

Red Data List of southern African plants. 1. corrections and additions

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The recently published *Red Data List of southern African plants* (Hilton-Taylor 1996), by its very nature, is dynamic and constantly changing. It was therefore proposed that any corrections to the List, such as changes in names, conservation status and distributions; deletions; and new additions, should be published annually in *Bothalia* to provide users of the List with information as up-to-date as possible. These corrections and additions will form a series similar to the contributions to the *Flora of southern Africa (FSA)* published in *Bothalia* as 'FSA contributions'.

It should be noted that all corrections and comments given here pertain only to the information published in the Red Data List (Hilton-Taylor 1996), whereas the additions are new records which must be added to the List. Readers are referred to Hilton-Taylor (1996) for an explanation of the methodology used and for definitions of all the terms. The old IUCN Red Data Categories have been used here again, rather than the new categories. A departure from the methodology described in Hilton-Taylor (1996) is the use of the new South African provinces. The abbreviations for the old provinces are, however, given in brackets so that information is comparable to that in the published List. Name changes for those taxa in the Red Data List whose conservation status is not threatened (nt), neither locally nor globally, are not given here. Changes in conservation status (hereafter referred to as status) apply to both the local and global level, unless otherwise specified. Corrections, additions or deletions of taxa in the Extinct, Endangered or Vulnerable categories should also be made in Appendix 2 where necessary.

CORRECTIONS

1. The status of *Amphithalea rostrata* A.L.Schutte & B.-E.van Wyk, should be changed from Rare (R) to Endangered (E) as it is only known from a small population near Pearly Beach on the Agulhas Plain.

2. The author citation for *Apodolirion lanceolatum* should be (Thunb.) Baker not (L.f.) Benth. (Hilliard & Burt 1973).

3. A population of *Argyrobium crinitum* (E.Mey.) Walp. (Edwards 1996) was recently rediscovered (J.H.J. Vlok pers. comm.). The conservation status of this attractive shrub should therefore be changed from Extinct (Ex) to Endangered (E). The population comprises only a dozen plants along a road verge and approximately 200 individuals in a remnant piece of Renosterveld vegetation between wheat fields.

4. *Argyrobium* sp. nov. (*Drège s.n.*, BM) has been formally described by Edwards (1996) as *Argyrobium*

angustissimum (E.Mey.) T.J.Edwards. Its Extinct (Ex) status is unchanged.

5. *Brachystelma discoideum* R.A.Dyer was incorrectly listed as being globally Rare (R) and endemic to the FSA region. S. Venter (pers. comm.) reports that it also occurs in Botswana and Zimbabwe. Pending further details, its global status and status in Botswana should be changed to Insufficiently Known (K).

6. *Ceropegia filiformis* (Burch.) Schltr. is now known to occur on the Great Karas Mountains in southern Namibia where it is fairly common, and there have also been a number of new collections from the Northern and Eastern Cape (Bruyns 1995). The conservation status for this species should therefore be changed from Rare (R) locally (Cape) and globally to not threatened (nt) and a status of nt should be listed under Namibia (N). The Vulnerable (V) status under the Free State (O) remains unchanged as it is only known from a single collection made in that province (Bruyns 1995).

7. The status of *Coelidium obtusilobum* Granby, should be changed from Rare (R) to Endangered (E) as it is only known from the type collection made by Elsie Esterhuysen in 1954. As this area has been fairly well collected this species may even be Extinct (Ex).

8. *Coelidium vlokii* A.L.Schutte & B.-E.van Wyk, is threatened by agricultural activities and its status should be changed from Rare (R) to Endangered (E).

9. Nordal & Fangan (1994) have shown that *Crinum zeylanicum* (L.) L., pro parte, sensu Nordal (1977) should be regarded as a synonym of *Crinum ornatum* (L.f. ex Aiton) Bury. *Crinum kirkii* sensu Verdoorn in *Bothalia* 11: 38 (1973) non Baker, previously listed as a synonym of *C. zeylanicum* (L.) L., should therefore also be listed as a synonym of *C. ornatum*. The conservation status remains not threatened (nt) as it is a common widespread taxon.

10. *Cyclopia bowieana* Harv. is not as scarce as previously thought and its status should be changed from Indeterminate (I) to not threatened (nt).

11. *Cyclopia burtonii* Hofmeyr & E.Phillips (note the corrected spelling of Hofmeyr) is a scarce endemic from the upper slopes of the Great Swartberg Mountains. As it is susceptible to frequent burning, the conservation status should be changed from Indeterminate (I) to Rare (R).

12. Several attempts to relocate *Cyclopia filiformis* Kies, have been unsuccessful; the conservation status should therefore be changed from Insufficiently Known (K) to Extinct (Ex) (A.L. Schutte pers. comm.).

13. The status of *Cyclopia latifolia* DC. should be changed from Vulnerable (V) to Endangered (E) as it is known only from two sites, one comprising 23 plants and the other just a single individual (J.H. de Lange pers. comm.).

14. *Cyclopia pubescens* Eckl. & Zeyh. is severely threatened by expanding urbanisation and its status should be changed from Insufficiently Known (K) to Endangered (E).

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15. The conservation status of *Echiostachys spicatus* (Burm.f.) Levyns was incorrectly given as Vulnerable (V); this should be changed to Rare (R) (Hall & Veldhuis 1985).

16. The realisation that plants named as *Encephalartos lebomboensis* I. Verd. from the Lebombo Mountain range in KwaZulu-Natal and Swaziland were incorrectly identified and represent a separate and undescribed species (Vorster 1995, 1996e) means that the distribution and status of *E. lebomboensis* needs to be corrected. *E. lebomboensis* only occurs in the Pongola River valley of KwaZulu-Natal (KN) with a disjunct population on the Lebombo range in Mpumalanga (T) (Vorster 1996e). As a result of its reduced distribution range and population size, the conservation status of this species should be upgraded from Rare (R) to Vulnerable (V) in both provinces and globally. The conservation status given under Swaziland should be deleted.

17. The population of *E. lebomboensis* in the Pongola River valley has popularly been referred to as the 'Piet Retief' form (Vorster 1995) and hence the use of *Encephalartos* sp. nov. 'Piet Retiefii' (Vorster 2977, PRE) in the Red Data List (Hilton-Taylor 1996). Following the taxonomic changes described above, this 'name' must now be placed into synonymy under *E. lebomboensis* (Vorster 1995).

18. *Encephalartos* sp. nov. 'Msinga' (Vorster 2949, PRE) was formally described by Vorster (1996c) as *Encephalartos msinganus* Vorster. Its conservation status is still Endangered (E).

19. *Encephalartos* sp. nov. 'venetus' (Steyn 318, PRE) was recently described by Vorster (1996d) as *Encephalartos venetus* Vorster. Unbeknown to Vorster, a manuscript describing this taxon as *Encephalartos nubimontanus* P.J.H. Hurter, was submitted almost simultaneously for publication elsewhere (Hurter 1995; Hurter & Claassen 1996). As *E. nubimontanus* was effectively and validly published before *E. venetus*, it is accepted as the correct name for the taxon while *E. venetus* is regarded as a synonym. The conservation status of this taxon remains Endangered (E).

20. E.G.H. Oliver (pers. comm.) has found that specimens previously named as *Erica parvulisepala* H.A. Baker, match the type of *Erica xanthina* Guthrie & Bolus, and as the latter is the older name it must take priority. *E. parvulisepala* will therefore be reduced to synonymy under *E. xanthina* (E.G.H. Oliver pers. comm.). As a result of this taxonomic change, the conservation status of *E. xanthina* must be changed from Insufficiently Known (K) to Rare (R).

21. A recent study of *Euphorbia barnardii* A.C. White, R.A. Dyer & B. Sloane (Knowles & Witkowski 1996) has shown that it is not as threatened as previously thought and that its conservation status should be changed from Endangered (E) to Vulnerable (V).

22. The distribution of *Gladiolus appendiculatus* G.J. Lewis var. *appendiculatus* should be extended to KwaZulu-Natal (KN) where it is also Rare (R).

23. The spelling of the specific epithet for *Haemanthus pauciflorus* Snijman & A.E. van Wyk should be corrected to *paucifolius* (Snijman & Van Wyk 1993).

24. The spelling of the specific epithet for *Haworthia mcmurtryi* C.L. Scott should be changed to *macmurtryi* in accordance with ICBN Article 60C.4 (Greuter *et al.* 1994).

25. The conservation status of *Liparia angustifolia* (Eckl. & Zeyh.) A.L. Schutte should be changed from Insufficiently Known (K) to Endangered (E). This species occurs in marshy areas along the coast between the Cape Peninsula and Hermanus and many populations have been destroyed by coastal developments.

26. The status of *Liparia splendens* (Burm.f.) Bos & de Wit subsp. *splendens*, should be changed from Insufficiently Known (K) to Rare (R).

27. *Liparia laevigata* (L.) Thunb. is confined to the Cape Peninsula, occurring only in marshy places on Constantiaberg and Table Mountain; its status should be changed from Insufficiently Known (K) to Rare (R).

28. *Liparia myrtifolia* Thunb., is now known to have a wide distribution in the southwestern Cape occurring on many mountain ranges where it appears to be secure. Its conservation status should therefore be changed from Insufficiently Known (K) to not threatened (nt).

29. *Lobostemon* sp. nov. (Buys 432, STE) is now formally described as *Lobostemon belliformis* Buys (Buys & Van der Walt 1996). Its conservation status needs to be changed from Vulnerable (V) to Endangered (E), as only twenty plants are known to survive in the wild (Buys & van der Walt 1996).

30. *Podalyria burchellii* DC. is incorrectly recorded as occurring in KwaZulu-Natal. Its status remains unchanged.

31. *Podalyria cordata* (Thunb.) R.Br., although localised, is not as threatened as previously thought and its status should be changed from Vulnerable (V) to Rare (R).

32. Recent attempts to relocate *Podalyria microphylla* E.Mey. in its natural habitat, have been unsuccessful, and its status should therefore be changed from Indeterminate (I) to Extinct (Ex). Its habitat has largely been replaced by urbanisation.

33. The <D> which occurs after the author citation for *Podalyria velutina* Burch. ex Benth. is a typographical error which should be deleted.

34. The following entry should be inserted into Appendix 3: *Polycarena capitatum* Benth. *sensu* Hall *et al.* (1980) see *Phyllopodium heterophyllum* (L.f.) Benth.

35. The <D> which occurs after the author citation for *Pseudopentameris obtusifolia* (Hochst.) N.P. Barker, is a typographical error which should be deleted. The conservation status of this species should also be changed from Insufficiently Known (K) to Rare (R) (Barker 1995).

36. Investigation by P.V. Bruyns (pers. comm.) into the identity and distribution of *Senecio sarcoides* (DC.) C. Jeffrey, has shown that it is a far more common and widespread species in the Western and Northern Cape (C) than previously thought. Its conservation status should therefore be changed from Insufficiently Known (K) to not threatened (nt).

37. For *Sonderina streyi* Merxm., the status of Insufficiently Known (K) was omitted from under Namibia.

38. *Stirtonanthus taylorianus* (L. Bolus) B.-E. van Wyk & A.L. Schutte, is not as threatened as previously thought and its status should be changed from Vulnerable (V) to Rare (R). The spelling of the specific epithet of this taxon was incorrectly given as 'tayloriana' in Appendix 2.

39. The following entry under Appendix 3 of the List, *Priestleya tomentosa* (L.) Druce see *Liparia vestita* Thunb.

is incorrect, and should be replaced with the following: *Priestleya tomentosa* sensu Hall & Veldhuis (1985) auct. non (L.) Druce see *Xiphotheca fruticosa* (L.) A.L.Schutte & B.-E.van Wyk. The entry for *L. vestita* should be deleted from Appendix 1 and a new entry for *X. fruticosa* should be added. This endemic Western Cape (C) taxon was previously thought to be Rare (R) but is now better classified as not threatened (nt) because its distribution has been greatly expanded.

40. *Xiphotheca canescens* (Thunb.) A.L.Schutte & B.-E.van Wyk, should be reclassified from Insufficiently Known (K) to Vulnerable (V) because of its very restricted distribution close to an expanding farming area.

41. *Xiphotheca elliptica* (DC.) A.L.Schutte & B.-E.van Wyk, previously listed as Indeterminate (I) should be reclassified as not threatened (nt) as it is a fairly common high altitude mountain species.

42. *Xiphotheca guthriei* (L.Bolus) A.L.Schutte & B.-E.van Wyk, is severely threatened by farming practices and its status should therefore be changed from Insufficiently Known (K) to Endangered (E).

43. The status of *Xiphotheca lanceolata* (E.Mey.) Eckl. & Zeyh., must be changed from Indeterminate (I) to Endangered (E) as it is severely threatened by urban expansion on the Cape Flats.

44. The status of *Xiphotheca reflexa* (Thunb.) A.L.Schutte & B.-E.van Wyk, must be changed from not threatened (nt) to Vulnerable (V) as it only occurs on the Western Cape (C) lowlands in areas now largely replaced with agricultural lands and urban areas. Recent searches for this species were unsuccessful (A.L. Schutte pers. comm.).

45. The status of *Xiphotheca tecta* (Thunb.) A.L.Schutte & B.-E.van Wyk, should be changed from Rare (R) to not threatened (nt) as it has a wide distribution and is relatively safe.

46. *Erica* sp. nov. '*flexistyla*' (Oliver 10558 STE) has been formally described by Oliver & Oliver (1995) as *Erica flexistyla* E.G.H.Oliv. Its Endangered (E) status remains unchanged.

47. *Erythrophyssa transvaalensis* I.Verd. is not endemic to the FSA region as it also occurs in southwestern Zimbabwe, it's rare (R) status remains unchanged.

48. The <D> which occurs after the author citation for *Nemesia micrantha* Hiern, is a typographical error which should be deleted.

49. The <D> which occurs after the author citation for *Nemesia picta* Schltr., is a typographical error which should be deleted.

50. Based on information from C.J. Geldenhuys (pers. comm.) the status of *Ocotea bullata* (Burch.) Baill. should be changed from a question mark (?) under Cape (C) to not threatened (nt), and therefore its global status should also be changed from Vulnerable (V) to not threatened (nt).

51. *Ocotea kenyensis* (Chiov.) Robyns, is not endemic to the FSA region and its global status should be changed from (R) to not threatened (nt).

52. The status of *Strelitzia alba* (L.f.) Skeels, should be changed from Indeterminate (I) in the Cape (C) and globally, to not threatened (nt), (C.J. Geldenhuys pers. comm.).

53. The global conservation status of *Strelitzia juncea* Link, should be Rare (R).

54. The global status of *Vlokia ater* S.A.Hammer, should be Rare (R).

ADDITIONS

All taxa listed here are endemic to the FSA region and the global conservation status is therefore the same as the local status (province and/or country) unless otherwise indicated. The status of newly recorded taxa not previously known to occur in the FSA region is not given here, unless the taxon concerned is already classified as threatened elsewhere. The conservation status of these taxa will be evaluated at a later stage once more collecting information is available. The additions are listed in alphabetical order by family and genus.

Aizoaceae

1. *Delosperma guthriei* Lavis, is a Vulnerable (V) species confined to coastal areas at Kleinmond and Hermanus in the Western Cape (C) where it is threatened by coastal development and alien plant invasions.

2. *Drosanthemum austricolum* L.Bolus, is an Endangered (E) limestone endemic from the Agulhas Plain, Western Cape (C) where it is confined to an area densely infested by alien species.

3. *Lampranthus stenus* (Haw.) N.E.Br., is a Rare (R) species recorded from lowland coastal sites from the Cape Peninsula to Hermanus, Western Cape (C).

Apiaceae

1. *Centella ternata* M.T.R.Schubert & B.-E.van Wyk, is an Insufficiently Known (K) species known only from the type collection made by Elsie Esterhuysen in the Cedarberg, Western Cape (C) in 1962 (Schubert & Van Wyk 1995).

2. *Centella umbellata* M.T.R.Schubert & B.-E.van Wyk, is an Insufficiently Known (K) species known only from the type collection made by Elsie Esterhuysen on the mountain slopes above Porterville in the Western Cape (C) in 1979 (Schubert & Van Wyk 1995).

Asteraceae

1. *Hoplophyllum ferox* Sond., is a very poorly known species collected from only two localities in the Western Cape (C) portion of the Great Karoo last century. Until further information is obtained, its conservation status is Indeterminate (I).

2. *Metalasia octoflora* DC., is a Vulnerable (V) species confined to Renosterveld fragments on the lowlands along the west coast of the Western Cape (C).

Euphorbiaceae

Euphorbia versicolores G.Will., is a Rare (R) species known only from two small colonies in the central Richtersveld of the Northern Cape (C). Although only approximately 20 plants in total are known, this species is not classified as Endangered or Vulnerable at this stage, as it is not considered to be severely threatened at present. There are probably other undiscovered populations in this botanically poorly explored remote, mountainous area (Williamson 1995).

Fabaceae

A large number of species in this family have been added to the Red Data List as a result of a recent detailed systematic study of the tribes Podalyriaceae and Lipariaceae (Schutte 1995a):

1. *Amphithalea alba* Granby, is a Vulnerable (V) limestone endemic from the Agulhas Plain, Western Cape (C).
2. *Amphithalea axillaris* Granby, is a Rare (R) species from the Langeberg and Outeniqua Mountains, Western Cape (C).
3. *Amphithalea biovulata* (Bolus) Granby, is a Vulnerable (V) species recorded mainly from the Agulhas Plain, Western Cape (C). It is threatened by agricultural activities.
4. *Amphithalea ericifolia* (L.) Eckl. & Zeyh. subsp. *erecta* Granby, is an Endangered (E) taxon from the west coast lowlands, Western Cape (C).
5. *Amphithalea ericifolia* (L.) Eckl. & Zeyh. subsp. *scoparia* Granby, is a Rare (R) taxon from the Hottentots Holland and Riviersonderend Mountains, Western Cape (C).
6. *Amphithalea ericifolia* (L.) Eckl. & Zeyh. subsp. *minima* Granby, is a Rare (R) highly localised endemic taxon from the Riviersonderend Mountains, Western Cape (C).
7. *Amphithalea imbricata* (L.) Druce, is a Rare (R) species from the Cape Peninsula and Hottentots Holland Mountains in the Western Cape (C).
8. *Amphithalea oppositifolia* L.Bolus, is an Endangered (E) species from the Kogelberg and Betty's Bay area, Western Cape (C).
9. *Amphithalea sericea* Schltr., is a Vulnerable (V) species from the Agulhas Plain, Western Cape (C).
10. *Amphithalea speciosa* Schltr., is an Endangered (E) species from the Elim area near Bredasdorp, Western Cape (C), where it is threatened by agricultural activities.
11. *Amphithalea stokoei* L.Bolus, is an Endangered (E) species known only from a single locality on the Hottentots Holland Mountains, Western Cape (C).
12. *Amphithalea tomentosa* (Thunb.) Granby, is a Vulnerable (V) species occurring on the coastal lowlands between Betty's Bay and Riversdale, Western Cape (C), where it is threatened by coastal development and agricultural activities.
13. *Amphithalea virgata* Eckl. & Zeyh., occurs only in the Caledon area of the Western Cape (C), where it is highly Endangered (E) by agricultural activities.
14. *Coelidium bowiei* Benth., is a Vulnerable (V) highly localised species from the Houhoek, Caledon and Kleinmond areas, Western Cape (C).
15. *Coelidium flavum* Granby, is a poorly known but apparently Rare (R) species confined to a small area on the Outeniqua Mountains, Western Cape (C).
16. *Coelidium minimum* Granby, is a Rare (R) species known only from the type collection made near Nieuwoudtville, Northern Cape (C). This area has been relatively well collected and it is surprising that no further collections have been made.
17. *Coelidium pageae* L.Bolus, is a Rare (R) species confined to the Montagu area, Western Cape (C).
18. *Coelidium purpureum* Granby, is a Rare (R) species known only from the type collection made in the Koue Bokkeveld Mountains, Western Cape (C).
19. *Coelidium spinosum* Harv., is a Rare (R) species recorded only from the Hex River Valley and Touwsrivier area, Western Cape (C).
20. *Cyclopia laxiflora* Benth., is known only from a few old records collected in the Knysna–Plettenberg Bay area, Western Cape (C). Despite numerous searches for this species, no traces of it have been found; it is therefore presumed to be Extinct (Ex).
21. *Liparia bonaespei* A.L.Schutte, is a poorly known Rare (R) species from the Hottentots Holland Mountains, Western Cape (C), where it has only been collected a few times (Schutte 1995b).
22. *Liparia calycina* (L.Bolus) A.L.Schutte, is a Rare (R) species confined to a few localities on the Hottentots Holland and Klein River Mountains, Western Cape (C).
23. *Liparia congesta* A.L.Schutte, is a Rare (R) species known only from a few localities in the Cederberg, Western Cape (C) (Schutte 1995b). Only one plant could be found during a recent search for this species and it is probably susceptible to frequent burning (A.L. Schutte pers. comm.).
24. *Liparia genistoides* (Lam.) A.L.Schutte, is a very Rare (R) species known only from two disjunct localities on the Kamanassie and Kouga Mountains in the Eastern Cape (C).
25. *Liparia graminifolia* L., has not been collected since 1829, when it was found by Ecklon near Simon's Town on the Cape Peninsula, Western Cape (C). This species probably became Extinct (Ex) as a result of urban development.
26. *Liparia parva* Vogel ex Walp., is a Rare (R) species confined to the Cape Peninsula, Western Cape (C).
27. *Liparia rafnioides* A.L.Schutte, is a Rare (R) species known only from a single locality in the Kogelberg Mountains, Western Cape (C) (Schutte 1995b).
28. *Liparia striata* A.L.Schutte, is confined to two hills near Swellendam–Heidelberg, Western Cape (C), where it is seriously Endangered (E) by farming activities (Schutte 1995b).
29. *Podalyria argentea* (Salisb.) Salisb., is a Rare (R) species restricted to the Cape Peninsula, Cape Flats and Hottentots Holland Mountains, Western Cape (C). Many of the populations on the lower slopes and flats have been destroyed by urbanisation (A.L. Schutte pers. comm.).
30. *Podalyria lanceolata* (E.Mey.) Benth., is a Rare (R) Langeberg endemic, Western Cape (C).
31. *Podalyria orbicularis* (E.Mey.) Eckl. & Zeyh., is a Rare (R) species known only from the Swartberg near Caledon and Genadendal Mountain, Western Cape (C).
32. *Podalyria pearsonii* E.Phillips, is a Rare (R) species recorded only from a few sites on the Bokkeveld escarpment near Nieuwoudtville in the Northern Cape and the Gifberg in the Western Cape (C).
33. *Podalyria reticulata* Harv., is a Rare (R) species known only from three old collections made on the Swartberg near Caledon, Western Cape (C). This taxon is doubtfully distinct from *P. orbicularis* (see above).
34. *Podalyria sericea* (Andrews) R.Br., is a Vulnerable (V) species confined to granite hills on the Cape Peninsula

and Cape Flats, Western Cape (C), where it is threatened by urbanisation.

35. *Stirtonanthus chrysanthus* (Adamson) B.-E. van Wyk & A.L. Schutte, is a highly localised Rare (R) endemic of the Klein Swartberg Mountains, Western Cape (C).

36. *Stirtonanthus insignis* (Compton) B.-E. van Wyk & A.L. Schutte, is a Vulnerable (V) species, limited to the mountains around Montagu. Some populations are threatened by farming activities.

37. *Xiphotheca cordifolia* A.L. Schutte & B.-E. van Wyk, is a Rare (R) species known only from a few collections made in the Hex River Mountains, Western Cape (C).

Iridaceae

1. *Galaxia parva* Goldblatt, is a Vulnerable (V) species confined to a single locality on the Agulhas Plain near Bredasdorp, Western Cape (C) (Goldblatt 1984).

2. *Gladiolus abbreviatus* Andrews, is a Vulnerable (V) species from the Western Cape (C). It was once fairly widespread but is now limited to remnant Renosterveld patches and road verges (J.C. Manning pers. comm.).

3. *Moraea regalis* Goldblatt & J.C. Manning, is a Rare (R) species known only from a single locality at De Rust in the Little Karoo, Western Cape (C) (Goldblatt & Manning 1995).

Poaceae

Pseudopentameris brachyphylla (Stapf) Conert, is a Rare (R) species from the Betty's Bay area of the Western Cape (C), which although not presently under threat, is 'potentially threatened' because of its narrow habitat requirements (Barker 1995).

Orchidaceae

Following a systematic revision of *Disa draconis* (L.f.) Sw. by Johnson & Linder (1995), this Western Cape (C) species needs to be added to the Red Data List as Endangered (E). One small population is protected at Rondevlei, a pocket-sized nature reserve, while the remainder are all under severe threat from urban and agricultural development (Johnson & Linder 1995).

Zamiaceae

1. *Encephalartos hirsutus* P.J.H. Hurter, is a Vulnerable (V) species known only from three small, widely separated populations in the Northern Province (T) (Hurter & Glen 1996).

2. *Encephalartos aplanatus* Vorster, is a critically Endangered (E) species which occurs in Swaziland (S); only a single population is known, comprising just a few scattered individuals (Vorster 1996a).

3. *Encephalartos brevifoliolatus* Vorster, is an Endangered (E) species known only from five individuals widely scattered over a few square kilometers in the Northern Province (T) (Vorster 1996b).

4. *Encephalartos senticosus* Vorster, is a Rare (R) species occurring along the Lebombo Mountain range in northern KwaZulu-Natal (KN) and Swaziland (S) (Vorster 1996e). This species is not endemic to the FSA region, as it also occurs in southern Mozambique where it is considered to be Vulnerable (V) (Bandeira *et al.* 1996). Large

numbers of this species have been removed from the wild for horticultural purposes in the last 50 years (Vorster 1996e) and if this trend continues, its status will have to be changed to Vulnerable (V).

SUMMARY

As a result of the changes in status and the additions to the Red Data List given above, the statistics on the number of taxa in each threatened category need to be changed [see Table 2 of the Red Data List, Hilton-Taylor (1996)]. Sixty taxa are now presumed to be Extinct (Ex), 270 are Endangered (E), 432 Vulnerable (V), 1436 Rare (R), 375 Indeterminate (I) and 905 Insufficiently Known (K). The numbers in all the categories, except for the last two, have increased. Twelve taxa were removed from the List and 55 were added, giving a new total of 3 478 globally threatened taxa in the FSA region.

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Book Reviews

DYNAMICS OF WEED POPULATIONS by R.D. Cousens & M. Mortimer. 1995. *Cambridge University Press*, The Edinburgh Bldg, Shaftsbury Rd, Cambridge CB2 2RU, UK. Pp. 332. Hard cover: ISBN 0 521 49649 7, price £50.00, US\$79.95. Soft cover: ISBN 0 521 49969 0, price £17.95, US\$29.95.

The study of weed dynamics in agricultural situations has for centuries been largely directed at solving problems (how can the weeds be killed?). Large-scale problems associated with the invasive spread of alien plants into natural ecosystems is a much more recent phenomenon, and agricultural weed scientists have paid little attention to the study of the dynamics of such invasions. The study of invasions of natural systems has been the domain of ecologists who see the phenomenon as a special case of succession with considerable potential for shedding light on the forces that structure communities. With a few exceptions, studies of such invasions have paid little attention to advances in 'classical' weed science. Recent synthesis volumes in these disciplines have further contributed to the widening chasm. The authors of this timely volume set out to integrate recent advances from the two related fields. They believe there is a need to 'establish a framework of interlocking components, which together help us to predict and to manage the size of populations'.

In attempting this ambitious task, Cousens & Mortimer explore the dynamics of geographic range expansion (at various scales); dispersal within and between populations; processes involved in the regulation of population density; the intrinsic and extrinsic dynamics of population density; and the spatial dynamics of weed populations. The penultimate chapter is devoted to the evolution of herbicide resistance. I particularly enjoyed the section on the dynamics of geographic range expansion. Here, the authors point out the very real problem of recognizing phases in the invasion process which bedevil attempts at generalization and prediction. Extensive coverage is given to the well-studied invasion of large parts of North America by *Bromus tectorum*. They re-analyze data on the spread of this grass species to show how difficult it is to distinguish exponential increase from a two-phase increase incorporating a lag phase. Another chapter I found very useful was the one on mathematical models of population density. I can think of no better introduction on the topic.

The case studies are fairly heavily based in favour of Australian, UK and, to a lesser extent, North American examples. Herbaceous plants are also given much better coverage than woody plants. Despite this, the examples that are chosen cover a very wide range of situations, and everyone with an interest in weeds will find points that relate to their particular interest. As a plant ecologist working mainly on the ecology of woody plants invading natural vegetation, I certainly found a great deal of interest in this book. I unreservedly recommend it to all plant population ecologists and other researchers with an interest in manipulating plant populations. The volume would also be ideal as the foundation for a post-graduate course on the subject.

The book is a pleasure to read; it is very well written, the concepts are clearly developed, and there is a good balance between text, figures and tables. I found no typographical errors.

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THE ANTHUR: FORM, FUNCTION AND PHYLOGENY, edited by W.G. D'Arcy and R.C. Keating. 1996. *Cambridge University Press*, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU, UK. Pp. xii + 351, 267 illustrations (line drawings, cladograms and photomicrographs), 13 tables. Size: 253 × 193 mm. ISBN 0 521 48063 9. Price: hard cover, £55.00, US\$80.00.

A comprehensive work on the male reproductive structures of flowering plants has for many years been overdue. This book with its focus on the anther as the fundamental unit of the male floral organ, provides an authoritative summation of the present state of knowledge and theories, scattered in botanical literature, about the stamen of extinct and extant angiosperms. Essentially, the book is derived from papers read at the 1993 International Botanical Congress in Yokohama, Japan, but additional chapters have been added to include, *inter alia*, a bibliography (Chapter 13) which lists 1 347 references, indexed by subject and plant family, relating to stamen morphology and anatomy.

Although the first chapter is basically intended to outline the contents of the book and to act as a primer for understanding the terms and concepts used to describe stamen structure and function, a formidable amount of detailed information is presented concisely, but in an easily readable style. Summaries of classical and current theories on stamen design, arrangement, structure, function and evolution are interwoven with data on morphological and anatomical characters and are related to modes of pollen delivery and pollinator behavioural patterns. Importantly, the introductory chapter stresses the necessity of solid primary observations, both in the field and the laboratory, for the collection of new information and the alignment and testing of facts and theories about stamens.

Keating's overview (Chapter 12) of the literature dealing with diverse techniques for studying the anther is a valuable contribution to the volume. Initially, methods for preparing specimens intended for serial sectioning and light and electron microscopical studies are discussed and the advantages of hand sectioning, various wet mount techniques, smears and clearing agents are pointed out. Numerous recently developed methods to elucidate the biochemical and genetic basis behind the known structural complexity in developing and in mature anthers are referred to and the well-chosen references contribute more valuable information. This review of methodology could, in combination with D'Arcy's outline, serve as an excellent textbook on the angiosperm stamen for biologists at the non-specialist level.

For specialists in the subdisciplinary fields of palaeobotany, taxonomy, comparative morphology, anatomy and embryology, this beautifully illustrated book offers much useful and interesting information and answers to questions which otherwise would require searching through many reference works. The mystery of the origin(s) of flowering plants is explored by using the results of cladistic analyses (Chapter 3) or evidence from the fossil record (Chapter 2). Since the stamen has been recognized as a model organ for addressing basic and applied problems concerning plant cell biology, morphogenesis, breeding and evolution, fundamental questions such as: 'Are stamens and carpels homologous?' are considered and critically evaluated from divergent perspectives. Anatomists and embryologists who are not particularly inclined towards phylogenetic studies, will appreciate contributions dealing with heterochrony, resorption tissue (the calcium oxalate package) and the diversity of endothecium patterns in anthers, while pollination ecologists will welcome Peter Bernard's review on the role of the anther in zoophily.

The volume is elegant in style, has a good standard of finish and the format makes it a delight to handle. Errors in the text and references are few and insignificant. The illustrations are superb, informative and not a recycling of old ones, seen many times before. Literature cited in each chapter is listed separately by contributors and shows that the book is up to date: of the nearly 1 300 references included in Chapters 1–12 and ranging from 22–226 per chapter, 40% were published later than 1985, while less than 30% are older than 1970.

In conclusion, I must stress that the title of the book is extremely misleading. Although this is the first-ever authoritative work on angiosperm stamens, it is also a comprehensive source of references on floral biology and will, in time, become indispensable to both students and professional biologists. The price easily puts it in the realm of constitutional purchasing and the book should be available in all botanical li-

baries to stimulate and enhance research in numerous fields of basic and applied biology.

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TERRESTRIAL ORCHIDS: FROM SEED TO MYCOTROPHIC PLANT, by HANNE N. RASMUSSEN. 1995. *Cambridge University Press*, The Pitt Building, Trumpington St., Cambridge CB2 1RP, England. Pp. 444. ISBN: 0 521 45165 5. Price: hard cover: £45.00, US\$64.95.

There is an imbalance in our general interest in orchids, as epiphytic species are preferred to terrestrial ones by most people, botanists as well as amateurs. Probably the main reason is that (unlike most terrestrial orchids) epiphytic species have frequently showy flowers and are fairly easy to cultivate. Epiphytic orchids are also the larger group, and it is estimated that approximately 70% of orchid species grow as epiphytes. Consequently, we know a great deal more about the biology of the epiphytic orchids than about that of the terrestrial species.

Nevertheless, the biology of terrestrial orchids has, for a variety of reasons, fascinated some botanists and plant lovers for centuries, but several aspects of it are still poorly understood. Many terrestrial species are rather rare and unpredictable in their appearance which is largely due to their heavy dependency on the associated mycorrhiza—sometimes thriving underground for several years and then suddenly emerging from the soil with a flowering shoot—and this sporadic nature enhances their appeal to the botanically interested community. The life cycle of terrestrial orchids has been something of a mystery for centuries because of their underground stage which is difficult to study. Especially, the germination of the minute seeds is still incompletely known. Due to their mycotrophy the cultivation of terrestrial species is difficult for the most part, but as a consequence, maintaining them in culture has become a new challenge for the advanced grower. Especially at a time when many terrestrial orchids are becoming increasingly rare and their conservation is rapidly becoming a high priority, a better understanding of their germination and growth requirements is vital.

In view of our incomplete knowledge Hanne Rasmussen's comprehensive book on the life cycle and the fungal associations of terrestrial orchids is a most welcome addition to the orchid literature. This book is the first that deals extensively with the aspect of the biology of the terrestrial orchids since the work of Burgeff in the first half of the century (Burgeff 1911, 1936, 1954). The present book deals with the holarctic species only. The first few chapters explain the properties of their dust-like seeds, the germination requirements, germination processes, associated mycorrhizal fungi, as well as the development of the seedling to the mature plant. Ecological and evolutionary consequences of the orchid-mycorrhiza symbiosis are also outlined. A chapter on substrates and

the propagation with relation to mycorrhizal fungi describes our present state of knowledge in this field, and will be particularly useful for orchid growers. The life cycle of the holarctic species of 36 genera of terrestrial orchids is discussed in detail in a subsequent chapter. The genera are mostly European, but a few North American and Asian genera have also been included. Throughout the text the available literature on these aspects is reviewed, and is supplemented by personal observations which the author has made in the field as well as in laboratories, both in Maryland, USA, and in Copenhagen, Denmark. Obviously several aspects are still insufficiently understood, and such gaps in our knowledge are pointed out by the author, and it is hoped that future students will be able to solve some of these problems. Appendix A lists the nutrient substrates mentioned in the text, and Appendix B is a list of scientific names and synonyms. An extensive list of references and an index conclude the book.

The text is clearly and concisely written, and is illustrated by black and white line drawings and photographs. There are very few errors, like genus *Hammerbya* instead of *Hammarbya* (p. 135) or *Cypripedium calceolus* var. *parviflorus* and var. *parviflora* instead of var. *parviflorum* (p. 241). Considering the abundance of terrestrial orchids in southern Africa, the general chapters of this book are certainly relevant to our region although it has not been established yet if, and how far, the data obtained in orchids from the northern hemisphere can also be applied to southern hemisphere species. Australian and South African terrestrial orchids are occasionally mentioned in the text, but a slight limitation of the new book to us south of the equator is its geographical range. The publication—particularly the description of the life cycle of various genera—will certainly be of greater interest to readers in the northern hemisphere or at least to those with a strong interest in orchids from that hemisphere.

On the whole this new book can be widely recommended, both for botanists and horticulturalists. Being invaluable for our understanding of the biology of the terrestrial orchids, it will also appeal to conservationists who will find, e.g. information on species suitable for re-introduction, or information on germination and growth requirements of certain rare species.

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