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Two new species of *Genoplesium* R.Br. *sensu lato* (Orchidaceae: Prasophyllinae) from the Central Coast of New South Wales

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Abstract

We describe two new species of Prasophyllinae from New South Wales, in the genus *Genoplesium* R.Br. following the generic classification currently in use at the National Herbarium of New South Wales. One of these new species, *Genoplesium branwhiteorum* M.A.M.Renner & P.H.Weston, which we name for the Branwhite family, has been known for nearly a decade under the informal name *Corunastylis* sp. Charmhaven (NSW896673). The other new species, *G. geminatum* M.A.M.Renner & Towle has been confused with both *G. rufum* (R.Br.) D.L.Jones & M.A.Clem. and *G. trifidum* (Rupp) M.A.M.Renner, although it is more similar to *G. mucronatum* (Rupp) M.A.M.Renner and *G. tasmanicum* D.L.Jones, and possesses a combination of features of consistent expression supporting its recognition as a new species. Three new combinations are made. *Genoplesium cuspidatum* (D.L.Jones & L.M.Copel.) M.A.M.Renner, comb. nov. is based on *Corunastylis cuspidata* D.L.Jones & L.M.Copel., *Genoplesium laminatum* (Fitzg.) M.A.M.Renner, is based on *Prasophyllum laminatum* Fitzg. and *Genoplesium mucronatum* (Rupp) M.A.M.Renner is based on *Prasophyllum mucronatum* Rupp. [listed as a synonym of *G. rufum* in PlantNet].

Introduction

Australian orchid taxonomy presents an unusual, but perhaps not unique, situation wherein multiple competing classifications, at both species level and above, are applied simultaneously within a single country and even within single states and territories. This situation is the result of a very human tension between an enthusiasm for the rapid adoption of new insights into diversity and relationships borne of novel morphological and molecular data on the one hand; and a reluctance to make changes in the absence of complete knowledge on the other. To be fair, the extremes of both perspectives are equally unworkable. We may be misled by, or misinterpret, empirical data and so adopt new classifications that do not reflect real world diversity or history. But refusing to acknowledge novel data results in the same outcome, which is to persist with classifications that do not reflect real world diversity. The scientific method provisions us with inferential tools that allow us to further our knowledge of the world, through an observational approach to testing our understanding.

Taxonomy falls within the purview of scientific inference because the names we use, at both species level and above, are formal placeholders for hypotheses of relationship, though the relationships among individuals and among species are of a different kind. These hypotheses, and by proxy their associated names, can be tested against agreed criteria associated with how well they reflect reality. The replication and scrutiny of those tests are integral to the scientific endeavour.

One of the lineages in which a consensus within Australia regarding generic circumscription has not yet been reached is the orchid tribe Prasophyllinae, comprising the named genera *Prasophyllum* R.Br.*, Genoplesium* R.Br.*, Paraprasophyllum* M.A.Clem. & D.L.Jones*, Mecopodum* D.L.Jones, *Cheiroteris* D.L.Jones, and *Corunastylis* Fitzg. At least four of these genera are widely used by orchid enthusiasts in New South Wales and across Australia (e.g. Jones 2021; Copeland & Backhouse 2022). However, only two genera, *Prasophyllum* and *Genoplesium*, are currently accepted by the National Herbarium of New South Wales, for reasons outlined below.

The first study suggesting that revision to the circumscription of *Genoplesium* was required was Clements e*t al.* (2002) who resolved *Prasophyllum australe* R.Br. as nested among three species of *Genoplesium*, *G. baueri* R.Br., *G. apostasioides* (Fitzg.) D.L.Jones & M.A.Clem., and *G. rufum* (R.Br.) D.L.Jones & M.A.Clem.*,* but this relationship was unsupported. In this analysis the terminal branch leading to *G. baueri* was associated with the highest number of substitutions (116) of any in the tree. This may have been associated with alignment of the two spacer regions within the ribosomal RNA cistron (comprising partial sequences of 18S and 26S and full sequence of 5.8S, separated by internally transcribed spacers, ITS 1 and 2), for which satisfactory alignment across the Prasophyllinae is difficult to achieve (M.A.M. Renner *pers. obs.*). Inspection of an algorithmically aligned and manually edited matrix based on the sequences analysed by Clements *et al.* (2002) reveals, within the coding regions of the rRNA cistron, six unambiguous sites grouping *G. apostasioides* and *G. rufum;* two sites that unambiguously group *G. baueri* and *P. australe;* and four that group *G. baueri* with the other two *Genoplesium* (*Corunastylis*) species, suggesting that the majority of signal for the sister relationship between *G. baueri* and *P. australe* may reside in the equivocally aligned spacer regions.

The most recent changes to generic circumscription within the Prasophyllinae (Clements and Jones 2019) were based on a sample of 54 species representing all 6 recognised genera, from which nrITS sequence data were again obtained. This sampling is comprehensive, and some unexpected relationships were detected, including the nesting of *Mecopodum striatum* (R.Br.) D.L.Jones & M.A.Clem. among *Corunastylis* species, and the resolution of two lineages of *Prasophyllum sens. strict.*, for one of which the new genus *Paraprasophyllum* was proposed. It is not known what effect the alignment of these regions has on resolution of relationships among species within the Prasophyllinae as a whole, because the data underpinning the analyses presented by Clements and Jones (2019), and supporting the recognition of *Paraprasophyllum* among other insights, has not been published, contrary to standard practice. The widely acknowledged issues associated with equating nrITS gene trees and species trees were reviewed by Alvarez and Wendel (2003) and include, paralogy, reticulation, and incomplete lineage sorting, in addition to the standard challenges of homologising sites within indel-rich regions, which make this marker generally unsuitable for the inference of phylogenetic relationships when used alone. Assessing the quality of relationships inferred from the nrITS cistron is complicated by the absence of published data supporting published inferences, which is a decoupling of interpretation from evidence uncharacteristic of most biological sciences. The reasons why the National Herbarium of New South Wales has not adopted the revised generic circumscriptions proposed for the Prasophyllinae include the acknowledged issues associated with inferring species trees from the nrITS cistron alone and the non-trivial challenges associated with aligning nrITS1 and nrITS2 spacer regions across Diuridae, and even within the Prasophyllinae, associated with the risk that suboptimal alignment generates misleading phylogenetic signal. The National Herbarium of New South Wales continues to apply the generic concepts of Clements and Jones (1989) until the relationships of *Genoplesium baueri* have been fully resolved, and independently verified, with independent verification ideally coming from multiple low-copy nuclear loci.

It is encouraging that contemporary research into Australian orchid diversity is coupled with next generation sequencing technologies and sophisticated analyses of molecular and morphological variation (e.g. Nargar *et al.* 2018), which therefore presents an empirically rich platform for hypothesis-driven advances to our understanding of diversity within this family.

This paper is about the proposal of two new species of orchid from New South Wales, rather than generic circumscription. One of these new species has been known for nearly a decade under the informal name *Genoplesium* sp. Charmhaven (NSW896673) (also known as *Corunastylis* sp. Charmhaven). *Genoplesium* sp. Charmhaven (NSW896673) was first discovered in 2012 in the Central Coast region, and was immediately recognised as distinct. The other has either been recognised as a member of the *Genoplesium rufum* complex,

or confused with *G. trifidum*, but has not been formally or informally described. We describe both new species in the genus *Genoplesium* following the National Herbarium of New South Wales' position on generic circumscription within the Prasophyllinae, articulated in part above, while we await published evidence mandating the adoption of an alternative generic classification.

Taxonomic treatment

Genoplesium branwhiteorum M.A.M.Renner & P.H.Weston, sp. nov.

Type: Australia, New South Wales, Central Coast, Charmhaven, precise locality withheld, 18 February 2012, *R.J. Payne s.n.* (holo: NSW896673).

Corunastylis sp. Charmhaven (NSW896673), NSW Herbarium, PlantNet [https://plantnet.rbgsyd.nsw.gov.au/, accessed 3 Aug. 2022].

Genoplesium sp. Charmhaven (NSW896673), Herbarium, PlantNet [https://plantnet.rbgsyd.nsw.gov.au/, accessed 3 Aug. 2022].

Diagnosis: *Genoplesium branwhiteorum* is similar to *G. archeri* (Hook.f.) D.L.Jones & M.A.Clem., *G. sagittiferum* (Rupp) D.L.Jones & M.A.Clem. and *G. stephensonii* (D.L.Jones) J.M.H.Shaw in its green and cream flowers with prominent purple markings; the labellum with ciliate margins but the other tepal margins entire or nearly so, but is distinct in the sparse short cilia on the petal margins, the flowers around 6 mm wide with a column 2.2–3.3 mm tall with a fairly conspicuous column foot 0.5 mm long, and the broad triangular lower column wing lobe.

Etymology: Named after the Branwhite family, whose members have contributed to the understanding of many orchid species across New South Wales and, in particular, within the Central Coast region.

Terrestrial tuberous herb. Leaf to 19.5 cm long, 1.8 mm wide, slender, terete, mid green; free lamina c. 16 mm long (measured from base of terete part; 25 mm from tip to base of slit), 1.4 mm wide, linear-lanceolate, sheathing the scape, ending c. 8 mm above base of the first flower. Inflorescence length exposed outside of leaf to 40 mm long, bearing 3–15 closely spaced flowers on a peduncle 6–12 mm long above the leaf; flowers opening in sequence from the base; flowers sessile. Ovary ellipsoidal, curved, 2.5–3.8 mm long, nearly straight on abaxial margin, and curved on the adaxial margin, lengthening with age, slightly longer at maturity. Flowers porrect, c. 8.5 mm long between tip of dorsal sepal and tips of lateral sepals, 6 mm wide between tips of lateral petals; green and cream with deep maroon markings. Dorsal sepal 4.0–4.5 mm long by 2.0–2.1 mm wide, ovate, cucullate, glabrous, greenish cream, with 3 maroon veins and maroon margins. Lateral sepals 5.0–5.5 mm long, 1.3–1.4 mm wide, narrow-ovate, bent abaxially c. 1 mm above base through 45–100°, erect to ascending, slightly to prominently divergent, distally involute, thick-textured, pale at base, then maroon and maroon with green in outer 1/2–2/3, glabrous, apex obtuse, without a gland. Lateral petals 3.2–3.7 mm long, 1.0–1.2 mm wide, narrow-ovate, acute or shortly acuminate, apex without a gland, divergent, cream with 3 maroon veins and maroon margins, with entire or with very sparsely ciliate margins, with as few as 1 or 2 cilia on the margin; cilia mostly less than 0.1 mm long. Labellum 3.0–3.5 mm long, 1.5 mm wide, broadly oblong-ovate to slightly obovate, rounded distally, with recurved, mucronate apex, maroon, in upper two thirds, pale in the basal third, but with maroon marginal and medial markings, narrowed in proximal 2/3, thick and fleshy, the margins densely ciliate, cilia varying in length from < 0.1 mm long to 1.0 mm long, flexuous and often entangled; callus defined by its intense maroon pigmentation in the outer half, slightly elevated profile above the surrounding lamina, and the smaller projecting cells on its surface, extending almost to labellum apex, ligulate from a broad base which encompasses nearly the whole labellum width, channelled for basal 2/3 of its length, thickest in the basal half. Column 2.2–3.3 mm long, erect, with two prominent basal callosities; column foot present c. 0.5 mm long, projected forwards, curved upwards. Column wings shallowly divided to 1/5–1/6 the wing length by a narrow sinus with acute vertex into two lobes, upper triangular to triangular oblong, lower narrow triangular, each with an acute apex; the lower lobe finely papillate on its surface and margin papillae longer toward the apex of the lobe, and there mixed with cilia; upper lobe pale, lower lobe maroon. Anther 1.0 mm long, truncate. Stigma broad-elliptical, 0.8 mm long, 0.7 mm wide, tapering to a free, forward projecting truncate protrusion beneath the anther, surface uneven but not papillate. Pollinarium 1.0 mm long; pollinia 0.45 mm long, yellow, granular; hamulus 0.45 mm long; viscidium 0.3 mm wide. (Figures 1–4)

Fig. 1. *Genoplesium branwhiteorum* inflorescence from a plant at Lake Macquarie, not vouchered, photo by Brian Towle.

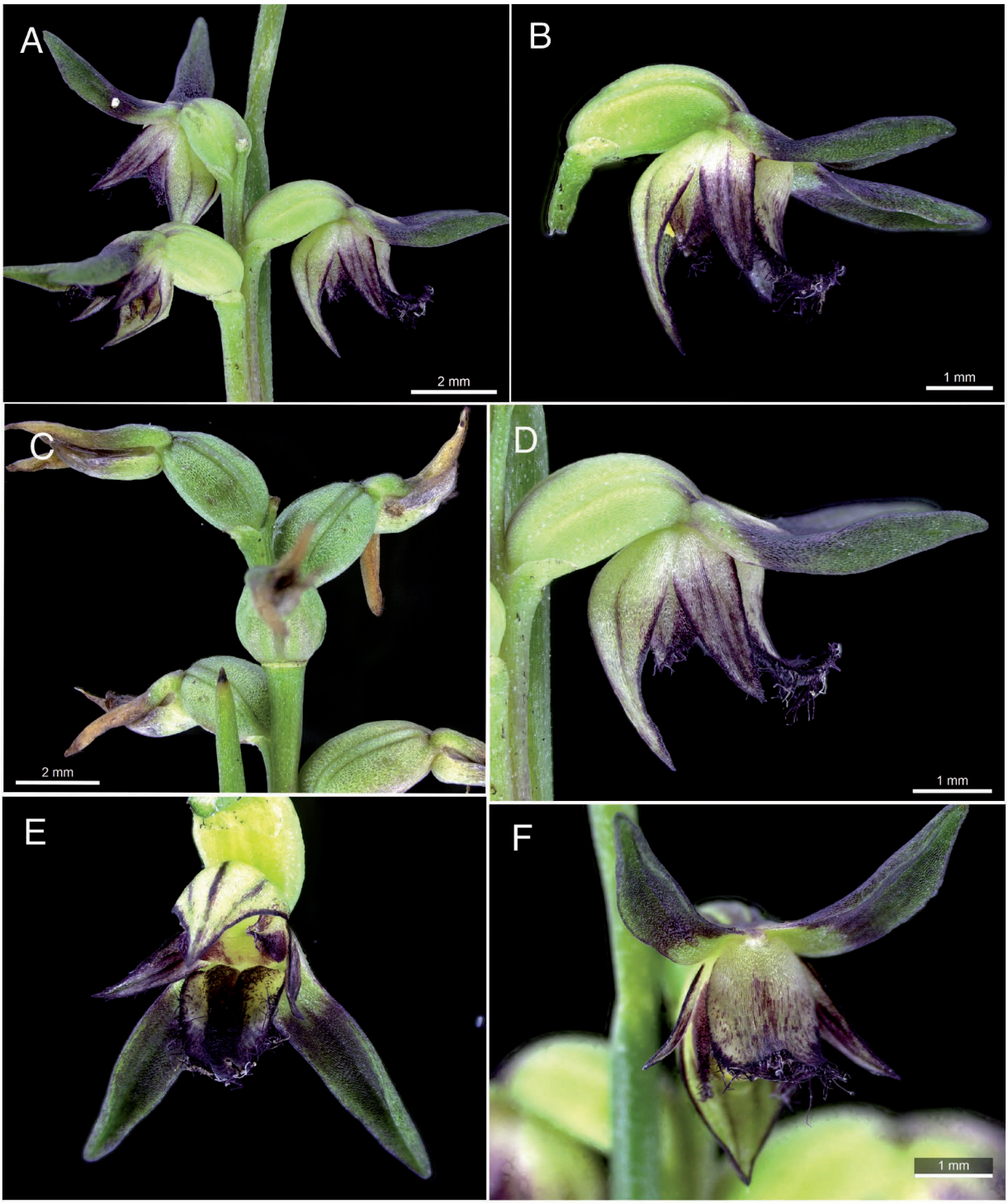

Fig. 2. *Genoplesium branwhiteorum*. A: Three-flowered inflorescence, showing leaf projecting above flowers. B: Flower from side. C: Developing capsules showing closed, withering flowers and smooth capsules. D: Flower from the side showing arrangement of sepals and petals. E: Flower from below showing labellum marginal cilia and pale regions either side of the dark pigmented callus, also the coriaceous inrolled lateral sepal apex. F: Flower in frontal view showing the labellum margin and ventral surface. All from NSW1114958.

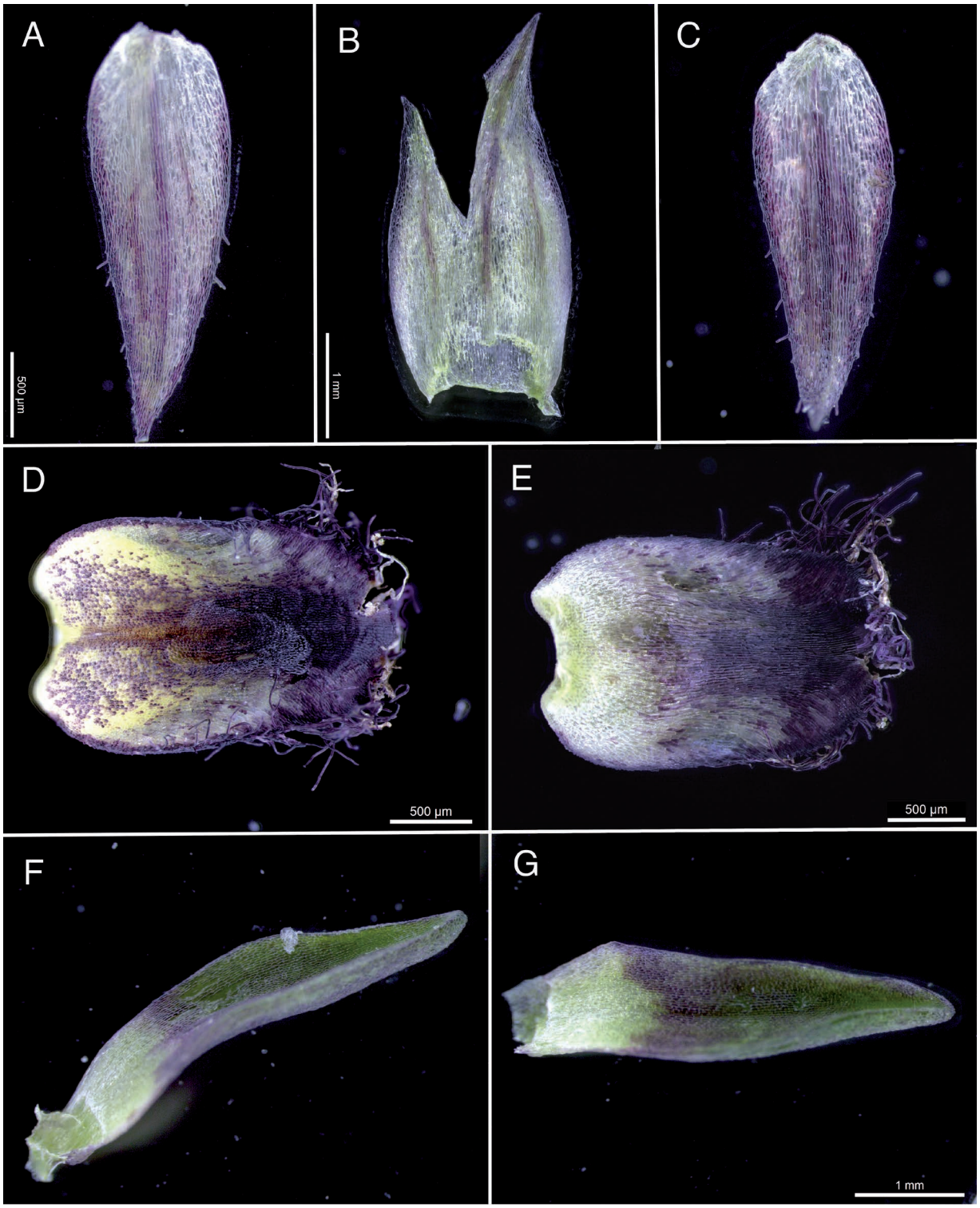

Fig. 3. *Genoplesium branwhiteorum.* A, C: Petal showing marginal and medial stripe and short sparse cilia on the petal margins. B: Dorsal sepal showing margins and medial stripes and acute apex. D: Labellum in dorsal view, showing marginal cilia, callus and pigmentation. E: Labellum in ventral view showing base and insertion and dense marginal cilia on outer margins. F, G: Lateral sepals showing pigmentation and texture. All from NSW1114958.

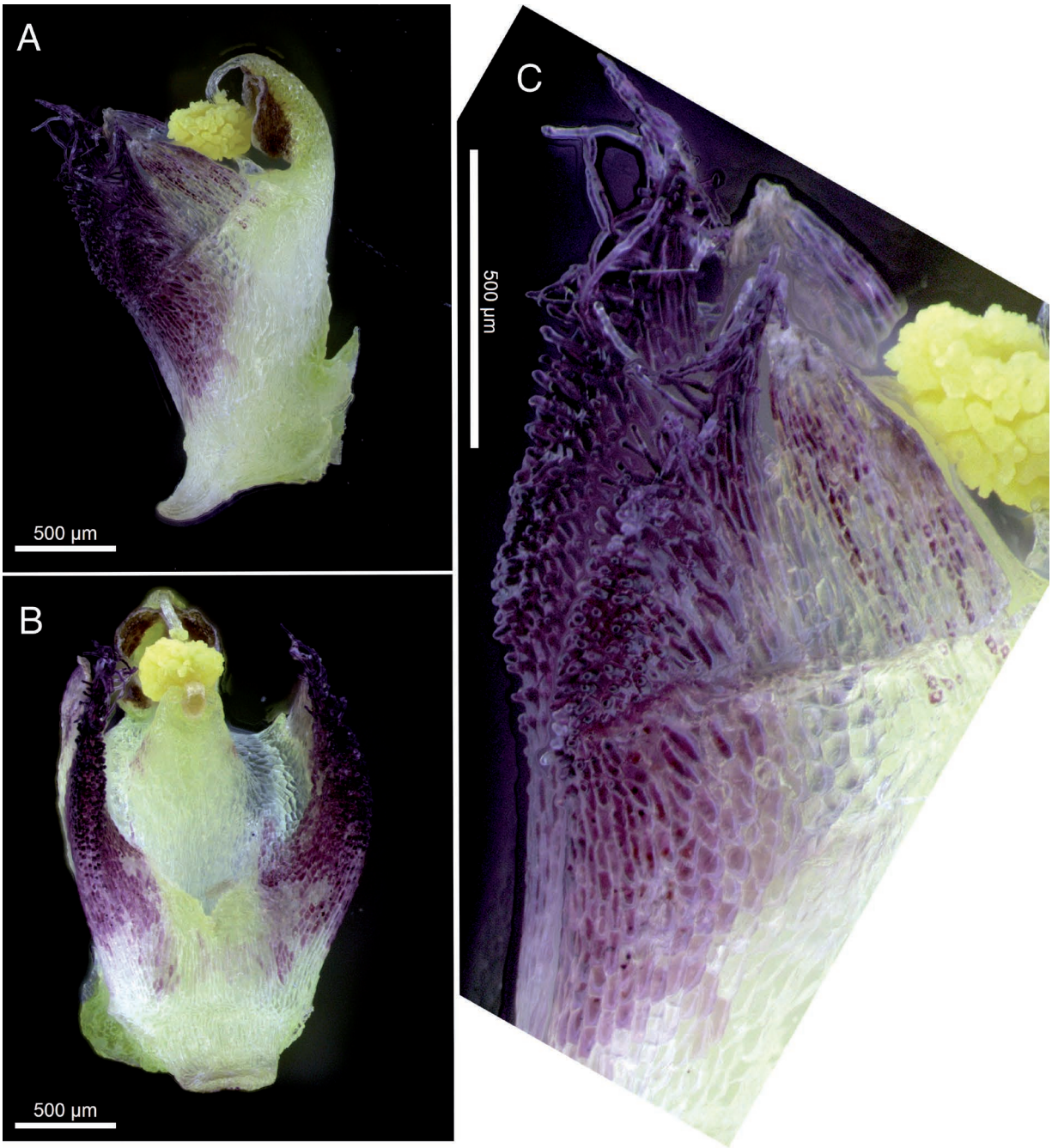

Fig. 4. *Genoplesium branwhiteorum.* A. Column in lateral view showing column wings, anther, pollen mass, and column foot, note pigmentation of the column wings. B. Column in frontal view showing the anther, pollen mass with stipe and viscidium resting over the apical projection of the stigma, the stigma and a basal recess at the fusion between the two column wings, note the long cilia on the lower column wing lobe apex, which grade into tall papilla below. C. Detail of the column wings. All from NSW1114958.

Distribution and ecology: Currently known from the Central Coast and Lake Macquarie Local Government Areas of NSW, where *G. branwhiteorum* has been recorded from the area bound by the localities of Morisset, Chain Valley Bay, Charmhaven and Bushells Ridge. We estimate the extent of occurrence (EOO) of *G. branwhiteorum* based upon all documented records of the species, to be 76.2 km^2 and its area of occupancy (AOO) to be 40 km^2. *Genoplesium branwhiteorum* has been observed growing in dry sclerophyll forests, heathlands and forested wetlands where it commonly occurs amongst a dense understorey of grasses and sedges. Dominant species include *Allocasuarina littoralis*, *Leptospermum juniperinum*, *Melaleuca nodosa*, *Callistemon linearis* and *Schoenus brevifolius*. The pollination biology of this species is unknown, however the near perfect rate of capsule development, in the absence of herbivory, suggests that it is at least facultatively autogamous. *Genoplesium branwhiteorum* is listed as critically endangered under both the NSW *Biodiversity Conservation Act 2016*, and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* as *Corunastylis/Genoplesium* sp. Charmhaven (NSW896673).

Recognition: *Genoplesium branwhiteorum* is similar to *Genoplesium archeri*, but differs from *G. archeri* in having fewer, larger flowers (3–15 flowers, 6 mm across, versus 10–20 flowers, 4.5–5 mm across in *G. archeri*), borne on a shorter inflorescence (1.4 cm long versus 2–3.5 cm long in *G. archeri*).

Genoplesium branwhiteorum is similar to *G. sagittiferum*, but can be distinguished by the sparse, short cilia present on the petal margins, a feature shared with *G. stephensonii*, but absent in *G. sagittiferum*.

Genoplesium branwhiteorum is also similar to *G. stephensonii*, but *G. stephensonii* has a shorter column c. 1.8–2.0 mm tall, and c. 0.7 mm wide at the base in lateral view; the column foot is curved upward, and is fairly narrow, only 0.25 mm wide at its apex; the lower margin and lower lobe of the column wing bearing long cilia, the apex of the lower wing lobe may also be long attenuate. In contrast, the column of *G. branwhiteorum* is taller, up to 3.3 mm tall, and wider at the base, where c. 1.1 mm wide in lateral view; the column foot is an obtuse protrusion from the base of the column and is 0.75 mm wide at its apex; the lower margin and lower lobe of the column wing bear short cilia or tall papillae, not long cilia, and the apex is acuminate but never attenuate.

Genoplesium branwhiteorum could be confused with ***Genoplesium cuspidatum*** (D.L.Jones & L.M.Copel.) M.A.M.Renner, comb. nov. (basionym: *Corunastylis cuspidata* D.L.Jones & L.M.Copel., *Australian Orchid Review* 82(6): 54 (2017)), but lacks the distinctive cuspidate sepal apices which characterise that species.

Genoplesium branwhiteorum is broadly sympatric with *G. insigne* D.L.Jones, and although the field aspects of *G. branwhiteorum* and *G. insigne* are very different, without colouration and on microscopic examination the two are rather similar in floral structure, except perhaps that *G. insigne* has rather more coriaceous column wings and entirely lacks cilia or any form of projection on the petal margins.

Notes: *Genoplesium branwhiteorum* is thought to hybridise with *G. insigne* to produce plants that bear a striking resemblance to *G. plumosum,* though one of us (MR) thinks these putative hybrids are actually *G. plumosum*. Further work on the breeding system and population genetics of *G. branwhiteorum* and other *Genoplesium* in the Warnervale area and surrounds is required to establish whether *G. branwhiteorum* does indeed hybridise with other species, and whether or not hybridisation presents any potential threats to the long-term genetic integrity of the known populations of this highly localised species.

Additional specimen examined: NEW SOUTH WALES: Central Coast, Lake Macquarie State Conservation Area, precise locality withheld, 19 March 2021, *M.A.M. Renner 9493* (NSW1114958).

Genoplesium geminatum M.A.M.Renner & Towle, sp. nov.

Type: Australia, New South Wales, Lake Macquarie, precise locality withheld, 10 February 2021, *M.A.M. Renner 9430* (holo: NSW1114957; iso: CANB)

Diagnosis: *Genoplesium geminatum* has a distinct aristate petal apex, a feature shared only by *G. mucronatum,* from which *G. geminatum* differs by its obovate rather than oblong labellum shape; by the aristate bract at the base of each flower whose apex lays flush on the flower bud, is longer than the ovary, and is recurved as the flower opens, where as in *G. mucronatum* the bract is shorter than the ovary and has a rounded or obtuse apex; and by the glands of which three are present in the buds of *G. geminatum* but only two in the buds of *G. mucronatum*.

Etymology: from the Latin for doubled and having been united, in reference to the prominent glands on the lateral sepals that form a conspicuous cluster at the apex of the flower buds, which are separated and present only on the lateral sepals at anthesis.

Fig. 5. *Genoplesium geminatum* inflorescence from a plant at the type locality, not vouchered, photo by Brian Towle.

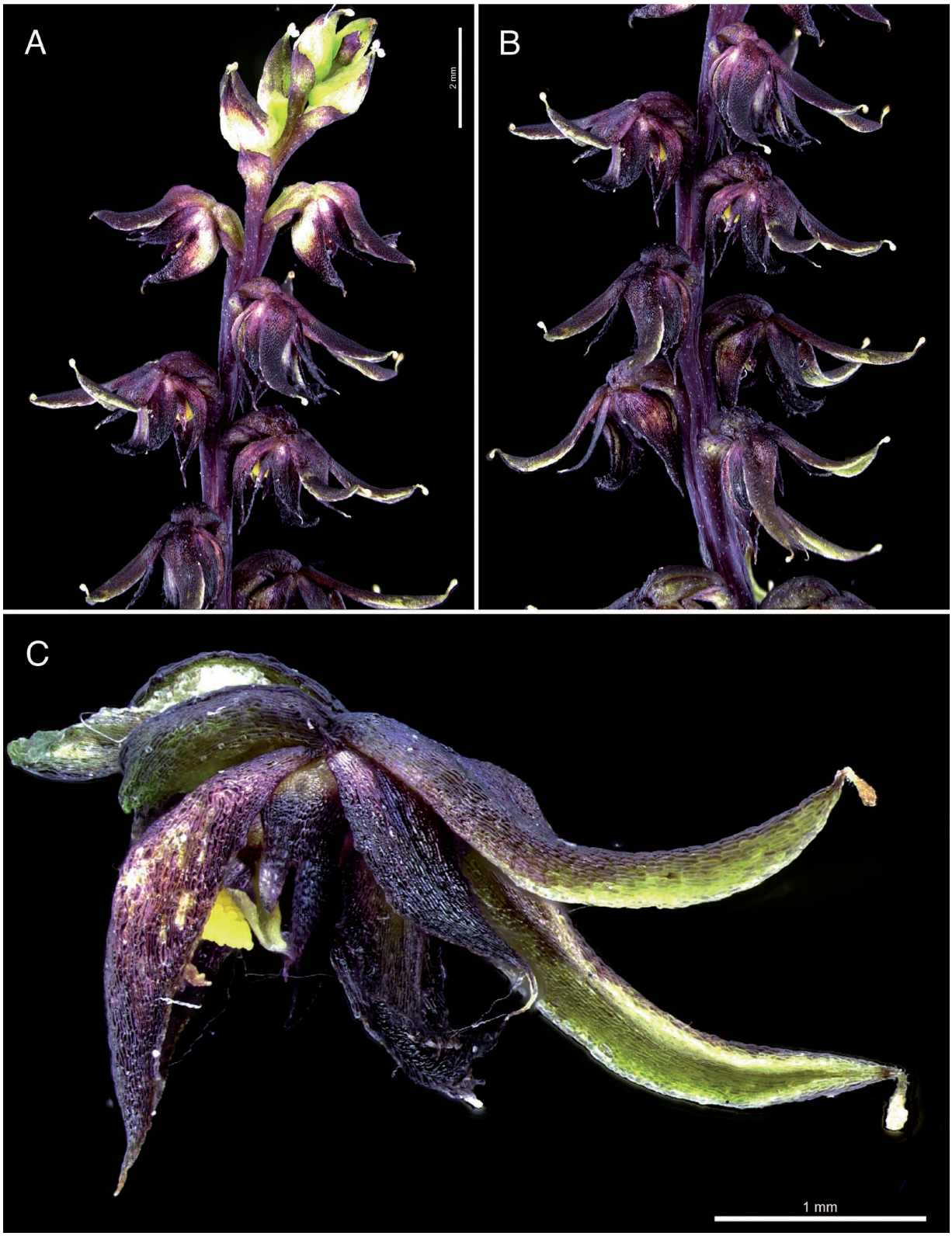

Fig. 6. *Genoplesium geminatum*. A: Upper inflorescence showing buds with close-set glands on lateral sepals, note change in colour of lateral and dorsal sepal with age. B: Middle of inflorescence showing flower spacing and colour, note the contrast between inner and outer lateral sepal surface, and the conspicuous gland at the lateral sepal apex. C. Close-up of flower in lateral-oblique view. All from NSW1114957.

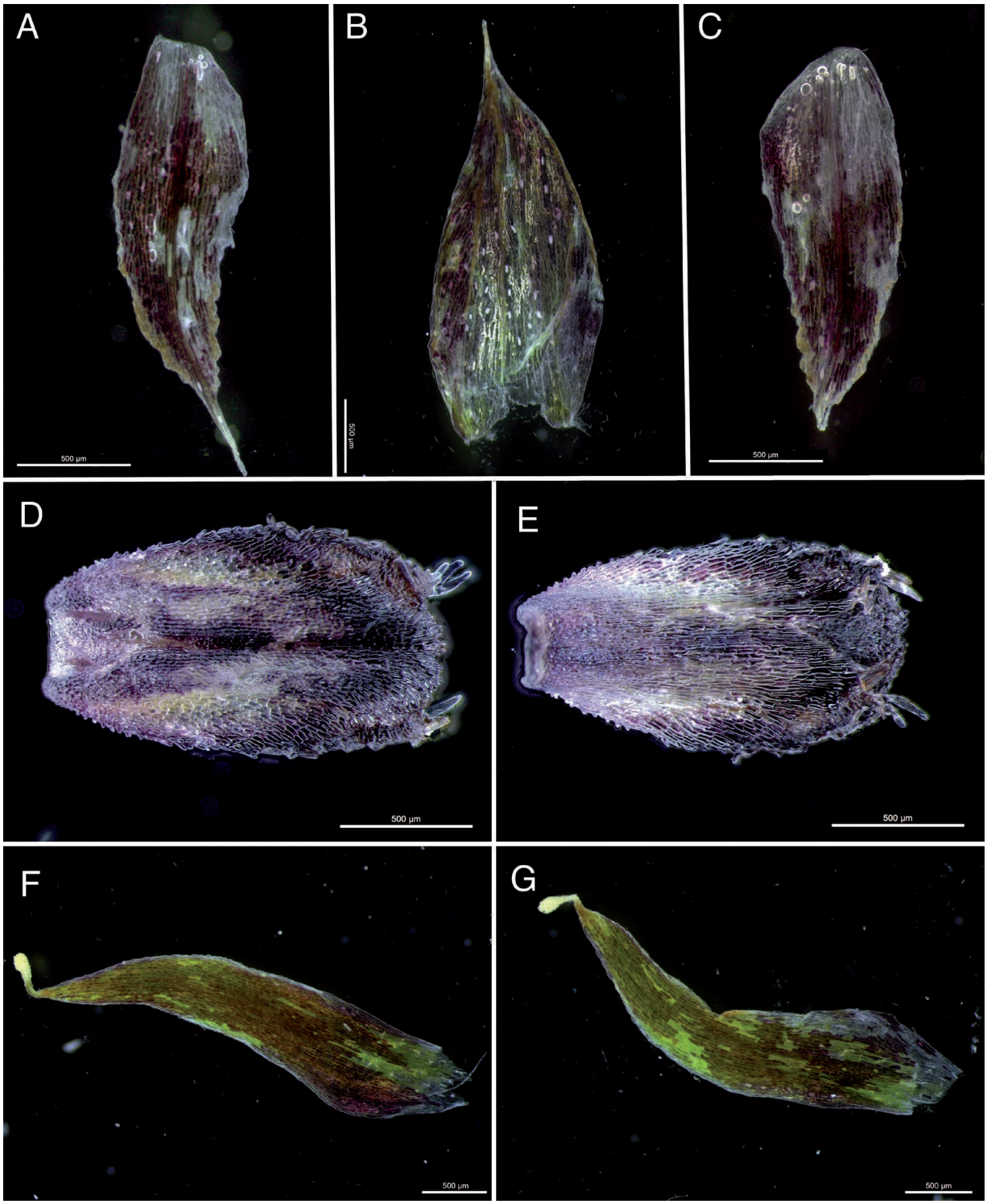

Fig. 7. *Genoplesium geminatum.* A, C: Petals showing apex with hyaline acuminus and margins with irregular crenation. B: Dorsal sepal showing apex with acuminus. D: Labellum in dorsal view showing margins with coarse ciliolate hairs close to the apex. E: Labellum in ventral view showing tapered base, short acuminus at apex, and coarse ciliolate hairs around the apex. F, G: Lateral sepals with the prominent hyaline apical gland. All from NSW1114957.

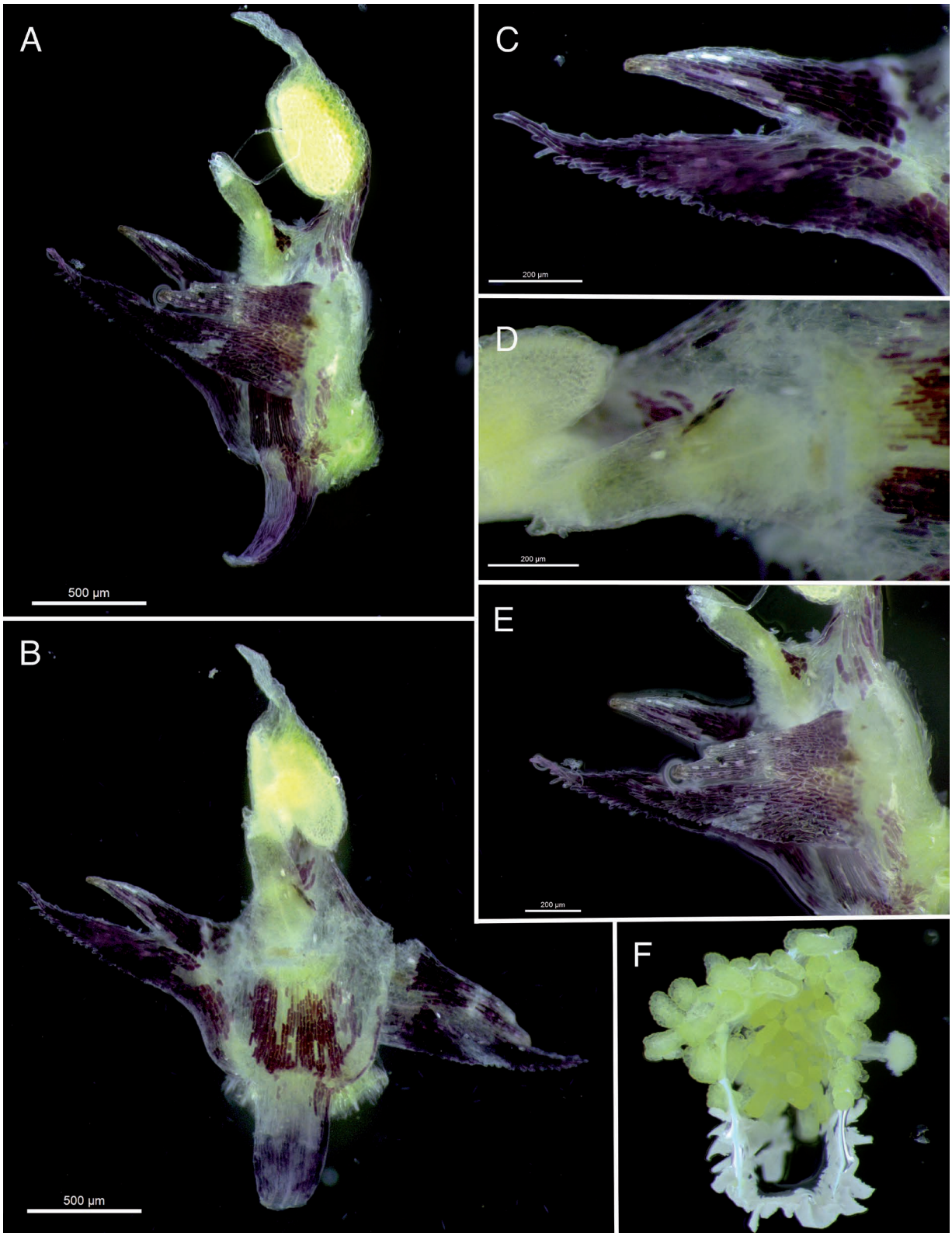

Fig. 8. *Genoplesium geminatum*. A: column in lateral view showing column wings, anther, pollen mass, and column foot, note pigmentation of the column wings. B: Column in frontal view showing the anther, the apical projection of the stigma, the papillate stigma, the two column wings, and the column foot. C: Detail of the column wings. D: The stigma, with papillate surface just visible. E: Column wings and stigma in lateral view. F: Pollinarium. All from NSW1114957.

Leaf terete, to 21 cm long, 1.0 mm wide, lamina sheathing the scape, linear, free lamina 10–15 mm long and 1.5–2.0 mm wide, ending around 15 mm below the first flower. Inflorescence 40–60 mm long, bearing 17–30 flowers on a peduncle 20–30 mm long above the leaf; flowers opening in sequence from the base; pedicel and ovary straight, 1.5–2.5 mm long, lengthening with age such that young spikes with newly opened flowers are densely crowded while older spikes with all flowers open and presenting may be openly spaced. Bracts at the base of each flower 1.5 mm long by 1.0 mm wide, with long apex that lays flush on the flower bud and is recurved as the flower opens. Flowers porrect to deflexed, dorsal sepal 4.0 mm long including apex when flattened, 1.3 mm wide triangular-ovate, concave and inflated at medial base, apex shortly attenuate, bearing a small, obovoid, hyaline, stalked gland in bud, but this gland evidently deciduous and shed as the flower opens, absent at anthesis; lateral sepals 4.0 mm long, 1.0 mm wide, linear-lanceolate, widest just above base, concave toward apex sometimes margins overlapping and so tubular, acute, bearing a hyaline, obovoid, stalked gland; petals 2.3 mm long, 0.9 mm wide, triangular-falcate, outer surface papillate in distal third, dorsal margin straight in lower third, base not ampliate, then curved through 45° to the apex, margin irregularly crenate to shortly ciliolate in distal half, ventral margin curved at base then arched through around 30° from middle to apex, margin irregularly crenate in outer half, apex long attenuate, hyaline, without gland; labellum 2.0 mm long including apex when flattened, 1.0 mm wide, obovate, widest two thirds from the base, apex narrowed with an acute to acuminate apiculus, margins purple, ciliolate from base to apex, toward the base ciliola are short, papilla-like projections, these projections increase in length with increasing distance above the base and around the apex are turgid, non-flexuous, and up to 250 μm long, callus purple, extending from base into the apex, linear except at the very base where broadens to encompass the labellum width, shallowly channelled above a broad depression at the base, channel extending nearly to the apex, cells of the callus arranged in regular longitudinal rows, in contrast to the adjacent labellum lamina where cells are arranged in radiating rows, and are hyaline in the basal half of the labellum and purple in the upper half, callus surface increasingly papillate from the middle of the labellum toward the apex, papillae formed by prorate surface cells, increasing in length toward the apex, where nearly ciliolate across the labellum surface; attachment narrow, articulated, at apex of column foot. Column 2 mm long not including column foot, 0.8 mm wide; column foot present, thin, falcate, purple, 400 μm long; wings purple, unequally bilobed to 0.5 × of their length, upper lobe around 250 μm long and 100 μm wide, ligulate with an asymmetrically acute apex, margins entire, slightly narrower than lower lobe; lower lobe narrow triangular, apex acuminate, margins and surfaces shortly and closely ciliolate; anther versatile, 0.5 mm long, broad elliptic, with a filiform rostrum whose apex is obtuse; stigma a squat lageniform shape, with a long dorsal projection extending well above the column wings in lateral view, the base rounded, surface ciliolate below dorsal projection. Pollinarium comprising a massulate pollen mass adherent to a white, laciniate ring, a short hamulus and small globose viscidium 0.1 mm wide. (Figures 5–8)

Distribution and ecology: *Genoplesium geminatum* has been observed at six locations on the North Coast and Central Coast of New South Wales, from Woodford to the immediate south-west and west of Sydney in the south, to Kearsley, Clarence Town, and Myall Lakes National Park north of Newcastle in the north, in addition to the type locality in the Lake Macquarie area. We estimate the extent of occurrence (EOO) for *G. geminatum* to be 9,086 km^2 and the area of occupancy (AOO) to be 20 km^2. At the type locality, *G. geminatum* grew in gravelly orange-brown clay on the edge of a road corridor amongst short sedges and grasses including *Themeda*.

Recognition: *Genoplesium geminatum* can be distinguished from almost all other *Genoplesium* species by the long acuminate to mucronate tips to the petals. The mucronate petal apex is shared only with ***Genoplesium mucronatum*** (Rupp) M.A.M.Renner, comb. nov. (basionym: *Prasophyllum mucronatum* Rupp., *The Victorian Naturalist* 65(6): 145 (1948)), but sharp petal apices also occur in some other outwardly similar species such as ***Genoplesium laminatum*** (Fitzg.) M.A.M.Renner, comb. nov. (basionym: *Prasophyllum laminatum* Fitzg., *Journal of Botany, British and Foreign* 23: 136 (1885)) and *G. tasmanicum* D.L.Jones. *Genoplesium geminatum* can be distinguished from *G. mucronatum* by the mucronate tip to the floral bract, which is reflexed against the ovary by the opened flower. In *G. mucronatum* the floral bract is shorter than the ovary and has a rounded to obtuse apex (Fig. 9). Other differences between *G. geminatum* and *G. mucronatum* are found in the labellum, which is obovate and has projecting cilia around the apex in *G. geminatum* but broadly oblong without projecting cilia in *G. mucronatum*; and in the glands of which there are usually three in the flower buds of *G. geminatum*, but two in the buds of *G. mucronatum*. The lateral and dorsal sepals of *G. geminatum* generally all bear glands, but the gland on the dorsal sepal is either shed, or grows into an acuminus as flowers develop, so that at anthesis only the lateral sepal glands are present. *Genoplesium mucronatum* (as *Prasophyllum* or *Corunastylis*) is listed as a synonym of *G. rufum* on PlantNet and APNI, but is distinct from this species, as Jones (2021) asserts.

Fig. 9. *Genoplesium mucronatum* inflorescence from a plant from near Appin, not vouchered, photo by Lachlan Copeland, and used with his kind permission.

Genoplesium geminatum differs from *G. laminatum* in its floral bract, which is longer than the ovary, and in generally bearing more flowers on each inflorescence (17–30 versus 5–20), and the labellum margin is ciliate toward the apex, whereas in *G. laminatum* the labellum margin is entire or slightly irregular throughout (Jones 2021).

Genoplesium geminatum has been confused with *G. trifidum* (Rupp) M.A.M.Renner, possibly because the mucronate petal tips may be hyaline and so resemble glands. However, the petal tips of *G. geminatum* are filiform, linear, and seamless with the petal lamina, and in these features differ from the glands at the apex of *G. trifidum* petals, which are circinate to hook-shaped, constricted at their insertion on the petal, and usually presented on the inner surface of the petal. The column arms also serve to differentiate these two species, in *G. geminatum* the upper lobe of the column arm is acuminate, whereas in *G. trifidum* it is rounded, or at most weakly obtuse (see illustration in Renner 2019). The lateral sepal glands in *G. geminatum* are prominent and hyaline, in *G. trifidum* if they are present at all they are small, inconspicuous and orange-pigmented.

Genoplesium geminatum is similar to *G. tasmanicum* but differs by its obovate labellum whose upper margins are shortly ciliate, in *G. tasmanicum* the labellum is ovate to elliptic, and usually broadest below the middle with irregular, rather than ciliate, margins throughout. The flowers of *G. tasmanicum* tend to be more green-pigmented on the outer surface of the lateral sepals than *G. geminatum*, in which the lateral sepal outer surface is uniformly red-purple.

Genoplesium geminatum is similar to *G. rufum* but is readily distinguished by the presence of conspicuous hyaline glands at the apex of the lateral sepals, particularly when flowers are in bud, and by the ciliate upper labellum margins. *Genoplesium rufum* lacks glands on its dorsal and lateral sepals, and has smooth to irregular labellum margins (Jones 2021).

Notes: Illustrated in Jones (2021) as *Corunastylis trifida* (Rupp.) D.L.Jones & M.A.Clem., from plants observed at Clarence Town.

Additional specimens examined: None, unfortunately disruptions caused by COVID-19 prevented us from examining material from other herbaria, including UNE, that may be this species. See under distribution and ecology for additional observations of this species.

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