens of *P. trullifolia* var. *gracilis* (Kaimai Range, *M. A. Curran*, 1.x.1966). The height of the galea ranges from 11–14 mm. In 13 specimens, the uppermost leaf-bract is shorter than the ovary, but in the other two it is taller. The junction of the lateral sepals is projecting, and the labellum tapers evenly.

"Hooker's own collection—Bay of Islands, No. 76—is mixed, and not all the specimens are in good condition. 5 have dead flowers, 9 represent typical *P. trullifolia*, and 2 are the var. *alobula*. In the Lindley collection there is another Hooker sheet, but this also has a specimen of var. *alobula* mixed with typical *trullifolia*. Another mixed sheet is Cheeseman, vicinity of Auckland. This is annotated 'Illustrations of the New Zealand Flora, Plate 194'. It is possible to match two of the specimens with the illustrations: one is typical *P. trullifolia*, the other var. *alobula*.

"Of the var. *alobula*, in addition to the specimens referred to above, there are four sheets at Kew. The galea ranges from 18 to 21 mm in height, but in one specimen it is only 16 mm."

DISTRIBUTION: North Island, mostly north of about lat. 38°; recorded also from Hutt Valley, Wellington. Forest floor, scrub, banks. Fl.: Jun-Oct.

#### REPRESENTATIVE SPECIMENS:

North of lat. 37°: Kaitaia, *H. B. Matthews*, Jul 1920 (CANTY 79.11.8 "large form"), Aug 1920 (CANTY 79.11.8 "small form"); Kaiaka, in forest, *H. Carse*, 15 Aug 1920 (CANTY 572/8 in Herb. Carse); Russell, in open scrub, *H. Carse*, Jul 1917 (CANTY 572/10 in Herb. Carse), 17 Aug 1921 (CANTY 572/9a in Herb. Carse); Whangarei, hilly bush, *H. Carse*, Jul 1898 (CANTY 572/11 in Herb. Carse); Kaiwaka, floor of kauri forest, *L. B. Moore*, 7 Oct 1967; Whakatiwai near Helensville, *Leonie H. Moore*, 29 Jul 1966 (fl.), 21 Nov 1966 (fr.), 7 Jun 1967 (fl.); Little Barrier I., scrub on clay hillside, *J. E. Moore*, Jul 1952; Waitakerei, ravines in high *Leptospermum*, *T. F. Cheeseman*, Aug 1900, labelled by Cheeseman "var. *gracilis*" (CANTY 79.11.8a.1); Titirangi, light bush, 200 ft, *A. D. Mead*, 26 Jul 1967; Laingholm, *E. D. Hatch*, 23 Jul 1966, 25 Jun 1967 (Fig. 3); Kennedy Bay, Coromandel Peninsula, *H. B. Matthews*, 23 Sep 1920 (CANTY s.n., 1 plant on mixed sheet).

South of lat. 37°: Mauku, *H. Carse*, Jul 1899 (CANTY 572/6 in Herb. Carse, 1 plant out of 16 on sheet); Pirongia, *R. Bell*, 19 Jul 1967; Kaimai Range, east side c. 1,000 ft. *M. A. Curran*, 1 Oct 1966; Okere Falls, Rotorua Co., *D. Hiltzman*, 1 Nov 1967 (fr.); Mangaroa Valley, east of Trentham, manuka scrub c. 500 ft, *A. P. Druce*, Aug 1961, Sep 1961.

*P. trullifolia* Hook. f. var. *gracilis* Cheesem. in *Trans. N.Z. Inst.* 47, 1915, 46. (*Illustrations N.Z. Flora t. 194B*, left-hand figure.)

From the protologue: "Taller and more slender than the type. sometimes 9 in. high. Radical leaves usually wanting in flowering specimens, and seldom more than 1 or 2 in barren plants. Cauline leaves narrower. Flowers smaller,  $\frac{1}{2}$ – $\frac{3}{4}$  in. long; lobes of the lower lip [=lateral sepals] shorter in proportion. *Hab.*—North Island: Vicinity of Auckland, Waitakerei, and Hunua Ranges, *T.F.C.*; Thames, *J. Adams!* Kaitaia, *R. H. Matthews!* I have been acquainted with this for many years. It probably has the same range as the type, with which it sometimes grows intermixed."

Lectotype: K, *Cheeseman*, vicinity of Auckland, sheet annotated "Illustrations of the New Zealand Flora, Plate 194", the specimen matching the left-hand figure of the Plate; isotypes AK 3528, sheet similarly annotated, smaller-flowered specimens only.

Amongst the figures of Pl. 194B, besides the left-hand whole plant, most or perhaps all of the dissections could be drawn from "var. *gracilis*" though no drawing shows the characteristically abruptly projecting junction of the lateral sepals. The other two figures of whole plants apparently represent the kind later named var. *alobula* by Hatch. The text accompanying Pl. 194 states: "Two well-marked varieties are commonly seen. The first, which must be regarded as the type, has a rather large flower often an inch in length, and the petiole radical leaves are usually present in flowering specimens, and frequently very numerous in barren ones, forming a conspicuous rosette. The other variety, which may be distinguished as var. *gracilis*, is taller and more slender, with a smaller flower varying from  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in length; the cauline leaves are narrower, the radical leaves are seldom present in flowering specimens, and in barren plants are fewer in number and smaller. Both varieties are figured in the accompanying plate."

It is puzzling that Cheeseman should have regarded large-flowered plants as "the type" when Hooker had quoted much smaller dimensions, citing perianth length as  $\frac{1}{2}$  in. originally and as  $\frac{3}{4}$  in. in the Handbook (1864, p. 269). Average height of galea seems to be well correlated with several other useful characters. Total height of plant and proportionate lengths of lateral sepals, on the other hand, are rarely reliable criteria; and Hatch (1949, p. 245) has pointed out that the development of the rosette in *P. trullifolia* (*sensu lato*) is in part related to the size of the tuber. In suitable places a colony may cover an area of half a square metre, the majority of plants being in the form of non-flowering rosettes, each of 3–6 petiolate leaves.

*P. rubella* Col. in *Trans. N.Z. Inst.* 18, 1886, 271. *P. trullifolia* var. *rubella* (Col.) Hatch in *Trans. R. Soc. N.Z.* 77, 1949, 244 descr. et ic. excl.

From the protologue: "3-4 inches high. Leaves 2-3 at base, cordate, 3 lines long, petioles same length; cauline bracts 4. . . . Flower . . . 6-7 lines long [=c. 12-15 mm]; . . . lateral sepals (lower lip) connate, emarginate . . . ; lip [=labellum] glabrous, dark-red, linear-lanceolate, acuminate, 4 lines long, under 1 line wide, grooved, tip thickened, obtuse . . ." *Hab.* Whangaroa, County of Mangonui; 1884: *Mr. R. W. Rowson. Obs.* A species having some affinity with *P. trullifolia*."

Lectotype: WELT 24380, in Herb. Colenso.

On the sheet numbered WELT 24380 is a newspaper packet labelled, probably in Colenso's hand, "(ex? Augt./84) *Pterostylis* \_\_\_\_\_ from Rowson, Whangaroa". Inside the packet are two small stalks from which flowers have been taken together with dissected portions including: rosette leaf; dorsal sepal; lateral sepals spread to show emarginate junction; petals; labellum and column. On another sheet, numbered WELT 24283, are two plants with flowers, accompanied by a label in Cheeseman's hand "*Pterostylis trullifolia* Hk. f. Whangaroa, Rowson. Type of *P. rubella*, Colenso". The specimens on the two sheets probably together comprise the whole of the original material. They do not differ in any material point from Colenso's protologue, and can all be placed with confidence as *P. trullifolia* (*sensu stricto*).

It is not clear why Hatch chose to place under this name, as *P. trullifolia* var. *rubella*, plants with flowers up to 3 cm tall, when his figures show that he was aware of the characteristic differences in flower size in the varieties he recognised.

### ***Pterostylis brumalis* L. B. Moore sp. nov.**

(Fig. 3)

Caulis gracilis laevis saepe rubellus. Folia rosulata longe petiolata late ovato-cordata. Folia caulina plerumque lineari-elliptica sessilia, inferiora interdum rosulatis similia plus minusve petiolata, supremum ovarium superans. Flos solitarius. Perianthium basi erectum dein plus minusve horizontale, galeae altitudino interdum 2 cm excedens. Sepala lateralia apice longe filiformia connata in labium inferius erectum late emarginatum abrupte prominens. Petala sepalum dorsale plus minusve aequantes apicem versus late explanata. Labellum lineari-triangularum subacutum, columnam excedens. Stigma ellipticum prominulum.

TYPUS: CHR 177314, Laingholm near Auckland, *E. D. Hatch* 20.6.1966, determined by Hatch as *P. trullifolia* var. *rubella* (Col.) Hatch.

The specific epithet is chosen because these plants flower through the winter (*brumalis*, wintery, from *bruma*, the shortest day or winter solstice).

Plant to c. 20 cm tall. Stem slender, smooth, often reddish, internodes usually rather shorter than leaves. Petiolate leaves commonly

but not invariably absent from flowering stem, forming separate rosettes; lamina c. 5–12×5–12 mm, ovate-orbicular, surface not strongly marked by veins; petiole well defined, sometimes longer than lamina. Cauline leaves several, for the most part sessile, the lowest one or two occasionally more or less like the rosette leaves; lamina c. 1.5–4 cm×2–7 mm, linear-lanceolate to narrow-elliptic, the uppermost usually overtopping the ovary but rarely reaching the height of the galea. Flower usually solitary, erect. Dorsal sepal c. 1.5–2–(3) cm tall, the tip acuminate and usually more or less down-curved; lateral sepals diverging at a wide angle forming an open U or broad W shape from front view, this region abruptly prominent in side view, tips long-caudate-filiform and much overtopping galea. Petals almost as long as dorsal sepal, a broad, more or less horizontal marginal strip exposed making the width of the whole galea at the top 7–10 mm. Labellum narrow-triangular, arcuate, apex subacute. Column shorter than labellum; stigma elliptic, slightly prominent.

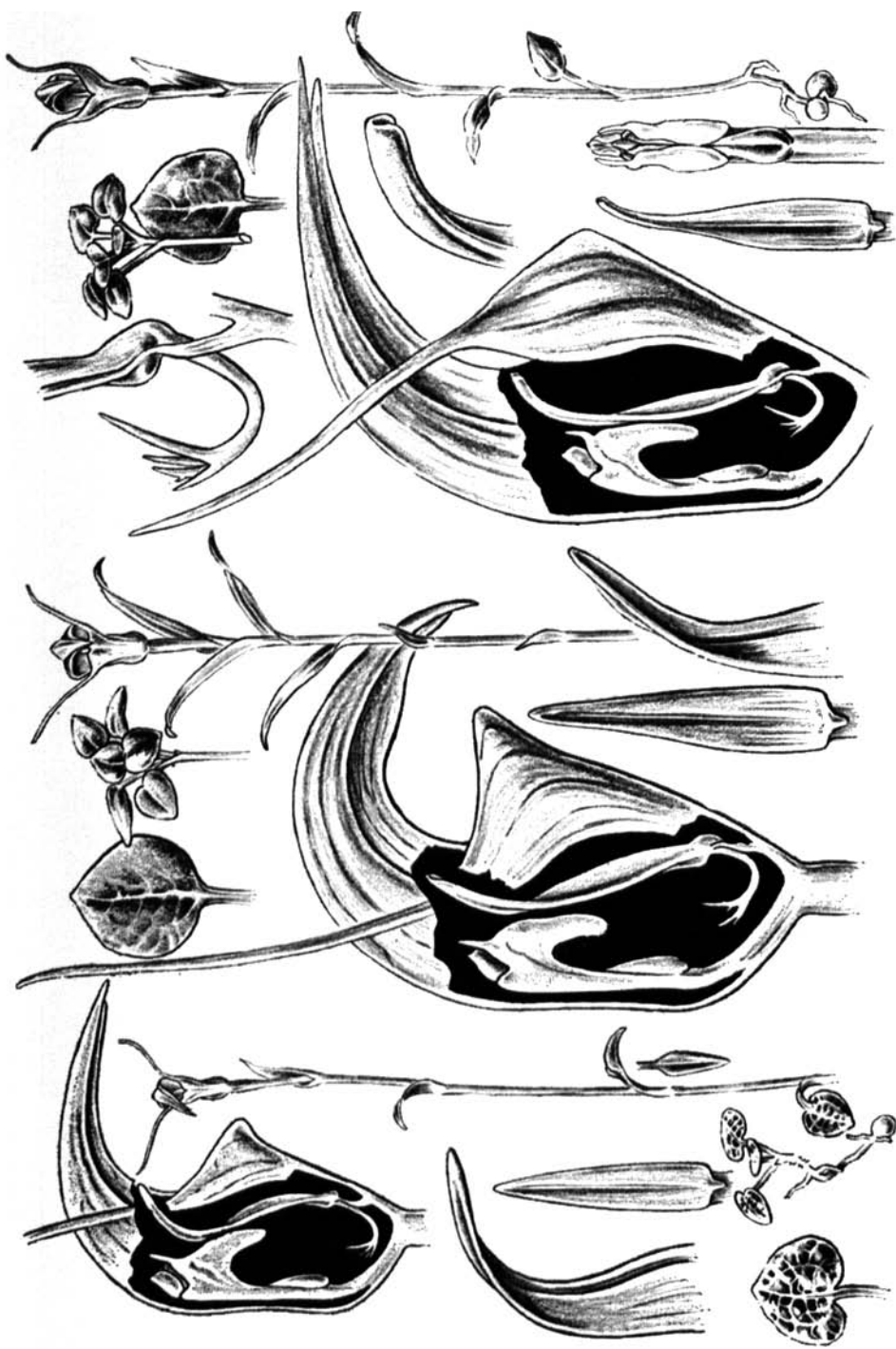
**DISTRIBUTION:** North Island, probably extending little south of Auckland City. Forest, scrub and open mossy places. Fl.: Apr-Aug. Hatch (1949, p. 244) lists "Lake Tutira, *H. Guthrie Smith*; Hutt Valley, 6.1946, *J. A. Healy*; Foxton, 6.1945, *Wgtn. Bot. Soc.*"; these more southerly records have not been confirmed though the Wellington district at least has been fairly intensively combed for orchids in recent years.

**REPRESENTATIVE SPECIMENS:**

Laingholm, *E. D. Hatch*, 23 May 1965, 25 Jun 1967 (Fig. 3); Waitakere Range, *R. Mason*, Apr 1933; Piha Valley, *A. D. Mead*, 18 Jul 1967; Kauri Bush, Birkdale, *H. B. Matthews*, 28 Jul 1920 (CANTY 79.11); Mauku, *H. Carse*, Jul 1899 (CANTY 572/6 in Herb. Carse, 2 plants out of 16 on sheet).

These plants were described by Hatch (1949, p. 244, Pl. 30, fig. 1, A-D, J, K) under the name *P. trullifolia* var. *rubella* (Col.) Hatch. They differ from *P. trullifolia* Hook. f. and *P. rubella* Col. (the latter name being an equivalent synonym of the former) in that the cauline leaves are in general longer and proportionately broader, the uppermost one usually considerably overtopping the ovary, and the rosette leaves lack a rugose vein pattern; the flower, besides being rather consistently larger, has a much broader galea with widely exposed petal margins. Flowering times overlap but *P. trullifolia* continues to flower later into the spring. The lateral sepals, projecting forwards at their U to widely W shaped junction, resemble those of *P. trullifolia*; in this feature and in general habit *P. brumalis* has much in common with *P. obtusa* R. Br. of eastern and southern Australia, but that species has a relatively shorter and notably broader and blunter labellum.

***Pterostylis alobula*** (Hatch) L. B. Moore comb. nov. *P. trullifolia* Hook. f. var. *alobula* E. D. Hatch in *Trans. R. Soc. N.Z.* 77, 1949, 244, Pl. 30, fig. 3, E-H.  
(Fig. 3)



— *P. trullifolia* — *Pterostylis brumalis* — *P. lobula*

FIG. 3.—PTEROSTYLIS. Left, *P. trullifolia* Hook f. from Laingholm; centre, *P. brumalis* L. B. Moore from Laingholm; right, *P. lobula* (Hatch) L. B. Moore from Wellington. For each species: a flowering stem, a non-flowering rosette and one of its leaves, a flower with part of one side cut away to display labellum and column, labellum and its tip; for *P. lobula* only: base of labellum and its appendage, front view of column. Comparable structures are drawn on the same scale. Drawn by J. B. Irwin.



Hatch's diagnosis and description read: "*Pt. trullifolia rubella affinis, subsimilis. Differentis in sinus sepalium lateralium acutus, nulla loba.* Habit and size of var. *rubella*. Flower darker green, rather erect. Sinus of the lateral sepals acute, *without* a central lobe. Labellum narrower, with a slightly swollen, truncate or even crenulate tip."

Holotype: AK 24608, Laingholm, *E. D. Hatch* No. 566, 7/1945.

As already pointed out, Hatch used the epithet *rubella* not for plants matching the type of *P. rubella* Col. but for those now named *P. brumalis*, and it is with *P. brumalis* that he compares and contrasts his var. *alobula*. The following amplified description is based on the holotype of var. *alobula* and plants considered to be conspecific with it, and is not seriously at variance with Hatch's figures.

Caulis gracilis laevis plerumque viridis. Folia rosulata longe petiolata late ovato-cordata. Folia caulina plerumque linearia vel lineari-elliptica sessilia, inferiora interdum rosulatis similia plus minusve petiolata nonnulla interdum trulliformia, supremum ovarium plerumque superans. Flos solitarius. Perianthium basi erectum dein plus minusve horizontale, galeae altitudino interdum 2 cm excedens. Sepala lateralialia apice longe filiformia connata in labium inferius erectum sinu acuto curvatum neque abrupte prominens. Petala sepalum dorsale plus minusve aequantes apicem versus mediocriter explanata. Labellum ad medium usque latius dein angustius fere lineare apice truncatum marginibus revolutis, columnam excedens. Stigma ellipticum prominulum.

Plant to c. 15 cm tall, often less. Stem slender, smooth, usually green but sometimes reddish, internodes rarely longer than leaves. Petiolate leaves in separate rosettes or more or less spaced on lower part of flowering stem; lamina c. 5–15 mm long, orbicular-cordate to broad-ovate to trulliform, surface not usually rugose with raised veins; petiole well defined in rosette, merging gradually into lamina in lower stem-leaves. Upper or all cauline leaves sessile; lamina c. 5–25 × 3–6 mm, linear- to narrow-lanceolate to narrow-elliptic, the uppermost usually slightly overtopping the ovary. Flower usually solitary, erect. Dorsal sepal c. 1.5–2.5 cm tall, the tip acuminate and usually more or less horizontal; lateral sepals diverging at such an angle as to form a wide V shape from front view, this region in side view smoothly rounded and not jutting sharply forward, the tips long-caudate-filiform and much overtopping galea. Petals almost as long as dorsal sepal, the exposed marginal strip of medium width, often nearly horizontal. Labellum arcuate, narrowing gradually and concave from base to about mid-length, then contracting in width more abruptly and the margins recurving so that the distal third is linear in outline and deeply channelled beneath, the narrow apex truncate. Column shorter than labellum; stigma elliptic, slightly prominent.

DISTRIBUTION: North Island. Many records from north of about lat. 38°, also from Wanganui, Manawatu and Wairarapa southwards in the Wellington district. South Island. Scattered lowland localities in Nelson and Marlborough. Forest, scrub and open mossy places. Fl.: Apr–Oct.

## REPRESENTATIVE SPECIMENS:

Auckland district: Kopu Okai, Mangonui Co., in bush, *H. Carse*, 31 Aug 1902 (CANTY 572/1 in Herb. Carse; 1 plant has 2 flowers); Kaiaka, Mangonui Co., in open forest. *H. Carse*, 3 Aug 1902; Kerikeri, Bay of Islands, *J. R. Don*, Oct 1966; Aponga, Whangarei, *A. Thomson*, Jul 1899 (CANTY 572/2 in Herb. Carse); Kaipara Flats, shaded forest floor, *L. B. Moore*, 3 Oct 1967; Whakatiwai near Helensville, *Leonie H. Moore*, 7 Jun 1967; Woodhill, Waitemata Co., in small wood, sand dunes, *H. Carse and H. B. Matthews*, 12 Jul 1921 (CANTY 572/5 in Herb. Carse); Little Barrier I., scrub on clay hillside, *J. E. Moore*, Jul 1952; Laingholm, *E. D. Hutch*, 3 Jul 1965; Birkdale near Auckland, *D. Petrie*, 4 Sep 1920; Kauri Gully, Northcote, Auckland, *H. B. Matthews and H. Carse*, 23 Jun 1921 (CANTY 572/3 in Herb. Carse); Mauku, *H. Carse*, Jul 1899 (CANTY 572/6 in Herb. Carse, 13 plants out of 16 on sheet).

Wellington district: Levin, sand-dune forest, *H. H. Allan*, 17 Jun 1945; E. Wairarapa near Tinui, damp manuka scrub c. 2,000 ft, *D. Wellman*, 3 Sep 1966; Taita, Hutt Valley, scrub, *A. P. Druce*, May 1965; York Bay, Wellington, outskirts of beech forest, 800 ft, *E. H. Atkinson*, 27 Jul 1921; Muritai Park, Wellington, *I. M. Morice*, 24 Jul 1966 (Fig. 3).

South Island: Cloudy Bay near Rarangi, *J. A. Hay*, 14 May 1951; Mt Piripiri, Picton, banks in *Nothofagus* forest, *A. J. Healy*, 21 May 1943; Black Rock, Kenepuru, Marlborough, *J. H. McMahon*, Jul 1936 (CANTY 572/12 in Herb. Carse); Hackett Valley, Nelson, second-growth forest, *G. W. Ramsay*, 20 Apr 1966; Between Collingwood and Pakawau, sandspit under *Podocarpus totara*, *M. J. A. Simpson*, 25 Oct 1965 (fr.).

This is the plant figured in somewhat stylised fashion by Cheeseman (1873, Pl. 20) to illustrate the pollination mechanism of *Pterostylis*, and it probably also corresponds to the right-hand figures of his Pl. 194B (Cheeseman, 1914). The very different labellum separates this species immediately from both *P. trullifolia* (*sensu stricto*) and *P. brumalis*, and the profile of the flower in the region of the junction of the lateral sepals is much more rounded. In size the flowers are similar to those of *P. brumalis* and, like *P. brumalis*, *P. alobula* flowers through the winter, but it resembles *P. trullifolia* in continuing to flower well into the spring.

Amongst Australian species the nearest seems to be *P. alata* (Labill.) Reichb. f., based on *Disperis alata* Labill. *Nov. Holl. Pl. Sp.* 2, 1806, 59, t. 210 "Habitat in Capite Van-Diemen". According to Nicholls (1958, Pl. 93) the type is in Florence and was collected by Labillardière at Recherche Bay, Tasmania, in April 1792. Labillardière's protologue gives no hint of petiolate leaves (very often present towards the base of flowering stems in *P. alobula*); long filiform caudae of lateral sepals are not mentioned and in the figures the tips do not stand very high above the galea. The dorsal sepal, described as subulate, is depicted as long-acuminate. The labellum, said to be ovate-lanceolate, is not very clearly illustrated and the column, which is scarcely as long, bears a cordiform stigma.

Two names usually listed as synonyms of *P. alata* might also be considered. *P. praecox* Lindl. *Gen. Sp. orch. Pl.* 1840, 388, "Habitat in Tasmania in saxetis siccis, Julio florens, Gunn 751", is described as having a scaberulous stem, leaves all ovate-lanceolate

acuminate ("foliis omnibus conformibus"), the lateral sepals erect, filiform-acuminate and little longer than the acute dorsal sepal, the lamina of the labellum linear-lanceolate.

*P. striata* Fitzg. *Austr. Orchids* 1, 3, 1877, t. 5 was "found near Yass [N.S.W.] and flowers in May". It has a labellum described as "linear lanceolate, acute, concave for two-thirds of its length, channelled along the centre, remaining pointed portion bent slightly back, not extending above the anther"; figures of the labellum show margins evenly tapering inwards through its length without the characteristically narrow linear appearance of the distal part or the truncate tip of *P. alobula*. "When the plant is not in flower the leaves are rosulate, shortly petio<sup>l</sup>ate, ovate, oblong, obtuse", and the figure shows undulate margins.

Nicholls (1958, Pl. 93) figures the labellum of *P. alata* with a broad, longitudinally ridged lower part contracting suddenly into a narrow linear distal half, the whole barely as tall as the column; no petiolate leaves are shown on flowering stems from Tasmania and Victoria, and those forming the separate rosette are shown with undulate margins and acute to acuminate tips not closely resembling the New Zealand plants.

#### LILIACEAE

#### XERONEMA Brong. et Gris

**Xeronema callistemon** W. R. B. Oliver in *Trans. N.Z. Inst.* 56, 1926, 1.

Var. **callistemon**. From the protologue: "Bracteae scariosae, acutae, 1 cm long. Pedicelli patentes, 2 cm long. . . . Bracts scariosus, acute, 1-nerved, 1 cm long. Pedicels erect, dark red, 2 cm long. . . . *Xeronema Callistemon* is known only from the Poor Knights Islets, off the north-east coast of New Zealand".

Lectotype: WELT 40683 "Poor Knights Is. Dec. 1924".

Var. **bracteosa** L. B. Moore var. nov. Bracteae foliosae, ante anthesin virides, pedicellis longiores.

TYPUS: CHR 50094 A, from plant cultivated in Whangarei, K. Pickmere, 11 Nov 1943. fig. 4A in *Pacif. Sci.* 11, 1957, 359.

Floral bracts leaf-like in texture, green at least until anthesis, longer than the pedicels.

The two varieties both grow on the Poor Knights Islands and transplants from there have been kept under observation in Whangarei by the Pickmere family for 30 years. The difference is most striking in the young inflorescences which in var. *callistemon* become red very early while in var. *bracteosa* they remain green until the flower-buds emerge. Var. *bracteosa* is said to be the more plentiful on the islands.

The two kinds of inflorescence were discussed by Moore (1957, p. 361) without formal division of the species into varieties.

Plants of the only other species of the genus, *X. moorei* from New Caledonia, have flowered at Lincoln, all floral bracts being scarious, and reddish like the rest of the inflorescence.

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