

*CHAPTER 7

TAXONOMIC TREATMENT

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* Species sequence according to the key to species

7.1 Circumscription of the genus

Passerina L. Species plantarum: 559 (1753); L.: 168 (1754); P.J.Bergius: 126 (1767); Mill.: (1768); Burm.f.: 12 (1768); L.: 236 (1771); L.: 225 (1782); L.: 374 (1784); Thunb.: 75 (1794); J.C.Wendl.: 18 (1798); Willd.: 429 (1799); Poir.: 39 (1804); Lam. & DC.: 359 (1805); Wikstr. 39: 319 (1818); Thunb.: 374 (1825a); Meisn.: 390 (1840); Steud.: 273 (1841); C.A.Mey.: 45 (1843); Meisn. 14: 561 (1857); Harv.: 325 (1868); Gand.: 418 (1913); C.H.Wright: 9 (1915); Thoday 4:146 (1924a); Marloth: 214 (1925); Domke: 137 (1934); Palmer & Pitman: 1583 (1972); Coates Palgrave: 648 (1977); Bond & Goldblatt: 432 (1984); Hilliard & B.L.Burt: 182 (1987); Goldblatt & Manning: 683 (2000). Type species: *Passerina filiformis* L.

Sanamunda [Clus.: 89 (1601); L.: 146 (1737)] Adans. 2: 258 (1763); Lam. & DC.: 359 (1805); Raf.: 104 (1836). Type species: as above.

Thymelaea [Tourn.: 594 (1719); L.: 146 (1737)] Adans. 2: 258 (1763); Juss.: 77 (1789); Lam. & DC.: 359 (1805). Type species: *Daphne laureola* L.

Passerine Lam. & DC. 3: 359 (1805) orth. var.

Balendasia Raf. 4: 105(1836). Type species: *B. ericoides* (Burm.f.) Raf.

Steirotis Raf. 4: 105 (1836). Type species: not designated (Farr. *et. al.* 1979).

Trimeandra Raf.: 105 (1836). Type species: *T. spicata* Raf. nom. illeg.

(*Passerina pentandra* Thunb.) \equiv *Lonchostoma* Wikstr. 39: 350 (1818) nom. cons.

Chymococca Meisn. 14: 565 (1857); Harv.: 325 (1868); Benth. & Hook.: 194 (1880); Thoday 4:166 (1924a). Type species: *C. empetroides* Meisn.

Passerina L. Sectio *Pentameræ* Meisn.: 390 (1840). Type species: not designated.

Passerina L. Sectio *Tetrameræ* Meisn.: 395 (1840). Type species: not designated.

Shrubs or small trees. *Stems* greyish brown; bark tough and stringy. *Leaves* decussate, imbricate on young branchlets, sessile, closely appressed to stem or spreading at an angle of 5–20°(–60°), cymbiform (boat-shaped), falcate or cigar-shaped; plane shape linear, oblong, lanceolate or narrowly trullate; base sessile or

cuneate; apex truncate and hump-backed, obtuse, rounded, acuminate or acute to almost spine-tipped; margins sometimes ciliate; length \times depth (leaf shape usually cymbiform, depth of lamina—distance from adaxial groove to main vein situated abaxially) (1.5–)2.5–4.0(–8.0) \times (0.8–)1.2–2.0(–3.0) mm; lamina inversely ericoid, adaxial surface concave, tomentose, abaxial surface convex, glabrous, seldom tomentose. *Inflorescences* comprising polytelic synflorescences [apex of main florescence (main axis) not terminating with a flower—indeterminate, co-florescences (lateral branches) of the same structure]; main florescences as well as co-florescences spicate; spikes reduced, resembling terminal subcapitulate inflorescences, each characterized by two terminal leaves with axillary blind-ending rudimentary flowers, enveloping minute growing point, proliferating growth (inflorescence apex growing out and returning to vegetative growth) less common (Figures 7.1–7.5A), or spikes mostly extended, number of spikes reduced or multiflowered main and co-florescences present, proliferating growth common (Figures 7.6–7.22A). *Bracts* enveloping flowers and fruits, largest after anthesis of flowers, becoming more coriaceous and rounded at fruit set, decussate, imbricate, cymbiform or helmet-shaped; plane shape oblong, lanceolate, ovate and obovate to widely ovate and obovate, rhombic and narrowly obtrullate to obtrullate; base sessile, cuneate; main vein strongly developed, often keeled, extending to form a leaf-like point in many species; apex obtuse, rounded or acute; texture mostly coriaceous; lamina with adaxial surface (inside) concave, abaxial surface (outside) convex, outside usually glabrous, inside, base or midrib tomentose or completely tomentose, coriaceous or chartaceous, rugose or smooth, \pm succulent or thin, sometimes \pm 3–5-ribbed, reticulately veined or ribbed and reticulately veined on each side of main vein; wings absent or bullate, coriaceous, chartaceous or membranous; margins often ciliate to setose; size variable, bracts without leaf-like point, length \times depth (2.5–)3.5–4.5(–5.5) \times (0.9–)1.0–1.5(–2.4) mm or bracts with leaf-like point, length \times depth (4.0–)5.1–6.3(–7.3) \times (1.4–)1.5–2.0(–2.6) mm. *Flowers* actinomorphic, hypogynous. *Floral envelope* constituting hypanthium and sepals, membranous during pollination and yellowish in *P. rigida*, *P. paleacea*, *P. nivicola* and *P. esterhuyseniae*, slightly succulent and greenish in *P. ericoides*, mostly yellow-pink in all other species, dehydrated after shedding of pollen, becoming papyraceous or coriaceous, yellow-pink tones turning red; (4.0–)5.3–7.3(–8.4) mm long. *Pedicel* very short or absent. *Receptacle* very short. *Hypanthium* a membranous to coriaceous cylindrical tube (fused calyx and androecium,

differentiating into sepals and diplostemonous androecium arising from hypanthium rim at separation of sepals) (Figure 7.1); indumentum variable in density, trichomes nonglandular, uniseriate, often spiralled, whitish, density of indumentum at ovary ranging from glabrous to tomentose or strigose; neck (narrowed tube between apex of ovary and sepals) (0.3–)0.6–2.6(–3.0) mm long, density of indumentum ranging from glabrous to tomentose on outside, inside often hairy, abscission tissue not macroscopically discernable, articulation plane absent, after fruiting fragmentation of neck base caused by dehydration and torsification of tissue, the sepals and androecium being shed in most species. *Sepals* 4, petaloid; imbricate in bud, flexed in flower, often setose with up to 5 long trichomes on outer surface and glabrous to tomentose on inner surface; outer sepals cymbiform or concave; inner sepals oblong, elliptic or obovate. *Corolla* absent. *Disc* absent. *Androecium* dimorphic diplostemonous, arising from hypanthium at separation point of sepals; filaments of antipetalous whorl (0.4–)0.7–1.2(–1.5) mm long, those of antisealous whorl (1.2–)1.4–2.2(–2.4) mm long; anthers (0.5–)0.7–0.9(–1.1) × (0.2–)0.3–0.4(–0.7) mm, sub-basifixed, 2-theous and 4-locular, exerted, extrorse. *Ovary* superior, (1.6–)2.0–2.5(–2.7) × (0.5–)0.6–1.4(–1.7) mm, bicarpellate during embryonic stage (Bunniger 1972), pseudomonomerous (Heinig 1951) at maturity, placentation parietal, uniloculate, with 1 pendulous ovule laterally attached near top of ovary. *Style* separating laterally from top of ovary, maintaining lateral position in hypanthium neck, reaching beyond hypanthium rim. *Stigma* ± globose, mop-like or penicillate (wind pollination). *Fruit* enveloped by persistent, loosely arranged hypanthium fragmented at neck base or, in some species, fragmenting over widest circumference of fruit, the fragmented hypanthium, sepals and androecium being shed; in *P. ericoides* and *P. rigida* a fleshy 1-seeded berry, 5.3 × 4.0 mm; in all other species an achene, pericarp membranous and dry, 2.5 × 1.2 mm. *Seed* broadly fusiform with outgrowths at both micropylar and funicular ends; tegmen black and shiny, often with white spots; size 2.2(–2.9) × 1.2(–1.6) mm; endosperm formation nuclear, but later becoming cellular throughout.

Nomenclatural notes

See Table 7.1, for a summary of taxa in the most comprehensive works on *Passerina* from Linnaeus (1753) to the present study.

Diagnostic characters

Plants of *Passerina* are shrubs or small trees, distinguished by the inversely ericoid leaves, that are inverse-dorsiventral in c/s. The inflorescences are few- to multiflowered, simple or compound spikes, often reduced, artificially resembling terminal subcapitulate inflorescences. Each flower is enveloped by a conspicuous bract, becoming more coriaceous and rounded at fruit set. The flowers are adapted to wind pollination. During pollination the flower colour is yellow-pink, the four petaloid sepals are flexed and the anthers are exerted and extrorse (unique for Thymelaeaceae in southern Africa). All anthers open explosively and the pollen is shed at once. The stigma is mop-like. The fruit is enveloped by a persistent, loosely arranged hypanthium. Because of the absence of an articulation plane, the hypanthium fragments at neck base or, in some species, over widest circumference of fruit, the fragmented hypanthium, sepals and androecium being shed. *P. ericoides* and *P. rigida* are characterized a fleshy 1-seeded berry and all other species by an achene.

Etymology

Passerina refers to the Latin *passer* (= a sparrow) as the seeds resemble a sparrow's beak.

Common names

The vernacular name 'sparrow-wort' was suggested by Miller (1768) for all *Passerina* species and Wendland (1798) used the name *fadenförmige Vogelkopf*. According to Smith (1966) *gonna* is a collective name once used by the Khoekhoe for various members of Thymelaeaceae, e.g. several species of *Passerina* and *Struthiola*.

Uses

Many *Passerina* species grow on sand dunes and in sandy areas, with parts of the woody stem subterranean, forming runners and developing an extended root system.

Most of these plants are pioneers and resprouters, increasing their chances of survival in disturbed areas. These plants are excellent sand binders and are suitable for binding problematic sandy areas, especially after the clearing of invader species. Sim (1919) recommended *Passerina* in his list of trees and shrubs for coastal areas exposed to sea winds. Certain *Passerina* species are small trees and can be used as ornamental garden plants. The bark is exceedingly tough and is used for tying down thatch. According to Watt & Breyer-Brandwijk (1962) it is also plaited into whip thongs and used as twine. Members of the genus are not browsed by stock as the plants are apparently unpalatable (Story 1952).

Flowering and fruiting

Most *Passerina* species flower profusely in spring, from September to October. During this season the Cape Floristic Region is quite windy and large amounts of pollen is produced, as *Passerina* is wind-pollinated. Pollen is often wafted away in clouds, causing a kind of hay-fever in sensitive persons (Marloth 1925). Fruiting time is mostly from December to January. The fleshy fruits of *P. ericoides* and *P. rigida* are dispersed by birds or rodents inhabiting the distribution ranges of these species along the South African coast. Fruits of *P. truncata* subsp. *truncata*, growing in the Karoo, passively fall to the ground, where they are probably dispersed by ants or rodents. The fruits of *P. montana*, occurring along the Great Escarpment, are probably dispersed by birds as they are arranged at the tips of branchlets, exposed, red, and beak-like, possibly resembling the beaks of nestlings.

Distribution and ecology

Of the 20 species, 14 are endemic or near-endemic to the Cape Floristic Region. *P. obtusifolia* is widespread in the Northern, Eastern and Western Cape Provinces, while *P. corymbosa* occurs in the Western and Eastern Cape Provinces, with outliers in KwaZulu-Natal. *P. rigida* is distributed from the Western Cape, along the coast to northern KwaZulu-Natal; all these species are endemic to the southern African provinces in which they occur. *P. drakensbergensis* is endemic to the Bergville District in KwaZulu-Natal. *P. montivaga* is found from Mossel Bay and Oudtshoorn to the Eastern Cape and along the escarpment northwards to Zimbabwe and

P. montana is distributed from the eastern mountains and Great Escarpment of southern Africa to Zimbabwe and Malawi.

7.2 Key to the species

- 1a Inflorescences comprising terminal subcapitulate spikes; proliferating growth (inflorescence apex growing out and returning to vegetative growth) uncommon (Figures 7.1–7.5A):
- 2a Floral envelope yellow and membranous, up to ± 4 mm long, neck (portion of hypanthium between ovary and sepals) very short, ± 0.3 mm long; bracts widely ovate, wings membranous and obscurely veined 1. *P. paleacea*
- 2b Floral envelope yellow-pink and papyraceous, 4.9–6.4 mm long, neck 0.7–1.4 mm long; bracts variously shaped, wings present or absent:
- 3a Leaves narrowly oblong to oblong; base sessile, dilated; apex truncate, or truncate to rounded, keeled, often appearing humped on the back 2. *P. truncata*
- 3b Leaves linear-lanceolate; base diamond-shaped to rounded; apex rounded to acute:
- 4a Abaxial surface of young leaves tomentose; bracts ovate to widely ovate; lamina comose on inside, sparsely hairy to tomentose on outside, ± 3 -ribbed on each side of main vein, coriaceous and rugose; length \times depth (leaf shape usually cymbiform, depth of lamina—distance from adaxial groove to main vein situated abaxially) (4.5–)4.9 \times 1.5(–1.8) mm 3. *P. quadrifaria*
- 4b Abaxial surface of young leaves glabrous; bracts ovate to obovate; lamina villous on inside, glabrous on outside, obscurely ribbed on each side of main vein, thinly coriaceous; length \times depth (3.2–)4.0 \times 0.9(–1.6) mm 4. *P. montana*
- 1b Inflorescences comprising extended spikes, number of spikes often reduced, or many compound, multiflowered spikes present; proliferating growth common (Figures 7.6–7.22A):

- 5a Inflorescences reduced, often to solitary spikes; dwarf shrubs up to 300 mm high; bracts rhombic, dark green when fresh, dark brown in dried specimens, coriaceous, membranous wings absent..... 5. *P. burchellii*
- 5b Inflorescences with multiflowered main and co-florescences; low shrubs, shrubs or small trees; bracts variously coloured, textured and winged:
- 6a Fruit fleshy; floral envelope greenish or yellow, coriaceous or membranous; leaves greyish green:
- 7a Fruit a red berry; floral envelope greenish and coriaceous, hypanthium strigose; leaves oblong, apex obtuse to subacute; bracts larger, oblong to lanceolate, leaf-like 6. *P. ericoides*
- 7b Fruit a bright yellow berry; floral envelope yellow and membranous, floral envelope glabrous at ovary, tomentose at neck; leaves narrowly lanceolate to ovate, apex acute with main vein visible as a blunt keel; bracts widely ovate, apex acute..... 7. *P. rigida*
- 6b Fruit dry (an achene); floral envelope yellow, yellow-pink or red, membranous or papyraceous; leaves variously coloured:
- 8a Floral envelope membranous, yellow or yellow-pink:
- 9a Floral envelope yellow or yellow-pink; bracts chartaceous, widely obovate, wings membranous, often bullate, tinged red at margins 8. *P. nivicola*
- 9b Floral envelope yellow; bracts thinly chartaceous, smooth and helmet-shaped with membranous rims..... 9. *P. esterhuyseniae*
- 8b Floral envelope papyraceous, yellow-pink or red:
- 10a Young leaves and bracts abaxially sparsely hairy, becoming tomentose towards apex, older leaves rugose or warty with bases of fallen hairs..... 10. *P. comosa*
- 10b Young leaves and bracts abaxially glabrous:
- 11a Bracts shorter than 4.5 mm:

- 12a Bracts rhombic in outline, softly coriaceous, with membranous wings, margins brownish ciliate 11. *P. pendula*
- 12b Bracts oblate in outline, chartaceous, with bullate membranous wings, margins glabrous..... 12 *P. galpinii*
- 11b Bracts longer than 4.5 mm:
- 13a Floral envelope \pm 5.9 mm long; outer and inner sepals concave and lanceolate; bracts larger than leaves, bracts and leaves lanceolate and glaucous 13. *P. drakensbergensis*
- 13b Floral envelope 6.0–8.4 mm long; outer and inner sepals variously shaped; bracts not as above, variously shaped and coloured:
- 14a Midrib of bract shortly extended into an acute apex, lamina rhombic to obtrullate, distinctly angled, 4- or 5-ribbed; leaves with a distinct midrib, laterally compressed, greyish green, drying greyish brown 14. *P. corymbosa*
- 14b Midrib of bract extending beyond lamina into a leaf-like point, lamina variously shaped and ribbed; leaves with a distinct midrib, or midrib less obvious, abaxially convex or laterally compressed, variously coloured:
- 15a Bracts with leaf-like point obtuse at apex, lamina closely 2-ribbed at margin; hypanthium fragments at circumference of ovary 15. *P. obtusifolia*
- 15b Bracts with leaf-like point variously shaped, but not obtuse, lamina (faintly ribbed in *P. drakensbergensis*) extending into a membranous margin; hypanthium fragments at neck base:
- 16a Adaxial (inner) surface of bracts basally to centrally setose or tomentose over entire length of midrib; wings glabrous:
- 17a Bracts with midrib and leaf-like point stout and strongly developed, apex acute..... 16. *P. paludosa*
- 17b Bracts with midrib forming a straight or filiform, leaf-like point, or midrib shortly extended:

- 18a Bracts with leaf-like point straight or slightly incurved; wings of bracts ovate, margins hairy in distal half, or obtrullate, narrowing abruptly into midrib.....17. *P. montivaga*
- 18b Bracts with leaf-like point shortly extended or extended into a filiform, slightly falcate point; wings of bracts ovate-acuminate, gradually narrowing to a point or widely obovate, narrowing abruptly into midrib..... 18. *P. filiformis*
- 16b Adaxial (inner) surface of bracts completely villous:
- 19a Bracts with midrib extended, leaf-like point falcate; wings of bracts \pm 4-ribbed; hypanthium neck \pm 3.0 mm long, tomentose, often arcuate; spikes lax, often arcuate, mottled grey-green, with up to 16 fertile, enlarged bracts.....19. *P. falcifolia*
- 19b Bracts with midrib shortly extended into a short point, apex acute; wings of bracts \pm 5-ribbed; hypanthium neck \pm 2.0 mm long, glabrous to sparsely pubescent; spikes robust, rigid and extended, glaucous, with up to 30 fertile, enlarged bracts 20. *P. rubra*.

7.3 Species treatment

1. *Passerina paleacea* Wikstr. Kunglinga Svenska Vetenskapsakademiens

Handlingar 39: 323 (1818); Meisn.: 400 (1840); Meisn. 14: 562 (1857); C.H.Wright: 12 (1915); Thoday 4: 164 (1924a); Thoday 10: 388 (1924b). Type: Caput Bonae Spei, Herb. Wikströmii, *Sparman s.n.* (S!, lecto., here designated; UPS!).

Lachnaea paleacea Herb. Banks, ined., fide Wikstr. 39: 324 (1818); Meisn. 14: 562 (1857); C.H.Wright: 12 (1915); Thoday 4:164 (1924a), nom. inval. in synonymy.

Passerina glomerata sensu Thunb.: 374 (1825a) pro parte quoad specim. *Herb. Thunberg 9596D, 9579*.

Lachnaea conglomerata L. sensu Thunb.: 374 (1825a) pro parte quoad specim. *Herb. Thunberg 9596D*.

Passerina ericoides sensu Thunb.: 374 (1825a) pro parte quoad specim. *Herb. Thunberg 9596D, 9579*, non L.; *P. ericoides* sensu Meisn.: 401 (1840) pro parte, non L.; Meisn. 562 (1857) pro parte quoad specim. *Drège s.n.* (G!, K!, Pl!, S!).

Shrubs or shrublets 0.1–1.5 m high. *Stems* branching from base to up to growing points, young branchlets ascending, branchlets from previous growth persistent, arcuate, indurate; younger branchlets densely white-tomentose, villous closer to growing points; shredded bark of older branchlets greyish brown, remains of tomentum forming lengthwise strips; leaf scars conspicuous; older stems fissured lengthwise exposing greyish white sclerenchyma fibres; internodes shorter than leaves. *Leaves* imbricate on young branchlets, closely appressed to stem, diverging at an angle of $\pm 0-5^\circ$, cymbiform, often expanding, becoming thickly chartaceous and bract-like towards inflorescences; lamina inversely ericoid, adaxial surface concave, tomentose, abaxial surface laterally compressed and glabrous, plane shape linear to linear lanceolate; base sessile, dilated; apex acute, median vein forming a distinct keel incurved at apex; margins involute; length \times depth 1.5–2.5(–4.0) \times 0.6–0.8(–1.2) mm. *Inflorescences* subcapitulate, \pm ellipsoid. *Bracts* decussate, imbricate, sessile, appressed, widely ovate in outline; lamina adaxially (inside) concave and villous, abaxially (outside) convex and glabrous, thickly chartaceous, smooth on each side of main vein, concolorous, greyish green, senescing to yellowish brown; base cuneate; main vein extending into obtuse apex; wings membranous, borders glabrous, obscurely veined; length \times depth (2.5–)2.7 \times 1.2(–1.9) mm. *Floral envelope* membranous and yellow during pollination, dehydrated after shedding of pollen, turning red to brownish, \pm 4.2 mm long. *Hypanthium* glabrous, neck \pm 0.3 mm long, abscission tissue and articulation plane absent. *Sepals* concave, elliptic or subrotund and glabrous. *Androecium* with filaments of antipetalous whorl \pm 0.7 mm and antisepalous whorl \pm 1.4 mm long; anthers 0.6 \times 0.5 mm. *Ovary* 2.4 \times 1.4 mm. *Fruit* an achene with pericarp membranous and dry, 2.3 \times 1.2 mm, enveloped by persistent, loosely arranged hypanthium fragmenting over widest circumference of fruit, the fragmented hypanthium, sepals and androecium being shed. Figure 7.1A–H.

Nomenclatural notes

In the latter half of the eighteenth century *Lachnaea conglomerata* L. (1753), *Passerina ericoides* L. (1753) and *P. glomerata* Thunb. (1794) were constantly confused by botanists, causing Wikström (1818: 322) to place *P. glomerata* and *L. conglomerata* in the synonymy of *P. conglomerata* Thunb. In the same publication Wikström delimited and described *P. paleacea*. However, *P. paleacea* is not mentioned in Thunberg's revision of 1825, in which he described *P. glomerata* occurring in 'Hautbay', the currently known locality of both *P. paleacea* and *P. ericoides*. This confusion is reflected on many herbarium specimens, e.g. the specimen *Herb. Thunberg 9579*, bearing the inscriptions *P. ericoides*, *P. glomerata* (struck out) and the word 'paleacea' written in pencil. Although Thoday (1924b) chose the specimen *Herb Thunberg 9597* as the type of *P. paleacea*, this specimen was not chosen as lectotype in the present study, as the Sparrman specimen cited by Wikström (1818: 324) was located at S. The specimen *LINN 504.3*, positively identified as *P. paleacea*, bears the inscription 'sp 161', possibly referring to Sparrman. However, there will always be doubt whether it is a duplicate of the Sparrman specimen cited by Wikström.

Diagnostic characters and relationships

Passerina paleacea can easily be confused with *P. rigida*, as both occur on sand dunes along the coast. The branches of *P. rigida* are nodding and abundantly covered by pendulous branchlets, spikes are extended and the fruits are fleshy yellow berries. Plants of *P. paleacea* are less robust, reaching a maximum height of 1.5 m, and are characterized by an abundance of subcapitulate inflorescences and dry fruit. The subcapitulate inflorescences at times led to the confusion of *P. paleacea* with *P. truncata* (= *P. glomerata*), but, these two species are morphologically as well as geographically distinct. *P. paleacea* has a maritime habit and *P. truncata* is distributed from Vanrhynsdorp, along the Cederberg mountains, to Malmesbury, Ceres, Tulbagh

and Matjiesfontein up to Seven Weeks Poort. The earlier confusion between *P. paleacea* and *P. ericoides* was probably due to their sympatric occurrence, but these two species are morphologically quite different.

Etymology

The Latin specific epithet *paleacea* (= chaffy) probably refers to the chaff-like subcapitulate inflorescences.

Distribution and ecology

Passerina paleacea occurs in both the Southwestern and the Agulhas Plain Centres of the Cape Floristic Region (CFR) (Goldblatt & Manning 2000) and is a typical fynbos element. It grows on coastal dunes and other in maritime habitats from Langebaan, round the Cape Peninsula to the Cape Flats, Kogel Bay, Hermanus, Gansbaai, De Hoop, the Potberg coast, Bredasdorp, Arniston, Vermaaklikheid and Puntjie up to Stilbaai. It can be confused with *P. rigida*, a robust plant often growing on the primary dunes and widely distributed from the Western Cape, along the coast to northern KwaZulu-Natal. The vegetation types Dune Fynbos and dune thicket form a mosaic along many parts of the southern Cape coast (Lubke 1998a, 1998b; Lubke & Van Wijk 1998). This same distribution pattern is displayed by *P. paleacea* as it is found in the dune scrub, amongst typical fynbos species, but not in the dune thicket amongst larger shrubs or small trees with mesophytic leaves such as members of *Chrysanthemoides*, *Mimusops*, *Morella*, *Rhus* and *Sideroxylon*. Figure 7.11.

Conservation status: Least Concern (LC) (IUCN Species Survival Commission 2000).

Specimens examined

WESTERN CAPE.—3318 (Cape Town): Langebaan, Schrywershoek, (–AA), *Boucher 2951* (NBG, PRE); Melkbosch Strand, (–CB), *Pillans s.n.* (GRA); Camps Bay, (–CD), *Hutchinson 143* (BOL, K, PRE); *Alexander-Prior s.n.* (PRE); *Schlechter 1363* (C, PRE); Stellenbosch District, Bottelary, (–DC), *Bolus 17197* (BOL). 3418 (Simonstown): Simonstown, (–AB), *Acocks 1001* (S); Witsand, *Andraea 581* (NBG PRE); near Wynberg, *Bolus 2926* (K); Kommetjie, *Bredenkamp 960* (PRE); Glencairn, Table Mountain, *Compton 11594* (NBG, S); Hout Bay, *Compton 9172* (NBG); Ronde Vlei, *Compton 24363* (NBG); between Muizenberg and sewage works, *Esterhuysen 35504* (BOL, C, M, MO); Hout Bay, *Krauss s.n.* (M); Witsand, *Gillett 814* (NBG); Klipfontein, *Gillett 1012* (NBG); Mountains between Fish Hoek and Simonstown, *Hutchinson 149* (BOL, GRA, K, PRE); Simonstown, *Lindeberg s.n.* (S); N of Wildevoëllei, *O'Callaghan 708* (NBG); NW of Simon's Bay, *Pillans 3783* (BOL, PRE); Noordhoek, *Thoday 216* (K, NBG, PRE); beyond Simonstown, *Wolley-Dod 2927* (BM, K); Hout Bay, *Wolley-Dod 1575* (PRE, K); Simons Bay, *Wright s.n.* (K, MO, P, TCD); Hout Bay, *Zeyher 38* (MO); Cape Maclear, (–AD), *Bredenkamp 961* (PRE); Cape Point, *Lewis 71* (NBG); near Cape Maclear, *Salter 6220* (BM, K); Krom River, *Taylor 7123* (K MO PRE); Cape of Good Hope, *White 5230* (PRE); Cape Flats, (–BA), *Alexander-Prior s.n.* (PRE); Cape Flats along Athlone Road, *Bolus s.n.* (BOL, PRE); Cape Flats, *Burchell 8389* (K); *Compton 13486* (NBG); Strandfontein, *Esterhuysen 35507* (S); between Eersterivier and Swartklip, *Pillans 9240* (BOL); Swartklip, Cape Flats, *Taylor 8166* (NBG PRE); between Strand and Paarl Roads, (–BB), *Acocks 184* (S); sanddunes the Strand, *Garside 1577* (K); sanddunes Gordon's Bay, *Garside 491* (K); Faure District, S of Kranat, *Jordaan 655* (PRE); Strand, *Parker 3843* (K NBG); Somerset Strand, *Rehm s.n.* (M); *Strey 715* (PRE); Cape Flats near Faure, *Van Rensburg 443* (K, M, NBG, PRE); Kogel Bay, (–BD), *Boucher 468, 469 & 470* (NBG, PRE); Harold Porter NBG, *Bredenkamp 952 & 954* (PRE); Hangklip Caledon, *Compton 13600* (NBG); Pringle Bay, *Greuter 21500* (PRE); Kogel Bay, *Parker 4109* (K, PRE); Rooiels near Hangklip, *Parsons 61* (NBG). 3419 (Caledon): Wildevlei Reserve, Hawston, (–AC), *Hubbard 224* (NBG); Walker Bay, Hermanus, (–AD), *Britton 12* (NBG); Mossel River shore, *Compton 23625* (NBG); Vogelklip, Hermanus, *Williams 440* (K MO); Rooi Els, (–BD) *Compton 15996* (NBG); Hangklip, Caledon, *Compton 22941* (NBG); between Gordon's Bay and Rooiels, *Dela Bat s.n.* (NBG); 2 mi. W of Betty's Bay, *Marsh 541* (K, PRE); Kogelberg, Rooiels, *Rycroft 1331* (NBG); Hangklip, *Stokoe s.n.* (NBG); Harold Porter NBG, *Topper 122* (NBG); Gansbaai, Bredasdorp, (–CB), *Compton 18159* (MO, NBG); Stanford Lagoon, dunes, *Compton 19930* (C, NBG); Gansbaai, *Esterhuysen 1855* (BOL); *Leighton 1855* (PRE); Uilskraal River Mouth, *Parsons 112* (NBG); Baviaansfontein, *Taylor 6996* (PRE, NBG, S); Pearly Beach, (–DA), *Boucher 1603* (PRE); S of Elim, *Goldblatt 2599* (MO, PRE, S); Pearly Beach, Afsaal Campsite, *Taylor 10022* (PRE, K); Ratel River, *Van Breda 823* (PRE); Brandfontein, dune fynbos, (–DB), *Cowling 3436* (NBG). 3420 (Bredasdorp): De Hoop Nature Reserve, Koppie Alleen, (–AD), *Bredenkamp 950* (PRE); Potberg Nature Reserve, Dronkvelei, *Burgers 2186* (PRE); De Hoop, *Van der Merwe 1186* (PRE); Potberg Farm, 0.3 km from coast, (–BC), *Burgers 1015* (PRE); Potberg Coast, *Burgers 2268* (NBG PRE); Arniston, (–CA), *Acocks*

22606 & 22615 (PRE); 1 km from Arniston en route to Bredasdorp, *Bredenkamp 949* (PRE); Die Mond, Bredasdorp, *Compton 22122* (BOL, NBG); Arniston, *Levyns 9725* (BOL); *Taylor 3802* (NBG, PRE); Bredasdorp District, Dronkulie Farm, *Van Breda 1633* (PRE); De Hoop, Buffelsfontein, fynbos, (-CB), *Fellingham 773* (C, PRE). 3421 (Riversdale): Riversdale, (-AB), *Jacot Guillarmod 20776* (GRA); 6.7 mi. SE of Vermaaklikheid P.O., (-AC), *Acocks 22528* (PRE); 4.5 mi. S of Vermaaklikheid, *Acocks 24212* (K, NBG PRE); Duivenhok's River, Puntjie, *Boucher 2219* (NBG, PRE); 6,7 km from Vermaaklikheid P.O., *Bredenkamp 937 & 938* (PRE); Puntjie, *Bredenkamp 940* (PRE); Stilbaai, (-AD), *Muir 4496* (K, PRE); Stilbaai, Blombos Road, *Wurts 1567* (NBG). Grid ref. unknown: *Acocks 5756* (S); Dunes W of Sarepta, *Acocks 583* (S); *s.n.* (K, S); between Grasberggrivier and Waterval, 2 500–3 000 ft, *Drège s.n.* (S); *Ecklon & Zeyher s.n.* (PRE); *Grey 4* (C); *Herb. Banks & Wikstr.* (C); *Herb. Banks & Swartz s.n.* (S); *Herb. Thunberg 9579 & 9596D* (UPS); *Masson s.n.* (BM); Cape Peninsula, *Moss 5760* (BM); *Museum Bot. Hauniense* (C); False Bay, *s.n.* (UCD); Cape Peninsula, Red Hills, *Lam & Meeuse 4272* (S); *Savage Cat. 504.2* (LINN); *Savage Cat. 504.3, Sp. 161* (LINN); Caput Bonae Spei, *Herb. Wikströmii, Sparrman s.n.* (S); Caput Bonae Spei, *Herb. Gastronii, Sparrman s.n.* (S).

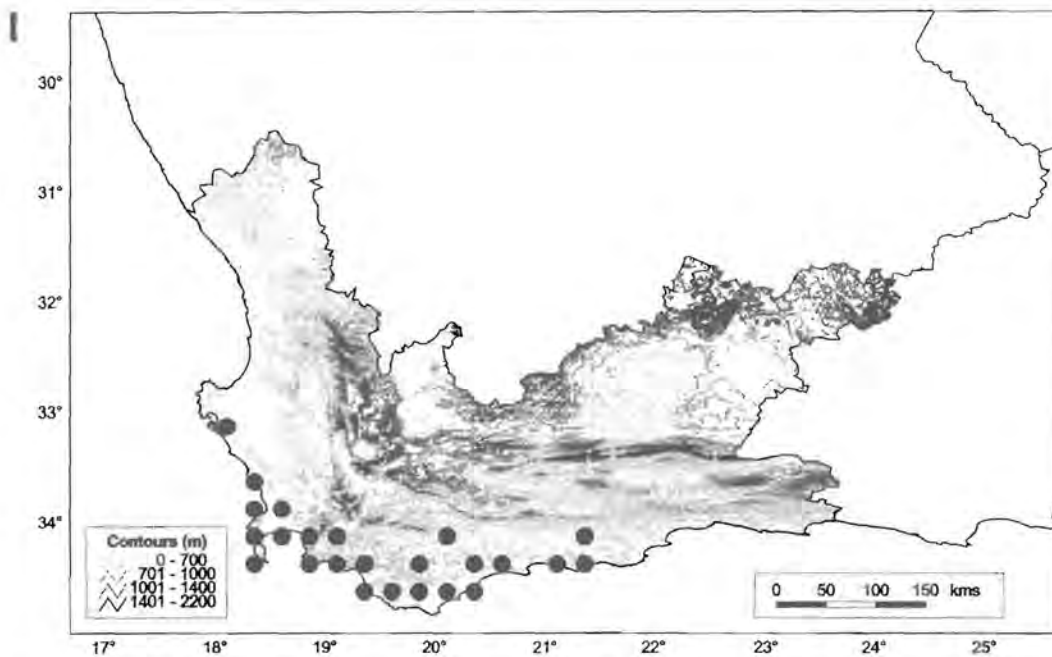
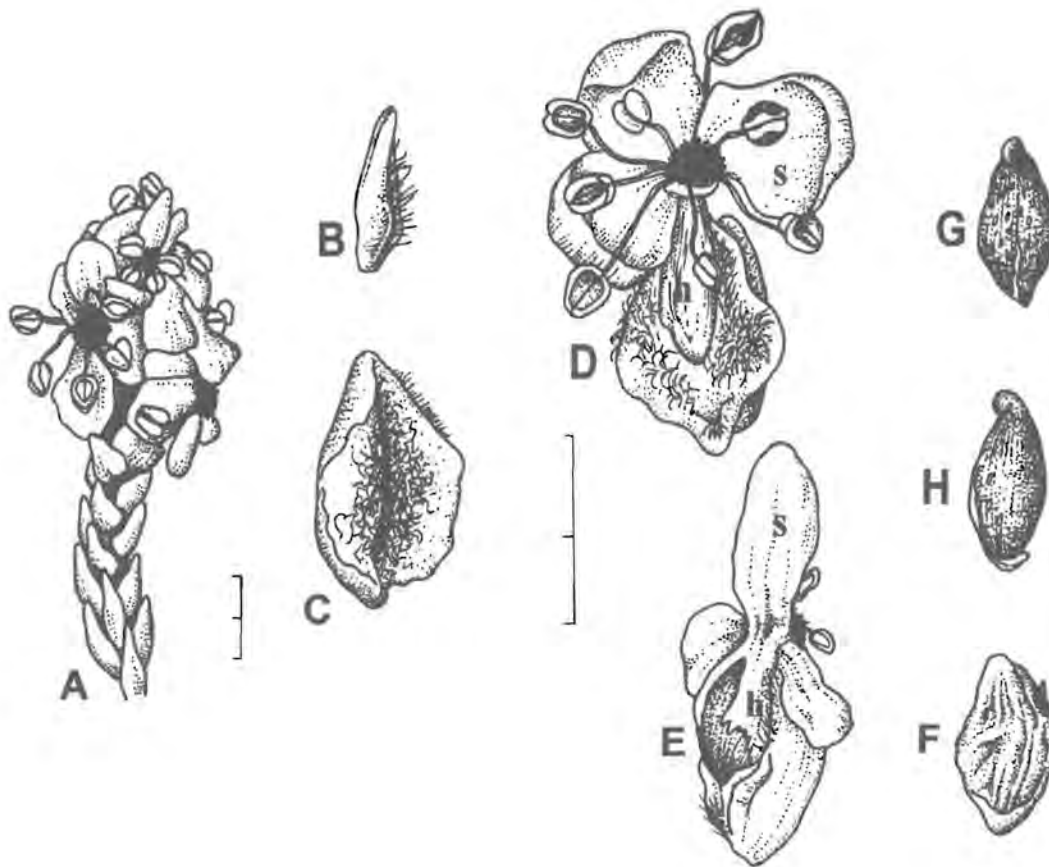


FIGURE 7.1.—*Passerina paleacea* (Bredenkamp 960). A, spike reduced, resembling terminal subcapitulate inflorescence; B, leaf; C, bract; D, flower clasped by bract in ventral view; E, hypanthium fragmenting at circumference of ovary; F, achene, enveloped by membranous pericarp; G, achene in lateral view; H, achene in ventral view. h, hypanthium; s, sepal. Scale bars: 2 mm.

I, known distribution of *Passerina paleacea*.

2. *Passerina truncata* (Meisn.) Bredenk. & A.E. van Wyk, stat. nov. Type: Western Cape, near Tulbagh Waterfall, April 1865, Zeyher 43 (K!, lecto., here designated; MEL!, MO!, NBG!, S!, W!).

Passerina rigida Wikstr. var. *truncata* Meisn. 14: 563 (1857); C.H. Wright: 13 (1915); Thoday 4:153 (1924a). Type as above.

Passerina rigida Wikstr. var. *tetragona* Meisn. 14: 563 (1857) pro parte quoad specimen Drège 2971; C.H. Wright: 13 (1915); Thoday 4:153 (1924a). Type: Western Cape, circa Ezelsbank, Drège 2971 (P!, lecto, here designated; K!).

Passerina glomerata sphalm. quoad *Lachnaea conglomerata* L. sensu Thunb.: 75 (1794); Willd.: 434 (1799); Wikstr. 39: 323 (1818); Thunb: 374 (1825a); Meisn. 14: 562 (1857); Cafferty & Beyers: 171, 172 (1999). *Lachnaea glomerata* sphalm. quoad *L. conglomerata* L. sensu Thunb.: 75 (1794).

Passerina ericoides sensu Thunb.: 374 (1825a) non L.

P. glomerata Thunb. sensu Thoday 4:153 (1924a). Type: '*P. glomerata* α (Lin. Herb.)'(Thoday 1924b: 387). *Herb. Thunberg* 9577 (UPS!).

Shrubs, shrublets or low stunted shrublets (0.2–)0.4–1.5(–2) m high. *Stems* branching from base to growing points; branchlets ascending, straight or arcuate (subsp. *monticola*), greyish brown, younger branchlets whitish tomentose, older branchlets with whitish scales, remains of indumentum and scales flaking off with cork on older branchlets; cork fissured between leaf scars or tessellate, scaberulent. *Leaves* imbricate on young branchlets, diverging at an angle of 15–45°, 4-ranked, cymbiform; lamina inversely ericoid, adaxial surface concave, tomentose, abaxial surface laterally compressed and glabrous, plane shape narrowly oblong to oblong, length \times depth (1.7–)2.0–3.0(–4.0) \times (0.6–)0.8–1.0(–1.7) mm; base sessile, dilated; apex truncate, keeled, appearing humped on back or rounded (subsp. *monticola*); margins involute. *Inflorescences* comprising polytelic synflorescences, spikes reduced, artificially resembling terminal subcapitulate inflorescences, each

characterized by 2 terminal leaves with axillary blind-ending rudimentary flowers, enveloping minute growing point; proliferating growth less common; subcapitulate inflorescences \pm ellipsoid, pale green or straw-coloured. *Bracts* enveloping flowers and fruits, largest after anthesis, becoming more coriaceous and rounded at fruit set, decussate, imbricate, sessile, appressed or ascending, obovate to widely obovate in outline, length \times depth (2.5–)2.9–4.0 \times 1.4(–2.4 mm); lamina adaxially concave (inside), abaxially convex (outside), villous on inside, glabrous on outside, coriaceous to thickly coriaceous, ribbed (subsp. *monticola*) or ribbed and reticulately veined on each side of main vein, concolorous, pale green or greyish green, senescing to yellowish brown or pale brown (subsp. *monticola*); base cuneate; main vein extending into obtuse to acute apex; margins involute. *Flowers* actinomorphic, hypogynous. *Floral envelope* 4.9–6.4 mm long, comprising a hypanthium (fused calyx and androecium) and sepals, papyraceous and yellow-pink during pollination, dehydrated after shedding of pollen, turning red to brown. *Pedicel* very short or absent. *Receptacle* very short. *Disc* absent. *Hypanthium* a membranous cylindrical tube, glabrous at ovary or apex of ovary tomentose, neck tomentose, 0.7–0.8 mm long, abscission tissue and articulation plane absent. *Sepals* 4, petaloid; imbricate in bud, flexed in flower; outer sepals concave, ovate or cymbiform, adaxially scantily pubescent or apex tomentose, abaxially glabrous; inner sepals oblong to elliptic or widely obovate, adaxially scantily pubescent or tomentose, abaxially glabrous. *Corolla* absent. *Androecium* dimorphic, diplostemonous, arising from hypanthium at separation point of sepals; filaments of antipetalous whorl 0.9–1.2 mm and those of antisepalous whorl \pm 1.4 mm long; anthers (0.8–)0.9 \times 0.4 mm, sub-basifixed, 2-theous and 4-locular. *Ovary* superior (2.4–)2.5 \times 0.9 mm, pseudomonomerous (Heinig 1951) at maturity, unilocular, placentation parietal; ovule 1, pendulous, laterally attached near top of ovary. *Style* separating laterally from top of ovary, maintaining lateral position in hypanthium neck, reaching beyond hypanthium rim. *Stigma* \pm globose, mop-like or penicillate (wind pollination). *Fruit* an achene with pericarp membranous and dry, 2.5 \times 1.2 mm, enveloped by persistent, loosely arranged hypanthium, the latter fragmenting over widest circumference of fruit, resulting in the fragmented hypanthium, sepals and androecium being shed.

Nomenclatural notes

The name *Lachnaea conglomerata* L. 1753 was thought by early authors to apply to what is here called *P. truncata*. The only extant material, however, is an illustration by Breyne 1678, which is found to be identifiable as *Phylica stipularis* L. 1771 (Cafferty & Beyers 1999). The name *P. glomerata* published by Thunberg 1794 is interpreted as a mistake for *L. conglomerata*, and may be cited as *P. conglomerata* (L.) Thunb. 1794, and must also be typified by the illustration of the *Phylica*. Both *L. conglomerata* and *P. conglomerata* (L.) Thunb. were proposed for rejection by Cafferty & Beyers (1999) and this proposal has been accepted (Brummitt 2000). These names are therefore referred to the list of 'Excluded species' starting on p. 315.

Because Meisner (1857) had placed both *P. glomerata* and *L. conglomerata* in synonymy under *P. ericoides*, he described two new varieties, namely *P. rigida* var. *tetragona* and *P. rigida* var. *truncata*. Both these varieties included authentic material later cited by Thoday (1924a) in his description of *P. glomerata*. Based on the specimen *Herb. Thunberg 9577* (UPS) as the type, Thoday (1924a) reinstated *P. glomerata* Thunb. and placed Meisner's two varieties in synonymy, disregarding the fact that Thunberg (1794) had made the combination *P. glomerata*, in error. The rejection of *L. conglomerata* (Cafferty & Beyers 1999; Brummitt 2000) and *P. glomerata* implied the choice of a new name for the existing species. As all the specimens included in *P. rigida* var. *truncata* are characterized by '*foliis ramulo adpressis vel semipatulatis truncatis*' and their distribution coincide perfectly with the distribution of the previously known *P. glomerata sensu* Thoday, var. *truncata* is here selected and raised to the species level. Var. *tetragona* included *Drège 2971* (K, P) from Ezelsbank in the Western Cape, and has now been placed in synonymy under *P. truncata*, and *Drège s.n.* from Stormberg in the Eastern Cape has now been identified as *P. montana*.

Etymology

The Latin specific epithet *truncata* (= ending very abruptly, as if cut straight across), describes the blunt, keeled apex of the leaves, which appear humped on the back.

Key to subspecies

- 1a Shrubs or shrublets from various habitats; stems branching from base, straight; branchlets straight; leaves diverging at angle of $\pm 15^\circ$, narrowly oblong to oblong, apex truncate, keeled, appearing humped on back; bracts appressed, thickly coriaceous, ribbed and reticulately veined on each side of main vein, greyish green, senescing to yellowish brown..... 2a. subsp. *truncata*
- 1b Shrubs or low shrublets from mountain habitats; stems often stunted; branchlets lax, arcuate; leaves diverging at angle of $\pm 45^\circ$, narrowly oblong, apex truncate to rounded and keeled; bracts ascending, coriaceous, ribbed on each side of main vein, pale green, senescing to pale brown..... 2b. subsp. *monticola*

2a. subsp. *truncata*

Shrubs or shrublets 0.4–2.0 m high. *Stems* branching from base to growing points; branchlets ascending, younger branchlets whitish tomentose; cork tessellate. *Leaves* diverging at an angle of $\pm 15^\circ$, plane shape narrowly oblong to oblong, length \times depth (1.7–)2.0–3.0(–4.0) \times (0.6–)0.8–1.0(–1.7) mm; apex truncate, keeled, appearing humped on the back. *Inflorescences* subcapitulate, \pm ellipsoid, pale green or straw coloured. *Bracts* thickly coriaceous, ribbed, reticulately veined on each side of main vein, extending into obtuse apex; greyish green, senescing to yellowish brown; length \times depth (2.5–)2.9–4.0 \times 1.4(–2.4) mm. *Floral envelope* \pm 4.9–6.4 mm long.

Hypanthium: ovary glabrous, neck tomentose, 0.7–0.8 mm long. *Sepals*: outer sepals cymbiform, adaxially tomentose, abaxially glabrous; inner sepals oblong to elliptic, adaxially tomentose, abaxially glabrous. *Androecium* with filaments of antipetalous

whorl 0.9–1.2 mm and those of antisepalous whorl \pm 1.4 mm long; anthers 0.8×0.4 mm. *Ovary* 2.4×0.9 mm. Figure 7.2A–F.

Diagnostic characters and relationships

Subsp. *truncata* can easily be distinguished from the other subspecies by its decussate, imbricate, four-ranked leaves, spreading at an angle of 15° . The leaves are abaxially laterally compressed and glabrous, narrowly oblong to oblong, with a dilated base and a truncate, keeled apex, appearing humped on the back. Inflorescences are reduced spikes, terminally subcapitulate. The bracts are obovate to widely obovate, greyish green, senescing to yellowish brown. The lamina of the bracts is villous on the inside and glabrous on the outside. It is thickly coriaceous, ribbed and reticulately veined on each side of the main vein, which extends into an obtuse apex. *P. truncata* could be confused with *P. quadrifaria*, which is characterized by shortened leaf-bearing branchlets with closely arranged nodes, very short internodes and leaves spreading at an angle of 45° ; the abaxial surface is convex and tomentose in young leaves and the leaf apex is rounded.

Distribution and ecology

Subsp. *truncata* is confined mainly to the Fynbos (Rebelo 1998) and Succulent Karoo Biomes (Hoffman 1998) of the Northern and Western Cape. It occurs in the Northwestern, Southwestern, Karoo Mountain and Southeastern Centres within the CFR. In the Northern Cape, it is distributed from Steinkopf, through Namaqualand, Nieuwoudtville and Vanrhynsdorp to Wolfberg. This subspecies is common in the Western Cape, where it is distributed from Vanrhynsdorp, the Koue Bokkeveld, Clanwilliam, the Olifants River Valley, Citrusdal, along the Cederberg Mountains to Malmesbury, Ceres, Tulbagh, Matjiesfontein and Seven Weeks Poort. The most southeasterly locality is Baviaanskloof near Patensie; the specimen *Bayliss 546* is an outlier, collected as a voucher for cancer research and is currently housed at PRE. Subsp. *truncata* is adapted to a wide range of habitats. It occurs on low-lying plains as well as on several mountain ranges, where it is common on level ground,

rocky slopes and along watercourses. It is one of the dominant taxa between Tulbagh and Clanwilliam, where the size of the shrubs varies from 0.4–1.5(–2) m on flat areas and plains. These plants grow prolifically and during flowering time yellow, yellowish pink and red flowers can often be seen on the same plant, representing various stages of maturation. This subspecies is also common in the arid karoo environment of the Witteberg Mountains near Matjiesfontein, where it grows in rocky areas. In extremely dry areas of Namaqualand, the Ceres-Karoo and on top of the Skurweberg and Cederberg Mountains, subsp. *truncata* becomes a hardy, skeletal, sparsely branched, sclerophyllous shrublet, with yellow, coriaceous leaves, closely arranged on the stem, but with each growing point protected by a pair of conspicuous, coriaceous bracts. Figure 7.2G.

Conservation status: Least Concern (LC) (IUCN Species Survival Commission 2000).

Specimens examined

NORTHERN CAPE.—2917 (Springbok): Namaqualand, Steinkopf, (–BC), *Meyer 74* (NBG); Spektakel Pass, (–CA), *Zietsman & Zietsman 925* (PRE); Spektakelberg, (–DA), *Bolus 9507* (BOL, K); top of Spektakel Pass, *Goldblatt 2802* (C, PRE, M, MO); north side of road, *Le Roux 2310* (PRE); 24 km from Springbok to Kleinsee, *Stirton 10148* (PRE); Farm Naries, between Kleinsee and Springbok, *Van Wyk 6485* (PRE, PRU); Vogelklip, (–DB), *Pearson & Pillans 5928* (K); Steinkopf District, (–DC), *Marloth 6873* (PRE); Little Namaqualand, Springbok District, Komaggas Mountains, *Marloth 6957* (PRE). 3017 (Hondeklipbaai): Namaqualand, Kanariesfontein, (–BA), *Acocks 19397* (K, M, PRE); 12 mi. S of Kamieskroon, (–BB), *Merxmüller & Giess 3832* (M); between Kamieskroon and Garies, *Salter 1568* (K); Kamieskroon, Skilpad, Wild Flower Reserve, *Van Rooyen 2401, 2626* (M); between Garies and Kamieskroon, (–BD), *Hutchinson 834* (GRA, K, PRE); Bachgrund, 12 mi. S of Kamieskroon, *Merxmüller & Giess 3832* (PRE). 3018 (Kamiesberg): Bovelei, (–AA), *Archer, F. 120* (NBG, PRE); Anegas, upper slopes of Zuurberg, *Pearson, 6256* (BOL, K); between Garies and Liefontien, (–AC), *Esterhuysen 1327* (BOL); Studer Pass, *Evrard 9001* (MO, PRE, UPS); hills above Twee Rivieren, *Pearson 6765* (K); *Pearson 6773* (BOL); Kamiesberg, *Stokoe 22331* (BOL, PRE); Ezelsfontyn, *Whitehead s.n.* (TCD). Grid ref. unknown: Namaqualand, Bowesdorp, *Stokoe s.n.* (NBG). 3119 (Calvinia): top of Vanrhyn's Pass, (–AC), *Bredenkamp 1011* (PRE); Dwarsrivier, on road to Algeria, *Emdon 197* (PRE); 10 km SW of Nieuwoudtville, *Greuter 21765* (PRE); top of Vanrhyn's Pass, *Levy's 4108* (BOL); Nieuwoudtville, Willemsrivier Farm, *Nortje 17* (NBG); 10 km from Nieuwoudtville to



Vanrhynsdorp, *Strid 37832* (C, NBG); Vanrhyn's Pass, *Taylor 2865* (NBG, S); Nieuwoudtville, *Van Son s.n. TRV 36623* (PRE); Wolfberg Arch, *Kruger 911* (PRE); Calvinia District, Lokenburg, (–CA), *Acocks 17234* (K, PRE); *Story 4303* (K, GRA, PRE); Lokenberg Farm, *Bremer 264* (PRE, S). 3219 (Wuppertal): Wolfberg near Arch, (–AD), *Kruger 911* (NBG); Matjesrivier, Cederberg, *Wagener 259* (NBG);

WESTERN CAPE.—3018 (Kamiesberg): Rietkloof Mountain, (–DC), *Pearson 5709* (BOL). 3118 (Vanrhynsdorp): Nardouw Pass, (–BC), *Bayliss BRI B591* (K, MO, PRE); Vanrhynsdorp, (–DA), *Almborn 475* (MO); *Linscherg s.n.* (S); Bokkeveld Mountains, Meulstein Farm, *Marloth 12943* (PRE); Gifberg Pass, halfway up at stream crossing, (–DB), *Boucher 2872* (K, NBG, PRE); Heerenlogementsberg, above monument, (–DC), *Boucher 3177* (C, K, NBG, PRE); Clanwilliam, Trawal road, *Bredenkamp 1010* (PRE); sandy slopes of Bullshoek, *Goldblatt 2757* (M, NBG, PRE, S); sand flats between Driefontein and Heerenlogement, *Pearson 6782* (K); Heerenlogementsberg, 14 mi. N of Graafwater, *Taylor 3921* (PRE); Nardouw Mountains, Olifants River, *Thompson 2823* (K, MO, NBG, PRE); Piketberg road, *Tyson 1452* (PRE); Trawal, *Van Rooyen, Steyn & De Villiers 618* (NBG); Gifberg, (–DD), *Bayliss 577*, (M, MO, PRE); 39–40 km NE from Clanwilliam, *Bellamy 2* (PRE); Nardouw Kloof, *Stokoe s.n.* (NBG); Gifberg plato, *Zietsman & Zietsman 1151* (PRE). 3218 (Clanwilliam): S of Lambert's Bay, (–AB), *Taylor 4011* (NBG); roadside at Alpha, (–BB), *Acocks 3045* (S); 9 mi. S of Clanwilliam, *Almborn 539* (M); Rheboksvallei, next to road between Calvinia and Clanwilliam, *Bredenkamp 1008, 1009* (PRE); Olifants River Valley, *Compton 4901* (BOL); Pakhuis Kloof, *Compton 6902* (NBG); Pakhuis Pass, *Compton 9537* (NBG); Nardouw road, *Compton 22821* (S); Pakhuis Pass, *Esterhuysen 26859* (K); *Galpin 11209, 11210, 11218* (BM, C, PRE, UPS); Kransvlei Pass, summit, *Gillett 4012* (BOL, K, PRE); 12 mi. from Clanwilliam on Citrusdal road, *Hardey 448, 449* (PRE, BM, K, M); Zeekoe Vlei, *Levyns 1232* (BOL); Elandskloof, *Lewis 4061* (NBG); Cederberg Mountains, *Stokoe 8042* (BOL, GRA, NBG, PRE); Nardouw Mountain Pass, (–BC), *Bayliss 591* (K, MO, PRE); Olifants River Mountain, (–BD), *Compton 4901* (NBG); Witelskloof, *Hugo 679* (K, PRE); Kriedouw, *Levyns 1335* (BOL); W end of Elandskloof, *Lewis s.n.* (NBG); Kriedouw, *Pocock 770* (NBG, PRE); Langfontein, S of Clanwilliam, *Taylor 9293* (PRE); N of Clanwilliam, *Thompson 1278* (NBG); Het Kruis, Eendekuil, (–DA), *Acocks 1002* (S); Het Kruis, *Compton 15020* (NBG); 1 km N of Goedverwacht, *Dahlgren & Peterson 257* (K); De Hoek, *Lewis 62671* (MO); base of Kapteins Kloof, *Pillans 8021* (BOL); Olifants River Valley, (–DB), *Barker 5751* (NBG); *Stephens 7226* (K); near Eendekuil, *Levyns 1377* (BOL); 2 mi. S of Citrusdal, *Maguire 2025* (C, NBG); Zebra Kop, *Pillans 7298* (K); Middelpas, (–DC), *Morley 250* (NBG, PRE); Rietkloof Mountains, *Pearson 5709* (K); Nardouw Kloof, *Stokoe s.n.* (NBG); De Hoek, *Compton 19949* (NBG MO); *Lewis 2730, 4062, SAM67057 & SAM67058* (NBG, PRE); Piketberg road, *Tyson 318* (NBG). 3219 (Wuppertal): Pakhuispas, (–AA), *Bredenkamp 1005* (PRE); Rheboksvallei, *Bredenkamp 1006, 1007* (PRE); Klipfonteinrand, NE of Pakhuis, *Esterhuysen 32195* (MO); Platkloof, Citrusdal, *Hanekom 1249* (K); 2 km N of Pakhuis, *Hugo 545* (K, PRE); Cederberg, *Marloth 11686* (PRE); Eikeboom, en route to Algeria, *Bredenkamp 988* (PRE); between Sneekop and Sneeberg hut, at Hoogvertoon, *Bredenkamp 989, 991* (PRE); above road from Cederberg, (–AC), *Acocks 3214* (S); roadside Algeria to Clanwilliam, *Boucher*



2880 (PRE); Crystal Pool, *Bredenkamp 990* (PRE); at the base of Sneekop, *Bredenkamp 992* (PRE); Jantjieshoek, *Bredenkamp 993* (PRE); Kromrivier Farm, *Bredenkamp 994* (PRE); 3 km from Algeria en route to Clanwilliam, *Bredenkamp 1004* (PRE); Ezelsbank, *Drège 2971* (K, P); on road to Algeria, few miles from Dwars River, *Emdon 197* (C, K); Olifants River Mountain, *Howes 225* (K, PRE); De Hangen Farm, *Metelerkamp 562, 562a* (BOL); Nieuwoudt Pass, *Stokoe s.n.* (NBG); pass S of Wuppertal, *Taylor 10483* (NBG, PRE); Cederberg, near Spitskop, *Taylor 10618* (NBG, PRE); Middelpoos Farm, (-CA), *Bredenkamp 986* (PRE); 10 mi. E of Citrusdal, Elandskloof, *Compton 519* (NBG S); Citrusdal, NE Cederberg Mountains, *Goldblatt 7264* (MO, PRE, S); Platklouf, *Hanekom 1249* (PRE); Citrusdal, *Rauh 3553* (M); Gideon's Kop, (-CB), *Stokoe s.n.* (NBG); Piketberg, Dasklip Pass, Cardouw, (-CC), *Barker 10286* (NBG); Porterville Grootfontein Farm, *Boucher 1983* (NBG); Porterville, Dasklip Pass, (-CC), *Hugo & Mauve 4* (K, MO, NBG, PRE); Clanwilliam, Cardouw Road, *Compton 22821, 24331* (NBG, MO); Dasklip Pass, *Thompson 1519* (NBG); Ceres-Karoo, Skurweberge, W of farm Tweefontein (-CD), *Bredenkamp 983* (PRE); 15 km from Citrusdal, Pickenierskloof Pass, *Bredenkamp 985* (PRE); Swartrug, between Koue Bokkeveld and Ceres-Karoo, *Hanekom 943* (NBG, PRE); W base of 'Schurfteberg', *Pillans 9606, 63799* (BOL, MO, PRE); Swartruggens, Groenfontein Farm, S.A. Nature Heritage No. 77, (-DC), *Bredenkamp 977* (PRE); Kagga Kama road, *Bredenkamp 978* (PRE); E slopes of Swartruggens, *Levyns 1808* (BOL); Koue Bokkeveld, near Konkelhaaks River, *Levyns 1941* (BOL); foothills of Cold Bokkeveld, *Stephens 7264* (K). 3318 (Cape Town): Moorreesburg, Bakkersbos, (-BA), *Jordaan 545* (NBG); Oshoekop N of Moorreesburg, *Van Zyl 3295* (K, MO, PRE); Porterville, Piketberg, (-BB), *Loubser 598* (NBG); Malmesbury, Riebeek Kasteel, (-BD), *Compton 11718* (NBG); *Pillans 10705* (MO); Malmesbury Clanwilliam road, *Alice Godman 527* (BM). 3319 (Worcester): Hills near Saron, *Schlechter 10627* (BM, K, MO, PRE, S); Saron 3 000 ft, (-AA), *Schlechter 10660* (BM, K, PR, PRE, S); Ceres, Gydo, (-AB), *Compton 18781* (NBG); Koue Bokkeveld, Driefontein, *Marloth 10668* (NBG); 'Skurfteberg', Justice Diemont's Property, *Taylor 8664* (K, NBG, PRE, S); Tulbagh, Gouda, (-AC), *Barker 9217* (NBG); road between Wolseley and Tulbagh, Farm 'The Wild Olive', *Bredenkamp 972* (PRE); 8 km from Tulbagh, *Bredenkamp 973* (PRE); Roodesandberg, *Compton 6546* (NBG); New Kloof, *Compton 11701* (NBG); mountains near Tulbagh Kloof, *Davis s.n.* (NBG, PRE, SAM); New Kloof, *Gillette 397* (NBG); above Tulbagh Waterfall, *Hutchinson 416* (BM, GRA, K, PRE); Elands Kloof Bridge, 10 mi. from Citrusdal, *Johnson 519* (NBG); Lewerfontein Farm, *Kotze 45* (NBG); Tulbagh 400 m, *Marloth 4238* (K, PRE); Tulbagh Mountains, *Marloth 13006, 13007* (NBG, PRE); *Pappe s.n.* (K); Voëlvlei Tortoise Reserve, *Solomon 92* (NBG); Tulbagh Waterfall, *Stokoe 1460* (PRE); *Stokoe & Davis s.n.* (NBG); Piketberg road, *Tyson 2318* (K); Tulbagh, *Zeyher 43* (K, NBG, MO, S); Ceres, Bonteberg, (-AD), *Compton 3743* (NBG); Conical Peak, *Stokoe s.n.* (NBG); *Stokoe 8041* (BOL); Ceres District, Visgat, *Stokoe s.n.* (NBG); Spes Bona, foot of Zwarterruggens, (-BA), *Marloth 13144* (PRE); Kavadoouws Mountains near Orchard, (-BC), *Esterhuysen 10886* (BOL); Buffelskraal West, *Forrester s.n. & 114* (NBG); Bonteberg, (-BD), *Compton 9970* (MO, NBG); Eikenbosch, *Esterhuysen 3703* (K); Matroosberg, *Phillips 2057* (NBG); Ertjiesland Kloof, (-CA), *Esterhuysen 2273* (BOL); near base of Sneekop, *Compton 4894* (BOL); Worcester District, *Van Breda 198*

(PRE); Worcester Waterfall, *Ecklon & Zeyher s.n.* (BREM, S); between Eendracht and Triangle, (–DB), *Buchell 387* (PRE). 3320 (Montagu): poort N of Pienaarskloof, (–AA), *Acocks 23678* (PRE); Tweedside, near top of Witteberg Koppie, (–AB), *Levyns 2382* (BOL); Tweedside, *Marloth 10798* (PRE); Pienaarskloof Poort, (–AC), *Taylor 6495* (NBG; PRE); Matjiesfontein, (–BA), *Marloth 11426* (PRE); Matjiesfontein, Whitehall, *Thoday 213* (NBG); White Hill, near Matjiesfontein, quartzite ridges S of railway line, *Thoday 1921* (BOL); Laingsburg, Witteberg, (–BC), *Compton 2800* (BOL, NBG); *3327* (BOL, K); *5890* (BOL, NBG); *12237* (NBG). 3321 (Ladismith): Seven Weeks Poort, (–AD), *Levyns 2415a* (BOL). 3322 (Oudtshoorn): near Rondevlei, Sedgefield, (–DC), *Bayliss 1105* (K, MO, PRE).

EASTERN CAPE.—3324 (Steytlerville): Baviaanskloof near Patensie, (–CD), *Bayliss BRI B 546* (PRE). Grid ref. unknown: Karoo Poort, *Acocks 1004* (S); *Drège s.n.* (K); *Ecklon & Zeyher s.n.* (MO); *Herb. Thunberg s.n.* (UPS); *Herb. Swartzii s.n.* (S); Caput Bonae Spei, *Hiendlmayr s.n.* (M); Pigmentberg Mountain, *Levyns 2165* (BOL); Greg’s Pass, *Levyns 1370* (BOL); Caput Bonae Spei, *Museum Botanicum Hauniense* (C); *Thunberg s.n.* (S); Caput Bonae Spei, *Thunberg s.n.* (SBT); *Zeyher s.n.* (M).

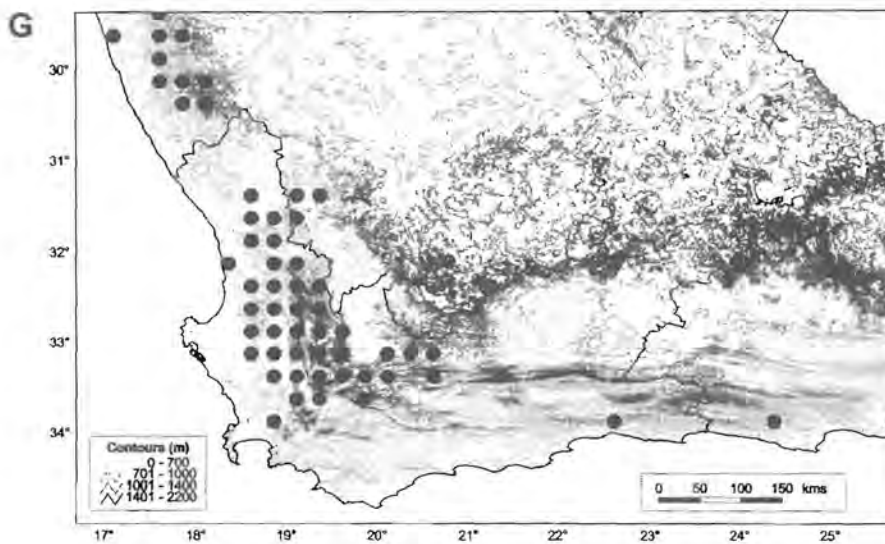
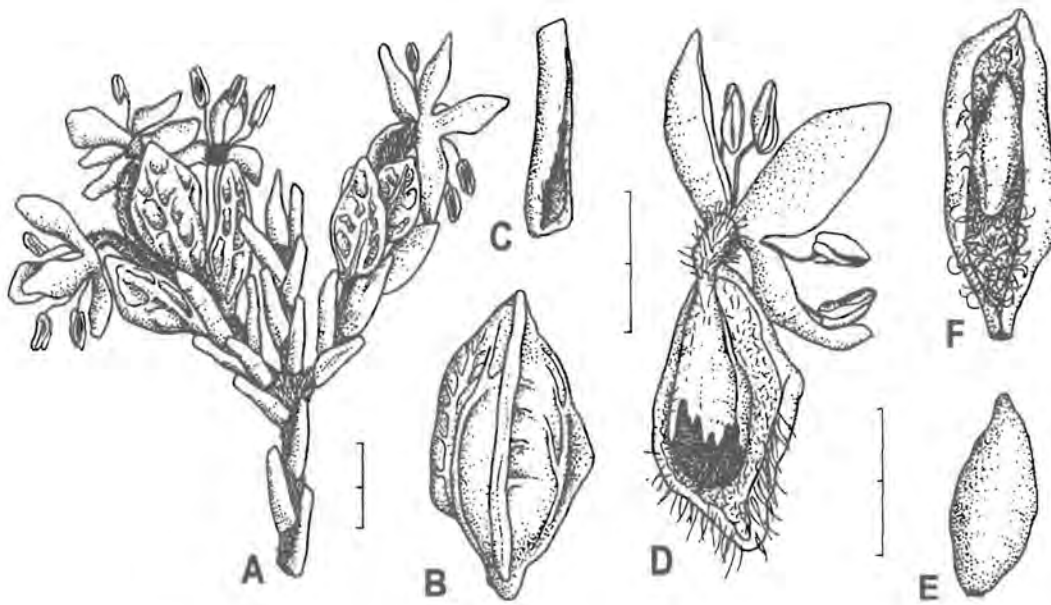


FIGURE 7.2.—*Passerina truncata* subsp. *truncata* (Bredenkamp 985). A, spike reduced, resembling terminal subcapitulate inflorescence; B, leaf; C, bract; D, flower clasped by bract, fragmenting at circumference of ovary; E, achene clasped by bract; F, achene, enveloped by membranous pericarp. Scale bars: 2 mm.

G, known distribution of *Passerina truncata* subsp. *truncata*.

2b. subsp. *monticola* Bredenk. & A.E. van Wyk, subsp. nov., a subspecie typica praecipue habitu differt. *Frutices* vel fruticuli in habitu montano in fissuris rupium radicanibus; ramuli adscendentes, laxi, arcuati. *Folia* ad angulum 45° divergentia, anguste oblonga, carinata, apice truncata vel rotundata. *Bracteae* adscendentes, obovatae ad late obovatae, coriaceae, utrinque costae costatae, pallide virides.

TYPUS.—Western Cape, 3319 (Worcester): Robertson Division, Omklaar, (–DD), 1923, *Stokoe* 22330 (PRE!, holo.; K!, iso.).

Shrubs or low stunted shrublets 0.2–1.5 m high, often rooted in rock crevices. *Stems* often stunted, branching profusely on younger growth, branchlets ascending, arcuate; younger branchlets densely whitish tomentose; cork fissured between yellowish leaf scars. *Leaves* diverging at an angle of $\pm 45^\circ$, abaxial surface laterally compressed and glabrous, plane shape narrowly oblong, length \times depth (2.4–)2.6(–3.0) \times 0.6–1.7 mm; base dilated; apex truncate to rounded, keeled. *Inflorescences* subcapitulate, \pm ellipsoid, pale green. *Bracts* ascending, obovate to widely obovate; lamina adaxially concave (inside), abaxially convex (outside), villous on inside, glabrous on outside, coriaceous, ribbed, pale green, senescing to pale brown, base cuneate; main vein extending into obtuse to acute apex; length \times depth (2.5–)2.9 \times 1.5 mm. *Floral envelope* \pm 4.9 mm long. *Hypanthium*: apex of ovary tomentose, neck tomentose, \pm 0.7 mm long. *Sepals*: outer sepals concave, ovate, apex adaxially tomentose, abaxially glabrous; inner sepals widely obovate, adaxially tomentose, abaxially glabrous. *Androecium* with filaments of antipetalous whorl \pm 1.2 mm and those of antisepalous whorl \pm 1.4 mm long; anthers 0.9 \times 0.4 mm. *Ovary* 2.5 \times 0.9 mm.

Figure 7.3A–F.

Diagnostic characters and relationships

Passerina truncata subsp. *monticola* can easily be distinguished from the typical subspecies by its growth form. Plants are often low shrublets rooted in rock crevices on mountain peaks. Stems are stunted, branching profusely on younger growth, the branchlets are ascending, lax and arcuate. The leaves spread at an angle of 45°, are narrowly oblong and the apex is truncate to rounded and keeled. Bracts

retain the characteristic shape of subsp. *truncata*, but are ascending, smaller and pale green. Subsp. *monticola* is also distinguished from *P. quadrifaria* by its characteristic lax, arcuate branchlets.

Etymology

The subspecific epithet *monticola* (= mountaineer) refers to the mountainous habit of the subspecies.

Distribution and ecology

Subspecies *monticola* is distributed south of 32°S latitude and between 18°E and 20°E longitude. It occurs in the Northwestern and Southwestern Centres of the CFR. It grows in mountainous areas and is distributed from Clanwilliam, along the Cederberg Mountains, southwards along mountain ranges and summits to Table Mountain, Helderberg, Kogelberg, the Hex River Mountains and the Rivieronderend Mountains.

Plants are often found in rock crevices or in damp sheltered gullies. They also occur on western, southwestern and eastern slopes and on shale bands at an altitude of 1 667–2 000 m on Sneekop (Goudini). The most common habitat is on mountain summits, e.g. Sneeberg, Slanghoek Pile, Zebra Kop, Jonaskop and Buffelshoek, as well as on mountain peaks, e.g. Milner, Du Toits, Uitkyk and Bailey's Peaks, at altitudes of ± 2 000 m. Figure 7.3G.

Conservation status: Least Concern (LC) (IUCN Species Survival Commission 2000).

Specimens examined

WESTERN CAPE.—3218 (Clanwilliam): Clanwilliam, (–BB), *Compton 1404* (NBG); Cederberg, Donkerkloof Kop, *Stokoe 64616* (PRE); E slopes of Kapteinskloof, *Pillans 7769* (BOL); Piketberg Mountain, summit of Zebra Kop, (–DB), *Pillans 7298* (BOL). 3219 (Wuppertal):

Cederberg Mountains, Uityk Peak, (–AC), *Esterhuysen 7380* (BOL); Cederberg Forest Reserve, Sneekop, *Stehle 309* (NBG); Cederberg, *Stokoe s.n.* (NBG); *Stokoe 8040* (BOL); Cederberg Forest Reserve, Sneeberg summit, *Taylor 6145* (PRE); Ceres border, Gidcon’s Kop, (–CB), *Stokoe s.n.* (NBG). 3318 (Cape Town): Table Mountain, Kasteel’s Gully, (–CD), *Esterhuysen, 28574* (BOL); Jonkershoek, Langrivier, (–DD), *Kerfoot K5061* (NBG); The Twins, *Kruger 1754* (PRE). 3319 (Worcester): SW slopes of Sneekop, (–AD), *Esterhuysen 3638* (BOL); Mostert’s Hoek, *Esterhuysen 9822* (BOL); Hex River Mountains, Milner Peak, 6 000 ft, *Esterhuysen 28587* (BOL); Buffelshoek Peak, (–BD), *Esterhuysen 8416* (BOL); *Esterhuysen 27451* (BOL); Slanghoek Pile, summit, (–CA), *Esterhuysen 1744* (BOL); Worcester District, Mostert’s Hoek, (–CB), *Esterhuysen 9921* (BOL); Goudini, Sneekop, shale band slopes 5 000–6 000 ft, *Esterhuysen 28555* (BOL, K); Devil’s Tooth, (–CC), *Esterhuysen 9542* (BOL); Adolph’s Kop, *Esterhuysen 11046* (BOL); Wemmershoek, *Esterhuysen 11255* (BOL, K); Du Toits Peak, 6 000 ft, *Esterhuysen 30573* (BOL); Wemmershoek Peak, *Stokoe s.n.* (NBG); Jonaskop, near summit, (–DC), *Rourke 961* (MO, NBG); Wildepaardeberg, *Stokoe s.n.* (BOL); Robertson District, Onklaar, (–DD), *Stokoe 22330* (K, PRE). 3418 (Simonstown): near Wynberg Caves, (–AB), *Compton 6347* (NBG); Helderberg, (–BB), *Stokoe 17574* (BOL, PRE). 3419 (Caledon): W end of Riviersonderend Mountains, Olifantsberg, Boschiesveld, (–AB), *Esterhuysen 30910* (BOL); spur of Riviersonderend Mountains between Caledon and Robertson, 5 000 ft, *Stokoe s.n.* (BOL); Genadendal, Baviaanskloof, (–BA), *Marloth 6626* (NBG, PRE); *Stokoe 2520* (PRE); Kogelberg, (–BD), *Stokoe s.n.* (NBG). Grid ref. unknown: *Guthrie s.n.* (NBG); Tulbagh District, Bailey’s Peak, *Stokoe s.n.* (NBG); Paarl District, top of Bailey’s Peak near beacon, *Stokoe 8225* (BOL); Tulbagh, Little Winterhoek Mountains, *Stokoe s.n.* (BOL).

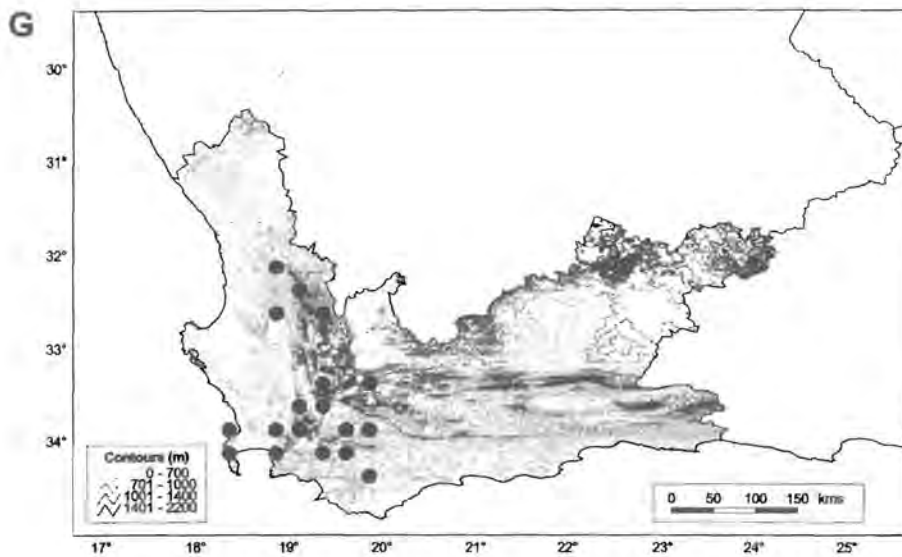
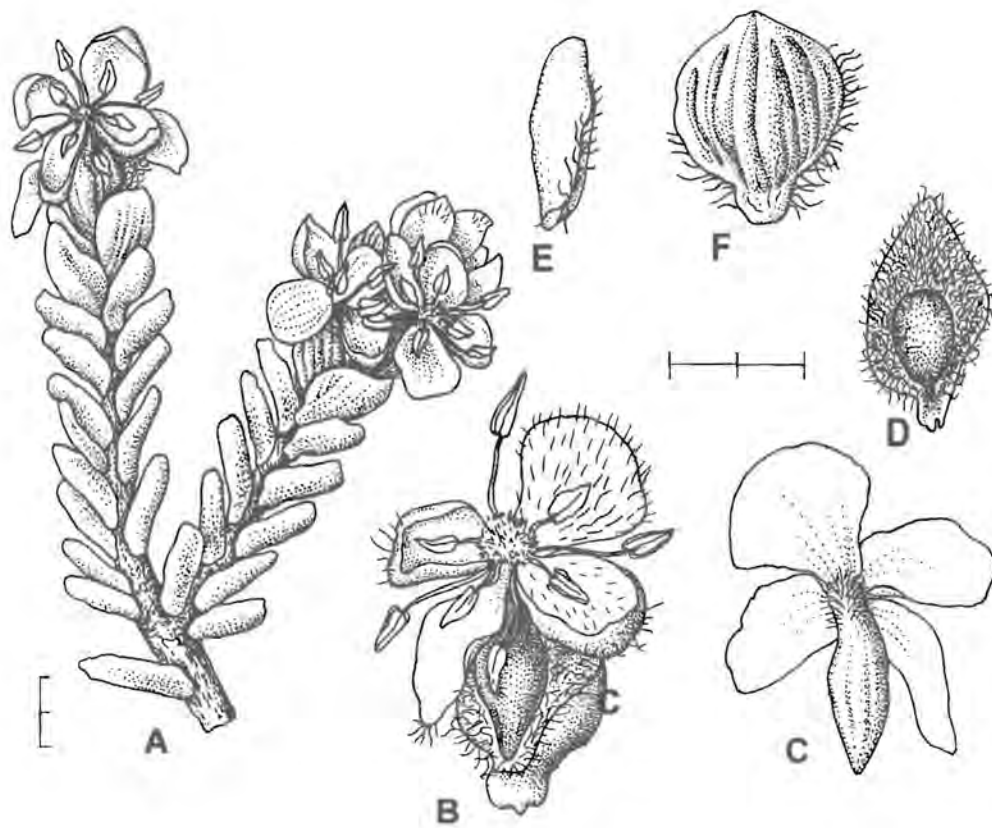


FIGURE 7.3.—*P. truncata* subsp. *monticola*, Esterhuysen 28587. A, spike reduced, resembling terminal subcapitulate inflorescence; B, flower clasped by bract; C, indumentum of hypanthium tube and glabrous abaxial surfaces of calyx lobes; D, fruit in tomentum of bract; E, leaf; F, bract. Scale bars: 2 mm.

G, known distribution of *P. truncata* subsp. *monticola*.

3. *Passerina quadrifaria* Bredenk. & A.E. van Wyk, sp. nov., *P. comosae* C.H. Wright affinis sed ramulis foliatis abbreviatis, internodis perbrevibus. *Folia* decussata, imbricata, ad angulum 45° divergentia, sessiles, basis rhombea, dilatata, accurate interordinata basibus foliorum nodorum proximorum, cymbiformes, circumscriptione lineari-lanceolata; lamina inverse ericoidea, pagina adaxialis concava, setosa, pagina abaxialis convexa, foliis juvenibus tomentosa; apex rotundatus; margines ciliati. *Bracteae* cymbiformes, circumscriptione ovatae vel late ovatae; lamina adaxialiter concava, comosa, abaxialiter convexa, sparsim pubescens ad tomentosa, ± tricotata utrinque costae, coriacea rugosaque, in marginem membranaceum expansa; basis cuneata; costa excurrens apicem rotundatum vel subacutum faciens; margines ciliati. *Flores* papyracei, tempore pollinationis luteo-rosei, postea rubescentes vel brunnescentes.

TYPUS.—Eastern Cape, 3324 (Steytlerville): Uitenhage District, Great Winterhoek Mountains, Cockscomb, (–BD), rocky ridge, 30 Nov. 1958, *Esterhuysen 28006* (PRE, holo.; BOL!, K!).

Passerina sp. nov. 3 Bredenk. & A.E. van Wyk 129: 70 (2000); 31,1: 56 (2001a); 31,2: 217 (2001b).

Low, often slender shrubs up to 1.0 m high, sometimes prostrate. *Stems* greyish brown, cork roughly fissured, grey-brown, with yellowish brown scabs often surrounding leaf scars; indumentum at growing point yellowish and villous, tomentose between leaf bases, flaking off with cork on older branchlets, becoming glabrous; leaf-bearing branchlets shortened, nodes closely arranged, internodes very short. *Leaves* spreading at an angle of 45°, plane shape linear-lanceolate, length × depth 4.0 × 2.5 mm; leaf base sessile, dilated, rhombic, exactly fitting between other leaf bases at alternate nodes; adaxial surface concave, setose, abaxial surface convex, tomentose in young leaves; apex rounded; margins ciliate. *Inflorescence* axes villous with yellowish hair. *Bracts* ovate to widely ovate in outline, length × depth (4.5–)4.9 × 1.5(–1.8) mm; lamina adaxially concave (inside), abaxially convex (outside), comose on inside, sparsely hairy to tomentose on outside, ± 3-ribbed on each side of main vein, coriaceous and rugose, extending into a membranous rim; base cuneate; main vein extending into a rounded or subacute apex, or the second form with a more

rounded apex (resembling *P. montana*); margins ciliate. *Floral envelope* ± 5.9 mm long, papyraceous and yellow-pink during pollination, dehydrated after shedding of pollen, turning red to brown. *Hypanthium* glabrous at ovary, neck tomentose, ± 1.4 mm long. *Sepals*: outer sepals concave, ovate, apex abaxially setose; inner sepals obovate, adaxially tomentose in upper third, apex abaxially setose. *Androecium* with filaments of antipetalous whorl ± 1.1 mm and those of antisealous whorl ± 2.2 mm long; anthers 0.7×0.2 mm, subbasifixed, 2-theous and 4-locular. *Ovary* 1.6×1.0 mm. *Fruit* an achene, with pericarp membranous and dry, 2.5×1.2 mm, enveloped by persistent, loosely arranged hypanthium, breaking up at neck base due to dehydration and torsification of tissue, resulting in the sepals and androecium being shed. Figure 7.4A–F.

Diagnostic characters and relationships

Both *Passerina quadrifaria* and *P. comosa* have bracts that are abaxially hairy, hence they are easily confused. Morphologically *P. comosa* is less robust, internodes are longer, leaves adhere closely to the stem and are generally more hairy and the bracts often have extended wings that are abaxially setose. These two species are geographically isolated, with *P. comosa* considered as a ‘north-western endemic’ of the Cape flora (Weimarck 1941), while the distribution of *P. quadrifaria* is along the mountain ranges of the southern Cape and western parts of the Eastern Cape Province.

All the specimens characterized by abaxially hairy bracts and occurring in mountainous areas of the Little Karoo and southern Cape showed considerable variation. In the present study all these specimens were grouped under *P. quadrifaria*, but two forms could be recognized within this species. The first form corresponds to the present species description. *Schlechter 5864*, *Keet 1067* and *Esterhuysen 10734*, *27971* and *27383* represent the second form, characterized by slightly longer internodes, smaller leaves and bracts with a more rounded apex (resembling *P. montana*). None of these characters are constant and many specimens represent intermediates between the two forms. Leaf anatomy does not provide additional characters to justify the recognition of these two forms at species level (Bredenkamp & Van Wyk 2000, 2001a).

Passerina quadrifaria could also be confused with stunted forms of *P. obtusifolia*, a species occurring in dryer areas of the Eastern Cape. The leaves of these plants also have a four-ranked appearance, but the shape and especially the obtuse apex of the leaves and the bracts clearly identify *P. obtusifolia*.

Etymology

The specific epithet is derived from the Latin *quadrifarius* (= in four ranks). The name describes the decussate arrangement of the leaves, which almost gives the impression of a spinal column found in lower vertebrates.

Distribution and ecology

Passerina quadrifaria is distributed in a belt between 33° and 34°S latitude and from 20° to 24°E longitude, on the mountain ranges of the southern and eastern parts of the Western Cape and the southern and western parts of the Eastern Cape, including the Langeberg, Swartberg, Kouga, Outeniqua, Tsitsikamma and Great Winterhoek Mountains. The range includes the Karoo Mountain, Langeberg and Southeastern Centres within the CFR. Plants grow at high altitudes (1 500–1 670 m), in rocky places, often on southeast-facing rocky slopes and the summits of peaks. According to Rebelo (1998) summer drought has a major influence on the vegetation of the Mountain Fynbos, possibly contributing to the xeromorphic appearance of *P. quadrifaria*, such as its shortened branchlets and internodes as well as sturdy, decussate and coriaceous leaves. On the northern side of the Swartberg Mountains, fynbos is replaced by karroid vegetation and it is in these areas that *P. quadrifaria* can easily be confused with *P. obtusifolia*, a species largely confined to more arid karoo conditions. Figure 7.4H.

Conservation status: Least Concern (LC) (IUCN Species Survival Commission 2000).

Specimens examined

WESTERN CAPE.—3320 (Montagu): Heidelberg, Lemoenshoek Peak, SE slopes of Langeberg, 1500-1670 m, (-DD), *Esterhuysen 30876* (BOL). 3321 (Ladismith): Swartberg Mountains, Prince Albert side, (-AC), *Stokoe s.n.* in *SAM 59493* (NBG); Towerkop, SE aspect of Swartberg Mountains, (-BC), *Esterhuysen 26710*, (-BOL); Swartberg Pass, Prince Albert Division, (-BD), *Barnard s.n.* in *SAM 48187* (NBG); *Stokoe s.n.* in *SAM 51426* (NBG); Oudtshoorn Div. Swartberg Mountains, (-BD), *Stokoe s.n.* in *SAM 58589* (NBG). 3322 (Oudtshoorn) Prince Albert District, Swartberg summits, (-AC), *Pocock S.48* (PRE); *Stokoe 8676, 8678, 9302* (BOL, PRE); George District, Montagu Pass, (-CD), *Schlechter 5846* (BOL, G, GRA, M, PRE, TCD); Uniondale, summit of Mannetjiesberg at radio mast (DB), *Bredenkamp 1550-1553* (PRE). 3323 (Willowmore): Knysna Division, Gouna, Hoogeberg, (-CC), *Keet 1067* (GRA, PRE).

EASTERN CAPE.—3323 (Willowmore): Uniondale Division, Smutsberg, (-DA), *Esterhuysen 10734* (BOL, K, NBG, PRE); Kouga Mountains, Saptoukop from Withoek, (-DA), *Esterhuysen 27971* (BOL); *Oliver 9927* (NBG); Uniondale Division, Peak Formosa, Tsitsikamma Mountains, (-DC), *Esterhuysen 27383* (BOL). 3324 (Steytlerville): Uitenhage Division, Great Winterhoek Mountains, Cockscomb, (-BD), *Esterhuysen 28006* (BOL, K, PRE); E peak of Kareedouw Pass 833 m, (-CD), *Fourcade 4889* (BOL).

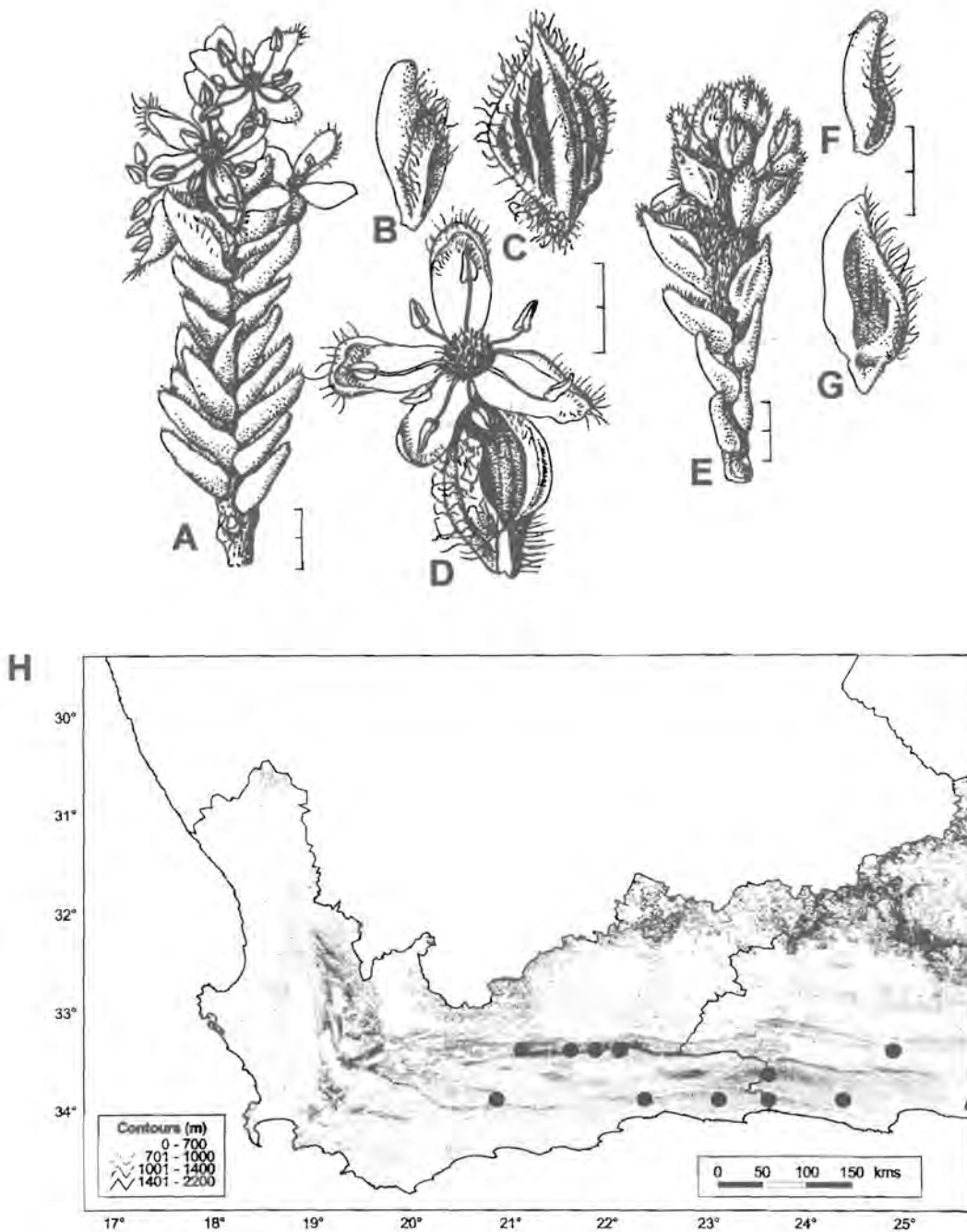


FIGURE 7.4.—*Passerina quadrifaria*, A–D form 1 (Esterhuysen 28006). A, spike reduced, resembling terminal subcapitulate inflorescence; B, leaf; C, bract; D, Flower clasped by bract. E–G form 2 (Esterhuysen 10734). E, inflorescence; F, leaf; G, bract. Scale bars: 2 mm.

H, known distribution of *P. quadrifaria*.

4. *Passerina montana* Thoday. Bulletin of Miscellaneous Information. Kew 4: 152 (1924a); Norl. & Weim.: 630 (1958); Bond & Goldblatt: 432 (1984); Hilliard & B.L.Burt: 182 (1987). Type: Mooi River, *Wood 4036* [K!], lecto., designated by Thoday 10: 387 (1924b); BOL!, GRA!, PRE!].

Passerina ericoides sensu Meisn.: 401 (1840) pro parte, non L.; Meisn. 14: 562 (1857) pro parte; C.H.Wright: 12 (1915), pro parte.

Passerina rigida Wikstr. var. *tetragona* Meisn. 14: 563 (1857) pro parte quoad specim, circa Stormberg *Drège s.n.*

Small trees or shrubs (0.2–)1.0–2.0(–2.5) m high. *Stems* branching from base to up to growing points, young stems profusely branched, young branchlets ascending; branchlets terminally leafless and woolly, with conspicuous terminal scars after dispersal of fruit; bark greyish brown, younger branchlets densely white-tomentose, villous closer to growing points; bark on older branchlets shredding, greyish brown, remains of tomentum forming lengthwise strips; leaf scars conspicuous; older stems fissured lengthwise exposing greyish white sclerenchyma fibres; internodes mostly shorter than leaves. *Leaves* imbricate on young branchlets, closely appressed to stem, diverging at an angle of $\pm 0-5^\circ$, cymbiform, lamina inversely ericoid, adaxial surface concave, tomentose, abaxial surface laterally compressed and glabrous, plane shape linear to lanceolate; base sessile, dilated; apex acute, median vein prominent in upper third of leaf, incurved at apex; margins involute; length \times depth 1.5–2.5(–4.0) \times 0.6–0.8 mm. *Inflorescences* subcapitulate, \pm ellipsoid. *Bracts* decussate, imbricate, sessile, appressed, ovate to obovate in outline; lamina adaxially (inside) concave and villous, abaxially (outside) convex and glabrous, thinly coriaceous, obscurely ribbed, yellowish green, margins of fruiting bracts turning red; base sessile; main vein extending into subacute apex; wings membranous, brownish; length \times depth (3.2–)4.0 \times 0.9(–1.6 mm). *Floral envelope* papyraceous and yellow-pink during pollination, dehydrated after shedding of pollen, turning red to brownish; \pm 5.8 mm long.

Hypanthium glabrous at ovary, neck tomentose and \pm 0.8 mm long, fragmentation at neck base. *Sepals*: outer sepals cymbiform, adaxially scantily tomentose, abaxially glabrous; inner sepals obovate, adaxially tomentose, abaxially glabrous. *Androecium*

with filaments of antipetalous whorl ± 0.6 mm and those of antisealous whorl ± 1.5 mm long; anthers 0.8×0.4 mm. *Ovary* 2.1×0.6 mm. *Fruit* an achene enveloped in beak-like, reddish, papyraceous hypanthium, fragmented at neck base; pericarp membranous and dry, 2.3×1.2 mm. Figure 7.5A–F.

Nomenclatural notes

According to the concept of C.H. Wright (1915), *P. ericoides* is not only distributed along the southern coast of the Western Cape (present interpretation), but also along the coast to the Eastern Cape and further inland up to the present province Mpumalanga. However, most of the inland specimens cited by him have been classified as *P. montana* by Thoday (1924a). The interpretation of *P. corymbosa* by Wright (1915) posed the same problem, as *Wood 4036* (the lectotype of *P. montana*) was also placed in this taxon.

Meisner (1857) described *P. rigida* var. *tetragona* citing two Drège specimens, one from Ezelsbank and the other from Stormberg. The Ezelsbank specimen (*Drège 2971*, P, K) is *P. truncata*, but the Stormberg specimen could not be located. According to Gunn & Codd (1981), Drège crossed the Stormberg (3126BC, Queenstown) on 17 December 1832. The present author suspected that the Drège specimen would be *P. montana*, as it is common in this area. This suspicion is supported by *Sim 68* (from the Pirie Mountains in the King William's Town District), a syntype of *P. montana*, bearing the inscription '*P. rigida* Wiks – *tetragona*' and the Drège specimen from Stormberg is consequently regarded as *P. montana*.

Diagnostic characters and relationships

Hilliard & Burt (1988) noted two rather distinct forms of *P. montana* in KwaZulu-Natal. The first form is characterized by plants on rock platforms that are low, rounded bushes, 0.3–1.0 m high, with the tips of the branches erect, while those of the second form inhabit valleys and are riverside bushes of up to 2 m high, with open branches and pendulous branchlets. The present study, taking the whole distribution

range of *P. montana* into consideration, recognises two forms. One, centred in the God's Window area of Mpumalanga, are rounded shrubs 0.5–2 m high, with many branchlets covered with smaller, decussate, imbricate leaves, bluish green in colour. The second form dominates in the Free State, Lesotho, KwaZulu-Natal and the Eastern Cape. These plants are more robust, with open branches and larger, yellowish green leaves and inflorescences, which are tinged pink. However, the two forms are not geographically distinct and intermediates are common. Both forms unequivocally show the specific characters and therefore we do not propose to give them formal taxonomic recognition. The leaf epidermal, anatomical and floral morphological studies (Bredenkamp & Van Wyk 2000, 2001a, 2001b) supplied no further evidence on which the two forms could be delineated.

Etymology

The specific epithet is derived from the Latin *montanus* (= pertaining to or growing on mountains). This is a very appropriate epithet as *P. montana* is distributed along the Great Escarpment from the Eastern Cape to Zimbabwe.

Common names

Cooper 2302 (K), from Lesotho, reported the vernacular name *Likhabei* and *Staples 17* (PRE), from the Maluti Mountains in Lesotho, recorded the name *Lekaphu*. Story (1952) mentions the name *pakaan*. Von Breitenbach *et al.* (2001) used the names *berg-gonna* and 'mountain gonna'.

Uses

Information on the specimen *Watt & Breyer-Brandwijk 1851*, collected at Thabaneng, states that the plants are used medicinally. However, Watt & Breyer-Brandwijk (1962) supplied no further details.

Distribution and ecology

Passerina montana is a near-endemic to the Great Escarpment of southern Africa, with distant satellite populations in high-mountain areas of Angola, Namibia and the Northern Province of South Africa. It is distributed from Nyanga in Zimbabwe, along the escarpment to Manica and Sofala in Mozambique, the Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, the Free State, Lesotho and the Eastern Cape. Outliers in Angola have been found on the escarpment of the Huilla Plateau near Lubango and the Cheila Mountains. Several specimens of this species have been collected at Moltkeblick on the Auas Mountains in Namibia. In the Northern Province *P. montana* is found in the Soutpansberg area and on the Blouberg, as well as on the summit of Krantzberg in the Waterberg Mountains. A single specimen (*Goossens 375*) was collected in the Pretoria District, but the species is currently probably extinct in this area, due to human impact. Figure 7.5G.

This species grows at altitudes of (900–)1 200–3 000 m. At Nyanga, *P. montana* is associated with *Erica mannii* (Hook.f.) Beentje and *E. hexandra* (S. Moore) Oliv., bordering on *Brachystegia* woodland and montane forest. In Mozambique and South Africa it has been found with *Widdringtonia nodiflora* (L.) Powrie and *Erica* species, bordering on montane forest. It is common amongst rocks on hills, mountain slopes, mountain tops, cliff ledges and rocky ridges. It also frequents stream courses and banks as well as river beds and banks, where the growth form has been reported as a shrub amongst rocks, a drooping bush over running water, a limply spreading bush in sand or dense bushes. These plants also grow in river valley forests and along plantations.

Conservation status: Least Concern (LC) (IUCN Species Survival Commission 2000).

Specimens examined

ANGOLA.—1413: Lubango, Tundavala, ± 12 km from the cascades, (–CD), *Borges 112* (M, PRE); escarpment of the Cheila Mountains, *Mendes 866* (BM); Buraco do Bimbe, 220 m, *Mendes 3803* (K, M). 1513: Tundavala, in the proximity of the cascades, Mapunda River, (–BA), *Barbosa 9447* (K); Cheila Mountains, 10 mi. W of Sa da Bandeira, *Kers 3240* (S).

ZIMBABWE.—1832 (Nyanga): Rhodes, Nyanga Estate, (–BA), *Brain 6950* (MO, PRE); *Chase 592* (BM, PRE); Nyanga, Chapungu Falls, *Dahlgren & Peterson 1661* (B, K); *Davies 48954* (PRE); *Eyles 8527* (K, S); *Eyles Herbarium 7945* (BM); *Fries, 2248, 2496* (K, MO); at Kuhera River, *Fries, Nordlindh & Weimarck 3077* (M); *Gilliland 2025* (BM); Nyanga, Pungwe Hills, *Hopkins s.n.* (K); Nyangani Mountains, *Hopkins B1580, 17165* (K, PRE); *Henkel s.n.* (K); *Humbert 15801* (NBG); *Le Munch 387* (K); *Linder 3980* (BOL, K, PRE); above Pungwe Falls, *Miller 3815, 3847* (K, PRE); *Erin, Miller 4644* (K, PRE); Nyanga Downs, *Rattray 909* (K); Troutbeck, *Robinson 1873* (K, MO); *Simon 657* (K, PRE); *Wild 1352* (K, PRE); Nyumkombe Forest, (–DA), *Gilliland 881* (BM); Nyumkombe Valley, *Gilliland 904 & 905* (BM, K); Odzani River, *Gilliland 1183* (BM); Manica, Umtali, Odzani River Valley, (–DC), *Teague 312* (BOL, K). 1932 (Melsetter): W slopes Mt Peni, Mermaid's Grotto Farm, (–DD), *Goldsmith 15/73* (K, MO, PRE).

MOZAMBIQUE.—Grid ref. unknown: Manica E Sofala, *Pedro & Pedragao 8095* (BOL, PRE); Manica Serra Zuira, 2 k da vacaria estrada Vila Perz, *Torre & Perreira 12683* (C).

NAMIBIA.—2217 (Windhoek): Ausberge, Moltkeblick, (–CA), *Giess 9014, 9429, 13136* (M, PRE); *Homan s.n.* (M); *Meyer 106, 9429* (M); *Rennie 2613* (BOL).

NORTHERN PROVINCE.—2229 (Waterpoort): Soutpansberg, Rushton, (–DD), *Raal & Raal 296* (PRE). 2230 (Messina): Venda, Dزامbe Village, SE of Nwanedi Game Park, (–CB), *Hardy 6894* (PRE); Ngulumbi, Phiphidi Waterfall N bank of Nutshindudi, (–CD), *Glen & Glen 3911* (PRE); Sibasa District, Tate Vondo Forest Reserve, Tshirorha River Valley, *Hemm 1* (PRE); Phiphiti Waterfall, *Obermeyer TRV 30044* (PRE); Tate Vondo, Nzhelele River, *Van Wyk 2899* (PRE, PRU). 2328 (Baltimore): Blouberg, near Malabosch's Kraal, (–BB), *Van der Schijff 5376* (PRE). 2329 (Pietersburg): Blouberg Kloof, (–AA), *Codd 8772* (PRE); *Smuts & Pole-Evans 933* (BOL, K); Louis Trichardt, Hangklip, (–BB), *Bremekamp & Schweickerdt 417* (PRE); *Schlieben s.n.* (M); 40 mi. E of Haenertsburg, Iron Crown Mountains, (–DD), *Mogg 17383* (PRE). 2330 (Tzaneen): Entabeni Forest Reserve, (–AB), *Codd & Dyer 4473* (PRE); Tshakoma, *Obermeyer 1078* (PRE); Sebasa, *Smuts & Gillett 3179* (NBG); Woodbush Forest Reserve, (–CC), *Van Vuuren 1632* (PRE); Letaba District, Cyprus Farm, *Renny 179* (PRE); Zoutpansberg District, Pepiti Falls, *Smuts & Gillett 3179* (PRE), Soutpansberg District, hill S of Berlin Mission, *Curson & Irvine 91* (PRE). 2427 (Thabazimbi): Waterberg, Bergfontein Farm, (–BC), *Jacobsen 3468* (PRE); Krantzberg; Groothoek Farm, *Westfall 716* (PRE); Marikele Nature Reserve, on top of Krantzberg, Bergfontein, (–CB), *Bredenkamp 1026* (PRE); Groothoek Farm, SE kloof, (–DA), *Westfall 756* (PRE). 2430 (Pilgrim's Rest): Platberg, The Downs, (–AA), *Rogers 21919* (PRE); Ararat Mountain, *Venter 7123* (PRE); Wolkberg Wilderness Forest Reserve, *Venter 11013* (PRE); Leboyana Peak area, Thabakgolo, (–AD), *Matthews & Van Rensburg 1036* (PRE).



GAUTENG.—2528 (Pretoria): Pretoria District, (–CA), *Goossens 375* (PRE).

MPUMALANGA.—2430 (Pilgrim's Rest): Ohrigstad Dam Nature Reserve, (–CC), *Jacobsen 1340* (PRE); Mariepskop, (–DB), *Keet s.n.* (NBG); *Killick & Strey 2386* (M, PRE); *Krymauw 789* (PRE); *Meeuse 9965* (PRE), 2 000–5 000 m, *Merxmüller 591* (M); *Van der Schijff 4478, 4836, 5592, 5845 & 6191* (K, PRE); *Venter 12721* (PRE); Mt Sheba Estate, (–DC), *Boucher 1862a & 1862b* (NBG); Ohrigstad Dam Nature Reserve, *Edwards 4058* (K, PRE); Mt Sheba Nature Reserve, *Forrester & Gooyer 203* (PRE); *Kerfoot 8102* (PRE); Ohrigstad Dam Nature Reserve, *Mauve 5246* (PRE); *Smit 22* (PRE); from World's View to God's Window, (–DD), *Bredenkamp 1022, 1023, 1024 & 1025* (PRE); 6.5 mi. from Pilgrim's Rest to God's Window, *Davidson & Mogg 32909* (PRE); Chum Falls to Belvedere, *Davidson & Mogg 32881* (UPS); Lisbon falls, *Davidson & Mogg 32859* (UPS); Vaalhoek, Erasmuskop, near grave of Oswald, *Perold & Fourie 2256* (PRE); Graskop Spruit, *Galpin 14573, 14578, & s.n.* (BOL, PRE); Lisbon Falls, *Jordaan 97* (PRE); Mac Mac Nature Reserve, *Kluge 1995* (PRE); God's Window, *Lambinon & Reekmans 82/157* (PRE); Kowyn's Pass, *Levyns 9409* (BOL); Lisbon falls, *Louw 2373* (NBG); 3 km from God's Window, *Meyer 1061* (PRE); Mac Mac, *Mudd s.n.* (K); Graskop, *Pole-Evans 129* (PRE); Graskop, top of gorge, *Prosser 2050* (PRE); Kowyn's Pass, *Rauh & Schlieben 9788* (M, PRE); *Rechinger A-4413* (M). 2530 (Lydenburg): Zwagershoek Farm, (–AB), *Obermeyer 258* (PRE); Hartebeestvlakte, *Kluge 2044* (PRE); 6 mi. NE of Dullstroom, (–AC), *Codd & De Winter 3237* (PRE); Santa 7.3 mi. from Dullstroom, (–AC), *Story 3896* (GRA, PRE); Schoemans Kloof, Somerset Farm, (–AD), *Smuts & Gillett 2162* (BOL, NBG, PRE); Long Tom Pass, (–BA), *Balsinhas & Kersberg 2114* (PRE); Mt Anderson, *Smuts & Gillett 2469* (PRE); 12 mi. from Lydenburg on Sabie road, *Story 3899 & 3900* (PRE); 7,6 km between Sabie and Hazyview, (–BB), *Deall 34* (PRE); Mac Mac Pools, *Hilliard & Burt 18443* (PRE, S); Mt Anderson, *Humbert 11018* (NBG); Sabie, *Rogers 23675* (PRE); Wonderkloof Nature Reserve, (–BC), *Elan-Puttick 146* (PRE); Buffelskloof Nature Reserve, *Onderstall 919* (PRE); Lowveld Botanical Garden, (–BD), *Buitendag 104* (NBG, PRE); Witklip State Forest, *Kluge 797* (PRE); Pilgrim's Rest District, Roschaugh, *Smuts 91* (PRE); Kaapsche Hoop, (–DB), *Nel 219* (PRE); *Onderstall 1269* (PRE); *Pole-Evans 986* (PRE); *Van der Merwe s.n.* (K, PRE); Crocodile River, *Pons s.n.* (PRE). 2531 (Komatipoort): Barberton District, Duivelskantoor, (–CB), *Thode 1639* (PRE).

SWAZILAND.—2631 (Mbabane): Helolotsha Valley, (–AA), *Kemp 1184* (MO, PRE); *Moss & Rogers 1263* (BM).

KWAZULU-NATAL.—2729 (Volksrus): W Slopes of Majuba Hill, (–BD), *Phillips 228* (PRE). 2730 (Vryheid): Utrecht District, Naauwhoek, (–AD), *Devenish 712* (BM, K, M, NBG, PRE); Great Winterhoek Mountains, (–CB), *Thode A292* (K, MO, PRE). 2731 (Louwsburg): Hlobane, (–CD), *Johnstone 543* (MO, PRE, S). 2828 (Bethlehem): Bergville District, Royal Natal National Park, Dooley Mountain, (–DB), *Galpin 10146* (PRE); Mont Aux Sources, (–DD), *Hutchinson, Forbes & Verdoorn 75* (PRE); in Tugela Gorge, *Schweickerdt 759* (PRE). 2829 (Harrismith): Van Reenen 5 000 ft, (–AD), *Wood 6601 & 11405* (BM, K); Klipriver, (–BC), *Sutherland s.n.* (K); Cathedral Peak area, (–CC), *Levyns 8274* (BOL); Little Tugela District, (–DC), *Hoffenthal 3464* (K); Klip River, *Curator Pretoria Botanical Garden s.n.* (PRE); *Stam 429* (PRE). 2830 (Dundee): Nkandla



District, 0.75 mi. W of Qudeni Beacon 88, (-DB), *Edwards 2239* (K, PRE). 2929 (Underberg): Bergville District, Champagne Castle, (-AB), *Edwards 1991* (PRE); Estcourt District, Giant's Castle Reserve, *Edwards 2276* (K, PRE); Bergville District, *Franks s.n.* (PRE); Cathedral Peak Forest, *Killick 1071 & 1585* (PRE); Champagne Castle, *Meebold 15158* (M); on slopes of Giant's Castle, *Symons 144* (PRE); Giant's Hut area, (-AD), *Ward 6944 & 6954* (PRE); Estcourt District, Stillerust Farm, *Wright 1029* (PRE); Estcourt pasture reserve, banks of Bushmans River, (-BA), *West 485* (PRE); Tabamhlope Mountain, *West 1392* (PRE); Estcourt District, Dalton Bridge, (-BB), *Acocks 10660* (PRE); Mooi River, *Wood s.n.* (NBG); Meteor Ridge, (-BC), *Mogg 3347 & 7083* (PRE); Mooi River, *Wood 4036* (BOL, K, GRA); Mpendle District, Mulangane Ridge, above Carter's Neck, *Hilliard & Burt 16921* (M, PRE, S); Underberg District, Cobham Forest Reserve, Polola Valley, (-CB), *Hilliard & Burt 13970 & 18071* (PRE); Sani Pass, (-DB), *Hilliard & Burt 7139* (MO, S); Himeville, (-DC), *Marloth 11873* (PRE). 2930 (Pietermaritzburg): Mooi River, (-AA), *Wood 4036 & s.n.* (K); Dargle District, The Chestnuts Farm, (-AC), *Letty 269* (PRE); Howick District, Furth Farm, 40 km SW of Howick, *Curator Bloemfontein Museum 4* (PRE); district of Albert, (-AD), *Cooper 625* (BM, BOL, K, TCD); Umgeni Falls, (-CA), *Bayer 786* (PRE); Dargle Forest, *Moll 1228* (K, PRE). 2931 (Stanger): Mvoti River mouth, (-BA), *Moll 2466* (K). Grid ref. unknown: Drakensberg National Park, Tugela Gorge, *Acocks 1005* (S); Drakensberg summit, *Galpin 6825* (K); *Hilliard & Burt 11726 & 13511* (K, S); Impendle District, Tilhitudlein Farm, *Huntley 125* (PRE); Natal 4 000-5 000ft, *Sutherland 185B* (TCD); Klip Rivier, *Sutherland s.n.* TCD; Movel Hills, *Sutherland s.n.* (K).

FREE STATE.—2827 (Senekal): Korannaberg (CC), *Zietsman & Zietsman 427 & 512* (PRE); Clocolan, Hursley, (-C), *Stam 43* (PRE); Ficksburg District, Farm Westbury, (-DD), *Galpin, 14018 & s.n.* (BOL, PRE, S). 2828 (Bethlehem): Slabberts, Help Mij Plaas, (-AC), *Stam 174* (PRE); Mr Naude's farm, (-AD), *Theron 2182* (PRE); Golden Gate Highland, NW of Glen Reenen House, (-BC), *Liebenberg 7299* (PRE); Meltsetter Summit, *Roberts 3359* (PRE); Kestell, 'Korfshoek', (-BD), *Blom 275* (PRE); Ficksburg, Franschoek, (-CA), *Ferreira 5* (PRE); Mt Morkel, *Repton 6253* (PRE); Fouriesburg District, Nelspoort Farm, E of Wittebergen, *Lutjeharms 6818* (PRE); Dunblane 335 Farm, W of Clarens, W flank of Mt Spur, (-CB), *Scheepers 1831* (MO, PRE); Golden Gate, Zuluhoek, bottom of valley, (-DA), *Bredenkamp 889* (PRE); summit of Mt Meltsetter, *Bredenkamp 890 & 891* (PRE); Brandwag Rock, Gertenbach & Groenewald 9104 (PRE); Golden Gate National Park, *Liebenberg 7299* (K, NBG); Witsieshoek, (-DB), *Junod TRV 17326* (PRE); *Thode s.n.* (NBG); Witsieshoek, (-DB), *Van der Zeyde s.n.* (MO, S). 2829 (Harrismith): Manyenyeza Mountain, Rensburgkop Farm, (-AC), *Jacobsz 664* (PRE); Kerkenberg, *Jacobsz 1379 & 1482* (PRE); Platberg Botanical Garden area, *Jacobsz 2603* (NBG, PRE); Platberg slopes, *Putterill s.n.* (PRE); *Sankey 69* (K, MO); *Van der Zeyde s.n.* (NBG); Van Reenen, *Wood 12179* (NBG); Kerkenberg, (-CA), *Jacobsz 313* (PRE). 2926 (Bloemfontein): Thaba Nchu, (-BB), *Mostert 1185* (PRE); *Peeters, Gericke & Burelli 387 & 407* (MO, PRE); *Roberts 1953 & 1954* (PRE). 2927 (Maseru): Ladybrand, on top of mountain, (-AB), *Bredenkamp 893 & 894* (PRE); *Rogers 788* (PRE); Leliehoek, *Zietsman 323* (PRE). 3027 (Lady Grey): Zastron District, mountain summit, (-AC), *Heydoorn 10* (PRE); Trans-Garipina, Kornetspruit, Gariep & Caledon Rivers, foot

of Wittebergen, (–AD), *Zeyher 117.11* (S); between Drakensberg and Wittebergen, *Mellersh 617* (TCD).

LESOTHO.—2828 (Bethlehem): Leribe, mountain slopes, (–CC), *Dieterlen 49* (K, MO, NBG, PRE, S); Butha Buthe, from Motenge to Oxbow, *Hedberg & Hedberg 82060* (UPS); Oxbow, Tsehlanyane, *Herbst 5269* (PRE); 2 mi. from Oxbow, kloof leading to Khatibe, *Lubke 274* (PRE, M); Ox Bow, (–DC), *Hebblethwaite s.n.* (GRA); Lekhapu, *Jacot-Guillarmod 3824* (GRA); 8 km from New Oxbow Inn road to Moteng Pass, Tsehlanyane River, *Killick 4485* (PRE). 2927 (Maseru): Maseru District, mountain road, (–AD), *Jacot-Guillarmod 3225* (K, PRE); Ha Khotso, (–BB), *Gormley & Barber 23* (PRE); Masoeling, *Jacot-Guillarmod 1546* (PRE); Blue Mountain Pass, (–BC), *Schmitz 8265* (PRE); Molimo-Nthuse, between Bushmen’s and Blue Mountain Passes, (–BD), *De Kruif 1158* (PRE); between God Help Me Pass and Blue Mountain Pass, *Hilger 22* (M, PRE); Blue Mountain Pass, *Hilliard & Burt 17703* (PRE, S); God Help Me Pass, *Killick 4225* (MO, PRE); Bushmans Pass, *Werdermann & Oberdieck 1560* (K); Thaba Morewa Mission, (–CD), *Dieterlen 1247* (NBG, PRE); Thabaneng, *Watt & Brandwijk 1851* (PRE); S of Roma, 3 km E of Quaba, (–DB), *Hilger 83/8* (M, PRE); Roma, Hanging Valley, *Schmitz 56* (PRE); bridle path, hill slope, (–DB), *Jacot-Guillarmod 1792* (PRE). 2928 (Marakabei): Mamalapi, (–AC), *Jacot-Guillarmod 765 & 780* (PRE); Likolobeng, *Compton 21236* (NBG); Lehaha-La-Sekhonyana, (–AD), *Jacot-Guillarmod 230* (PRE). 2929 (Underberg): Sehlabathebe Nature Park, Matsa-A-Mafikeng area at cave, (–CC), *Beverly 72* PRE; Sesiu Valley, Sehlabathebe National Park, *Hoener 1635 & 1846* (MO, PRE, S); Bushmans Pass, *Werdermann & Oberdieck 1560* (B, K, PRE). 3028 (Matatiele): Ntibokho, Rafanyanes Valley, junction Lehaha-La-Sekhonyana, bridle path and cut-off to Bokong (–AB), *Jacot-Guillarmod 298* (PRE); upper Quthing, gorge after Makope’s, (–AC), *Schmitz 8314* (PRE); Transkei/Lesotho border, Qachasnek, (–BA), *Jacot-Guillarmod 9842 & 9886* (GRA, PRE); Grid ref. unknown: experimental area Thaba Tsoeu, *Archibald 677* (GRA); Machoeka 9 000 ft, *Bryce s.n.* (K); Chalabisa, *Compton 21048* (NBG); Mequalleng, *Cooper 702* (BM, BOL, K, M, PRE, TCD); Orange Free State & Basutoland, *Cooper 842* (BOL, K); Basutoland, *Cooper 2302* (K); Maluti Mountain, *Staples 17* (PRE).

EASTERN CAPE.—3026 (Aliwal North): Elandshoek Farm 40 km S of Aliwal North, (–DC), *Dold 1617* (GRA); Elandshoek, *Story 2071* (MO, PRE). 3027 (Lady Grey): Witteberg, Jouberts Pass, (–BC), *Hilliard & Burt 12213* (PRE, S); Wittebergen, Lady Grey, (–CA), *Barber 745* (GRA); Lady Grey District, *Gerstner 119 & s.n.* (PRE); Jouberts Pass, *Werger 1806* (MO, PRE); Jouberts Pass, (–CB), *Werger 1054* (PRE); Karringmelkspruit Gorge, (–CC), *Jacot-Guillarmod 7854* (GRA, PRE); Jouberts Pass, 2 km up from Glen Doon, (–CD), *Welman 798* (PRE); Moshesh’s Ford, 21 mi. from Barkley East, (–DD), *Edwards 4187* (K, MO, PRE); along road S of Lundean’s neck, 1 km S of Fetcani Glen Farm track, *Phillipson 624* (MO, UPS). 3028 (Matatiele): Ramatselanes Gate, escarpment, (–BB), *Bayliss 1349 & 1362* (PRE); Maclear District, Naude’s Neck Pass, (–CA), *Acocks 12175* (PRE); *Dold 2053* (GRA); *Hilliard 5191* (MO, PRE); *Seutloali 94* (PRE); *Thomas s.n.* (GRA); *Werdermann & Oberdieck 1129* (K, PRE); Naude’s Neck, between Maclear and Rhodes, (–CC), *Van Wyk 6704* (PRE, PRU). 3029 (Kokstad): Mt Fletcher District, Kokstad to Franklin Road, (–CB), *Hilliard & Burt 7220* (PRE). 3030 (Port Shepstone): Port Shepstone, (–CB),

Burt-Davy 2410 (BOL). 3126 (Queenstown): Majuba Neck, Sterkspruit, (-AA), *Hepburn 85* (GRA); Molteno, Broughton, (-AC), *Flanagan 1635 & 1892* (K, NBG, PRE, S); near Predikantskop, road to Burgersdorp, (-BA), *Edwards 4196* (K, PRE); Predikantskop, deviation from Jamestown Road, Farm Spitskop, *Bredenkamp 895* (PRE); Jamestown, Vogelfontein Farm, (-BB), *Compton 2241* (NBG); Andriesberg near Bailey, (-DA), *Galpin 2028* (K, PRE); near top of Hangklip Mountain, (-DD), *Roberts 1973 & 2001* (PRE); Mt Shepstone, *Bayliss 1432* (PRE); Hangklip Mountain, *Roberts 1973* (PRE). 3127 (Lady Frere): Indwe, (-AD): *Sim 2595* (K); Transkei, Xalanga District, Cala commonage, (-BC), *Dold 840* (GRA); Enqcobo, (-DB), *Esterhuysen 29153* (BOL). 3128 (Umtata): Ugie, Pomona, (-AA), *Gill 240* (BOL). 3226 (Fort Beaufort): Tarka District, near Spring Valley P.O., (-AD), *Acocks 12125* (PRE); Stockenstrom, Katberg, (-BB), *Dyer 752* (GRA, K, PRE); Katberg, near the gorge, (-BC), *Dyer 753 & 754* (GRA, K, PRE); *Hutchinson 1624* (PRE, K); Amatole Mountains, Hogsback, Cathcart Road, near Klipplaat River crossing, (-RD), *Phillipson 1140* (K, PRE); Cathcart District, Fairford, *Catterrell 41* (PRE); Farm Glencoe, *Palmer 1417* (GRA); Katberg, (-DA), *Hutchinson 1624* (BM); Keiskamma Hoek Dist, Amatola Range, top of range NW of Cata Forest Reserve, (-DB), *Story 3667* (PRE). 3227 (Stutterheim): Hogsback District, Stockenstrom, (-CA), *Compton s.n.* (NBG); Victoria East District, Hogsback, *Levyns 9553* (BOL); *Ratray s.n.* (PRE); Keiskammahoek District, Wolf-Mnyameni Watershed, *Story 3778* (GRA PRE); King William's Town District, mountains, (-CD), *Ratray 382* (BOL); Pirie Mountain, *Sim 68* (K PRE). 3326 (Grahamstown): Kenton-on-Sea, (-DA), *Botha 2610* (PRE). 3327 (East London): (-BB), *Sim 1471* (K). Grid ref. unknown: *Dunne s.n.* (BM); Drakensberg, Barkley East District, summit Doodmans Krans Mountain, *Galpin 6825* (PRE); Victoria East Hogsback, *Giffen s.n.* GRA; Bushmans River Pass, *Thode s.n.* (NBG); *Wager TRV 10772* (PRE).

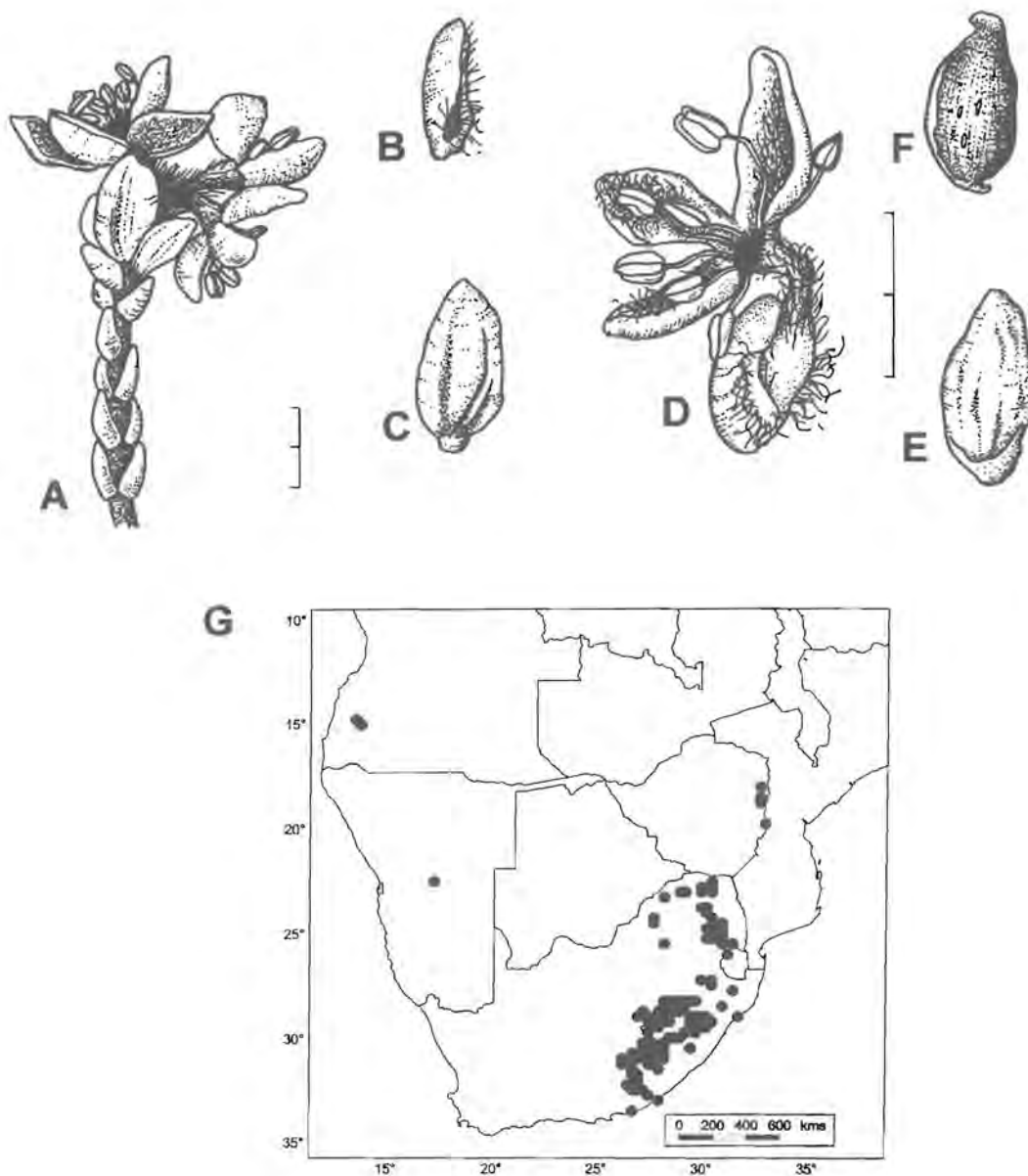


FIGURE 7.5.—*Passerina montana* (Bredenkamp 893). A, spike reduced, resembling terminal subcapitulate inflorescence; B, leaf; C, bract; D, flower clasped by bract; E, achene, enveloped by membranous pericarp; F, achene in lateral view. Scale bars: 2 mm.

G, known distribution of *Passerina montana*.

5. *Passerina burchellii* Thoday. Bulletin of Miscellaneous Information. Kew 4: 155 (1924a); Bond & Goldblatt: 432 (1984); Goldblatt & Manning: 683 (2000). Type: Western Cape, Caledon Division, mountain tops of Baviaanskloof near Genadendal, *Burchell 7761* [K, lecto.!, designated by Thoday 10: 387 (1924b); M!, P!].

Passerina tetragona Burchell MS. in Herb. Kew, non Steud. fide Thoday 4:156 (1924a).

Low, erect, many-stemmed shrublets, branching mostly on new growth, ± 0.3 m high, from a common rootstock. *Stems* greyish brown, cork fissured, grey-brown, scabrous, surrounding prominent leaf scars; indumentum at growing point densely white-tomentose, flaking off with cork on older branchlets, which become glabrous. *Leaves* imbricate, overlapping $\pm 50\%$, diverging at an angle of 30° , plane shape rhombic, length \times depth $2.8(-3.5) \times 1.5$ mm, adaxial surface concave, villous, abaxial surface convex, glabrous; base sessile, cuneate; apex subacute, bearded; margins brownish setose. *Inflorescences* with spikes extended, number of spikes often reduced, spikes sometimes solitary, 6–12-flowered, arrangement subterminal, axis white-tomentose, proliferating growth common. *Bracts* appressed, rhombic, length \times depth $(3.2-3.5) \times 1.5$ mm; lamina adaxially concave (inside), abaxially convex (outside), villous inside, glabrous outside, coriaceous and smooth, extending into a smooth wing, dark green when fresh, dark brown in dried specimens; base cuneate; main vein extending into acute, bearded apex; margins brownish setose, involute. *Floral envelope* ± 4.7 mm long, papyraceous and yellow-pink during pollination, dehydrated after shedding of pollen, turning red to brown. *Hypanthium* glabrous at ovary, neck tomentose, ± 0.8 mm long. *Sepals*: outer sepals cymbiform, midrib adaxially and apex abaxially setose; inner sepals obovate, adaxially tomentose, apex abaxially setose. *Androecium* with filaments of antipetalous whorl ± 0.7 mm and those of antisepalous whorl ± 1.5 mm long; anthers 0.5×0.3 mm, subbasifixed, 2-thecous and 4-locular. *Ovary* 1.6×0.6 mm. *Fruit* an achene, pericarp membranous and dry, 2.5×1.2 mm, enveloped by persistent, loosely arranged hypanthium, breaking up at neck base due to dehydration and torsification of tissue, resulting in sepals and androecium being shed. Figure 7.6A–D.

Nomenclatural notes

Although Thoday (1924a) cited *P. rigida* var. *comosa* Meisn. partly (ex MS. in Herb. Kew) in synonymy under *P. burchellii*, the specimens cited by Meisner (1857) in the description of the var. *comosa* all belong to *P. pendula* (Eckl. & Zeyh.) Thoday.

Diagnostic characters and relationships

Bearded sepals, leaves and bracts distinguish this species from *P. pendula*.

Eponymy

This plant was named in honour of the explorer and botanist W.J. Burchell, who collected in Caledon and as far north as Tulbagh between 1810 and 1811. During this trip *Burchell 7761*, the lectotype of *P. burchellii*, was collected on the summit of the mountains of Baviaanskloof near Genadendal.

Distribution and ecology

Passerina burchellii is endemic to the Southwestern and Langeberg Centres within the CFR. It is common on mountain summits of the Villiersdorp and Genadendal Districts, with outliers on southeastern rocky slopes of Towerkop in the Swartberg Mountains at Ladismith. This species occurs at altitudes of 1 333–2 167 m, often covered in mist. It is found in small groups on sandy loam, between boulders and rocks on upper south- or southeast-facing slopes. Figure 7.6E.

Conservation status: because of small population size, the conservation status is considered as Vulnerable (VU D2) (IUCN Species Survival Commission 2000).

Specimens examined

WESTERN CAPE.—3319 (Worcester): Blokkop, above Villiersdorp, (–CC), *Esterhuysen* 35415 (BOL); Jonaskop, (–DC), *Bredenkamp* 1545, 1546 (PRE); *Esterhuysen* 36404 (BOL); *Stokoe s.n.* (NBG, PRE); *Stokoe* 2800, 2802, 22329 (BOL, K, NBG, PRE). 3321 (Ladismith): Towerkop, (–CA), *Esterhuysen* 26714 (BOL, K). 3419 (Caledon): Genadendal mountain summits, (–BA), *Bolus* 687 (BM, BOL, HAL, K, NBG, P, PRE, UPS, W); mountain tops of Baviaanskloof, *Burchell* 7761 (K, M); Robertson, Galgeberg, *Esterhuysen* 34537 (BOL, K, S); Genadendal, Kanonkop, *Esterhuysen* 35616 (BOL, K); top of Baviaanskloof, *Stokoe* 2542, 3199 (PRE, K). Grid ref. unknown: Caledon, E of Villiersdorp "Silverstream", *Esterhuysen* 33533a (BOL M); *Niven Laubert s.n.* (S).

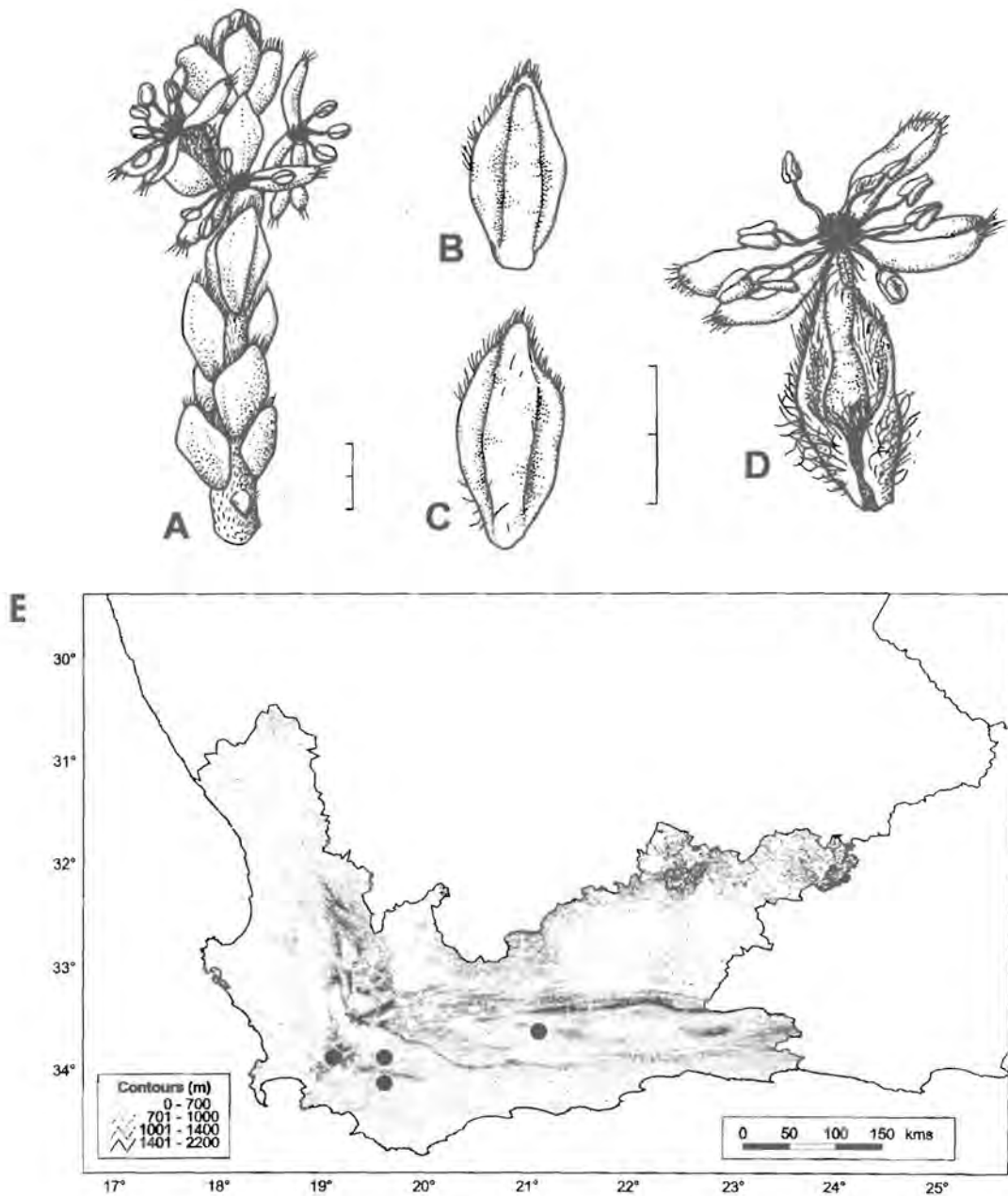


FIGURE 7.6.—*Passerina burchellii* (H. Bolus 687). A, flowering inflorescence; B, leaf; C, bract; D, flower clasped by bract. Scale bars: 2 mm.
E, known distribution of *Passerina burchellii*.

6. *Passerina ericoides* L. *Systema naturae* 12,2: 733 (1767); *Burm.f.*: 12 (1768); L.: 236 (1771); L.: 374 (1784); Willd.: 430 (1799); Poir.: 41 (1804); Wikstr. 39: 325 (1818); Meisn.: 401 (1840) pro parte minore; Steud.: 274 (1841); C.A.Mey.: 49 (1843); C.H.; Meisn. 14: 562 (1857) pro parte minore; Wright: 12 (1915) pro parte; Thoday 4:166 (1924a); Bond & Goldblatt: 432 (1984); Hilliard & B.L.Burtt: 182 (1987); Goldblatt & Manning: 683 (2000). Type: *Passerina ericoides*, *Linnean Herbarium 504.5* [LINN, lecto.!, designated by Thoday 4:148 (1924a)].

Chymococca empetroides Meisn. 14: 565 (1857); Harv.: 325 (1868); Bol. & Wolley-Dod: 315 (1904); C.H.Wright: 15 (1915); Thoday 4:166 (1924a).

Passerina filiformis L. var. *crassifolia* Eckl. & Zeyh. fide Meisn. 14: 565 (1857). Type: *Eckl. & Zeyh. herb. no. 39* (G!, lecto., here designated; BOL!, MO!, P!, W!).

Passerina glomerata sensu Meisn. 14: 562 (1857), non Thunb.: 75 (1794); *Lachmaea conglomerata* L. sensu Meisn. 14: 562 (1857).

Low, rounded, many-stemmed shrublets, branching profusely on new growth, 0.3–1.2 m high, older branchlets indurate, young branchlets lax, often arcuate. *Stems* light greyish brown, cork fissured lengthwise, grey-brown, whitish scabrous, surrounding prominent leaf scars; indumentum at growing point densely white strigose, flaking off with cork on older branchlets, which become glabrous. *Leaves* slightly succulent, imbricate, overlapping $\pm 50\%$, diverging at an angle of 45° , plane shape oblong, length \times depth 2.5–2.8 \times 0.6–0.7 mm, adaxial surface concave, villous, abaxial surface convex, glabrous, greyish green, smooth; base sessile, dilated; apex obtuse to subacute; margins glabrous, basally sparsely setose. *Inflorescences* with spikes usually extended, 6–12-flowered, arrangement subterminal, axis white strigose, proliferating growth common. *Bracts* spreading at an angle of 60° (flowering) or 90° (fruiting), oblong to lanceolate, length \times depth 3.6 \times 1.5 mm; lamina adaxially concave (inside), abaxially convex (outside), villous inside, glabrous outside, smooth, wings absent, greyish green, slightly succulent; base dilated; apex obtuse to subacute; margins glabrous, basally sparsely setose, involute. *Floral envelope* ± 5.0 mm long, coriaceous and greenish during pollination, dehydrated after shedding of pollen,

turning red. *Hypanthium* ovate-oblong at ovary, strigose, neck strigose, ± 0.6 mm long. *Sepals* globose when young, concave, widely obovate, outer and inner sepals adaxially puberulent, abaxially glabrous. *Androecium* with filaments of antipetalous whorl ± 0.5 mm and those of antisepalous whorl ± 1.3 mm long; anthers large, 0.9×0.7 mm, subbasifixed, 2-theous and 4-locular. *Ovary* 2.1×1.7 mm. *Fruit* a fleshy red berry, 5.3×4.0 mm, enveloped by persistent, loosely arranged hypanthium, fragmenting over widest circumference of fruit, the fragmented hypanthium, sepals and androecium being shed. *Seed* 2.9×1.6 mm. Figure 7.7A–G.

Nomenclatural notes

In the *Catalogue of the Linnaean Herbarium*, Savage (1945) made the following inscription ‘Tulb. list c. 1769. n.1. det. L.—*Blaeria ericoides*’. This refers to consignments of bulbs, seeds and herbarium specimens that Rijk Tulbagh sent to Van Royen, the Burmans at Amsterdam and Linnaeus at Upsala (Gunn & Codd 1981). Jackson (1917–1918) published a list of 203 of the specimens sent to Linnaeus around 1769 and identified by him. The first inscription on the list is the provisional name *Blaeria ericoides*, which Savage (1945) believed to be the *P. ericoides* specimen at LINN, but there is no numbering or any other indication on the specimen to link it with Tulbagh’s list (Jackson 1917–1918). As Linnaeus had already described *P. ericoides* in 1767, the specimen at LINN is probably not part of the Tulbagh collection. Thoday (1924a) clearly regarded the specimen at LINN, named by Linnaeus, as the type of *P. ericoides*. As no other original elements exist, *P. ericoides* LINN 504.5 is regarded as a lectotype designated by Thoday (1924a).

Thunberg (1825a) accepted Wikström’s concept of *P. glomerata*, occurring at Hout Bay in the Cape, and cited *P. ericoides* in synonymy, causing confusion about the identity of the latter taxon. Meisner (1840) reinstated *P. ericoides*, but the concept of this taxon became even more doubtful in the light of the cited distribution. In 1857 Meisner retained his concept of *P. ericoides*, occurring at Uitenhage, Port Elizabeth, Witbergen and Onderbokkeveld, and placed *P. glomerata* and *Lachnaea conglomerata* in synonymy under *P. ericoides*. This revision by Meisner (1857) was largely followed by Wright (1915). Because of his incorrect concept of the taxon,

Meisner (1857) was confronted with material from Table Bay and Standvallei with red berries, which he then named *Chymococca empetroides*, based especially on the fleshy fruit. Thoday (1924a) was justified in placing this name in synonymy under *P. ericoides* as the descriptions of these taxa coincide and as the fleshy fruit of *C. empetroides* is not unique, but is also found in *P. rigida*. The concept of *P. ericoides*, occurring along coastal dunes mainly in the Cape Peninsula and adjacent coastal areas of the Western Cape, was clarified by Thoday (1924a) and is also accepted in the present study.

Diagnostic characters

Passerina ericoides is characterized by greenish flowers, with a coriaceous, strigose hypanthium and the fruits are fleshy red berries. The leaves are greyish green and oblong, with an obtuse apex. The bracts are leaf-like, larger and lanceolate.

Etymology

The specific epithet *ericoides* refers to the ericoid appearance of this species indicated by the phrase ‘corollae tubus globosus, inflatus—unde et Ericam refert flore’, which was used by Linnaeus (1767) in his original description of the species.

Common names

Willdenow (1799) introduced the vernacular name *heideartiger Vogelkopf*, and the common names ‘Christmas berry’ or *dronkbessie* were documented by Smith (1966).

Uses

Marloth (1925) remarked that *P. ericoides* was laden with bright, scarlet fruits and that it was often employed as a Christmas decoration. The juicy pulp has a somewhat unpleasant taste, but appears to be harmless (*dronkbessie*). As early as

(1919) Sim recommended *P. ericoides* as a useful shrub for planting in coastal areas exposed to sea winds. This species occurs on coastal dunes and on the banks of lagoons in the Cape Peninsula and adjacent coastal areas of the Western Cape. The plants are excellent sand binders as they have an extensive root system from which resprouting often takes place. Because human impact and invasion of alien vegetation along the coast of the Cape Peninsula are very high, rehabilitation and conservation of coastal dunes is of vital importance. *P. ericoides* plants are ideally suited to combat erosion of coastal dunes and can be used as a substitute in coastal areas where alien vegetation is cleared. In their research on the coastal erosion of the Milnerton beaches, Biggs *et al.* (2001) made use of *P. ericoides*, occurring on the mobile dunes of this area as a natural monitor to indicate coastal erosion.

Distribution and ecology

Passerina ericoides ranges from Melkbosstrand along the coast of the Cape Peninsula to De Mond in the Bredasdorp District. It is endemic to the Southwestern and Agulhas Plain Centres within the CFR. This species occurs on littoral sand between rocks, or in dune valleys between the primary and secondary dunes. Figure 7.7H.

According to a note on the specimen *Taylor 4042*, *P. ericoides* forms part of the Coastal Fynbos (Acocks 1988), currently divided by Rebelo (1998) into the Laterite Fynbos of the Elim Flats, the Limestone Fynbos on calcareous sands overlying the limestone and associated calcretes of the Bredasdorp Formation, and the Sand Plain Fynbos from the Olifants River Mouth to Muizenberg on the West Coast lowlands. According to Rebelo (1998) the southernmost centre of the Sand Plain Fynbos is almost engulfed by the Cape Town Metropolitan Area and the area between Milnerton and Malmesbury must rank as one of the world's hottest spots for the loss of plant biodiversity.

Conservation status: as a large portion of the coast along the Cape Peninsula is affected by human impact and invasion by alien vegetation associated with the

Cape Town Metropolitan Area, the conservation status of *P. ericoides* is considered as Near Threatened (NT) (IUCN Species Survival Commission 2000).

Specimens examined

WESTERN CAPE.—3318 (Cape Town): valley between Melkbosstrand and Duinefontein, (–CB), *Glen 1089* (PRE); Milnerton, (–CD), *Andraea 385, 385b* (NBG PRE); Blaauwberg Beach, beacon 41, (–CD), *Boucher 3973* (PRE); Sands of Table Bay, (–CD), *Bowie 1* (BM); Milnerton Beach, higher dunes, (–CD), *Bredenkamp 956* (PRE); *Garside 502* (K); Blouberg Strand, (–CD), *Giess 1293* (M); *Pole-Evans 4373* (PRE); Zoutrivier, (–DA), *Zeyher 42* (NBG). 3418 (Simonstown): Blaauwbergstrand, (–AB), *Acocks 19066* (K, PRE); Noordhoek, (–AB), *Barker 2726* (NBG); Kalk Bay, (–AB), *Bolus 4498* (BM, K); Fish Hoek bay, (–AB) *Bolus 4498* (BOL); Miller's Point, (–AB), *Gillett 3457* (NBG); between Smith's farm and Vasco da Gama, (–AB), *Hutchinson 663* (K, PRE); Simonstown, (–AB), *MacOwen 3404* (K); Muizenberg, (–AB), *Marloth 5648* (B, PRE); Miller's Point, (–AB), *Meebold 15154* (M); Noordhoek, (–AB), *Salter 7051* (K); Witsand, (–AB), *Smuts 1134* (PRE); Strandfontein, (–AB), *Van Zinderen Bakker 12* (NBG); Fish Hoek, (–AB), *Wall s.n.* (S); Simonstown, (–AB), *Wolley-Dod 1878* (BOL, K); Simonstown Bay, (–AB), *Wright s.n.* (C, P); Cape Maclear, (–AD), *Bredenkamp 962* (PRE); Buffels Bay, (–AD), *Compton 10633* (NBG); Cape Peninsula, Olifantsbos, (–AD), *Compton 22289* (NBG, S); Cape of Good Hope Nature Reserve, (–AD), *Taylor 9871* (NBG, PRE); dunes near Strandfontein, (–BA), *Acocks 690* (S); Macassar Beach, (–BB), *Taylor 6211* (NBG, PRE); *Downing 401* (NBG, PRE); near Hangklip Lighthouse, (–BD), *Boucher 1691* (NBG); near Rietvalley, (–DC), collector unknown (BOL, P, W). 3419 (Caledon): Mossel River near Hermanus, (–AC), *Guthrie 17414* (BOL); Hermanus, (–AC), *Krause s.n.* (NBG); *Walters 247, 1084* (C, NBG); 3 mi. E of Hangklip Coast at Stony Point, (–BD), *Pillans 8513* (BOL); Melkbosch Strand, (–BD), collector unknown (S); Pearly Beach, (–CB), *Acocks 22784* (PRE); *Taylor 4042* (K, M, PRE); Pearly Beach Holiday Resort, (–DA), *Boucher 856* (K, NBG, PRE). 3420 (Bredasdorp): Struis Bay, (–CA), *Levyns 3100* (BOL); Arniston sand dunes, (–CA), *Martin s.n.* (GRA); Quoin Point, (–CA), *Rycroft 2135* (NBG); De Mond, (–CA), *Walsh s.n.* (NBG). Grid ref. unknown: *Corneliussen 1875* (C); Herb. S. Dreyer, *Ecklon s.n.* (C); locality doubtful, *Ecklon & Zeyher 39* (BOL, G, MO, P, W); *Harvey 691* (BM); Herb. Regium Monacense, Caput Bonae Spei, *Hiendlmayr s.n.* (M); Herb. Schreberianum, *Swartz s.n.* (M); Caput Bonae Spei, *Laubert s.n.* (S); *Linnaeus 504.5* (LINN); *Marloth s.n.* (PRE); Museum Botanicum Hauniense (C); Cape, *N.J.A. s.n.* (S); *Pappe s.n.* (NBG); locality unknown, *Zeyher s.n.* (NBG).

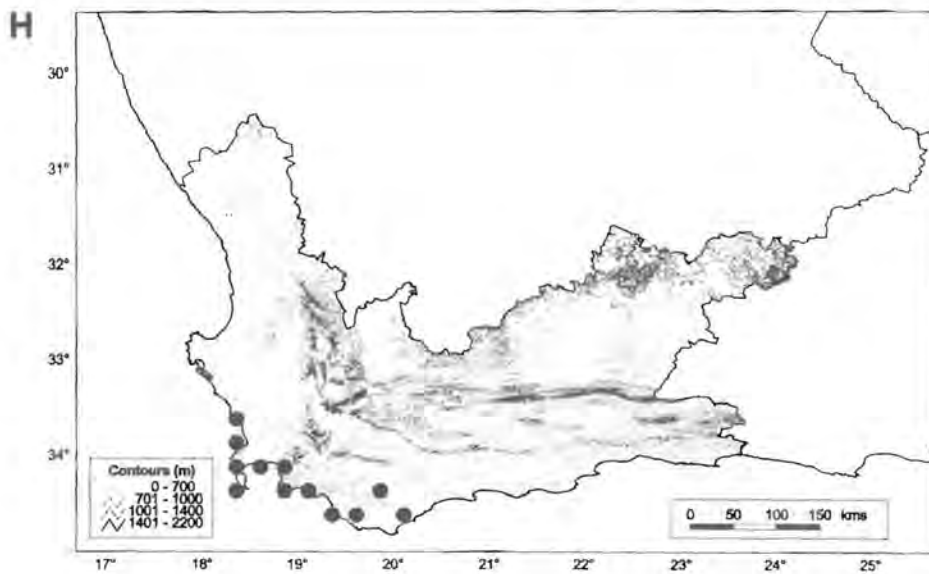
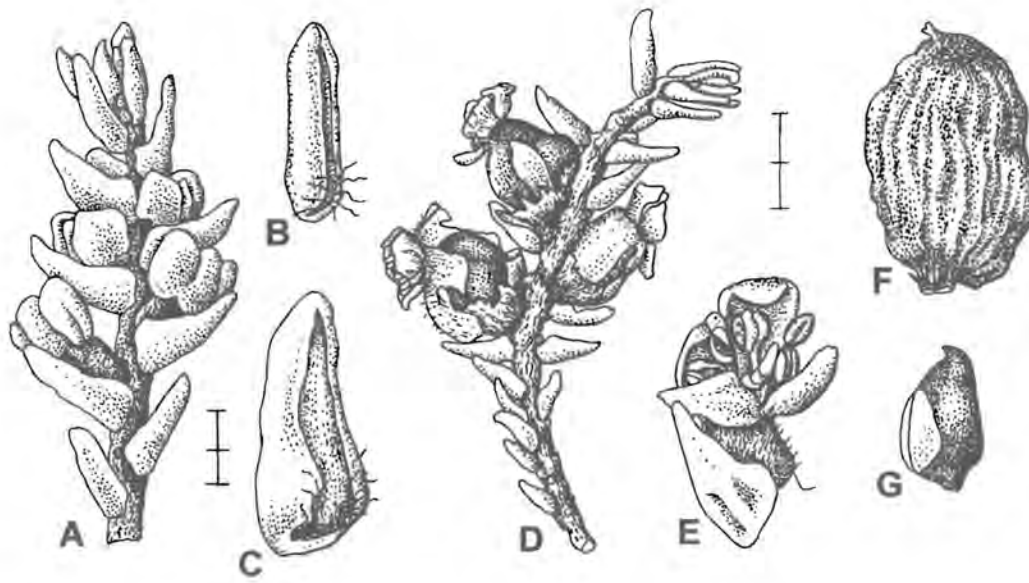


FIGURE 7.7.—*Passerina ericoides* (Bredenkamp 962). A, young inflorescence; B, leaf exposing adaxial surface; C, bract exposing adaxial surface; D, fruiting branchlet; E, flower enveloped by bract; F, fleshy one-seeded berry; G, seed with black tegmen and white fragment of endocarp. Scale bars: 2 mm.
 H, known distribution of *Passerina ericoides*.

7. *Passerina rigida* Wikstr. in Kunglinga Svenska Vetenskapsakademiens Handlingar 39: 326 (1818); Meisn.: 402 (1840); Steud.: 274 (1841); Drège: 208 (1843); C.A.Mey.: 49 (1843); Meisn. 14: 563 (1857); C.H. Wright: 13 (1915); Thoday 4:165 (1924a); Palmer & Pitman: 1585 (1972); Coates Palgrave: 649 (1977); Bond & Goldblatt: 433 (1984); A.E.van Wyk & P.van Wyk (1997). Type: Hab. ad Promont bonae spei [Cape Peninsula], Prof. Sparrman s.n., Herb. Thunb. 9578 (UPS, holo.!; M!, S!).

Passerina eriophora Gand.: 418 (1913); Thoday 4:165 (1924a). Types: KwaZulu-Natal, Stanger, Natal, in ora prope Durban [coast near Durban], Wood 1712 (K!, lecto., designated by Thoday 4:165 (1924a), BM!, BOL!, M!, W!); Wood 6592 (S!).

Passerina ericoides sensu Meisn. 14: 562 (1857) pro parte quoad specim. Drège s.n. (MO!), non L.

Many-stemmed, much branched, robust shrubs of (0.6–)1.0–2.0(–3.04) m tall on coastal dunes; secondary and tertiary branches ascending, conical in appearance, formation of branchlets profuse, decussate, older branchlets self-pruning, lax or arcuate, 60–100 mm long, progressively shortening towards growing point, young branchlets ascending, 5–60 mm long, growing point nodding, fertile branchlets often pendulous and secund. *Stems* greyish brown, bark stringy; cork grey-brown; branchlets and growing points densely white-tomentose, tomentum forming lengthwise patterns with cork on older branchlets, which later become glabrous. *Leaves* imbricate, overlapping \pm 50%, appressed, plane shape lanceolate to ovate, length \times depth 1.6–2.5 \times 0.1–1.1 mm, adaxial surface concave, villous, abaxial surface convex, glabrous, greyish green, smooth, often covered by salt crystals; base sessile, dilated; median vein in distal half visible as a keel, forming acute apex; margins villous. *Inflorescences* with spikes usually extended, 6–10-flowered, arrangement subterminal, axis white-tomentose, proliferating growth common. *Bracts* appressed, ascending in fruit, widely ovate, length \times depth (2.6–)3.4 \times 1.4(–1.9) mm; lamina adaxially concave (inside), abaxially convex (outside), villous inside, glabrous outside, smooth, with 2 or 3 shallow folds on each side of main vein, wings absent, greyish green, coriaceous; base dilated; apex with distinct, short, acute point; margins

tomentose, involute. *Floral envelope* ± 4.0 mm long, membranous and yellow during pollination, dehydrated after shedding of pollen, turning red. *Hypanthium* glabrous at ovary, neck tomentose, ± 0.8 mm long. *Sepals*: outer sepals cymbiform, midrib adaxially tomentose, abaxial surface glabrous, inner sepals obovate, adaxially tomentose, abaxially glabrous. *Androecium* with filaments of antipetalous whorl ± 0.5 mm and those of antisealous whorl ± 1.5 mm long; anthers, 0.8×0.4 mm, subbasifixed, 2-theous and 4-locular. *Ovary* 2.2×1.4 mm. *Fruit* a fleshy yellow berry, 2.6×2.3 mm, enveloped by persistent, loosely arranged hypanthium, fragmenting over widest circumference of fruit, the fragmented hypanthium, sepals and androecium being shed. *Seed* 1.4×1.1 mm. Figure 7.8A–I.

Nomenclatural notes

In his description of *P. rigida*, Wikström (1818) clearly indicated the specimen of Sparrman, in the Thunberg Herbarium, as the type. This specimen bears the inscriptions *Passerina glomerata* β and epithet *rigida* in pencil. Thoday (1924a) identified the handwriting of the pencilled ‘*rigida*’ as Wikström’s, comparing it to signed letters in the library at Kew. Wikström’s handwriting was also confirmed in the present study, using examples published by Burdet (1979). According to Stafleu & Cowan (1986), original specimens of the Thunberg Herbarium (to which Sparrman also contributed) were donated to UPS and the duplicates were sent to S. Thus three other *Sparrman s.n.* specimens of Herb. Swartzii, Herb. Wikströmii and Herb. Gaströmii, housed at S, and a fourth one from Schreber’s herbarium, housed at M, are duplicates. As Wikström clearly indicated the specimen in the Thunberg Herbarium as the type, we regard it as the holotype and the other four Sparrman specimens as isotypes.

Diagnostic characters and relationships

Passerina rigida can easily be distinguished as robust, rigid shrubs of mostly 1.0–2.0 m high. The ascending branches are conical in shape due to many branchlets that are pendulous when fertile. The flowers are yellow and membranous and bright yellow berries are borne subterminally. The leaves are narrowly lanceolate to ovate

and the apex is acute, with the main vein visible as a blunt keel. The bracts are widely ovate with the apex acute. This species is easily distinguished from *P. paleacea* which occurs on secondary dunes and is distributed mainly along the southern coast of the Western Cape. Plants of the latter species are less robust, reaching a maximum height of 1.5 m, characterized by an abundance of subcapitulate inflorescences and the fruits are dry (achenes).

Etymology

The epithet *rigida* refers to the rigid, ascending branches, characteristic of the growth form of this plant.

Common names

Smith (1966) recorded the vernacular names *gonnabas* and *seekoppiesgonna*, while both Palmer & Pitman (1972) and Coates Palgrave (1977) added the name 'dune gonna'. Palmer & Pitman (1972) also listed the names *ishoba* and *unyenyevu*. The names 'dune-string', *duinetaabos* and *gonnabos* were used by Lubke & Van Wijk (1998). *Duin-gonna*, 'dune gonna', *inwele*, *unyenyevu* are names given by Von Breitenbach *et al.* (2001).

Uses

Passerina rigida is a pioneer of the coastal dunes along large portions of the South African coast. Because these robust plants are excellent sand binders and are completely adapted to maritime winds and salt spray, they can be used in the rehabilitation of coastal dunes in disturbed areas. *P. rigida* has an extensive root system from which resprouting commonly takes place. The yellow berries are an important food source for animals inhabiting coastal areas, especially birds.

Distribution and ecology

Passerina rigida is distributed from Witsand River Mouth on the western coast of the Cape Peninsula, along the coastline of South Africa to Lake Sibayi on the northeastern coast of KwaZulu-Natal. It is endemic to the coastlines of KwaZulu-Natal, the Eastern Cape and the Western Cape. The specimen *Taylor 4143*, recorded as far North as Lambert's Bay on the West Coast, is regarded as an outlier as no other specimens have been recorded in the grid 3318. Thoday (1924a) mentioned *Bowker s.n.* from Somerset, *Cooper 2301* from Albany and *Ecklon & Zeyher s.n. (SAM 19801)* as specimens from inland localities. In recent years more cases of *P. rigida* growing along sandy banks of rivers adjacent to the coast have been noted. Figure 7.8J.

This species occurs on littoral sand dunes and hammock dunes just above the level of spring tide. It is also found in marshy places and on sandy banks of river mouths and lagoons. A stunted form is present on shallow marine sand over limestone and on rocky hills facing the sea. Lubke & Van Wijk (1998) regard *P. rigida* on the southern and Eastern Cape coast as a pioneer found in bush clumps or bush pockets on rear dunes. According to them, there are often no pioneer communities on the vast dune sands and the first vegetation encountered as one moves away from the shore is dune thicket, in which *P. rigida* is one of the dominant shrubs. *Passerina* species occurring on littoral dunes in the Western Cape are found mainly in Coastal Fynbos (Acocks 1988). From the southern Cape coast to Port Alfred, Dune Fynbos and Dune Thicket form a mosaic as well as a successional series between the two vegetation types (Lubke & Van Wijk 1998).

Conservation status: Least Concern (LC) (IUCN Species Survival Commission 2000).

Specimens examined

KWAZULU-NATAL.—2732 (Ubombo): Lake Sibayi, near Mabibi, (–BC), *Stephen 455* (PRE); between Island Rock and Mabibi, (–BD), *Ward 2167* (PRE); Mtunzini Farm, (–DC), *Van Wyk 2517*

(PRE, PRU); Mtunzini District, beach area, (-DD), *Eicker 1* (PRE); *Worsdell s.n.* (NBG). 2832 (Mtubatuba): St Lucia, (-AD), *Buff 760610-2/1* (WU); Maphelane Nature Reserve, (-AD), *Fokkens 5* (PRE); St Lucia, (-AD), *Jacobsen 1381* (PRE); *Strey 6769* (PRE); *Ward 7211* (PRE); St Lucia Park, 600 m N of bridge, (-BA), *Ward 4374* (PRE); Richards Bay, (-CC), *Gafney 11* (MO, PRE); Isipingo Beach, (-DD), *Gillett 1207* (PRE); near Durban, (-DD), *Wood 9139* (NBG). 2931 (Stanger): Mvoti River Mouth, (-BA), *Moll 2466* (K, PRE); Durban, (-CC), *Kuntze s.n.* (K); bluff at Durban, (-CC), *Meebold 15755* (M); Beachwood, (-CC), *Mitchell, Pammenter & Spencer B 4(11)* (PRE); near Port Natal, (-CC), *Sutherland s.n.* (K); Durban, (-CC), *Wilms 2277* (K); Durban, sandy hills near sea, (-CC), *Wood 1712* (BM, BOL, K); *Wood 5786* (M, MO); *Wood 6592* (S); *Wood 9139* (BOL); *Wood s.n.* (PRE). 3030 (Port Shepstone): Winkle Spruit, (-BB), *Rudatis 1505* (K, NBG); Isipingo Beach, (-BB), *Smuts s.n.* (NBG); Isipingo North, (-BB), *Ward 549* (PRE); between Port Shepstone and Margate, (-CD), *Acocks 1006* (S); Margate Beach, (-CD), *Bayer 1307* (MO); Port Shepstone, (-CD), *Burt-Davy 2410* (K); Uvongo, (-CD), *Mogg 13220* (K PRE).

EASTERN CAPE.—3129 (Port St Johns): Embotyi Mouth, (-BC), *Miller 2701* (PRE); Msikaba River, (-BD), *Van Wyk 1545* (PRE, PRU); Umgazi River Mouth, (-CB), *Taylor 8998* (PRE, S); Port St Johns, (-CB), *Wall s.n.* (S); Tshani River Mouth, (-CC), *Snyman s.n.* (GRA); Port St Johns, (-DA), *Acocks 10967* (PRE); *Bayliss 6017* (PRE); *Comins 1930* (PRE); *Galpin 9353* (K, PRE); *Hutchinson 1748* (K, PRE). 3130 (Port Edward): Umtamvuna Bridge, (-AA), *Bredenkamp 1013, 1014* (PRE); Umtamvuna Lagoon, (-AA), *Crawford 384* (PRE); Leisure Bay, (-AA), *Euckermann 7889* (PRE); Palm Beach, (-AA), *Weigend 2341* (M); Umtamvuna River, (-AB), *Botha & Coetzee 1605* (PRE). 3227 (Stutterheim): Nahoon, (-DC), *Nanni 123* (PRE); Bonza Bay, (-DD), *Compton s.n.* (S). 3228 (Butterworth): Kei Mouth, (-CB), *Flanagan 418* (NBG, PRE); Kentani District, coast, (-CB), *Pegler 234* (PRE); N side of Nxaxo Mouth, (-CB), *Ward 5735* (PRE); Gonubie Springs, (-CC) *Levy's 10832* (BOL); Kweleqa, (-CC), *McKitterick 12* (GRA); Cefane River, (-CC), *O'Callaghan 1003* (GRA); Cintsa, New East London, (-CC), *Quickelberge A7758* (GRA). 3323 (Willowmore): Nature's Valley, Groot River Mouth, (-DC), *Parsons 182* (NBG); Koega River, (-DC), *Zeyher 3777* (NBG); Tsitsikama Forest, Elandsbos River, (-DD), *Bower 602* (PRE). 3324 (Steylerville): near mouth of Swartkops River, (-DD), *Zeyher 405* (TCD, GRA); *Zeyher 1025* (BM). 3325 (Port Elizabeth): Sundays River, (-AA), *Hendricks 13* (GRA); *Rivers-Moore s.n.* (GRA); Maitland River Mouth, (-CD), *Boucher 3363* (NBG); Uitenhage, (-CD), *Ecklon & Zeyher s.n.* (S); *Pappe s.n.* (S); Humewood, (-DC), *Dahlstrand 148* (MO); Markman industrial area, (-DC), *Dahlstrand 2949* (NBG, PRE); Humewood, (-DC), *Holland 3699* (BOL); Port Elizabeth, (-DC), *Kemsley 141* (GRA, NBG); *Long 798* (K, PRE); Amsterdam Hoek, (-DC), *Noel s.n.* (GRA); Coega River, (-DC), *Olivier 2027* (PRE); Cape Recife, (-DC), *Olivier 3024* (GRA); Humewood, (-DC), *Paterson 1123* (GRA); Port Elizabeth, (-DC), *Potts BLF 288* (GRA, PRE). 3326 (Grahamstown): Somerset, near Kowie, (-BC), *Bowker s.n.* (K); Kowie, salt vlei dunes, (-BC), *Martin s.n.* (GRA); Alexandria District, fore dunes, (-CB), *Gilfillan 7* (GRA); Bushmans River Mouth, (-CB), *Johnson 1069* (GRA); Alexandria, (-CB), *Osborne 126* (GRA); Cape Padrone, (-CD), *Jacot-Guillarmod & Brink 41* (GRA, PRE); Kenton-on-Sea, (-DA), *Abrahams s.n. & A7759* (GRA, MO, PRE); Bushmans River Mouth, (-DA), *Archibald 4552/52* (GRA, PRE); Kenton-on-Sea, (-DA), *Bredenkamp 899* (PRE); Boknes, (-DA), *Burrows 3395* (GRA); Bushmans River

mouth, (-DA), *Cooper 15* (GRA); *Johnson 1069* (K, PRE); Dias Cross Memorial, (-DA), *Relief 1194* (MO, PRE); Port Alfred, (-DB), *Bayliss 650* (K, MO, M, PRE); Port Alfred, (-DB), *Bredenkamp 898* (PRE); Kowie West, (-DB), *Britten 5014* (GRA); Kowie River, (-DB), *Germishuizen 1527* (PRE); spring between Port Alfred and Kasuka, (-DB), *Gibbs Russell 4094* (PRE); Bathurst, (-DB), *Hoole JI* (GRA); Port Alfred, (-DB), *Rogers 28018* (GRA); *Theron G.C. 1076* (PRE, K); *Theron G.K. 282* (PRE); *Tyson s.n. & TRV 17233* (PRE). 3327 (Peddie): East London, (-BB), *Fouche s.n.* (PRE); *Galpin 3363* (PRE); *Hilner 184* (PRE); Kleinmond River near western bank, (-CA), *Bredenkamp 897* (PRE); Tharfield Farm, between Riet and Kleinmond Rivers, (-CA), *Lubke 2312* (GRA); Kleinmond East, (-CA), *Van Wyk 3167* (PRE, PRU). 3424 (Humansdorp): W of Tsitsikama River, (-AB), *O'Callaghan 1425* (NBG); between Kromme and Tsitsikama Rivers, (-AB), *District Forest Officer 97* (GRA); Duineveld between Slang and Kromme Rivers, (-BA), *Sim 1* (GRA); Kromme Bay, (-BB), *Acocks 21455* (M, PRE); Jeffreys Bay, (-BB), *Bredenkamp 911, 913* (PRE); Sea Vista, (-BB), *Lubke 1782* (GRA); Slang River, (-BB), *Phillips 1622, 3363A & B* (K, PRE); Jeffreys Bay, (-BB), *Stopp 70* (M).

WESTERN CAPE.—3218 (Clanwilliam): Lambert's Bay, (-AB), *Taylor 4143* (NBG). 3322 (Oudtshoorn): Wilderness, (-DC), *Mogg s.n.* (PRE). 3418 (Simonstown): Witsand River Mouth, (-AB), *Hugo 1912* (C, M, PRE); Cape Flats, (-BA), *Van Rensburg 459* (NBG); Betty's Bay, (-BD), *Bohnen 94.04* (PRE); *Botha 372* (PRE); Kogel Bay, (-BD), *Boucher 470* (K); near Hangklip Lighthouse, (-BD), *Boucher 1690* (NBG, PRE); Rooiels, Hangklip, (-BD), *Parsons 60* (NBG); Palmiet River Mouth, (-BD), *Van Rensburg STE 2147* (PRE). 3419 (Caledon): Hermanus, (-AC), *Marloth 13012* (PRE); *Purcell s.n.* (NBG); Mossel River, (-AD), *Guthrie 17413* (BOL); Walker Bay, (-AD), *Taylor 8367* (NBG); Voëlklip, (-AD), *Taylor 9879* (NBG, PRE); *Williams 1008* (K, M); Cape Hangklip, (-BD), *Levyns 10867* (BOL). 3420 (Bredasdorp): Swellendam, (-AB), *Ecklon & Zeyher s.n.* (NBG); De Hoop Nature Reserve, (-AD), *Burgers 2924* (NBG); Slang River, (-BC), *Fourcade 1806* (NBG); Lekkerwater, (-BC), *Paterson-Jones 697* (NBG); *Taylor 9905* (NBG, PRE); Slang River, (-BD), *Fourcade 1806* (K, PRE); Waenhuiskrans, (-CA), *Bredenkamp 948* (PRE); De Mond, Heuning River, (-CA), *Boucher 1677* (PRE); Struis Bay, (-CA), *Levyns 3101* (BOL); Waenhuiskrans, (-CA), *Taylor 10171, 10249* (MO, NBG, PRE); Die Mond Forest Station, (-CA), *Van Breda 1037* (PRE); Waenhuiskrans, (-CA), *Van der Westhuizen 144, 147* (PRE). 3421 (Riversdale): Stilbaai, (-AD), *Bohnen 4911, 8147* (NBG, PRE); *Bredenkamp 935* (PRE); *Muir 14* (PRE); *Taylor 10144* (NBG, PRE); Stilbaai, (-BC), *Van Schalkwyk 46* (PRE). 3422 (Mossel Bay): Hartenbos River Mouth, (-AA), *Parsons 322* (NBG, PRE); Sedgefield, (-BB), *Anderson 76* (PRE); Gericke Point, (-BB), *Hugo 1992* (NBG, PRE). 3423 (Knysna): Buffalo Bay, (-AA), *Duthie 533* (NBG); *Keet 873* (NBG); Groen Vlei, (-AA), *Levyns 10291* (BOL); Knysna Heads, (-AA), *Oldevig-Roberts 120* (S); Keurboomsrivier Strand, (-AB), *Codd 3602* (PRE, K); Plettenberg Bay Lagoon, (-AB), *Marsh 1327* (NBG, PRE); S of Keurboomsrivier Lagoon, (-AB), *O'Callaghan 839* (NBG, PRE); Plettenberg Bay, (-AB), *Rogers 26774, 26790* (PRE); Keurboomsrivier Strand, (-AB), *Taylor 2953* (PRE). Grid ref. unknown: *Burchell 4049, 7463* (K); Albany, *Cooper 2301* (K); *Drège s.n.* (K, MO); *Ecklon & Zeyher s.n.* (BREM); Transkei, Casino, *Frankish 253* (MO); *Gerrard 95* (K); *Herb. Thunberg 9578* (UPS); Caput Bonae Spei, *Hutton s.n.* (TCD); *Laubner s.n.* (K); Caput Bonae Spei, *Museum Bot. Hauniense s.n.* (C); KwaZulu-Natal, *without collector s.n.* (TCD); Caput Bonae Spei, *Herb. Schreber, Sparrman s.n.* (M);

Caput Bonae Spei, *Herb. Swartzii*, *Sparrman s.n.* (S); Caput Bonae Spei, *Herb. Wikströmii*, *Sparrman s.n.* (S); Caput Bonae Spei, *Herb. Gaströmii*, *Sparrman s.n.* (S); KwaZulu-Natal, Manzingwenya, *Vahrmeijer & Tolken 252* (PRE).

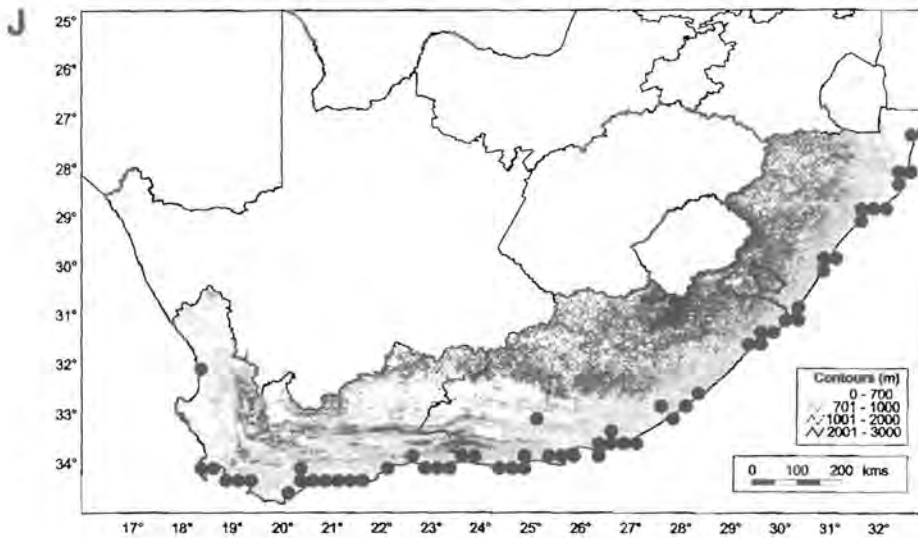
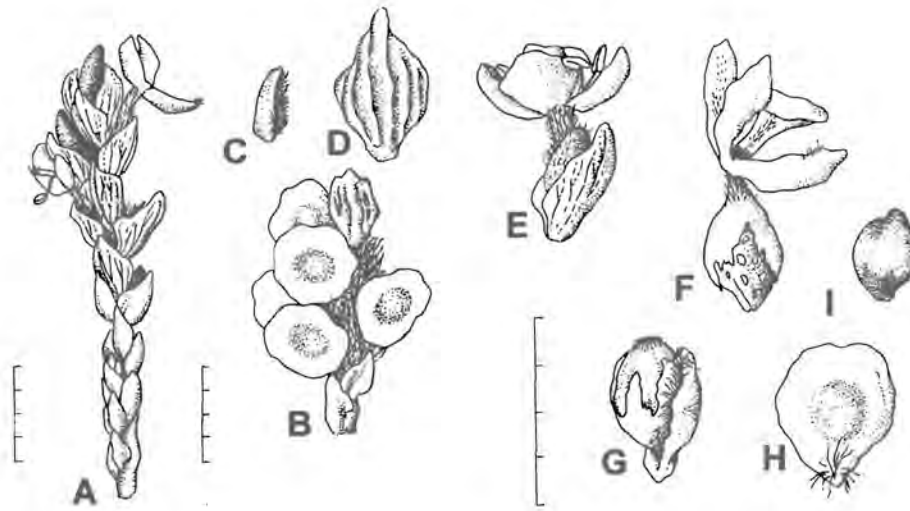


FIGURE 7.8.—*Passerina rigida* (Bredenkamp 1013). A, flowering inflorescence; B, fruiting inflorescence; C, leaf; D, bract; E, flower clasped by bract; F, hypanthium fragmenting at circumference of ovary; G, fruit clasped in tomentum of bract; H, fruit, a yellow, fleshy berry; I, seed. Scale bars: 4 mm.

J, known distribution of *Passerina rigida*.

8. *Passerina nivicola* Bredenk. & A.E. Van Wyk, sp. nov., *P. comosae*

C.H. Wright affinis sed bracteis circumscriptione late obovatis, basi cuneatis, rubrofusis in alabastro, lamina utrinque glabra, chartacea, alis bullatis, membranaceis, marginibus ciliatis dimidio superiore, costa crassa, ventraliter tomentosa in apicem subacutum extensa, caespite apicali pilorum. *Hypanthium* circa ovarium extra tomentoso. *Sepala* tempore pollinationis membranacea, lutea vel luteorosea; sepalis exterioribus apice setosis, sepalis interioribus utrinque glabris.

TYPUS.—Western Cape, 3319 (Worcester): Ceres District, Waboomberg, 1760 m, (–DD), 12 November 1989, *E.G.H. Oliver 9281* (PRE!, holo.; NBG!, iso.).

Passerina sp. nov. 1 Bredenk. & A.E. van Wyk 129: 70 (2000); 31,1: 56 (2001a); 31,2: 217 (2001b).

Low rounded shrublets or shrubs 0.3–0.5 m high. *Stems* greyish brown, younger branchlets greyish tomentose, cork finely fissured, grey-brown. *Leaves* imbricate on young branchlets, sessile, closely appressed to stem, cymbiform, cigar-shaped, often slightly dilated apically; plane shape linear-lanceolate, length \times depth (2.5–)3.1(–4.5) \times (0.5–)0.6(–0.7) mm; lamina inversely ericoid, adaxial surface concave, tomentose, abaxial surface convex, glabrous; base sessile; apex rounded, with an apical tuft of hair, tinged red; margins sometimes ciliate. *Inflorescences* polytelic synflorescences; main florescences and co-florescences spicate. *Bracts* tinged red in bud stage, enveloping flowers and fruits, largest after anthesis of flowers, becoming more coriaceous and rounded at fruit set, decussate, imbricate, cymbiform, plane shape widely obovate, length \times depth (3.1–)3.5 \times 1.4(–1.9) mm; lamina, adaxial surface (inside) concave, abaxial surface (outside) convex, glabrous on outside, chartaceous; main vein strongly developed, tomentose on inside, extending to form a subacute apex, with an apical tuft of hair; wings glabrous, bullate, membranous; margins ciliate in distal half; base cuneate. *Floral envelope* petaloid, \pm 5.3 mm long, during pollination membranous and yellow or yellow-pink, after pollination papyraceous, turning red. *Hypanthium* ovary tomentose, neck \pm 1.2 mm long, tomentose on outside, inside often hairy; after fruiting dehydration and torsification of tissue causing

fragmentation of neck base and shedding of sepals and androecium. *Sepals* 4, imbricate in bud, flexed in flower, outer sepals cymbiform, abaxially setose at apex, inner sepals widely ovate, glabrous on both surfaces. *Androecium* filaments of antipetalous whorl ± 0.4 mm and those of antisealous whorl ± 1.2 mm long. *Ovary* $\pm 1.7 \times 0.5$ mm. *Fruit* enveloped by persistent, loosely arranged hypanthium fragmented at neck base; a 1-seeded berry, pericarp membranous and dry. *Seed* 2.2×1.2 mm. Figure 7.9A–E.

Diagnostic characters and relationships

Passerina nivicola can easily be distinguished from *P. comosa* by its glabrous leaves and red-tinged bracts, which are glabrous outside, with bullate, membranous wings. The flowers are yellow or yellow-pink and membranous at pollination, with outer sepals abaxially setose at apex, inner sepals glabrous on both surfaces.

Etymology

The specific epithet is a compound of the Latin *nivalis* (= pertaining to snow) and *cola* (= dweller), thus *nivicola* (= a dweller in the snow). The name refers to the occurrence of this species at high altitudes, where the plants are often covered by snow; specimens collected during the present study were dug from the snow in mid-October.

Uses

Plants growing on the level area south of the beacon on Waboomberg were conspicuously stunted, possibly because they were covered by a layer of snow, but it was also obvious that these plants had been grazed by livestock.

Distribution and ecology

Restricted mostly to mountainous areas, *Passerina nivicola* is possibly still under-collected. The most northerly record is from Sneekrans on the Roggeveld

Escarpment, an area covered by Escarpment Mountain Renosterveld (Rebelo 1998). The species was more extensively collected in the Ceres District and also further south in the Worcester District, in Mountain Fynbos or Central Mountain Renosterveld (Rebelo 1998). Figure 7.9F.

Plants on Waboomberg (altitude 1760 m) occur in low restioid or graminoid veld on sandy loamy soil, are somewhat stunted and attain a height of ± 0.3 m, possibly due to the effect of snow. Based on the bracts that are morphologically similar, the plants growing lower down, along the road leading up the mountain, are regarded as the same species. These plants reach a height of up to 0.5 m, are more robust and the bracts are more coriaceous. Information from *Grobler 540* (PRE), indicates that this species occurs on shale flats at Kareevlakte near Ceres.

Conservation status: Least concern [LC] (IUCN Species Survival Commission 2000). This species is rare, but does not qualify for Red List status under IUCN (2000) guidelines.

Specimens examined

WESTERN CAPE.—3220 (Sutherland): Roggeveld Escarpment, Quaggasfontein Farm on road to Uitkyk, Sneekrans W of Sutherland, (–AB), *Goldblatt & Manning 8627* (PRE). 3319 (Worcester): Ceres, Kareevlakte, (–AD), *Grobler 540* (PRE); Ceres, Waboomberg, (–AD), *Bredenkamp 1044–1047* (PRE); Vlei N of FM tower, *Cillie 9* (NBG); Level area S. of Beacon, *Oliver 9281* (NBG, PRE); Ceres, Baviaansberg, (–BA), *Compton 8718* (NBG); Worcester District, Tafelberg, (–CC), *Pillans 17159* (BOL, K); *Pillans sn* (K).

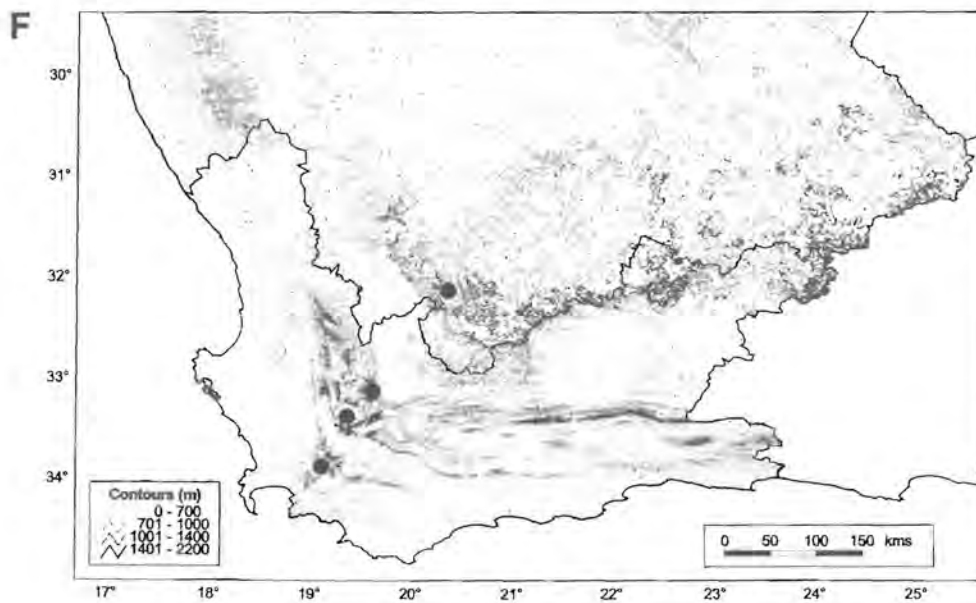
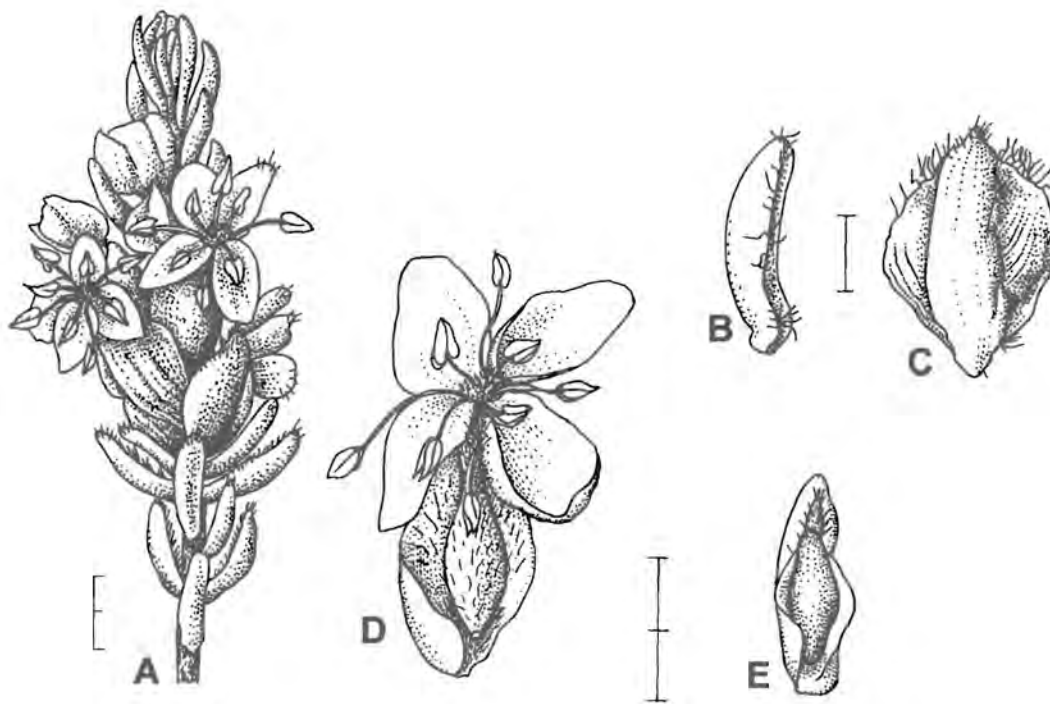


FIGURE 7.9.—*Passerina nivicola* (Oliver 9281). A, inflorescence with apex growing out, returning to vegetative growth (proliferating growth); B, leaf; C, bract; D, flower clasped by bract; E, fruit enveloped by persistent floral bract. Scale bars: A, D, E, 2 mm; B, C, 1mm.

F, known distribution of *P. nivicola*.

9. *Passerina esterhuyseniae* Bredenk. & A.E.van Wyk, sp. nov., *P. comosae* C.H.Wright affinis. *Bracteae* galeiformes, circumscriptione obovatae; lamina adaxialiter concava, abaxialiter convexa, intra setosa, extra glabra, tenuiter chartacea, laevis, concolorans, brunneola, in marginem membranaceum vel in alas membranaceas expansa; basis cuneata; costa excurrens apicem subacutum vel acutum faciens; margines ciliati dimidio superiore. *Flores* membranacei, tempore pollinationis flavidi, postea rubri ad brunnei.

TYPE.—Western Cape, 3218 (Clanwilliam): N Cederberg Mountains, (–BB), Groenberg near Pakhuis, along base of high rugged rock, rocky slopes, ± 1167 m, 27-12-1956, *Esterhuysen 26859* (BOL, holo!).

Passerina sp. nov. 2 Bredenk. & A.E.van Wyk 129: 70 (2000); 31,1: 56 (2001a); 31,2: 217 (2001b).

Shrubs or shrublets 0.3–0.5 m high. *Stems* greyish brown, younger branchlets greyish tomentose, cork finely fissured, grey-brown, displaying whitish sclerenchyma fibres at scars. *Leaves* imbricate on young branchlets, closely appressed to stem, cymbiform, plane shape linear-lanceolate, length × depth ± 2.0 × 0.5 mm; lamina inversely ericoid, adaxial surface concave, setose, abaxial surface convex, glabrous; base sessile; apex rounded into subacute point; margins sometimes ciliate. *Inflorescences* polytelic synflorescences; main florescences and co-florescences spicate. *Bracts* enveloping flowers and fruits, largest after anthesis of flowers, becoming more coriaceous and rounded at fruit set, decussate, imbricate, sessile, helmet-shaped, widely obovate in outline, length × depth ± 3.1 × 2.4 mm; lamina adaxially concave (inside), abaxially convex (outside), setose on inside, glabrous on outside, thinly chartaceous, smooth, concolorous, brownish, extending into a membranous rim or membranous wings; base cuneate; main vein extending to form a subacute to acute apex; margins ciliate in distal half. *Floral envelope* constituting hypanthium (fused calyx and androecium) and sepals; membranous and yellowish during pollination, dehydrated after shedding of pollen, becoming papyraceous, turning red to brown, ± 4.6 mm long. *Hypanthium* a membranous cylindric tube, indumentum at ovary and neck tomentose, neck ± 0.7 mm long, abscission tissue and articulation plane absent. *Sepals* 4, petaloid; imbricate in bud, flexed in flower, outer

sepals concave oblong with apex adaxially tomentose, abaxially setose; inner sepals concave, obovate with apex adaxially glabrous, abaxially setose. *Androecium* filaments of antipetalous whorl ± 0.4 mm and those of antisepalous whorl ± 1.2 mm long. *Ovary* 1.8×0.5 mm. *Fruit* enveloped by persistent, loosely arranged hypanthium fragmenting over widest circumference of fruit, the fragmented hypanthium, sepals and androecium being shed; an achene with pericarp membranous and dry, 2.5×1.2 mm. Figure 7.10A–G.

Diagnostic characters and relationships

Passerina esterhuyseniae can easily be distinguished from *P. comosa* by its helmet-shaped bracts, which are widely obovate in outline. The concolorous, brownish bracts are thinly chartaceous and smooth in texture, the lamina extends into a membranous rim or membranous wings and the main vein elongates forming a subacute to acute apex. The flowers are membranous and yellowish during pollination and red to brown after shedding of the pollen.

Eponymy

This species is dedicated to Elsie Esterhuysen who diligently collected especially the high-mountain flora of the Northern, Western and Eastern Cape Provinces.

Distribution and ecology

Passerina esterhuyseniae has been collected on the northern Cederberg Mountains at Groenberg near Pakhuis and at Konpoort. It is endemic to the Northwestern Centre within the CFR. The northern Cederberg area is covered by Mountain Fynbos (Rebello 1998). This species grows at the peaks of mountain tops at altitudes of $\pm 1\ 167$ m, or against rocky slopes amongst high rugged rocks. Confined mostly to mountainous areas, this species is still under-collected. *Pillans* 7689 (BOL) collected on slopes near the road SE of Redelinghuis has been classified under *P. esterhuyseniae*, although these plants seem to be more robust and grow at lower altitudes. Figure 7.10H.

Conservation status: as the population size of this species is probably very small or restricted, the conservation status is Near Threatened (NT) (IUCN Species Survival Commission 2000).

Specimens examined

WESTERN CAPE.—3218 (Clanwilliam): Piquetberg District, SE of Redelinghuis, slopes near road, (–AD), *Pillans 7689* (BOL); N Cederberg Mountains, Groenberg near Pakhuis, (–BB), *Esterhuysen 26859* (BOL); slopes of peak at Konpoort, (–BB), *Esterhuysen 12189* (BOL).

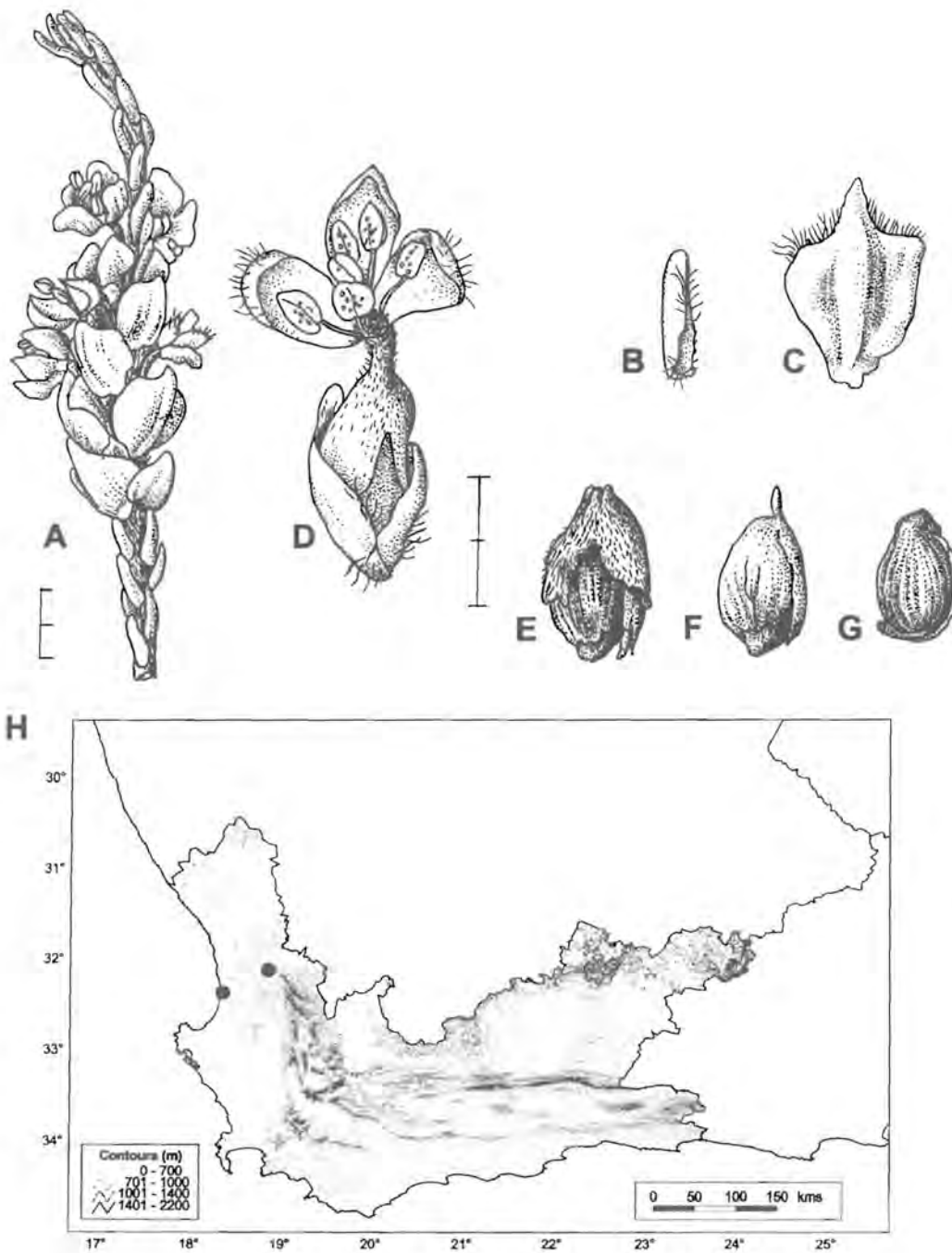


FIGURE 7.10.—*Passerina esterhuyseniae* (Esterhuysen 26859). A, inflorescence with apex growing out, returning to vegetative growth (proliferating growth); B, leaf; C, bract; D, flower clasped by bract showing fragmentation of hypanthium at circumference of fruit. E, fruit with remnants of hypanthium; F, achene, enveloped by membranous pericarp; G, Achene in lateral view. Scale bars: 2 mm.

H, known distribution of *Passerina esterhuyseniae*.

10. *Passerina comosa* (Meisn.) C.H. Wright. *Flora capensis* 5,2: 11 (1915); Thoday 4:158 (1924a); Bond & Goldblatt: 432 (1984); Goldblatt & Manning: 683 (2000). Type: Little Namaqualand; Khamiesberg Range, between Pedros Kloof and Leliefontein, 3 000–4 000 ft., Drège 2570 [K!], lecto., designated by Thoday 10: 388 (1924b); PRE!].

Passerina filiformis L. var. *comosa* Meisn.: 399 (1840); Meisn. 14: 562 (1857); C.H. Wright: 11 (1915); Thoday 4:158 (1924a). Type: as above.

Passerina falciformis Drège: 68 (1843) nom. nud.

Small shrubs, (0.3–)0.6–0.9(–1.06) m high, branches often virgate. *Stems* grey-brown, cork fissured lengthwise, grey-brown, surrounding prominent leaf scars; indumentum of young branches densely white or yellowish tomentose, flaking off with cork on older branchlets, which become glabrous. *Leaves* imbricate, overlapping $\pm 20\%$, diverging at an angle of 20° , plane shape linear to narrowly lanceolate, length \times depth (2.7–)3.0(–4.0) \times 0.6–0.9 mm, adaxial surface concave, villous, abaxial surface convex, tomentose to villous, rugose or warty with bases of fallen hairs; base sessile; apex obtuse to subacute; margins glabrous, basally setose. *Inflorescences* with spikes usually extended, 6–12-flowered, arrangement subterminal, axis white-tomentose, proliferating growth common. *Bracts* appressed, widely ovate, length \times depth (3.0–)5.5 \times 1.5(–1.8) mm; lamina adaxially concave (inside), abaxially convex (outside), villous inside, tomentose to villous outside, coriaceous, rugose with bases of fallen hairs, ± 3 -ribbed on each side of main vein, margins submembranous or wings extended and abaxially setose to villous; base sessile; apex acute; margins glabrous, basally setose, involute. *Floral envelope* ± 7.3 mm long, yellow-pink during pollination, dehydrated after shedding of pollen, turning red. *Hypanthium* glabrous at ovary, neck tomentose, ± 0.9 mm long. *Sepals*: outer sepals cymbiform, inner sepals elliptic, outer and inner sepals adaxially glabrous, abaxially tomentose. *Androecium* with filaments of antipetalous whorl ± 0.7 mm and those of antisepalous whorl ± 1.5 mm long; anthers 0.7 \times 0.4 mm, subbasifixed, 2-theous and 4-locular. *Ovary* 2.7 \times

1.0 mm. *Fruit* an achene with pericarp membranous and dry, 2.5×1.2 mm, enveloped by persistent, loosely arranged hypanthium, breaking up at neck base due to dehydration and torsification of tissue, resulting in the sepals and androecium being shed. Figure 7.11A–D.

Diagnostic characters and relationships

Passerina comosa and *P. quadrifaria* both have abaxially hairy bracts and are easily confused. However, these two species are geographically segregated, with *P. comosa* considered as a ‘north-western endemic’ of the Cape flora (Weimarck 1941), while *P. quadrifaria* is endemic to the Karoo Mountain and Southeastern Centres. Morphologically *P. comosa* is less robust, internodes are longer, leaves adhere closely to the stem and are generally more hairy and the bracts often have extended wings that are abaxially setose to villous.

Etymology

The epithet *comosa* refers to the hairs on the abaxial surface of the leaves, bracts and sepals, which are characteristic of this species.

Distribution and ecology

Passerina comosa ranges from mountain summits and slopes of the Kamiesberg to Calvinia in the Northern Cape. In the Western Cape it is distributed in the area between 33° and 34° S latitude and from 19° to 21° E longitude, with *Primos 41* (PRE) as the most easterly outlier. This species is endemic to the Northern Cape, as well as the Northwestern, Southwestern and Karoo Mountain Centres within the CFR. It occurs on the Roggeveld, Witteberg and the Klein Swartberg mountain ranges. This species is found in sand among rocks, on rocky ledges, on mountain summits, or on SW facing slopes at altitudes of 1 000–1 200 m. Figure 7.11E.

Conservation status: Least Concern (LC) (IUCN Species Survival Commission 2000).

Specimens examined

NORTHERN CAPE.—3018 (Kamiesberg): between Pedroskloof and Leliefontein, (–AB), *Drège* 2570 (K, PRE); NE of Leliefontein, (–AC), *Adamson* 1515 (PRE); hills E of Leliefontein, (–AC), *Levyns* 1515 (BOL). 3119 (Calvinia): between Calvinia and Middelpoos, (–BD), *Goldblatt* 4380 (MO, NBG).

WESTERN CAPE.—3319 (Worcester): Waterfall, Bergfläche von Bächen durchschnitten, 1 000–2 000 ft, (–AB), *Ecklon & Zeyher s.n.* (C, UPS); Roggeveld, Uitkyk Farm, (–AB), *Marloth* 9695 (PRE); Tafelberg, (–CC), *Pillans* 17158 (NBG); Stettynsberg, SW slopes, (–CD), *Esterhuysen* 11148 (BOL). 3320 (Montagu): Tweedside, (–AB), *Compton* 22870 (C, NBG); Witteberg Rocks, Tweedside Slopes, (–AB), *Levyns* 2371 (BOL); Tweedside mountain near Matjesfontein, (–AB), *Marloth* 10817 (NBG, PRE); Laingsburg, Cabidu, (–BB), *Compton* 22218 (NBG, S); Concordia Valley, (–CC), *Michell* 333 (PRE); Montagu District, near Concordia, (–CD), *Thoday* 212, 212A (BOL, K, NBG). 3321 (Ladismith): Prince Albert, Klein Zwartbergen, (–AC), *Andraea* 1222, 1227 (NBG, PRE); *Curator Pretoria Botanical Garden* P42 (PRE); Prince Albert District, Seweweekspoort Mountain, (–AD), *Andraea* 1288, 1288A (PRE); *Barnard s.n.* (NBG); Klein Swartberg above Sand River, N slopes, first slope W of Seweweekspoort Peak, (–AD), *McDonald* 2125, (–NBG); *Stokoe* 1790, 1811 (PRE). 3322 (Oudtshoorn): Prince Albert District, Klein Zwartberg, N and S side on ledges, (–BC), *Primos* 41 (PRE). Grid ref. unknown: *Burchell* 7129 (K); no locality, 1839, *Drège s.n.* (S); *Drège s.n.* (BM, NBG, S); Trinity College, *no collector s.n.* (TCD); *Tyson* 77 (GRA).

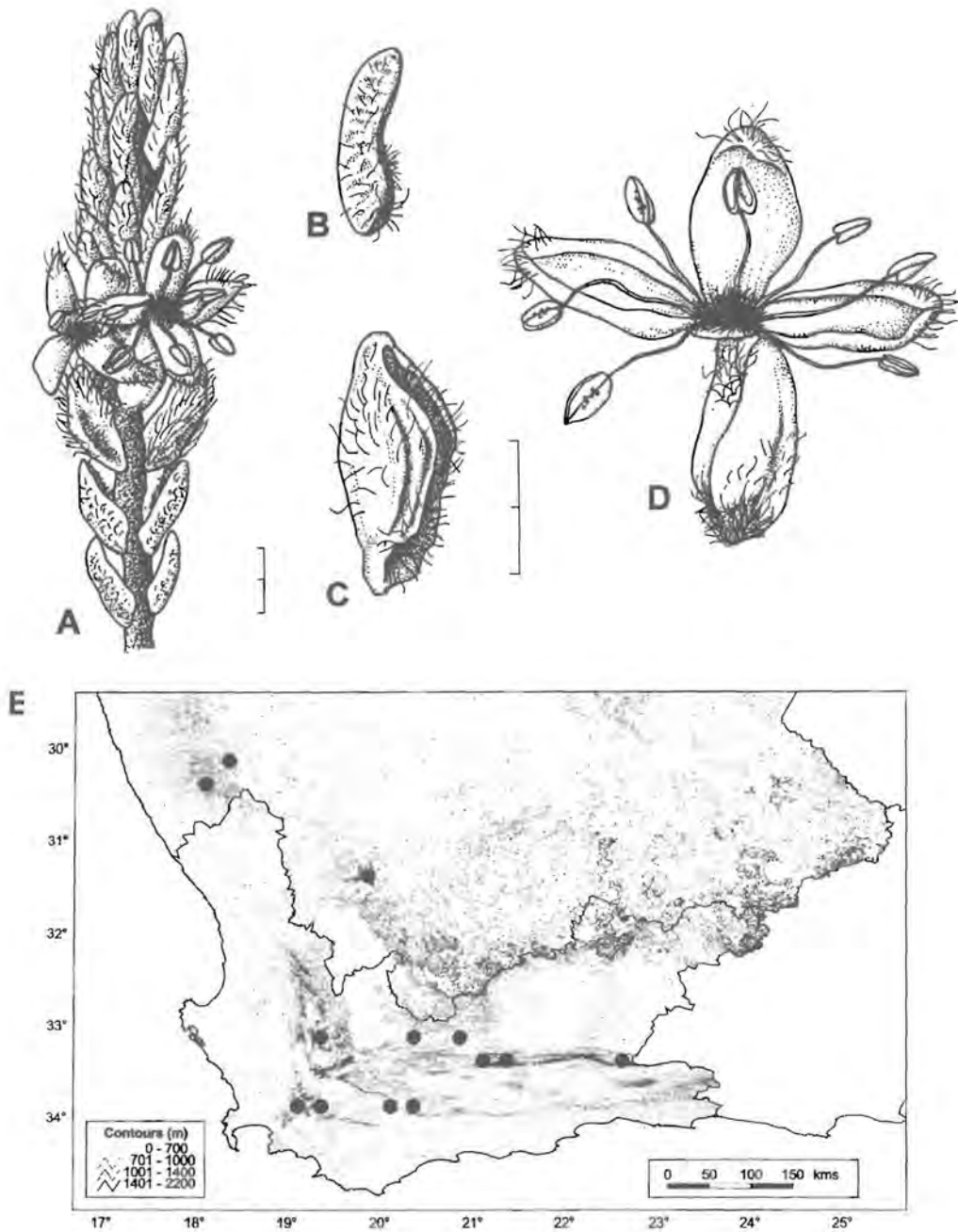


FIGURE 7.11.—*Passerina comosa* (Andraea 1288). A, inflorescence with apex growing out, returning to vegetative growth (proliferating growth); B, leaf; C, bract; D, flower clasped by bract. Scale bars: 2 mm. E, known distribution of *Passerina comosa*.

11. *Passerina pendula* Eckl. & Zeyh. ex Thoday. Bulletin of Miscellaneous Information. Kew 4: 155 (1924a); Bond & Goldblatt: 433 (1984); Goldblatt & Manning: 684 (2000). Type: Uitenhage Division, Zwartkops River, *Ecklon & Zeyher* 7381 [K!, lecto., designated by Thoday 10: 387 (1924b); BREM!, P!, PRE!, WU!].

P. pendula Eckl. & Zeyh. fide Drège: 210 (1847b) nom. nud.; Meisn. 14: 563 (1857) nom. nud.

Passerina rigida Wikstr. var. *comosa* Meisn.: 402 (1840); Drège: 584 (1847a); Meisn. 14: 563 (1857); C.H. Wright: 13 (1915) pro parte; Thoday 4:155 (1924a).
Lectotype as above.

Erect, many-stemmed shrubs, 1.0–1.5 m high, young branchlets often pendulous. *Stems* greyish brown, indumentum of young stems densely white-tomentose, flaking off on older branchlets, which become glabrous, remaining indumentum forming lengthwise patterns with grey-brown cork, brown leaf scars prominent. *Leaves* greyish green, imbricate, overlapping $\pm 25\%$, appressed, plane shape rhombic, length \times depth 2.5–3.4 \times 1.0–1.2 mm, adaxial surface concave, comose, abaxial surface convex, softly coriaceous and smooth, glabrous; base sessile, abruptly tapered; apex subacute; margins brownish setose. *Inflorescences* with multiflowered main and co-florescences; spikes usually extended, 6–16-flowered, arrangement subterminal, axis white-tomentose, proliferating growth common. *Bracts* greyish green when fresh, grey-brown in dried specimens, appressed, rhombic, length \times depth (3.0–)4.2 \times 1.0 (–1.5) mm; lamina adaxially concave (inside), abaxially convex (outside), comose inside, glabrous outside, softly coriaceous and smooth, wings membranous; base cuneate; apex obtusely angled; margins brownish setose. *Floral envelope* ± 6.5 mm long, membranous and yellow-pink during pollination, dehydrated after shedding of pollen, turning red to brown. *Hypanthium* glabrous at ovary, neck tomentose, ± 0.6 mm long. *Sepals*: outer sepals cymbiform, adaxially scantily tomentose, abaxially glabrous; inner sepals oblong, adaxially scantily tomentose, abaxially glabrous. *Androecium* with filaments of antipetalous whorl ± 1.5 mm and those of antisepalous whorl ± 2.0 mm long; anthers 0.8 \times 0.4 mm, subbasifixed, 2-theous and 4-locular.

Ovary 2.0 × 0.7 mm. *Fruit* an achene with pericarp membranous and dry, 2.5 × 1.2 mm, enveloped by persistent, loosely arranged hypanthium, breaking up at neck base due to dehydration and torsification of tissue, resulting in the sepals and androecium being shed. Figure 7.12A–D.

Nomenclatural notes

Passerina pendula, ascribed to Ecklon & Zeyher, was first published as a *nomen nudum* by Drège (1847b). This name was placed in synonymy under *P. rigida* var. *comosa* by Meisner (1857). Wright (1915) partly followed Meisner's interpretation of *P. rigida* var. *comosa*, but in the citation of the specimens he added all those that were later published as *P. burchellii* by Thoday (1924a). In his revision of *Passerina*, Thoday (1924a) reinstated the name *P. pendula* Eckl. & Zeyh. ex Meisn., as the varietal name 'comosa' had already been used at species level by Wright (1915). The present study regards Thoday's publication of *P. pendula* as valid, as it is accompanied by a Latin diagnosis, a description of the species and it was published in 1924. As *P. pendula* Eckl. & Zeyh. ex Meisn. was based on a *nomen nudum*, and since Thoday ascribed the name to Ecklon & Zeyher, the correct author citation for this species is *P. pendula* Eckl. & Zeyh. ex Thoday.

Diagnostic characters and relationships

Passerina pendula is distinguished from *P. burchellii* by being taller (up to 1.5 m), much branched shrubs with pendulous branchlets, with grey-green, softly coriaceous and smooth leaves and yellow-pink membranous flowers that are abaxially glabrous and adaxially scantily tomentose.

Etymology

The specific epithet *pendula* refers to the pendulous branchlets of these shrubs as seen in their natural habitat.

Distribution and ecology

Passerina pendula is endemic to the Southeastern Centre within the CFR. It is distributed on hills and slopes from the Kouga Mountains in the Western Cape to the Langkloof Mountains and the Great Winterhoek Mountains in the Eastern Cape. The species is also distributed along watercourses as it occurs in the KwaZunga Catchment Basin and on the banks of the Upper Swartkops River as well as the Bushmans River at Port Elizabeth. *P. pendula* grows at altitudes of (133–)383–600 m. On mountain slopes it is often found in a belt above Valley Thicket and below Mountain Fynbos. It grows in sand or shallow, gravelly, sandy loam. The plants are frequent throughout the natural range of the species and a number of populations are conserved in the Groendal Nature Reserve at Uitenhage. Figure 7.12E.

Conservation status: Least Concern (LC) (IUCN Species Survival Commission 2000).

Specimens examined

WESTERN CAPE.—3323 (Willowmore): Uniondale District, Kouga Mountains, (–CB), *Esterhuysen* 10733 (BOL); Misgund, (–CD), *Esterhuysen* 6962 (BOL); Langkloof below Ongelegen and Misgund, (–CD), *Fourcade* 1708 (BOL, K, NBG, PRE).

EASTERN CAPE.—3324 (Steytlerville): Kouga Mountains, Drinkwaterskloof, (–CA), *Euston-Brown* 41 (BOL); Humansdorp, Kouga Hills at Sewefontein, (–CB), *Esterhuysen* 6678 (K, NBG); Zuur Anys, along road to Kouga, (–CB), *Fourcade* 3043 (MO, PRE); channel of Swartkops River, (–DB), *Zeyher* 1025 (NBG, TCD); Uitenhage, Swartkops River, valley and hills adjacent to farm of Paul Maré, (–DB), *Ecklon & Zeyher* 3781 (G, HAL, P, PRE, S, W, WU); *Zeyer* 44 (G, NBG, S, W); Swartkops River, (–DB), *Ecklon & Zeyher* 7381 (BREM, K, P, PRE, WU). 3325 (Port Elizabeth): Upper Swartkops River, Groendal Wilderness area, KwaZunga Ridge, (–CA), *Scharf* 1067 (PRE); Farm Rietvlei, (–CA), *Scharf* 1596 (NBG, PRE); Uitenhage District, Groendal Nature Reserve, Spitskop Road, (–CB), *Bredenkamp* 908, 909 (PRE); Great Winterhoek Mountain Range, Matthew's Place Farm, (–CB), *Scharf* 1958 (PRE); *Scharf* 1959 (K, PRE); near Uitenhage, (–CD), *Ecklon & Zeyher* s.n. (C, S, UPS); Groendal Wilderness area, Ten Stop Hill, (–CD), *Olivier* 3197 (PRE); Groendal Wilderness area, catchment basin, (–CD), *Scharf* 1013 (PRE); Krakakamma, between Port Elizabeth and Van Stadensberg, (–CD), *Zeyher* 3780 (G, P, S, W); Uitenhage, banks of Boesmans River, (–CD), *Zeyher* 41 (G, S); Port Elizabeth, (–DC), *Rob & Fries* 3395 (UPS, S).

3424 (Humansdorp): Enon conglomerat, Farm Boshhoek, (-BB), *Cowling 796* (GRA); 7 mi. N of Humansdorp, (-BB), *Schonland 3054* (GRA, PRE).

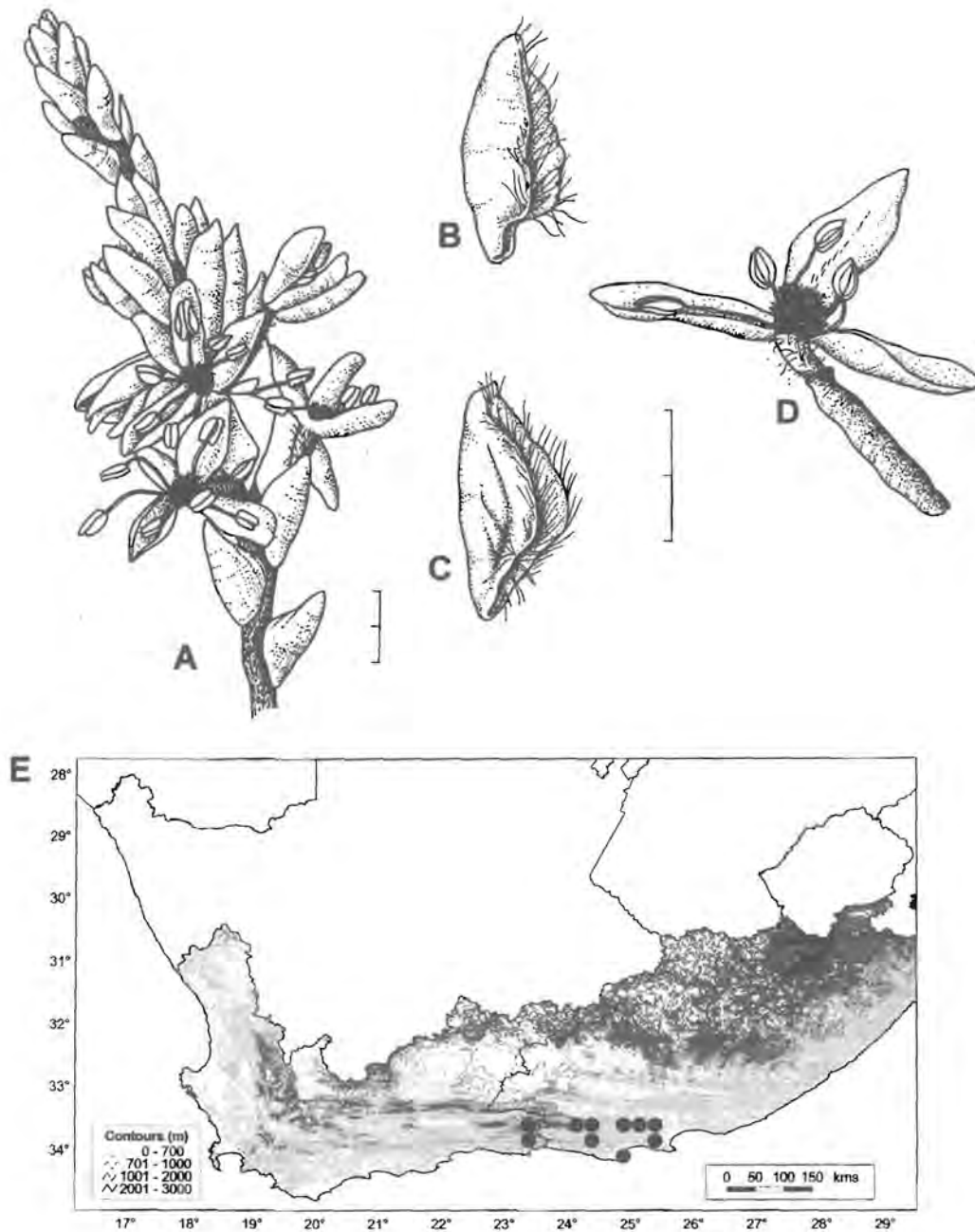


FIGURE 7.12.—*Passerina pendula* (Bredenkamp 908). A, inflorescence with apex growing out, returning to vegetative growth (proliferating growth); B, leaf; C, bract; D, flower. Scale bars: 2 mm.
 E, known distribution of *Passerina pendula*.

12. *Passerina galpinii* C.H.Wright. *Flora capensis* 5,2: 10 (1915) as *P. galpini*; Thoday 4:161 (1924a); Bond & Goldblatt: 433 (1984); Goldblatt & Manning: 683 (2000). Type: Western Cape, Riversdale District, Melkhoutfontein, about 600 ft, 7 October 1897, *Galpin 4491* (K, holo.!; PRE!).

Stunted or erect, much branched shrubs, (0.1–)0.3–1.0(–1.2) m high. *Stems* light greyish brown, indumentum of young stems greyish brown tomentose, cork grey-brown, fissured lengthwise, with sclerenchyma fibres protruding between fissures, leaf scars rounded. *Leaves* greyish green, imbricate, overlapping 10%–25%, diverging at an angle of 30°, plane shape linear, incurved towards apex, length × depth 2.9–4.5 × 0.5–0.8 mm, adaxial surface concave, comose, abaxial surface convex, chartaceous, glabrous; base sessile; apex subacute to obtuse; margins glabrous, involute. *Inflorescences* with spikes subterminal, usually congested, 8–10-flowered, axis whitish tomentose, proliferating growth common. *Bracts* appressed, oblate, length × depth (3.6–)4.5 × 1.1(–2.2) mm; lamina greyish green, adaxially concave (inside), abaxially convex (outside), chartaceous, glabrous outside, midrib extended into leaf-like point, tomentose inside; wings straw-coloured, membranous, broadly rounded, bullate; base cuneate; apex subacute; margins glabrous, involute. *Floral envelope* ± 5.3 mm long, papyraceous and yellow-pink during pollination, dehydrated after shedding of pollen, turning red to brown. *Hypanthium* pubescent at ovary, neck pubescent, ± 1.0 mm long. *Sepals*: outer sepals concave elliptic, glabrous, inner sepals obovate, abaxially glabrous, apex margin adaxially tomentose. *Androecium* with filaments of antipetalous whorl ± 1.4 mm and those of antisepalous whorl ± 2.1 mm long; anthers 0.6 × 0.5 mm, subbasifixed, 2-theous and 4-locular. *Ovary* 2.0 × 1.1 mm. *Fruit* an achene with pericarp membranous and dry, 2.5 × 1.2 mm, enveloped by persistent, loosely arranged hypanthium, breaking up at circumference of ovary, resulting in the sepals and androecium being shed. Figure 7.13A–D.

Nomenclatural notes

Passerina galpini C.H. Wright (1915), published with a full description, but without a Latin diagnosis, was accepted by Thoday (1924a). In the present study the specific epithet is corrected to '*galpinii*' and the name accepted as validly published by Wright, as the starting date for a Latin diagnosis as prerequisite for valid publication is 1 January 1935 (Greuter *et al.* 2000).

Diagnostic characters and relationships

Passerina galpinii is distinguished by its characteristic bracts, which are oblate, with the midrib extended into a leaf-like point. The lamina is cymbiform, greyish green, chartaceous and glabrous, with the midrib adaxially tomentose. The wings are straw-coloured, membranous, broadly rounded and bullate. The distribution of this species is also diagnostic as it is endemic to the Agulhas Plain Centre within the CFR.

Eponymy

Passerina galpinii was named in honour of the botanist E.E. Galpin. The holotype of this name, *Galpin 4491*, was collected on 7 October 1897. At this time, Galpin organised a collecting trip from Port Elizabeth via the Humansdorp, Knysna, George, Riversdale, Swellendam and Caledon Districts to Cape Town and increased his collecting numbers from 3531 to 4846. All these specimens were probably identified at the Bolus Herbarium in Cape Town, where he also spent a few weeks (Gunn & Codd 1981).

Common name

Rebelo (1998) mentions the vernacular name *Elim gonna* for this species.

Distribution and ecology

Passerina galpinii is endemic to the Agulhas Plain Centre within the CFR. It is distributed on stony flats, coastal limestone deposits and limestone hills, from Elim to Bredasdorp, Arniston, Stilbaai, Melkhoutfontein, Albertinia and Mossel Bay; it grows at altitudes of 0–290 m. Plants reach a height of ± 1.2 m on stony flats, but become stunted on southeast-facing slopes of limestone hills, overlooking the sea. The plants are frequent in their natural environment. They are conserved in the De Hoop and Potberg Nature Reserves and several private nature reserves. The vegetation of the area is threatened by large stands of *Acacia cyclops* (*rooikrans*), an alien invasive tree. Figure 7.13E.

Passerina galpinii is associated with Laterite Fynbos (Rebelo 1998), occurring on the Elim Flats of the Western Cape, which is characterized by gravelly, lateritic and seasonally waterlogged soils. The present study also indicates the presence of this species in Limestone Fynbos, where it occurs on coastal limestone deposits.

Conservation status: Least Concern (LC) (IUCN Species Survival Commission 2000).

Specimens examined

WESTERN CAPE.—3419 (Caledon): Bredasdorp, The Poort, (–DB), *Compton 9066, 14743* (NBG); between Elandsport and Elim, (–DB), *Levyms 9726* (BOL); De Hoop Nature Reserve, (–AD), *Bredenkamp 946, 947* (PRE); *Van der Merwe 1108* (PRE). 3420 (Bredasdorp): Potberg Nature Reserve, (–BC), *Burgers 2259* (PRE); Hamerkop Farm, (–BC), *Van Wyk 1920* (PRE, PRU); De Hoop, Witwater, (–BD), *Morley 21* (PRE); Hamerkop Farm, (–BD), *Van Wyk 1736* (M, PRE); Arniston, (–CA), *Acocks 22608* (K, PRE); Bredasdorp Poort, (–CA), *Esterhuysen 3016* (BOL); *Esterhuysen 23322* (MO); Bredasdorp District, Klipbrug, (–CA), *Henrici 3701* (BOL); Soetendalsvlei, (–CA), *Henrici s.n.* (NBG); between Bredasdorp and Elim, (–CA), *Leighton 21113* (BOL); Meulvlei Farm, (–CA), *Rosenberg & Rutherford 308* (NBG); 5 mi. inland near Arniston,

(-CA), *Taylor 3803* (PRE). 3421 (Riversdale): 4.5 mi. S of Vermaaklikheid, (-AC), *Acocks 24213* (K, NBG, PRE); Puntjie, Duivenhok's River Mouth, (-AC), *Boucher 2224* (NBG); Puntjie, (-AC), *Bredenkamp 939* (PRE); hills between Riversdale and Stilbaai, (-AC), *Goldblatt 4144* (MO, NBG, PRE); Stilbaai, (-AD), *Bohnen 4012* (C, PRE); Stilbaai Rifle Range, (-AD), *Bohnen 4065* (NBG, PRE); road to Riethuiskraal, (-AD), *Bredenkamp 932* (PRE); Kafferkuil's River at Stilbaai Rifle Range, (-AD), *Bredenkamp 933, 934* (PRE); Riversdale District, Melkhoutfontein, (-AD), *Galpin 4491* (K, PRE); road between Riversdale and Stilbaai, (-AD), *Levyms 9511* (BOL); Melkhoutfontein, (-AD), *Muir 2441* (PRE); Stilbaai, (-AD), *Strauss s.n.* (NBG); Albertinia, Ystervarkpunt Coastal Stoop, (-BC), *Willemse 805* (NBG, PRE). 3422 (Mossel Bay): close to light house at Mossel Bay, (-AA), *Bredenkamp 923* (PRE). Grid ref. unknown: *Ecklon s.n.* (S); Duineveld Limestone hill, *Levyms 9674* (BOL).

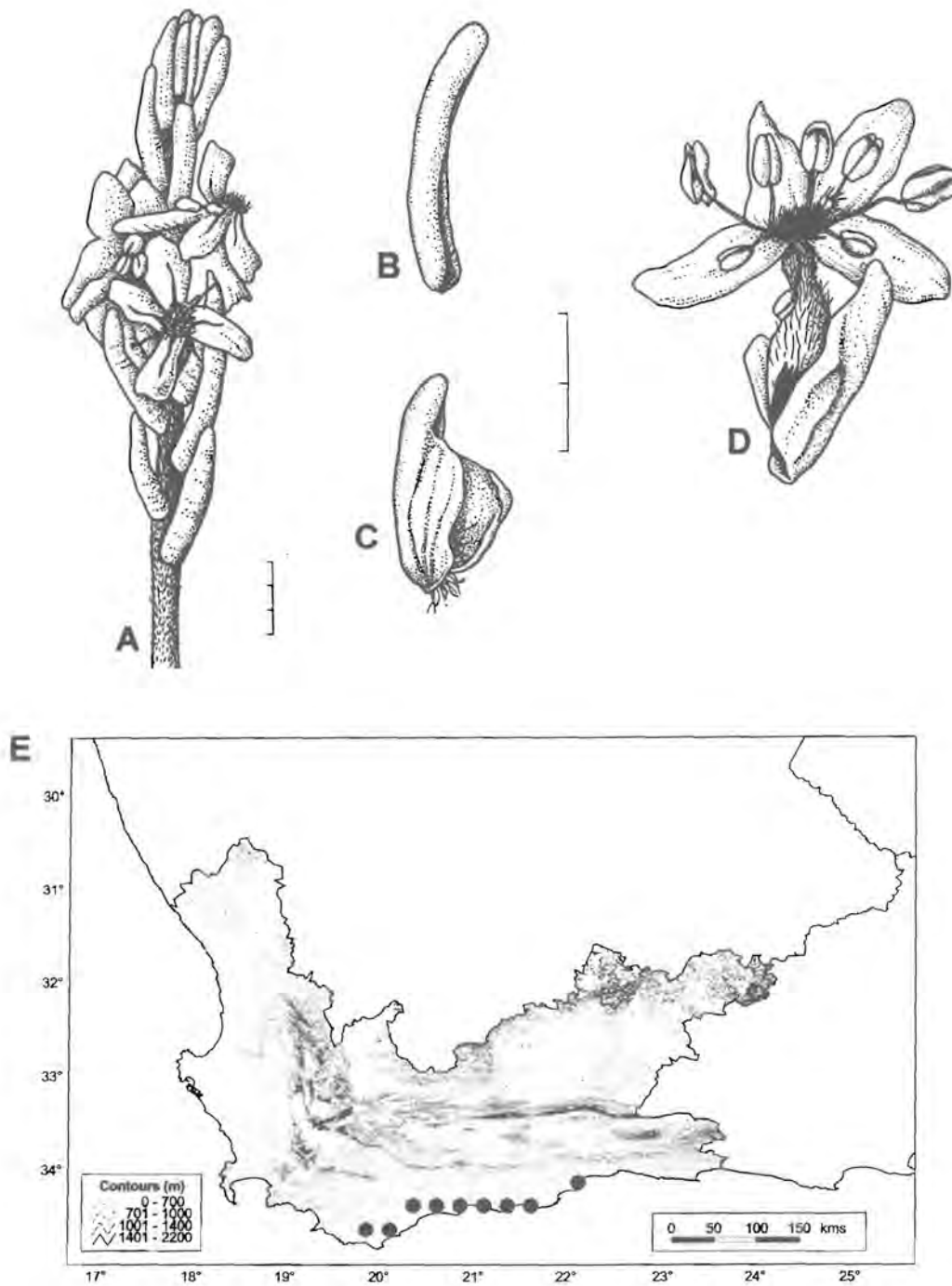


FIGURE 7.13.—*Passerina galpinii* (Bredenkamp 946). A, inflorescence with apex growing out, returning to vegetative growth (proliferating growth); B, leaf; C, bract; D, flower clasped by bract, hypanthium fragmenting at circumference of ovary. Scale bars: A 3 mm; B, C, D 2 mm.

E, known distribution of *Passerina galpinii*.