

THYMELAEACEAE

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

INTRODUCTION

Passerina L. comprises about 20 species and four subspecies of evergreen perennial shrublets (Thoday 1924; Goldblatt & Manning 2000). Most members are confined to the Cape Floristic Region with its Mediterranean or semi-Mediterranean climate. Three species extend northwards along the Great Escarpment, with *P. montivagus* Bredenkamp & A.E.van Wyk extending northwards to Tanzania. Under the heading 'Incertae', Thoday (1924) discussed specimens of doubtful identity, most of them from mountain summits and outlying localities. He concluded that further collecting would solve the problem of their identification. Here we describe a new species confined to high altitudes on some of the mountains in the western sector of the Cape Floristic Region and the adjacent Roggeveld Escarpment. The separate

specific status of the new taxon is supported by evidence derived from the epidermal structure (Bredenkamp & Van Wyk 1999, 2000), leaf anatomy (Bredenkamp & Van Wyk 2001a) and vegetative and floral morphology (Bredenkamp & Van Wyk 2001b).

MATERIAL AND METHODS

All collections of *Passerina* from 22 herbaria were studied for taxonomy and external morphology. Specimens of the new species were found in the following herbaria (acronyms according to Holmgren *et al.* 1990): BOL, K, NBG, PRE.

For leaf anatomy, both fresh and herbarium material were studied. Vouchers used in anatomical studies: *Bredenkamp 1044–1047; Goldblatt & Manning 8627;*

Oliver 9281. Methods used in the study of leaf structure are described in Bredenkamp & Van Wyk (1999, 2000, 2001a).

***Passerina nivicola* Bredenkamp & 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, caespit apicali pilorum. *Hypanthium* circa ovarium extra tomentosum. *Sepala* tempore pollinationis membranacea, lutea vel luteorosea; sepalis, exterioribus apice setosis, sepalis interioribus utrinque glabris.

TYPE.—Western Cape, 3319 (Worcester): Ceres Dist., Waboomberg, 1 760 m, (–DD), 12 November 1989, E.G.H. *Oliver 9281* (PRE, holo.; NBG, iso.).

Rounded evergreen shrublets 0.3–0.5 m high. *Stems* greyish brown, younger branchlets greyish tomentose, cork finely fissured, grey-brown. *Leaves* decussate, imbricate on young branchlets, sessile, closely adpressed to stem, cymbiform, cylindric, often slightly dilated apically, linear-lanceolate, (2.5–)3.1(–4.5) × (0.5–)0.6(–0.7) mm, inversely ericoid; adaxial surface concave, tomentose; abaxial surface convex, glabrous; apex rounded, with tuft of trichomes, tinged red; base sessile; margin sometimes ciliate. *Inflorescences* composed of polytelic synflorescences; main florescences as well as co-florescences spicate. *Bracts* tinged red in bud stage, enveloping flowers and fruits, largest after anthesis, becoming more coriaceous and rounded at fruit set, decussate, imbricate, cymbiform; lamina rolled, widely obovate, length × 1/2 width (3.1–)3.5 × 1.4(–1.9) mm, adaxially (inside) concave, abaxially (outside) convex and glabrous, midrib tomentose on inside, chartaceous; base cuneate; main vein strongly developed, extending to form subacute apex, with apical tuft of trichomes; wings glabrous, bullate, membranous; margin ciliate in upper half. *Pedicle* very short or absent. *Receptacle* very short. *Floral envelope* petaloid, up to 5.3 mm long, membranous and yellow or yellow-pink during pollination, papyraceous and

turning red after pollination; hypanthium tomentose at ovary, neck ± 1.2 mm long, tomentose on outside, often hairy inside, articulation at neck base absent because of lack of abscission tissue, fragmentation of neck base caused by dehydration and torsification of tissue after fruiting, resulting in 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. *Corolla* absent. *Petaloid scales* absent. *Disc* absent. *Androecium* dimorphic diplostemonous, arising from hypanthium at separation point of sepals; filaments of antipetalous whorl ± 0.4 mm long, those of antisepalous whorl ± 1.2 mm long; pollen grains shed as monads, spheroid, pantoporate, basal reticulum of typical crotonoid pattern no longer discernible, replaced by secondary reticulum derived from fused sexine (Bredenkamp & Van Wyk 1996). *Ovary* superior, ± 1.7 × 0.5 mm, pseudomonomerous, uniloculate, with one pendulous ovule laterally attached near top of ovary, placentation parietal; ovule anatropous, position ventrally epitropous, bitegmic, with exotegmic palisade, crassinucellate, obturator of elongate cells extending from base of style to micropyle; stigma developing at base of sepals, penicillate. *Fruit* a 1-seeded berry, pericarp membranous and dry, enveloped by persistent, loosely arranged hypanthium fragmented at neck base. *Seed* broadly fusiform with outgrowths at both micropylar and funicular ends, ± 2.2 × 1.2 mm, tegmen black and shiny; endosperm formation nuclear, but later becoming cellular throughout. Figure 16.

Leaf anatomy

Leaf structural type A: leaf isobilateral. *Main vascular bundle* central; bundle sheath completely enclosing vascular tissue. *Secondary vascular bundles* close, with bundle sheaths adhering, forming a central plate of veins. *Sclerenchymatous hypodermal sheath* absent. (Bredenkamp & Van Wyk 2001a).

Leaf isobilateral, outline in transverse section (t/s) transversely elliptic. *Adaxial epidermis*: cuticular membrane (CM) ± 3 µm thick; periclinal × anticlinal cell diameters in t/s 25 × 40 µm; stomata often dispersed in

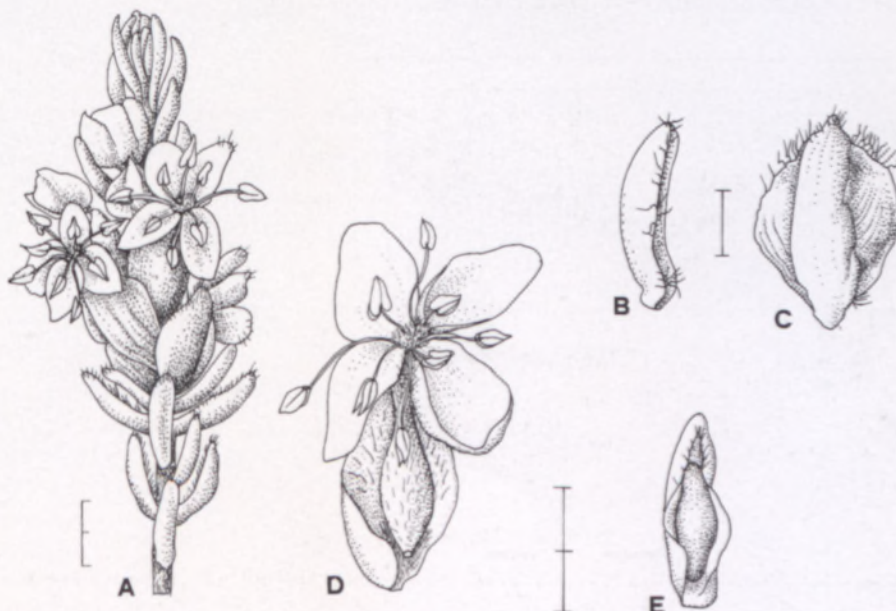


FIGURE 16.—*Passerina nivicola*, *Oliver 9281*: A, inflorescence; B, leaf; C, bract; D, flower clasped by bract; E, fruit enveloped by persistent floral bract. Scale bars: A, D, E, 2 mm; B, C, 1 mm.

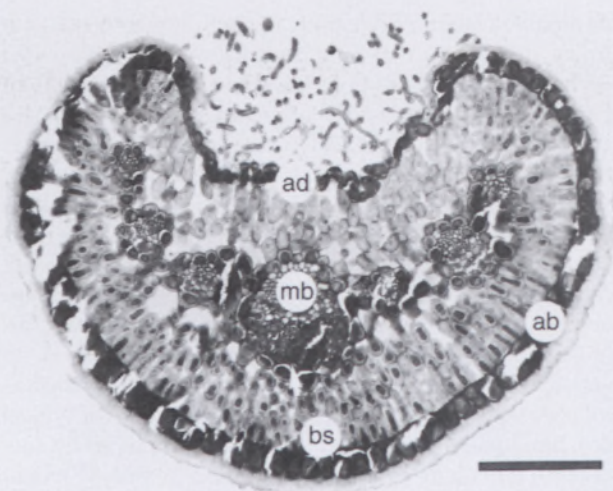


FIGURE 17.—*Passerina nivicola*, Bredenkamp 1044: leaf structural type A, t/s; leaf isobilateral, vascular bundles closely arranged, bundle sheaths adhering, forming central plate of veins. ad, adaxial epidermis; ab, abaxial epidermis; bs, bundle sheath; mb, median vascular bundle. Scale bar: 100 μ m.

two columns in adaxial epidermal folds, with ± 3 –5 rows of epidermal cells in between, sunken or arranged in stomatal crypts. *Abaxial epidermis*: cuticular ornamentation comprising several domes per cell, CM ± 20 μ m thick, irregularly marked by grooves, wax platelets scarce, geometrical, flat or raised, with rounded to sharp edges; cells arranged in rows, oblong, pentagonal-heptagonal, dimensions in surface view 45–55 \times 35–40 μ m, periclinal \times anticlinal cell diameter in t/s 35–40 \times 40–55 μ m. *Mesophyll* consisting of ± 3 adaxial and 4 abaxial layers of \pm homogeneous, palisade-like parenchyma cells; density 3 or 4 cells per 50 μ m; intercellular spaces surrounding central veins. *Main vascular bundle* 410–450 μ m thick, 810–850 μ m wide, widely ovate with ample extraxylary fibres. *Bundle sheath* consisting of ± 19 –25 parenchymatous cells, completely enclosing vascular tissue, cells rounded, transversely or longitudinally elongated. *Secondary vascular bundles* forming central plate of 3 or 4 veins on each side of main bundle. Figure 17.

Diagnostic characters and relationships: *Passerina nivicola* is superficially similar to *P. comosa*, but differs

from it by its glabrous leaves and red-tinged bracts, which are glabrous outside, with bullate, membranous wings. The flowers of the new species are membranous and yellow or yellow-pink at pollination, with outer sepals abaxially setose at the apex and the 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 alludes to the occurrence of this species at high altitudes, where the plants are periodically covered by snow.

Distribution and ecology: because of its confinement to mountainous areas *P. nivicola* is clearly still under-collected. The most northerly record is from Sneeukskrans on the Roggeveld Escarpment, where it is associated with Escarpment Mountain Renosterveld (Rebello 1998). Most records are from the Ceres and Worcester Districts (Figure 18), with plants occurring in either Mountain Fynbos or Central Mountain Renosterveld (Rebello 1998).

The new species was found on Waboomberg near Ceres growing at an altitude range of 1 200–1 760 m and although it was summer, the plants were dug out from under a layer of snow (Figure 19). Here the plants occur in low restioid or graminoid veld on sandy loamy soil. They are somewhat stunted and attain a height of ± 0.3 m, possibly because of the effects of snow. The same species is also found lower down, next to the road leading to the mountain, where the plants are more robust and reach a height of up to 0.5 m; the floral bracts are more coriaceous. Accessible plants are grazed by stock. Information from Grobler 540, indicates that this species also occurs on shale flats at Kareevlakte in Ceres.

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

Specimens examined

NORTHERN CAPE.—3220 (Sutherland): Roggeveld Escarpment, Quaggasfontein Farm, on road to Uitkyk, Sneeukskrans W of Sutherland, (–AB), Goldblatt & Manning 8627 (PRE).

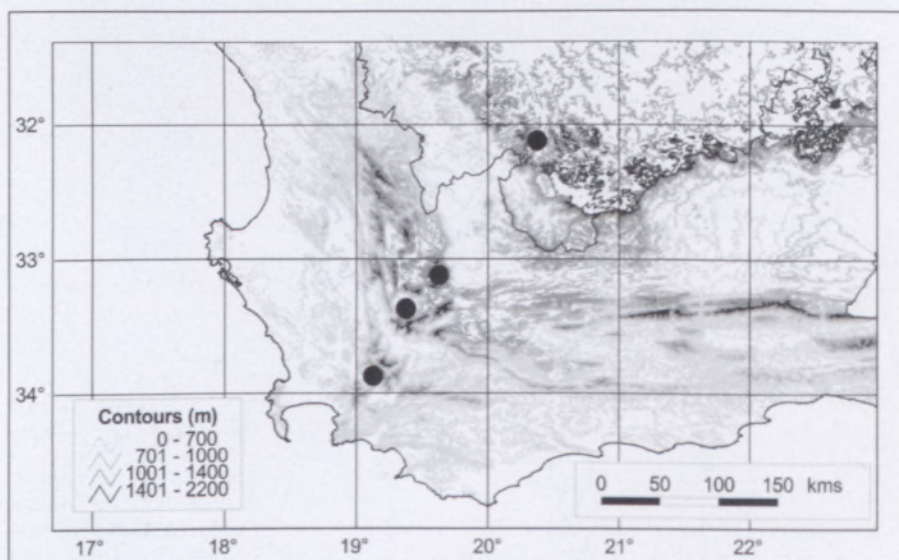


FIGURE 18.—Known distribution of *P. nivicola*.



FIGURE 19.—Typical habitat of *P. nivicola*: A, rounded shrublets covered in snow on level area close to summit of Waboomberg, near Ceres; B, individual stunted plants, ± 0.3 m high; C, plants flowering lower down mountain.

WESTERN CAPE.—3319 (Worcester): Ceres, Kareevlakte, (–AD), *Grobler 540* (PRE); Ceres, Waboomberg, Farm Merino, (–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 Dist., Tafelberg, (–CC), *Pillans 17159* (BOL, K), *s.n.* (K).

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