

## ERICACEAE

A NEW SPECIES OF INDEHISCENT-FRUITED *ERICA* FROM THE CENTRAL KOUEBOKKEVELD,  
WESTERN CAPE, SOUTH AFRICA

## INTRODUCTION

The genus *Erica* L. in southern Africa has recently been enlarged by the reduction to synonymy of the 18 small, indehiscent-fruited Cape genera, or 'Minors' (Oliver 2000). The inclusion of the 84 species resulted in a total of  $\pm 765$  species for the genus. Since then, one additional indehiscent-fruited species, *E. rusticula* E.G.H. Oliv., has been described and this paper adds another, *E. tragomontana*.

*Erica* possesses either a dehiscent, indehiscent or partially dehiscent fruit. Two dehiscence strategies are displayed within the partially dehiscent type: 1, partial, active dehiscence when the drying out of the valves causes an incomplete split along suture lines; and 2, partial, passive dehiscence when valves do not open independently and the swelling of the developing seed forces the valves to open partially (Oliver 2000: 49, 50). In both instances seeds are not released from the capsule. The new species described here has a wholly indehiscent fruit, no swelling or splitting of the ovary occurring during or after ripening. Roughly 680 dehiscent-fruited species occur throughout southern Africa, whereas the 86 indehiscent and partially dehiscent-fruited species are confined to the Cape Floral Kingdom between Niewoudtville in the northwestern Cape and Port Elizabeth in Eastern

Cape (Oliver 2000). Marked centres of species richness occur in the Kogelberg/Grabouw area, Riviersonderend Mountains and Central Kouebokkeveld, 16–18, 15 and 13 species occurring per quarter degree grid ( $\pm 14 \times 17$  km) respectively (Oliver 2000: 87–95). The discovery of *E. tragomontana* therefore raises the number of indehiscent-fruited species in the central Kouebokkeveld (grid reference: 3319AB) to 14.

*Erica tragomontana* R.C.Turner, sp. nov., in grege specierum olim in generibus minoribus fructibus indehiscentibus positorum, *Ericae bokkeveldiae* E.G.H. Oliv. et *Ericae rusticulae* E.G.H.Oliv. & I.M.Oliv. affinis, sed ab eis pilis ovarii densis longis lanatis apicalibus, staminibus 5 vel 6 interdum 4 rare 7, sepalibus bracteaque appressis ovato-lanceolatis, foliis latioribus longioribus, habitu sparsiore erecto differt. Figura 8.

TYPE.—Western Cape, 3319 (Worcester): central Kouebokkeveld, Bokberg southwest of Winkelhaak Farmstead, southeast-facing slopes below trig. beacon 4, 1 257 m, (–AB), 9 October 2002, Turner 530, (NBG, holo.; BM, K, NY, PRE).

Plants up to 350 mm tall, erect, single-stemmed reseeders. *Branches*: several erect, main and numerous short,

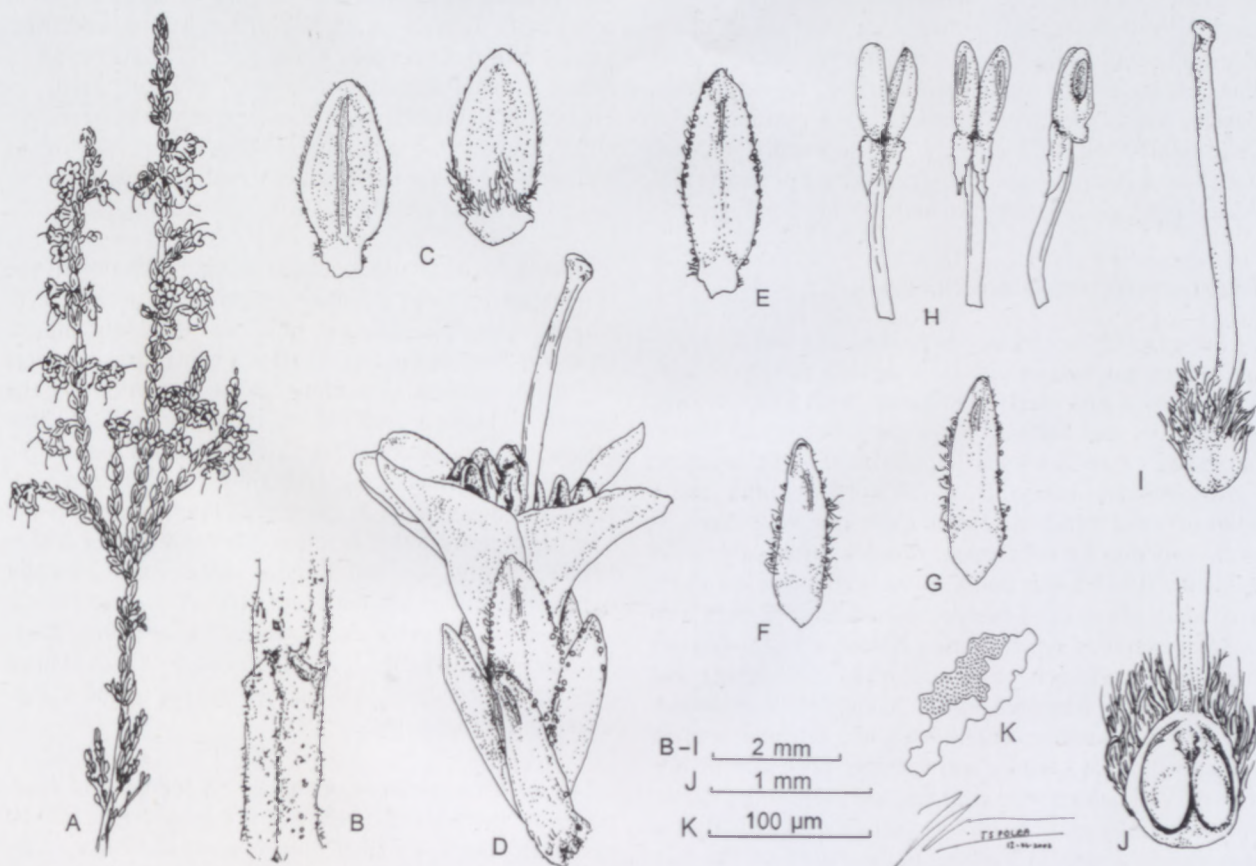


FIGURE 8.—*Erica tragomontana*. A, flowering branch, natural size; B, stem; C, leaf, abaxial view (left), adaxial view (right); D, flower; E, bract; F, bracteole; G, sepal, abaxial view; H, stamen, back, front and side views; I, gynoecium; J, ovary; K, testa. All drawn from type, Turner 530. Artist: Traci Polea. Scale bars: B–I, 2 mm; J, 1 mm; K, 100  $\mu$ m.

partially decurved secondary branches; stems, younger with short stiff hairs, older subglabrous with occasional short hairs; weak infrafoliar ridges. *Leaves* 3-nate, narrowly ovate, 1.0–2.4 × 1.2 mm, narrowly sulcate, abaxially glabrous, hairy on basal portions adaxially, reddish green, margins hyaline and ciliate; petiole 0.25–0.4 mm long, yellow. *Inflorescence*: flowers 1 to 3-nate, terminal on short, secondary branchlets; pedicel 0.1 mm long, red, with short, sparse hairs; bract partially recaulescent, adpressed, leaf-like, ovate-lanceolate, 1.4–1.6 mm long, minutely sulcate, pinkish green, margins ciliate with sessile glands; bracteoles 2, approximate, adpressed, longer than bract, oblong to lanceolate, 1.6–1.8 mm long, subacute, keeled, minutely sulcate, pink, margins ciliate with sessile glands, abaxially and adaxially glabrous. *Calyx* 4-lobed; sepals adpressed, ovate-lanceolate, keeled, subacute, 1.6 mm long, glabrous, pink, margins ciliate with sessile glands. *Corolla* 4-lobed, broadly funnel-shaped, 2.75–3.3 mm long, glabrous, colliculate, pink, margins erose, lobes spreading broadly apically, narrow basally. *Stamens* (4) 5 or 6 (7), free, manifest; filaments linear with a slight sigmoid bend, broadening basally, 1.6–1.8 mm long, glabrous, pink; anthers dorsally fixed at base, bipartite, erect, scabrous, reddish brown; thecae 0.72–1.0 mm long; appendages pendulous, dorsally fixed at bases of thecae, 0.6 mm long, linear, reddish purple, erose, scabrous, pores 0.2–0.36 mm long; pollen in monads. *Ovary* 2-locular, ovoid, 0.8–1.1 mm long, laterally flattened, dense, long lanate hairs apically and halfway down lobes, otherwise glabrous, reddish purple, 1 ovule per locule, placenta apical, no basal nectaries; style truncate, 2.6–3.8 mm long, far exserted, glabrous, pink; stigma minutely capitate. *Fruit* indehiscent, ovoid, 0.8–1.1 mm long, verrucose, reddish brown with long lanate apical hairs, otherwise glabrous; pericarp smooth, subcolliculate, thin, brittle, brown; mesocarp thin, red; endocarp thin, papery, pale cream. *Seeds* ellipsoid, ± 0.8 mm long; testa yellowish brown, cells elongate with unevenly jigsawed anticlinal walls and numerous small to medium-sized pits. *Flowering time*: September to early November. Figure 8.

#### Diagnostic features and discussion

Superficially resembling *E. bokkeveldia* and *E. rusticula*, *E. tragomontana* differs in having mostly 5 or 6, sometimes 4 and rarely 7 stamens, with long, woolly, apical hairs and halfway down the lobes of the ovary; adpressed ovate-lanceolate sepals, bract and bracteoles; narrowly ovate leaves of 1.0–2.4 × 1.0–1.2 mm; and a sparser, erect habit. *E. bokkeveldia* has pendulous, 3-nate, broadly funnel-shaped flowers with very short pedicels, 0.1–0.5 mm long, borne terminally on short, secondary branches; 3-nate leaves; aculeate anthers with broad, pendulous appendages; a 2-locular ovary with one pendulous ovule per locule and an apical placenta; but differs from *E. tragomontana* in having scarious, broadly ovate sepals; oblanceolate bract and bracteoles; eight stamens; and an apically and sparsely pubescent ovary. The general habit is also compact and more rounded, the species usually growing on drier, sandy, quartzitic flats in low proteoid/restioid fynbos at the bases of the surrounding mountains (R.C. Turner pers. obs.).

*Erica rusticula*, endemic to substrate derived from quartzitic Witpoort Formations in the northern Kou-

bokkeveld, also has pink, broadly funnel-shaped flowers with very short pedicels, 0.3 mm long, borne terminally on short, partially decurved secondary branches; filaments with an apical sigmoid bend, a far exserted, truncate style with a minutely widened stigma; 3-nate leaves; and a 2-locular indehiscent ovary with one pendulous ovule per locule. This species differs from *E. tragomontana* in having branches with short, dense, reflexed hairs; slightly shorter, imbricate leaves, with entirely hairy adaxial surfaces; flowers with only four stamens; filaments that broaden apically; non-scarious anthers with very short, narrow, pendulous appendages; shorter, straight, dense hairs covering the top  $\frac{3}{4}$  of the ovary surface and a subapical placenta; as well as a compact, woody and more rounded habit, especially in old plants (Oliver & Oliver 2000; R.C. Turner pers. obs.).

However, *E. tragomontana* also displays several similar morphological characters to the dehiscent-fruited *E. argentea* Klotzsch ex Benth., particularly the 3-nate leaves; the branches with weak infrafoliar ridges and fine hairs; the very short pedicel, 0.16–0.29 mm long, the 3-nate flowers borne terminally on short, partially decurved, secondary branchlets; the adpressed bract, bracteoles and sepals; the filaments with a slight sigmoid bend; the scabrous thecae with pendulous appendages; an apically hairy ovary; and an erect, slightly lax habit. This is not a unique instance, as character similarities between the indehiscent-fruited *E. cetrata* E.G.H. Oliv. and the dehiscent-capsuled *E. macrotrema* Guthrie & Bolus var. *glabripedicellata* Dulfer have been noted (Oliver 2000: 287). A closer inspection of *E. tragomontana* reveals an indehiscent, laterally-flattened 2-locular ovary with 1 ovule per locule and a lack of nectaries; mostly 5 or 6, sometimes 4 and rarely 7 stamens; and a broadly funnel-shaped corolla with spreading lobes. *E. argentea* has a dehiscent, 4-locular ovary with occasionally 1, usually 2–5 and rarely 7–9 ovules per locule, as well as basal nectaries; 8 stamens; and a narrowly obconical to urceolate corolla.

Character adaptations related to the protection of the fruit differ between the three indehiscent species. In *E. tragomontana* the hardened, adpressed sepals continue to clasp the base of the corolla tightly when dried flowers fall to the ground, providing added protection for the slightly sclerified fruit for a further period of time (Turner 728; pers. obs.). The dried, hardened base of the corolla tube protects the fruit of *E. bokkeveldia* after flowering, whereas in *E. rusticula* a thicker pericarp and seed testa perform this function (Oliver & Oliver 2000). While *E. tragomontana* usually possesses a 2-locular ovary with one ovule per locule ( $G \frac{2}{1}$ ), an exceptional situation was observed during dissection of mature fruits (Turner 728; pers. obs.), in which one locule contained two developed seeds and the second contained a flattened, unfertilized ovule.

As *E. tragomontana* possesses an indehiscent fruit, pollen in monads and a  $G \frac{2}{1}$  ovary, it would appear to be allied with the major basal polychotomy of 62 taxa within the indehiscent-fruited species (Oliver 2000). Due to the lack of clear indications of infrageneric relationships within the now greatly enlarged genus *Erica*, indehiscent-fruited species have been temporarily retained at the

end of the genus (Oliver 2000 in Oliver & Oliver 2000) and this new species is therefore provisionally placed after *E. rusticula* as species number M45.2.

#### Pollination syndrome

The pollination syndrome of *E. tragomontana* is unresolved. Although the species has no floral nectaries, only a slight stigmatic enlargement (minutely capitellate) has occurred, a similar condition also existing with *E. rusticula* (Oliver 2000) and the question is thus posed as to what exactly the pollination strategies of these species are, neither being specifically adapted for entomophily nor anemophily.

Thrips, common visitors to many *Erica* species, have been observed under magnification in the anther pores of fresh material of *E. tragomontana* (Turner 530, 592; pers. obs.) but these insects are considered too small to be effective pollinators (Rebello *et al.* 1987). The anthers of *E. tragomontana* possess relatively large, broad and pendulous appendages, suggesting some form of entomophily, although no pollinators have been observed during field study. Even though the flowers of *E. tragomontana* have no nectaries and do not emit a noticeable scent (R.C. Turner pers. obs.), it is very possible that larger flying insects, such as bees, visit the plant for its pollen reward alone (Rebello *et al.* 1987).

#### Distribution and habitat

*Erica tragomontana* is known only from two subpopulations occurring in the central Kouebokkeveld on the Bokberg and Sandberg (Figure 9), hence the specific epithet *tragomontana*, referring to the type locality on the Bokberg: *tragus* (Latin) = goat = *bok* (Afrikaans). Remarkably, the relatively dry Bokberg complex consisting of the Bokberg, Houdenbeksberg, Sandberg and Vaalboskloofberg, supports at least 14 indehiscent and 38 dehiscent *Erica* species as well as three subspecies of taxa occurring within the complex (R.C. Turner pers. obs.).

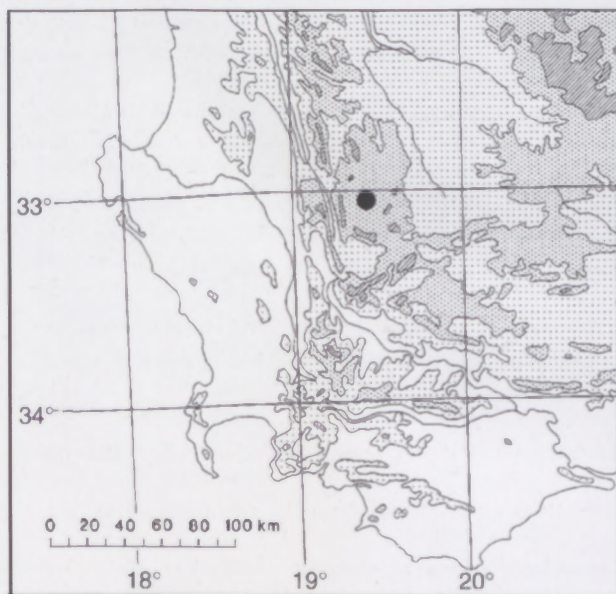


FIGURE 9.—Known distribution of *E. tragomontana*.

Upon initial discovery, only 15 plants were found in a small winter seepage area but it is now known that these plants represent the fringes of the Bokberg subpopulation as specimens have since been found to thrive in far greater numbers on drier, rocky, south- to southeast-facing slopes in a sandy substrate derived from resistant Witpoort formations of the Witteberg Group (Spatial Data Management Unit 1997). This quartzitic sandstone rock comprises both the Bokberg and Sandberg. At the type locality the species grows in association with *E. eremioides* (MacOwan) E.G.H.Oliv., *E. incarnata* Thunb., *E. melastoma* Andrews variant D (Oliver & Oliver 2002), *E. nudiflora* L., *E. recurvifolia* E.G.H.Oliv., *Aulax pallasia* Stapf (Proteaceae), *Sorocephalus lanatus* Thunb. (Proteaceae) and several species of Restionaceae. The Sandberg subpopulation occurs on a similar rocky, sandy, south-facing slope of identical substrate, growing in association with *E. arachnocalyx* E.G.H.Oliv., *E. argentea*, *E. monsoniana* L.f., *E. nudiflora*, *E. recurvifolia* and *E. virginalis* Klotzsch ex Benth., as well as several species of Restionaceae. Both populations occur between 140–1280 m and may be snowbound for short periods of time during the winter months of May to September.

#### Paratype material

WESTERN CAPE.—3319 (Worcester): Bokberg, Kouebokkeveld, upper south-facing slopes S of beacon 4, 1280 m, (–AB), 06-10-2001, Turner 381 (NBG); SE-facing slopes of Bokberg S of trig. beacon 4, fruiting material, 1257 m, (–AB), 10-03-03, Turner 728 (NBG); rocky S-facing slopes S of Sandberg, spot height 1341 m, Peerboomkloof, Kouebokkeveld, 1240 m, (–AB), 09-11-2002, Turner 592 (NBG); Bokberg, Hartebeeskloof 216, southern slopes SE of beacon 4, 1280 m, (–AB), 10-10-2002, Oliver 12069 (BM, BOL, E, K, MO, NBG, NY, P, PRE).

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