

LAMIACEAE

TETRADENIA KAOKOENSIS, A NEW SPECIES FROM KAOKOLAND, NAMIBIA

INTRODUCTION

Tetradenia kaokoensis was discovered while surveying succulent cremnophytes in South Africa and Namibia as part of a larger study of succulent plants associated with cliff faces in southern Africa.

The genus *Tetradenia* is endemic to Africa (4 species) and Madagascar (3 species). It was revised by Codd (1983, 1984) in *Bothalia*; the southern African species were treated in the *Flora of southern Africa* by Codd (1985). All members of the genus are semisucculent, drought-resistant, deciduous shrubs.

Tetradenia kaokoensis Van Jaarsv. & A.E.van Wyk, sp. nov., a *T. ripariae* (Hochst.) Codd habitu humiliorae parce ramoso, radicibus tuberosis, ramis juvenibus albo-arachnoideis tomentosis, 12 mm diametro, phyllopodisque acutis munitis, aestate florenti differt.

TYPE.—Namibia, 1712 (Posto Velho): northern Kaokoland, Otjhipa Mountains, near Koakora Spring, sheer dolomite cliffs, (–BD), Van Jaarsveld, Cilliers & Van Wyk 16617 (WIND, holo.; NBG, PRE).

Robust, erect, semisucculent, slightly aromatic, deciduous, sparsely branched, dioecious shrub up to 0.6 m tall. *Roots* succulent, up to 10 mm diam. *Stem* terete, 12–20 mm diam., succulent, brittle, grey-brown, sparsely longitudinally fissured, with oblong-oval lenticels 5 mm long; young branches densely white-cobwebby tomentose, sparsely covered with orange gland dots, becoming glabrescent and brown with age; bark peeling. *Leaves* crowded, ovate or ovate-triangular, 65–140 × 45–115 mm, apex acute to rounded, base cordate, densely white-cobwebby tomentose on lower surface with scattered orange glands, less so on upper surface, veins prominent below; margin crenate-dentate with up to 20 pairs of teeth; petiole 20–45 mm long, with basal subpetiolar purplish gland-like swellings and abscission layer (detachment point of petiole); 2–4 mm of base of petiole persistent forming a phyllopodium and slightly thicker than petiole, densely white-cobwebby tomentose, adaxially grooved, becoming woody after leaves have fallen; phyllopodium scar cordate and concave, dorsal side sharp and pointed. *Inflorescence* flowering when in leaf, of dense lateral or terminal oblong to pyramidal panicles, up to 200 × 120 mm; lateral branches 20–25 mm long; rachis densely white-cobwebby tomentose and with orange gland dots; bracts broadly triangular-ovate, 1.5 × 1.5 mm, translucent. *Flowers* dioecious, in 3-flowered cymes forming 6-flowered verticillasters; pedicels ± 0.3 mm long. *Calyx* ± 0.8 mm long, in female plants enlarging up to 1.5 mm in fruit, cobwebby tomentose and covered with orange gland dots; five-toothed, appears 3-lobed, upper lobe ovate, 0.5 mm long (becoming erect in fruit), lateral lobes bifid, each lobe divided into two triangular-lanceolate lobes 0.5–0.7 mm long (female flowers). *Corolla* 2-lipped, 5-lobed, up to 3 × 3–4 mm diam. when open, 3 mm long; tube funnel-shaped, white,



FIGURE 5.—*Tetradenia kaokoensis* in flower.

glabrous inside, tomentose outside; lower lip oblong-oval, 1.5 × 0.7 mm; upper lobes ovate, 1 × 0.7 mm. *Stamens* in male flowers exerted, up to 5.3 mm long, much shorter in female flowers, translucent; anthers white. *Disc* 2-lobed, bright red, lobes exceeding ovary. *Style* ± 2.5 mm long; stigma bifid, purplish, ± 1 mm long in male flowers. *Nutlets* of two types: normal type more common, larger, 0.7 mm long, oblong-ovoid, brown; smaller type 0.5 mm long, oblong, longitudinally ridged with 4–7 dark brown ridges. *Flowering time*: November to February. Figures 5–7.

Tetradenia kaokoensis has several distinct vegetative and floral features. Flowering occurs in summer, when the plants are in leaf (Figure 5). It is a robust, short, up to 0.6 m tall, sparsely branched shrub, with succulent roots and young branches of 12 mm in diameter (Figure 6). Most parts have a dense white-cobwebby tomentum, with distinct orange gland dots and no stipitate glandular hairs. The young branches of *T. kaokoensis* are unique within the genus *Tetradenia*. The new species is covered with pointed phyllopodia (Figure 7) resulting from persistent petiole bases; the basal petiole scar is characteristically heart-shaped.

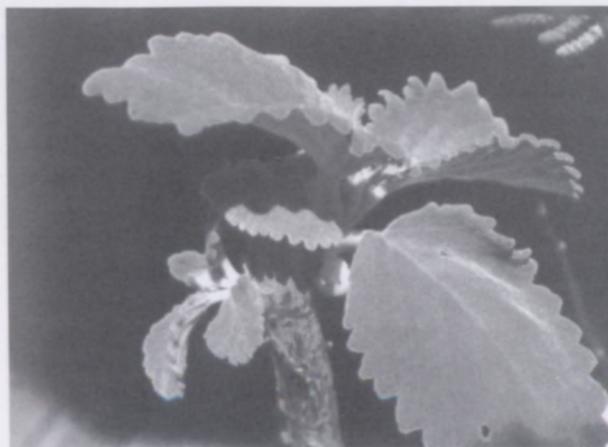


FIGURE 6.—*Tetradenia kaokoensis*, showing the leaves.



FIGURE 7.—*Tetradenia kaokoensis*, $\times 0.9$, showing the characteristic pointed phyllopodia. Artist: Jeanette Loedolff.

Tetradenia kaokoensis closely resembles the widespread and variable African species *T. riparia* (Hochst.) Codd. *T. riparia* is a highly aromatic, much-branched shrub up to 3 m tall, without succulent roots. Furthermore, it has much thinner young branches, lacking the characteristic crowded leaves and woody phyllopodia found in *T. kaokoensis*. The leaves are glandular pubescent and lack the dense white-cobwebby indumentum and orange sessile gland dots found in *T. kaokoensis*. *T. riparia* flowers in midwinter after its leaves have dropped. The mature calyx of *T. kaokoensis* is smaller, only 1.5 mm long, compared to 2 mm in *T. riparia*. The bright red ovary disc in *T. kaokoensis* is bilobed, exceeding the ovary. This is quite similar to the three Madagascan species, *T. fruticosa* Benth., *T. nervosa* Codd and *T. goudotii* Briq., which also have a bilobed disc exceeding the ovary. The ovary disc of *T. nervosa* is purple. In all other African species, *T. riparia*, *T. brevispicata* (N.E.Br.) Codd and *T. barberae* (N.E.Br.) Codd, the disc is 1-lobed (colourless in *T. riparia*) and occasionally 2-lobed in *T. brevispicata* and the disc does not exceed the ovary.

Tetradenia kaokoensis appears to be endemic to the dolomite cliffs of the Otjihipa Mountains of northern Kaokoland. It occurs on southern and northern slopes of sheer precipices, growing in rock cracks. The larger mountains of the region are generally known as the Baynes Mountains. The Otjihipa Mountains just south of

the Kunene River are the western outlier of the Baynes Mountains. The eastern portion, just over 2 000 m high, consists of quartzitic sandstone, whereas the western portion on the fringe of the Namib Desert consists of dolomite. *T. kaokoensis* is not common and is restricted to the inaccessible cliff faces. The climate is subtropical, warm in winter and hot in the summer months. Leaves appear in late spring and last until the end of autumn, also depending on the rainfall. Rainfall is ± 200 mm per annum and the vegetation is arid savanna with species of mopane and *Commiphora*, the most common woody plants. Associated plants found with the new species include *Adenium boehmianum*, *Aloe corallina*, *Ceraria longipedunculata*, *Plectranthus hereroensis* and *Sesamothamnus 'leistneri'*.

It is interesting to note the convergent features of *T. kaokoensis* with another African species of the family Lamiaceae, *Plectranthus crassus* from Mulanje Mountain to the east, a granite massif more or less at the same latitude, but closer to the Indian Ocean. *P. crassus* has a similar white-cobwebby indumentum and sessile orange gland dots on its young stems and leaves and the young stems have similar adaxially grooved, short, woody phyllopodia. It is also a sparsely branched shrub up to 1 m tall, with tuberous roots and base, but this is where the resemblance ends. Its floral features are typical of the genus *Plectranthus*. *P. crassus* occurs in grassland at an altitude of about 3 000 m.

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