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A new species of *Pomaderris* (Rhamnaceae) from the Central Tablelands of New South Wales

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Abstract

Pomaderris walshii, a shrub of the Central Tablelands of New South Wales, is described and illustrated. The species is apparently restricted to the upper Kangaroo River, south-east of Robertson. It is threatened because of its small population size and possible future changes in land use, and fire and flood frequencies. As a result of morphometric analyses on *P. walshii* and related taxa, *P. argyrophylla* subsp. *graniticola* is raised to specific rank (as ***P. graniticola***).

Introduction

Pomaderris comprises 70 species throughout Australia and New Zealand. Of the 65 species that occur in Australia, 45 of these occur within New South Wales (Harden 2000). Much of the genus has been reviewed over the last two decades resulting in a significant increase in the number of known species, particularly in south eastern Australia (Walsh 1988a; Walsh 1988b; Walsh 1990; Walsh 1992; Walsh & Coates 1997).

Pomaderris parrisiae N.G. Walsh, *P. nitidula* (Benth.) N.A. Wakef. and *P. argyrophylla* N.A. Wakef. form a closely related group within *Pomaderris* (Walsh and Coates 1997) and can be difficult to distinguish as they are morphologically very similar. Collectively, they are found along the east coast of Australia from south-east NSW to Queensland and are usually found in small, disjunct and isolated populations both within and between species (Fig. 1).

A small population of a *Pomaderris* species was recently discovered near Carrington Falls in the Central Tablelands of NSW and was found to have close affinities to the above group of taxa. Surveys of the nearby area revealed that its distribution appears to be limited to two small populations in the riparian zone in the upper Kangaroo River catchment (Millott 2003). The smaller population, located in Budderoo National Park, consists of 13 individual plants. The larger population is located on private land approximately 2.5 km upstream, and consists of approximately 30 plants.

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A morphometric analysis was undertaken to compare plants from the populations in the upper Kangaroo River with *P. parrisiae*, *P. nitidula*, *P. argyrophylla* subsp. *argyrophylla* and *P. argyrophylla* subsp. *graniticola* to assess its level of differentiation and taxonomic status.

Methods

A total of 76 dried collections were used in the morphometric analysis: 17 specimens of the *Pomaderris* from Carrington Falls were measured and compared against 13 specimens of *P. argyrophylla* subsp. *argyrophylla,* 10 of *P. argyrophylla* subsp. *graniticola*, 29 of *P. parrisiae* and 7 of *P. nitidula.* The sample sizes reflect availability of material.

The nine morphological characters measured were selected from a larger set used in preliminary analyses (Millott 2003). These nine characters were found to fully describe the variation amongst the selected taxa. Five of these characters were foliar and the remaining four were floral (Table 1).

Each character was measured on either 10 leaves or 10 flowers per specimen and the mean used in the statistical analysis. The two exceptions to this were leaf hair length and lateral vein overtopping. These characters were measured once per specimen because they were taken in a single visual inspection of the leaf**.** Only leaves that were more than two nodes removed from the growth apex were chosen for measurement to avoid taking measurements on juvenile leaves; this method appeared to be the most reliable for choosing mature leaves. The leaf base angle was taken as the angle at the base of the leaf between the two leaf margins at points approximately 5 mm along the margins from the base. The inflorescence diameter was taken as the widest point across the inflorescence which was at or near the base of the inflorescence for these species.

The morphometric data were analysed using the CLUSTER program of Primer for Windows 5.2.8. A matrix of Bray-Curtis similarity coefficients from log (x+1) transformed data was constructed to enable CLUSTER. The significance of differences in characters between species groupings was determined by multiple ANOVA.

Results and Discussion

In the CLUSTER analysis, all but one collection was grouped with the other collections of the taxon it had previously been determined as (Fig. 2). The aberrant collection (ag5) had the highest values for five of the eight quantitative measures within that taxon — the values were 1.8 to 2.5 standard deviations above the mean. As a consequence, collection ag5 was omitted from subsequent analyses. Further collections from the ag5 population would be useful to clarify its identity and status.

Although five clusters appear to be naturally separable, there was less similarity within *P. argyrophylla* subsp. *graniticola* collections than between the other taxa groups. Despite this, subsp. *graniticola* as an entity is distinct from the other taxa and a new status is proposed here for it. The plants from Carrington Falls appear to be most closely allied to *P. nitidula*. *Pomaderris parrisiae* is most closely allied to *P. argyrophylla* subsp. *argyrophylla*.

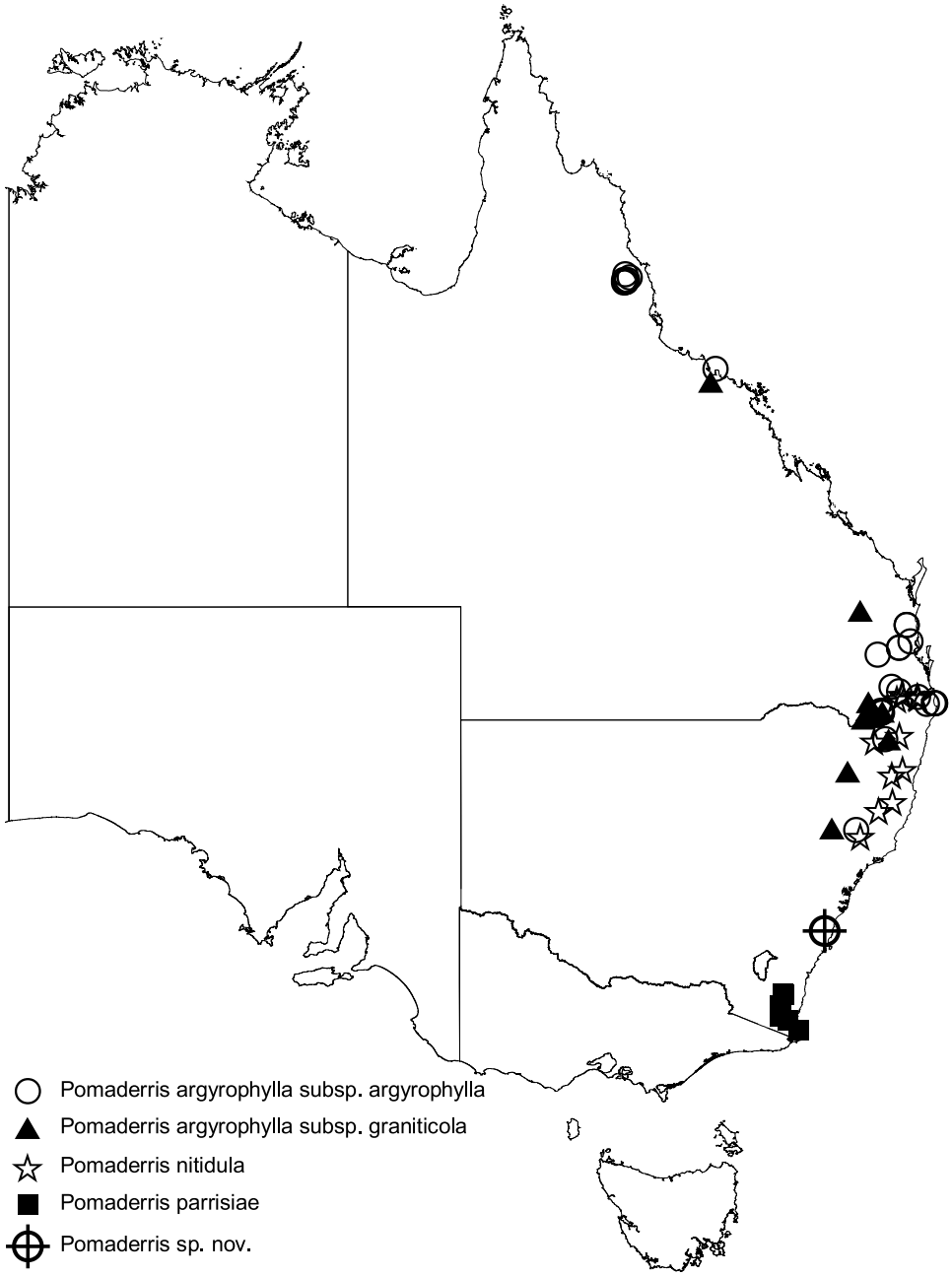

Fig. 1. Distribution of the *Pomaderris* species that are the subject of this paper: ● = *P. argyrophylla* subsp. *argyrophylla*; ▲ = *P. argyrophylla* subsp. *graniticola*; ✳ = *P.* sp. nov.; ☆ = *P. nitidula*; ■ = *P. parrisiae*.

There were significant differences between taxa for each of the characters measured (Table 1). The plants from Carrington Falls are separable from *P. argyrophylla* subsp. *argyrophylla* by their larger leaf base angle, shorter leaves, and leaf vein indumentum, from *P. argyrophylla* subsp. *graniticola* by their broader inflorescences, longer and broader leaves, and presence of leaf vein indumentum, from *P. nitidula* by their shorter anthers, narrower hypanthia, larger leaf base angle, and shorter sepals, and from *P. parrisiae* by all characters except hypanthium diameter.

Because of the differences between the Carrington Falls *Pomaderris* and the four related taxa, we believe it warrants recognition at the species level.

Table 1. 99% confidence intervals for each quantitative character measured, and presence/absence of overtopping of abaxial vein indumentum.

All measurements used to determine character means were used to calculate the confidence intervals. Within each character, identical superscript letters indicate that the means are not significantly different as determined by single classification ANOVA ($P < 0.05$).

Character	*P. argyrophylla* subsp. *argyrophylla*	*P. argyrophylla* subsp. *graniticola*	*P. nitidula*	*P. parrisiae*	*P. walshii*
Anther length (mm)	0.9 – 1.1[a]	0.8 – 1.0[a]	1.2 – 1.5[b]	1.3 – 1.4[b]	0.9 – 1.0[a]
Hypanthium diameter (mm)	0.9 – 1.2[a]	1.0 – 1.1[a]	1.2 – 1.4[b]	1.2 – 1.3[b]	1.0 – 1.1[a]
Inflorescence diameter (mm)	43 – 58[ac]	19 – 41[b]	26 – 49[ab]	49 – 57[c]	45 – 59[ac]
Leaf base angle (°)	45 – 61[a]	74 – 121[b]	56 – 74[a]	63 – 68[c]	71 – 84[b]
Leaf simple hair length	0.1 – 0.3[a]	0.1 – 1.1[a]	0.2 – 0.5[a]	1.1 – 1.3[b]	0.8 – 1.0[a]
Leaf length (mm)	54 – 77[a]	19 – 36[b]	38 – 52[c]	61 – 66[a]	43 – 52[c]
Leaf width (mm)	16 – 21[a]	9 – 14[b]	14 – 19[a]	21 – 23[c]	15 – 19[a]
Sepal length (mm)	1.7 – 1.9[a]	1.9 – 2.0[b]	2.3 – 2.6[c]	2.5 – 2.6[c]	1.8 – 2.0[ab]
Overtopping of leaf lateral vein hair bylacuna hair	absent	absent	present	absent	present

Pomaderris walshii J.C. Millott & K.L. McDougall**, *sp. nov.***

Pomaderris nitidula (Benth.) N.A. Wakef. proxime affinis sed statura maiore, floribus minoribus, lamina basi obtusiore et distributione geographica magis ad meridiem differt.

Holotype: New South Wales: Central Tablelands: Budderoo National Park, Douglas Creek, c. 0.7 km upstream of Carrington Falls, S of disused quarry, *J. Millott*, 1 Nov 2003 (NSW656890).

Shrub or small tree to 3 m high. Young stems and petioles with appressed, silvery to rusty simple hairs and medium to dense, white stellate hairs. Leaves narrowly ovate; (36–)43–52(–60) mm long; 14–19(–22) mm wide; base cuneate to obtuse; margins

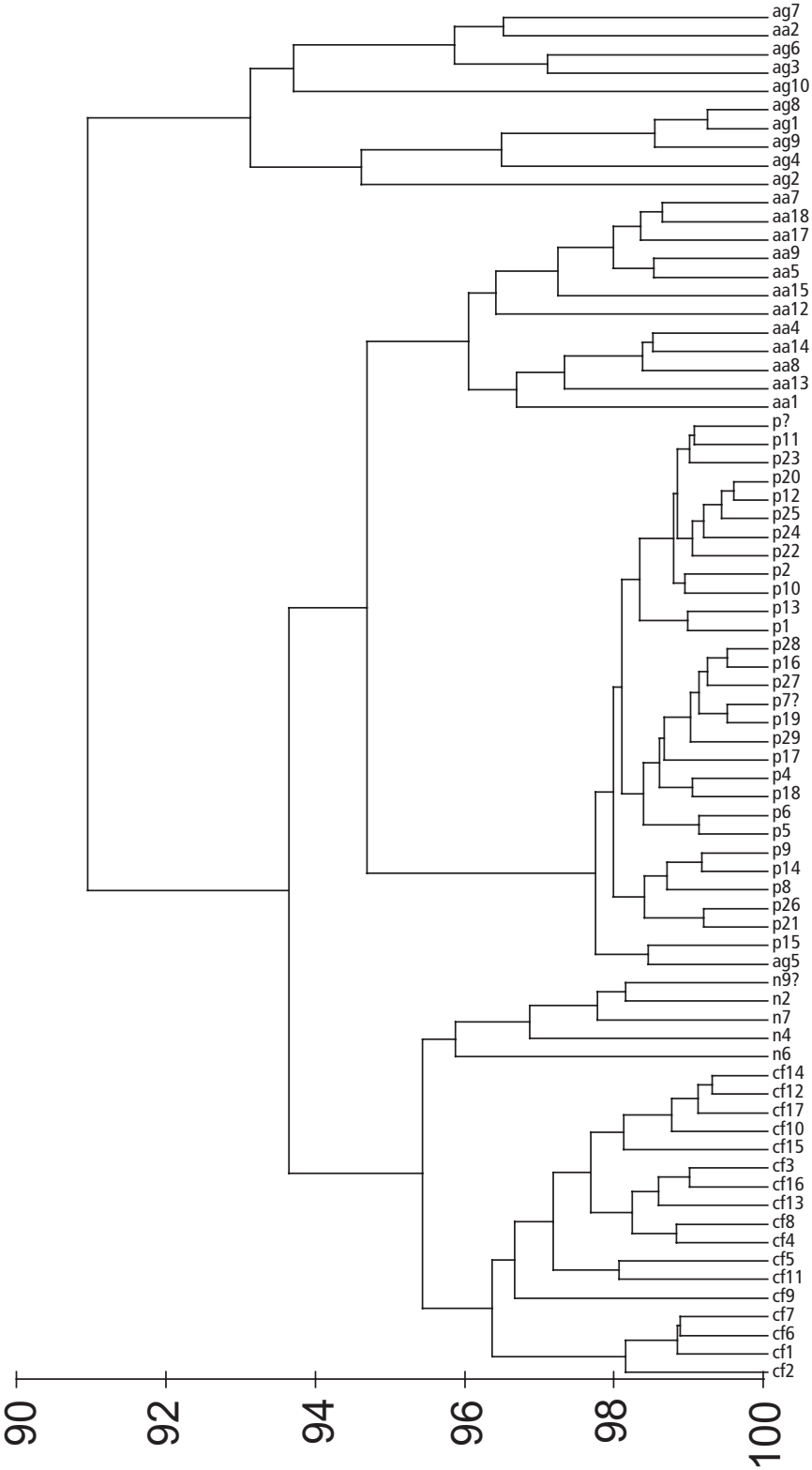

Fig. 2. Cluster analysis of 79 specimens of five apparent *Pomaderris* taxa. The herbarium determination is indicated by the following labels: aa = *P. argyrophylla* subsp. *argyrophylla*; ag = *P. argyrophylla* subsp. *graniticola*; cf = *P.* sp. nov.; n = *P. nitidula*; p = *P. parrisiae*.

entire, plane or slightly recurved; apex acute to acuminate; adaxial surface green and glabrous; abaxial surface moderately hairy with loosely appressed, white-silvery simple hairs and dense white stellate hairs; lateral veins not or slightly impressed above, clearly visible below and covered with an indumentum of moderately dense, appressed rusty simple hairs and sparsely to moderately dense white stellate hairs; abaxial lateral vein indumentum overtopped by, or level with, lacuna indumentum; petiole 4–10 mm long. Stipules narrowly triangular, apex acute, 2–6 mm long, soon deciduous. Inflorescence of 20– c. 100 flowers, pyramidal to hemispherical, terminal, 4–6.5(–7.5) cm long and wide at base; bracts deciduous; pedicels 1.5–4.3 mm long. Flowers cream-coloured to yellow; externally pubescent to villous with loosely appressed, silvery simple hairs and dense stellate hairs (sepals less densely indumented than hypanthium); hypanthium (0.8–)1–1.4 mm in diameter, 0.8–1.2 mm long; sepals 1.8 – 2.0 mm long; petals present, 1.7–1.9 mm long, spreading, spathulate; stamens 2–2.5 mm long; anthers (0.7)–0.8–1.2 mm long; ovary inferior, summit simple-pubescent; style glabrous, 1.6 – 1.9 mm long, branched in lower or middle third. Fig. 3.

Etymology: Named in recognition of botanist Neville Walsh of the National Herbarium of Victoria for his work on the revision of this genus.

Distribution: Currently only known from the upper Kangaroo River and its tributaries (above Carrington Falls) on the Central Tablelands of New South Wales.

Habitat and ecology: Populations have been recorded in riparian shrubland dominated by *Callicoma serratifolia, Ceratopetalum apetalum* and *Grevillea rivularis*, and open grassy forest (partly cleared for grazing) dominated by *Eucalyptus fastigata*. An unnamed *Pomaderris* species was recorded close to Carrington Falls on the Kangaroo River by Jordan (1989) in *Eucalyptus piperita / E. sieberi* forest but this has not been relocated in recent times. The upper Kangaroo River is underlain by Hawkesbury Sandstone and the soils in populations are sandy alluvium. Annual rainfall is about 1800 mm and populations range in elevation from about 550 – 600 m above sea level. The Budderoo population was last burnt in 1983, however, the response of the species to fire is unknown. Plants possibly resprout following flood damage. Old, dead prostrate stems were observed on small plants closest to the river, a possible consequence of the last major flood event in 1999.

Conservation status: Two populations of this species have been recorded over a lineal range of about 3 km. One population of approximately 13 plants is reserved in Budderoo National Park but most of these plants are apparently young. The remaining plants are on freehold land. Populations may be threatened by changes in fire or flood frequencies, or by future use of private land. A conservation code of 2ECi is suggested for this species.

Other specimens examined: New South Wales: Central Tablelands: Douglas Creek (a tributary of Kangaroo River) above Carrington Falls, SE of Robertson, *K. McDougall 567,* June 1998 (MEL 2117356).

New status for *Pomaderris argyrophylla* subsp. *graniticola*

As a result of our analysis we elevate *P. argyrophylla* subsp. *graniticola* to specific rank because it is clearly morphometrically distinct from the other four taxa analysed.

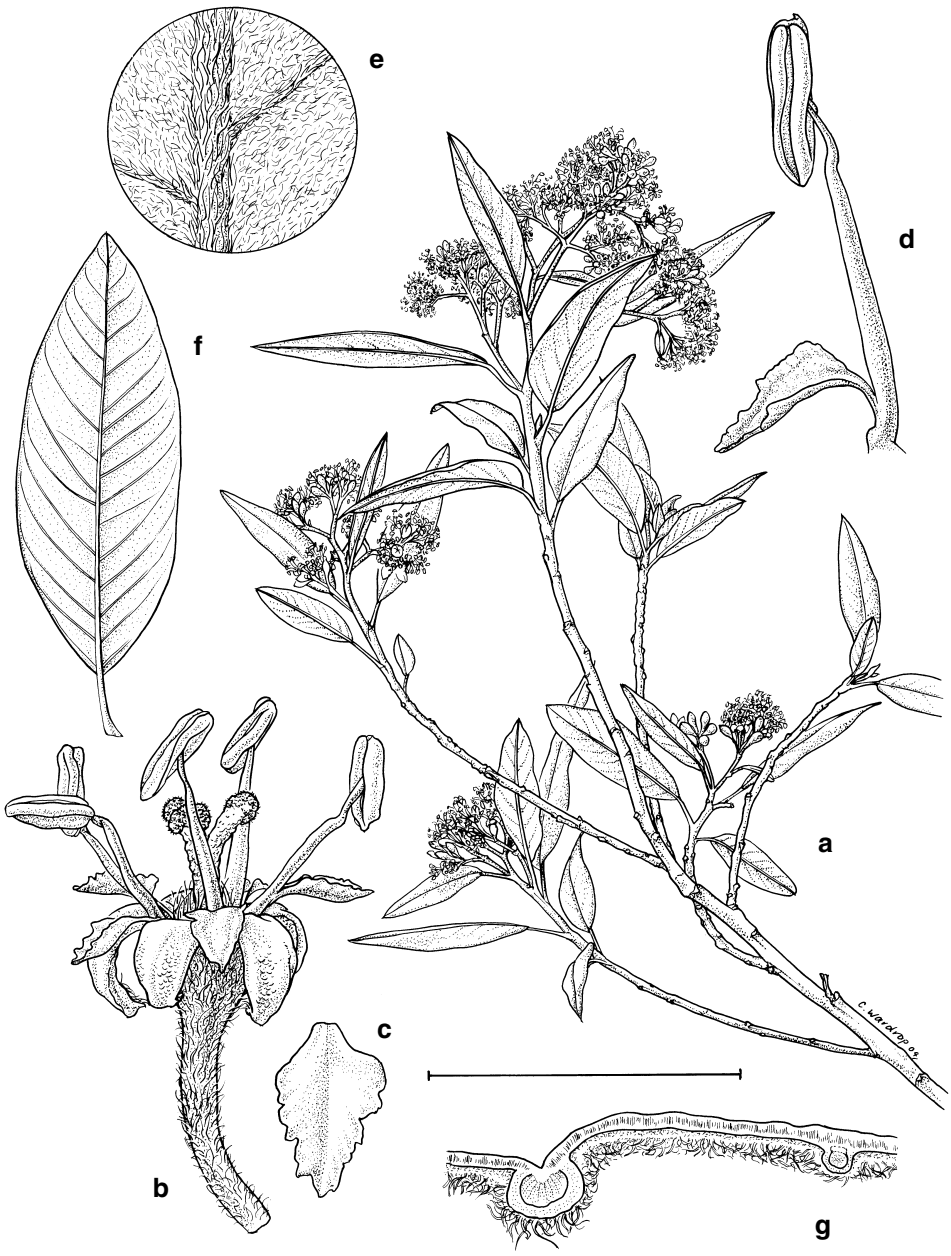

Fig. 3. *Pomaderris walshii*. **a**, habit; **b**, flower; **c**, petal; **d**, stamen, showing petal attachment; **e**, abaxial leaf indumentum; **f**, leaf venation; **g**, cross section of leaf. Scale bar: a = 5 cm; b = 0.4 cm; c = 0.25 cm; d = 0.25 cm; e = 0.5 cm; f = 3 cm; g = 0.25 cm.

Pomaderris graniticola (N.A. Wakef.) K.L. McDougall & J.C. Millott, ***comb.*** & ***stat. nov.***

Pomaderris argyrophylla N.A. Wakef. subsp. *graniticola* N.G. Walsh & F. Coates, *Muelleria* 10: 46 (1997).

Type: Queensland, Girraween National Park, c. 50 m W of Dr Roberts Waterhole, towards its southern reach, *N.G. Walsh 3883*, 15.ix.1994 (holotype MEL; isotypes BRI, CANB, NSW, UNE).

Notes: The apparent preference of this taxon for growing on granitic substratum is retained in the new name. Notes on the distinctions between *P. graniticola* and *P. argyrophylla* are given in Walsh and Coates (1997), who indicate that in the area east of Stanthorpe in Queensland, the two taxa may be difficult to distinguish. The significant diagnostic characters identified above — inflorescence diameter (19–41 mm in *P. graniticola*, 43–58 mm in *P. argyrophylla*), leaf base angle (74–121° in *P. graniticola*, 45–61° in *P. argyrophylla*), leaf length (19–36 mm in *P. graniticola*, 54–77 mm in *P. argyrophylla*), leaf width (9–14 mm in *P. graniticola*, 16–21 mm in *P. argyrophylla*), and sepal length (1.9–2.0 mm in *P. graniticola*, 1.7–1.9 mm in *P. argyrophylla*) — will hopefully assist in identification.

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