

Taxonomy of the genus *Passerina* (Thymelaeaceae)

C.L. BREDENKAMP* and A.E. VAN WYK**

Keywords: anatomy, cladistics, endemism, macromorphology, new species, palynology, *Passerina*, southern Africa, taxonomy, Thymelaeaceae

ABSTRACT

Passerina L. is mainly a southern African genus, comprising 20 species and four subspecies. A few species occur along the Great Escarpment, two extend into Zimbabwe and Mozambique, but most are concentrated in the Cape Floristic Region. Palynological, macromorphological and anatomical evidence was used in the delimitation of the genus and its infrageneric taxa. A cladistic study supports *Passerina* as a monophyletic genus. A genus treatment, key to species and a full species treatment are given. Each species treatment includes a taxonomic diagnosis, description and notes on taxonomy, etymology, economic value and distribution. Illustrations of representative species are provided and distribution maps are included for each species. *P. esterhuyseniae* Bredenk. & A.E.van Wyk is newly described. A list of excluded species names highlights the previous cosmopolitan taxonomic interpretation of *Passerina*, as many names are now in synonymy under other genera of the Thymelaeaceae.

CONTENTS

Abstract	59	18. <i>Passerina filiformis</i> L.	85
Introduction	59	[for a complete description see Bredenkamp & Van Wyk in <i>Bothalia</i> 32: 29–34 (2002d)]	
Thymelaeaceae	59	18a. subsp. <i>filiformis</i>	85
<i>Passerina</i>	60	18b. subsp. <i>glutinosa</i> (Thoday) Bredenk. & A.E.van Wyk	85
Materials and methods	61	19. <i>Passerina falcifolia</i> (Meisn.) C.H.Wright	85
<i>Passerina</i> L.	61	20. <i>Passerina rubra</i> C.H.Wright	87
Key to species	65	Doubtful name	89
1. <i>P. paleacea</i> Wikstr.	66	Excluded names	89
2. <i>P. truncata</i> (Meisn.) Bredenk. & A.E.van Wyk ...	68	Specimens examined	92
[for a complete description see Bredenkamp & Van Wyk in <i>Bothalia</i> 32: 66 (2002a)]		Acknowledgements	94
3. <i>Passerina quadrifaria</i> Bredenk. & A.E.van Wyk ...	68	References	95
[for a complete description see Bredenkamp & Van Wyk in <i>South African Journal of Botany</i> 68: 304 (2002b)]		Index to taxa (also doubtful and excluded names)	97
4. <i>Passerina montana</i> Thoday	68		
5. <i>Passerina burchellii</i> Thoday	70		
6. <i>Passerina ericoides</i> L.	71		
7. <i>Passerina rigida</i> Wikstr.	73		
8. <i>Passerina nivicola</i> Bredenk. & A.E.van Wyk	74		
[for a complete description see Bredenkamp & Van Wyk in <i>Bothalia</i> 32: 77 (2002c)]			
9. <i>Passerina esterhuyseniae</i> Bredenk. & A.E.van Wyk ...	75		
10. <i>Passerina comosa</i> (Meisn.) C.H.Wright	76		
11. <i>Passerina pendula</i> Eckl. & Zeyh. ex Thoday ...	77		
12. <i>Passerina galpinii</i> C.H.Wright	78		
13. <i>Passerina drakensbergensis</i> Hilliard & B.L.Burt ...	80		
14. <i>Passerina corymbosa</i> Eckl. ex C.H.Wright	81		
15. <i>Passerina obtusifolia</i> Thoday	82		
16. <i>Passerina paludosa</i> Thoday	84		
17. <i>Passerina montivaga</i> Bredenk. & A.E.van Wyk ...	85		
[for a complete description see Bredenkamp & Van Wyk in <i>Bothalia</i> 32: 34 (2002d)]			

INTRODUCTION

Thymelaeaceae

Applying the sexual system of classification, Linnaeus (1754) placed the genus *Passerina* under Class VIII, Octandria, 1. Monogynia. This system was followed until De Jussieu (1789) instated the family Thymelaeaceae, with the following genera: *Dirca* L., *Lagetta* Juss., *Daphne* L., *Passerina* L., *Stellera* L., *Struthiola* L., *Lachnaea* L., *Dais* L., *Gnidia* L., *Nectandra* Berg. and *Quisqualis* L. Wikström (1818) accepted the Thymelaeaceae, but based the infrafamilial classification on the number of stamens, following Linnaeus. The most important contributions towards the infrafamilial classification of the Thymelaeaceae, based on morphological characters, were made by Endlicher (1847), Meisner (1857), Bentham & Hooker (1880) and Gilg (1894a). Using anatomical characters, further contributions were made by Van Tieghem (1893), Gilg (1894b) and Leandri (1930).

Domke (1934) proposed a widely adopted subfamilial classification for the Thymelaeaceae and divided the family into four subfamilies, namely Gonystyloideae, Aquilarioideae, Gilgiodaphnoideae and Thymelaeoideae. The genus *Passerina* is classified under the Thymelaeoideae. Based on palynological evidence Archangelsky (1971: fig. 10) added the new subfamilies Octolepidoideae, Microsem-

* National Botanical Institute, Private Bag X101, 0001 Pretoria.

** H.G.W.J. Schweickerdt Herbarium, Department of Botany, University of Pretoria, 0002 Pretoria.

MS. received: 2002-11-08.

matoideae and Synadrodaphnoideae and raised the Gonystyloideae to the family Gonystylaceae (also recognized by Takhtajan 1997, amongst others). Bredenkamp & Van Wyk (1996) published new evidence on the structure of the pollen wall in *Passerina* resulting in the elevation of the subtribe Passerininae Endl. to the monogeneric tribe Passerineae (Endl.) Bredenk. & A.E. van Wyk. Evidence obtained from floral morphology, anatomy, embryology and palynology indicates that the Thymelaeaceae has a strong malvacean relationship, an affinity also supported by molecular data (APG 1998; Magallón *et al.* 1999). The possible phylogenetic relationships of the Thymelaeaceae are discussed by Bredenkamp & Van Wyk (2001b).

The Thymelaeaceae is currently considered a family of \pm 58 genera and \pm 720 species. (Mabberley 1989; Brummitt 1992; Takhtajan 1997). It is subcosmopolitan and the distribution of the genera is listed by Mabberley (1989), as follows:

Africa: temperate southern Africa—*Dais* L., *Englerodaphne* Gilg, *Gnidia* L., *Lachnaea* L., *Passerina* L., *Peddiea* Harv., *Struthiola* L., *Synaptolepis* Oliv.; tropical Africa—*Craterosiphon* Engl. & Gilg, *Dicranolepis* Planch., *Octolepis* Oliv., *Synandrodaphne* Gilg.

Asia: *Aetoxylon* Airy Shaw, *Amyxa* Tiegh., *Drapetes* Lam., *Erioseola* Blume, *Pentathymelaea* Lecomte, *Rhamnoneuron* Gilg, *Restella* Pobed., *Wikstroemia* Endl.

Australia: *Arnhemia* Airy Shaw, *Drapetes* Lam., *Pimelea* Banks & Sol., *Oreodendron* C.T. White.

Europe: *Daphne* L., *Diarthron* Turcz.

Japan: *Daphnimorpha* Nakai, *Edgeworthia* Meisn.

Madagascar: *Stephanodaphne* Baill.

Malesia: *Aquilaria* Lam., *Enkleia* Griff., *Gonystylus* Teijsm. & Binn., *Linostoma* Wall. ex Endl., *Phaleria* Jack.

Mediterranean region: *Thymelaea* Mill.

New Caledonia: *Deltaria* Steenis, *Lethedon* Spreng., *Solmsia* Baill.

North and South America: *Daphnopsis* Mart. & Zucc., *Dirca* L., *Funifera* Leandro ex C.A. Mey., *Goodallia* Benth., *Lagetta* Juss., *Lasiadenia* Benth., *Linodendron* Griseb., *Lophostoma* Meisn., *Ovidia* Meisn., *Schoenobiblus* Mart.

Sri Lanka: *Gyrinops* Gaertn.

Perhaps the economically most important character in the family is its tough fibrous bark. The bark of *Wikstroemia*, *Daphne*, *Edgeworthia*, *Thymelaea* and *Daphnopsis* is used for rope, and in the manufacturing of bank notes and strong paper. Flexible shoots of *Dirca* are used for baskets. Bark of *Pimelea* was used as a source of twine by early settlers in Australia.

Many genera are also known for their medicinal value. The wood of *Wikstroemia* is a source of incense and that of *W. ovata* C.A. Mey. is a strong purge. In China the bark of *Daphne* is used as an apparently safe and efficient abortifacient; it contains the glycoside daphnin and

an acrid resin (mezerein) giving plants a bitter taste. The decaying heartwood of *Aquilaria malaccensis* Lam. is saturated with a resin which is the basis of incense and when distilled it is used in perfume and medicine.

The genera *Pimelea*, *Edgeworthia* and *Daphne* are cultivated for horticultural purposes. The scent of *Daphne* flowers is carnation-like and attractive to Lepidoptera; some members are moth-pollinated. *Gonystylus bancanus* (Miq.) Kurz. is a peat swamp-forest tree, with knee-roots. Its lightweight commercial timber is used for dowelling and is much exported from Indomalaysia.

In southern Africa, the bark of various genera is used for tying down thatch, for plaiting into whip thongs and for twine. *Dais cotinifolia* L. is an ornamental tree with attractive flowers, occurring mostly along the eastern regions of the country.

Passerina

In his comprehensive work on the circumscription of the Thymelaeaceae and infrafamilial taxa, Domke (1934) gave a complete historical review of the intergeneric classification of *Passerina*. He included the southern African genera *Dais*, *Gnidia* (= *Lasiosiphon*), *Struthiola*, *Lachnaea* (= *Cryptadenia*) and *Passerina* in the tribe Gnidieae, subtribe Gnidinae of the subfamily Thymelaeoideae. Bredenkamp & Van Wyk (1996) place *Passerina* in the monogeneric tribe Passerineae on the basis of mainly pollen characters. Currently *Passerina* is considered advanced at the intergeneric level, as many of the advanced character states present in other genera of the Thymelaeoideae are all found together in this genus. The most prominent characters distinguishing *Passerina* are the exserted, extrorse anthers and the unique anemophilous habit (Bredenkamp & Van Wyk 1996, 2001b).

The infrageneric classification of *Passerina* is documented by Linnaeus (1753) in his *Species plantarum*, in which he described *P. filiformis*, *P. hirsuta*, *P. ciliata* and *P. uniflora*. *P. filiformis* is the only species that is currently recognized in *Passerina*. Publications mentioned in the applicable protologue and in synonymy to the various species that pre-date the nomenclatural starting point for the Spermatophyta [International Code of Botanical Nomenclature, Article 13.1 (Greuter *et al.* 2000)] are Linnaeus's *Hortus Cliffortianus* (1737), Van Royen (1740), Plukenet (1700: 180), Breynia (1678) and Burman (1739). The generic name *Passerina* appearing in *Species plantarum* (Linnaeus 1753) is associated with the subsequent description given in *Genera plantarum* (Linnaeus 1754) (Greuter *et al.* 2000, Article 13.4).

Wikström (1818) recognized 41 species of *Passerina* and the subspecies *P. filiformis* subsp. *divaricata*; of these only four species are presently recognized in *Passerina*. In the interim the subspecies was raised to species level and is presently known as *P. falcifolia*. Thunberg (1825a) recognized nine species of which only one is currently maintained. His concept of *P. glomerata*, *P. ericoides* and *Lachnaea conglomerata* were completely incorrect and caused confusion right up to the present study. Meisner (1840; 1857: 563–565) redefined the genus by clarifying 92 'species exclusae' which were mostly synonymous with

other cosmopolitan genera in the Thymelaeaceae and he retained only four species and six subspecies. The distribution of the remaining species clearly indicated that *Passerina* was a smaller genus, largely confined to southern Africa. At the beginning of the 20th century, Wright (1915) revised the Thymelaeaceae for the *Flora capensis* and his generic concept of *Passerina* was mostly based on that of Meisner (1857). He recognized ten species, of which three were new, as well as three subspecies. He recognized *P. ericoides* and *Chymococca empetroides*. We agree with Thoday (1924a) that *C. empetroides* is a synonym of *P. ericoides*. Although Thoday (1924a) provided a much improved classification of the group, the circumscription and identification of several species remained problematic, especially in the herbarium. Table 1 is a summary of taxa recognized in the most comprehensive works on *Passerina* from Linnaeus (1753) to the present study.

In his treatment of *Passerina*, Meisner (1840) divided the genus into section I. *Pentameræ* and section II. *Tetrameræ*. *P. polycephala* E.Mey., *P. anthylloides* L.f. and *P. calocephala* Meisn., with pentamerous flowers (section I), were eventually all placed in the genus *Gnidia* (Meisner 1857; Gilg 1894a). Meisner (1857) did not divide *Passerina* into infrageneric taxa, a pattern followed by all subsequent treatments and no further mention was made of the relevant sections. In the present genus treatment the sectional classification is not maintained.

MATERIALS AND METHODS

Material from the following herbaria was studied (acronyms according to Holmgren *et al.* 1990): BM, BOL, BREM, C, GRA, K, LINN, M, MEL, MO, NBG, P, PR, PRC, PRE, PRU, S, SBT, TCD, UPS, W, WU. A database of the specimens was compiled on the Microsoft Access Relational Database Management System for Windows, Version 2.0.

Live and preserved (dried and in liquid preservatives) material of all the species and subspecies in *Passerina* was studied. As far as possible, material was collected from at least five different localities for every taxon. Illustrations were made from herbarium material by means of a drawing tube. Measurements were taken using a dissection microscope and a calibrated eyepiece. Because the laminas of most leaves and floral bracts are cymbiform or rolled, the depth was measured, with dimensions indicated as length × depth.

Light microscopy (LM) was used for general leaf anatomy, epidermal studies and floral anatomy (Bredenkamp & Van Wyk 1999, 2001a, 2001b). Leaf and floral material was fixed and stored in a 0.1 M phosphate-buffered solution at pH 7.4, containing 2.5% formaldehyde, 0.1% glutaraldehyde and 0.5% caffeine [modified Karnovsky fixative; Karnovsky (1965)]. The material was washed in water, dehydrated and embedded in glycol methacrylate (GMA) following the methods of Feder & O'Brien (1968). Embedded material was serially sectioned. Sections were stained in toluidine blue 'O', subjected to the periodic acid-Schiff's (PAS) reaction and mounted in Entellan (Art. 7961, E. Merck, Darmstadt).

Scanning electron microscopy (SEM) was used to study the epidermal surface features (including epicuticular waxes) and to verify the structure of the cuticle (Bredenkamp & Van Wyk 2000).

Transmission electron microscopy (TEM) was used for the study of the structure of mucilaginous epidermal cell walls in *Passerina* (Bredenkamp & Van Wyk 1999).

Terminology used in the descriptions of inflorescences and flowers is mentioned in Bredenkamp & Van Wyk (2001b). General descriptive terminology follows Stearn (1973) and Radford *et al.* (1974). Author citations follow Brummitt & Powell (1992).

***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.: 319 (1818); Thunb.: 374 (1825a); Meisn.: 390 (1840); Steud.: 273 (1841); C.A.Mey.: 45 (1843); Meisn.: 561 (1857); Harv.: 325 (1868); Gand.: 418 (1913); C.H.Wright: 9 (1915); Thoday: 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.: 258 (1763); Lam. & DC.: 359 (1805); Raf.: 104 (1836). Type species: as above.

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

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

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

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

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

Lonchostoma obtusiflorum Wikstr. nom illeg. = *Passerina pentandra* Thunb. (Farr *et al.* 1979) ≡ *Lonchostoma Wikstr.*: 350 (1818) nom. cons.

Chymococca Meisn.: 565 (1857); Harv.: 325 (1868); Benth. & Hook.: 194 (1880); Thoday: 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.

≡ the identity sign denoting nomenclatural synonymy for names based on the same type species.

TABLE 1.—A summary of taxa in the most comprehensive works on *Passerina* from Linnaeus (1753) to the present study

Linnaeus (1753)	Wikström (1818)	Thunberg (1825a)	Meisner (1857)	Wright (1915)	Thoday (1924a)	Present study
<i>P. filiformis</i> L.	<i>P. filiformis</i> L.	<i>P. filiformis</i> L.	<i>P. filiformis</i> L. (= <i>P. pectinata</i> nom. nud.)	<i>P. filiformis</i> L. (= <i>P. pectinata</i> nom. nud.)	<i>P. filiformis</i> L. (= <i>P. pectinata</i> nom. nud.)	<i>P. filiformis</i> L. (= <i>P. cupressina</i> J.C. Wendl. nom. nud.) (= <i>P. pectinata</i> Lodd. nom. nud.) subsp. <i>filiformis</i> subsp. <i>glutinosa</i> (Thoday) Bredenk. & A.E. van Wyk
			<i>P. filiformis</i> L. α <i>vulgaris</i> Meisn.	<i>P. corymbosa</i> Eckl. ex C.H. Wright	<i>P. vulgaris</i> Thoday	<i>P. corymbosa</i> Eckl. ex C.H. Wright
	<i>P. filiformis</i> L. β <i>divaricata</i> Wikstr.		<i>P. filiformis</i> L. β <i>falcifolia</i> Meisn.	<i>P. falcifolia</i> C.H. Wright	(= <i>P. filiformis</i> L. var. <i>vulgaris</i> Meisn.) (= <i>P. filiformis</i> L. var. <i>vulgaris</i> Meisn.) <i>P. falcifolia</i> C.H. Wright	(= <i>P. corymbosa</i> Eckl. ex Meisn.) (= <i>P. vulgaris</i> (Meisn.) Thoday) <i>P. falcifolia</i> (Meisn.) C.H. Wright
			<i>P. filiformis</i> L. γ <i>comosa</i> Meisn.	<i>P. comosa</i> C.H. Wright	(= <i>P. filiformis</i> L. var. <i>divaricata</i> Wikstr.) (= <i>P. filiformis</i> L. var. <i>falcifolia</i> Meisn.) <i>P. comosa</i> C.H. Wright	(= <i>P. filiformis</i> L. var. <i>divaricata</i> Wikstr.) (= <i>P. filiformis</i> L. var. <i>falcifolia</i> Meisn.) <i>P. comosa</i> (Meisn.) C.H. Wright
			<i>P. filiformis</i> L. δ <i>squarrosa</i> Meisn	<i>P. rubra</i> C.H. Wright	<i>P. rubra</i> C.H. Wright	(= <i>P. filiformis</i> L. var. <i>comosa</i> Meisn.) (= <i>P. falciformis</i> Drege) <i>P. rubra</i> C.H. Wright
<i>P. hirsuta</i> L.	<i>P. hirsuta</i> L. (= <i>P. metnan</i> Forssk.)		<i>Thymelaea hirsuta</i> Endl. (= <i>P. hirsuta</i> L.) (= <i>P. metnan</i> Forssk.)		(= <i>P. filiformis</i> L. var. <i>squarrosa</i> Meisn.)	(= <i>P. filiformis</i> L. var. <i>squarrosa</i> Meisn.)
<i>P. ciliata</i> L.	<i>P. ciliata</i> L. (= <i>P. ciliata</i> L.)	<i>P. ciliata</i> Thunb. (= <i>P. ciliata</i> L.)	<i>Cryptadenia ciliata</i> Meisn. (= <i>P. ciliata</i> Thunb.) <i>Gnidia?</i> <i>ciliata</i> Meisn. (= <i>P. ciliata</i> L.)			
<i>P. uniflora</i> L.	<i>P. uniflora</i> L.	<i>P. uniflora</i> L.	<i>Cryptadenia uniflora</i> Meisn. (= <i>P. uniflora</i> L.)			
<i>Lachnaea conglomerata</i> L.	<i>P. conglomerata</i> Thunb. (= <i>L. conglomerata</i> L.) (= <i>P. conglomerata</i> Thunb.) (= <i>P. ericoides</i> L.)	<i>P. conglomerata</i> Thunb. (= <i>L. conglomerata</i> L.) (= <i>P. ericoides</i> L.)	<i>L. conglomerata</i> L.		<i>P. glomerata</i> Thunb. (= <i>L. conglomerata</i> L.)	<i>L. conglomerata</i> L. nomen rejiciendum
	<i>P. paleacea</i> Wikstr. (= <i>Lachnaea paleacea</i> fide Wikstr.)		<i>P. paleacea</i> Wikstr. (= <i>Lachnaea paleacea</i> fide Wikstr.)	<i>P. paleacea</i> Wikstr. (= <i>Lachnaea paleacea</i> fide Wikstr.)	<i>P. paleacea</i> Wikstr. (= <i>Lachnaea paleacea</i> Wikstr.) (= <i>P. glomerata</i> fide Thunb.)	<i>P. paleacea</i> Wikstr. (= <i>Lachnaea paleacea</i> fide Wikstr.) (= <i>P. glomerata</i> sensu Thunb.) (= <i>P. ericoides</i> sensu Thunb.)
	<i>P. ericoides</i> L.		<i>P. ericoides</i> L.	<i>P. ericoides</i> L.	<i>P. ericoides</i> L. (= <i>Chymococca empetroides</i> Meisn.) (= <i>P. filiformis</i> L. var. <i>crassifolia</i> Eckl. & Zeyh. fide Meisn.) (= <i>P. glomerata</i> sensu Meisn.)	<i>P. ericoides</i> L. (= <i>Chymococca empetroides</i> Meisn.) (= <i>P. filiformis</i> L. var. <i>crassifolia</i> Eckl. & Zeyh. fide Meisn.) (= <i>P. glomerata</i> sensu Meisn.)
	<i>P. rigida</i> Wikstr.		<i>P. rigida</i> Wikstr. (= <i>Lachnaea conglomerata</i> L.)	<i>P. rigida</i> Wikstr. (= <i>Lachnaea conglomerata</i> L.)	<i>P. rigida</i> Wikstr.	<i>P. rigida</i> Wikstr. (= <i>P. eriophora</i> Gand.) (= <i>P. ericoides</i> sensu Meisn.)

TABLE 1.—A summary of taxa in the most comprehensive works on *Passerina* from Linnaeus (1753) to the present study (cont.)

Linnaeus (1753)	Wikström (1818)	Thunberg (1825a)	Meisner (1857)	Wright (1915)	Thoday (1924a)	Present study
			<i>P. rigida Wikstr.</i> α <i>comosa Meisn.</i>	<i>P. rigida Wikstr.</i> var. δ <i>comosa Meisn.</i>	<i>P. pendula Eckl. & Zeyh. ex Meisn.</i>	<i>P. pendula Eckl. & Zeyh. ex Thoday</i>
			<i>P. rigida Wikstr.</i> var. β <i>tetragona Meisn.</i>	<i>P. rigida Wikstr.</i> var. γ <i>tetragona Meisn.</i>	(= <i>P. rigida</i> var. <i>comosa Meisn. pro parte</i>) <i>P. burchellii Thoday</i>	(= <i>P. rigida</i> Wikstr. var. <i>comosa Meisn.</i>) <i>P. burchellii Thoday</i>
			<i>P. rigida Wikstr.</i> γ <i>truncata Meisn.</i>	<i>P. rigida Wikstr.</i> β <i>truncata Meisn.</i>	(= <i>P. rigida</i> var. <i>comosa Meisn. pro parte</i>) (= <i>P. tetragona</i> Burch.) <i>P. glomerata Thub.</i>	(= <i>P. tetragona</i> fide Thoday) <i>P. truncata (Meisn.) Bredenk. & A.E. van Wyk</i>
			<i>P. filiformis L.</i> <i>J.C. Wendl. ex Bartl.</i> nom. nud.		(= <i>P. rigida</i> Wikstr. var. <i>truncata Meisn.</i>) (= <i>P. rigida</i> Wikstr. var. <i>tetragona Meisn. pro parte</i>)	(= <i>P. rigida</i> Wikstr. var. <i>truncata Meisn.</i>) (= <i>P. rigida</i> Wikstr. var. <i>tetragona Meisn.</i>)
			<i>Chymococca empetroides Meisn.</i>	<i>Chymococca empetroides Meisn.</i>	<i>P. filiformis L.</i>	(= <i>P. glomerata</i> sphalm. quoad <i>L. conglomerata L. sensu Thub.</i>) (= <i>Lachnaea glomerata</i> sphalm. quoad <i>L. conglomerata L. sensu Thub.</i>) (= <i>P. ericoides sensu Thub.</i>) (= <i>P. glomerata</i> Thub. sensu Thoday) subsp. <i>truncata</i> subsp. <i>monticola Bredenk. & A.E. van Wyk</i> <i>P. cupressina</i>
					(= <i>P. cupressina</i> <i>J.C. Wendl. nom. nud.</i>) <i>P. ericoides L.</i>	(= <i>P. cupressina</i> <i>J.C. Wendl. nom. nud.</i>) <i>P. ericoides L.</i>
					(= <i>Chymococca empetroides</i> Meisn.) <i>P. galpini C.H. Wright</i>	(= <i>Chymococca empetroides</i> Meisn.) <i>P. galpini C.H. Wright</i>
				<i>P. lamiflora C.H. Wright</i>	<i>P. lamiflora C.H. Wright</i> type specimen is a <i>Lachnaea</i>	<i>Lachnaea lamiflora (C.H. Wright) Bond</i>
				<i>P. eriophora Gand.</i>	<i>P. rigida Wikstr.</i>	(= <i>P. laniflora</i> <i>C.H. Wright</i>) <i>P. rigida Wikstr.</i>
				<i>P. hamulata Gand.</i>	(= <i>P. eriophora</i> Gand.) <i>P. hamulata Gand.</i> ; probably <i>P. paleacea</i>	(= <i>P. eriophora</i> Gand.) <i>P. hamulata Gand.</i> ; nom. dub.
					<i>P. montana Thoday</i> (= <i>P. ericoides</i> <i>C.H. Wright non L. pro parte</i>)	<i>P. montana Thoday</i> (= <i>P. ericoides sensu Meisn.</i>)
					<i>P. obtusifolia Thoday</i>	(= <i>P. rigida</i> Wikstr. var. <i>tetragona Meisn. pro parte</i>) <i>P. obtusifolia Thoday</i>
					<i>P. paludosa Thoday</i>	<i>P. paludosa Thoday</i>
						<i>P. drakensbergensis Hilliard & B.L. Bartt</i>
						<i>P. quadrifaria Bredenk. & A.E. van Wyk</i>
						<i>P. nivicola Bredenk. & A.E. van Wyk</i>
						<i>P. esterhuyseniiae Bredenk. & A.E. van Wyk</i>
						<i>P. montivaga Bredenk. & A.E. van Wyk</i>

*The complete list of excluded species described by Meisner (1857: 563) was not included in Table 1 as most names are dealt with under 'Excluded names'.

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 × depth (1.5–)2.5–4.0(–8.0) × (0.8–)1.2–2.0(–3.0) mm (leaf shape usually cymbiform, depth of lamina is distance from adaxial groove to main vein situated abaxially); 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 1, 3, 4), or spikes mostly extended, number of spikes reduced or multiflowered, main and co-florescences present, proliferating growth common (Figures 10, 12, 13, 15, 16, 20, 23). *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, ± succulent or thin, sometimes ± 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 × depth (2.5–)3.5–4.5(–5.5) × (0.9–)1.0–1.5(–2.4) mm or bracts with leaf-like point, length × depth (4.0–)5.1–6.3(–7.3) × (1.4–)1.5–2.0(–2.6) mm.

Flowers actinomorphic, hypogynous. *Floral envelope* constituting hypanthium and sepals, (4.0–)5.3–7.3(–8.4) mm long, membranous during pollination and yellowish in *P. rigida*, *P. paleacea*, *P. nivicola* and *P. esterhuysenii*, 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. *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 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, 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 antisepalous 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 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, 2.2(–2.9) × 1.2(–1.6) mm; tegmen black and shiny, often with white spots; endosperm formation nuclear, but later becoming cellular throughout.

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 the widest circumference of the fruit, the fragmented hypanthium, sepals and androecium being shed. *P. ericoides* and *P. rigida* are characterized by 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 such as *P. falcifolia* are small trees and can be used as ornamental garden plants. *P. filiformis* has been cultivated in Britain and Europe since the time of Linnaeus. *P. obtusifolia* is used in the wild flower industry in the Robertson area. 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). Ash from *Passerina obtusifolia* was traditionally used by the people of Genadendal in Western Cape in the home industry of soap-making. Although certain species have been recorded in cancer research, these plants are not currently known for their medicinal value.

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 are 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: in *Passerina* the highest number of species per grid (nine) occurs in each of the grids 3321 (Ladismith), 3322 (Oudtshoorn) and 3419 (Caledon). The highest diversity of species (six) occurs in the False Bay area, from Seekoeivlei, including the Cape Flats, to De Mond at the Palmiet River (3418B). After an extensive study of herbarium material in cooperation with field work, Western Cape is regarded as the centre of diversity for *Passerina*, from where certain species extend west, north and east.

Thoday (1925) published an account of the geographical distribution and ecology of *Passerina*, based on 15 species. Of the 20 species currently studied, 10 are endemic and 4 species are near-endemic to the Cape Floristic Region. *P. obtusifolia* is widespread in the Northern, Eastern and Western Cape, whereas *P. corymbosa* occurs in Western and Eastern Cape, with outliers in KwaZulu-Natal. *P. rigida* is distributed from 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 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 Mozambique. *P. montivaga* and *P. montana* are near-endemic to the Great Escarpment.

Conservation status: with the exception of *Passerina esterhuyensiae* (from the northern Cederberg Mountains) known from herbarium material only, all other species and subspecies of *Passerina* were studied in the wild. Assessments were done using the guidelines of the IUCN Species Survival Commission (2000) and Victor (2002).

Key to species

- 1a Inflorescences comprising terminal subcapitulate spikes; proliferating growth (inflorescence apex growing out and returning to vegetative growth) uncommon (Figures 1, 3, 4):
 - 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 (abaxially) 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 (4.5–)4.9 \times 1.5(–1.8) mm (leaf shape usually cymbiform, depth of lamina is distance from adaxial groove to main vein situated abaxially) 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 10, 12, 13, 15, 16, 18, 20, 21, 23):
 - 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-floriscences; 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, 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 obovate, 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 obovate, 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 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 mm long, glabrous to sparsely pubescent; spikes robust, rigid and extended, glaucous, with up to 30 fertile, enlarged bracts 20. *P. rubra*

1. *Passerina paleacea* Wikstr. in Kungliga Svenska Vetenskapsakademiens Handlingar 39: 323 (1818); Meisn.: 400 (1840); Meisn.: 562 (1857); C.H.Wright: 12 (1915); Thoday: 164 (1924a); Thoday: 388 (1924b). Type: Caput bonae Spei, Herb. Wikströmii, *Sparman s.n.* (S!, lecto., here designated; UPS!).

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

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

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

P. 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!, P!, S!).

Shrubs or shrublets 0.1–1.5 m high. *Stems* branching from base up to growing points, branchlets from previous growth persistent, arcuate, indurate; younger branchlets

ascending, 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°, 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, length \times depth 1.5–2.5(–4.0) \times 0.6–0.8(–1.2) mm; base sessile, dilated; apex acute, median vein forming a distinct keel incurved at apex; margins involute. *Inflorescences* subcapitulate, \pm ellipsoid. *Bracts* decussate, imbricate, sessile, appressed, widely ovate in outline, length \times depth (2.5–)2.7 \times 1.2(–1.9) mm; 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 yellow-

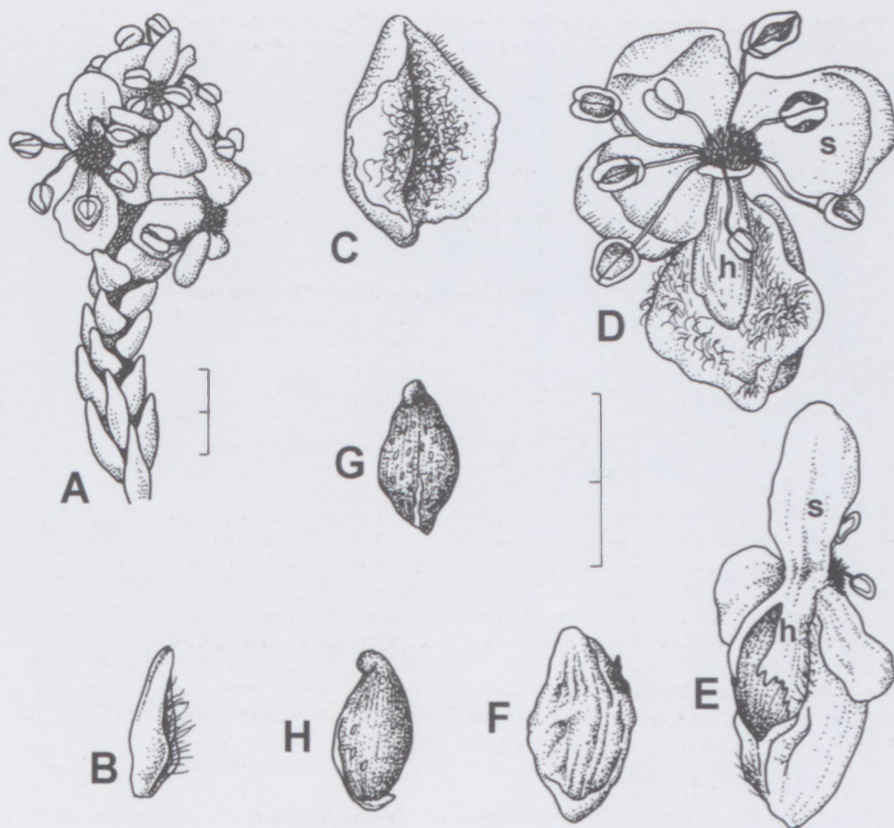


FIGURE 1.—*Passerina paleacea*, Bredenkamp 960. A, spike reduced, resembling terminal subcapitulate inflorescence; B, leaf; C, bract; D, flower clasped by bract in ventral view; E, hypanthium fragmenting at circumference of ovary. F–H, achene: enveloped by membranous pericarp; G, lateral view; H, ventral view. h, hypanthium; s, sepals. Scale bars: 2 mm. Artist: A. Stadler.

ish brown; base cuneate; main vein extending into obtuse apex; wings membranous, borders glabrous, obscurely veined. *Floral envelope* membranous and yellow during pollination, dehydrated after shedding of pollen, turning red to brownish, ± 4.2 mm long. *Hypanthium* glabrous, neck ± 0.3 mm long, abscission tissue and articulation plane absent. *Sepals* concave, elliptic or subrotund and glabrous. *Androecium* with filaments of antipetalous whorl ± 0.7 mm and antiseptalous whorl ± 1.4 mm long; anthers 0.6×0.5 mm. *Ovary* 2.4×1.4 mm. *Fruit* an achene with pericarp membranous and dry, $\pm 2.3 \times 1.2$ mm, enveloped by persistent, loosely arranged hypanthium fragmenting over widest circumference of fruit, the fragmented hypanthium, sepals and androecium being shed. Figure 1.

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* may 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 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 (Figure 2). The vegetation types dune fynbos and dune thicket form a mosaic along many parts

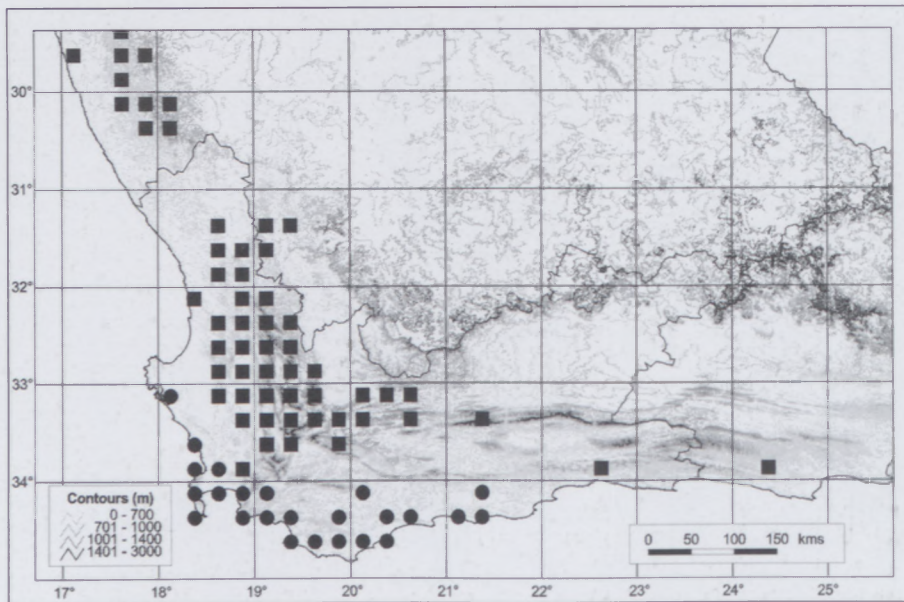


FIGURE 2.—Known distribution of *Passerina paleacea*, ●, *P. truncata* subsp. *truncata*, ■.

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 species of *Chrysanthemoides*, *Mimusops*, *Morella*, *Rhus* and *Sideroxylon*.

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

2. *Passerina truncata* (Meisn.) Bredenk. & A.E.van Wyk in *Bothalia* 32: 66 (2002a). Type: Western Cape, near Tulbagh Waterfall, April 1865, *Zeyher* 43 (K!, lecto.; MEL!, MO!, NBG!, S!, W!).

The complete description of the species and subspecies, the synonymy, relationships, etymology, distribution, habitat and key to subspecies is dealt with in *Bothalia* 32: 66–71 (2002).

2a. subsp. *truncata* (Figures 2, 3)

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

2b. subsp. *monticola* Bredenk. & A.E.van Wyk

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

3. *Passerina quadrifaria* Bredenk. & A.E.van Wyk in *South African Journal of Botany* 68: 304 (2002b). Type: 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: 70 (2000); Bredenk. & A.E.van Wyk: 56 (2001a); Bredenk. & A.E.van Wyk: 217 (2001b).

The complete description of the species, relationships, etymology, distribution and habitat appear in the *South African Journal of Botany* 68: 304–307 (2002).

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

4. *Passerina montana* Thoday in *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*

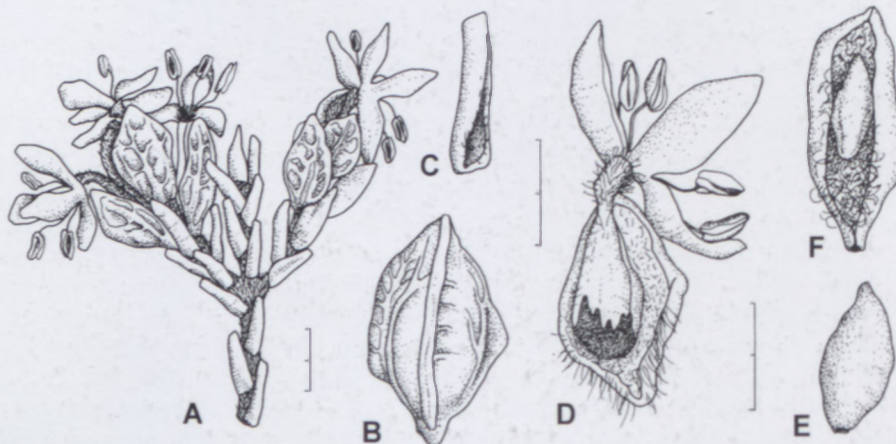


FIGURE 3.—*Passerina truncata* subsp. *truncata*, Bredenkamp 985. A, spike reduced, resembling terminal subcapitate inflorescence; B, bract; C, leaf; D, flower clasped by bract, fragmenting at circumference of ovary. E, F, achene: E, clasped by bract; F, enveloped by membranous pericarp. Scale bars: 2 mm. Artist: A. Stadler.

4036 [K!, lecto., designated by Thoday 10: 387 (1924b); BOL!, GRA!, PRE!].

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

P. rigida Wikstr. var. *tetragona* Meisn.: 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 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, length \times depth 1.5–2.5(–4.0) \times 0.6–0.8 mm; base sessile, dilated; apex acute, median vein prominent in upper third of leaf, incurved at apex; margins involute. *Inflorescences* subcapitulate, \pm ellipsoid. *Bracts* decussate, imbricate, sessile, appressed, ovate to obovate in outline, length \times depth (3.2–)4.0 \times 0.9(–1.6 mm); 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. *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, \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 \pm 0.6 mm and those of antisepalous whorl \pm 1.5 mm long; anthers \pm 0.8 \times 0.4 mm. *Ovary* \pm 2.1 \times 0.6 mm. *Fruit* an achene enveloped in beak-like, reddish, papyraceous hypanthium, fragmented at neck base; pericarp membranous and dry, \pm 2.3 \times 1.2 mm. Figure 4.

Nomenclatural notes: according to the concept of Wright (1915), *P. ericoides* is not only distributed along the southern coast of Western Cape (present interpretation), but also along the coast to Eastern Cape and further inland up to 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 first 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 m high, with the tips of the branches erect, whereas 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, recognizes 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 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. Studies

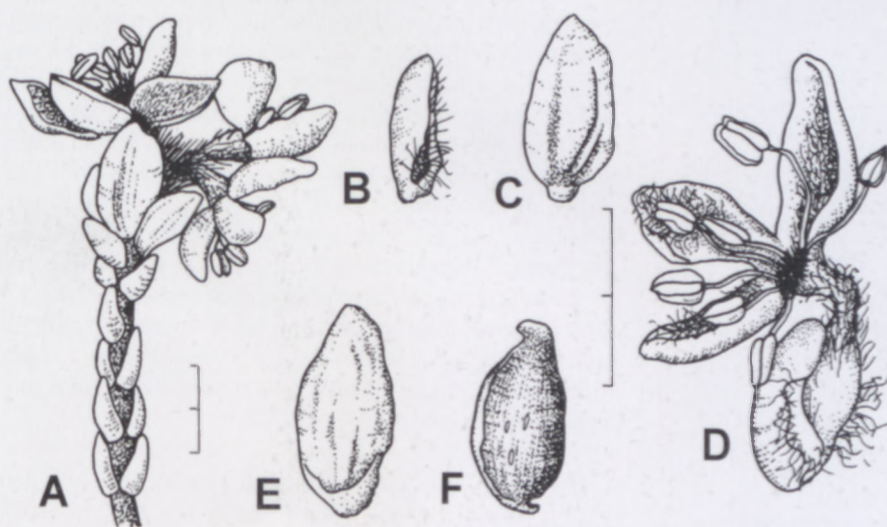


FIGURE 4.—*Passerina montana*, Bredenkamp 893. A, spike reduced, resembling terminal subcapitulate inflorescence; B, leaf; C, bract; D, flower clasped by bract. E, F, achene: E, enveloped by membranous pericarp; F, lateral view. Scale bars: 2 mm. Artist: A. Stadler.

of the leaf epidermis, anatomy and floral morphology (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 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 Limpopo [Northern Province], South Africa. It is distributed from Nyanga in Zimbabwe, along the escarpment to Manica and Sofala in Mozambique, Limpopo, Mpumalanga, Swaziland, KwaZulu-Natal, Free State, Lesotho and the Eastern Cape (Figure 5). 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 Limpopo, *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.

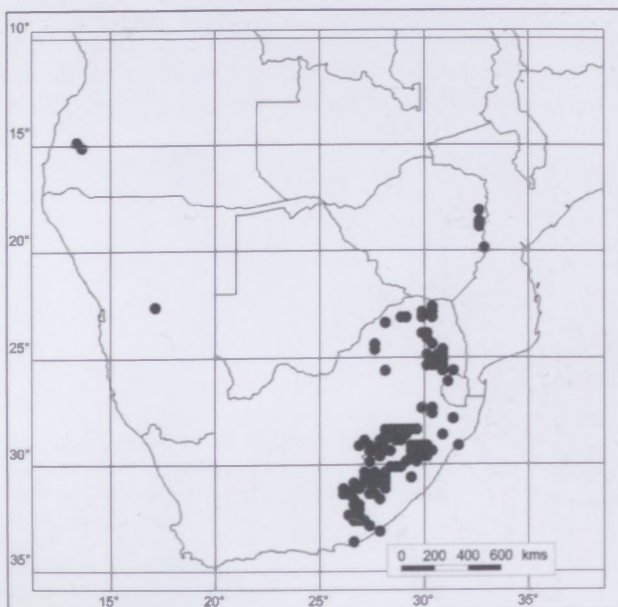


FIGURE 5.—Known distribution of *Passerina montana*.

This species grows at altitudes of (900–)1 200–3 000 m. At Nyanga, *P. montana* is associated with *Erica mannii* and *E. hexandra*, bordering on *Brachystegia* woodland and montane forest. In Mozambique and South Africa it has been found with *Widdringtonia nodiflora* 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 riverbeds 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).

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

P. tetragona Burch. MS. in Herb. Kew, non Steud. fide Thoday: 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 anti-sepalous whorl ± 1.5 mm long; anthers 0.5×0.3 mm, subbasifixed, 2-theous and 4-locular. *Ovary* $\pm 1.6 \times 0.6$ mm. *Fruit* an achene, pericarp membranous and dry, $\pm 2.5 \times 1.2$ 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 6.

Nomenclatural notes: although Thoday (1924a) cited *P. rigida* var. *comosa* Meisn. partly (ex MS. in Herb.

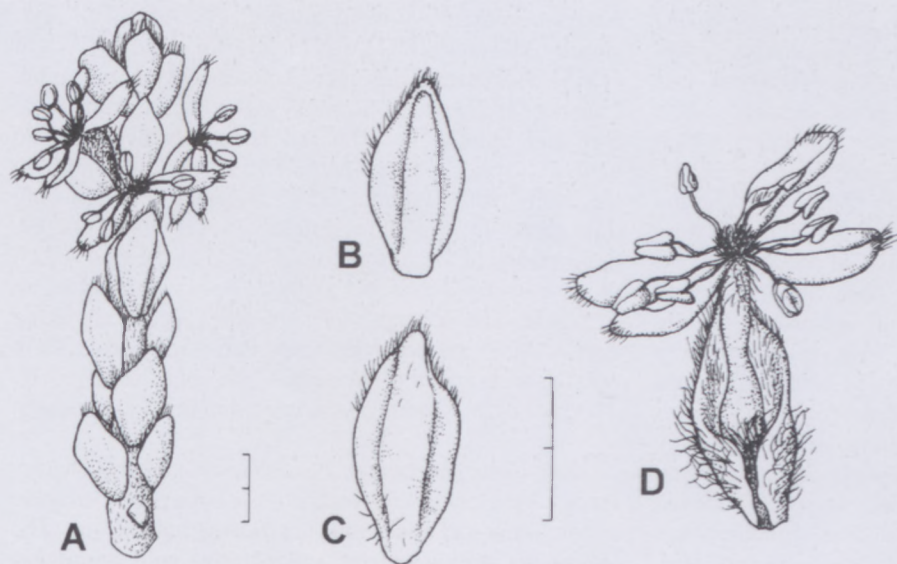


FIGURE 6.— *Passerina burchellii*, H. Bolus 687. A, flowering inflorescence; B, leaf; C, bract; D, flower clasped by bract. Scale bars: 2 mm. Artist: A. Stadler.

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 (Figure 7), 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.

Conservation status: Vulnerable (VU D2) (Victor 2002) because of small population size.

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.: 325 (1818); Meisn.: 401 (1840) pro parte minore; Steud.: 274 (1841); C.A.Mey.: 49 (1843); Meisn.: 562 (1857) pro parte minore; C.H.Wright: 12 (1915) pro parte; Thoday: 166 (1924a); Bond & Goldblatt: 432 (1984); Hilliard & B.L.Burt: 182 (1987); Goldblatt & Manning: 683 (2000). Type: *Passerina ericoides*, Linnean Herbarium 504.5 [LINN, lecto!., designated by Thoday: 148 (1924a)].

Chymococca empetroides Meisn.: 565 (1857); Harv.: 325 (1868); Bolus & Wolley-Dod: 315 (1904); C.H.Wright: 15 (1915); Thoday: 166 (1924a). *P. filiformis* L. var. *crassifolia* Eckl. & Zeyh. fide Meisn.: 565 (1857). Type: Eckl. & Zeyh. herb. no. 39 (G!, lecto., here designated; BOL!, MO!, P!, W!).

P. glomerata sensu Meisn.: 562 (1857), non Thunb.: 75 (1794). *Lachnaea conglomerata* L. sensu Meisn.: 562 (1857).

Low, rounded, many-stemmed shrublets, branching profusely on new growth, 0.3–1.2 m high, older branch-

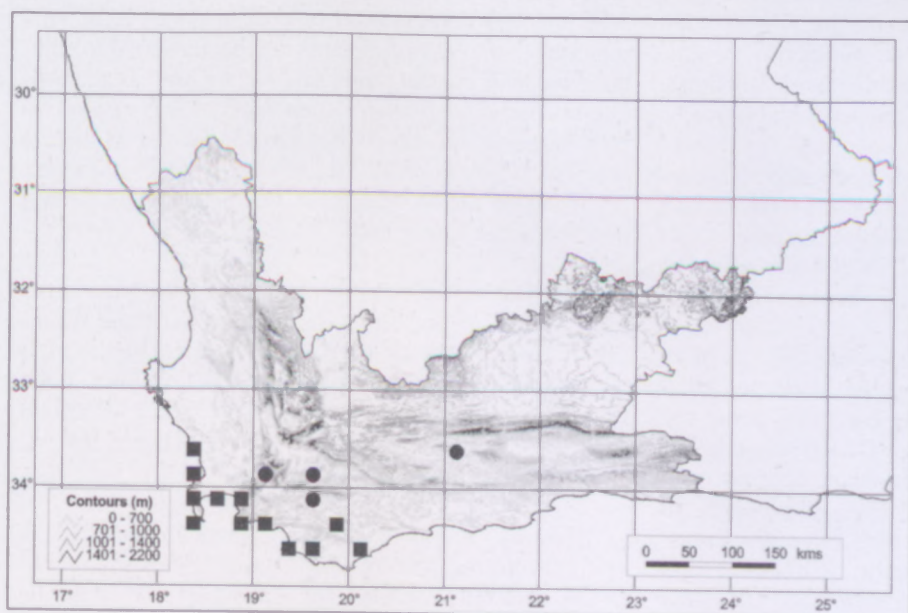


FIGURE 7.—Known distribution of *Passerina burchellii*, ●; *Passerina ericoides*, ■.

lets 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 $2.5\text{--}2.8 \times 0.6\text{--}0.7$ 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 $\pm 3.6 \times 1.5$ 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 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, $\pm 0.9 \times 0.7$ mm, subbasifixed, 2-thecous and 4-locular. *Ovary* $\pm 2.1 \times 1.7$ mm. *Fruit* a fleshy red berry, $\pm 5.3 \times 4$ mm, enveloped by persistent, loosely arranged hypanthium, fragmenting over widest circumference of fruit, the fragmented hypanthium, sepals and androecium being shed. *Seed* $\pm 2.9 \times 1.6$ mm.

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 Uppsala (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 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 (Figure 7). 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.

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: Lower Risk (LR-nt) (Victor 2002), 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.

7. *Passerina rigida* Wikstr. in Kungliga Svenska Vetenskapsakademiens Handlingar 39: 326 (1818); Meisn.: 402 (1840); Steud.: 274 (1841); Drège: 208 (1843); C.A.Mey.: 49 (1843); Meisn.: 563 (1857); C.H.Wright: 13 (1915); Thoday: 165 (1924a); Palmer & Pitman: 1585 (1972); Coates Palgrave: 649 (1977); Bond & Goldblatt: 433 (1984); A.E.van Wyk & P.van Wyk: 68 (1997). Type: Hab. ad Promont bonae spei [Cape Peninsula], Prof. Sparrman s.n., Herb. Thunb. 9578 (UPS, holo.!; M!, S!).

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

P. ericoides sensu Meisn.: 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 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 antisepalous whorl ± 1.5 mm long; anthers, $\pm 0.8 \times 0.4$ mm, sub-basifixed, 2-theous and 4-locular. Ovary 2.2 \times 1.4 mm. Fruit a fleshy yellow berry, $\pm 2.6 \times 2.3$ mm, enveloped by persistent, loosely arranged hypanthium, fragmenting over widest circumference of fruit, the fragmented hypanthium, sepals and androecium being shed. Seed $\pm 1.4 \times 1.1$ mm. Figure 8.

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 Staffleu & Cowan (1986), original specimens of the Thunberg Herbarium (to which Sparrman also contributed) were donated to UPS and the duplicates

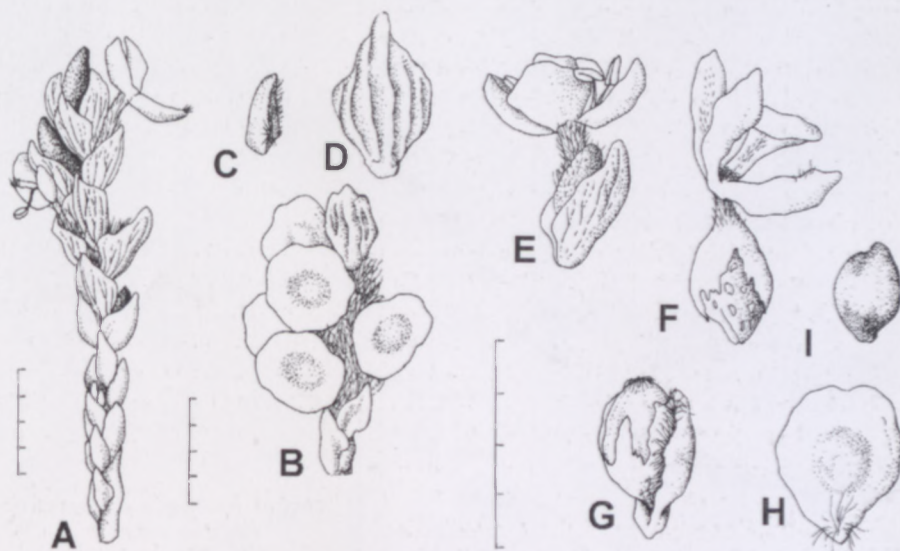


FIGURE 8.—*Passerina rigida*, Brendenkamp 1013. A, flowering inflorescence; B, fruiting inflorescence; C, leaf; D, bract; E, flower clasped by bract; F, hypanthium fragmenting at circumference of ovary. G, H, fruit; G, clasped in tomentum of bract; H, yellow, fleshy berry. I, seed. Scale bars: 4 mm. Artist: A. Stadler.

were sent to S. Thus three other *Sparman 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 Sparman specimens as isotypes.

Diagnostic characters and relationships: *Passerina rigida* is easily distinguished as a robust, rigid shrub, usually 1–2 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 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', *duinetaaibos* 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 (Figure 9). It is endemic to the coastlines of KwaZulu-Natal, Eastern Cape and 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.

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 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).

8. *Passerina nivicola* Bredenk. & A.E.van Wyk in *Bothalia* 32: 77 (2002c). Type: Western Cape, 3319 (Worcester): Ceres Dist., Waboomberg, 1 760 m, (-DD),

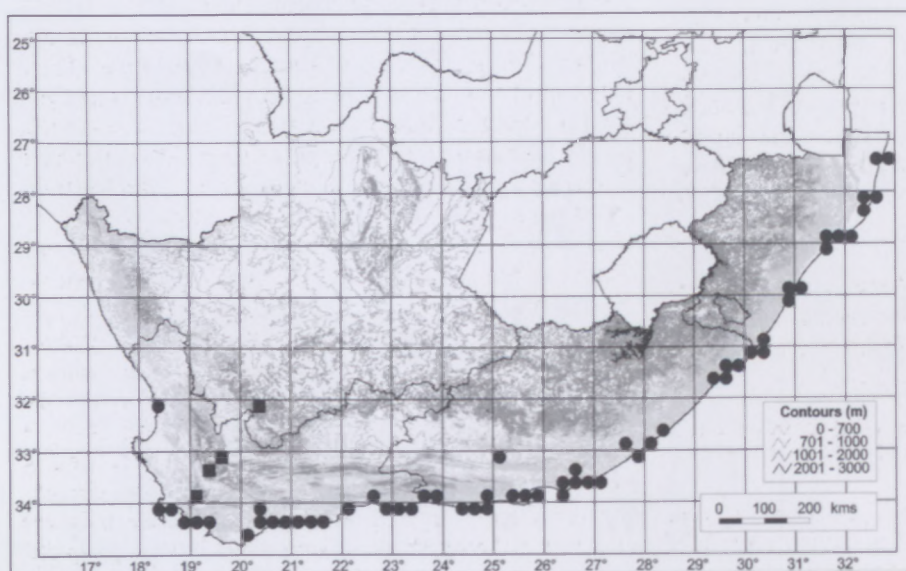


FIGURE 9.—Known distribution of *Passerina rigida*, ●; *P. nivicola*, ■.

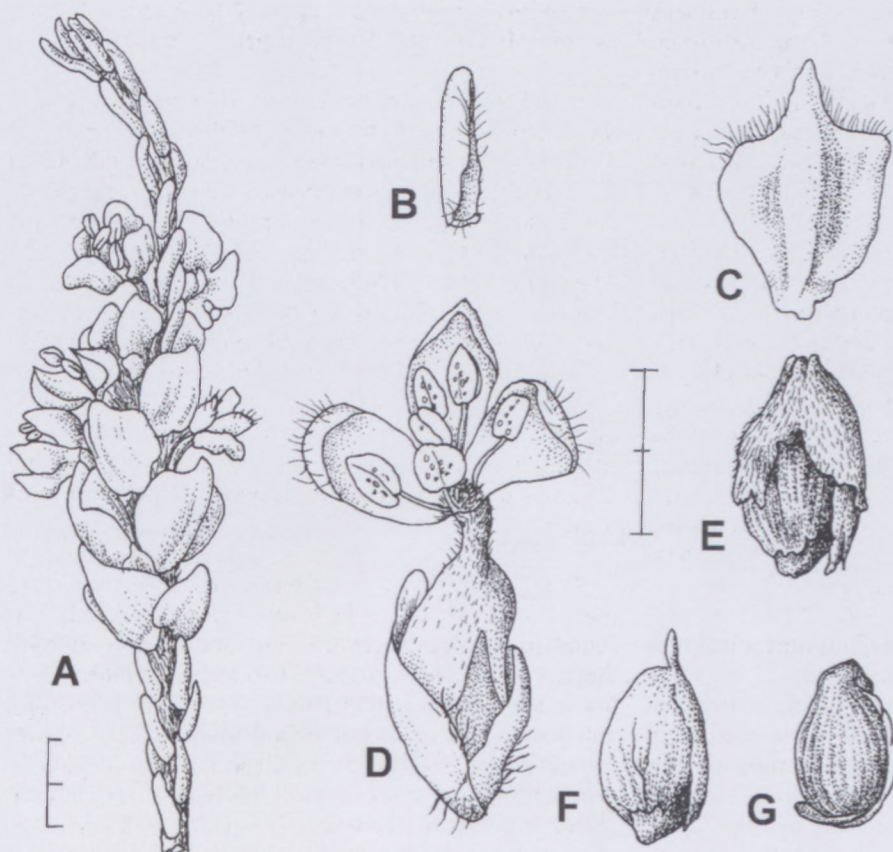


FIGURE 10.—*Passerina esterhuyseniae*, Esterhuysen 26859. A, inflorescence with apex growing out, returning to vegetative growth (proliferating growth); B, leaf; C, bract; D, flower clasped by bract showing fragmentation of hypanthium at circumference of fruit; E, fruit with remnants of hypanthium. F, G, achene: F, enveloped by membranous pericarp; G, lateral view. Scale bars: 2 mm. Artist: A. Stadler.

12 November 1989, E.G.H. Oliver 9281 (PRE!, holo.; NBG!, iso.).

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

For a complete description see Bredenkamp & Van Wyk in *Bothalia* 32: 76–79 (2002c). Distribution (Figure 9).

Conservation status: Lower Risk [LR-lc] (Victor 2002). This species is rare, but does not qualify for Red List status under IUCN (2000) guidelines.

9. *Passerina esterhuyseniae* Bredenk. & A.E.van Wyk, sp. nov., *P. comosae* C.H.Wright affinis. *Bractae* 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, \pm 1 167 m, 27-12-1956, Esterhuysen 26859 (BOL, holo.!).

Passerina sp. nov. 2 Bredenk. & A.E.van Wyk: 70 (2000); Bredenk. & A.E.van Wyk: 56 (2001a); Bredenk. & A.E.van Wyk: 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 sclerenchy-

ma fibres at scars. *Leaves* imbricate on young branchlets, closely appressed to stem, cymbiform, plane shape linear-lanceolate, length \times depth \pm 2.0 \times 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 \times depth \pm 3.1 \times 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, \pm 4.6 mm long. *Hypanthium* a membranous cylindrical tube, indumentum at ovary and neck tomentose, neck \pm 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 \pm 0.4 mm and those of antisepalous whorl \pm 1.2 mm long. *Ovary* \pm 1.8 \times 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, \pm 2.5 \times 1.2 mm. Figure 10.

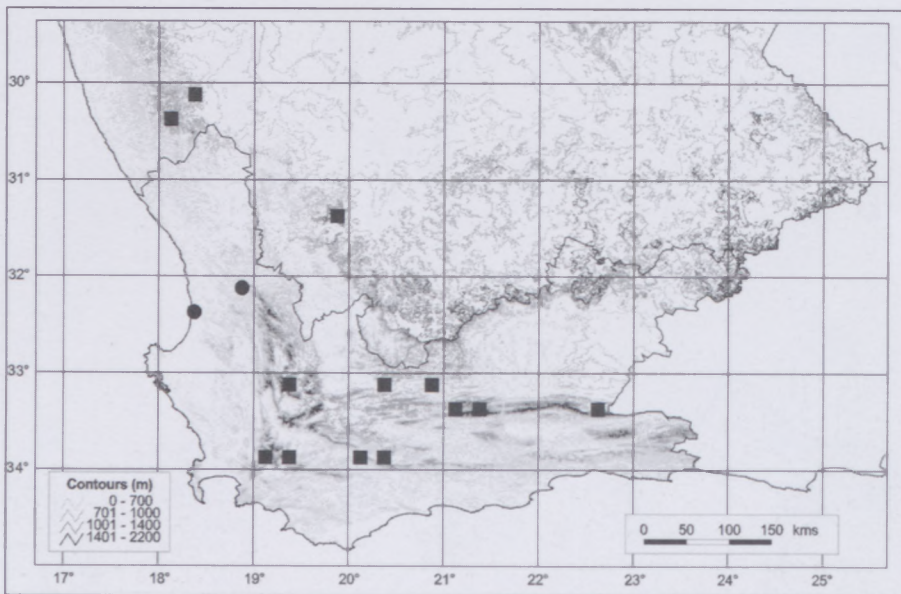


FIGURE 11.—Known distribution of *Passerina esterhuyseniae*, ●; *P. comosa*, ■.

Diagnostic characters and relationships: *Passerina esterhuyseniae* is easily 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 plants especially the high-mountain flora of the Northern, Western and Eastern Cape.

Distribution and ecology: *Passerina esterhuyseniae* has been collected on the northern Cederberg Mountains at Groenberg near Pakhuis and at Konpoort (Figure 11). 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 undercollected. *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.

Conservation status: Lower Risk (LR-lc) (Victor 2002), as the population size of this species is probably very small or restricted.

10. *Passerina comosa* (Meisn.) C.H.Wright in *Flora capensis* 5,2: 11 (1915); Thoday: 158 (1924a); Bond & Goldblatt: 432 (1984); Goldblatt & Manning: 683 (2000). Type: Little Namaqualand; Khamiesberg Range, between Pedros Kloof and Leliefontein, 3000–4000 ft., *Drège 2570* [K!, lecto., designated by Thoday: 388 (1924b); PRE!].

P. filiformis L. var. *comosa* Meisn.: 399 (1840); Meisn.: 562 (1857); C.H.Wright: 11 (1915); Thoday: 158 (1924a).

P. 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 0.7×0.4 mm, sub-basifixed, 2-theous and 4-locular. Ovary $\pm 2.7 \times 1$ mm. Fruit an achene with pericarp membranous and dry, $\pm 2.5 \times 1.2$ 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 12.

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), whereas *P. quadrifaria* is endemic to the Karoo Mountain and Southeastern Centres. Mor-

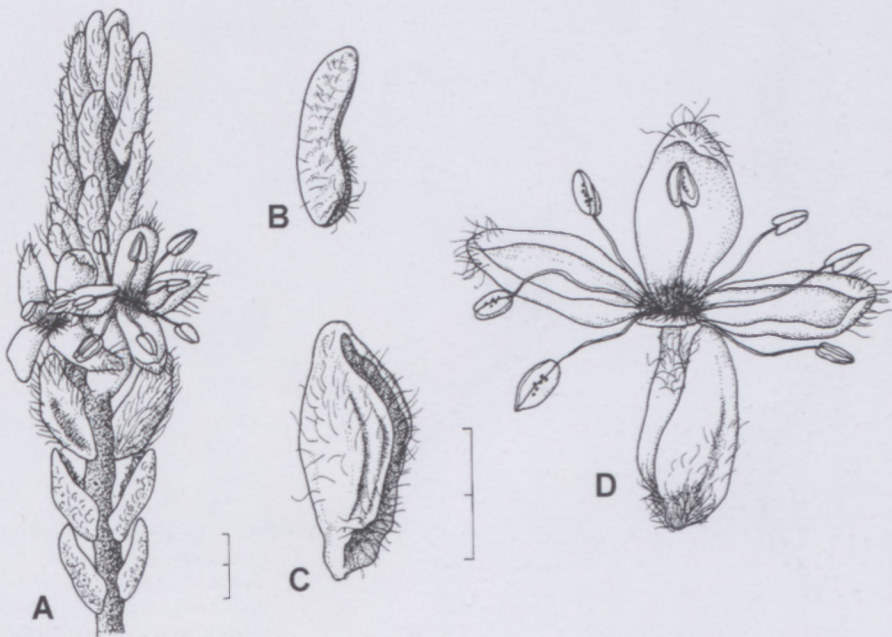


FIGURE 12.—*Passerina comosa*, *Andraea* 1288. A, inflorescence with apex growing out, returning to vegetative growth (proliferating growth); B, leaf; C, bract; D, flower clasped by bract. Scale bars: 2 mm. Artist: G. Condy.

phologically *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 (Figure 11). In 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.

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

11. *Passerina pendula* Eckl. & Zeyh. ex Thoday in *Bulletin of Miscellaneous Information*, Kew 4: 155 (1924a); Bond & Goldblatt: 433 (1984); Goldblatt & Manning: 684 (2000). *P. rigida* Wikstr. var. *comosa* Meisn.: 402 (1840); Drège: 584 (1847a); Meisn.: 563 (1857); C.H. Wright: 13 (1915) pro parte; Thoday: 155 (1924a). Type: Uitenhage Div., Zwartkops River, *Ecklon & Zeyher 7381* [K!], lecto., designated by Thoday: 387 (1924b); BREM!, P!, PRE!, WU!].

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

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 mm long; anthers $\pm 0.8 \times 0.4$ mm, sub-basifixed, 2-theous and 4-locular. *Ovary* $\pm 2.0 \times 0.7$ mm. *Fruit* an achene with pericarp membranous and dry, $\pm 2.5 \times 1.2$ 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 13.

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



FIGURE 13.—*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. Artist: G. Condy.

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 Western Cape to the Langkloof Mountains and the

Great Winterhoek Mountains in Eastern Cape (Figure 14). 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.

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

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

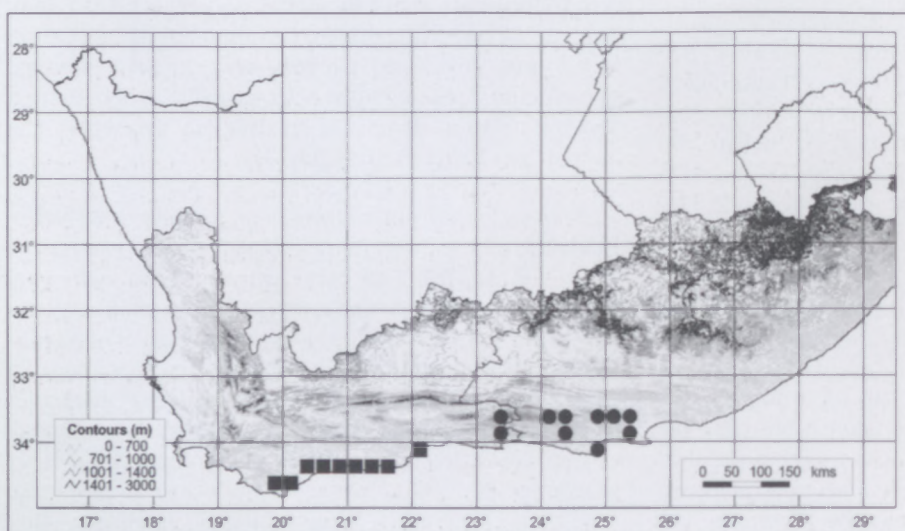


FIGURE 14.—Known distribution of *Passerina pendula*, ●; *P. galpinii*, ■.

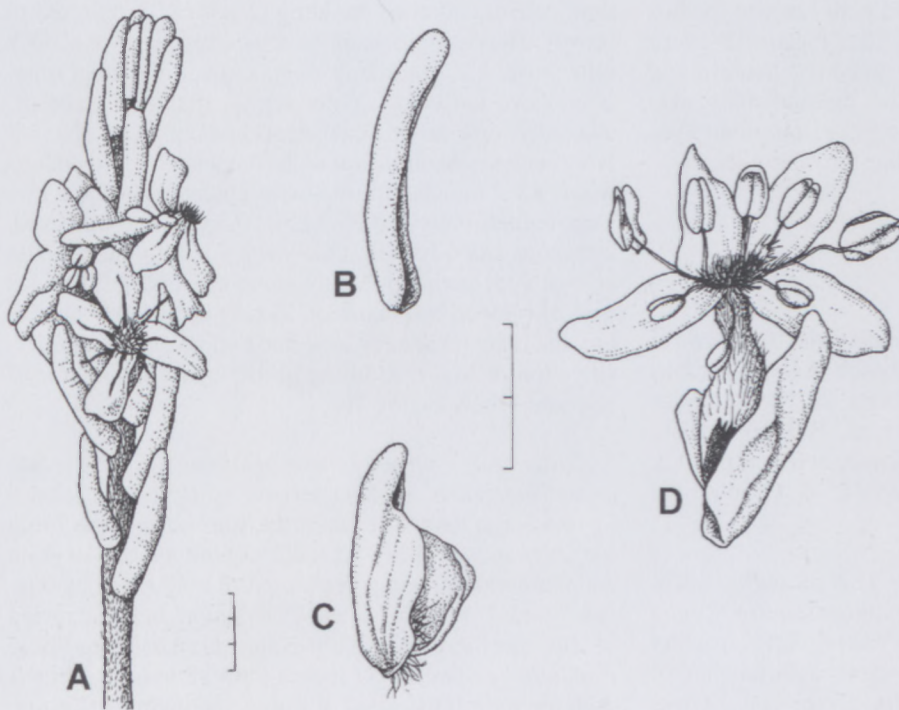


FIGURE 15.— *Passerina galpinii*, Bredenkamp 946. A, inflorescence with apex growing out, returning to vegetative growth (proliferating growth); B, leaf; C, bract; D, flower clasped by bract, hypanthium fragmenting at circumference of ovary. Scale bars: A, 3 mm; B–D, 2 mm. Artist: G. Condy.

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 \times depth 2.9–4.5 \times 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 \times depth (3.6–)4.5 \times 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* \pm 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, \pm 1 mm long. *Sepals*: outer sepals concave elliptic, glabrous, inner sepals obovate, abaxially glabrous, apex margin adaxially tomentose. *Androecium* with filaments of antipetalous whorl \pm 1.4 mm and those of antisepalous whorl \pm 2.1 mm long; anthers \pm 0.6 \times 0.5 mm, sub-basifixed, 2-theous and 4-locular. *Ovary* \pm 2.0 \times 1.1 mm. *Fruit* an achene with pericarp membranous and dry, \pm 2.5 \times 1.2 mm, enveloped by persistent, loosely arranged hypanthium, breaking up at circumference of ovary, resulting in the sepals and androecium being shed. Figure 15.

Nomenclatural notes: *Passerina galpinii* 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 pre-

requisite 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 organized 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 (Figure 14); it grows at altitudes of 0–290 m. Plants reach a height of \pm 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.

Passerina galpinii is associated with Laterite Fynbos (Rebello 1998), occurring on the Elim Flats of 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).

13. ***Passerina drakensbergensis* Hilliard & B.L.Burt** in *Annals of the Kirstenbosch Botanic Gardens* 15: 233 (1987); Hilliard & B.L.Burt: 88 (1988). Type: Natal [KwaZulu-Natal], Harrismith, Bergville Dist., Cathedral Peak Forest Reserve, Ndedema River, 6000 ft, 5 November 1985, Hilliard & Burt 18570 (E, holo.; K!, M!, P!, PRE!, S!).

Erect, many-stemmed shrubs, ± 2 m high, much-branched. *Stems* grey-brown; indumentum of young stems closely white-tomentose, flaking off on older branches, forming lengthwise patterns with patches of yellowish brown cork; leaf scars prominent. *Leaves* greyish green (glaucous), imbricate, overlapping $\pm 15\%$, appressed, plane shape linear to lanceolate, longitudinally folded and somewhat keeled, length \times depth (3.5–) 4.2–5.5(–6.5) \times 0.8–2 mm, adaxial surface concave, tomentose, abaxial surface slightly convex, rugose, glabrous; base sessile, abruptly narrowed; apex subacute, sometimes incurved; margins setose. *Inflorescences* with multiflowered main and co-florescences; spikes usually extended, 8–12-flowered, arrangement subterminal, axis white-tomentose, proliferating growth common. *Bracts* greyish green (glaucous), appressed, lanceolate, length \times depth 4.75–6.0(–7.0) \times 1.5 mm; lamina folded lengthwise and keeled, adaxially concave (inside), abaxially slightly convex (outside), villous inside, glabrous outside, coriaceous, obscurely ribbed and reticulately veined; base cuneate; apex obtuse to acute; margins sometimes narrowly membranous. *Floral envelope* ± 5.9 mm long; papyraceous and yellow-pink during pollina-

tion, dehydrated after shedding of pollen, turning red to brown. *Hypanthium* scantily tomentose at ovary, neck tomentose, ± 1.7 mm long. *Sepals*: outer and inner sepals concave lanceolate, outer sepals adaxially glabrous, abaxially tomentose; inner sepals adaxially and abaxially tomentose. *Androecium* with filaments of antipetalous whorl ± 1.2 mm and those of antisealous whorl ± 2 mm long; anthers oblong, 0.9(–1.25) \times 0.3 mm, sub-basifixed, 2-thecous and 4-locular. *Ovary* $\pm 2.4 \times 0.9$ mm. *Fruit* an achene with pericarp membranous and dry, $\pm 2.5 \times 1.2$ mm, enveloped by persistent, loosely arranged hypanthium, breaking up at neck base due to dehydration and torification of tissue, resulting in the sepals and androecium being shed. Figure 16.

Diagnostic characters and relationships: *Passerina drakensbergensis* is characterized by appressed leaves, up to 6.5 mm long. The bracts are lanceolate, up to 7 mm long, the apex is obtuse to acute without a leaf-like point and membranous wings are absent. It may easily be confused with *P. montivaga* and *P. montana*, both occurring in the northern KwaZulu-Natal Drakensberg area. *P. montivaga* has longer leaves (up to 8 mm) and bracts with the midrib extended, forming a straight or filiform, leaf-like point. The wings are ovate with margins hairy in the distal half, or obrullate, narrowing abruptly into the midrib. *P. montana* can be separated by its terminal subcapitulate spikes and short leaves (up to 4 mm long), which are linear to lanceolate, with a dilated base and with a prominent median vein in the upper third of the leaf, incurved at the acute apex. The bracts are ovate to obovate in outline.

Passerina montivaga is a fynbos element which possibly originated in the southern Cape and dispersed eastwards. Both this species and *P. montana* are distributed from Eastern Cape via the Drakensberg Mountains northwards to Zimbabwe. Although the distribution of *P. drakensbergensis*, *P. montivaga* and *P. montana* overlap in the northern part of the KwaZulu-Natal Drakensberg, significant trends in the geographical and altitudinal ranges of these species have been identified.

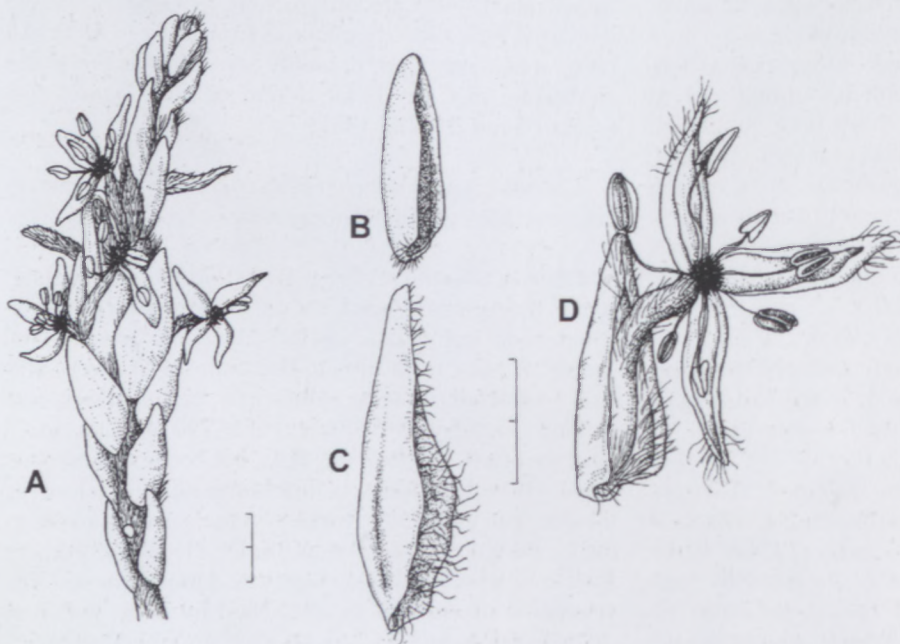


FIGURE 16.— *Passerina drakensbergensis*, Bredenkamp 1021. A, inflorescence with apex growing out, returning to vegetative growth (proliferating growth); B, leaf; C, bract; D, flower clasped by bract. Scale bars: 2 mm. Artist: G. Condy.

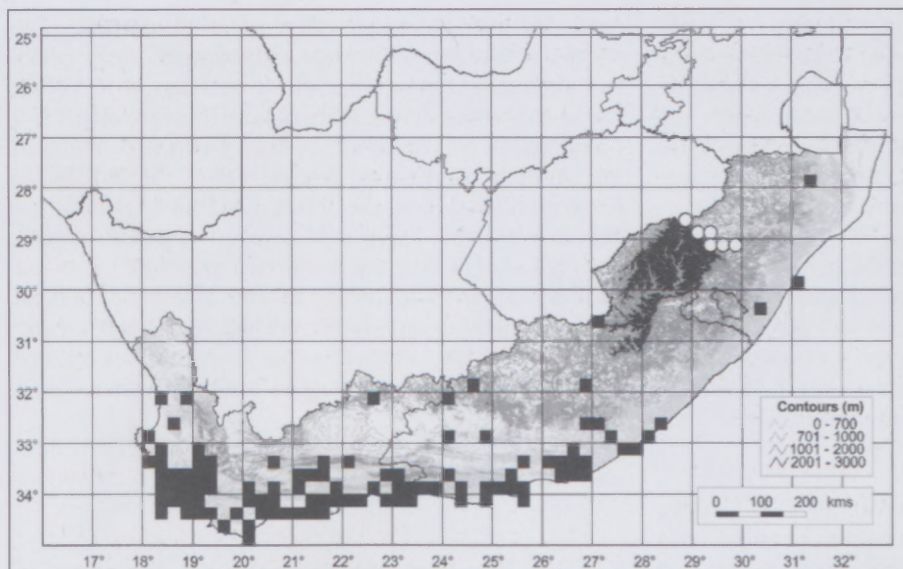


FIGURE 17.—Known distribution of *Passerina drakensbergensis*, O; *P. corymbosa*, ■.

Etymology: the specific epithet refers to the location of this species in the northern KwaZulu-Natal Drakensberg.

Distribution and ecology: *Passerina drakensbergensis* is endemic to the Bergville District in the northern KwaZulu-Natal Drakensberg (Figure 17). It has been collected from the Royal Natal National Park to Giant's Castle Game Reserve at altitudes between 1 500 and 1 980 m. It is frequent at Cathedral Peak above Ndedema Gorge, where it is found in a marginal belt between forest and grassland. It also grows along streams and riverbanks and on mountain slopes.

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

14. *Passerina corymbosa* Eckl. ex C.H.Wright in *Flora capensis* 5,2: 14 (1915); Thoday: 162 (1924a). Type: Cape [Western Cape], Bredasdorp, Zwelldam, Pupas Valley, Voormansbosch and Duivelsbosch, Keurboomsrivier, October, *Ecklon & Zeyher* 40 (70.10) (B, holo.†; W!, lecto., here designated; MO!, S!).

P. filiformis L. var. *vulgaris* Meisn.: 399 (1840); Meisn.: 562 (1857); Drège: 87 (1843). *P. vulgaris* (Meisn.) Thoday: 162 (1924a); Bond & Goldblatt: 433 (1984); Goldblatt & Manning: 684 (2000). Type: locis subhumidis secus rivulum, prope Paarlberg, alt. 1000–1500 ped. [subhumid locality along river, near Paarlberg, alt. 1000–1500 ft], Nov.–Dec. 1839, *Drège s.n.* [K, lecto., designated by Thoday: 388 (1924b); S!, W!].

P. filiformis sensu C.H.Wright: 11 (1915) pro parte, non L.

Much-branched shrubs, (0.3–)1.0–1.5(–2.5) m high, younger branchlets leafy, older ones leafless, often arcuate, indurate. *Stems* often arising from a woody, underground rootstock, greyish brown; indumentum of young stems closely whitish tomentose, forming lengthwise patterns with cork on older branches, which gradually become glabrous; cork fissured lengthwise, with sclerenchyma fibres protruding between fissures; leaf scars oblate. *Leaves* greyish green, drying greyish brown, ascending, diverging at an angle of $\pm 40^\circ$, imbricate, overlapping up to 50%, laterally compressed, plane shape linear to narrowly lanceolate, length \times depth (2.0–)3.2–4.4

(–10.0) \times 0.5–0.8 mm, adaxial surface concave, tomentose, abaxial surface glabrous; lamina longitudinally folded, midrib distinct and somewhat keeled, with 2 or more lateral veins visible as faint striae when fresh, base sessile; apex tapered or acute; margins glabrous, involute. *Inflorescences* with multiflowered main and co-florencescences; spikes usually extended, 10–16-flowered, arrangement subterminal, axis white-tomentose, proliferating growth common. *Bracts* greyish green, ascending, rhombic to obtrullate, distinctly angled, length \times depth (4.4–)5.1 \times 1.4(–1.7) mm; lamina folded lengthwise and keeled, adaxially concave (inside), abaxially slightly convex (outside), shortly villous inside, glabrous outside, coriaceous; wings coriaceous, distinctly 4- or 5-ribbed; base cuneate; midrib shortly extended into an acute apex; margins glabrous, involute. *Floral envelope* ± 6.2 mm long, papyraceous and yellow-pink during pollination, dehydrated after shedding of pollen, turning red to brown. *Hypanthium* glabrous at ovary, neck scantily tomentose, ± 1.6 mm long. *Sepals*: outer sepals cymbiform, inner sepals obovate, outer and inner sepals adaxially scantily tomentose, abaxially glabrous. *Androecium* with filaments of antipetalous whorl ± 0.7 mm and those of antisepalous whorl ± 1.4 mm long; anthers ovoid, $\pm 0.9 \times 0.4$ mm, sub-basifixed, 2-thecous and 4-locular. *Ovary* $\pm 2.1 \times 1.1$ mm. *Fruit* an achene with pericarp membranous and dry, $\pm 2.6 \times 1.5$ 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.

Diagnostic characters and relationships: *Passerina corymbosa* is distinguished by its greyish green leaves and grey-brown stems of which the older branchlets are leafless, often arcuate and indurate. The leaves are laterally compressed with the distinct midrib somewhat keeled. The rhombic to obtrullate (diamond-shaped) bracts are always conspicuously angled and distinctly 4- or 5-ribbed. The most diagnostic character in the leaf anatomy of *P. corymbosa* is the presence of a hypodermal sclerenchymatous sheath, illustrated by Bredenkamp & Van Wyk (2001a). This species has always been confused with *P. filiformis sensu lato*, which has inconsistently been distinguished by longer, filiform leaves. In Western Cape *P. filiformis* subsp. *filiformis* is separated

by widely obovate bracts, narrowing abruptly into a filiform point. Where the distribution of *P. corymbosa* and *P. montivaga* overlap in the southern Cape, the latter species is distinguished by bracts with ovate wings and margins that are hairy in the distal half. In Eastern Cape *P. montivaga* is distinguished by obtrullate bracts narrowing abruptly into a straight, leaf-like point.

Etymology: of all the species in the genus, *Passerina corymbosa* is the most common, as it is adapted to a wide range of habitats mostly in Western and Eastern Cape. The specific Latin epithet *corymbosa* (= with a cluster of flowers or of fruits) indicates the 10–16-flowered, extended spikes usually arranged in multiflowered main and co-florescences.

Common names: according to Van Wyk & Gericke (2000), *P. corymbosa* (formerly known as *P. vulgaris*) is also called *bakkersbos*, a name that commemorates an era when the official bakers in the Cape used this plant to heat up their outdoor ovens.

Uses: from an agricultural point of view, Story (1952) described *P. corymbosa* at Keiskammahoek as an unpalatable bush, which remained undamaged from grazing, among the few closely cropped specimens of *Cliffortia linearifolia* and *C. paucistaminea*. However, the value of *P. corymbosa* as a pioneer, and also in combatting erosion, cannot be underestimated. This species is commonly found along roadsides and in other disturbed places. It is one of the most successful species for the rehabilitation of embankments along newly built roads in Western and Eastern Cape. The plants are resprouters from woody, underground rootstocks and are excellent sand binders, often found on coastal sand dunes. Considering the human impact and invasion of alien vegetation along the Cape coast, *P. corymbosa* would be a natural pioneer, combatting erosion in areas where alien vegetation is cleared.

Distribution and ecology: except for a few outliers, *P. corymbosa* is endemic to Western and Eastern Cape, and all the phytogeographic centres within the CFR. Although this species is distributed from Clanwilliam to Cape Town and eastwards to East London, it most commonly occurs in an area between the coast and the 33°S latitude and from 18° to 29°E longitude (Figure 17). *Gerstner 105* (PRE), collected near Compasberg in the Lady Grey District, represents the most northerly distribution of *P. corymbosa* in Eastern Cape. The specimens collected in KwaZulu-Natal are regarded as outliers, representing remnants of a former wider distribution. *Hilliard 4081* (PRE), collected at the Ellesmere Farm in Ngome (KwaZulu-Natal), is an anomalous specimen, with a greyish appearance, infected by fungi and recorded from cliff faces. This specimen was classified as *P. corymbosa* on the basis of the angular bracts and the leaves that are laterally compressed. The other two specimens, *Herb. Poeppig s.n.*, probably collected before 1868, and *Rudatis 1204* (PRE), collected in 1910, represent populations that have possibly succumbed to human impact.

Passerina corymbosa is a species with a wide habitat spectrum. It most commonly occurs as a pioneer along

roadsides over the whole range of its distribution. The species is found in stony areas on mountain slopes, peaks and mountain passes. Along the coastal region, it is often found on the rear dunes. It also grows in river valleys and on the banks of river mouths. This species is common in the whole of the Fynbos Biome of the CFR. In Eastern Cape it is found in all the above-mentioned habitats, but also in grassland. Story (1952) reported that *P. corymbosa* is found in sourveld and mixed grassveld but that it showed no sign of advancing into the sweetveld. In open grassland this species is often clustered along stream-banks or on rocky areas. *P. corymbosa* occurs at a range of altitudes, from sea level up to 1 300 m.

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

15. *Passerina obtusifolia* Thoday in Bulletin of Miscellaneous Information, Kew 4:157 (1924a); Bond & Goldblatt: 433 (1984); Goldblatt & Manning: 683 (2000). Type: Cape [Western Cape], Worcester Div., between Osplaats and Tunnel Sidings 2000–3000 ft., *Rogers 16703* [K!], lecto., designated by Thoday: 388 (1924b)].

Erect shrubs with several fairly stout stems, bare at base, branching profusely higher up, (0.3–)0.8–1.8(–2.4) m high. *Stems* ash-grey; indumentum of young stems whitish tomentose, flaking off, becoming scabrid on older branchlets and forming lengthwise patterns with cork, which fissures lengthwise; sclerenchyma fibres protruding between fissures; leaf scars oblate. *Leaves* greyish green, imbricate, spreading at an angle of 45°, plane shape linear, straight or incurved, length × depth 4.0–8.0(–12.0) × 0.9–1.5 mm, adaxial surface concave, comose, abaxial surface convex, coriaceous, glabrous; base sessile; apex obtuse; margins glabrous, involute. *Inflorescences* with multiflowered main and co-florescences; spikes usually extended, 8–16-flowered, arrangement terminal, axis whitish tomentose, proliferating growth common. *Bracts* spreading, narrowly obtrullate, length × depth (4.0–)5.8 × 1.5(–1.7) mm; lamina greyish green, adaxially concave (inside), abaxially convex (outside), coriaceous, glabrous outside, tomentose inside, closely 2-ribbed at margins, midrib extending beyond lamina into a leaf-like point, apex obtuse; wings absent; base cuneate; margins glabrous, involute. *Floral envelope* ± 6.8 mm long, papyraceous and yellow-pink during pollination, dehydrated after shedding of pollen, turning red to brown. *Hypanthium* glabrous at ovary, neck tomentose, ± 1.8 mm long. *Sepals*: with outer sepals cymbiform, adaxially tomentose, abaxially glabrous; inner sepals narrowly oblong, adaxially tomentose, abaxially glabrous. *Androecium* with filaments of antipetalous whorl ± 1.2 mm and those of antiseptalous whorl ± 2.2 mm long; anthers ± 1.1 × 0.5 mm, sub-basifixed, 2-theous and 4-locular. *Ovary* ± 2.5 × 1.1 mm. *Fruit* an achene with pericarp membranous and dry, ± 2.3 × 1.2 mm, enveloped by persistent, loosely arranged hypanthium, breaking up at circumference of ovary, resulting in sepals and androecium being shed. Figure 18.

Diagnostic characters and relationships: the growth form of *P. obtusifolia* may easily be confused with that of *P. corymbosa*, but *P. obtusifolia* is distinguished by

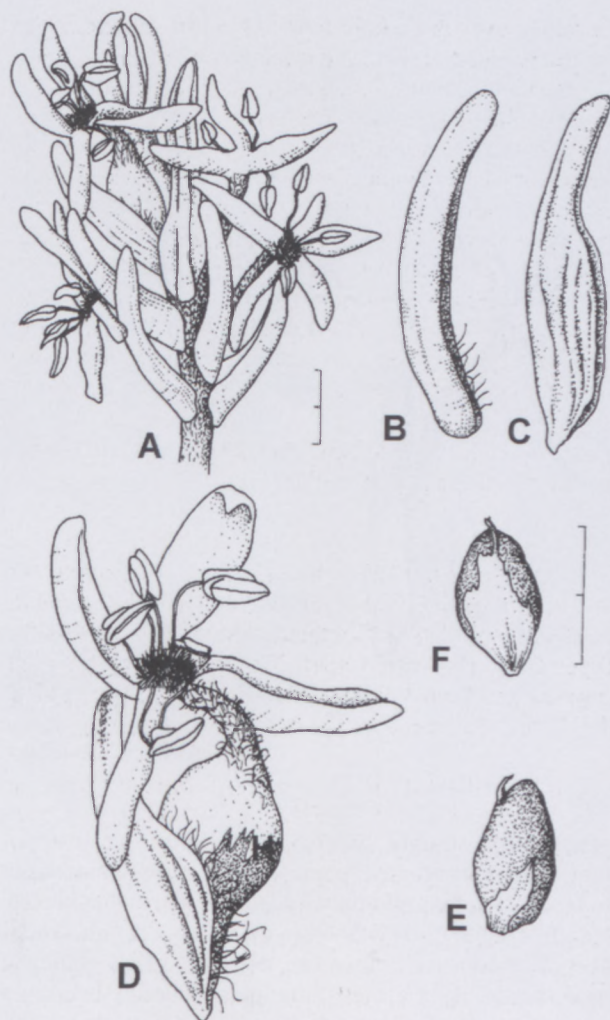


FIGURE 18.—*Passerina obtusifolia*, Bredenkamp 919. A, flowering inflorescence; B, leaf; C, bract; D, flower clasped by bract, fragmenting at circumference of ovary. E, F, achene: E, lateral view, with basal fragment of membranous pericarp; F, ventral view, with remnant of membranous pericarp. Scale bars: 2 mm. Artist: G. Condy.

the spreading, linear, incurved leaves, with obtuse apices. The bracts are narrowly obtrullate, with the midrib extending beyond the lamina into a leaf-like point and the lamina is closely 2-ribbed at the margins. Intermediate forms between *P. obtusifolia* and *P. truncata*

ta subsp. *truncata* are found in the Karoo Desert National Botanical Garden at Worcester. *P. obtusifolia* usually occurs on the northern side of the southern Cape mountain ranges in drier habitats and *P. falcifolia* is confined to the summits of mountains and southwards towards the southern Cape coast. Intermediates between *P. obtusifolia* and *P. falcifolia* have been found on the boundary between the two species, just north of the Prince Albert Pass.

Etymology: the Latin specific epithet, *obtusifolia*, refers to the obtuse apices of leaves and bracts, which are characteristic of this species.

Common name: the vernacular name *karoo gonna* is used by the local people at Genadendal.

Uses: according to the curator at the Museum in Genadendal, *P. obtusifolia* was traditionally used by the local people in the home industry of soap-making. The plants were burnt and the alkaline ashes used to react with the stearic acid in fat at boiling point, thus forming soap. In the Robertson area these plants are used in the wild flower industry. *Bayliss 521* (PRE) is a voucher specimen recorded in cancer research, but the results must have been negative; these plants are not currently known for their medicinal value.

Distribution and ecology: *Passerina obtusifolia* is endemic to Northern, Western and Eastern Cape (Figure 19). It is centred in a belt between 33° and 34°S latitude and from 19° to 27°E longitude, comprising all the centres within the CFR—it is most common in the Karoo Mountain, Langeberg and Southeast Centres. *P. obtusifolia* is distributed from Worcester in Western Cape, to Grahamstown in Eastern Cape. The most northwesterly distribution are the Vanrhyn's Pass and the Hantamberg. The Karoo National Park and the Nuweveld Mountains in the Beaufort West District and the Lootsberg Pass at Middelburg are the most northerly distribution in Western and Eastern Cape. *Hilliard & Burt 14654* and *Acocks 20170* from the Lady Grey District are considered as outliers.

Passerina obtusifolia is well adapted to drier karoo habitats and is often found on the north-facing aspect of mountains in the southern Cape. It frequents the bound-

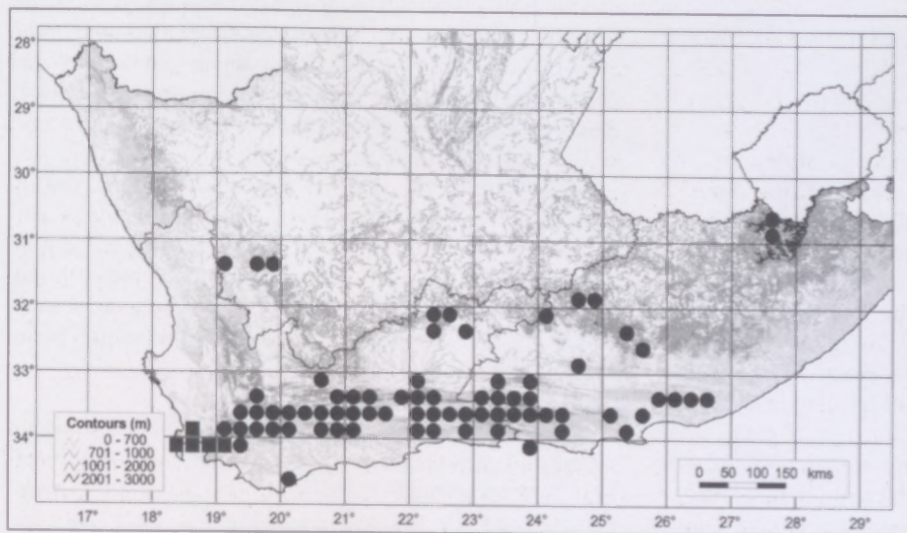


FIGURE 19.—Known distribution of *Passerina obtusifolia*, ●; *P. paludosa*, ■.

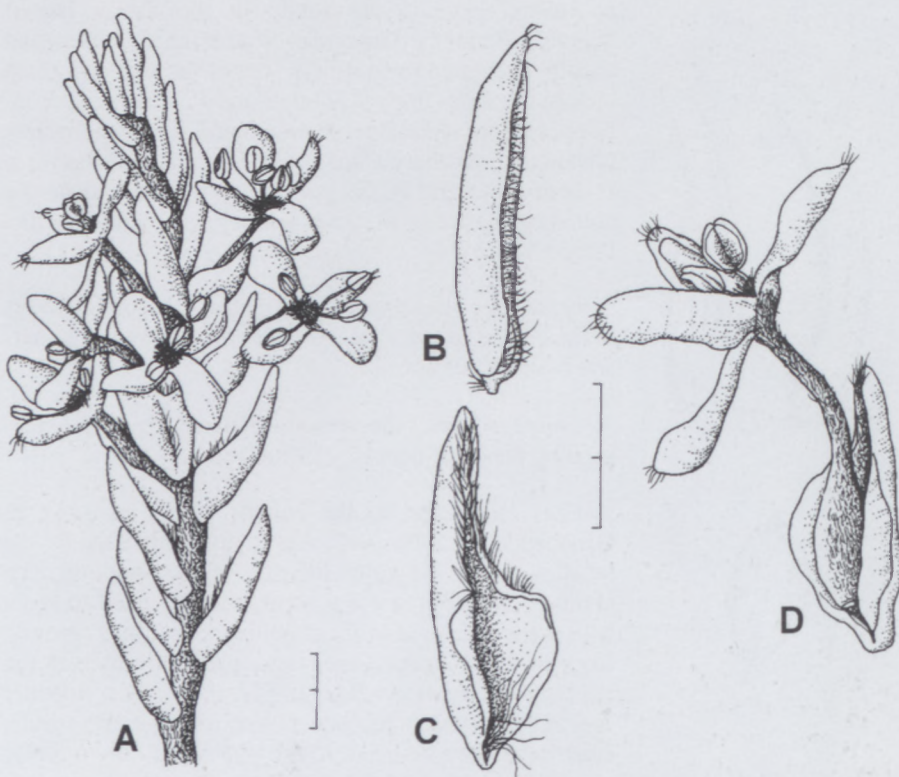


FIGURE 20.—*Passerina paludosa*, Jangle 156. A, inflorescence with apex growing out, returning to vegetative growth (proliferating growth); B, leaf; C, bract; D, flower clasped by bract. Scale bars: 2 mm. Artist: G. Condy.

ary of fynbos and karroid vegetation and is common in the Little Karoo, growing at altitudes of (300–)670–1 400 (–1 700) m. Although this species occurs at high altitudes on the summit of the Swartberg Pass, it grows below the snow line and does not occur on the highest peaks of mountain ranges in its distribution range. It is common in drier mountainous habitats, growing in shallow rocky soil and between rocks on well-drained slopes. It also grows amongst sandstone boulders of upper mountain slopes and on stony ridges of mountain tops. On the Hantamberg it has been recorded in renosterveld on the flat, rocky, dolerite summit. On Jonaskop it grows in a zone below the fynbos and is absent at the summit. This species is also found amongst rocks in river valleys and dry streambanks. The average height of these plants is 0.8–1.8 m, but stunted forms have been recorded from the arid Bergkwagga National Park, which is one of the most northeasterly localities. *P. obtusifolia* is a very common species and amongst the dominant species within its distribution range.

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

16. *Passerina paludosa* Thoday in Bulletin of Miscellaneous Information, Kew 4: 161 (1924a); Bond & Goldblatt: 433 (1984); Goldblatt & Manning: 683 (2000). Types: Cape [Western Cape], Simonstown, Cape Flats, Riet Valley, in and near shallow vleis, November 1922, Thoday 100 [K!, lecto., designated by Thoday: 388 (1924b); C!, NBG!, PRE!].

Much-branched shrubs or small tree, up to 2 m high. *Stems* fawn-coloured; indumentum of young stems closely white-tomentose, forming lengthwise patterns with cork on older branches, which gradually become glabrous; leaf scars oblate, comose at upper rim. *Leaves*

erect, nearly straight, greyish green, imbricate, overlapping $\pm 25\%$, appressed, plane shape narrowly lanceolate to lanceolate, longitudinally folded and somewhat keeled, length \times depth (3.0–)5.5–6.8(–10) \times 0.8–1.4 mm, adaxial surface concave, tomentose, abaxial surface glabrous; base sessile; apex acute, sometimes incurved, bearing a persistent tuft of white, erect hairs; margins setose. *Inflorescences* with multiflowered main and co-florescences; spikes usually extended, 10–12-flowered, arrangement subterminal, axis white-tomentose, proliferating growth common. *Bracts* greyish green, appressed, narrowly obovate with leaf-like point, length \times depth (5.2–)7.0 \times 1.8(–2.0) mm; lamina folded lengthwise and keeled, adaxially concave (inside), abaxially slightly convex (outside), basally setose inside, glabrous outside, coriaceous, ± 2 -ribbed; wings membranous with obscure venation, glabrous; base cuneate; apex acute; margins white setose. *Floral envelope* ± 7.2 mm long, papery and yellow-pink during pollination, dehydrated after shedding of pollen, turning red to brown. *Hypanthium* shortly tomentose at ovary, neck strigose, ± 2.6 mm long. *Sepals*: outer sepals cymbiform, ad- and abaxially glabrous, apex setose; inner sepals oblong, ad- and abaxially glabrous, apex setose with margins tomentose. *Androecium* with filaments of antipetalous whorl ± 1.2 mm and those of antisepalous whorl ± 2.4 mm long; anthers ovoid, $\pm 0.7 \times 0.5$ mm, sub-basifixed, 2-theous and 4-locular. *Ovary* $\pm 2.3 \times 1$ mm. *Fruit* an achene with pericarp membranous and dry, $\pm 2.4 \times 1.2$ 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 20.

Diagnostic characters and relationships: *Passerina paludosa* is a stout shrub up to 2 m high, occurring mostly in marshy ground on lowland flats. It is characterized by erect, nearly straight, greyish green, imbricate, ap-

pressed leaves, which are \pm lanceolate. The bracts are narrowly obovate, with the midrib and leaf-like point stout and the apex acute. This species is distinguished from *P. filiformis* subsp. *filiformis* which has filiform leaves and widely obovate bracts, which narrow abruptly into a filiform point.

Etymology: the specific epithet *paludosa* refers to the habitat of this species, namely marshy lowland flats; from the Latin *paludosus* (= marshy, swampy or boggy).

Distribution and ecology: *Passerina paludosa* is endemic to the Southwestern Centre within the CFR (Figure 19). Herbarium specimens dated from 1921 to 1995 show that this species used to be distributed from sandy places along the Malmesbury Road (*Acocks* 2482), along marshy areas of the Cape Flats and the Stellenbosch District to the Palmiet River at Elgin, the most easterly locality. As *P. paludosa* was severely affected by urbanization and invasion by alien vegetation in the Cape Peninsula, it is currently confined to small marshy areas east of Muizenberg.

According to Smuts (1996) the only three extant populations known, are at the Rondevlei Nature Reserve, Zeekoevlei and along the Strandfontein Road. Label information on *Peterson* 1263, collected in 1982, states that the population at a housing estate site SE of Zeekoevlei consisted of \pm 400 plants, but Smuts (1966) reported only 60 living plants. At the same time the population at Rondevlei consisted of 35 plants and the one along the Strandfontein Road of possibly a few hundred. Currently both the Zeekoevlei and Strandfontein sites are in danger of urban development and are being threatened by invasive alien vegetation, primarily Port Jackson (*Acacia saligna*) and rooikrans (*A. cyclops*). Conservation measures proposed by Smuts (1996) include an environmental impact study at the Zeekoevlei site prior to any development and a plea for urgent attention by conservation authorities to ensure the conservation of the Strandfontein population.

The Rondevlei Nature Reserve boasts more than 250 plant species of which many are rare and endangered. Species associated with *P. paludosa* include *Chondropetalum nudum*, *Juncus kraussii* and *Leucadendron levisanus*. In recent years the management at the reserve concentrated on restoring and managing its biodiversity. Alien vegetation has been cleared, plant species that occurred there historically have been re-introduced and *P. paludosa* has been successfully propagated by cuttings to expand the population. As aridification is an important effect of urbanization and as alien vegetation impacts on the natural drainage system of an area, the whole wetland east of Muizenberg can be conserved only if it is included in the Rondevlei Nature Reserve (Smuts 1996).

Recently two new populations of plants, that appear to be *P. paludosa*, were collected at Springfontein Farm near Stanford [3419AD, *Louw* 7083 (NBG, PRE)], and in seasonally wet clays at Heidehof, 5 km NW of Pearly Beach [3419CB, *Helme* 2376 (NBG, PRE)]. These specimens were not included in the distribution of *P. paludosa* as further population studies need to be done. Taking

urbanization and invasion by alien vegetation into account, the Red List status of *P. paludosa* was also not changed.

Conservation status: Vulnerable, [VU B1B2abcd] (Victor 2002).

17. *Passerina montivaga* Bredenk. & A.E.van Wyk in *Bothalia* 32: 34 (2002d). Type: Natal [KwaZulu-Natal], 2930 (Pietermaritzburg): hills above Pinetown, 2400 ft, (-DD), 3 December 1891, *J.M.Wood* in *PRE* 49409 (PRE!, holo.; MO!).

P. montivagus Bredenk. & A.E.van Wyk: 34 (2002d), sphalm.

P. filiformis L.: 559 (1753) pro parte, excluding type; Thunb.: 75 (1794); Wikstr.: 324 (1818); Thunb.: 374 (1825a); Meisn.: 562 (1857); C.H.Wright: 10 (1915); Thoday: 159 (1924a); Bond & Goldblatt: 432 (1984); Hilliard & B.L.Burt: 182 (1987); Goldblatt & Manning: 683 (2000).

Passerina sp. nov. 4 Bredenk. & A.E.van Wyk: 70 (2000); Bredenk. & A.E.van Wyk: 56 (2001a); Bredenk. & A.E.van Wyk: 217 (2001b).

For a complete description see Bredenkamp & Van Wyk in *Bothalia* 32: 34 (2002d).

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

18. *Passerina filiformis* L. in *Species plantarum*: 559 (1753); Thunb.: 75 (1794); J.C.Wendl.: 18 (1798); Wikstr.: 324 (1818); Thunb.: 374 (1825a); Meisn.: 562 (1857); C.H.Wright: 10 (1915); Thoday: 159 (1924a); Palmer & Pitman: 1587 (1972); Coates Palgrave: 648 (1977); Bond & Goldblatt: 432 (1984); Hilliard & B.L.Burt: 182 (1987); A.E.van Wyk & P.van Wyk: 68 (1997); Goldblatt & Manning: 683 (2000). Bredenk. & A.E.van Wyk 32: 29 (2002d). Type: *Passerina filiformis*, *Linnean Herbarium* 504.1 [LINN, lecto!., designated by Thoday: 388 (1924b)].

P. cupressina J.C.Wendl. nom. nud. Meisn.: 404 (1840); Meisn.: 563 (1857); Thoday: 159 (1924a). *P. cupressoides* Steud.: 273 (1841).

P. pectinata Lodd.: 18 (1816) nom. nud. Wikstr.: 347 (1818); Meisn.: 404 (1840); Meisn.: 562 (1857); Thoday: 159 (1924a).

For a complete description see Bredenkamp & Van Wyk in *Bothalia* 32: 29–34, figs 1–4 (2002d).

18a. subsp. *filiformis*

For a complete description see Bredenkamp & Van Wyk in *Bothalia* 32: 31–33, figs 1–3 (2002d).

18b. subsp. *glutinosa* (Thoday) Bredenk. & A.E.van Wyk

For a complete description see Bredenkamp & Van Wyk in *Bothalia* 32: 33–34, fig. 4 (2002d).

Conservation status: Lower Risk, [LR-nt] (Victor 2002).

19. *Passerina falcifolia* (Meisn.) C.H.Wright in *Flora capensis* 5,2: 10 (1915); Thoday: 158 (1924a); Palmer & Pitman: 1585 (1972); Coates Palgrave: 648

(1977); Bond & Goldblatt: 433 (1984); Goldblatt & Manning: 683 (2000). *P. filiformis* L. var. *falcifolia* Meisn.: 399 (1840); Drège: 118, 124 (1843); Meisn.: 562 (1857); C.H. Wright: 10 (1915); Thoday: 158 (1924a). Type: Eastern Cape, Uitenhage, Vanstaadesberg [now Van Staden's Mountains], 1000–2000 ft, Drège s.n. (K!, lecto., designated by Thoday: 388 (1924b)].

P. filiformis L. var. *divaricata* Wikstr.: 325 (1818); Thoday: 158 (1924a). Type: Caput bonae Spei [Cape Peninsula], Sparrman s.n., Herb. Thunberg 9573 (UPS, holo.), Herb. Swartzii (S, iso.).

Much-branched, tall shrubs or small ornamental trees, (1.0–)1.2–2.0(–3.04) m high, branchlets often arcuate, pendulous. Stems grey-brown; indumentum of young stems closely whitish tomentose, forming lengthwise patterns, with cork on older branches, which gradually become glabrous, fissuring lengthwise, yellowish brown lenticulae present; leaf scars oblate. Leaves greyish green, drying greyish brown, falcate, linear to narrowly lanceolate, longitudinally folded, triangular in section, length \times depth 3.9–5.6 \times 0.6 mm, adaxial surface concave, tomentose, abaxial surface glabrous; base sessile; apex obtuse or tapered; margins glabrous, involute; younger leaves inclined, diverging at an angle of $\pm 60^\circ$, imbricate, overlapping up to 50%, older leaves horizontally spreading, not imbricate. Inflorescences with multiflowered main and co-florescences; spikes usually extended, lax, often arcuate, up to 16-flowered, arrangement subterminal, axis white-tomentose, proliferating growth common. Bracts mottled grey-green, rose-tinted during flowering time, ascending, imbricate, widely ovate, narrowing into a leaf-like, falcate point, length \times depth (5.3–)5.8 \times 1.7(–2.0) mm; older bracts folded lengthwise along midrib and keeled, younger bracts adaxially concave (inside), abaxially slightly convex (outside), villous inside, glabrous outside, coriaceous; wings chartaceous, distinctly ± 4 -ribbed and reticulately veined; base cuneate; apex obtuse or tapered; margins ciliate in distal half. Floral envelope ± 8.4 mm long, papyraceous and yellow-pink during pollination, dehydrated after shedding of pollen, turning red to brown. Hypanthium scantily tomentose at ovary, neck

exserted, often arcuate, tomentose, ± 3 mm long. Sepals: outer sepals concave, obovate, adaxially scantily tomentose, abaxially glabrous; inner sepals obovate, adaxially tomentose, abaxially glabrous. Androecium with filaments of antipetalous whorl ± 1.4 mm and those of antisepalous whorl ± 2.1 mm long; anthers ovoid, $\pm 1 \times 0.4$ mm, sub-basifixed, 2-theous and 4-locular. Ovary $\pm 2.5 \times 0.7$ mm. Fruit an achene with pericarp membranous and dry, $\pm 2.5 \times 1.4$ 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 21.

Nomenclatural notes: Wright (1915) overlooked the combination *P. filiformis* L. var. *divaricata* Wikstr. (1818), also indicated by Thoday (1924a), which is the earliest name for the taxon. However, this name based on Sparrman s.n. (Herb. Thunberg 9573) falls into synonymy under *P. falcifolia*, as the name of a taxon does not have priority outside the rank in which it was published (Greuter *et al.* 2000).

Diagnostic characters and relationships: *Passerina falcifolia* is distinguished by the mottled grey-green falcate leaves, which are inclined or horizontally spreading. The widely ovate bracts are villous inside and narrow into a leaf-like, falcate point, with chartaceous wings that are distinctly ± 4 -ribbed and reticulately veined. The most conspicuous floral character is the slender, often arcuate, tomentose hypanthium neck, exserted from the clasping bract. This species may be confused with *P. filiformis* subsp. *filiformis* which has widely obovate bracts, narrowing abruptly into a filiform point. The bracts are basally to centrally setose on the inside and the wings are glabrous. *P. montivaga* is another close species, but is distinguished by bracts that are basally setose on the inside, with glabrous wings.

Etymology: the specific epithet *falcifolia* is derived from the Latin *falcatus* (= curved like a sickle), referring to the falcate or sickle-shaped leaves of these plants.

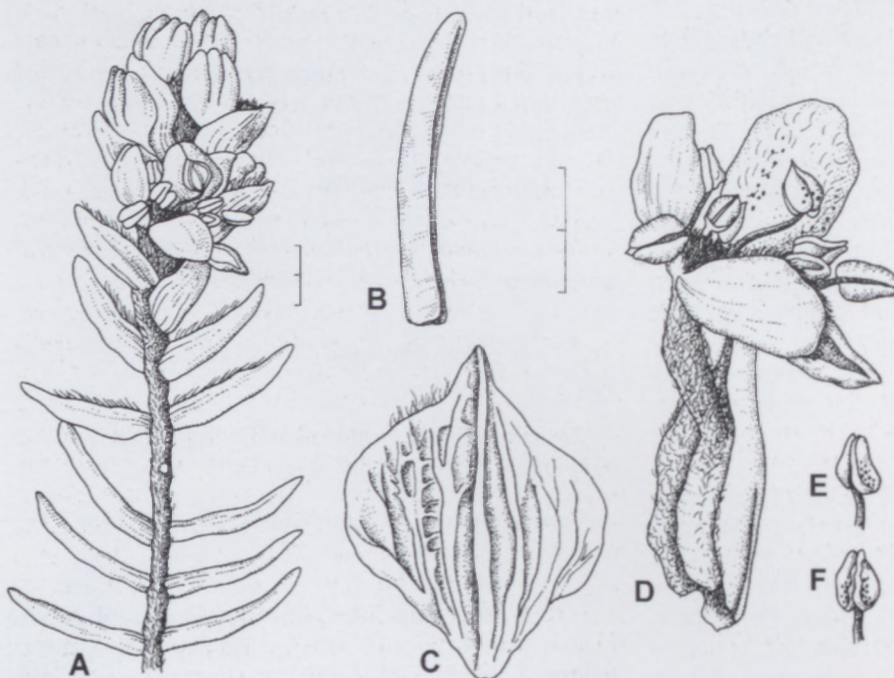


FIGURE 21.—*Passerina falcifolia*, Bredenkamp 917. A, flowering inflorescence; B, leaf; C, bract; D, flower clasped by bract. E, F, anther: E, dorsal view; F, ventral view. Scale bars: 2 mm. Artist: G. Condy.

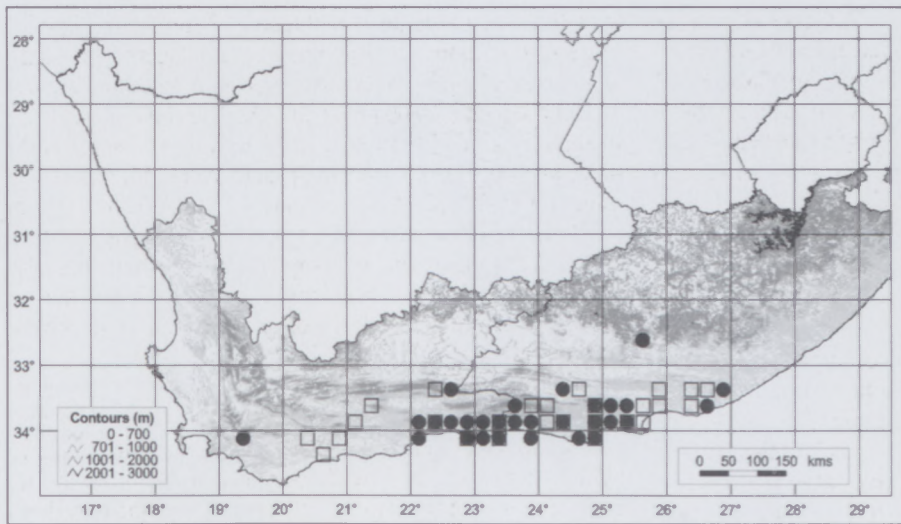


FIGURE 22.—Known distribution of *Passerina falcifolia*, ●; *P. rubra*, □.

Common names: *Passerina falcifolia* is also known as the 'Outeniqua gonna' or the *Outeniekwagonna*, referring to the Outeniqua Mountains where it occurs (Coates Palgrave 1977). Palmer & Pitman (1972) use the vernacular name forest gonna, as these plants are commonly seen along roadsides on mountain passes of the southern Cape forests. Von Breitenbach *et al.* (2001) use the names *Outeniekwa-gonna*, *gonnabas*, *gonnabos*, *kannabas* and *Outeniqua gonna*, *gonna bush*.

Uses: *Passerina falcifolia* is used for fuel or for making cord (Palmer & Pitman 1972). According to label information on *Dahlstrand 1905* (PRE), the species is cultivated by florists. Plants grow into small ornamental trees and could be used more widely in horticulture. According to *Grobbelaar 63* (PRE), *P. falcifolia* is a host to members of the insect genus *Eremnus*.

Distribution and ecology: *Passerina falcifolia* is associated with forests and Mountain Fynbos (Rebello 1998) in the southern Cape and the southern parts of Eastern Cape. It is a near-endemic to the CFR and occurs in the Karoo Mountain, Southwestern and Southeastern Centres, as well as the Zuurberg, Blaauwkrantz and Alexandria Forests of Eastern Cape. It most commonly occurs in a belt between the coast and the 33°S latitude and from 22° to 26°E longitude (Figure 22). The two specimens, *Brown 25975* and *Rogers 28858*, collected near Caledon in October 1924, are regarded as outliers, possibly indicating a wider previous distribution of the species into areas with woody vegetation in Western Cape. *P. falcifolia* occurs from Meiringspoort, in the Oudtshoorn area, to Ruytersbosch in the Mossel Bay area, and along the Outeniqua, Tsitsikamma and Great Winterhoek Mountains to the Grahamstown area.

Passerina falcifolia is found on mountain plateaus and southeast-facing slopes on Table Mountain Sandstone in shallow, sandy loam soil. Plants commonly occur along forest margins, in open patches, or disturbed areas along roadsides. This species is also found in coastal regions and riverine fynbos. *P. falcifolia* grows at a range of altitudes, from sea level up to 1 100 m.

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

20. *Passerina rubra* C.H.Wright in *Flora capensis* 5,2: 12 (1924a); Thoday: 156 (1924a); Bond & Goldblatt: 433 (1984); Goldblatt & Manning: 684 (2000). Type: Cape [Western Cape], Ladismith, Muiskraal, near Garcia Pass, 1200 ft, 3 October 1897, *Galpin 4492* [K!, lecto., designated by Thoday: 388 (1924b); GRA!, PRE!].

P. filiformis L. var. *squarrosa* Meisn.: 562 (1857); Thoday: 156 (1924a). Type: Eastern Cape, prope Cradockstad et Port-Elisabeth [near Cradock Town and Port Elizabeth], October, *Zeyher 3779* (S!, lecto., here designated; BM!, MEL!, NBG!, W!).

Much-branched, erect shrubs, with rigid branchlets and inflorescences or smaller, extensively branched, rounded shrublets under arid, calcareous habitat conditions, (0.2–)0.3–0.75(–1.1) m high. **Stems:** older ones grey-brown, indurate, and sclerenchyma fibres exposed; young stems reddish brown, indumentum whitish tomentose, forming lengthwise patterns with cork on older branches, which gradually become glabrous; cork fissuring lengthwise; internodes longer than leaves during prolific lengthening of branchlets or shorter under arid conditions. **Leaves** greyish green, ascending, appressed, decussate and rigid, or under arid conditions, imbricate (overlapping 5–30%), appressed or ascending, diverging at an angle of up to 30°; lamina narrowly lanceolate or oblong, longitudinally folded, triangular in section, length × depth 2.4–4.3 × 0.7 mm, adaxial surface concave, tomentose, abaxial surface glabrous; base sessile; apex obtuse; margins glabrous, involute. **Inflorescences** with conspicuous, multiflowered main and co-florescences; spikes robust, rigid, extended, narrowly ellipsoid, with rows of enlarged, decussate, pointed bracts, 20–30-flowered, arrangement subterminal, axis white-tomentose, proliferating growth common. **Bracts** grey-green, rose-tinted during flowering time, ascending, imbricate, widely ovate, midrib shortly extended into a point, length × depth (4.3–)5.1 × 1.8(–2.0) mm; older bracts folded lengthwise along midrib, younger bracts adaxially concave (inside), abaxially slightly convex (outside), villous inside, glabrous outside, coriaceous; wings widely ovate, chartaceous, ± 5-ribbed, reticulately veined; base cuneate; apex acute; margins ciliate in distal half. **Floral envelope** ± 8.4 mm long, papyraceous and yellow-pink during pollination, dehydrated after shedding of pollen, turning red to brown. **Hypanthium** glabrous at ovary, neck exerted, sparsely pubescent, ± 2 mm long. **Sepals:** outer sepals cymbiform,

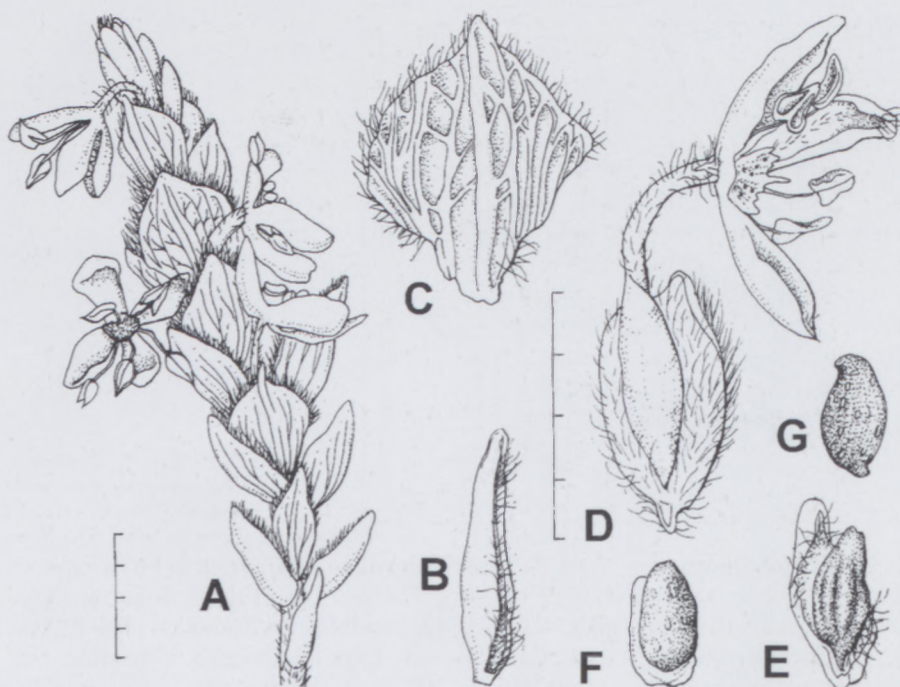


FIGURE 23.—*Passerina rubra*, Brendenkamp 914. A, inflorescence with apex growing out, returning to vegetative growth (proliferating growth); B, leaf; C, bract; D, flower clasped by bract; E, fruit clasped in tomentum of bract, enveloped by hypanthium, fragmented at neck base. F, G, achene: F, enveloped by membranous pericarp; G, side view. Scale bars: 4 mm. Artist: A. Stadler.

ad- and abaxially glabrous, inner sepals obovate, adaxially scantily tomentose, abaxially glabrous. *Androecium* with filaments of antipetalous whorl ± 0.7 mm and those of antisepalous whorl ± 1.7 mm long; anthers ovoid, $\pm 0.9 \times 0.3$ mm, sub-basifixed, 2-theous and 4-locular. *Ovary* $\pm 2.7 \times 1.1$ mm. *Fruit* an achene with pericarp membranous and dry, $\pm 2.1 \times 1.2$ 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 23.

Nomenclatural notes: as the starting date for a Latin diagnosis is 1 January 1935 (Greuter *et al.* 2000), *P. rubra* is a valid name, although it was published with a full description, but without a Latin diagnosis, by Wright (1915). The combination *P. filiformis* L. var. *squarrosa* (Meisner 1857), was overlooked by Wright (1915), but mentioned in synonymy by Thoday (1924a). In the present revision all the type material cited by both Wright (1915) and Meisner (1857) was studied. Galpin 4492 (K) was selected as the lectotype of *P. rubra* by Thoday (1924b) and Zeyher 3779 in S was selected as lectotype for *P. filiformis* var. *squarrosa* as it is internationally available in many herbaria.

Diagnostic characters and relationships: the distribution of *P. rubra* partly coincides with that of *P. corymbosa*, *P. montivaga* and *P. falcifolia*. *P. rubra* is a smaller shrub (average height 0.3–0.75 m), often occurring in calcareous soil. It is distinguished from the other three species which are taller (average heights 1–2 m), and especially from *P. falcifolia*, which is a tall shrub or a small tree (up to 3.04 m), often associated with indigenous forests. *P. rubra* may also be separated by the inflorescences which have extended, robust spikes, with up to 30 fertile, enlarged bracts. The bracts are typified by the midrib which is shortly extended into a point and by the wings which are adaxially tomentose, widely ovate, chartaceous, ± 5 -ribbed and reticulately veined. Flowers are distinguished by the exerted hypanthium neck, which is ± 2 mm long and glabrous to sparsely pubescent.

Etymology: the specific epithet *rubra* was derived from the Latin *ruber* (= red), referring to the conspicuous, multiflowered inflorescences of these plants, which have 20–30 flowers arranged in four rows and turning red after wind pollination.

Uses: *Passerina rubra* is a pioneer which often occurs along roadsides or in disturbed places, e.g. close to the salt works in the vicinity of Port Elizabeth. It is also found on calcareous soils between Port Elizabeth and Cradock. In the Coega area, earmarked for industrial development, *P. rubra* might be a useful plant for combating erosion.

Distribution and ecology: *Passerina rubra* is near-endemic to the CFR, occurring in the Langeberg, Karoo Mountain and Southeastern Centres, as well as southern parts of the Eastern Cape. It most commonly occurs in a belt between the coast and the 33°S latitude and from 20° to 26°E longitude. *P. rubra* is distributed from the Bontebok National Park in the Swellendam District, eastwards to Gowie's Kloof near Grahamstown (Figure 22). This species is somewhat variable. It was initially thought that plants in Western Cape were more rigid, with longer internodes and appressed leaves, which did not overlap, whereas those in Eastern Cape tended to be rounded shrublets, with imbricate, ascending leaves. After many specimens, from all parts of the range had been studied, no geographical or morphological discontinuity between the two forms could be shown, and it was decided that the morphological differences were probably due to plasticity. Plants growing in more arid conditions and calcareous soil, typical of the Port Elizabeth and Cradock areas, tend to be rounded much-branched shrublets, with short internodes and imbricate, ascending leaves. Under more favourable conditions in sandy loam, the plants are taller, less branched, internodes are longer and the appressed leaves do not overlap.

Passerina rubra is common in the Steytlerville, Humansdorp, Port Elizabeth and Grahamstown areas of Eastern

Cape and less frequent in Western Cape. The area between Cradock and Port Elizabeth is renowned for the ancient dunes and flats, abounding in limestone. Acocks (1988) described the vegetation occurring on the limestone as False Fynbos (A70), also known as Mountain Fynbos or Grassy Fynbos (Rebello 1998). *P. rubra* seems to be well adapted to the calcareous soils on which it occurs. These plants are often pioneers in disturbed areas and along roadsides, as in the Colchester, Coega and the Markman industrial areas of Port Elizabeth. At the Groendal Catchment Basin, this species occurs in grassland on sandstone and it is also found on semi-karroid, dry, rocky hillsides in the Baviaanskloof area. At the Bontebok National Park it is found in flat areas between fynbos species. *P. rubra* grows at altitudes of 70–700 m.

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

DOUBTFUL NAME

Passerina hamulata Gand.: 418 (1913). Hab.: Cap, in dunis arenosis prope Wynberg [Western Cape, Simons-town, sand dunes near Wineberg], *Bolus s.n.* Note: *P. paleacea*, *Bolus* 2926, complies with this distribution, but the name *P. hamulata* is not written on this specimen, therefore *P. hamulata* was not placed in synonymy under *P. paleacea*.

EXCLUDED NAMES

Sources of information: 1, *Passerina* databases at National Botanical Institute; 2, literature cited in the list; 3, Royal Botanic Gardens, Kew. Index Kewensis on Compact Disc (1997).

Accepted names are in bold roman type and synonyms are in italics.

Lachnaea conglomerata L.: 560 (1753); 374 (1784); Willd.: 434 (1799); Wikstr.: 323 (1818); Thunb.: 374 (1825a); Meisn.: 562 (1857); Cafferty & Beyers: 171, 172 (1999); Brummitt: 805 (2000) nom. rejic. = **Phylica stipularis** L. (Rhamnaceae) in Cafferty & Beyers: 171 (1999).

P. ammodendron Kar. & Kir.: 444 (1842) = **Stellera lesseritii** C.A.Mey. in Meisn.: 550 (1857). Iran.

P. annua Auch. ex Meisn.: 552 (1857) = **Thymelaea aucheri** Meisn.: 552 (1857); K.Tan: 235 (1980). Syria, Lebanon, W Iran.

P. annua (Salisb.) Wikstr.: 320 (1818) = **Thymelaea passerina** (L.) Coss. & Germ. in K.Tan: 236 (1980) [= *Thymelaea arvensis* Lam. in Meisn.: 551 (1857) (= *Stellera passerina* L.)]. Widespread: C and S Europe, SW Asia, C Russia.

P. anthylloides L.f.: 226 (1782) = **Gnidia virescens** Wikstr. in Meisn.: 592 (1857). South Africa: Cape Peninsula.

P. anthylloides Thunb.: 75 (1794) = **Gnidia virescens** Wikstr. in Meisn.: 592 (1857). South Africa: Cape Peninsula.

P. aragonensis Rouy: 123 (1910). Pyrenees.

P. argentata Pau: 67 (1922) = **Thymelaea argentata** (Lam.) Pau in K.Tan: 212 (1980). Spain and N Africa.

P. arvensis Ball: 653 (1878) = **Thymelaea passerina** (L.) Coss. & Germ. in K.Tan: 236 (1980) [= *Thymelaea arvensis* Lam. in Meisn.: 551 (1857) (= *Stellera passerina* L.)]. Widespread: C and S Europe, SW Asia, C Russia.

P. axillaris Thunb.: 106 (1792) = **Pimelea virgata** Vahl in Meisn.: 516 (1857). New Zealand.

Passerina baccata, *Pappe s.n.* (NBG!, SAM!) err. typogr. = **P. ericoides** L.

P. baccifera Mihi? nom. nud., *Eckl. & Zeyh. s.n.* (BOL!, P!, W!) = **P. ericoides** L.

P. bartlingiana Meisn. True identity unknown.

P. broteriana (Cout.) Sampaio & Da Silva: 104 (1913) = **Thymelaea broteriana** Cout.: 145 (1909); K.Tan: 227 (1980). Endemic to N and C Portugal.

P. bruniades Eckl. & Zeyh. ex Meisn.: 579 (1857) = **Lachnaea penicillata** Meisn.: 579 (1857); J.B.P.Beyers: 96 (2001). South Africa: Western Cape.

P. brunoides Eckl. & Zeyh. in Meisn.: 563, 579 (1857) = *P. bruniades* Eckl. & Zeyh. ex Meisn.

P. calocephala Meisn.: 393 (1840) = **Gnidia calocephala** (C.A.Mey.) Gilg: 226–228 (1894a). South Africa: KwaZulu-Natal and Eastern Cape.

P. calycina Lam. & DC.: 360 (1805) = **Thymelaea calycina** (Lapeyr.) Meisn.: 555 (1857); K.Tan: 226 (1980). C Pyrenees, rare.

P. campanulata E.Mey. ex Meisn.: 407 (1840) = **Lachnaea grandiflora** (L.f.) Baill. in J.B.P.Beyers: 45 (2001). South Africa: Western Cape.

P. canescens Schousb.: 190 (1800) = **Thymelaea lanuginosa** (Lam.) Ceballos & Vicioso in K.Tan: 211 (1980) [= *Thymelaea canescens* (Schousb.) Endl. in Meisn.: 556 (1857)]. S Spain, Morocco and Gibraltar.

P. cantabrica Pourr. ex Willk. & Lange: 299 (1862) = **Thymelaea coridifolia** (Lam.) Endl. in K.Tan: 226 (1980). Endemic to N Spain.

P. capitata L.: 88 (1760) = **Lachnaea capitata** (L.) Crantz in J.B.P.Beyers: 66 (2001). South Africa: Western Cape.

P. cephalophora Thunb.: 75 (1794) = **Lachnaea eriocephala** L. in J.B.P.Beyers: 98 (2001). South Africa: Western Cape.

P. chamaedaphne Bunge: 58 (1833) = **Wikstroemia canescens** Meisn.: 547 (1857). Nepal.

P. chamaejasme Fisch. ex Meisn.: 549 (1857) = **Stellera chamaejasme** L. in Meisn.: 549 (1857). Siberia.

P. chamaejasme Schangin: in Meisn.: 549 (1857) = **Stellera altaica** Thieb. in Meisn.: 549 (1857). Siberia.

P. ciliata L.: 559 (1753) = **Gnidia penicillata** Licht. ex Meisn. in B.Peterson: 476 (1959). South Africa: Western Cape.

P. ciliata Thunb.: 75 (1794) = *Lachnaea ciliata* (L.) Crantz in J.B.P.Beyers: 109 (2001), excluded species.

P. conglomerata (L.) Thunb.: 75 (1794); Wikstr.: 322 (1818) = **Phylica stipularis** L. (Rhamnaceae) in Cafferty & Beyers: 171 (1999).

Passerina coridifolia Wikstr.: 334 (1818) = **Thymelaea coridifolia** (Lam.) Endl. in K.Tan: 226 (1980). Endemic to N Spain.

P. cornucopiae = **Pimelea cornucopiae** Vahl in B.Hansen & P.Wagner: 352 (1998). Australia.

Passerina corsica J.Gay ex Litard. in Briq.: 6 (1938) = **Thymelaea tartonraira** All. subsp. **thomasii** (Duby) Briq. in K.Tan: 220 (1980) [= *Thymelaea tartonraira* All. var. *calvescens* Gren. & Godr. in Meisn.: 556 (1857)]. Circum-Mediterranean.

P. costata Griff.: 367 (1854) = **Diarthron vesiculosum** C.A.Mey. in Meisn.: 558 (1857). Iran.

P. diarthronoides Griff.: 365 (1854) = **Thymelaea passerina** (L.) Coss. & Germ. in K.Tan: 236 (1980) [= *Thymelaea*

arvensis Lam. in Meisn.: 551 (1857) (= *Stellera passerina* L.). Widespread: C and S Europe, SW Asia, C Russia.

P. dichotoma Steud.: 273 (1841) = *Stellera chamaejasme* L. in Meisn.: 549 (1857). Siberia.

P. dioica Ramond: 139 (1800) = *Thymelaea dioica* (Gouan) All. in K.Tan: 222 (1980). W Pyrenees to SW Alps.

P. dodecandra L.: 10 (1755) = *Struthiola dodecandra* (L.) Druce in Levyns: 599 (1950). South Africa: Eastern Cape and Western Cape.

P. elliptica Boiss.: 556, t. 158 (1842) = *Thymelaea pubescens* (L.) Meisn. subsp. *elliptica* (Boiss.) K.Tan: 231 (1980) [= *T. elliptica* (Boiss.) Endl.: 66 (1847)]. Endemic to S Spain.

P. empetrifolia Lapeyr.: 212 (1813) = *Thymelaea dioica* (Gouan) All. subsp. *dioica* in K.Tan: 222 (1980). W Pyrenees to SW Alps.

P. eriocephala Thunb.: 75 (1794) = *Lachnaea globulifera* Meisn.: 576 (1857); J.B.P.Beyers: 107 (2001). South Africa: Western Cape.

P. filiformis Mill.: no. 1 (1768) = *Struthiola* sp.

P. filiformis var. *ereifoifolia* Eckl. & Zeyh. *herb. no. 39* (G!), err. typogr. = *P. ericoides* L.

P. ganpi Sieb. ex Miq. in Meisn.: 564 (1857) = *Stellera ganpi* Meisn.: 550 (1857). Japan.

P. geminiflora Ram. in K.Tan: 222 (1980) = *Thymelaea dioica* (Gouan) All. subsp. *dioica* in K.Tan: 222 (1980). W Pyrenees to SW Alps.

P. globosa Lam.: 431 (1792) = *Lachnaea alpina* Meisn.: 578 (1857); J.B.P.Beyers: 59 (2001). South Africa: Western Cape.

P. gnidia Forst.: 28 no. 170 (1786); Meisn.: 516 (1857) = *Pimelea gnidia* Banks et Sol. in Meisn.: 516 (1857). New Zealand.

Passerina gnidia L.f.: 226 (1782) = *Pimelea gnidia* Banks et Sol. New Zealand.

Passerina granatensis Pau: 7 (1904) = *Thymelaea dioica* (Gouan) All. subsp. *granatensis* (Pau) Malag in K.Tan: 222 (1980). SE Spain, C and W Pyrenees.

P. grandiflora L.f.: 226 (1782) = *Lachnaea grandiflora* (L.f.) Baill. in J.B.P.Beyers: 45 (2001). South Africa: Western Cape.

P. gymnostachya Meisn.: 397 (1840). = *Gnidia gymnostachya* (C.A.Mey.) Gilg in E.Phillips: 63 (1944). South Africa: North-West, Gauteng, Mpumalanga, Free State, KwaZulu-Natal and Eastern Cape, also in Lesotho.

P. hirsuta Asso in Meisn. 555 (1857) = *Thymelaea tinctoria* (Pouret) Endl. subsp. *tinctoria* in K.Tan: 223 (1980). Portugal (?), NE and E Spain and S France.

P. hirsuta Brot. in K.Tan: 227 (1980) = *Thymelaea broteriana* Cout.: 145 (1909); K.Tan: 227 (1980). Endemic to N and C Portugal.

P. hirsuta L.: 559 (1753) = *Thymelaea hirsuta* Endl. in K.Tan: 209 (1980). Circum-Mediterranean, Europe, SW Asia and N Africa.

P. imbricata Burm.f.: 12 (1768). True identity unknown.

P. imbricata Sennen: 69 (1924). True identity unknown. Spain.

P. incana Pourr. ex Willk. & Lange: 300 (1862) = *Thymelaea velutina* (Pourr. ex Camb.) Endl. in K.Tan: 221 (1980). Endemic to the Balearics.

P. inconspicua Meisn.: 397 (1840) = *Gnidia inconspicua* Meisn. in Arnold & De Wet: 516 (1993) [= *Arthrosolen inconspicua* Meisn. 560 (1857)]. South Africa: Western Cape.

P. incurva Wendl. ex Bartl.: 404 (1840). True identity unknown.

P. involucrata Spreng. ex Meisn.: 595 (1857) = *Gnidia capitata* L.f. in B.Peterson: 627 (1958) [= *Lasiosiphon linifolius* Decne. var. *glabrata* Meisn.: 595 (1857)]. South Africa: Limpopo [Northern Province], North-West, Gauteng, Mpumalanga, Free State, KwaZulu-Natal and Eastern Cape, also Botswana, Swaziland and Lesotho.

P. involucrata Thunb.: 106 (1792) = *Pimelia linifolia* Sm. in B.Hansen & P.Wagner: 352 (1998). Australia.

Passerina japonica Sieb. & Zucc.: 76 (1846) = *Wikstroemia japonica* Miq.: 184 (1863). Japan.

P. javanica Thunb.: 19 (1825b). True identity unknown. Java.

P. juniperifolia Lapeyr.: 213 (1813) = *Thymelaea tinctoria* (Pouret) Endl. subsp. *nivalis* (Ramond) K.Tan [= *Thymelaea nivalis* (Ram.) Meisn.: 555 (1857)] K.Tan: 224 (1980). Endemic to C and W Pyrenees.

P. kalifolia Pourr. ex Willk. & Lange: 301 (1862) = *Thymelaea lanuginosa* (Lam.) Ceballos & Vicioso in K.Tan: 211 (1980) [= *Thymelaea canescens* (Schoub.) Endl. in Meisn.: 556 (1857)]. S Spain, Morocco and Gibraltar.

P. laevigata L.: 15 (1756) = *Gnidia oppositifolia* L. in Meisn.: 586 (1857). South Africa: Eastern Cape and Western Cape.

P. laniflora C.H.Wright: 11 (1915) = *Lachnaea laniflora* (C.H.Wright) Bond in J.B.P.Beyers: 81 (2001). South Africa: Western Cape.

P. lanuginosa Pau: 67 (1922) = *Thymelaea lanuginosa* (Lam.) Ceballos & Vicioso in K.Tan: 211 (1980). Morocco, S Spain, Gibraltar.

P. lateriflora Hort. ex Wikstr.: 347 (1818) = *Gnidia spicata* (L.f.) Gilg in E.Phillips: 63 (1944). South Africa: Western Cape.

P. laxa L.f.: 226 (1782) = *Gnidia laxa* (L.f.) Gilg: 226 (1894a). South Africa: Eastern Cape and Western Cape.

P. lessertii Wikstr.: 341 (1818) = *Stellera Lessertii* C.A.Mey. in Meisn. 14: 550 (1857). Iran.

P. linariaefolia Pourr. ex Wikstr.: 333 (1818) = *Thymelaea pubescens* (L.) Meisn. subsp. *thesioides* (Lam.) K.Tan: 231 (1980). Spain.

P. linearifolia Wikstr.: 343 (1818) = *Gnidia linoides* Wikstr. var. *major* Meisn.: 583 (1857).

P. linearis Wendl. ex Bartl.: 404 (1840). Species non descriptae, Meisn.: 563 (1857).

P. linoides Thunb.: 75 (1794) = *Gnidia linoides* Wikstr. in Meisn.: 582 (1857). South Africa: Western Cape.

P. longiflora Thunb.: 189 (1800) = *Pimelea longifolia* Banks et Sol. in Meisn.: 516 (1857). New Zealand.

Passerina longifolia Thunb.: 32 (1797) = *Pimelia longifolia* Banks et Sol. in Meisn.: 516 (1857). New Zealand.

Passerina matnak J.F.Gmel.: 1597 (1792), sphalm. = *P. metnak* J.F.Gmel.: 634 (1791), sphalm.

P. metnam Forssk.: 81 (1775) = *Thymelaea hirsuta* Endl. in K.Tan: 209 (1980). Circum-Mediterranean, Europe, SW Asia and N Africa.

P. metnam Forssk. in Meisn.: 564 (1857) = *Thymelaea hirsuta* Endl. in K.Tan: 209 (1980). Circum-Mediterranean, Europe, SW Asia and N Africa.

P. microphylla Coss. & Durand: 744 (1856) 744 = *Thymelaea microphylla* Meisn.: 556 (1857); K.Tan: 214 (1980). N Africa.

P. nervosa Thunb.: 75 (1794) = *Lachnaea nervosa* (Thunb.) Meisn. in J.B.P.Beyers: 69 (2001). South Africa: Western Cape.

- P. nervosa* Wikstr.: 328 (1818) = **Lachnaea striata** (Poir.) Meisn.: 577 (1857); J.B.P.Beyers: 77 (2001). South Africa: Western Cape.
- P. nitida* (Vahl) Desf.: 331, t. 94 (1798) = **Thymelaea argentata** (Lam.) Pau in K.Tan: 212 (1980) [= *Thymelaea nitida* Endl. in Meisn.: 554 (1857)]. Spain and N Africa.
- P. nivalis* Ram.: 131, t. 9 (1800) = **Thymelaea tinctoria** (Pourret) Endl. subsp. **nivalis** (Ramond) K.Tan: 224 (1980). Endemic to C and W Pyrenees.
- P. orientalis* Willd.: 431 (1799) = **Thymelaea tinctoria** (Gouan) All. subsp. **dioica** [= *Thymelaea orientalis* Meisn.: 557 (1857)] in K.Tan: 222 (1980). W Pyrenees to SW Alps.
- P. passerina* Huth.: 135 (1898) = **Thymelaea passerina** (L.) Coss. & Germ. in K.Tan: 236 (1980) [= *Thymelaea arvensis* Lam. in Meisn.: 551 (1857) (= *Stellera passerina* L.)]. Widespread: C and S Europe, SW Asia, C Russia.
- P. pentandra* Thunb.: 76 (1794) = **Lonchostoma obtusiflorum** Wikstr. in Meisn.: 564 (1857).
- P. persica* Boiss.: 85 (1846) = **Stellera lessertii** C.A.Mey. in Meisn.: 550 (1857). Iran.
- P. pilosa* G.Forst. in Meisn.: 564 (1857); B.Hansen & P.Wagner: 352 (1988) = **Pimelea tomentosa** (J.R.Forst. & G.Forst.) Druce in B.Hansen & P.Wagner: 352 (1998). New Zealand.
- Passerina pilosa* L.f.: 226 (1782) = **Pimelea tomentosa** (J.R. & G.Forst.) Druce in B.Hansen & P.Wagner: 352 (1998) (= *Pimelea virgata* Vahl). New Zealand.
- Passerina planifolia* Burm.f.: 12 (1768) = **Lachnaea alpina** Meisn.: 578 (1857); J.B.P.Beyers: 59 (2001). South Africa: Western Cape.
- P. polyccephala* E.Mey ex Meisn.: 390 (1840) = **Gnidia polyccephala** (C.A.Mey.) Gilg: 227 (1894a). Namibia, Botswana and South Africa: North-West, Gauteng, Mpumalanga, Free State, Eastern Cape and Northern Cape.
- P. polygalaefolia* Lapeyr.: 214 (1813) = **Thymelaea hirsuta** Endl. in K.Tan: 209 (1980). Circum-Mediterranean, Europe, SW Asia and N Africa.
- P. prostrata* G.Forst.: 28 (1786) = **Pimelea prostrata** (J.R.Forst. & G.Forst.) Willd. in B.Hansen & P.Wagner: 352 (1998). New Zealand.
- Passerina prostrata* L.f.: 227 (1782) = **Pimelea prostrata** (J.R.Forst. & G.Forst.) Willd. in B.Hansen & P.Wagner: 352 (1998). New Zealand.
- Passerina pubescens* Guss.: 451 (1843) = **Thymelaea mesopotamica** (Jeffrey) Peterson in K.Tan: 239 (1980) [= *Thymelaea arvensis* Lam. var. *pubescens* (Guss.) Meisn.: 552 (1857)]. SE Anatolia, Iraq, W Iran, Kuwait.
- P. pubescens* (L.) Loscos var. *virgata* Pau: 33 (1925) = **Thymelaea pubescens** (L.) Meisn. subsp. **thesioides** (Lam.) K.Tan: 231 (1980). Spain.
- P. pubescens* (L.) Wikstr.: 332 (1818) = **Thymelaea pubescens** (L.) Meisn. subsp. **pubescens** in K.Tan: 231 (1980). Pyrenees, S and E Spain.
- P. purpurea* Wikstr.: 323 (1818) = **Lachnaea eriocephala** L. in J.B.P.Beyers: 99 (2001). South Africa: Western Cape.
- P. racemosa* Wikstr.: 320 (1818) = **Stellera altaica** Thieb. in Meisn.: 549 (1857). Subalpine region, the Caucasus.
- P. rosmarinifoliae* fide Meisn.: 400 (1840) = **Phylica** sp., Herb. Lamarck (P. microfiche 574).
- Passerina ruizii* (Loscos.) Font-Quer in K.Tan: 225 (1980) = **Thymelaea ruizii** [Loscos] Casav. in K.Tan: 225 (1980). High ranges, Sierra de Cabrera in NE Portugal to C Pyrenees.
- P. salina* Munby = **Thymelaea passerina** (L.) Coss. & Germ. in K.Tan: 236 (1980); seen from (C), specimen without collector and number.
- P. salsa* Hunley, *Debeaux* s.n. (PR), cf. *P. annua* (Salisb.) Wikstr. var. *salsa* Munby in K.Tan: 238 (1980) = **Thymelaea salsa** Murb. in K.Tan: 238 (1980). S Spain, Morocco and Algeria.
- P. salsolaefolia* Poir.: 41 (1804) = **Phylica** sp. in Meisn.: 400 (1840); Herb. Lamarck (P. microfiche 574).
- Passerina sanamunda* (All.) Bub.: 135 (1897) = **Thymelaea sanamunda** All. in Meisn.: 553 (1857); K.Tan: 233 (1980). Spain, S France and Italian Riviera.
- P. segobriensis* Pau: 25 (1887) = **Thymelaea argentata** (Lam.) Pau in K.Tan: 212 (1980) [= *Thymelaea nitida* Endl. in Meisn.: 554 (1857)]. Spain and N Africa.
- P. sericea* L.: 15 (1755) = **Gnidia sericea** L. in Meisn.: 583 (1857). South Africa: Eastern Cape and Western Cape.
- P. setosa* Thunb.: 75 (1794) = **Gnidia setosa** Wikstr. in Meisn.: 590 (1857). Eastern Cape.
- P. spicata* L.f.: 226 (1782) = **Gnidia spicata** (L.f.) Gilg in E.Phillips: 63 (1944). South Africa: Western Cape.
- P. stachyoides* Schrenk in Meisn.: 550 (1857) = **Stellera stachyoides** Schrenk in Meisn.: 550 (1857). Siberia.
- P. stellera* Ram. ex Lam. & DC.: 361 (1805) = **Thymelaea passerina** (L.) Coss. & Germ. in K.Tan: 236 (1980) [= *Thymelaea arvensis* Lam. in Meisn.: 551 (1857)]. Widespread: C and S Europe, SW Asia, C Russia.
- P. stelleri* Wikstr.: 321 (1818) = **Stellera chamaejasme** L. in Meisn.: 549 (1857). Siberia.
- P. striata* Poir.: 44, t. 291, f. 2 (1804) = **Lachnaea striata** (Poir) Meisn.: 415–416 (1840); J.B.P.Beyers: 77 (2001). South Africa: Western Cape.
- P. stricta* Thunb.: 75 (1794) = **Gnidia wikstroemiana** Meisn.: 582 (1857). South Africa: Northern Cape and Free State.
- P. subspicata* Meisn.: 395 (1840) = **Wikstroemia subspicata** Meisn. 14: 547 (1857).
- P. tartonraira* Schrad.: 89 (1810) = **Thymelaea Tartonraira** All. in Meisn.: 556 (1857); K.Tan: 215 (1980). Circum-Mediterranean.
- P. tenuiflora* Willd.: 426 (1809) = **Gnidia laxa** (L.f.) Gilg: 226 (1894a). South Africa: Eastern Cape and Western Cape.
- P. tetragona* Steud.: 274 (1841) = **Struthiola dodecandra** (L.) Druce in Levyns: 599 (1950). South Africa: Eastern Cape and Western Cape.
- P. thesioides* Wikstr.: 333 (1818) = **Thymelaea pubescens** (L.) Meisn. subsp. **thesioides** (Lam.) K.Tan [= *Thymelaea thesioides* (Lam.) Endl. in Meisn.: 553 (1857)] in K.Tan: 231 (1980). Spain.
- P. thomasii* Duby: 406 (1828) = **Thymelaea tartonraira** All. subsp. **thomasii** (Duby) Briq. [= *Thymelaea tartonraira* All. var. *calvescens* Gren. & Godr. in Meisn.: 556 (1857)] in K.Tan: 220 (1980). Circum-Mediterranean.
- P. thunbergii* Wikstr.: 343 (1818) = **Gnidia sericea** L. in Meisn.: 583 (1857). South Africa: Eastern Cape and Western Cape.
- P. thymelaea* (Lam.) DC. in Lam. & DC.: 366 (1815) = **Thymelaea sanamunda** All. in Meisn.: 553 (1857); K.Tan: 233 (1980). Spain, S France and Italian Riviera.
- P. tinctoria* Pourr. in Meisn.: 565 (1857) = **Thymelaea tinctoria** (Pourr.) Endl. subsp. **tinctoria** in K.Tan: 223 (1980). Portugal (?), NE and E Spain and S France.
- P. tinctoria* var. *angustifolia* Boiss.: 556 (1842) = **Thymelaea calycina** Meisn.: 555 (1857); K.Tan: 226 (1980). C Pyrenees, rare.
- P. tingitana* Salzm. ex Meisn.: 554 (1857) = **Thymelaea villosa** (L.) Endl. in K.Tan: 229 (1980). S Portugal, Spain, Gibraltar, Morocco.

P. tomentosa Wikstr.: 332 (1818) = **Thymelaea tartonraira** All. in Meisn.: 556 (1857); K.Tan: 215 (1980). Circum-Mediterranean.

P. uniflora Drège ex Meisn.: 574 (1857) = **Gnidia penicillata** Licht. ex Meisn. in B.Peterson: 476 (1959), [= *Cryptadenia ciliata* (Thunb.) Meisn. in J.B.P.Beyers: 45 (2001), excluded species].

P. uniflora L.: 560 (1753) = **Lachnaea uniflora** (L.) Crantz in J.B.P.Beyers: 43 (2001). South Africa: Western Cape.

P. uniflora L. var. *alba* P.J.Bergius: 129 (1767) = **Lachnaea grandiflora** (L.f.) Baill. in J.B.P.Beyers: 45 (2001). South Africa: Western Cape.

P. uniflora L. var. *angustifolia* Burm.f.: 12 (1768). = **Lachnaea uniflora** (L.) Crantz in J.B.P.Beyers: 43 (2001). South Africa: Western Cape.

P. uniflora L. var. *latifolia* Burm.f.: 12 (1768). = **Lachnaea grandiflora** (L.f.) Baill. in J.B.P.Beyers: 45 (2001). South Africa: Western Cape.

P. uniflora L. var. *purpurea* P.J.Bergius: 128 (1767). = **Lachnaea uniflora** (L.) Crantz in J.B.P.Beyers: 43 (2001). South Africa: Western Cape.

P. velutina Boiss.: 81 (1838) = **Thymelaea pubescens** (L.) Meisn. subsp. **elliptica** (Boiss.) K.Tan: 231 (1980). Endemic to S Spain.

P. velutina [Pourr.] Cambess.: 183 (1827) = **Thymelaea velutina** (Pourr. ex Camb.) Endl. in K.Tan: 221 (1980). Endemic to the Balearics.

P. vesiculosa Fisch. & C.A.Mey.: 170 (1839) = **Diarthron vesiculosum** C.A. Mey. in Meisn.: 558 (1857). Iran.

P. villosa Thunb.: 106 (1792) = **Pimelea arenaria** Cunn. in Meisn.: 517 (1857). New Zealand.

Passerina villosa Wikstr.: 332 (1318) = **Thymelaea villosa** (L.) Endl. in Meisn.: 554 (1857); K.Tan: 229 (1980). S Portugal and Spain, Gibraltar, Morocco.

P. virescens Coss. & Dur. ex Meisn.: 554 (1857) = **Thymelaea virescens** Meisn.: 554 (1857); K.Tan: 212 (1980). NW Africa.

P. virgata Desf.: 331, t. 95 (1798) = **Thymelaea virgata** (Desf.) Endl. in K.Tan: 228 (1980); subsp. **virgata** from NW Africa and S Spain & subsp. **broussonetii** from NW Africa.

SPECIMENS EXAMINED

Abel s.n. (19) NBG. *Abrahams s.n.* & A7759 (7) GRA. MO. PRE. *Acocks 184, 583, 1001, 5756* (1) S; 690 (6) S; 1005 (4) S; 1006 (7) S; 1007, 1549 (15) S; 1067, 1519 (14) S; 2482 (16) S; 10660, 12125, 12175 (4) PRE; 10967 (7) PRE; 16000, 18634, 19000, 21252, 22862, 24427 (15) K. PRE; 19066 (6) K. PRE; 19810 (14) K. NBG. PRE; 20170 (15) M. PRE; 20714, 21309, 23379, 23848, 24257 (14) PRE; 21424 (20) K. M. PRE; 21455 (7) M. PRE; 22365 (20) PRE; 22528, 22606, 22615 (1) PRE; 22608 (12) K. PRE; 22784 (6) PRE; 24212 (1) K. NBG. PRE; 24213 (12) K. NBG. PRE. *Adamson 1515* (10) PRE; 5124 (15) PRE. *Alexander-Prior s.n.* (1) PRE; *s.n.* (14) PRE. *Allardice 1726* (15) NBG. *Anderson 76* (7) PRE. *Andersson s.n.* (14) S. *Andraea 385, 385b* (6) NBG. PRE; 581 (1) NBG. PRE; 597 (14) PRE; 979, 982 (15) NBG. PRE; 1018, 1030 (15) PRE; 1222, 1288, 1288A (10) PRE; 1227 (14) NBG. *Archibald 677* (4) GRA; 3833 (20) GRA; 4552/52 (7) GRA. PRE; 4558, 5259 (20) K. PRE; 5583, 5727, 6053 (14) PRE.

Balkwill 456 (15) K. PRE. *Balsinhus & Kersberg 2114* (4) PRE. *Barber 745* (4) GRA. *Barbosa 9447* (4) K. *Barker 349* (14) PRE; 2726 (6) NBG; 5565 (20) NBG; 5925 (15) C. NBG; 6036 (19) NBG. S; 10580 (15) NBG. *Barnard 526, 699* (20) PRE; 660 (14) PRE; *s.n.* (10) NBG; *s.n.* (14) NBG. *Barnes 88* (14) GRA. *Bayer 786* (4) PRE; 1307 (7) MO. *Bayliss 521* (15) K. MO. PRE; 546 (20) K. M. MO. NBG; 650 (7) K. MO. M. PRE; 1349, 1362, 1432 (4) PRE; 1684 (15) PRE; 2468 (14) B. MO. NBG; 5023 (14) M. MO; 5035 (14) B. MO; 5164 (20) MO; 5238, 5289 (14) MO; 6017 (7) PRE; 6060, 6093 (15) PRE; 6117 (14) PRE.

6856, 8850 (20) M. MO; 6861 (20) K. MO. S; 7731, 8908 (15) M. MO; *BRI B32* (14) GRA. MO. PRE; *BRI B295* (19) PRE; *BRI B1088* (20) PRE; *BRI B1105* (14) PRE. *Bean 1385* (15) BOL. MO. NBG. *Bean & Viviers 1508* (14) BOL. *Behemiae s.n.* (14) PR. *Bengis 344* (15) PRE. *Beverly 72* (4) PRE. *Blom 275* (4) PRE. *Boemert, Herb. Reg. Monacense s.n.* (14) M. *Bohnen 94.04* (7) PRE; 4012 (12) C. PRE; 4065 (12) NBG. PRE; 4911, 8147 (7) NBG. PRE. *Bolton s.n.* (20) DUB. *Bolus 170* (14) BOL. K; 687 (5) BM. BOL. HAL. K. NBG. P. PRE. UPS. W; 1905 (20) BOL; 2924 (14) K; 2926 (1) K; 4498 (6) BM. BOL. K; 11630 (15) BM. BOL; 17197 (1) BOL; *s.n.* (1) BOL. PRE; *s.n.* (14) BOL. *Bond 1820* (15) NBG. *Borges 112* (4) M. PRE. *Boshoff 156* (15) NBG. *Bot. Mus. Univ. Wien s.n.* (14) WU. *Botha 372* (7) PRE; 2610 (4) PRE; 2618 (14) PRE; 5656 (20) GRA. *Botha & Coetzee 1605* (7) PRE. *Boucher 468, 469* (1) NBG. PRE; 470 (7) K; 761, 1955, 2012, 2014, 2449, 3243, 3301 (14) PRE; 856 (6) K. NBG. PRE; 1559a (15) NBG. PRE; 1603 (1) PRE; 1677 (7) PRE; 1690 (7) NBG. PRE; 1691 (6) NBG; 1862a, 1862b (4) NBG; 2008 (15) PRE; 2219 (1) NBG. PRE; 2224 (12) NBG; 2244, 2439 (15) PRE; 2951 (1) NBG. PRE; 3363 (7) NBG; 3973 (6) PRE. *Boucher & Shepherd 4828* (14) PRE. *Bower 602* (7) PRE. *Bowie 1* (6) BM; 3 (20) BM; 5 (19) BM. *Bowker s.n.* (7) K. *Brain 6950* (4) MO. PRE. *Bredenkamp 889-891, 893-895* (4) PRE; 896 (14) PRE; 897-899 (7) PRE; 900 (20) PRE; 901-903 (14) PRE; 904 (15) PRE; 905, 906 (20) PRE; 907 (14) PRE; 908, 909 (11) PRE; 911, 913 (7) PRE; 912 (14) PRE; 914 (20) PRE; 915 (19) PRE; 916 (14) PRE; 917 (19) PRE; 918 (14) PRE; 919 (15) PRE; 920, 921 (19) PRE; 922 (15) PRE; 923 (12) PRE; 924-927 (14) PRE; 928-930 (15) PRE; 931 (14) PRE; 932 (12) PRE; 933, 934 (12) PRE; 935 (7) PRE; 936 (14) PRE; 937, 938 (1) PRE; 939 (12) PRE; 940 (1) PRE; 943-945 (14) PRE; 946, 947 (12) PRE; 948 (7) PRE; 949, 950 (1) PRE; 951, 953 (14) PRE; 952, 954 (1) PRE; 955 (14) PRE; 956 (6) PRE; 957-959 (14) PRE; 960, 961 (1) PRE; 962 (6) PRE; 963-965 (14) PRE; 966-968, 970, 971 (15) PRE; 974 (14) PRE; 979, 980 (14) PRE; 1013, 1014 (7) PRE; 1018-1021 (13) PRE; 1022-1026 (4) PRE; 1035 (16) PRE; 1545, 1546 (5) PRE; 1549, 1554 (15) PRE. *Brehm., Herb. Reg. Monacense s.n.* (14) M. *Breijer TRV 16577* (14) PRE; *TRV 16898* (14) PRE. *Bremekamp & Schweickerdt 417* (4) PRE. *Bremer 299* (14) BOL. *Brink 232* (20) GRA. K. PRE; 924 (15) GRA. *Britten 130* (19) PRE; 1245 (15) GRA; 1633 (15) GRA. PRE; 2239 (14) PRE; 2562 (14) GRA; 2828 (14) PRE; 5008 (14) GRA. PRE; 5014 (7) GRA; 5489, 5522 (14) PRE; 5523 (15) PRE; 5812 (19) GRA. PRE. *Britton 12* (1) NBG. *Brooker-Leslie s.n.* (15) GRA. *Brown 490* (14) PRE; 28858 (19) PRE. *Bryce s.n.* (4) K. *Buchenau s.n.* *Buff 760610-2/1* (7) WU. *Buitendag 104* (4) NBG. PRE. *Burchell 473, 3835, 6163, 6721* (14) K; 4049, 7463 (7) K; 6109 (19) K. PRE; 7129 (10) K; 7761 (5) K. M; 8389 (1) K. *Burgers 1015, 2186* (1) PRE; 1188, 2270 (14) PRE; 1464 (20) PRE; 2259 (12) PRE; 2268 (1) NBG. PRE; 2924 (7) NBG. *Burke 45* (14) K. PRE. *Burrows 2464* (19) PRE; 3066, 3956 (14) GRA; 3395 (7) GRA; 4118, 4682 (15) GRA. *Burt-Davy 2410* (7) K.

Campbell 13541 (19) NBG. *Capener CF/2* (19) PRE. *Cattell & Cattell 167* (15) NBG. *Catterrell 41* (4) PRE. *Chase 592* (4) BM. PRE. *Codd 3602* (7) PRE. K; 8772 (4) PRE; *Codd & De Winter 3237* (4) PRE; *Codd & Dyer 4473* (4) PRE. *Cole s.n.* (14) TCD. *Collector unknown s.n.* (14) S; (6) BOL. P. W; (6) S; 170 (14) S; (19) S. *Comins 1930* (7) PRE. *Compton 2241, 21048, 21236, s.n.* (4) NBG; 10633 (6) NBG; 11594 (1) NBG. S; 9172, 13486, 13600, 15996, 22941, 23625, 24363 (1) NBG; 18159 (1) MO. NBG; 18278 (15) M. NBG; 18380, 18449 (15) NBG; 19930 (1) C. NBG; 20274 (19) NBG; 21673 (14) C. MO; 22122 (1) BOL. NBG; 22218 (10) NBG. S; 22289 (6) NBG. S; 22870 (10) C. NBG; 2884 (15) BOL. NBG; 3005, 3166, 5915 (14) BOL. K; 3835 (15) BOL. NBG; 5725, 7427, 7438, 7498 (15) NBG; 7422 (19) NBG; 7584 (19) C; 9066, 14743 (12) NBG; *s.n.* (7) S. *Cooper 15* (7) GRA; 625 (4) BM. BOL. K. TCD; 702 (4) BM. BOL. K. M. PRE. TCD; 842 (4) BOL. K; 2301 (7) K; 2302 (4) K. *Corneliussen 1875* (6) C. *Cowling 51* (14) GRA; 796 (11) GRA; 926 (15) GRA; 1223 (20) GRA; 1419 (19) GRA; 3436 (1) NBG. *Crawford 384* (7) PRE. *Cross 58* (15) MO. NBG. *Cruden 37* (15) NBG. *Cummings s.n.* (14) GRA. *Curator Bloemfontein Museum 4* (4) PRE. *Curator Pretoria Botanical Garden P42* (10) PRE; *s.n.* (4) PRE. *Curson & Irvine 91* (4) PRE.

Dacombe s.n. (14) GRA. *Dahlgren & Peterson 168* (14) M; 1661 (4) B. K. *Dahlstrand 148* (7) MO; 1285 (19) C; 1490 (15) C. MO. NBG. PRE; 1905 (19) MO. PRE; 2836, 2849, 2850, (20) C. GRA. MO. NBG. PRE; 2949 (1) NBG. PRE; 3251 (20) C. GRA. MO. NBG. PRE. *Davidson 24904* (14) PRE. *Davidson & Mogg 32859, 32881* (4) UPS. 32909 (4) PRE. *Davies 33* (14) PRE; 48954 (4) PRE. *De Beer TRV 16536* (14) PRE. *De Kock 134* (14) PRE. *De Kruij 1158* (4) PRE. *Deall 34* (4) PRE. *Dela Bat s.n.* (1) NBG. *Devenish 712* (4) BM. K. M. NBG. PRE. *Dieterlen 49* (4) K. MO. NBG. PRE. S; 1247 (4) NBG. PRE. *District Forest Officer 97* (7) GRA. *Dobay 45* (15) NBG. *Dold 840* (4)

- GRA; 1063 (20) GRA; 1099 (14) GRA; 1617, 2053 (4) GRA; 2299 (15) GRA. *Doubell* 27 (15) GRA. *Downing* 401 (6) NBG, PRE. *Drège* 85 (14) UPS; 285 (14) GRA; 2570 (10) K. PRE; 3006 (20) GRA, PRE; s.n. (1) S; s.n. (7) K, MO; s.n. (10) BM. NBG, S; s.n. (14) MO, P; s.n. (14) S, W; s.n. (19) K; TRV10800 (14) PRE. *Du Toit* 155 (15) PRE. *Dunne* s.n. (4) BM. *Duthie* 533 (7) NBG; 1517 (16) BOL. *Dux de Wurte* s.n. (14) M. *Dyer* 179, 180 (14) PRE; 596 (15) K. PRE; 597 (14) GRA, K. PRE; 752-754 (4) GRA, K. PRE; 960, 961 (15) K. PRE; 962, 967, 968 (14) GRA, K. PRE; 963-966 (14) GRA, PRE; 970 (14) PRE.
- Ebersohn* 136 (14) NBG. *Ecklon I.11* (14) B, S; 508 (14) BOL, HAL, M. PR. PRE, S, W; 590 (14) S; 598 (20) S; s.n. (6) C; s.n. (12) S; s.n. (14) C. *Ecklon & Zeyher* 37 (14) MO, S; 100/12 (14) S; 38 (19) MO; 39 (6) BOL, G, MO, P, W; 40 (70.10) (14) B, BREM, C, MO, S, W; 41 (14) MO; 98 (15) BOL; 3781 (11) G, HAL, P, PRE, S, W, WU; 3782 (14) NBG, W; 7381 (11) BREM, K, P, PRE, WU; s.n. (1) PRE; s.n. (7) BREM, NBG, S; s.n. (10) C, UPS; s.n. (11) C, S, UPS; s.n. (14) BREM, GRA, MO, WU; s.n. (15) WU. *Edwards* 973, 974 (13) BOL, PRE; 1991 (4) PRE; 2239, 2276, 4058, 4196 (4) K. PRE; 4187 (4) K, MO, PRE; 17260 (20) BM. *Eicker* 1 (7) PRE. *Elan-Puttick* 146 (4) PRE. *Erlangh* 1017 (14) M. *Esterhuysen* 781 (14) MO; 961, 23319, 27139a (14) BOL; 1855 (1) BOL; 1998, 8978, 23446, s.n. (15) BOL; 3016 (12) BOL; 6634 (19) BOL; 6678 (11) K, NBG; 6962, 10733 (11) BOL; 11148 (10) BOL; 12189 (9) BOL; 16295 (14) PRE; 23322 (12) MO; 26714, 35616 (5) BOL, K; 29153 (4) BOL; 29962 (16) BOL, MO; 33533a (5) BOL, M; 34537, 36404 (5) BOL, K, S; 35415 (5) BOL; 35504 (1) BOL, C, M, MO; 35507 (1) S. *Euckermann* 7889 (7) PRE. *Euston-Brown* 41 (11) BOL. *Eyles* 8527 (4) K, S; *Eyles Herbarium* 7945 (4) BM.
- Fellingham* 169 (15) NBG, PRE; 202 (14) PRE; 773 (1) C, PRE. *Ferreira* 5 (4) PRE. *Flanagan* 418 (7) NBG, PRE; 1478 (14) BOL; 1635, 1892 (4) K, NBG, PRE, S. *Fokkens* 5 (7) PRE. *Forrester & Gooyer* 203 (4) PRE. *Fouche* s.n. (7) PRE. *Fourcade* 74 (19) BOL, K; 741 (15) BOL, K, GRA; 952 (14) BOL, GRA; 1478 (14) BOL, GRA, K, PRE; 1484 (14) BOL, K; 1646 (20) BOL; 1708 (11) BOL, K, NBG, PRE; 1806 (7) K, PRE; 1806 (7) NBG; 3043 (11) MO, PRE; 4417 (20) BOL; 4624, 4625 (15) BOL; 5747 (20) BOL; 5747 (20) NBG; 5940 (20) BOL, PRE. *Frankish* 253 (7) MO. *Franks* s.n. (4) PRE. *Fries* 2248, 2496 (4) K, MO. *Fries, Nordlindh & Weimarck* 3077 (4) M.
- Gafney* 11 (7) MO, PRE. *Galpin* 178 (15) PRE; 251 (14) PRE; 2028 (4) K, PRE; 3363 (7) PRE; 4491 (12) K, PRE; 4492 (20) GRA, K, PRE; 6825 (4) K; 6825 (4) PRE; 8279 (14) PRE; 9353 (7) K, PRE; 10146 (4) K, PRE; 14018, 14573, 14578, s.n. (4) BOL, PRE, S. *Garside* 491 (1) K; 502 (6) K; 1577 (1) K. *Gentry* 18995 (14) PRE. *Germshuizen* 4024 (15) PRE; 4077, 4097 (14) PRE. *Gerrard* 95 (7) K. *Gerstner* 105 (14) PRE; *Gerstner* 119, s.n. (4) PRE. *Gibbs Russell* 4094 (7) PRE. *Giess* 1293 (6) M; 9014, 9429, 13136 (4) M, PRE. *Giffen* s.n. (4) GRA. *Gilfillan* 7 (7) GRA. *Gill* 240 (4) BOL. *Gillet* 814, 1012 (14) NBG; 1207 (7) PRE; 1986 (15) NBG; 3457 (6) NBG; 4536 (19) BOL, PRE; 4536 (19) K. *Gilliland* 881 (4) BM; 904, 905 (4) BM, K; 1183, 2025 (4) BM. *Glen* 1089 (6) PRE; 1568 (15) C, PRE. *Glen & Glen* 3911 (4) PRE. *Goldblatt* 2599 (1) MO, PRE, S; 4144 (12) MO, NBG, PRE; 4380 (10) MO, NBG, *Goldblatt & Manning* 9589 (15) NBG. *Goldsmith* 15/73 (4) K, MO, PRE. *Goossens* 375 (4) PRE. *Gornley & Barber* 23 (4) PRE. *Greuter* 21500 (1) PRE; 21517 (14) PRE; 21845 (14) B, PRE; 22180 (15) PRE. *Grey* 4 (1) C. *Grobelaar* 63 (19) PRE. *Grobler* 454 (14) NBG, PRE. *Gron Dahl* s.n. (14) S. *Guthrie* 17413 (7) BOL, 17414 (6) BOL.
- Hafström* s.n. (14) S. *Hardy* 6894 (4) PRE. *Harvey* 691 (6) BM. *Hebblethwaite* s.n. (4) GRA. *Hedberg & Hedberg* 82060 (4) UPS. *Hemm* 1 (4) PRE. *Hendricks* 13 (7) GRA. *Henkel* s.n. (4) K. *Henrici* 3701 (12) BOL; *Henrici* s.n. (12) NBG. *Hepburn* 85 (4) GRA. *Herb. Banks & Swartz* s.n. (1) S. *Herb. Banks & Wikstr.* (1) C. *Herb. Bot. Hauniense* s.n. (14) C. *Herb. J. Peterstein* acc. no. 16/1946 (14) PR. *Herb. Poeppig* s.n. (14) M, PRE. *Herb. Praga Karlin, Herb. scholae med.* (14) PR. *Herb. Reg. Monacense* s.n. (14) M. *Herb. Schmidel* s.n. (14) M. *Herb. Scholae Lincopensis* s.n. (14) S. *Herb. Schreberianum* s.n. (14) M. *Herb. Sieber* 89 (14) S. *Herb. Swartzii* s.n. (14) S. *Herb. Thunberg* 9578 (7) UPS; 9579, 9596D (1) UPS; s.n. (14) UPS; s.n. (19) UPS. *Herbst* 5269 (4) PRE. *Hevdoorn* 10 (4) PRE. *Hiendlmayr* s.n. (6) M. *Hilger* 22 (4) M, PRE; 83/60 (14) M. *Hilliard & Burt* 7139 (4) MO, S; 7220 (4) PRE; 11726, 13511 (4) K, S; 12213 (4) PRE, S; 13970, 18071 (4) PRE; 14654 (15) PRE; 16921 (4) M, PRE, S; 17703, 18443 (4) PRE, S; 18570 (13) K, M, P, PRE, S. *Hilliard* 4081 (14) K, PRE; 5191 (4) MO, PRE. *Hilner* 184 (7) PRE. *Hoekstra* 73 (15) NBG. *Hoener* 1635, 1846 (4) MO, PRE, S. *Hoffenthal* 3464 (4) K. *Holland* 3699 (7) BOL. *Homan* s.n. (4) M. *Hoole* 10 (20) GRA, PRE; 11 (7) GRA. *Hopkins* B1580, 17165 (4) K, PRE; s.n. (4) K. *Hubbard* 224 (1) NBG. *Hugo* 1241 (14) PRE; 1405 (19) K, NBG, PRE; 1453 (15) K, PRE; 1912 (7) C, M, PRE; 1992 (7) NBG, PRE; 2079 (14) NBG, PRE. *Humbert* 11018, 15801 (4) NBG; 9908 (19) PRE. *Huntley* 125 (4) PRE. *Hutchinson* 143 (1) BOL, K, PRE; 149 (1) BOL, GRA, K, PRE; 663 (6) K, PRE; 1101 (15) BM, K, PRE; 1104 (15) K, PRE; 1624 (4) BM, K, PRE; 1748 (7) K, PRE. *Hutchinson, Forbes & Verdoorn* 75 (4) PRE. *Hutton* 1603 (14) K; s.n. (7) TCD.
- Ihlenfeldt* 1652 (14) PRE.
- Jacobsen* 1340 (4) PRE; 1381 (7) PRE; 3468 (4) PRE. *Jacobsz* 1379, 1482 (4) PRE; 2603 (4) NBG, PRE; 313 (4) PRE; 664 (4) PRE. *Jacot-Guillarmod* 230, 298, 765, 780, 1546, 1792 (4) PRE; 3225 (4) K, PRE; 3824 (4) GRA; 7464 (15) PRE; 7610 (14) GRA; 7854 (4) GRA, PRE; 9842, 9886 (4) GRA, PRE; 10003 (14) GRA, PRE; 20776 (1) GRA; s.n. (15) GRA. *Jacot-Guillarmod & Brink* 29 (14) GRA; 41 (7) GRA, PRE. *Jangle* 156 (16) PRE. *Johnson* 102 (20) M, NBG; 1069 (7) GRA, K, PRE. *Johnstone* 543 (4) MO, PRE, S. *Jordaan* 97 (4) PRE; 655 (1) PRE. *Joubert* s.n. (14) S. *Jules Verreaux* s.n. (14) TCD. *Junod* TRV17326 (4) PRE.
- Kapp* 1 (14) PRE. *Keet* 873 (7) NBG; 1152 (19) PRE; s.n. (4) NBG. *Kemp* 1184 (4) MO, PRE. *Kemsley* 141 (7) GRA, NBG. *Kerfoot* 8102 (4) PRE. *Kers* 3240 (4) S. *Killick* 1071, 1585 (4) PRE; 1973, 2289 (13) PRE; 4225 (4) MO, PRE; 4485 (4) PRE. *Killick & Strey* 2386 (4) M, PRE. *King* 1 (14) BM, M, MO, PRE. *Kluge* 797, 1995 (4) PRE; 2044 (4) PRE. *Knaf* s.n. (14) PR. *Krause* s.n. (6) NBG; s.n. (1) M. *Krynauw* 789 (4) PRE. *Kuntze* s.n. (7) K; s.n. (14) K.
- Laidler* 372 (15) NBG, PRE. *Lam & Meeuse* 4272 (1) S; 4660 (19) MO. *Lambinon & Reekmans* 82/157 (4) PRE. *Lansdell* s.n. (14) PRE. *Lanyokwe* 97, (14) GRA. *Laubert* s.n. (6) S. *Laubner* s.n. (7) K. *Lavrano* 3700 (15) PRE; 11652 (14) PRE. *Le Jolis* s.n. (14) S. *Le Munch* 387 (4) K. *Leighton* 1855 (1) PRE; 21113 (12) BOL. *Leitz* 182b, s.n. (14) M. *Letty* 142 (14) PRE; 269 (4) PRE. *Levy* 1515, 2371 (10) BOL; 2303, 2349, 2414, 2813, 5538, 6314, 6514, 6626, 6627, 8029, 9140, 9145, 9741, 9743, 15495 (15) BOL; 2325, 2550, 3763, 4443, 9603, 9644, 10833, 10873 (14) BOL; 3100 (6) BOL; 3101, 10291, 10832, 10867 (7) BOL; 5040, 7842 (19) BOL; 8236 (13) BOL; 8274, 9409, 9553 (4) BOL; 9511, 9674, 9726 (12) BOL; 9725 (1) BOL. *Lewis* 71 (1) NBG; 1795, 1796 (15) NBG; 1797 (15) NBG, PRE. *Liebenberg* 6574 (20) PRE; 7299 (4) K, NBG, PRE. *Lindeberg* s.n. (1) S. *Linder* 3980 (4) BOL, K, PRE. *Lindley* s.n. (14) S. *Linnaeus* 504.5 (6) LINN. *Long* 386 (15) K, PRE; 790 (14) GRA, PRE; 798 (7) K, PRE; 809 (20) PRE; 1061 (20) GRA, PRE. *Louw* 2373 (4) NBG. *Louwrens* A7763 (14) GRA. *Lubke* 274 (4) PRE, M; 1782, 2312 (7) GRA; 1861, s.n. (14) GRA. *Lutjeharms* 6818 (4) PRE. *Lynes* 1737 (20) BM; 1927 (14) BM.
- MacOwen* 103 (14) GRA, K, TCD; 103 (15) GRA; 103 (20) GRA, K, S; 3404 (6) K. *Maguire* 1127 (14) M; 1210 (15) NBG. *Manson* 147 (19) PRE. *Marloth* 1585, 2756, 6189, 6218, 10693, 10912 (14) PRE; 4273, 6862, 10964, 11283, 12724, 12785, 14128 (15) PRE; 5648 (6) B, PRE; 6244, 13044 (19) PRE; 9695 (10) PRE; 10817 (10) NBG, PRE; 11873 (4) PRE; 13012 (7) PRE; s.n. (6) PRE. *Marsh* 541 (1) K, PRE; 572, 1361 (14) PRE; 594 (19) K, PRE; 1327 (7) NBG, PRE. *Marshall* 130, 131 (15) NBG; 244 (15) NBG, PRE. *Martin* s.n. (6) GRA; s.n. (7) GRA; s.n. (19) GRA. *Maxson* s.n. (1) BM; s.n. (20) BM. *Mathews* 284 (15) PRE; 1153 (15) NBG. *Matthews & Van Rensburg* 1036 (4) PRE. *Mauve* 5246 (4) PRE. *Mauve & Hugo* 167 (14) MO, PRE. *McDonald* 819 (14) NBG, PRE; 2125, (10) NBG. *McDonald & Morley* 1005 (15) BM, NBG, PRE, TCD. *McKinnon* s.n. (14) NBG. *McKitterick* 12 (7) GRA. *McMurtry* 335 (15) PRE. *Meebold* 9965 (4) PRE; 15151, 15153, 15159, 15160 (14) M; 15154 (6) M; 15158 (4) M; 15755 (7) M. *Meinkauff* s.n. (14) M; s.n. (19) M. *Mellersh* 617 (4) TCD. *Mendes* 866 (4) BM; 3803 (4) K, M. *Merxmüller* 591 (4) M. *Meyer* 106, 1061, 9429 (4) M. *Michell* 24 (14) PRE; 71, 326 (15) PRE; 333 (10) PRE. *Miller* 2701 (7) PRE; 3815, 3847, 4644 (4) K, PRE. *Milton* 2 (16) BOL. *Mitchell, Pammenter & Spencer* B4-11 (7) PRE. *Mogg* 3347, 7083 (4) PRE; 13220 (7) K, PRE; 17383 (4) PRE; s.n. (7) PRE. *Moll* 1228 (4) K, PRE; 2466 (7) K, PRE. *Montgomery* 18 (20) NBG. *Morley* 21 (12) PRE; 92 (14) M, PRE. *Morris* 396 (19) NBG. *Mortensen* 200 (14) C. *Moss* 5644 (16) BM; 5760 (1) BM. *Moss & Rogers* 1263 (4) BM. *Mostert* 1185 (4) PRE. *Mudd* s.n. (4) K. *Muir* 12, 240 (14) NBG, PRE; 14 (7) PRE; 2441 (12) PRE; 4469 (14) K, PRE; 4485 (15) BOL, PRE; 4496 (1) K, PRE; 4538 (14) PRE; 683 (14) BOL, PRE. *Mund* s.n. (19) BM, NBG. *Munro* s.n. (15) PRE. *Museum Botanicum Hauniense* s.n. (1) C; (6) C; s.n. (7) C; s.n. (14) C.
- Nanni* 123 (7) PRE. *Nel* 219 (4) PRE. *Niven & Laubert* s.n. (5) S. *N.J.A.* s.n. (6) S. *Noel* 322 (14) GRA; *Noel* s.n. (7) GRA; s.n. (19) GRA.
- Obermeyer* 258, 1078, TRV30044 (4) PRE. *O'Callaghan* 273, 752 (14) PRE; 708 (1) NBG; 839 (7) NBG, PRE; 1003 (7) GRA; 1425 (7) NBG. *Oldenland, Herb. Schreb.* s.n. (14) M. *Oldevig-Roberts* 120 (7) S. *Olivier* 118 (15) M, PRE; 593 (19) K, PRE; 2027 (7) PRE; 2988 (14)

GRA: 3024 (7) GRA; 3197 (11) PRE; 3679 (15) K. PRE; 3797, 4555, 5194 (15) PRE; 5226, 5342 (14) PRE; 10318 (15) NBG. *Onderstall* 919, 1269 (4) PRE. *Orchard* 312 (14) C, MO, PRE, S. *Osbeck s.n.* (14) S. *Osborne* 126 (7) GRA.

Page 97 (15) PRE. *Palmer* 1094 (15) PRE; 1417 (4) GRA; 3932 (20) GRA. *Pappe s.n.* (6) NBG; *s.n.* (7) S; *s.n.* (14) GRA; *s.n.* (14) NBG. *Parker* 3843 (1) K, MO, UPS; 4109 (1) K, PRE. *Parsons* 60, 182 (7) NBG; 61, 112 (1) NBG; 169 (14) PRE; 172 (19) PRE; 322 (7) NBG, PRE. *Paterson* 1123 (7) GRA; 270 (20) GRA; 833 (15) BOL; 883 (15) PRE; TRV25754 (20) PRE. *Paterson-Jones* 697 (7) NBG. *Pedro & Pedrogao* 8095 (4) BOL, PRE. *Peeters, Gericke & Burelli* 387, 407 (4) MO, PRE. *Pegler* 234 (7) PRE. *Penther* 2891 (14) M, S, W; *s.n.* (14) M, S. *Perold & Fourie* 2256 (4) PRE. *Peterson* 1263 (16) BOL. *Phillips* 228 (4) PRE; 1294 (14) NBG; 1503 (15) NBG; 1622, 3363A, B (7) K, PRE; *s.n.* (14) NBG. *Phillipson* 624 (4) MO, UPS; 1140 (4) K, PRE. *Pillans* 2792 (14) BOL; 3779 (14) BOL, PRE; 3783 (1) BOL, PRE; 7689 (9) BOL; 8030 (14) BOL; 8513 (6) BOL; 9240 (1) BOL; 17158 (10) NBG; *s.n.* (1) GRA; *s.n.* (14) BOL, MO. *Pole Evans* 129, 986 (4) PRE; 4373 (6) PRE. *Pons s.n.* (4) PRE. *Potts* 1281 (14) PRE; BLF1300 (14) PRE; BLF288 (7) GRA, PRE; *s.n.* (14) NBG. *Primos* 41 (10) PRE. *Prosser* 2050 (4) PRE. *Purcell s.n.* (7) NBG; *s.n.* (14) NBG. *Putterill s.n.* (4) PRE.

Quickelberge A7758 (7) GRA.

Raal & Raal 296 (4) PRE. *Raitt s.n.* (15) PRE. *Ramsay* 1592 (14) GRA. *Rattray* 382 (4) BOL; 909 (4) K; *s.n.* (4) PRE. *Rauh & Schlieben* 9788 (4) M, PRE. *Rechinger A-4413* (4) M. *Reed* 35 (14) GRA. *Rehm s.n.* (1) M. *Renny* 179 (4) PRE. *Rennie* 480 (14) BOL, GRA; *Rennie* 2613 (4) BOL). *Repton* 6253 (4) PRE. *Retief* 12 (20) PRE; *Retief* 1194 (7) MO, PRE. *Rivers-Moore s.n.* (7) GRA. *Rob & Fries* 3395 (11) UPS, S. *Roberts* 1953, 1954, 1973, 2001, 3359 (4) PRE. *Robinson* 1873 (4) K, MO. *Rodin* 1305 (19) BOL, K, MO, PRE. *Rogers* 788, 21919, 23675 (4) PRE; 4724, 15512, 16701, 26983 (14) K; 16701A, 16705 (15) K, PRE; 16703, 17222 (15) K; 17281 (14) BM; 26574 (14) GRA, NBG, PRE; 26774, 26790 (7) PRE; 26987, 27017 (14) K, PRE; 27004 (19) BM, NBG, PRE; 27026 (14) PRE; 28018 (7) GRA; 28983 (19) GRA, NBG. *Rosenberg & Rutherford* 308 (12) NBG. *Rourke* 1204 (14) K, PR, PRE, S; 1505 (7) K, NBG; 3000 (14) NBG. *Rutprum s.n.* (14) S. *Rycroft* 1331 (1) NBG; 2135 (6) NBG; 3000 (19) S; 3117 (14) S; *s.n.* (1) K, S, TCD.

Salter 6220 (1) BM, K; 6352 (19) BM, BOL, K; 7051 (6) K; 9370 (14) BM; *s.n.* (14) BOL. *Sankey* 69 (4) K, MO. *Savage* Cat. 504.2 (1) LINN. 504.3, Sp. 161 (1) LINN. *Scharf* 1013 (11) PRE; 1023 (19) PRE; 1067 (11) PRE; 1069, 1522 (15) PRE; 1578, 2001, 2005 (19) NBG, PRE; 1596 (11) NBG, PRE; 1689 (19) K, NBG, PRE; 1958 (11) PRE; 1959 (11) K, PRE; 1961 (20) K, PRE; 1985, 2002 (19) PRE; 2033 (19) GRA, PRE. *Scheepers* 1831 (4) MO, PRE. *Schlechter* 1363 (1) C, PRE. *Schlieben s.n.* (4) M. *Schmidel s.n.* (14) M. *Schmidt* 41 (15) PRE; 567, 569 (14) M; 56 (4) PRE. *Schmitz* 8265, 8314 (4) PRE. *Schonland* 3054 (11) GRA, PRE; 3398, 3525 (14) GRA, PRE. *Schrire* 1869 (15) GRA; 1968, 1969, 2037, 2038 (20) GRA; 2083 (19) GRA. *Schweickerdt* 759 (4) PRE. *Seutloali* 94 (4) PRE. *Shearing* 870, 891 (15) PRE. *Shumane* P58 (20) GRA. *Sidey* 1219 (20) S; 1696, 1812 (14) MO, PRE, S; 2312 (15) MO, NBG, S; 3595, 3801 (14) PRE. S. *Sieber* 74 (14) BOL, HAL, M, NBG, P, PRE, S, W. *Sieber & Zeyher s.n.* (14) MO. *Sim* 1 (7) GRA; 20 (14) K; 68 (4) K, PRE; 1380, 1499 (14) C, NBG; 1471 (4) K; 19659 (14) PRE; 2595 (4) K. *Simon* 657 (4) K, PRE. *Simpson* 97 (15) NBG, PRE. *Smart* 15512 (14) PRE. *Smit* 22 (4) PRE. *Smith* 4637, 4649, 5081 (14) PRE. *Smuts* 91 (4) PRE; 1134 (6) PRE; *s.n.* (7) NBG; *s.n.* (14) NBG. *Smuts & Gillett* 2162 (4) BOL, NBG, PRE; 2469 (4) PRE; 3179 (4) NBG. *Smuts & Pole Evans* 933 (4) BOL, K. *Snyman s.n.* (7) GRA. *Sparman s.n.* (1) S; *s.n.* (7) M, S; *s.n.* (14) S; *s.n.* (19) M, S. *Stam* 43, 174, 429 (4) PRE. *Staples* 17 (4) PRE). *Starke s.n.* (15) NBG, PRE. *Stavner* 24 (14) GRA, PRE. *Stephen* 455 (7) PRE. *Stokoe* 1790, 1811 (10) PRE; 2542, 3199 (5) PRE, K; 2800, 2802, 22329 (5) BOL, K, NBG, PRE; 6335, 8677, 8977 (15) BOL; 8226 (16) BOL; *s.n.* (1) NBG; *s.n.* (5) NBG, PRE; *s.n.* (14) NBG; *s.n.* (15) NBG, PRE. *Stopp* 70 (7) M. *Story* 2071 (4) MO, PRE; 3109 (14) PRE; 3162 (20) PRE; 3559 (19) K, M, PRE; 3667 (4) PRE; 3778 (4) GRA PRE; 3885 (14) GRA; 3896 (4) GRA, PRE; 3899, 3900 (4) PRE. *Strauss s.n.* (12) NBG. *Strey* 715 (1) PRE; 6769 (7) PRE; *s.n.* (14) M. *Sutherland* 185B (4) TCD; *s.n.* (4) K; *s.n.* (7) K. *Swartz s.n.* (6) M. *Symons* 144 (4) PRE.

Taylor 2953 (7) PRE; 3413 (20) NBG, PRE; 3802, 8166 (1) NBG, PRE; 3803 (12) PRE; 4042 (6) K, M, PRE; 4143, 8367 (7) NBG; 5281, 7987, 7988 (14) PRE; 6211, 9871 (6) NBG, PRE; 6996 (1) NBG, PRE, S; 7123 (1) K, MO, PRE; 7562 (15) K, PRE; 8998 (7) PRE, S; 9356 (15) K, MO, PRE; 9879, 9905, 10144 (7) NBG, PRE; 10022 (1) PRE, K; 10171, 10249 (7) MO, NBG, PRE. *Teague* 312 (4) BOL, K. *Theron* 282 (7) PRE; 631 (14) PRE; 1076 (7) PRE, K; 2097 (14) PRE; 2182 (4) PRE; 2216 (14) M,

PRE. *Thoday* 13 (14) NBG; 42 (14) NBG; 52 (14) BOL, NBG; 100, (16) C, NBG, PRE; 212, 212A (10) BOL, K, NBG; 214 (15) BOL, NBG; 216 (1) K, NBG, PRE. *Thode* 993 (19) K, MO, PRE; 1120 (14) PRE; 1639 (4) PRE; A292 (4) K, MO, PRE; *s.n.* (4) NBG. *Thomas s.n.* (4) GRA. *Thompson* 1427 (15) NBG; 1856 (19) PRE; 1874 (20) PRE; 2005, 2151 (15) NBG, PRE; 3300 (14) PRE; 3303 (14) MO, PRE; 3318 (14) K, MO, PRE; 3374 (15) PRE; 880 (19) K, PRE; 903 (20) NBG, PRE. *Thunberg s.n.* (14) UPS. *Topper* 122 (1) NBG. *Torre & Perreira* 12683 (4) C. *Toughton* 156 (14) GRA. *Trauseld* 435 (13) PRE; 860 (13) PRE. *Trinity College s.n.* (14) TCD. *Tyson* 77 (10) GRA; 1449 (19) K, NBG, PRE; 2178 (20) K, NBG; *s.n.*, TRV17233 (7) PRE.

Ueckermann 7793 (19) PRE.

Vahrmeijer & Tolken 252 (7) PRE. *Van Breda* 131 (15) PRE; 639 (15) K; 679 (14) PRE; 754 (15) K, PRE; 823 (1) PRE; 1037 (7) PRE; 1633 (1) PRE; 1664 (14) PRE. *Van Dam* TRV 23994 (14) PRE. *Van der Merwe* 964, 1225 (14) PRE; 1108 (12) PRE; 1186 (1) PRE; 2420 (15) K, PRE; *s.n.* (4) K, PRE. *Van der Schijff* 4478, 4836, 5592, 5845, 6191 (4) K, PRE; 5376 (4) PRE. *Van der Walt* 250 (15) PRE; 409 (14) PRE. *Van der Westhuizen* 144, 147 (7) PRE. *Van der Zeyde s.n.* (4) MO, NBG, S. *Van Jaarsveld & Sardien* 10998 (20) PRE. *Van Niekerk* 95 (19) NBG. *Van Rensburg* 151 (14) PRE; 442 (15) PRE; 443 (1) K, M, NBG, PRE; 444 (14) PRE; 459 (7) NBG; 2147 (7) PRE; 2148 (14) PRE. *Van Schalkwyk* 46 (7) PRE. *Van Vuuren* 1632 (4) PRE. *Van Wilgen* 163 (14) PRE. *Van Wyk* 390 (14) K, PRE; 1545 (7) PRE, PRU; 1736 (12) M, PRE; 1920 (14) PRE, PRU; 2517 (7) PRE, PRU; 2899 (4) PRE, PRU; 3167 (7) PRE, PRU; 6704 (4) PRE, PRU. *Van Zinderen Bakker* 12 (6) NBG. *Van Zyl* 3366 (15) NBG, PRE. *Venter* 7123, 11013, 12721 (4) PRE. *Victor* 400 (15) PRE; 498 (14) PRE. *Vlok* 1235 (15) PRE. *Von Gedow* 473 (14) GRA.

Wager TRV10772 (4) PRE. *Wahl* 42 (19) NBG; *Wall* 30, *s.n.* (15) S; *s.n.* (6) S; *s.n.* (7) S; *s.n.* (14) S. *Wallich s.n.* (19) K. *Walsh s.n.* (6) NBG. *Walters* 1 (15) NBG; 247, 1084 (6) C, NBG; 384, 1017 (15) K, M, NBG, PRE; 1769 (15) NBG; 2143 (14) NBG. *Ward* 549, 2167, 4374, 5735, 7211 (7) PRE; 6944, 6954 (4) PRE; *s.n.* (14) TCD. *Watt & Brandwijk* 1851 (4) PRE. *Wawra* 3 (14) M, PRE. *Weigend* 2341 (7) M. *Wells* 2998 (14) PRE; *s.n.* (14) MO. *Welman* 798 (4) PRE. *Weltz* 743 (15) NBG. *Wendelberger* 406 (15) PRE. *Wendermann & Obendieck* 476 (14) B, PRE; 691, 693 (14) B, PRE; 1129 (4) K, PRE; 1560 (4) B, K, PRE; 1560 (4) K. *Werger* 1054 (4) PRE; 1806 (4) MO, PRE. *West* 181 (13) PRE; 358 (20) GRA; 485, 1392 (4) PRE. *Westfall* 716, 756 (4) PRE. *White* 95 (14) GRA; 5230 (1) PRE. *Wild* 1352 (4) K, PRE. *Willemse* 805 (12) NBG, PRE. *Williams* 440 (1) K, MO; 1008 (7) K, M; 1451 (14) NBG; 2624 (14) MO, PRE. *Williamson s.n.* (20) TCD. *Wilman s.n.* (14) PRE. *Wilms* 2277 (7) K. *Wirringhaus* 178 (14) GRA. *Without collector* 170 (15) TCD; *s.n.* (7) TCD; *s.n.* (10) TCD. *Wolley-Dod* 1575 (1) PRE, K; 1878 (6) BOL, K; 2927 (1) BM, K. *Wood* 12179 (4) NBG; 1712 (7) BM, BOL, K; 4036 (4) BOL, K, GRA; 5786 (7) M, MO; 6592 (7) S; 6601, 11405 (4) BM, K; 9139 (7) BOL, NBG; *s.n.* (4) NBG, K; *s.n.* (7) PRE. *Worsdell s.n.* (7) NBG. *Wright* 1029 (4) PRE; *s.n.* (1) K, MO, P, TCD; *s.n.* (6) C, P; *s.n.* (14) K; *s.n.* (14) TCD. *Wurtz* 208 (20) NBG; 1210 (15) NBG; 1211 (14) NBG; 1567 (1) NBG; 2121 (19) NBG.

Youthed 663 (20) GRA.

Zantovska 120 (15) PRE. *Zeyher* 34 (14) NBG; 38 (19) BOL; 41 (11) G, S; 42 (6) NBG; 44 (11) G, NBG, S, W; 117.11 (4) S; 156 (20) BM, BOL, K, NBG, TCD; 277 (19) BOL, K, NBG, TCD; 405 (7) TCD, GRA; 1025 (11) BM, NBG, TCD; 3777 (7) NBG; 3778 (19) NBG; 3779 (20) BM, MEL, NBG, S, W; 3780 (11) G, P, S, W; *s.n.* (6) NBG; *s.n.* (14) C, K, MO, P; *s.n.* (19) S. *Zietsman* 323 (4) PRE. *Zietsman & Zietsman* 427, 512 (4) PRE.

ACKNOWLEDGEMENTS

The authors wish to thank the following institutions and persons: the National Botanical Institute for the opportunity to do research in a professional and academic environment and for financial support; Prof. G.F. Smith, Director Research and Dr M. Koekemoer, curator of the National Herbarium for their support; directors and curators of the herbaria that provided material on loan. Mmes G. Condy and A. Stadler for the line drawings and Dr O.A. Leistner for translating the diagnoses into Latin; Ms S. Turck, graphic artist at PRE, for all the

technical drawings and Ms H. Steyn for producing high quality distribution maps; Mmes E. Potgieter and A. Fourie, librarians of the Mary Gunn Library, for their friendly assistance and Ms E. du Plessis for technical editing.

REFERENCES

- ACOCKS, J.P.H. 1988. Veld types of South Africa, edn 3. *Memoirs of the Botanical Survey of South Africa* No. 57: 85–87.
- ADANSON, M. 1763. *Familles des plantes*. Vincent, Paris.
- ANGIOSPERM PHYLOGENY GROUP (APG). 1998. An ordinal classification for the families of flowering plants. *Annals of the Missouri Botanical Garden* 85: 531–553.
- ARCHANGELSKY, D.B. 1971. Palynotaxonomy of the Thymelaeaceae s.l. In L.A. Kuprianova & M.S. Jakovlev, *Pollen morphology*: 104–234. Academy of Science, USSR, Komarov Botanical Institute, Leningrad (in Russian).
- ARNOLD, T.H. & DE WET, B.C. (eds). 1993. Plants of southern Africa: names and distribution. *Memoirs of the Botanical Survey of South Africa* No. 62: 1–825.
- BALL, J. 1878. Spicilegium Florae Marocanae. *Journal of the Linnean Society* 16: 281–742.
- BARTLING, F.G. 1840. *Passerina incurva*. *Linnaea* 14: 404.
- BENTHAM, G. & HOOKER, J.D. 1880. *Genera plantarum*, vol. 3. Cramer, Weinheim.
- BERGIUS, P.J. 1767. *Descriptiones plantarum ex Capite bonae Spei*. Salvius, Stockholm.
- BEYERS, J.B.P. 2001. The Cape genus *Lachnaea* (Thymelaeaceae): a monograph. *Strelitzia* 11: 1–115.
- BIGGS, C., KNIGHT, R., RAITT, L.M. & KEATS, D. 2001. The use of vegetation indicators for the assessment of coastal erosion in Milnerton South Africa. *27th Annual Conference of the South African Association of Botanists*. RAU, Johannesburg. Unpublished.
- BOISSIER, P.E. 1838. *Elenchus plantarum novarum*. Lador & Ramboz, Genève.
- BOISSIER, P.E. 1842. *Voyage botanique dans le midi de l'Espagne* 2. Paris.
- BOISSIER, P.E. 1846. *Diagnosis plantarum orientalium novarum* 1. Herman, Leipzig.
- BOLUS, H. & WOLLEY-DOD, A.H. 1904. A list of the flowering plants and ferns of the Cape Peninsula, with notes on some of the critical species. *Transactions of the South African Philo-sophical Society* 14: 207–373.
- BOND, P. & GOLDBLATT, P. 1984. Plants of the Cape flora: a descriptive catalogue. *Journal of South African Botany* Suppl. vol. 13. National Botanic Gardens of South Africa, Claremont.
- BREDENKAMP, C.L. & VAN WYK, A.E. 1996. Palynology of the genus *Passerina* (Thymelaeaceae): relationships, form and function. *Grana* 35: 335–346.
- BREDENKAMP, C.L. & VAN WYK, A.E. 1999. Structure of mucilaginous epidermal cell walls in *Passerina* (Thymelaeaceae). *Botanical Journal of the Linnean Society* 129: 223–238.
- BREDENKAMP, C.L. & VAN WYK, A.E. 2000. The epidermis in *Passerina* (Thymelaeaceae): structure, function and taxonomic significance. *Bothalia* 30: 69–86.
- BREDENKAMP, C.L. & VAN WYK, A.E. 2001a. Leaf anatomy of the genus *Passerina* (Thymelaeaceae): taxonomic and ecological significance. *Bothalia* 31: 53–70.
- BREDENKAMP, C.L. & VAN WYK, A.E. 2001b. Taxonomic significance of inflorescences, floral morphology and anatomy in *Passerina* (Thymelaeaceae). *Bothalia* 31: 213–236.
- BREDENKAMP, C.L. & VAN WYK, A.E. 2002a. Systematics of *Passerina truncata* and a new subspecies *monticola*. *Bothalia* 32: 65–71.
- BREDENKAMP, C.L. & VAN WYK, A.E. 2002b. *Passerina quadri-faria* (Thymelaeaceae): a new species from the southern Cape and Little Karoo in South Africa. *South African Journal of Botany* 68: 304–307.
- BREDENKAMP, C.L. & VAN WYK, A.E. 2002c. A new species of *Passerina* from Western Cape, South Africa. *Bothalia* 32: 76–79.
- BREDENKAMP, C.L. & VAN WYK, A.E. 2002d. Taxonomy of the *Passerina filiformis* complex (Thymelaeaceae). *Bothalia* 32: 29–36.
- BREYNE, J. 1678. *Exoticarum plantarum centuria*. David-Fredericus Rhetus, Gdansk.
- BRUMMITT, R.K. 1992. *Vascular plant families and genera*. Royal Botanic Gardens, Kew.
- BRUMMITT, R.K. & POWELL, C.E. 1992. *Authors of plant names*. Royal Botanic Gardens, Kew.
- BUBANI, P. 1897. *Flora Pyrenaea*, vol. 1. Ulrico Hoepli, Milan.
- BUNGE, A.A. VON. 1833. *Enumeratio plantarum, quas in China boreali*. Collegit St Petersburg.
- BUNNIGER, L. 1972. Untersuchungen über die morphologische Natur des Hypanthiums bei Myrtales- und Thymelaeales-Familien. *Beiträge zur Biologie der Pflanzen* 48: 79–156.
- BURDET, H.M. 1979. *Cartulae ad botanicorum graphicem*. XV. *Candollea* 34: 203, 204.
- BURMAN, J. 1739. *Rariorum Africanarum plantarum*. Henricum Bous-siere, Amsterdam.
- BURMAN, N.L. 1768. *Flora indica: cui accedit series zoophytorum indicorum, nec non prodromus florum capensis*. Cornelius Haak, Leiden; Johannes Schreuder, Amsterdam.
- CAFFERTY, S. & BEYERS, J.B. 1999. Proposal to reject the name *Lachnaea conglomerata* (Rhamnaceae). *Taxon* 48: 171, 172.
- CAMBESSEDES, J. 1827. *Enumeratio plantarum quas in insulis Balearibus*. Bélin, Paris.
- CLUSIUS, C. 1601. *Rariorum plantarum historia*. Joannem Moretum.
- COATES PALGRAVE, K. 1977. *Trees of southern Africa*. Struik, Johannesburg.
- COSSON, E.S. & DURAND, E.M. 1856. *Passerina microphylla*. *Bulletin de la Société de France* 3: 744.
- COUTINHO, A.X.P. 1909. *Thymelaea broteriana*. *Boletim da Sociedade Broteriana* 24: 145.
- DESFONTAINES, R.L. 1798. *Flora Atlantica*, vol. 1. Desgranges, Paris.
- DOMKE, W. 1934. *Untersuchungen über die systematische und geographische Gliederung der Thymelaeaceen*. E. Schweizerbart'sche Verlagsbuchhandlung (Erwin Nägele) G.M.B.H., Stuttgart.
- DRÈGE, J.F. 1843. Zwei pflanzengeographische Documente. In E. Meyer, *Besondere Beigabe zur Flora* 2: 44–229. Regensburg, Leipzig.
- DRÈGE, J.F. 1847a. Standörter-Verzeichniss der von C.L. Zeyher in Südafrika gesammelten Pflanzen. *Linnaea* 19: 584–591.
- DRÈGE, J.F. 1847b. Vergleichungen der von Ecklon und Zeyher und von Drège gesammelten südafrikanischen Pflanzen (so weit dieselben noch vorhanden) mit den Exemplaren von Zeyher's neuesten Sammlungen, welche derselbe zum Verkauf stellt. *Linnaea* 20: 183–258.
- DUBY, J.E. 1828. *Aug. Pyrami de Candolle, Botanicum gallicum* 1. Mme ve Bouchard-Huzard, Paris.
- ENDLICHER, S.F.L. 1847. *Generum plantarum supplementum quartum*, part 2. Fr. Beck, Vienna.
- FARR, E.R., LEUSSINK, J.A. & STAFLEU, F.A. 1979. *Index nominum genericorum (plantarum)*. Scheltema & Holkema, Utrecht.
- FEDER, N. & O'BRIEN, T.P. 1968. Plant microtechnique: some principles and new methods. *American Journal of Botany* 55: 123–142.
- FISCHER, F.E.L. VON, & MEYER, C.A. 1839. *Passerina vesiculosa*. *Bulletin de la Société des naturalistes de Moscou*: 170.
- FORSSKÅL, P. 1775. *Flora aegyptiaco-Arabica*. Möller, Copenhagen.
- FORSTER, G. 1786. *Florulae insularum australium prodromus*. Göttingen.
- GANDOGGER, M. 1913. L'herbier africain de Sonder. *Bulletin Société Botanique de France, Paris*: 414–422.
- GILG, E. 1894a. Thymelaeaceae. *Die natürlichen Pflanzenfamilien* 3.6a: 216–245.
- GILG, E. 1894b. Studien über die Verwandtschaftsverhältnisse der Thymelaeales und über die 'anatomische Methode'. *Botanische Jahrbücher* 18: 489–574.
- GMELIN, J.F. 1791. *Systema naturae*, part. 1. Georg Emanuel Beer, Leipzig.
- GMELIN, J.F. 1792. *Systema naturae*, part. 2. Georg Emanuel Beer, Leipzig.
- GOLDBLATT, P. & MANNING, J. 2000. Cape plants. A conspectus of the Cape flora of South Africa. *Strelitzia* 9. National Botanical Institute, Cape Town and Missouri Botanical Garden.
- GREUTER, W., MCNEIL, J., BARRIE, F.R., BURDET, H.M., DEMOULIN, V., FILGUEIRAS, T.S., NICOLSON, D.H., SILVA, P.C., SKOG, J.E., TREHANE, P., TURLAND, N.J. & HAWKSWORTH, D.L. 2000. *International Code of Botanical Nomenclature (Saint Louis Code)*. Koeltz Scientific Books, Königstein.
- GRIFF, W. 1854. *Notulae ad plantas asiaticas* 4. Bishop's College Press, Calcutta.
- GUNN, M. & CODD, L.E. 1981. *Botanical exploration of southern Africa*. Balkema, Cape Town.

- GUSSONE, G. 1843. *Flora Siculae Synopsis* 1. Tramater, Naples.
- HANSEN, B. & WAGNER, P. 1998. A catalogue of the herbarium specimens from Captain Cook's first and second expeditions housed in the Copenhagen Herbarium (C). *Allertonia* 7: 352, 353.
- HARVEY, W.H. 1868. Order CV. Thymeleae. In J.D. Hooker, *The genera of South African plants* 2: 323–327.
- HEINIG, K.H. 1951. Studies in the floral morphology of the Thymelaeaceae. *American Journal of Botany* 38: 113–132.
- HILLIARD, O.M. & BURTT, B.L. 1987. The botany of the southern Natal Drakensberg. *Annals of the Kirstenbosch Botanic Gardens* 15. National Botanic Gardens, Cape Town.
- HILLIARD, O.M. & BURTT, B.L. 1988. Notes on some plants of southern Africa chiefly from Natal: XIV. *Notes from the Royal Botanic Garden Edinburgh* 45: 77–94.
- HOLMGREN, K., HOLMGREN, N.H. & BARNETT, L.C. 1990. *Index herbariorum*. International Association for Plant Taxonomy, New York Botanical Garden, New York.
- HUTH, E. 1898. *Passerina passerina*. *Helios* 11: 135.
- IUCN Species Survival Commission 2000. *IUCN Red List Categories. As approved by the 51st Meeting of the IUCN Council*. Gland, Switzerland.
- JACKSON, B.D. 1917–1918. Linné–Tulbagh correspondence in possession of the Linnean Society, being a fifth contribution towards the history of the Linnean collections. *Proceedings of the Linnean Society* 130, Suppl. 1–13: 5–13.
- JUSSIEU, A.L. DE. 1789. *Genera plantarum*. Viduam Herissant & Theophilum Barrois, Paris.
- KARELIN, G.S. & KIRILOV, I.P. 1842. *Passerina ammodendron*. *Bulletin de la Société des naturalistes de Moscou* 15: 444.
- KARNOVSKY, M.J. 1965. A formaldehyde-glutaraldehyde fixative of high osmolality for use in electron microscopy. *Journal of Cell Biology* 27: 137a.
- LAMARCK, J.P.A.P.M. DE. 1792. *Tableau encyclopédique et méthodique. Botanique (Illustration des genres)* 2. Pancoucke, Paris.
- LAMARCK, J.P.A.P.M. DE & CANDOLLE, A.P. DE. 1805. *Flore Française*, vol. 3. Agasse, Paris.
- LAMARCK, J.P.A.P.M. DE & CANDOLLE, A.P. DE. 1815. *Flore Française*, vol. 6. Desray, Paris.
- LAPEYROUSE, P.P. DE. 1813. *Histoire abrégée des plantes Pyrénées*. De l'Imprimerie, de Bellagarigue, Toulouse.
- LEANDRI, J. 1930. Recherches anatomiques sur les Thyméléacées. *Annales des Sciences Naturelles Botanique* 12: 125–237.
- LEVYNS, M.R. 1950. Thymelaeaceae Reichb. In R.S. Adamson & T.M. Salter, *Flora of the Cape Peninsula*: 594–603. Juta, Cape Town.
- LINNAEUS, C. 1737. *Hortus Cliffortianus*. Amsterdam.
- LINNAEUS, C. 1753. *Species plantarum*, edn 1. Salvius, Stockholm.
- LINNAEUS, C. 1754. *Genera plantarum*. Salvius, Stockholm.
- LINNAEUS, C. 1755. *Centuria I. plantarum*. Höjer, Uppsala.
- LINNAEUS, C. 1756. *Centuria II. plantarum*. Höjer, Uppsala.
- LINNAEUS, C. 1760. *Amoenitates academicae* 6. Godofriedum Kiese-wetter, Leipzig.
- LINNAEUS, C. 1767. *Systema naturae*, edn 12, 2. Salvius, Stockholm.
- LINNAEUS, C. 1771. *Mantissa plantarum altera*. Salvius, Stockholm.
- LINNAEUS, C. 1784. *Systema vegetabilium*, edn 14 (edn J.A. Murray). Dieterich, Göttingen.
- LINNAEUS, C. fil. 1782. ('1781') *Supplementum plantarum*. Impensis Orphanotrophi, Brunswick.
- LITARDIÈRE, R.V. DE. 1938. *Passerina corsica*. In J.I. Briquet, *Prodrome de la flore corse* 3: 6. Lechevalier, Paris.
- LODDIGES, C. 1816. *Catalogue of plants*. Plummer & Brewis, London.
- LUBKE, R.A. 1998a. Dune Thicket. In A.B. Low & A.G. Rebelo, *Vegetation of South Africa, Lesotho and Swaziland*: 15. Department of Environmental Affairs & Tourism, Pretoria.
- LUBKE, R.A. 1998b. Terrestrial ecology. In R. Lubke & I. de Moor, *Field guide to the eastern and southern Cape coasts* 26: 402–343. University of Cape Town Press, Rondebosch.
- LUBKE, R.A. & VAN WIJK, Y. 1998. Terrestrial plants and coastal vegetation. In R. Lubke & I. de Moor, *Field guide to the eastern and southern Cape coasts* 21: 289–343. University of Cape Town Press, Rondebosch.
- MABBERLEY, D.J. 1989. *The plant-book*. Cambridge University Press, Cambridge.
- MAGALLÓN, S., CRANE, P.R. & HERENDEEN, P.S. 1999. Phylogenetic pattern, diversity, and diversification of eudicots. *Annals of the Missouri Botanical Garden* 86: 297–372.
- MARLOTH, R. 1925. *The flora of South Africa*, vol. 2.2. Darter, Cape Town.
- MEISNER, C.F. 1840. *Passerina* L. *Linnaea* 14: 390–404.
- MEISNER, C.F. 1857. Ordo CLXVII. Thymelaeaceae. In A.L.P.P. de Candolle, *Prodromus systematis naturalis* 14: 493–605. Masson, Paris.
- MEYER, C.A. 1843. Remarques sur les genres de Daphnacées sans écailles périgynes, et exposition des caractères des ces genres. *Annales des Sciences Naturelles, Seconde Série, Botanique* 20: 45–53.
- MILLER, P. 1768. *The gardener's dictionary*, edn 8. London.
- MIQUEL, F.A.W. 1863. *Annales musei botanici lugduno-batavi*, vol. 3. C.G. van der Post, Amsterdam.
- NORLINDH, T. & WEIMARCK, H. 1958. Beiträge zur Kenntnis der Flora von Süd-Rhodesia X. *Botaniska Notiser* 3: 623–631.
- PALMER, E. & PITMAN, N. 1972. *Trees of southern Africa*, vol. 3. Balkema, Cape Town.
- PAU, C. 1887. *Notas bóticas a la flora española* 1. Escuela Tipografía del Hospicio, Madrid.
- PAU, C. 1904. *Passerina granatensis*. *Carta botánicas* 1: 7.
- PAU, C. 1922. *Passerina argentata*. *Memórias del Museu de Ciências naturais*. Barcelona. Ser. Bot. 1., No. 1: 67.
- PAU, C. 1925. *Passerina pubescens* (L.) Loscos var. *virgata*. *Memórias del Museu de Ciências naturais*. Barcelona. Ser. Bot. 1., No. 3: 33.
- PETERSON, B. 1958. Beiträge zur Kenntnis der Flora von Süd-Rhodesia 10. *Botaniska Notiser* 111: 625–628.
- PETERSON, B. 1959. Some interesting species of *Gnidia*. *Botaniska Notiser* 112: 465–480.
- PHILLIPS, E.P. 1944. Notes on some genera of the Thymelaeaceae. *Journal of South African Botany* 10: 61–66.
- PLUKENET, L. 1700. *Almagesti botanici mantissa*. Sumptibus autoris, London.
- POIRET, J.L.M. 1804. *Encyclopédie méthodique (Dictionnaire Encyclopédique de botanique)* 5. Paris.
- PRESL, C.B. 1844. *Botanische Bemerkungen*. Gottlieb Haase Söhne, Prague.
- RADFORD, A.E., DICKISON, W.C., MASSEY, J.R. & BELL, C.R. 1974. *Vascular plant systematics*. Harper & Row, New York.
- RAFINESQUE, C.S. 1836. *Flora telluriana*, part 4. Auctore C.S. Rafinesque, Philadelphia.
- RAMOND DE CARBONNIÈRES, L.F.E. 1800. *Passerina dioica*. *Bulletin de la Société philomatique de Paris* 41: 131.
- REBELO, A.G. 1998. Fynbos Biome. In A.B. Low & A.G. Rebelo, *Vegetation of South Africa, Lesotho and Swaziland*: 62–74. Department of Environmental Affairs & Tourism, Pretoria.
- ROUY, G.C. 1910. *Flore de France*, vol. 12. Foucaud, Rochefort.
- ROYAL BOTANIC GARDENS, KEW. 1997. *Index kewensis* on Compact Disc. The Word Factory and System Simulation Ltd., Oxford University Press, Oxford.
- SAMPAIO, G.A. & DA SILVA, F. 1913. *Herbário Português*. Tipografia Costa Carregal, Porto.
- SAVAGE, S. 1945. *A catalogue of the Linnean Herbarium*. Linnean Society of London.
- SCHOUSBOE, P.K.A. 1800. *Iagttagelser over Vextriget: Marokko*. K.H. Seidelin, Copenhagen.
- SCHRADER, H.A. 1810. *Passerina tartonraira*. *Neues Journal für die Botanik* 4,1: 89.
- SENNEN, F. 1924. *Passerina imbricata*. *Annales de la Société linéenne de Lyon*: 69.
- SIEBOLD, P.F. & ZUCCARINI, J.G. 1846. *Florae japonicae familiae naturalis*, vol. 2. Lugdini batavorum, Leiden.
- SIM, T.R. 1919. *Flowering trees and shrubs for use in South Africa*. The Speciality Press of South Africa, Johannesburg.
- SMITH, C.A. 1966. Common names of South African plants. *Memoirs of the Botanical Survey of South Africa* No. 35: 589. Botanical Research Institute, Pretoria.
- SMUTS, L.M. 1996. *Passerina paludosa*. Information system for endangered plants, Cape Nature Conservation, Stellenbosch.
- STAFLEU, F.A. & COWAN, R.S. 1986. *Taxonomic literature*, vol. 6. Scheltema & Holkema, Utrecht.
- STEARNS, W.T. 1973. *Botanical Latin*, edn 2. David & Charles, Newton Abbott.
- STEUDEL, E.G. VON. 1841. *Nomenclator botanicus*, edn 2. Cottae, Stuttgart.
- STORY, R. 1952. A botanical survey of the Keiskammahock District. *Memoirs of the Botanical Survey of South Africa* No. 27: 1–184. Department of Agriculture, Pretoria.
- TAKHTAJAN, A.L. 1997. *Diversity and classification of flowering plants*. Columbia University Press, New York.
- TAN, K. 1980. Studies in the Thymelaeaceae II: a revision of the genus *Thymelaea*. *Notes from the Royal Botanic Garden Edinburgh* 38: 189–246.

- glomerata* sensu Thunb., 66
gnidia Forst., 90
gnidia L.f., 90
granatensis Pau, 90
grandiflora L.f., 90
gymnostachya Meisn., 90
hamulata Gand., 89
hirsuta Asso, 90
hirsuta Brot., 90
hirsuta L., 90
imbricata Burm.f., 90
imbricata Sennen, 90
incana Pourr. ex Willk. & Lange, 90
inconspicua Meisn., 90
incurva Wendl. ex Bartl., 90
involutrata Spreng. ex Meisn., 90
involutrata Thunb., 90
japonica Sieb. & Zucc., 90
javanica Thunb., 90
juniperifolia Lapeyr., 90
kalifolia Pourr. ex Willk. & Lange, 90
laevigata L., 90
laniflora C.H.Wright, 90
lanuginosa Pau, 90
lateriflora Hort. ex Wikstr., 90
laxa L.f., 90
lessertii Wikstr., 90
linariaefolia Pourr. ex Wikstr., 90
linearifolia Wikstr., 90
linearis Wendl. ex Bartl., 90
linoides Thunb., 90
longiflora Thunb., 90
longifolia Thunb., 90
matnak J.F.Gmel., 90
metkan J.F.Gmel., 90
metnam Forssk., 90
metnan Forssk., 90
microphylla Coss. & Dur., 90
montana Thoday, 68
montivaga Bredenk. & A.E.van Wyk, 85
montivagus Bredenk. & A.E.van Wyk, 85
nervosa Thunb., 90
nervosa Wikstr., 91
nitida (Vahl) Desf., 91
nivalis Ram., 91
nivicola Bredenk. & A.E.van Wyk, 74
obtusifolia Thoday, 82
orientalis Willd., 91
paleacea Wikstr., 66
paludosa Thoday, 84
passerina Huth., 91
pectinata Lodd., 85
pendula Eckl. & Zeyh. ex Thoday, 77
pendula Eckl. & Zeyh. fide Drège, 77
pentandra Thunb., 61, 91
persica Boiss., 91
pilosa G.Forst., 91
pilosa L.f., 91
planifolia Burm.f., 91
polycephala E.Mey ex Meisn., 91
polygalaefolia Lapeyr., 91
prostrata G.Forst., 91
prostrata L.f., 91
pubescens Guss., 91
pubescens (L.) Loscos var. *virgata* Pau, 91
pubescens (L.) Wikstr., 91
purpurea Wikstr., 91
quadrifaria Bredenk. & A.E.van Wyk, 68
racemosa Wikstr., 91
rigida Wikstr., 73
 var. *comosa* Meisn., 77
 var. *tetragona* Meisn., 69
 var. *truncata* Meisn., 63
rosmarinifoliae fide Meisn., 91
rubra C.H.Wright, 87
ruizii (Loscos.) Font-Quer, 91
salina Munby, 91
salsa Hunley, 91
salsolaefolia Poir., 91
sanamunda (All.) Bub., 91
segobriensis Pau, 91
sericea L., 91
setosa Thunb., 91
spicata L.f., 91
stachyoides Schrenk, 91
stellera Ram. ex Lam. & DC., 91
stelleri Wikstr., 91
striata Poir., 91
stricta Thunb., 91
subspicata Meisn., 91
tartonraira Schrad., 91
tenuiflora Willd., 91
tetragona Burch., 70
tetragona Steud., 91
thesioides Wikstr., 91
thomasii Duby, 91
thunbergii Wikstr., 91
thymelaea (Lam.) DC., 91
tinctoria Pourr., 91
 var. *angustifolia* Boiss., 91
tingitana Salzm. ex Meisn., 91
tomentosa Wikstr., 92
truncata (Meisn.) Bredenk. & A.E.van Wyk, 68
 subsp. *truncata*, 68
 subsp. *monticola* Bredenk. & A.E.van Wyk, 68
uniflora Drège ex Meisn., 92
uniflora L., 92
 var. *alba* P.J.Bergius, 92
 var. *angustifolia* Burm.f., 92
 var. *latifolia* Burm.f., 92
 var. *purpurea* P.J.Bergius, 92
velutina Boiss., 92
velutina [Pourr.] Cambess., 92
vesiculosa Fisch. & C.A.Mey., 92
villosa Thunb., 92
villosa Wikstr., 92
virescens Coss. & Dur. ex Meisn., 92
virgata Desf., 92
vulgaris (Meisn.) Thoday, 81
Passerine Lam. & DC., 61
Sanamunda Adans., 61
Steirotis Raf., 61
Stellera passerina L., 89, 90, 91
Thymelaea Adans., 61
 arvensis Lam., 89, 91
 var. *pubescens* (Guss.) Meisn., 91
 canescens (Schousb.) Endl., 89, 90
 elliptica (Boiss.) Endl., 90
 nitida Endl., 91
 nivalis (Ram.) Meisn., 90
 orientalis Meisn., 91
 tartonraira All. var. *calvescens* Gren. & Godr., 89, 91
 thesioides (Lam.) Endl., 91
Trimeandra Raf., 61