Tylecodon opelii, a new obligatory quartz-gravel species from the Northern Knersvlakte (Western Cape, South Africa)

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Introduction

Some 47 species of *Tylecodon* are endemic to South Africa and Namibia (Van Jaarsveld & Koutnik 2004). In South Africa 43 species occur, confined to the south – and south-western portion of the country where winter rainfall is experienced. The new species falls within the Knersvlakte Centre of Plant Endemism (Van Wyk & Smith 2001).

Tylecodon opelii is a new, obligate quartz-gravel dwelling species endemic to the northern Knersvlakte in the northern part of the Western Cape Province of South Africa. It was discovered by, and is named for, *Conophytum* expert Matt Opel, of the University of Connecticut (USA), on a expedition to the Knersvlakte July 2000. It is related to a group of dwarf, quartz-dwelling, geophytic species growing mainly in Succulent Karoo vegetation: *Tylecodon nolteei, T. occultans*, *T. pusillus* and *T. peculiaris*.

Tylecodon opelii is immediately distinguished from other species by its oblong tubers, and its irregularly moulded leaves, which are intensely dark green during the growing season, bearing a few pointed trichomes. The corolla of *T. opelii* is cylindric to slightly funnel-shaped, 12-14 mm long, with tapering squamae at the base.

The species can be confused with *T. occultans* and *T. nolteei*. However, *T. occultans* is immediately recognised by the white whiskery trichomes on its much broader leaf surfaces, *T. nolteei* (Fig. 1) by its blood-red, Gorbachev-forehead markings. *T. occultans* and *T. opelii* never have these painted markings, and *T. nolteei* has a larger, much taller caudex, though that pertains more to plants at the type locality; the eastern and southern populations show rounder, more modest caudexes. *Tylecodon peculiaris* (Fig. 2) is another very little-known plant with which *T. opelii* can also be confused, but it is immediately distinguished by its rough 'jellytot' appearance, the epidermis having a glassily bubbled purplish-green texture.

Tylecodon opelii Van Jaarsv. & S.A.Hammer, *differt a T. occultante tuberibus oblongis, foliis atroviridibus, irregulariter contortis, trichomata acuta sparse ferentibus, corolla* 12–14 × 2–3 mm *ad orem tubo alba differt*.

TYPE.—SOUTH AFRICA 3118 (Vanrhynsdorp): Bakoondkolk, south-sloping quartz gravel hillside, 150–200 m, (–AB), *Van Jaarsveld 22751* (NBG, holo.).

Plant solitary, summer-deciduous, dwarf geophyte to 10 mm in diameter. *Roots* fibrous. Tuber oblong, up to 35 × 10–15 mm, pale grey-brown and somewhat flaking, exposing the grey-green epidermis underneath; phyllopodia absent. *Leaves* softly succulent, apically produced, solitary or rarely with up to 3 leaves, ascending; blade irregularly molded, broadly club-shaped, orbicular to reniform (viewed from the top), often irregularly concave or shallowly grooved, 8–15 × 10–15 mm, cuneate and

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1 *Tylecodon nolteei* growing at Kareeberg. *2* *Tylecodon peculiaris* from Kareeberg.

3 *Tylecodon opelii*. Artist: Lisa Strachan. *4* *Tylecodon opelii* in its habitat at Bakoondkolk. Note the dark green leaf surface and the maroon under surface. *5* *Tylecodon opelii* towards the end of the season, becoming yellowish and wrinkled (Bakoondkolk). *6* *Tylecodon opelii* becoming yellowish, growing among *Oophytum nanum* (Bakoondkolk).

tapering to 2–3 mm at the base, upper surface very dark green; lower surface flushed beet red, both surfaces slightly shining, almost glabrous but bearing minute raised pointed trichomes and low scalloped ridges like dough pulled too early from the oven, glassy bubbles entirely absent; margin entire; petiole short, indistinct and 2–3 mm long.

Inflorescence a branched lax thyrse up to 100 mm long, bearing 1–2 monochasia, each with 1–2 flowers, faintly scented, not self-fertile; peduncle greenish, 15 mm long, 0.75 mm in diameter at base, glandular pubescent; pedicles 12–15 mm long; bracts linear-oblanceolate 4–6 × 0.3 mm, reddish-green soon becoming yellowish and deciduous. *Calyx* glandular pubescent, maroon green; lobes 3–4 × 0.5 mm. *Corolla* ascending, glandular pubescent, the buds white-tipped, tube 12-15 mm long, 2 mm at base expanding to 3 mm at throat,

7 *Tylecodon opelii* just before its leaves are shed, reddish raisins drying in the sun. *8* The quartz gravel habitat of *Tylecodon opelii*.

greenish-maroon; lobes 2.5–3 × 1.5 mm, becoming recurved, white, apices acute. *Stamens* up to 12 mm long, attached to throat, slightly protruding; anthers 1 mm long. *Squamae* oblong emarginate, ascending, 1 × 0.35 mm, yellowish-white, translucent. *Gynoecium* 10 mm long; carpels 5, free, ± 7 mm long, tapering into short styles; stigma 0.5 mm long. *Follicles* fused, 8 × 1 mm, greenish. *Seeds* ovoid, (0.6)-0.7 mm long, (0.3)-0.4 mm wide. brownish-yellow, surface slightly rugose, longitudinally ridged. *Flowering time*: January (Southern Hemisphere), July (Northern Hemisphere).

Distribution and Habitat

Tylecodon opelii (Figs. 3–9) is known only from the farm Bakoondkolk in the northern Knersvlakte (Fig. 10). This farm is somewhat removed from the main body of the Knersvlakte and harbours a number of unusual species and unusual forms of usual species. The vegetation consists of Knersvlakte quartz vygieveld (Mucina et al. 2005) growing at an altitude of 119 m. The plants grow well-camouflaged amongst the thick gravel (see Figures 5 – 8). They are not very abundant, sharing

9 *Tylecodon opelii* growing among *Oophytum nanum*. Note the previous season's fruit, very difficult to spot on the quartz fields at Bakoondkolk.

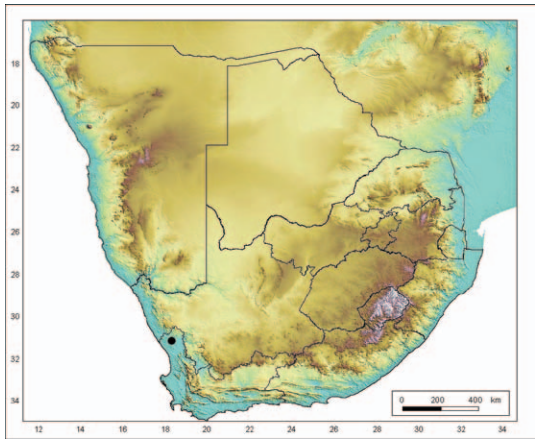
their living room with other quartz gravel species such as *T. pygmaeus, T. pearsonii, Diplosoma luckhoffii, Argyroderma crateriforme, Dicrocaulon humile*, *Oophytum nanum, Crassula globosa*, *C. columnaris* subsp. *prolifera, Othonna intermedia*, and *Dactylopsis littlewoodii*. Rainfall in the region is roughly between 75-125 mm per annum, supplemented by fogs from the cold Benguela current of the Atlantic Ocean. Ignatious Matimati and his coworkers (Matimati et al. 2010) recently measured fog deposits in the Knersvlakte and found that fog and dew deposits exceed the rainfall by 70%. They also found that *Argyroderma pearsonii* channels even greater amounts of precipitation by fog and dew (more than twice the annual rainfall!). They have shown that these dwarf succulent plant species are highly effective fog and dew interceptors.

The average rainfall in the Knersvlakte is about 150 mm per annum and the contribution by fog and dew is about 250 mm per annum (on gravel alone), but 460 mm per annum are trapped by *Argyroderma pearsonii*. One can thus safely extrapolate that dew and fog play a vital role for *T. opelii* and other dwarf succulents on the Knersvlakte and the dry Namaqualand and Namib coastal zones.

In the northern Knersvlakte summer temperatures are high during the day, with an average of 26°C. But at this time the dwarf tylecodons are leafless, seemingly inert, and hidden amongst the pebbles. This makes it all the more interesting that they choose this period for flowering. The flowers are well-elevated above the nestling quartz and exude enough nectar to ensure attention. As with their relatives, they are resinously sticky.

Cultivation

Tylecodon opelii has been grown from seed by one of us (S. Hammer). A rapid grower – it hasn't much mass to attain – it can mature a year after sowing.



10 Known distribution of *Tylecodon opelii*.

It develops a carrot-like tuber early on and after five years the tubers still lack the potato-like broadness seen in its sisters. *Tylecodon opelii* seems more difficult to hand pollinate than its relatives.

Plants are best grown in a lean, well-drained soil. Water well from late autumn (coinciding with the appearance of the new leaf) until mid-spring, when the plants should be weaned off. The species is best for the greenhouse, grown under a myopic specialist's care.

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