A NEW SPECIES OF *WAHLENBERGIA* FROM WESTERN CAPE, SOUTH AFRICA

INTRODUCTION

Wahlenbergia Schrad. ex Roth with 260 species (Lammers 2007a, b) is the largest genus of Campanulaceae in the southern hemisphere and is most abundant in South Africa where about 65 % of species occur. Other areas in the southern hemisphere with significant species numbers are Australia (28 spp., Smith 1992; Plunkett *et al*. 2009) and New Zealand (10 spp., Petterson 1997). *Wahlenbergia*, as currently circumscribed, includes the genus *Lightfootia* L'Hér. *nom*. *illegit*., which comprised shrubby species with deeply divided corolla lobes (Thulin 1975; Lammers 1995). Von Brehmer (1915) revised *Wahlenbergia* for almost the entire African continent. He provided a subgeneric classification and keys to all species of *Wahlenbergia* and also proposed a subgeneric classification for *Lightfootia*, which was an improvement on that of Sonder (1865). More than 50 % of the species accepted by Von Brehmer were based on single collections. Thulin (1975) who revised *Wahlenbergia* for tropical Africa and Madagas-

FIGURE 4.—*Wahlenbergia suffruticosa*, inflorescences. Photograph: C.N. Cupido.

car, expressed doubt on the validity of many of them. The most recent comprehensive revision of *Lightfootia* was published by Adamson (1955) in which he recognized 46 species and followed to a great extent the subgeneric treatment of Von Brehmer (1915). Since Adamson's treatment, new species and subspecies of the genus formerly treated as *Lightfootia* have been described for tropical Africa (Lambinon & Duvigneaud 1961; Duvigneaud & Denaeyer-De Smet 1963; Wild 1964) but none for South Africa.

During field work, while collecting material for phylogenetic studies of the Campanulaceae, an undescribed species of *Wahlenbergia* was discovered. Vegetative and floral characters displayed by this species, place it in the *Lightfootia*-type group of the genus. This is also confirmed by the phylogenetic analyses, using chloroplast and nuclear DNA sequences, where these shrubby species were grouped separately from the 'typical' *Wahlenbergia* species (Cupido 2008). The new species meets the criteria of the monophyletic species concept, under which species can be diagnosed by at least one autapomorphy (Donoghue 1985). The species is described and illustrated here.

Wahlenbergia suffruticosa *Cupido*, sp. nov., herba perennis a congeneribus rhizomate capsulaque loculicide secus rimas longitudinales inter valvas apicales depressas in segmenta 5 secedenti. W. subulatae (L'Hér.) Lammers affinis sed floris colore, hypanthii forma amplitudineque, disci epigyni forma et capsulae dehiscentia differt.

TYPE.—Western Cape, 3318 (Cape Town): Malmesbury, Chatsworth, southern end of Chamberlain Road, (–DA), 5 Dec. 2007, *C.N. Cupido 325* (NBG, holo.; K, PRE).

Perennial rhizomatous herb with suffruticose habit, up to 200 mm tall, hispid, tufted, initially with taproot, lateral rhizomes develop later from which new shrublets arise. *Stems* erect, slender, unbranched, occasionally with lateral branches. *Leaves* alternate, scattered, spreading, sessile, linear, up to 10 mm long, subulate, apex hyaline, sparsely hispidulous on abaxial surface; margins sparsely ciliate or ciliate-dentate; axillary cluster of smaller leaves present. *Inflorescence* 3-flowered, 1 terminal, lateral 2 rudimentary, on highly reduced lateral branches with leaf-like bracts, aggregated into raceme-like synflorescences toward ends of main branches. *Flowers* shortly pedicellate, axillary, actinomorphic; bracts 2, leaf-like, 1.2–3.6 mm long, opposite, succulent, subulate, apex hyaline, sparsely hispidulous on abaxial surface, margins sparsely ciliate or ciliate-dentate, subtending each of rudimentary flowers, absent in terminal flower. *Hypanthium* hemispherical, hispidulous. *Calyx*: lobes 5, alternating with corolla lobes, 1.2–2.5 mm long, triangular, apex hyaline, sparsely hispidulous, margins sparsely ciliate-dentate. *Corolla* stellate, white or mauve; tube 0.1–1.0 mm long; lobes 5, 2.3–3.6 mm long, linear, outer surface hispidulous along midrib and inner surface near base. *Stamens* 5, free, inserted at base of corolla tube; filament 1.0–2.2 mm long, base dilated, margin ciliate, upper part tapering, forming a dome; anthers linear, basifixed. *Ovary* inferior, 5-locular, each containing 3 or 4 erect ovules situated at base of ovary, epigynous disc fleshy, occasionally hairy; style cylindrical, 2.0–3.6 mm long, eglandular, mauve-purple, sparsely hairy; stigma 3(4)-lobed. *Fruit* a capsule with depressed apical valves, dehiscing loculicidally by 5 longitudinal slits, 1 seed develops in 1 or 2 locules. *Flowering time:* November to January. Figures 4, 5.

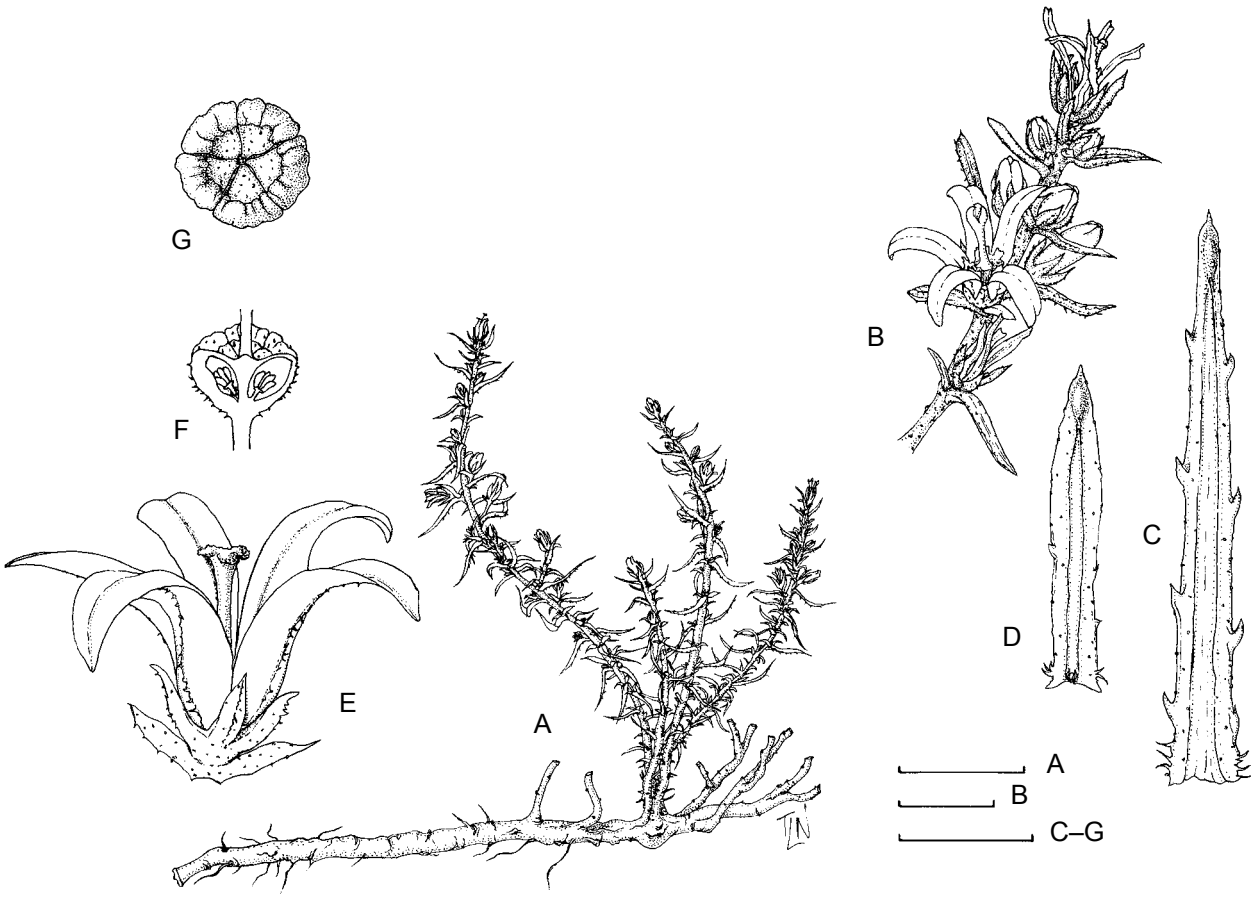

FIGURE 5.—*Wahlenbergia suffruticosa*, *Cupido 325*. A, portion of plant; B, flowering branch; C, leaf; D, leaf-like bract with rudimentary flower; E, flower with two leaf-like bracts; F, base of flower longitudinally opened, showing ovary and basal part of style; G, capsule (aerial view). Scale bars: A, 20 mm; B, 4 mm; C–G, 2 mm. Artist: Tracey Nowell.

Conservation status: known from a single population in Chatsworth, Malmesbury. The habitat of this species is under serious threat from invasive *Acacia saligna* trees and housing developments. Plots adjacent to the population are already being cleared for housing. It must be considered as Critically Endangered [A3c; B1 ab (i,ii,iii,iv,v) + 2ab (i,ii,iii,iv,v); C1+ 2a (i,ii); D, World Conservation Union (IUCN) 2001].

Diagnostic features and affinities: the '*Lightfootia*' clade in which *Wahlenbergia suffruticosa* is nested, is largely unresolved (Cupido 2008) and is of limited use in inferring relationships among species. The placement of *W. suffruticosa* is therefore uncertain, but morphological investigations suggest a strong affinity of this species to *W. subulata* L'Hér.

Vegetatively, the two species resemble each other in their spreading, often tufted habit, leaf shape and the presence of smaller leaves in the axils. The flowers of *Wahlenbergia subulata* are generally deep purple and on pedicels of longer than 1 mm, and larger than those of *W. suffruticosa*. In contrast, the smaller almost inconspicuous white flowers of *W. suffruticosa* are on pedicels shorter than 1 mm. The ovary in *W. subulata* is almost superior, thereby reducing the size of the hypanthium which is obscured by bulges at the base of the calyx lobes. *W. suffruticosa* differs from it in having an almost semi-inferior ovary, a well-developed hypanthium and no bulges at the base of the calyx lobes. Both species have three or more basal ovules in each of the five locules of the ovary. Usually in the Campanulaceae, the ovary locule number and style lobe number are correlated (Thulin 1975; Eddie & Ingrouille 1999), but this is not the case in this population of *W. suffruticosa*, in which the style lobe number (three) is smaller than the ovary locule number (five). The locule number, however, appears constant within the population. The style base in *W. subulata* is expanded, fusing with the dome-shaped epigynous disc, whereas in *W. suffruticosa* it is not expanded but embedded in a fleshy, flattened epigynous disc. In all species of *Wahlenbergia*, except *W. acaulis* E.Mey., the capsule characteristically dehisces by erect apical valves, which are formed by the dome-shaped epigynous disc. In *W. acaulis* dehiscence takes place via protruding intercalyx folds. *W. suffruticosa* has also departed from the typical *Wahlenbergia* pattern by evolving a unique mode of dehiscence in which slits develop between the depressed apical valves and extend longitudinally, separating the capsule into five segments (Figure 5G). This mode of dehiscence is an autapomorphy for the species. The uncorrelated style lobe and ovary locule numbers appear unique to this species, but could be a result of phenotypic plasticity, a phenomenon common in the Campanulaceae (Eddie & Ingrouille 1999). The consistency of these character states within the species needs to be confirmed when more populations are found.

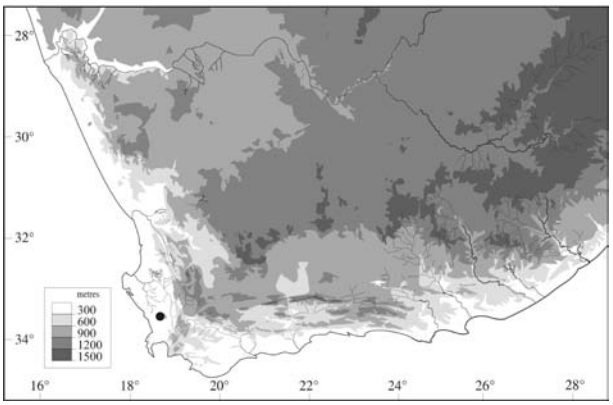

FIGURE 6.—Known distribution of *Wahlenbergia suffruticosa*.

In previous studies in the South African Campanulaceae, little or no attention has been given to below-ground plant structures as a potential source of taxonomic characters. The rhizomatous habit found in *Wahlenbergia suffruticosa* is documented here for the first time. It would appear from some herbarium specimens that rhizomes are also found in *W. subulata*.

Distribution and habitat: this species is only known from Chatsworth, a small town 15 km from Malmesbury off the N7 road from Cape Town (Figure 6). It grows in full sunlight in sand fynbos on sandy flats at an altitude of about 100 m. The soils are well drained and more than 2 m deep. The annual rainfall range is between 290 and 660 mm, with precipitation peaking from May to August. Additional precipitation is provided by mists which are common in winter. Frost occurs about three days per year (Rebelo *et al*. 2006).

Etymology: the epithet refers to the habit of the plant (*suffruticosus* = somewhat woody).

Additional specimen examined

WESTERN CAPE.—3318 (Cape Town): Malmesbury, Chatsworth, vacant plot SW of the Morris Brown AME Church, (–DA), 22 Nov. 2001, *Cupido 209* (NBG).

ACKNOWLEDGEMENTS

I wish to express my thanks and appreciation to Dr Ted Oliver for translating the diagnosis into Latin, Dr Tracey Nowell for doing the line drawing, Pethole Manyama for determining the conservation status, and the Western Cape Nature Conservation Board for granting a collecting permit.

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MS. received: 2010-02-23.