Identity of *Pterostylis valida* (Orchidaceae)

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Abstract

Nicholls named *Pterostylis valida* in 1941 as a variety of *P. squamata* R.Br. 1810 with a brief and basic description. There were no further records of this taxon from the type-locality region, until it was rediscoved about 1.5 km from the exact collection site in 2013 (Kuiter, 2016a). The species is a member of the large-flowered rustyhood group, comprising undetermined similar taxa and many localised forms. The basic description with simple drawings led to misidentifications and a clarification to the identity of the true species is presented here with images.

Pterostylis valida

Type-locality is Pigeon Hill and not the previously stated Mt. Tarrengower near Maldon. Pigeon Hill is a granite outcrop on private property, about 5 km away with its summit at 400 m altitude. It was grazed over for many years, but the upper rugged granite rock habitat may have surviving populations. Plants of *Pterostylis valida* where found on the next hill, only 1.5 km between the peaks, in identical habitat amongst large granite boulders and on adjacent north-facing rocky grass slopes in red-brown soils. Flowering time of October-November is consistent with the original collection. Type-form of this taxon appears to be restricted to the Maldon hills region.

This taxon is a member of the rustyhood group with large flowers and a sturdy stem, thickened by long enveloping bracts. Nicholls illustrated this accurately and his description also verified the identity of the many plants seen adjacent to the exact type-locality. The given height, "circa 14 cm", of his 2 specimens is for partly-flowering plants. The flowers were drawn as if being fresh, but it appears the labellum had changed shape from fluid-loss, which would drain quickly after collection. The short basal-setae over the upper margin and the long pair, projecting from the dark-coloured swellings, were not drawn. Lateral setae seem to be directed too much forward, which also suggests drying and narrowing.

The green plants are very cryptic and the basal rosette usually withers away once it begins to flower. Flowers look large on the typically short plants and usually are crowded towards the top. Synsepalum is cup shaped and filamentous tips are about 2 cm long. A set labellum is usually only just visible when viewed from the side. The back of the synsepalum has numerous setae to store fluids and function as a buffer during dry periods. They variably expand and become more numerous during the wet conditions, which is usually evident after rain (Fig. **1**).

Fig. 1 A typical flower at the type-locality, green with the usual stripes on the transparent parts of the hood, cup-shaped synsepalum and dark labellum swellings.

Opposite page

Image of the original 1941 description page by Nicholls of *Pterostylis valida* as a variety of *P. squamata*. It was cropped with the deletion of the description of *Caladenia hastata,* the other species.

TWO NEW VARIETIES OF ORCHIDS

By W. H. NICHOLLS, Melbourne

(1) *Pterostylis squamata*, R.Br., variety *valida*, n. var. *Planta robusta, circa 14 cm. alta, omnino viridis. Flores magni similes Pt. rufa*, R.Br. *Sepala longa haud-adunca. Circiter 2 cm. longa.*

A robust plant about 14 cm. high, wholly green. Flowers large, similar in general appearance to those of *Pt. rufa*, R.Br. Sepal points longer and not hooked inwards as in the typical form of *Pt. squamata*, R.Br., the points about 2 cm. long.

Habitat: Mt. Tarrengower, Maldon (Victoria). Collector: Mrs. J. von Bibra—23/10/1941.

Specimens received at the National Herbarium were found growing in small pockets of soil on a large granite boulder on Mrs. John Somer's property, Pigeon Hill, three miles from Maldon.

This sturdy form is figured by R. D. Fitzgerald in his monumental work "Australian Orchids" (Vol. 1, Pt. 6). It is, apparently, rarely met with, though probably it may have been mistaken, as my specimen was, for *Pt. rufa*, R.Br. (see figures).

Fig. 2 Selected parts of the original drawing of *Pterostylis valida*, which was provided with the description (reproduced above).

Fig. 3 Typical plant at the type-locality at about 16 cm in height, which is slightly taller, but comparable to the drawing of the type-specimen shown in Fig. 2.

Confusing species

Much confusion persists in the large-flower group of rustyhoods in the northwest of Victoria. Since colonisation nearly all habitats were destroyed and only small isolated pockets remain. Consequently many taxa are localised and regarded as complexes of undetermined taxonomic levels, with some going under different scientific names. Plants usually have a thin stem with spaced small bracts, often growing tall (Fig, **5**). Many forms occur in South Australia and the taxa are shown in Bates (2012), including the type-form of *Pterostylis biseta*, a name often used in Victoria. Most of the Victorian members are shown in Kuiter (2016a). The *P. valida*-name has been used for some of the *P.* aff. *biseta* forms based on flower similarities, including an undetermined taxon from Nardoo and Mt Korong (Fig. **6**). It grows taller and has a slender stem with spaced short 'squamata' bracts. Flowers differ in the shallower cupped synsepalum with much longer filamentous tips, and the labellum-shape is close to *P. basaltica* and some *P. biseta* forms at Broken Bucket (Fig. **7**). The Mt Korong taxon shares flower characteristics with both, *P. valida* and *P.* aff. *biseta*. Similar forms were found near Hopetoun, but plants were taller and stems even more slender. The taxonomic status of different forms in the western part of the state has been looked at by many experts over the years, without showing much progress – an indication of the difficulties when working on isolated populations in the surviving habitats missed by land clearing and mining, that are scattered over a vast area.

Pollinators

Pollinators of species-specific orchids may be used in taxonomy to distinguish similar species, but this requires a good knowledge of both the orchids and insects (Kuiter, 2016b). Distinct orchid taxa of some genera (e.g. *Cryptostylis*) attract the same species of pollinator, showing a close relationship, but they evolved in sympatry. Historically allopatric taxa that attract the same species, but became sympatric from habitat alterations readily hybridise. The allopatric taxa *Pterostylis basaltica, P. biseta, P. cheraphila, P. maxima, P. valida* all have the exact same male fungus-gnat pollinator *Orfelia* sp 1 (Kuiter, 2016b), but are geographically well separated. This vector was found widespread west of Melbourne and inland from the Great Dividing Range. It probably is the pollinator for *P. hamata* in the north-east, but no seed pods were found and no pollinators were seen. In the same region the sibling *P. boormanii* has *Orfelia* sp 2 as its vector. Large-flowered rustyhoods are not known from the eastern side of the divide in Victoria, where the small-flowered rustyhoods occur, and their vector is the much smaller *Orfelia* sp 3, matching labella size, which is widespread in Victorian coastal to highland regions.

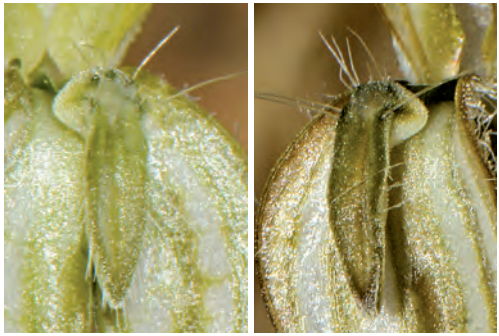
Fig. 4 *Pterostylis basaltica* is a localised taxon from the Woorndoo region and a close relative of *P. valida*. Plants are less robust and reach about 30 cm in height. Flowers differ in labellum features, narrower in shape, with long basal setae, long synsepalum tips, and the clear petal sections usually with a single line and dark outer margin. Only because of different localities the species are not confused and this is also the case with several other localised named taxa.

Fig. 5 *Pterostylis* aff. *biseta* forms. Most 'biseta' plants have a slender stem with well spaced bracts, and some plants reaching a height of about 40 cm.
Left Photographed near Hopetoun. Plant colonies comprised close groups that were growing out in the open. They averaged about 35 cm in height.
Right Photographed at Broken Bucket in shrubs. It represents the typical plant form there, usually with two flowers and heights up to about 30 cm.

Fig. 6 The taxon at Mt Korong is one of the *Pterostylis biseta* group with the typical long filamentous synsepalum tips and the slender stem, but has slightly larger bracts and labellum with long basal setae on the hump.

Fig. 7 Close-ups of labella of the various taxa commonly confused or status unresolved.

A Labella of *Pterostylis valida* from Maldon.



B Labella of *Pterostylis* aff *valida*. from Mt Korong.

C Labella vatiation of *Pterostylis* aff. *biseta* in a single population from Broken Bucket.

In sharing the same or sibling pollinators it would indicate that the large-flowered rustyhoods are closely related, but to what level? Lack of different diagnostic characters suggest synonymy between some of the taxa. Molecular testing may help in determining taxonomic levels in the vector-sharing *Pterostylis basaltica, P. biseta, P. cheraphila, P. maxima, P. planulata* and *P. valida*.

Labella

Labella shapes vary with age, habitat or by location and conditions, especially during wet or dry spells. The *Pterostylis valida* labellum is distinct in shape when fresh and usually lacks long setae on the basal margin. In the drawings by Nicholls the labellum doesn't reflect a fresh one, and it was probably in a drying state, effecting shape and setae.

Fig. **7, A–C** show labella similarities and differences between the various taxa, and also the variability in a single population. The taxon from Mt Korong has obvious and long basal setae, and the broad low part of the basal section is shaped like a member of the *Pterostylis* aff. *biseta* group, as shown in **B** and **C**. Labella shapes or setae arrangements can be used in general to distinguish rustyhood members, but they are of limited use to identify sibling taxa. Seemingly diagnostic characters are shared between many taxa and in large populations much variation in labella shapes and setae were noted of sibling *P. basaltica, P. cheraphila* and *P. maxima*. Taxa differences may be more obvious in plant habit, and a good example is the short-stem *P. despectans*, which has flowers like a member of the *P.* aff. *biseta* group.

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