

DROSERA HUEGELII ENDL. VAR. *PHILLMANNIANA*
FROM THE STIRLING RANGE, SOUTH WESTERN AUSTRALIA

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Abstract: Short-stemmed plants of *Drosera huegelii* from the highest peaks of the Stirling Range in south western Australia have been found to differ in a number of aspects from the more widespread typical form of this taxon and are recognized as a distinct variety.

Introduction

The short-stemmed form of *Drosera huegelii* Endl. from the highest peaks of the Stirling Range, in south western Australia has been known for many decades (e.g. Gibson 2001). It grows in montane shrubland above 800 meters elevation in an environment that experiences light snowfalls during most winters. It has often informally been referred to as the 'Dwarf Form' (Barrett 2000) and for much of this time it has been recognized that this entity required further study to see whether it warrants recognition as a distinct taxon.

At least two other examples of pairs of morphologically similar taxa, that differ primarily in stature, occurs within the tuberous *Drosera* flora of south western Australia. *Drosera moorei* (Diels) Lowrie is a climbing or scrambling sundew which grows on the aprons of granite outcrops. *Drosera zigzagia* Lowrie, in contrast, is a short, erect taxon in the same region which grows on the margins of salt lakes (Lowrie 1999). Both are native to the eastern wheatbelt and southern goldfields regions (Lowrie 1987). These taxa share yellow petalled flowers, glabrous sepals and stems, but differ in stature, habit, leaf number per node, leaf shape, sepal shape, and flower part and seed size and were thus considered to be different species (Lowrie 1999). Similarly, *Drosera monticola* (Lowrie & Marchant) Lowrie and *D. purpurascens* Schlotth. are two tuberous fan-leaved sundews (*Drosera* subg. *Ergaleium* section *Stolonifera*). *Drosera monticola* is endemic to the highest peaks of the Stirling Range and is smaller in all parts than *D. purpurascens* which grows widely across the south west but at lower elevations. These two taxa also differ by way of the presence of secondary stolons, the presence or absence of horizontal stolon section between the point of emergence and base of leafy rosette, and petal color. They were treated as separate species (Lowrie 2005, 2011).

Drosera huegelii is known to develop a variable number of leaves (Erickson 1978). Some of this is due to predation (Lowrie 2014) but at other times it appears to be due to seasonal ambient conditions. This variation was taken into account when studying plants for this project, particularly where short-stemmed plants had also been collected from few low-elevation sites, such as Mount Lindesay, near Denmark, and Ficifolia Road, near Walpole.

Materials and Methods

Herbarium collections and wild populations of *D. huegelii* were studied from across its range, with particular attention to short-stemmed specimens. Cultivated plants were also examined.

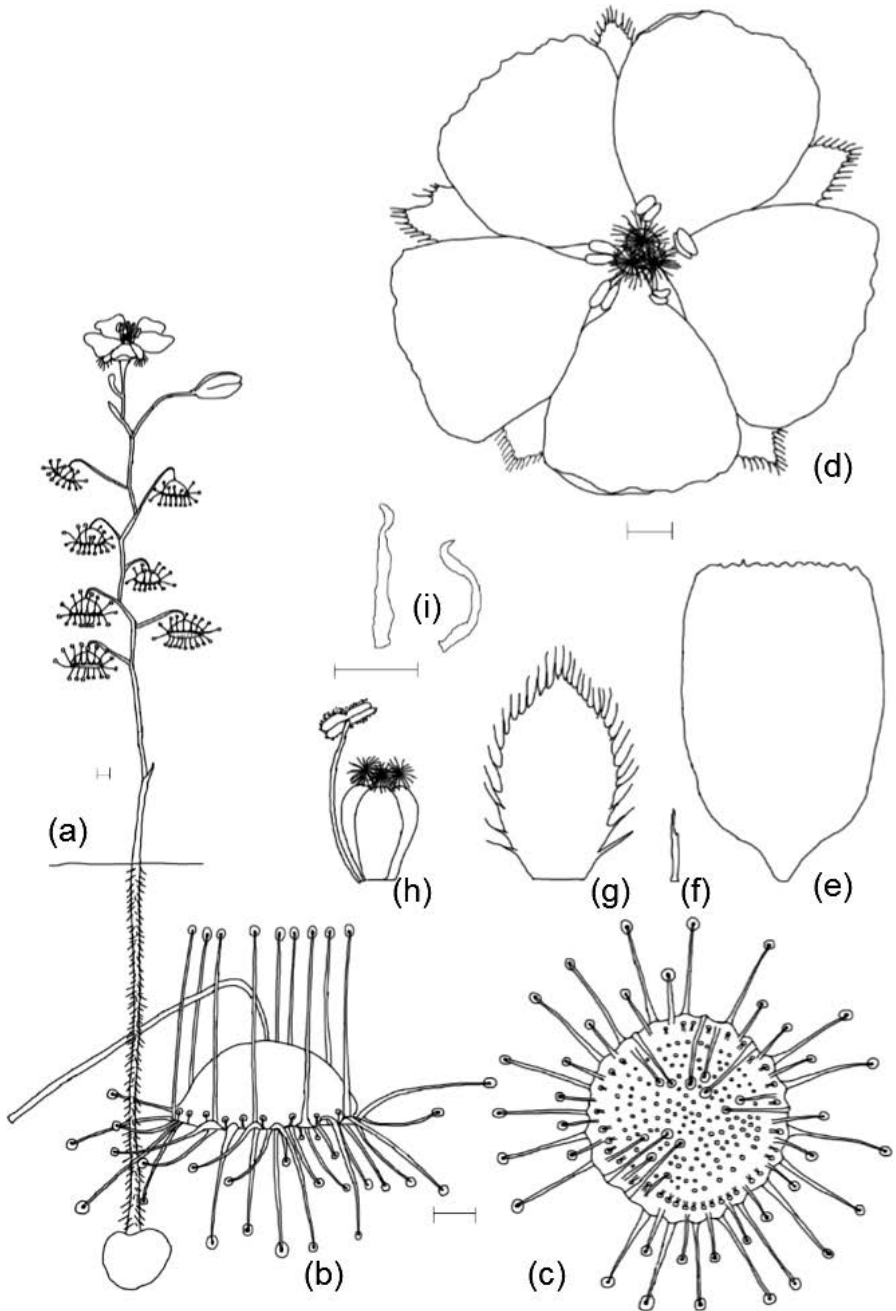


Figure 1: Botanic illustration of *Drosera huegelii* var. *phillmanniana* (a) plant, (b) lamina from side, (c) lamina from below, (d) open flower, (e) petal, (f) bracteole, (g) sepal, (h) ovary, styles and one stamen, and (i) seeds. Scale bar = 1 mm in all cases. Three levels of magnification are used for items (a); (b), and (c); and (d) to (i) inclusive. Sketch by R. Gibson.

Description

Drosera huegelii Endl. var. *phillmanniana* Y.-A.Utz & R.P.Gibson var. *nov.*

Diagnosis: Similar to *D. huegelii* var. *huegelii* but differs in having a consistently shorter stem in flowering plants of up to 12 cm tall.

Type: Australia. Western Australia: S. Barrett 633 (PERTH 4273567), 7 September 1995. Summit of Bluff Knoll, SE aspect.

Description: A green to light red-bronze colored tuberous perennial herb, plant with a single weakly flexuous, erect, self-supporting stem of flowering specimens to 12 cm tall (Fig. 1). **Stem** glabrous, lower part bearing 1-5 subulate prophylls 1-3 mm long, the remainder bearing usually 7-9 solitary, alternate cauline leaves; the axil of the uppermost leaf may occasionally produce a smaller secondary leaf. **Tuber** white, smooth, \pm globose, 8-10 mm diameter, enclosed in a black papery sheath; at the end of a vertical stolon 3-6 cm long. **Leaves** down-facing, borne on a semi-erect but hooked pedicel 10-14 mm long which is glabrous. Lamina very broadly campaniform, 5-6 mm diameter; very deeply cupped, 2-3 mm deep, pendulous with an orbicular opening. Abaxial surface glabrous. **Inflorescence** of a solitary flower or paniculate, terminal, 1-3-flowered. Peduncles to 6 mm long, glabrous; pedicels 6-25 mm long, glabrous. **Bracts**, linear to spatulate, 2-4 mm long. **Sepals** 5, green to red, ovate, elliptic to obovate, 5-6 mm long, 3-4 mm wide; margins lacinate; abaxial surface glabrous. **Petals** 5, creamy white, obovate to oblong, margins entire, apex truncate and denticulate, 8 mm long, 5-6 mm wide. **Stamens** 5, filaments white, to 2 mm long; anthers to 1 mm long, pale orange; pollen yellow. **Ovary** reddish brown, obconic, 1.2 mm long, 1 mm diameter; carpels 3. **Styles** 3, white, to 1 mm long, greatly divided into many filiform segments forming a tuft about 2 mm diameter at the apex of the ovary. **Seeds** dull black, straight or folded, linear to narrowly ovate, striated, flattened, to 1.8 mm long by 0.2 mm wide with funicle and apex weakly inflated (Fig. 2).

Immature plants of *D. huegelii* var. *phillmanniana* form flat rosettes of transversely elliptic lamina borne on linear petioles.

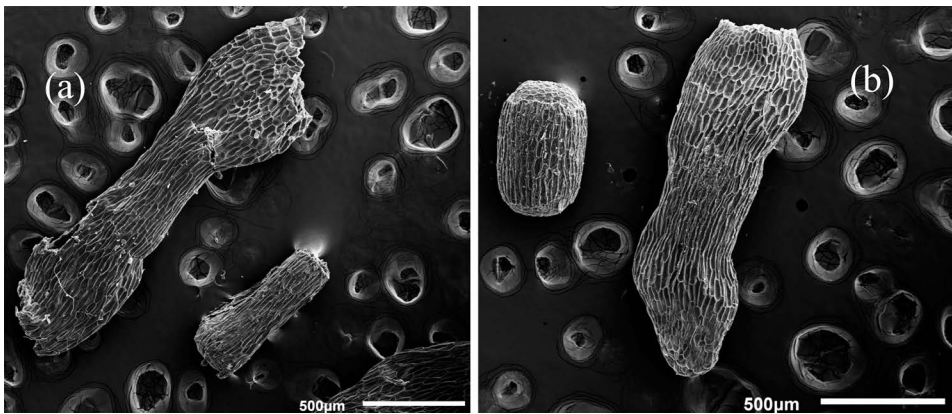


Figure 2: SEM images of the seeds of (a) *D. huegelii* var. *huegelii*, and (b), *D. huegelii* var. *phillmanniana*. The images include an example of a seed with and without the funicle and apex.

Table 1. Summary of differences between these two taxa.		
Character of mature plants	<i>Drosera huegelii</i> var. <i>phillmanniana</i>	<i>Drosera huegelii</i> var. <i>huegelii</i>
Plant maximum height (cm)	12	50
Tuber diameter (mm)	8-10	10-15
Lamina length (mm)	2-3	4-6
Cauline lamina cross-section	Broadly U-shaped	Narrowly U-shaped
No. of flowers per panicle	1-3	3-20
Peduncle length (mm)	6	20-35
Pediceal length (mm)	10-14	15-45
Ovary color	Red-brown	Green

Key differences between both varieties of *Drosera huegelii* are presented in Table 1 and are shown in Fig. 3.

Selected specimens examined:

D. huegelii var. *phillmanniana*

Capt. A. Dorrien Smith, 1910. Warrunup Hill, Stirling Range. Herbarium Kewense, WA, 1909-1910. (Det. Note by R. Erickson, 1963); S. Barrett 527 [PERTH 4135946], 21 Sept. 1995, Ellen Peak, Stirling Range; S. Barrett 330.8 [PERTH 4311566], 10 Oct. 1994, Hume Peak, Stirling Range; W. Bopp 120 [PERTH 4284976], 25 September 1994, western base of Bluff Knoll, Stirling Range.

D. huegelii var. *huegelii*

S.C. Coffey 116 A [PERTH 8468133], 13 Sept. 2009, Cape Arid National Park, near pay station; P.A. Jurjevich 1812 [PERTH 4822854], 8 Sept. 1997, 10 km W of Donnybrook; P. Mann 44/2003 & R.P. Gibson [NSW 884459], 25 Oct. 2003, 10 km NWN of Cranbrook; R.P. Gibson 271 & P. Mann [NSW 897543], 14 Sept. 2010. About 3 km E of Boyanup.

Etymology: This taxon is named in honor of our late friend, Phillip (Phill) Mann (1951 - 2014), who independently recognized the consistently diminutive habit of this taxon on the highest peaks of the Stirling Range. He encouraged both of us to take a closer look at these plants.

Phenology: Plants have been collected in flower in September (Southern Hemisphere) or January (Northern Hemisphere). Flowers open when the ambient air temperature exceeds about 15°C.

Distribution and ecology: *Drosera huegelii* var. *phillmanniana* has been recorded or observed on peaks of the Stirling Range that are above 800 meters elevation (Fig. 4). On Bluff Knoll it occurs in Eastern Stirling Range Montane Heath and Thicket Community (Barrett 2000) where it grows in open areas between shrubs; often in the company of *Drosera monticola*.

Robust, multi-flowered plants of *D. huegelii* var. *huegelii* grow beside the path to the summit plateau of Bluff Knoll [e.g. Bopp 120 [PERTH 428976]] in sheltered forest. However, they do not grow with *D. huegelii* var. *phillmanniana* plants on the summit plateau – about 500 meters to the



Figure 3: Comparison of *Drosera huegelii* var. *phillmanniana* and *D. huegelii* var. *huegelii*. *D. huegelii* var. *huegelii*: (a) mature plants in bud; (b) open flower; and (c) ripe seeds on a 2 mm grid. *Drosera huegelii* var. *phillmanniana*: (d) of plants in bud in cultivation, (e) open flowers; (f) ripe seeds; (g) plant in bud in the wild; (h) habitat in low open shrubland on the summit plateau of Bluff Knoll; and (i) comparison of mature plant tubers: *D. h. v. huegelii* (left) and *D. h. v. phillmanniana* (right) on a 2 mm grid. Photos (g) and (h) by R.G., all others by Y-A.U.

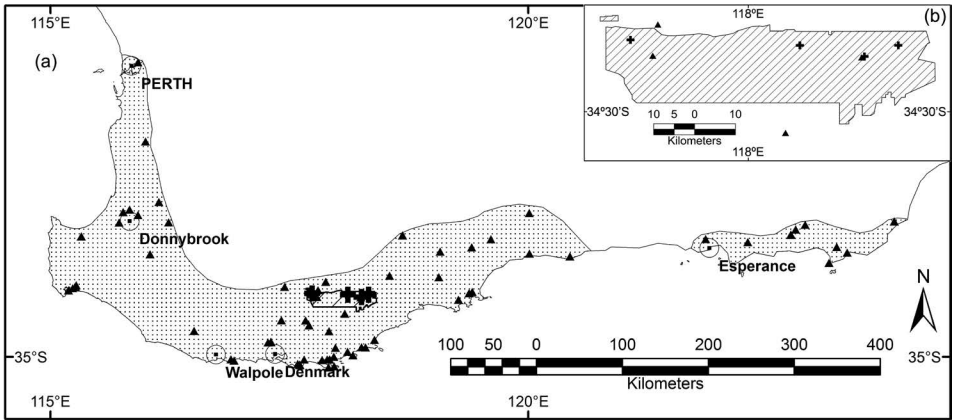


Figure 4: (a) Approximate distribution of *Drosera huegelii* is shown by stippling. Records of *D. huegelii* var. *huegelii* (▲) occur widely, however those of *D. huegelii* var. *phillmanniana* (+) have only been recorded within the Stirling National Park (diagonal lined polygon – see inset map (b)).

east and about 300 meters higher up. Plants of both varieties have been in cultivation for many years and retain their differing stature when grown under the same conditions.

Collections of short-stemmed plants around 10 cm maximum height have been made in a few coastal locations: notably Mount Lindesay, 14 km N of Denmark (S. Barrett 622 [PERTH 4273575]); beside Ficifolia Road, about 15 km E of Walpole (J. Wheeler 3120 [PERTH 5052785]); and 10 km W of Donnybrook (P.A. Jurjevich 1812 [PERTH 4822854]). Examination of these specimens has revealed that they had deeply cupped lamina and so represented short individuals of the typical form.

Conservation Status: This taxon appears to warrant ‘Endangered’ species status. It has a very limited range in which it typically occurs in a low density; at most a few thousand plants may occur in the wild. Further, its key habitat, ‘Eastern Stirling Range Montane Heath and Thicket Community’, is a Nationally-listed Critically Endangered Ecological Community (Barrett 2000). The main threat to this vegetation community is the impact of Dieback Fungus *Phytophthora cinnamomi*. This sundew does not appear to be killed by this pathogen, however it could pose an indirect threat by killing associated plant taxa and thereby modifying vegetation structure of its habitat.

Notes: *Drosera huegelii* var. *phillmanniana* shares most morphological characters with *D. huegelii* subsp. *huegelii*. From preliminary molecular studies and controlled pollinations between both taxa resulting in seed set, they appear to also be very closely related. Therefore, unlike the case of say, *D. zigzagia*, this taxon is not considered different enough to warrant neither specific nor subspecific rank.

Updated dichotomous key (Modified from Marchant *et al.* 1982)

- 10: Leaf lamina distinctly conical, inverted
- 11: Stems > 12 cm tall with >5 flowers per inflorescence*D. huegelii* var. *huegelii*
- 11: Stems < 12 cm tall with <5 flowers per inflorescence*D. huegelii* var. *phillmanniana*

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