

Rare and Threatened Pteridophytes of Asia 2. Endangered Species of India — the Higher IUCN Categories

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Abstract A revised list of 337 pteridophytes from political India is presented according to the six higher IUCN categories, and following on from the wider list of Chandra *et al.* (2008). This is nearly one third of the total c. 1100 species of indigenous Pteridophytes present in India. Endemics in the list are noted and carefully revised distributions are given for each species along with their estimated IUCN category. A slightly modified update of the classification by Fraser-Jenkins (2010a) is used. *Phanerophlebiopsis balansae* (Christ) Fraser-Jenk. et Baishya and *Azolla filiculoides* Lam. subsp. *cristata* (Kaulf.) Fraser-Jenk., are new combinations.

Key words : endangered, India, IUCN categories, pteridophytes.

The total number of pteridophyte species present in India is c. 1100 and of these 337 taxa are considered to be threatened or endangered (nearly one third of the total). It should be realised that IUCN listing (IUCN, 2010) is organised by countries and the global rarity and endangerment of species is therefore often somewhat masked in an area where the floras are intimately related. This particularly applies to the two major groups of Sino-Himalayan and S. E. Asian/Malesian elements present in India which extend across the eastern borders into China, Myanmar etc. It also applies to the Lankan/Indian peninsular element in the south, which contains the highest number of Indian endemics. A list of Asian globally threatened species of narrow distribution is given by Ebihara *et al.* (2012) for which the 76 Indian, Nepalese and Bhutanese species listed have been extracted from the present paper.

The present list is reduced compared to that of 414 threatened pteridophytes given by Chandra *et al.* (2008) as it concerns only the top six IUCN categories, EX (Extinct), EW (Extinct in the wild), CR (Critically endangered), EN (Endan-

gered), VU (Vulnerable) and NT (Near threatened), whereas Chandra *et al.*'s list was a more preliminary one which did not set out to follow the IUCN categories until more information became available. The IUCN categories given here apply to political India only. Table 1 shows a statistic summary of the categorised threatened species.

In addition more information about the status of species in Arunachal Pradesh has become available (Fraser-Jenkins and Benniamin, 2010; Fraser-Jenkins, 2010b; Fraser-Jenkins, Baishya, Benniamin and Rawat, in prep.) and has revealed that a number of species that are very rare else-

Table 1. The numbers of Indian pteridophytes belonging to different IUCN categories

Category	Number of species
CR or EX	12
CR or EW	4
CR	95
EN	117
VU	67
NT	43
Total	337
Globally threatened	74

where in India are much more common in the far North-East in Arunachal Pradesh and some other North-Easternmost States of India. Adjustment has also been made to the status of a number of species, either taxonomically, or for IUCN category, now that more information from Indian herbaria, particularly CAL, BSA and LWG, has become available to the author.

A few of the species that have now been excluded for taxonomic or other reasons have been listed here for explanatory reasons, but in square brackets and without categories. Many other species previously estimated to be Endangered and Endemic have been elucidated taxonomically by Fraser-Jenkins (1997, 2008a, 2008b) and Chandra *et al.* (2008) and excluded.

The classification of Fraser-Jenkins (2010a) has been used in the list, with some modifications according to more recent work. In general this is similar to that of Kramer and Green (1990) and Smith *et al.* (2006). But it is less similar to two molecular cladonomy lists recently produced by Christenhusz *et al.* (2011) and Rothfels *et al.* (2012), which are seen here as being insufficiently taxonomically based and to recognise too many groups that have no possible morpho-taxonomic significance. They also split many other groups that have been more successfully sunk into recognisable categories of more major value. Their schemes are therefore not accepted here as being applicable to taxonomic classification and are seen as being of less use to Botanists. While the former was used by Ebihara *et al.* (2012) in an editorial decision as being more recent and appearing more up-to-date, its drawbacks are considered too great for it to be used here.

List of endangered species with total distributions and IUCN category

Lycopodiaceae

1. *Huperzia cancellata* (Spring) Trevis. — N.E. India (Arunachal Pradesh; very rare); Tibet; China; Myanmar. **VU**.
2. *Huperzia carinata* (Desv.) Trevis. — Indian Islands (Nicobar Islands; very rare); China; Taiwan; Japan; Myanmar; Thailand; Vietnam; Malaysia; Indonesia; Philippines; Australia; Polynesia. Also reported from S. India (Tamil Nadu) by Dixit (1984, 1987, following Baker), but requiring confirmation and probably in error. **VU**.
3. *Huperzia ceylanica* (Spring) Trevis. (?syn.: *H. lajouensis* Ching) — Sri Lanka; S. India (Tamil Nadu, Parampure Swamp, Anamalai, 7500 ft. *C. E. C. Fischer* 3317, 2.4.1912, but no teeth; very rare); ?E. Nepal (*A. Zimmermann*, BM; very rare); N.E. India (Arunachal Pradesh; Meghalaya; very scattered and rare); ?Tibet, rare. Reported by IUCN (1998) as indeterminate. Listed from Java by Dixit (1984, 1987) in error. **NT**.
4. *Huperzia nilagirica* (Spring) R. D. Dixit (syn.: *H. hilliana* (Nessel) Holub) — S. India (Kerala; Tamil Nadu; very rare). **Endemic** to S. India. **VU; Globally threatened**.
5. *Huperzia nummulariifolia* (Blume) Jermy — Indian Islands (Nicobars; very rare); Thailand; Malaysia; Indonesia; Philippines; Polynesia. **EN**.
6. *Huperzia vernicosa* (Hook. et Grev.) Trevis. — ?Sri Lanka; S. India (Kerala; Tamil Nadu; very rare). **Endemic** to Sri Lanka and S. India. Reported by Spring from Sri Lanka, but requiring confirmation of the identity of the specimen he cited at Kew; not listed from Sri Lanka by Sledge (1982). **CR; Globally threatened**.
7. *Lycopodium dendroideum* Michx. — Bhutan, very rare; N.E. India (Arunachal Pradesh; very rare); China; Taiwan; Japan; E. Siberia; N. America. **CR**.
8. *Lycopodium annotinum* L. subsp. *alpestre* (Hartm.) Á. Löve et D. Löve (syn.: *L. zonatum* Ching) — N.W. India (Uttarakhand; very rare); Nepal, very rare; N.C. India (Sikkim; very rare); Bhutan, very rare; N.E. India (Arunachal Pradesh; very rare); Tibet; China; Taiwan; Japan; Myanmar. **EN; Globally threatened**.

Selaginellaceae

9. ?*Selaginella agustyamalayana* R. Antony, S. Khan et G. S. Nair — S. India (Tamil Nadu; very rare). ?**Endemic** to South India. Perhaps a synonym of *S. cataractarum* Alston, requiring further study. **CR**.

[*Selaginella adunca* subsp. *adunca* — N.W. India (Himachal Pradesh; Uttarakhand; locally abundant); W. Nepal, rare. Listed by IUCN (1998) as Endangered, in error. Alston's (1945) record from "Kashmir" was in error for Srinagar, Garhwal, Uttarakhand].

10. *Selaginella aitchisonii* Hieron. — Tien Shan; Sinkiang; Afghanistan; N. W. Pakistan, very rare; India (Jammu & Kashmir; very rare). Turkestan was also listed by Dixit (1992a). It appears that this is not just an ecotype of *S. sanguinolenta*, but a separate species. **EN**; **Globally threatened**.

11. *Selaginella cataractarum* Alston — S. India (Tamil Nadu; very rare and partly extinct). Reported in error from Kerala and Orissa by Dixit (1984, 1992a). Listed as endangered by IUCN (1998). **CR**; **Globally threatened**.

12. *Selaginella kurzii* Baker — N.E. India (Mizoram; very rare); Myanmar; Thailand; Malaysia. Reported in error from Nepal, and in a wide sense from "Assam", but meaning Mizoram. **CR**.

13. *Selaginella miniatospora* (Dalzell) Baker (syn.: *S. blatteri* Bole et M. R. Almeida; type not found at BLAT by the author) — S. India (Maharashtra; Goa; Karnataka; rare and very restricted). **Endemic** to S.W. India. Its relationship to the similar N. Indian etc. species, *S. tenuifolia* Spring, requires study. **NT**; **Globally threatened**.

14. *Selaginella pulvinata* (Hook. et Grev.) Maxim. — N. W. India (Uttarakhand, Pithoragarh; very rare); N. W. Nepal, very rare; N.E. India ("Assam, herb. Kew (K)" (Alston 1945), presumably a collection from Mishmee, northern Arunachal Pradesh, by W. Griffith); Myanmar (Mandalay; reported erroneously from Moulmein); Tibet; China, widespread. **EN**.

15. *Selaginella wattii* Baker — N.E. India

(Manipur; very rare, known only from the type); ?Myanmar. ?**Endemic** to N.E. India. Reported from Myanmar by Dixit (1984, 1992a) but without details, and requiring confirmation, and not so reported by Alston (1945); reported from Mizoram, Nagaland and Bangladesh by Ghosh *et al.* (2004) in error for *S. chrysorrhizos*. **CR**; **Globally threatened**.

[Several specimens described as new species by Dixit have been lost from CAL herbarium and the types are also not present in ASSAM, BSA, BSD, ARUN, BSHC, BSI, MH, LBG, DD, K or BM. If they are also not present in BSJO, CH or BURD they would appear to have been lost or destroyed, but they may be expected to have been dubious or erroneous, with the possible exception of *S. nayarii*, which might perhaps be distinct. These are: *S. ganguliana*, *S. keralensis*, *S. nayarii* and *S. panchganiana*.]

Isoetaceae

Many taxa have been described from India as new species, but the status of most of them as species is uncertain or dubious. Recent discussion between the author and Prof. G. K. Srivastava appears to lead towards a tentative conclusion that there are three major taxa present in India, which probably represent the species level, with other described taxa probably representing local variation within them. Despite the extinction of some populations representing various types, two of the three are apparently not under threat.

16. *Isoetes sahyadriensis* Mahabale (syn.: *I. dixitii* Shende) — C. India (Maharashtra, Madhya Pradesh; very rare). **Endemic** to C. India. The type specimen is not present at CAL, BSA, AHMA, BSI or Pune University and appears to have been lost, which would best be dealt with by neotypification. IUCN (1998) listed its synonym, *I. dixitii*, as extinct. **CR** or **EX**; **Globally threatened**.

[*Isoetes sampathkumaranii* L. N. Rao — C. India (Madhya Pradesh; Karnataka). Listed by IUCN (1998) as Extinct, but has several syn-

onyms, including *I. panchananii* D. D. Pant et G. K. Srivastava and *I. reticulata* Gena et Bhardwaja, which are not threatened. **Endemic** to C. and S. India].

[*Isoetes bilaspurensis* Panigrahi — listed by IUCN (1998) as Rare, but is a synonym of the widespread *I. coromandelina* L. f. subsp. *coromandelina* from Australia and India etc.].

Equisetaceae

17. *Equisetum palustre* L. — N. America; Europe; N. Asia; Afghanistan; N. Pakistan, very rare; N. W. India (Jammu & Kashmir; very rare); Tibet; China; Japan. **CR**.

Psilotaceae

18. *Psilotum complanatum* Sw. — C. and S. America; Indian Islands (Nicobar Islands; very rare); Thailand; Malaysia; Indonesia; Philippines; Australasia; Polynesia. **EN**.

Ophioglossaceae

19. *Botrychium simplex* E. Hitchc. subsp. *simplex* — N. America; N. Europe; N.C. India (Sikkim; very rare, Thangu, *B. S. Kholia* 35481, BSHC, det. CRFJ); Tibet. **EN**.

20. *Botrychium virginianum* (L.) Sw. — N. America; N. Europe; N. Asia; N. Pakistan, very rare; N.W. India (Jammu & Kashmir; Himachal Pradesh; Uttarakhand; very rare); ?W. Nepal; N.E. India (Meghalaya; very rare); China; Korea; Japan. **VU**.

21. ?*Ophioglossum eliminatum* Khand. — C. India (Madhya Pradesh; very rare). Said to be **endemic** to C. India. This taxon remains incompletely known and has neither been clearly described nor properly illustrated, while the type is either lost or unavailable. Repeated requests for photographs of multiple specimens in the field or on a herbarium-sheet failed to produce results. **VU**.

22. *Ophioglossum gramineum* Willd. — S. America; Africa; S. India (Tamil Nadu; ?Kerala; Karnataka; Andhra Pradesh; very rare); N.W. India (Uttarakhand; very rare); W. India (Rajasthan; very rare); C. India (Maharashtra; Mad-

hya Pradesh, Uttar Pradesh; very rare); N.E. India (Meghalaya; ?Tripura; very rare); Myanmar; Thailand, very rare; Vietnam; Malaysia; Philippines; Australasia; New Guinea. **NT**.

23. *Ophioglossum lusitanicum* L. (probable syn.: *O. indicum* B. L. Yadav et Goswami, *B. L. Yadav* 3011 [Herb. MLV Gov Coll., Bhilwara, Rajasthan, Herb. Bionature, Bhopal, TNS VS-1110445]) — N. and S. America; W. Europe; Africa; Macaronesia; S. India (Tamil Nadu; very rare); ?W. India (?Rajasthan; very rare); C. India (Madhya Pradesh; very rare); Australasia. **EN**.

24. *Ophioglossum pendulum* L. — Madagascar; Mascarenes; Seychelles; Sri Lanka; Indian Islands (Nicobar Islands; very rare); N.E. India (Assam State; very rare); Thailand; Malaysia; Indonesia; Philippines; New Guinea; Australia; Polynesia; China; Taiwan; Japan. **NT**.

Marattiaceae

25. *Christensenia aesculifolia* (Blume) Maxon (syn.: *C. assamica* (Griff.) Ching) — N.E. India (Arunachal Pradesh; Assam State; Meghalaya; very rare); Bangladesh, very rare; ?Myanmar; Thailand; Malaysia; Indonesia. IUCN (1998) listed *C. assamica* from China and N.E. India as Vulnerable. **EN**.

Osmundaceae

26. *Osmunda cinnamomea* L. subsp. *asiatica* (Fernald) Fraser-Jenk. — Bhutan; N.E. India (Arunachal Pradesh; very rare); Myanmar; Thailand; Vietnam; China; Taiwan; Korea; Japan; E. Siberia. **EN**.

27. *Osmunda javanica* Blume — N.E. India (Arunachal Pradesh, Siang; very rare); Myanmar; Malaysia; Indonesia. Reported from S. India and Sri Lanka by Chandra (2000) in error. **CR**.

Gleicheniaceae

28. *Gleichenia (Diplazium) blotiana* C. Chr. — N.E. India (Arunachal Pradesh; very rare); Thailand; Vietnam; China; Taiwan; Malaysia. **NT**.

Schizaeaceae

29. *Anemia schimperiana* C. Presl subsp. *wightiana* (Gardner) Fraser-Jenk. — S. India (Tamil Nadu; very rare and restricted). Subspecies **endemic** to S. India. **EN**.
- [? *Lygodium giganteum* Tagawa et K. Iwats. — N.E. India (Assam State; Nagaland; Manipur; and Mizoram). This species was reported by Singh and Panigrahi (1984) as a new record for India. But as described by them it was significantly dissimilar to the description and specimens of Tagawa and Iwatsuki, being much smaller in its parts and considerably less hairy on the axes, though bearing similar small scattered hairs on the indusium and with some segment base joints similarly swollen. At least the Indian material they cited appears to be *L. flexuosum*, which can often have some slightly swollen segment-base joints, though normally not so, and their record therefore requires confirmation].
30. *Lygodium longifolium* (Willd.) Sw. (probable syn.: *L. altum* (C. B. Clarke) Alderw.) — Sri Lanka; S. India (Kerala; very rare); N.E. India (Manipur; Meghalaya; very rare); Myanmar; China; Malaysia. **NT**.
31. *Lygodium polystachyum* Wall. ex T. Moore — N.E. India (Assam State; Manipur; very rare); Myanmar; Thailand; Laos; Cambodia; Vietnam; China. **EN**.
32. *Schizaea dichotoma* (L.) Sm. — Indian Islands (Nicobar Islands; rare); S. India (Kerala; very rare or extinct); Malaysia; Indonesia; Philippines; Australasia; Polynesia; Mascarene Islands; C. and S. America. **VU**.
33. *Schizaea digitata* (L.) Sw. — Indian Islands (Andaman Islands; Nicobar Islands; very rare); S. India (Kerala; very rare); N.E. India (Assam State; Meghalaya; very rare); Bangladesh (probably extinct); Sri Lanka; Malaysia; Indonesia; Philippines; New Guinea; Australasia; Polynesia. Beddome (1883) reported it from Sri Lanka and N.E. India in a confusion with *S. dichotoma* localities. **EN**.

Polypodiaceae

34. *Arthromeris cyrtomioides* S. G. Lu et C. D. Xu (syn.: *A. notholaenoides* V. K. Rawat et Fraser-Jenk.) — N.E. India (Arunachal Pradesh; very rare); China. **EN**; **Globally threatened**.
35. *Arthromeris tomentosa* W. M. Chu — Bhutan, very rare; N.E. India (Arunachal Pradesh; very rare); Tibet; China. **VU**.
36. *Drynaria bonii* Christ — N.E. India (Manipur; very rare); Thailand; Vietnam; China. Listed from Manipur by IUCN (1998) as Vulnerable. **EN**.
- [*Drynaria meeboldii* listed from Manipur by IUCN (1998) as vulnerable is delisted here as it is common in Bhutan and Arunachal Pradesh.]
- [*D. parishii* (Bedd.) Bedd. — listed with doubt by Roos (1985) from "Assam?" was in error for a specimen from Myanmar, as communicated by M. Roos to P. H. Hovenkamp, and thence to the author].
- [? *Goniophlebium persicifolium* (Desv.) Bedd. — listed without details from "Assam" in a wide sense by Rödl-Linder (1990), but appears to be an error, not now confirmable, and partly referred to *G. argutum* from Nepal].
37. *Lemmaphyllum microphyllum* C. Presl — N.E. India (Arunachal Pradesh; very rare); China; Taiwan; Korea; Japan. **VU**.
38. *Lepisorus miyoshianus* (Makino) Fraser-Jenk. et Subh.Chandra — N.E. India (Arunachal Pradesh; very rare (first reported by Dixit and Nair (1975), sub *Drymotaenium miyoshianum* (Makino) Makino, including partly in error for *Vittaria linearifolia* Ching); China; Japan. **CR**.
39. *Lepisorus sordidus* (C. Chr.) Ching — N.E. India (Arunachal Pradesh; Nagaland; Manipur; very rare); China; Myanmar. **VU**; **Globally threatened**.
40. *Lepisorus subconfluens* Ching — ?E. Nepal (reported by Iwatsuki (1975, 1988), but probably in error for *L. contortus* or *L. loriformis*); ?N.C. India (Sikkim, listed by Ghosh *et al.* (2004), but probably in error); ?Bhutan (reported by Tagawa and Iwatsuki (1989), but requiring confirmation as no specimens seen

- from Bhutan); N.E. India (Arunachal Pradesh; very rare); China; Myanmar; ?Thailand. **VU**.
 [*Leptochilus metallicus* (Bedd.) C. Chr. — reported by Nampy and Madhusoodanan (1998) from S. India (Kerala; very rare if present), but requiring confirmation of identity. Sri Lanka. **Endemic** to Sri Lanka.]
41. *Leptochilus minor* Fée (syn.: *L. minutulus* Fée; but not *Nistarika bahupunctika* B. K. Nayar, Madhus. et Molly, as synonymised by Nooteboom (1997), which is a synonym of *Leptochilus axillaris*, nor the other species of *Leptochilus* he synonymised in error) — N.E. India (Meghalaya; very rare); Malaysia (Malaya; Borneo); Philippines. Not present in Sri Lanka, as reported by Nooteboom. Listed from N.E. India by IUCN (1998) as Endangered. Distribution in S. E. Asia not fully known due to confusion with other species by Nooteboom. **EN**.
 [*Leptochilus thwaitesianus* Fée — synonym of *L. lanceolatus* Fée — Sri Lanka; S. and C. India, common.]
42. *Loxogramme grammitoides* (Baker) C. Chr. (misapplied name: *L. lankokiensis sensu auct. Ind., non* (Rosenst.) C. Chr.) — N.C. India (Darjeeling; very rare); N.E. India (Arunachal Pradesh; very rare); China; Taiwan; Japan. **EN**.
43. *Microgramma mauritiana* (Willd.) Tardieu (misapplied name: *M. lycopodioides sensu* Fraser-Jenkins in Chandra *et al.* (2008), *non* (L.) Copel.) — Africa; Mascarenes; Sri Lanka, very rare or extinct; S. India (Tamil Nadu; very rare, or extinct). **CR** or **EW**.
44. *Microsorium* (?*Neocheiropteris*) *fortunei* (T. Moore) Ching (excluding the larger, wider-fronded and commoner *M. chinense* (Mett. ex Kuhn) Fraser-Jenk.) — N.E. India (Arunachal Pradesh; very rare); Tibet; China; Taiwan. **EN**.
45. *Neocheiropteris ensata* (Thunb.) Ching — N.E. India (Manipur; Meghalaya; very rare); China; Taiwan; Korea; Japan; Vietnam. **EN**.
46. *Phymatosorus longissimus* (Blume) Pic. Serm. — ?Sri Lanka (Tagawa and Iwatsuki 1989); Indian Islands (Nicobar Islands; very rare, Dixit and Sinha (2001)); S. India (Kerala; very rare); N.E. India (Assam State; very rare and decreasing due to drainage); Bangladesh; Myanmar; Thailand; Vietnam; Malaysia; Indonesia: Philippines; Polynesia; China; Taiwan. **VU**.
47. *Pichisermollodes connexa* (Ching) Fraser-Jenk. — N.E. India (Arunachal Pradesh; Manipur; very rare); China. **EN**.
48. *Pichisermollodes erythrocarpa* (Mett. ex Kuhn) Fraser-Jenk. — N.W. India (Himachal Pradesh; very rare); Nepal, rare; N.C. India (Darjeeling; Sikkim; very restricted and rare); Bhutan; ?N.E. India (?Arunachal Pradesh, listed by Ghosh *et al.* (2004), but no specimen seen by the author in CAL or elsewhere); Tibet. **NT**.
49. *Pichisermollodes nigrovenia* (Christ) Fraser-Jenk. — N.W. India (Uttarakhand, Garhwal, Ramri, *J. F. Duthie* 5179, CAL, BM; very rare); Nepal, rare; N.C. India (Darjeeling; Sikkim, very rare); Bhutan, very rare; N.E. India (Arunachal Pradesh; very rare); Tibet; China. **NT**.
50. *Pichisermollodes tibetana* (Ching et S. K. Wu) Fraser-Jenk. — Nepal, very rare; N.C. India (Sikkim; very rare); Tibet; China. **CR**.
51. *Pichisermollodes* sp. ?near *Phymatopteris albopes* (C. Chr. et Ching) Pic.Serm. (fronds ± like a larger and robust *P. crenatopinnata*, widest at base, with undulate-lobed lowest pinnae, but rhizome rather thicker, scales black with mid-brown edges, lanceolate with attenuated apices and no fringe-hairs; intermediate towards *P. ebenipes*?) — N.E. India (Arunachal Pradesh, Kameng, Lum La, 2520 m., *A. K. Baishya* 90548, 13.7.1987, ASSAM; very rare). **CR**.
52. *Platyserium wallichii* Hook. — N.E. India (Manipur; very rare); Myanmar; Thailand; Malaysia; China. Erroneously mentioned by Chandra *et al.* (2008) from the Andaman and Nicobar Islands due to a mistaken transposition of typed text. **CR**.
- [? *Polypodiodes dielsiana* (C. Chr.) Fraser-Jenk. Reported and mapped by Rödl-Linder (1990)

- from N.E. India (Meghalaya, coll. *J. D. Hooker*, K), but its presence in India is very doubtful and requires confirmation; no such record exists in her card-index at L]
- [? *Polypodiodes manmeiense* (Christ) Fraser-Jenk. — ?N.E. India (Meghalaya; listed as from “Assam” *sens. lat.*, without details by Rödl-Linder (1990), presumably following Ching’s (1933) report from “Shillong, *H. Z. Darrah* [name probably incorrect], 1888”, which was perhaps in error, not shown in her map or card-index, its presence in India requires confirmation). Reported in error for *P. microrhizoma* from the W. Indo-Himalaya (Pithoragarh) by Pande and Pande (2002), and from Darjeeling etc. by Bir, Trikha and Vasudeva (1974) and Satija and Bir (1985); and mentioned by Ghosh *et al.* (2004) in error for *Thylacopteris papillosa* from Meghalaya, with its very thin rhizome. Distinguished from *P. microrhizoma* by the rhizome nearly twice as thick and veins free.]
53. *Polypodiodes simonsiana* Fraser-Jenk. *sp. nov.* in prep. (misapplied name: *Polypodiodes wattii sensu* Fraser-Jenkins (2008b) etc., *non* (Bedd.) Ching [= *P. niponicum*] — N.E. India (Arunachal Pradesh; Manipur; Meghalaya; very rare); Myanmar. Similar to *P. niponicum*, but larger, often with a curved rachis and mid and lower pinnae backward-deflexed and very acutely pointed. **VU; Globally threatened.**
54. *Polypodiodes niponicum* (Mett.) Ching (syn.: *P. wattii* (Bedd.) Ching, *non sensu* Fraser-Jenkins (2008b) etc., *nec* in Chandra *et al.* (2008)) — N.E. India (Arunachal Pradesh; Nagaland; Manipur; Meghalaya; very rare); Tibet; China; Taiwan; Japan; Myanmar; Vietnam. Not present in N.W. India as reported by Chandra (2000) in error. **NT.**
55. *Pyrrosia boothii* (Hook.) Ching — N.C. India (Sikkim; very rare); Bhutan; N.E. India (Arunachal Pradesh; very rare); Myanmar; Tibet. **VU; Globally threatened.**
56. *Pyrrosia ceylanica* (Giesenh.) Sledge — Sri Lanka; S. India (Karnataka; Kerala; Tamil Nadu; very rare though probably overlooked). **Endemic** to Sri Lanka and S. India. **EN; Globally threatened.**
57. *Pyrrosia drakeana* (Franch.) Ching — N.E. India (Arunachal Pradesh; very rare); Tibet; China. **VU.**
58. *Pyrrosia laevis* (J. Sm.) Ching — N.E. India (Meghalaya; very rare); Myanmar; Tibet; China. **EN.**
- [? *Pyrrosia longifolia* (Burm.f.) C. V. Morton — ?N.E. India (Arunachal Pradesh, reported from a single collection from Changlang District by Singh and Panigrahi (2005), but with morphological differences mentioned and very probably in error for *P. adnascens*, specimen taken to Singh’s house in Dehra Dun so not available for proper reidentification; presence in India very doubtful); S. Myanmar (Moulmein); Thailand; Laos; Cambodia; Vietnam; S. China; Malaysia; Indonesia; Philippines; New Guinea; Australia; Polynesia. Absent from Nepal, which was reported to be doubtful by Hovenkamp (1986)].
59. *Pyrrosia rasamalae* (Racib.) K. H. Shing (misapplied name: *P. floccigera*) — N.E. India (Arunachal Pradesh; very rare); Myanmar; Thailand; Malaysia; Indonesia; Philippines. **VU.**
60. *Pyrrosia stigmosa* (Sw.) Ching — N.E. India (Arunachal Pradesh, Debang Valley, Mayodia Pass, *A. Benniamin* 28757, 12.12.2011, ASSAM, det CRFJ; very rare); Myanmar; Thailand; Vietnam; Cambodia; Malaysia; Indonesia; Tibet; China. Widely misreported from India by Mehra (1939), Panigrahi (1960), Satija and Bir (1985) etc. in error for *P. costata*, thus previously unknown from India. **CR.**
61. *Pyrrosia subfurfuracea* (Hook.) Ching — Bhutan, very rare; N.E. India (Arunachal Pradesh; Nagaland; Manipur; very rare); Myanmar; Tibet; China. **NT.**
62. *Selliguea chrysotricha* (C. Chr.) Fraser-Jenk. — Bhutan; N.E. India (Arunachal Pradesh; very rare); Myanmar; China. **EN.**
63. *Selliguea engleri* (Lueress.) Fraser-Jenk. — N.E. India (Arunachal Pradesh; Mizoram; very

rare); China; Taiwan; Korea; Japan. **EN**.

64. *Selliguea majoensis* (C. Chr.) Fraser-Jenk. — N.E. India (Nagaland; Meghalaya; very rare); Tibet; China. **EN**.
65. *Selliguea subsparsa* (Baker) Hovenkamp — N.E. India (Arunachal Pradesh; very rare); ?Thailand; Malaysia; Sumatra. First reported from India by Dixit and Nair (1977) as *Holcosorus bisulcatus* (i.e. *Selliguea bisulcata*) in error. This species may perhaps be conspecific with *S. enervis* (Cav.) Ching. IUCN (1998) listed *Holcosorus bisulcatus* from Arunachal Pradesh as Endangered. **CR**.
66. *Selliguea tricuspis* (Hook.) Fraser-Jenk. — N.C. India (Darjeeling, ?extinct; Sikkim; very rare); Thailand; Vietnam; Malaysia; S. China. **CR or EW**.
67. *Selliguea trisecta* (Baker) Fraser-Jenk. — N.E. India (Assam State, Pynursla on Meghalaya border; very rare); Myanmar; Tibet; China. **CR**.
68. *Thylacopteris papillosa* (Blume) Kunze ex J. Sm. — N.E. India (Arunachal Pradesh; Meghalaya, det. CRFJ; very rare); Malaysia; Indonesia; Philippines. Reported from Meghalaya by Ghosh *et al.* (2004) sub *Metapolypodium manmeiense* in error, specimen in CAL! **CR**.

Grammitidaceae

69. *Ctenopterella blechnoides* (Grev.) Parris — Sri Lanka; S. India (Tamil Nadu; ?extinct); Malaysia; Indonesia; Australia; Polynesia. **CR or EX**.
70. *Oreogrammitis attenuata* (Kunze) Parris — Sri Lanka; S. India (Tamil Nadu; very rare). **Endemic** to Sri Lanka and S. India. **EN; Globally threatened**.
71. *Oreogrammitis austroindica* (Parris) Parris — S. India (Tamil Nadu; known from a single 19th Century collection, probably extinct). **Endemic** to S. India. **CR or EX; Globally threatened**.
72. *Oreogrammitis pilifera* (Ravi et J. Joseph) Parris (misapplied name: *Grammitis medialis sensu auct. Ind.*) — S. India (Kerala; Tamil Nadu; very rare). **Endemic** to S. India. **VU**;

Globally threatened.

73. *Prosaptia alata* (Blume) Christ — Sri Lanka; S. India (Tamil Nadu; very rare or ?extinct), Thailand; Malaysia; Indonesia; Philippines; Polynesia. **CR or EX**.
74. *Prosaptia contigua* (G. Forst.) C. Presl — Sri Lanka; S. India (Kerala; Tamil Nadu; very rare); Thailand; Malaysia; Indonesia; Philippines; Australasia; Polynesia; China; Taiwan. **CR**.
75. *Prosaptia khasyana* (Hook.) C. Chr. et Tardieu — N.E. India (Meghalaya; very rare); Myanmar. Records of this species from elsewhere, including S. China and S.E. Asia refer to *P. barathrophylla* (Baker) M. G. Price. (personal communication from B. S. Parris, May 2012). **CR; Globally threatened**.
76. *Prosaptia obliquata* (Blume) Mett. — Sri Lanka; S. India (Kerala; Tamil Nadu; very rare); Thailand; Vietnam; Malaysia; Indonesia; Philippines; New Guinea; China; Taiwan. **EN**.
77. *Scleroglossum sulcatum* (Kuhn) Alderw. — Sri Lanka, very rare; N.E. India (Meghalaya; very rare); Thailand; Vietnam; Malaysia; Indonesia; Philippines; Polynesia; China; Taiwan. **CR**.
78. *Tomophyllum perplexum* (Parris) Parris (misapplied name: *Ctenopteris subfalcata sensu auct. austr.-Ind.*) — Sri Lanka; S. India (Tamil Nadu; very rare). **Endemic** to Sri Lanka and S. India. **CR; Globally threatened**.

Hymenophyllaceae

79. *Hymenophyllum acanthoides* (Bosch.) Rosenst. — S. India (Kerala; very rare); Thailand; Malaysia; Indonesia; Philippines; New Guinea; Taiwan. A report from N.E. India by Ghosh (1982), repeated by Dixit (1984) was in error for *H. denticulatum*, but the species and report were not mentioned at all, nor corrected by Ghosh *et al.* (2004). **CR**.
80. *Hymenophyllum barbatum* (Bosch) Baker — N.E. India (Meghalaya; Mizoram; very rare); Myanmar; Thailand; Vietnam; China; Taiwan; Japan. **EN**.
- [? *Hymenophyllum edentulum* (Bosch) C. Chr. —

- N.E. India (Meghalaya; apparently very rare, Dixit (1984), as from "Assam" *sens. lat.*); Malaysia; Indonesia. This is a dubious taxon in addition to its identification from India being unsure.]
81. *Hymenophyllum levingei* C. B. Clarke — N.C. India (Sikkim; high altitude, very restricted and rare); Bhutan; Tibet; China. **NT**; **Globally threatened**.
82. *?Trichomanes agasthianum* (Madhus. et C. A. Hameed) C. A. Hameed, K. P. Rajesh et Madhus. (syn.: *T. lunulatum* (Madhus. et C. A. Hameed) C. A. Hameed., K. P. Rajesh et Madhus.) — S. India (Tamil Nadu; Kerala; very rare). Apparently **Endemic** to S. India. However the lamina-lobes extending slightly beyond the sori are similar to Sledge's description of *T. kurzii*, based on the type (and not to Hameed *et al.*'s description and illustration of *T. kurzii*). **EN**.
83. *?Trichomanes apiifolium* C. Presl — Indian Islands (Nicobar Islands; very rare); Thailand; Malaysian Islands; Indonesia; Philippines; New Guinea; Polynesia; Taiwan; Japan. Reported from the Nicobars by Tagawa & Iwatsuki (1979), but not since; its presence requires confirmation. It may be the same as the "*Nesopteris grandis*" (Copel.) Copel. reported from the Nicobar Islands by Dixit and Sinha (2001) and Dixit, Ghosh and Ghosh (1997). **CR**.
84. *Trichomanes exiguum* (Bedd.) Baker — Sri Lanka, uncommon; S. India (Karnataka; Kerala; Tamil Nadu; very rare); Thailand; Malaysia; Australia. **EN**.
- [*?Trichomanes grande* Copel. — Indian Islands (Nicobar Islands; very rare); Philippines; Polynesia. See *T. apiifolium*, above]
85. *Trichomanes henzaianum* Parish ex Hook. — S. India (Karnataka; very rare); Myanmar; Thailand; Vietnam; Malaya. **EN**.
86. *Trichomanes latemarginale* D. C. Eaton — N.E. India (Meghalaya; very rare); China; Taiwan; Japan; Vietnam; Malaysia. **VU**.
87. *Trichomanes maximum* Blume (syn.: *T. indicum* S. R. Ghosh, *nec al.*) — Indian Islands (Nicobar Islands; very rare); N.E. India (Arunachal Pradesh; very rare); Myanmar; Thailand; Vietnam; Malaysia; Indonesia; Polynesia; Taiwan; Japan. **EN**.
88. *?Trichomanes mindorenses* Christ — ?S. India (Kerala; very rare, Hameed, Rajesh and Madhusoodanan (2003), but may require confirmation); Malaysia, Philippines; New Guinea; Australia; Polynesia. **CR**.
- [*?Trichomanes motleyi* (Bosch) Bosch — Sri Lanka; ?Indian Islands (Andaman Islands; reported by Dixit (1984), with *T. henzaianum* in synonymy, but both omitted without explanation by Dixit and Sinha (2001)); Myanmar; Vietnam; China; Taiwan; Japan; Thailand; Malaysia; Indonesia; Philippines; Australia; Polynesia.]
89. *Trichomanes parvifolium* (Baker) Copel. — Nepal, very rare; N.C. India (Sikkim; very rare); N.E. India (Arunachal Pradesh; Meghalaya; very rare); Myanmar; Thailand. **EN**.
90. *Trichomanes sublimbatum* Müll. Berol. — N.E. India (Arunachal Pradesh; Meghalaya; very rare); S. India (Kerala; very rare); Myanmar; Thailand; S.E. Asia; China; New Guinea. **VU**.

Cyatheaceae

91. *Cyathea albosetacea* (Scott. ex Bedd.) Copel. — Indian Islands (Nicobar Islands; very rare). **Endemic** to the Nicobar Islands. IUCN (1998) listed it as Vulnerable. **EN**; **Globally threatened**.
92. *Cyathea contaminans* (Wall. ex Hook.) Copel. N.C. India (only known for certain from a single Indian collection, from Rungbee Valley, below Mongpo, Darjeeling, W. Bengal, and perhaps either extinct or requiring confirmation re identity); Thailand; China; Malaysia; Indonesia; Philippines. Other mistaken records mostly referred to *C. brunoniana* (Wall. ex Hook.) C. B. Clarke et Baker. **?CR** or **EX**.
93. *Cyathea crinita* (Hook.) Copel. — Sri Lanka; S. India (Kerala; Tamil Nadu; very rare). **Endemic** to Sri Lanka and S. India. **EN**.

94. ?*Cyathea nicobarica* N. P. Balakr. et R. D. Dixit — Indian Islands (Nicobar Islands; very rare). Described as endemic to the Nicobar Islands from a single, sterile and unidentifiable pinna of a *Cyathea* listed by Holttum as not being *C. albosetacea*. Quite probably a known Sumatran species. **CR** or **EX**.

[*Cyathea nilgirensis* Holttum — South India (Kerala; Tamil Nadu; not particularly rare). Erroneously listed by IUCN (1998) as endangered.]

Dennstaedtiaceae

95. *Dennstaedtia wilfordii* (T. Moore) Christ ex Ching — Pakistan; N. W. India (Jammu and Kashmir; very rare, perhaps extinct?); China; Japan. This highly disjunct occurrence in India is based only on a very few older collections of this species around a small area on both sides of the Pakistan/Indian border in the Jhelum Valley, Kashmir, and has not been seen for some 40 years since the reports of Stewart (1945, 1972). It also occurred a little further west in the lower Kagan Valley, in Pakistan, so is not an adventive species. A similar large disjunction occurs with *Dryopteris dickinsii*. **CR** or **EX**.

96. *Hypolepis* sp. ?near *brooksiae* Alderw. — N.E. India (Arunachal Pradesh; very rare). *H. brooksiae* is from Malaysia; Indonesia. The Indian plant is only very tentatively and not finally identified, being near *H. polypodoides* with alternate pinnae, but with thorny axes as in *H. brooksiae*. **EN**.

97. *Microlepidia calvescens* (Wall. ex Hook.) C. Presl — N.E. India (Arunachal Pradesh; Manipur; Meghalaya; rare); Myanmar; Thailand; Vietnam; China; Taiwan; Java. Reported from the W. Himalaya in error, over-reported from N.E. India and Nepal in error for *M. marginata* (Houtte ex Panz.) C. Chr. **NT**.

98. *Microlepidia caudigera* T. Moore (syn.: *M. uropinnata* Panigrahi et A. Das [= A. Biswas], *nom. superfl.*) — Bhutan; N.E. India (Arunachal Pradesh; ?Meghalaya; very rare); China. **VU**; **Globally threatened**.

99. *Microlepidia kurzii* (C. B. Clarke) Bedd. —

N.E. India (Manipur; very rare); Myanmar; Thailand; China. The Indian plant was erroneously separated as var. *manipurensis* A. Biswas et T. Sen, now sunk here into the synonymy of *M. kurzii*. *M. kurzii* was erroneously excluded from India by Fraser-Jenkins (2008) due to confusion as to which specimen Dixit was referring to. **CR**; **Globally threatened**.

100. *Microlepidia majuscula* (E. J. Lowe) T. Moore — Sri Lanka; S. India (Kerala; Tamil Nadu; very rare); Myanmar. **EN**.

101. *Microlepidia trichocarpa* Hayata — Nepal, very rare; N.C. India (Darjeeling; very rare); N.E. India (Manipur; Meghalaya; rare); China; Taiwan. **EN**.

102. *Pteridium brownseyi* Fraser-Jenk. — Pakistan; far N.W. India (Jammu and Kashmir; very rare). **VU**.

103. *Pteridium semihastatum* (Wall. ex J. Agardh) S. B. Andrews — N.E. India (Arunachal Pradesh; very rare); Myanmar; Thailand; China; Vietnam; Malaysia; Indonesia; Philippines; New Guinea; Australia. A report from N.W. India (Uttarakhand) was due to one of Wallich's rather numerous confusions and mislabellings of a Singapore collection as if collected by R. Blinkworth in Kumaon, due to his sorting some unclearly labelled collections less than critically by general appearance. This is a good species with fully formed spores, not the same as the very similar, but sterile hybrid *P. x yarrabense* (Domin) Wakef. from Australia. **CR**.

Lindsaeaceae

- [? *Lindsaea bouillodii* Christ — ?Indian Islands (Andaman and Nicobar Islands, sub *L. tenera* (Ghosh and Dixit 1978, Dixit and Ghosh 1982, Dixit and Sinha 2001; very rare); S. India (Tamil Nadu, Tinevelly (Dixit 1984, sub *L. bouillodii*); very rare); Thailand; Vietnam; S. China; Malaysia. *L. bouillodii* was misreported by Dixit (1984) from Sri Lanka. Although Dixit subsequently separated *L. bouillodii* as a distinct species, perhaps correctly, Kramer (1972) had had doubts whether

it were truly distinct from *L. tenera*. Further taxonomic investigation is required).

104. *Lindsaea chienii* Ching — Indian Islands (?Nicobar Islands (Dixit and Sinha 2001), may require reidentification; very rare); N.E. India (Manipur; very rare); Myanmar; Thailand; Vietnam; China; Taiwan; Japan. **EN**.
 105. *Lindsaea commixta* Tagawa — Sri Lanka; Indian Islands (Andaman Islands; very rare); S. India (Tamil Nadu; very rare); Nepal, very rare; N.E. India (Meghalaya; very rare); Myanmar; Vietnam; Malaysia; Indonesia; Philippines; China; Taiwan; Japan. Misreported from Uttarakhand (Mussoorie) on the basis of a mislabelled specimen of R. L. Fleming Sr., actually collected from the single S. C. Nepalese locality at Andhi Khola. **EN**.
 106. *Lindsaea gueriniana* (Gaudich.) Desv. — Indian Islands (Andaman Islands; Nicobar Islands; very rare); Malaysia; Philippines; New Guinea; Polynesia. **EN**.
 107. *Lindsaea javanensis* Blume — N.E. India (Assam State; Arunachal Pradesh; Meghalaya; very rare); Myanmar; Thailand; Malaysia; China; Taiwan; Japan. **VU**.
 108. *Lindsaea malabarica* (Bedd.) Baker — S. and C. India (Karnataka; Kerala; Tamil Nadu; ?Andhra Pradesh; Madhya Pradesh; very rare). **Endemic** to peninsular India. **NT; Globally threatened**.
 109. *Lindsaea malayensis* Holttum — Indian Islands (Nicobar Islands; very rare); Thailand; Malaysia. **VU**.
 110. *Lindsaea oblanceolata* Alderw. — Indian Islands (Nicobar Islands; very rare); Thailand; Malaysia; Indonesia. **EN**.
 111. *Lindsaea obtusa* J. Sm. ex Hook. (syn.: *L. andamanica* R. D. Dixit et B. Ghosh) — Indian Islands (Andaman Islands; very rare); China; S.E. Asia; Australasia. **NT**.
 112. *Lindsaea parasitica* (Roxb.) Hieron. — Indian Islands (Andaman Islands; Nicobar Islands; very rare); Thailand; Malaysia. **NT**.
 113. *Lindsaea tenera* Dryand. — Indian Islands (Andaman Islands; Nicobar Islands; very rare). **?Endemic** to the Andaman and Nicobar Islands, unless *L. bouillodii* is not a distinct species. Taxonomically somewhat uncertain as to whether it is really specifically distinct from *L. bouillodii*. **NT; Globally threatened**.
 114. *Lindsaea tetragona* K. U. Kramer — Indian Islands (Nicobar Islands; very rare); Indonesia; Polynesia. **NT**.
 115. *Lindsaea venusta* Kaulf. ex Kuhn — Sri Lanka; S. India (Kerala; Tamil Nadu; very rare). **Endemic** to Sri Lanka and S. India. **EN; Globally threatened**.
 116. *Lindsaea walkerae* Hook. (syn.: *L. rutlandica* ["rutlandia"] R. D. Dixit et B. Ghosh) — Sri Lanka; Indian Islands (Andaman Islands; very rare); S.E. Asia; Australasia. **EN**.
 117. *Tapeinidium pinnatum* (Cav.) C. Chr. — S. India (Tamil Nadu; very rare or extinct); Thailand; Malaysia; Philippines; Taiwan; Japan. Reported from the E. Himalaya by Dixit (1984) in error. **CR or EW**.
- Pteridaceae** (syn.: Adiantaceae, Sinopteridaceae, Cheilanthaceae, Taenitidaceae, Cryptogrammeaceae, Parkeriaceae)
118. *Acrostichum speciosum* Willd. — Indian Islands (Andaman Islands; Nicobar Islands; very rare); Thailand; Australia. **VU**.
 119. *Adiantum flabellulatum* L. — N.E. India (Assam State; Manipur; Meghalaya; very rare); Bangladesh, ?extinct; Malaysia; Indonesia; China; Taiwan; Japan. **VU**.
 120. *Adiantum myriosorum* Baker — Nepal; N.C. India (Sikkim; restricted and rare); Bhutan; N.E. India (Arunachal Pradesh, very rare); Tibet; China; Taiwan. **NT**.
 121. *Adiantum soboliferum* Wall. ex Hook. — ?S. India (Tamil Nadu, listed by Dixit (1984), Ghosh *et al.* (2004) and Chandra, Fraser-Jenkins *et al.* (2008), but details required for confirmation that it was not a misidentification); N.E. India (Assam, listed by the above authors, details required, including from BM, in case "Assam" was reported in a wide sense, in error for Nagaland; Nagaland; very rare). **CR**.
- [?Adiantum stenochlamys Baker — ?Andaman

- Islands (reported by Dixit (1992b) and thence Dixit and Sinha (2001) from a single specimen at CAL, but no material of it found in CAL, and its identity therefore requires confirmation); Malaysia; Indonesia; Philippines.]
122. *Aleuritopteris argentea* (S. G. Gmel.) Fée — ?N.C. India (?Sikkim, *J. D. Hooker*; very rare); Bhutan; ?N.E. India (?Meghalaya, *J. D. Hooker*, locality and/or identity doubtful, perhaps in error for *A. tamburii*, or perhaps actually from Sikkim — to see material at K/ BM; Arunachal Pradesh; very rare); China; Taiwan; Japan; Korea; E. Siberia. Reported from Uttarakhand (Pithoragarh) by Punetha *et al.* (2008) in error. **CR.**
123. *Aleuritopteris duclouxii* (Christ) Ching — N.E. India (Arunachal Pradesh, Namdapha, Shirong to Hunung, c. 1100 m., *B. K. Shukla* 88207, 7.2.1986, ASSAM, sub "*C. anceps*" in error, not previously noticed in India, tentatively reported by Fraser-Jenkins and Dulawat (2009) as possibly being the similar species, *A. shensiensis* Ching, in error; very rare). See Fraser-Jenkins and Benniamin (2010). **CR.**
124. *Aleuritopteris duthiei* (Baker) Ching — N.W. India (Uttarakhand; very rare); Nepal; Bhutan; Tibet. **CR; Globally threatened.**
125. *Aleuritopteris scioana* (Chiov.) Fraser-Jenk. et Dulawat — E. Africa; Socotra; S. Arabia; W. India (Rajasthan; very rare). **CR.**
126. *Aleuritopteris subargentea* Ching ex S. K. Wu — Nepal; N.C. India (N. Sikkim; very rare); Tibet; China; Taiwan. **CR.**
127. *Aleuritopteris tamburii* (Hook.) Ching (syn.: *A. punethae* Kholia, Bakhuni et Richa) — N.W. India (Uttarakhand, misidentified by Punetha *et al.* (2008) as *A. argentea*, and then subsequently as a new species, *A. punethae*, by Kholia *et al.* (2011), with two different dates cited, but the origin probably requires confirmation and is now said to have been destroyed (Kholia personal communication, 2012)); W., C. and E. Nepal; N.C. India (Sikkim; very rare); N.E. India (Arunachal Pradesh, Anjaw, Di Chu Gorge, 4500'. *F. Kingdon-Ward* 19362, 30.6.1950, BM!; Meghalaya; very rare); Tibet; China. Despite having been properly identified for them beforehand as a typical small *A. tamburii* and not *A. argentea* by the present author, *A. punethae* was erroneously described and published without informing him, but is now accepted as *A. tamburii* by its author and awaits correction by them (B. S. Kholia personal communication, April 2012). **EN.**
128. *Aleuritopteris*(?) *thwaitesii* (Mett. ex Kuhn) Saiki (syn.: *Cheilanthes keralensis* N. C. Nair et S. R. Ghosh) — Sri Lanka; S. India (Tamil Nadu; very rare). **Endemic** to Sri Lanka and S. India. The S. Indian plant was described as *C. keralensis*, but was actually from Tamil Nadu, not Kerala; it may still require further comparison with *Cheilanthes belangeri*. The genus is rather uncertain and might be *Cheilanthes* Sect. *Cheilosoria*. **CR; Globally threatened.**
129. *Anogramma leptophylla* L. — Europe; W. Asia; Afghanistan; N.W. Pakistan; C. India (Maharashtra; rare); S. India (Tamil Nadu; very rare). Records from the Indian W. Himalaya and Nepal refer to *A. reichsteinii* Fraser-Jenk., but the single Nepalese record of that species (Chapagaon, Kathmandu, *R. L. Fleming* 2231, MICH) is due to a locality-label confusion and came from Mussoorie in Uttarakhand, N.W. India. **EN.**
130. *Cheilanthes bhutanica* Fraser-Jenk. et Tandi (syn.: *Pellaea yunnanensis* Ching) — N.C. India (N. Sikkim; very rare, CAL); Bhutan; Tibet; China. **CR.**
- [? *Cheilanthes trichophylla* Baker — ?N.C. India (?Sikkim, Kyangnos la, *S. C. Verma*, specimen lost but recorded by Verma from memory; very rare indeed if correct); China.]
131. *Cryptogramma brunoniana* Wall. ex Hook. et Grev. subsp. *raddeana* (Fomin) Fraser-Jenk. — Georgia (Caucasus); ?N.W. Nepal; N.E. India (Arunachal Pradesh, Upper Siang, Teetapuri, N. of Tuting, c. 3000 m., *M.K. Pathak* 73006, in 2009, CAL, det. CRFJ, 12.2011; very rare); Tibet; China. **EN.**
132. *Doryopteris ludens* (Wall. ex Hook.) J.

- Sm. — N.E. India (Assam State; Manipur; Nagaland; Tripura; Mizoram; very rare); E. India (Orissa, very rare); Bangladesh; Myanmar; Thailand; Vietnam; Malaysia; Indonesia; Philippines; New Guinea; Australasia. **NT**.
133. *Notholaena borealisinensis* (Kitag.) Fraser-Jenk. (syn.: *Gymnopteris borealisinensis* Kitag.; *Paragymnopteris bipinnata* (Christ) K. H. Shing var. *auriculata* (Franch.) K. H. Shing; a mistyping by Fraser-Jenkins (2008b: 134) appears to say that the bipinnate species, *Paragymnopteris bipinnata* (Christ) K. H. Shing [syn.: *Paraceterach bipinnatum* (Christ) R. M. Tryon], is a synonym of *N. borealisinensis*, however the word “and” before var. *auriculata* is an overlooked typing error and should have been removed — Bhutan; N.E. India (Arunachal Pradesh; very rare); Tibet; China. The genus for this species and *N. himalaica* Fraser-Jenk. is unclear as it differs from *Notholaena* (type: *N. marantae* — J. Smith’s apparent typifications in *Historia Filicum* (1875) are not typifications as he meant the word type in a different sense, sometimes citing more than one species, or none of the original species) in having hairs instead of scales and might perhaps belong to *Paraceterach*. *N. dipinnata* Fraser-Jenk. was reported by Fraser-Jenkins in Chandra *et al.* (2008) from N.E. India (Arunachal Pradesh, Lohit) in error for a rather folded up specimen of *N. borealisinensis*. **EN**.
134. *Notholaena delavayi* (Baker) C. Chr. — N.W. India (Uttarakhand; very rare); Nepal; Bhutan. Erroneously reported from Himachal Pradesh. **EN**.
135. *Notholaena lanuginosa* (Desf.) Desv. ex Poir. subsp. *bivalens* Reichst. (syn., or perhaps correct name: *Cosentinea vellea* (Aiton) Tod. subsp. *bivalens* (Reichst.) Rivas Mart et Salvo) — Europe; N. Africa; W. Asia; Pakistan; N.W. India (Himachal Pradesh; very rare). **EN**.
136. *?Onychium fragile* S. C. Verma et Khullar — N.W. India (Uttarakhand, Mussoorie; very rare). Probably a synonym of the very similar species, *O. tenuifrons*. *O. fragile* is only certainly known from the single small type-specimen with two leaves, which though fertile, but immature, appears probably to represent semi-sterile frond-morphology. Khullar and Verma (2012) placed the two taxa into different groups, which is not accepted here as both are actually precisely intermediate between the two groups, of *O. japonicum* and *O. cryptogrammoides*. Despite their statement to the contrary, both species have thinly herbaceous fronds and fragile stipes and the veins in *O. tenuifrons* are not always raised above, especially in immature plants. They described the rhizome of *O. fragile* as short-creeping in its protologue, repeated in this paper, as also for *O. tenuifrons*, but then in contradiction tabulated the former as long-creeping, which however cannot be seen in the specimen itself, and did not appear to them to be so when they initially wrote the protologue. Any possible differences in rhizome length are not actually known as yet and need to be studied in both species. They also said that *O. tenuifrons* has a different rhizome anatomy, yet admitted that it matched that of *O. fragile* in one of the specimens of *O. tenuifrons* studied for them in China. Another important difference is that they said that *O. tenuifrons* has a pale stramineous stipe-base whereas *O. fragile* always has a black base (that is, always in the single specimen available). However the dark stipe-base in many, though not all specimens of *O. tenuifrons* as well is clearly visible in two of their photographs of it (5b and 9), as also in much more copious material of it seen by CRFJ in PE, and the mid and upper stipe in *O. tenuifrons* is similarly green, drying pale or stramineous. From study of *O. tenuifrons* in BM and of a population-collection of *O. fragile* collected at Mussoorie (CRFJ 18602, 18605, Oct. 1991, E) and verified by Khullar, the spores of both species are also generally very similar in morphology and size, though one specimen with smaller spores, investigated for Khullar and Verma (2012) as *O. tenuifrons*, may suggest that specimen might have been

misidentified; but only a white, immature spore of *O. fragile* was illustrated by Khullar and Verma (2012), from which conclusions cannot be drawn. Finally both are triploid apomict, a fact that was not accepted by Khullar because as stated by Kato to CRFJ and thence informed to Khullar, the counts on *O. tenuifrons* from China were mitotic root-tip counts. However in the whole body of literature on the cytology of pteridophytes world-wide no single instance of a triploid plant with good, non-hybrid type spores, as here (apart from two sterile voucher-specimens), has ever been reported except in apomicts and it is obvious that *O. tenuifrons* is inescapably also triploid apomict, even though it needs more chromosome-counts and spore-checking.

As so far known the only obvious difference between them, but one not noticed by Khullar and Verma (2012), is that the pinnae in the type of *O. fragile* are wider-based than in most *O. tenuifrons*, but narrow pinnae are not consistent in Chinese *O. tenuifrons* and may perhaps be a feature of the semi-sterile type of morphology that the type of *O. fragile* appears to have, as some of CRFJ's fully mature collections of it from Barlowganj, Mussoorie, also have rather elongated, narrowish pinnae. While remaining uncertain (as pointed out by Fraser-Jenkins in Thapa (2002), but misquoted as being Thapa's comment by Khullar in Khullar and Verma), it remains possible that *O. fragile* may well be a synonym of *O. tenuifrons*, as first suggested and then concluded by Fraser-Jenkins in various publications over time. But it requires further re-investigation before a final conclusion can be made, particularly considering pinna-width and spore-size.

No more is yet known of the range of *O. fragile*, but *O. tenuifrons* occurs in W. Nepal and Arunachal Pradesh (correctly reported by Biswas and Ghosh (1983), which was not mentioned by Khullar and Verma), and the Flora of China (Flora Reipublicae Popularis Sinicae 1990) gives its Chinese range as Yunnan, Szechuan and Kweichow, while naturally

being unaware of its range in the Indo-Himalaya. Even excluding *O. fragile*, it is not confined to Yunnan, as stated by Khullar and Verma (2012). ?VU.

137. *Onychium tenuifrons* Ching (probable syn.: *O. fragile* S. C. Verma et Khullar) — ?N.W. India (Uttarakhand; very restricted); Nepal, very rare; N.E. India (Arunachal Pradesh; very rare); China. VU.
138. *Pellaea boivinii* Hook. — Sri Lanka; S. India (Kerala; Tamil Nadu; very rare); Mascarenes; Madagascar. IUCN (1998) listed it from Sri Lanka only as indeterminate. VU.
139. *Pellaea calomelanos* (Sw.) Link — Pakistan, very rare; N.W. India (Himachal Pradesh; Uttarakhand; very rare); W. Nepal; W. Europe (Spain); Macaronesia (Azores, ?introduced); Africa; Madagascar; Mascarenes. EN. This African element has a typical ancient W. Himalayan range in India.
140. *Pellaea falcata* R. Br. (syn.: *P. seticaulis* (Hook.) S. R. Ghosh) — Sri Lanka; S. India (Tamil Nadu; very rare); Malaysia; Australasia. NT.
141. *Pellaea longipilosa* Bonap. (syn.: *P. malabarica* B.K.Nayar et Geev.) — E. Africa; S. India (Kerala; very rare). CR.
142. ?*Pteris amoena* Blume — N.E. India (Assam State, Cachar, *G. Mann*; very rare); Indonesia. The Assam collection might do with comparison with a subjuvenile *P. terminalis*. The Meghalaya collection also cited by Ching (coll. *H. H. Godwin-Austen*, K) is a specimen of *P. terminalis*. A report from Kashmir ("Cashmea") by Ghosh *et al.* (2004) was an error for Cachar. CR.
143. *Pteris barbigera* Ching — N.C. India (Darjeeling, Rungbi valley; very rare or extinct, not seen again after the original collection of H. F. Blanford's); China. CR or EX.
144. *Pteris geminata* Wall. ex J. Agardh (syn.: *P. kleiniana* Christ) — S. India (Tamil Nadu; very rare). **Endemic** to South India. **EN**; **Globally threatened**.
145. *Pteris griffithii* Hook. — N.E. India (Arunachal Pradesh; very rare); Myanmar;

- ?China. Reported by Dixit and Sinha (2001) from the Andaman Islands in error (see below); reported by Pasha and Chakraborty (1984) and thence Mirza and Rahman (1997) from Chittagong, Bangladesh, in error for the adventive far E. Asian species *P. multifida*. **CR; Globally threatened.**
146. *Pteris hookeriana* J. Agardh (syn.: *Idiopteris hookeriana* (J. Agardh) T. G. Walker) — Sri Lanka; S. India (Kerala; very rare). **Endemic** to Sri Lanka and S. India. **CR; Globally threatened.**
147. *Pteris inaequalis* Baker — N.E. India (Arunachal Pradesh, Kameng; very rare); China. **CR.**
148. *Pteris mertensioides* Willd. — Sri Lanka; Indian Islands (Andaman Islands; very rare); S. India (Tamil Nadu; Kerala; very rare); Myanmar; Thailand; Malaysia; Philippines; Polynesia. Reported from N.E. India and Bhutan in error for *P. taiwanensis* Ching (a segregate of *P. wallichiana* with much narrower segments, but distinguishable from *P. mertensioides* by its anastomosing basal veinlets, if sometimes hard to observe due to the very narrow wing between lobes). **CR.**
149. *Pteris quadriaurita* Retz. — Sri Lanka; S. India (Tamil Nadu; very rare or extinct). Non-apiculate, but toothed pinnules. **Endemic** to Sri Lanka and S. India. As *P. quadriaurita* has apparently not been collected in S. India since Koenig's type collection, its presence there and the identity of the type may now need further consideration since its initial identification by Walker (1960). It is possible that it could be a specimen of *P. otaria* Bedd. with no reduced areas of lamina, and pinnae with the full complement of pinnules. If so the name *P. quadriaurita* would apply to *P. otaria* and the Sri Lankan plant referred by Walker to *P. quadriaurita* would be an undescribed species, as originally proposed by Walker (1956) in his Ph.D. thesis, but later abandoned. The name *P. quadriaurita* has been and continues to be misapplied widely to quite different members of the *P. aspericaulis* aggregate in C. and N. India etc. A further species with smooth black stipes and toothed segment-apices, misreported by Dixit and Sinha (2001) as "*P. quadriaurita*" from the Andaman Islands is as yet unidentified, though very distinct, but is quite common. **?CR; Globally threatened.**
150. *Pteris reptans* T. G. Walker — Sri Lanka; S. India (Kerala; very rare). **Endemic** to Sri Lanka and S. India. **CR; Globally threatened.**
151. *Pteris tricolor* Linden — N.E. India (Manipur, Tripura; very rare); Myanmar; S.W. China. Misreported from Sikkim in error for a white-variegated *P. subquinata*. **EN.**
152. *Pteris tripartita* Sw. — Sri Lanka; Indian Islands (Andaman Islands; Nicobar Islands; very rare); S. India (Tamil Nadu, very rare, partly reported sub *P. wallichiana* by Manickam, Benniamin *et al.* (2004) in error and corrected after reidentification by the present author by Benniamin (2011)); N.E. India (Arunachal Pradesh, Siang; ?Manipur, in CAL; very rare); China; Taiwan; Myanmar; Thailand; Malaysia; Indonesia; Philippines; Australasia; Polynesia; Africa; Madagascar. **EN.**
153. *Pteris venulosa* Blume — N.E. India (Manipur; Mizoram; very rare); ?Thailand; Malesia; Indonesia. Frequently misreported from N.E. India in error for *P. pseudopellucida*, misreported from S. India by Nayar and Geevarghese (1993) in error for *P. pellucida*/*P. venusta*. **CR.**
154. *Pteris* sp. (sub "*P. pluricaudata*" *sensu* Dixit and Sinha (2001), *non* Copel. [from the Philippines]) — Indian Islands (Andaman Islands; very rare). Specimen at CAL requires reidentification. **CR.**
155. *Pteris* sp. (sub "*P. griffithii*" *sensu* Dixit and Sinha (2001), *non* Hook. — Indian Islands (Andaman Islands; very rare). Specimen at PBL requires reidentification. **CR.**
156. *Syngramma alismifolia* (C. Presl) J. Sm. — Indian Islands (Nicobar Islands; very rare (Dixit and Sinha 2001)); Thailand; Vietnam; Malaysia; Indonesia; Philippines. **CR.**
157. *Taenitis blechnoides* (Willd.) Sw. — Sri

Lanka; Indian Islands (Nicobar Islands; very rare); S. India (type, very rare); N.E. India (Meghalaya, Sohra; very rare), mistakenly stated by Fraser-Jenkins in Chandra *et al.* (2008) as being from Arunachal Pradesh); Bangladesh, ?extinct; China; Myanmar; Thailand; Vietnam; Malaysia; Indonesia; Philippines; Australasia; Polynesia. Transposed by typographical mistake in Chandra *et al.* (2008) to Lindsaeaceae. **EN**.

Vittariaceae

158. *Antrophyum parvulum* Blume — Indian Islands (Nicobar Islands (Dixit and Sinha, 2001); very rare); N.C. India (Sikkim; very rare); N.E. India (Meghalaya; very rare); Myanmar; Thailand; China; Taiwan; Malaysia; Indonesia; Philippines; Japan. **EN**.
159. *Vittaria microlepis* Hieron. — Sri Lanka; S. India (Tamil Nadu; very rare). **Endemic** to Sri Lanka and S. India. **EN; Globally threatened**.
160. *Vittaria ensiformis* Sw. (syn.: *V. montana* Manickam) — Mascarene Islands; Sri Lanka; S. India (Tamil Nadu; very rare). Reported by Dixit and Sinha (2001) from the Nicobar Islands in error for *V. elongata*. **VU**.

Aspleniaceae

161. *Asplenium affine* Sw. — Sri Lanka; S. India (Tamil Nadu; very rare); Mascarenes; Malaysia; Indonesia. **EN**.
162. *Asplenium auritum* Sw. — Madagascar; Mascarenes; S. India (Tamil Nadu; very rare); C. and S. America. **VU**.
163. *Asplenium batuense* Alderw. — Indian Islands (Nicobar Islands; very rare); Thailand; Malaysia; Indonesia. **CR**.
164. ?*Asplenium daghestanicum* Christ subsp. *hunzanum* (Reichst. et Fraser-Jenk.) Fraser-Jenk. — N. Pakistan, very rare; ?N.W. India (Uttarakhand, Nanda Devi, BSD, but identity uncertain; very rare). **CR; Globally threatened**.
165. *Asplenium delavayi* (Franch.) Copel. — W. Nepal, very rare; N.C. India (Sikkim; very rare); Bhutan; N.E. India (Manipur; very rare);

Myanmar; Thailand; Vietnam; China. **EN**.

166. *Asplenium exiguum* Bedd. subsp. *exiguum* — S. India (Kerala; Tamil Nadu; very rare). Subspecies **endemic** to S. India. **EN; Globally threatened**.
167. *Asplenium grevillei* Wall. ex Hook. et Grev. — S. India (Kerala; very rare); N.E. India (Arunachal Pradesh; Meghalaya; very rare); Myanmar; Thailand; Laos; Vietnam. **VU**.
168. *Asplenium hondoense* N.Murak. et Hatan. (syn.: *Hymenasplenium hondoense*) — S. India (Kerala; Tamil Nadu; very rare); C. Nepal, rare; N.E. India (Mizoram; very rare); China; Japan. Misidentified by Fraser-Jenkins in Chandra *et al.* (2008) as *A. apogamum* N. Murak. et Hatan., when first recognised in India. **NT**.
169. *Asplenium hymenophylloides* Fée — W. and E. Africa; W. India (Rajasthan, Mt. Abu; very rare). **EN**.
170. *Asplenium khasianum* Sledge — N.E. India (Assam State; Arunachal Pradesh; Manipur; Meghalaya; very rare); Myanmar; Thailand. **NT**.
171. *Asplenium macrophyllum* Sw. — Africa; Madagascar; Mascarenes; N.E. India (W. Bengal, Rangeet valley; Assam State; Nagaland; very rare); Myanmar; Thailand; Vietnam; Malaysia; Indonesia; Philippines. **NT**.
172. *Asplenium mysorensense* Roth (syn.: *A. lakshmananii* M. B. Viswan.; *A. bipinnatum* (Sledge) Philcox, *non al.*) — Sri Lanka; S. India (Karnataka; Kerala; Tamil Nadu; very rare); Malaysia. Misreported from many other countries by Dixit (1984) in error for *A. polyodon* and *A. falcatum* (see Salgado and Fraser-Jenkins (in press) re *A. falcatum*). **NT**.
173. *Asplenium paucivenosum* (Ching) Bir — N.C. India (W. Bengal; rare); China. Octaploid sexual, and much rarer than the closely related and larger tetraploid sexual *A. magnificum* Ching (from Uttarakhand to Arunachal Pradesh; Nepal; Bhutan; Tibet; China). **VU**.
174. *Asplenium pellucidum* Lam. — E. Africa; Madagascar; Mascarenes; Sri Lanka; N.C. India (Sikkim; very rare); Myanmar; Thailand;

- Vietnam; Malaysia; Indonesia; Philippines; New Guinea. **CR**.
175. *Asplenium rivulare* Fraser-Jenk. — S. India (Kerala; Tamil Nadu; very rare). As known so far **endemic** to S. India. **NT; Globally threatened**.
176. *Asplenium rockii* C. Chr. — S.E. India (Andhra Pradesh; very rare); N.E. India (Arunachal Pradesh; Nagaland; Manipur; very rare); Myanmar; China. **VU**.
177. *Asplenium sarellii* Hook. subsp. *pekinense* (Hance) Fraser-Jenk., Pangtey et Khullar — Pakistan, very rare; N.W. India (Jammu & Kashmir; Himachal Pradesh; Uttarakhand; very rare); W. Nepal, very rare; Tibet; China; Taiwan; Korea; Japan. **VU**.
178. *Asplenium scalare* Rosenst. — S. India (Kerala; very rare); Sumatra; Malaysia. **CR**.
179. *Asplenium serricula* Fée — Sri Lanka; S. India (Tamil Nadu; very rare); Philippines. **VU**.
180. *Asplenium sikkimbirii* Fraser-Jenk. — N.C. India (Sikkim; very rare); N.E. India (Arunachal Pradesh; very rare); China. **VU**.
181. *Asplenium ?sublaserpitiifolium* Ching — Indian Islands (Nicobar Islands; very rare); Malaysia. The Nicobar species is not *A. nitidum*, but although it may be correctly identified as *A. sublaserpitiifolium*, its identity could do with confirmation. **VU**.
182. *Asplenium tenerum* G. Forst. — Seychelles; Sri Lanka; Indian Islands (Nicobar Islands; very rare); S. India (Kerala; Tamil Nadu; very rare); Myanmar; Thailand; Vietnam; Taiwan; Japan; Malaysia; Indonesia; Philippines; New Guinea; Australia; Polynesia. **NT**.
183. *Asplenium thunbergii* Kunze — N.E. India (Manipur; very rare); Myanmar; Thailand; Malaysia; Indonesia; Philippines. **CR or EW**.
- Thelypteridaceae**
184. *Thelypteris beddomei* (Baker) Ching — Sri Lanka; S. India (Kerala; Tamil Nadu; very rare); Malaysia; Indonesia, Philippines; New Guinea; China; Taiwan; Japan. **CR**.
185. *Thelypteris confluens* (Thunb.) C. V. Morton — Africa; Madagascar; Sri Lanka; S. India (Tamil Nadu; very rare); Myanmar; Thailand; Laos; Sumatra; New Guinea; Australia; New Zealand. **CR**.
186. *Thelypteris cuspidata* (Blume) K. Iwats. — Indian Islands (Nicobar Islands; very rare); Malaysia; Indonesia; Philippines; Polynesia. **EN**.
187. *Thelypteris didymochlaenoides* (C.B. Clarke) Holttum — N.E. India (Meghalaya; very rare). As known so far **endemic** to N.E. India, but very probably also occurring in Myanmar and perhaps also China. **CR**.
188. *Thelypteris elwesii* (Baker) Ching — N.C. India (Sikkim; very rare); China. Listed from Sikkim only by IUCN (1998) as Rare. **VU**.
189. *Thelypteris griffithii* (T. Moore) C.F. Reed — N.E. India (Meghalaya; very rare); Myanmar; China; Taiwan. **EN**.
190. *?Thelypteris gustavii* (Bedd.) C.F. Reed — N.E. India (Assam State; very rare); ?Thailand (Holttum, 1976a), but not accepted by Lindsay *et al.* (2009). Known for sure only from Assam State, but as stated by Holttum, near to and possibly conspecific with *T. evoluta*. **?EN**.
191. *?Thelypteris heterocarpa* (Blume) C. V. Morton — Indian Islands (Andaman Islands; Nicobar Islands (Dixit and Sinha, 2001); very rare, but needing confirmation of identity as specimens so identified in CAL are *T. polycarpa*); Thailand; Vietnam; Malaysia; Indonesia; Philippines; Australia; Polynesia; China. Misreported from Assam State, Kamrup, by Kachroo *et al.* (1989). **?VU**.
192. *Thelypteris hirsutipes* (C.B. Clarke) Ching — N.E. India (Meghalaya; very rare); China; Thailand; Malaysia. **VU**.
193. *Thelypteris hirtisora* (C. Chr.) K. Iwats. — N.E. India (Nagaland; Mizoram; very rare); Myanmar; Thailand; Laos; Vietnam; China. **EN**.
194. *Thelypteris hokouensis* (Ching) C. F. Reed — N.E. India (Mizoram; very rare (Holttum 1976a), perhaps requiring confirmation as only an immature frond-apex was seen); China. **CR**.
195. *Thelypteris immersa* (Blume) Ching —

- Indian Islands (Andaman Islands; Nicobar Islands (Dixit and Sinha, 2001); very rare); ?N.E. India (erroneously reported, described as if with a creeping rhizome and lobed pinules, and illustrated from "Assam" i.e. ?Meghalaya or ?Arunachal Pradesh, *W. Griffith*, K (Beddome (1867), but reidentified by Clarke (in Beddome 1883) as *T. graciliscens*, though Assam mentioned again by Holtum (1976b)); Thailand; Malaysia; Indonesia; Philippines; Australia; Polynesia. Misreported from China by Holtum (1976b). **EN**.
196. *Thelypteris kingii* C. F. Reed — N.C. India (Sikkim; very rare). As known at present **endemic** to Sikkim, but likely to occur in Tibet and China. **EN; Globally threatened**.
197. *Thelypteris kurzii* (Holtum) Fraser-Jenk. — Indian Islands (Nicobar Islands; very rare or perhaps extinct). **Endemic** to the Nicobar Islands. **CR or EX**.
- [*Thelypteris latebrosa* (Kunze ex Mett.) C. F. Reed — N.C. India (reported from W. Bengal, Duars, *J.S. Gamble* 6652c, K, in error, see Chandra *et al.* (2008)); Malaysia; Indonesia; Philippines.]
198. *Thelypteris megacuspis* (Baker) C. F. Reed — N.E. India (Arunachal Pradesh; very rare); China Vietnam. **CR**.
- [*Thelypteris menisciocarpa* (Blume) K. Iwats. — ?Indian Islands (Nicobar Islands, very rare; reported by Dixit and Sinha (2001), but requires confirmation as no correct Nicobars material present at CAL; probably in error for a juvenile *T. nudata*); Thailand; Malaysia; Indonesia; Philippines; New Guinea. Reported from N.E. India (Arunachal Pradesh) by Singh and Panigrahi (2005) in error for a small *T. lakhimpurensis*.]
199. *Thelypteris namburensis* (Bedd.) C. F. Reed — N.E. India (Assam; Arunachal Pradesh; very rare). As known so far **endemic** to N.E. India, but likely to occur in Myanmar and/or China. Misreported from Thailand by Holtum (1976a) in error, and not recorded from there by Tagawa and Iwatsuki (1988) or Lindsay *et al.* (2009). **EN**.
200. *Thelypteris opulenta* (Kaulf.) Fosberg — E. Africa; Seychelles; Sri Lanka; Indian Islands (Nicobar Islands; very rare); S. India (Tamil Nadu; very rare); Myanmar; Thailand; Malaysia; Indonesia; Philippines; Australia; New Caledonia; Polynesia. Reported from N. India in error. **EN**.
201. *Thelypteris paludosa* (Blume) K. Iwats. — S. India (Tamil Nadu; very rare); N.E. India (Arunachal Pradesh; very rare); Thailand; Malaysia; Indonesia. **EN**.
202. *Thelypteris palustris* Schott subsp. *palustris* — Europe; W. Asia; Pakistan; N.W. India (Jammu & Kashmir; Himachal Pradesh; very local and rare). **VU**.
203. *Thelypteris parasitica* (L.) Fosberg subsp. *manickirudorum* Fraser-Jenk. et Benniamin — S. India (Tamil Nadu; very rare). A diploid subspecies, as known so far apparently **endemic** to S. India. **EN; Globally threatened**.
204. *Thelypteris polycarpa* (Blume) K. Iwats. — Indian Islands (Nicobar Islands; very rare); Thailand; Vietnam; Malaysia; Indonesia; Philippines; Polynesia. **EN**.
205. *Thelypteris repanda* (Fée) C.V. Morton (syn.: *Pronephrium birii* R. D. Dixit) — N.E. India (Arunachal Pradesh; very restricted); Myanmar; Vietnam; Malaysia; Indonesia; Philippines. **VU**.
206. *Thelypteris scallanii* (Christ) C.V. Morton — N.E. India (Arunachal Pradesh, Siang; very rare; Meghalaya, Elephant Falls; very rare); China; Vietnam. **VU**.
207. *Thelypteris siamensis* Tagawa et K. Iwats. — N.C. India (W. Bengal, Sevoke; very rare); Bhutan, very rare; N.E. India (Arunachal Pradesh; very rare). **NT**.
208. *Thelypteris srilankensis* Panigrahi (syn.: *Christella zeylanica* (Fée) Holtum) — Sri Lanka, very rare, probably extinct; ?Indian Islands (Nicobar Islands (Dixit and Sinha (2001) reported as doubtful); if present, very rare, but requires confirmation of identity). **Endemic** to Sri Lanka (?and the Nicobars). **?CR; Globally threatened**.

209. *Thelypteris zeylanica* Ching — Sri Lanka; ?N.E. India (Arunachal Pradesh; very rare). As known so far **endemic** to Sri Lanka and ?N.E. India. Although this may be a good species, it is conceivable that these plants might only be depauperate forms of *T. calcarata* and *T. caudipinna* respectively, and require further investigative study. ?**CR; Globally threatened.**
- Woodsiaceae** (syn.: Rhachidosoraceae, Cystopteridaceae, Diplaziopsidaceae, Athyriaceae, Onocleaceae).
210. *Athyrium atratum* Bedd. — N.E. India (Arunachal Pradesh; Manipur; very rare); Vietnam; Sumatra; Indonesia. IUCN (1998) listed it from Manipur only as endangered. **EN.**
- [*Athyrium davidii* (Franch.) Christ (syn.: *A. duthiei* (Bedd.) Bedd.) — N.W. India (Uttarakhand; rare); Nepal, fairly common; N.C. India (Sikkim; fairly common); N.E. India (Arunachal Pradesh; very rare). Its synonym, *A. duthiei*, was listed from Kumaon and Sikkim by IUCN (1998) as Rare.]
211. *Athyrium delavayi* Christ — N.E. India (Meghalaya; Mizoram; very rare); China; Taiwan. **CR.**
212. *Athyrium dissitifolium* (Baker) C. Chr. — N.E. India (Arunachal Pradesh; very rare); Myanmar; Thailand; China. **CR.**
213. *Athyrium khasimontanum* Fraser-Jenk. — N.E. India (Meghalaya; very rare). As known so far **endemic** to N.E. India, but likely to occur in Myanmar and/or China. **CR; Globally threatened.**
214. *Athyrium kumaonicum* Holttum ex Punetha — N.W. India (Uttarakhand; very rare). Range imperfectly known. As known so far apparently **endemic** to N.W. India, but requires more careful distinction from other similar species further east in the Himalaya. **EN; Globally threatened.**
215. *Athyrium nakanoi* Makino — Bhutan, very rare; N.E. India (Arunachal Pradesh; very rare); China; Taiwan; Japan. Misreported from Assam State and Meghalaya in error for *A. puncticaule*. **NT.**
216. *Athyrium niponicum* (Mett.) Hance — N.E. India (Arunachal Pradesh; Manipur; Tripura; very rare); China; Taiwan; Korea; Japan. **VU.**
217. *Athyrium otophorum* (Miq.) Koidz. — N.W. India (Uttarakhand, Pithoragarh; very rare); China; Taiwan; Japan. **EN.**
218. *Athyrium repens* (Ching) Fraser-Jenk. — Nepal; N.C. India (Sikkim; very rare); Bhutan; Tibet; China. **EN.**
219. *Athyrium roseum* Christ — C. Nepal, very rare; N.C. India (Darjeeling; very rare); Tibet; China. **CR.**
220. *Deparia macdonellii* (Bedd.) M. Kato — Pakistan; N.W. India (Jammu & Kashmir; Himachal Pradesh; very rare). **Endemic** to the W. Indo-Himalaya, and related to, but distinct from the Chinese species, *D. pterorhachis* (Christ) M. Kato. **CR; Globally threatened.**
221. *Diplazium austrosylvaticum* Fraser-Jenk. et Benniamin — S. India (Tamil Nadu, Agastya-malai Hills; very rare). **Endemic** to S. India. **CR; Globally threatened.**
222. *Diplazium beddomei* C. Chr. — Sri Lanka; S. India (?Kerala; Tamil Nadu; very rare). **Endemic** to Sri Lanka and S. India. **CR; Globally threatened.**
223. *Diplazium burmanicum* Ching ex W. M. Chu et Z. R. He (syn.: *D. bantamense* Blume var. *listeri* G. King, *ined.*, in herb. CAL, K) — N.E. India (Arunachal Pradesh; very rare and restricted); Myanmar. **EN; Globally threatened.**
224. *Diplazium cognatum* (Hieron.) Sledge — Sri Lanka, rare; S. India (Kerala; Tamil Nadu; very rare). **Endemic** to Sri Lanka and S. India; but closely related to or possibly a synonym of *D. leptophyllum*. Listed from Sri Lanka only by IUCN (1998) as Indeterminate. **VU; Globally threatened.**
225. *Diplazium cordifolium* Blume — N.E. India (Manipur; very rare); ?Myanmar; Thailand; Vietnam; Malaysia; Indonesia; Philippines; Australia; Polynesia. The Indian plant belongs to what was described as *D. integrifolium* Blume, with well pinnate fronds and might perhaps represent a separate species from *D.*

- cordifolium* proper. **CR.**
226. *Diplazium crenatoserratum* (Blume) T. Moore — Indian Islands (Andaman Islands; very rare); Myanmar; Thailand; Malaysia; Indonesia. **CR.**
227. *Diplazium griffithii* T. Moore (probable syn.: *D. petrii* (Tardieu) Ching) — N.E. India (Meghalaya; very rare); Thailand; Vietnam; China; Taiwan; Japan. Often confused with the very distinct *D. spectabile* due to 19th Century misapplications of the name. **CR.**
228. *Diplazium heterophlebium* (Mett. ex Baker) Diels — E. Nepal, rare; N.C. India (Darjeeling; Sikkim; very rare); Bhutan; N.E. India (Arunachal Pradesh; Manipur; Meghalaya; very rare); Myanmar; Thailand; Vietnam; Malaysia; China. **NT.**
229. *Diplazium leptophyllum* Christ ex C. Chr. — N.E. India (Mizoram; very rare); China; Myanmar; Thailand. It is possible that *D. cognatum* might be a synonym of this species. **CR.**
230. *Diplazium lobatum* (Tagawa) Tagawa — N.E. India (Assam State, Abhoypur Forest, Sibsagarh Distr., *S. Chandra* 26342, 1.5.1965, LWG, det. CRFJ; very rare); S. China; Taiwan; Japan. Previously unrecognised in India. **CR.**
231. *Diplazium pinfaense* Ching — N.E. India (Manipur; very rare); China; Japan. **CR.**
232. *Diplazium pinnatifidopinnatum* (Hook.) T. Moore — N.E. India (Assam State; Arunachal Pradesh; very rare); Myanmar; China. **EN.**
233. *Diplazium tomentosum* Blume — ?N.E. India (Meghalaya, *W. Griffith*, K, very rare, or possibly mislocalised); Myanmar; Thailand; Vietnam; Malaysia; Indonesia; Philippines. **?CR.**
234. *Diplazium travancoricum* Bedd. — Sri Lanka, very rare; S. India (Kerala; Tamil Nadu; rare and restricted). **Endemic** to Sri Lanka and S. India. **NT; Globally threatened.**
235. *Diplazium virescens* Kunze — N.E. India (Meghalaya, Shillong Peak, *C. R. Fraser-Jenkins* 27804, 27.11.1998, E; very rare); Vietnam; China; Taiwan; Japan. **CR.**
236. *Gymnocarpium oyamense* (Baker) Ching — Nepal, very rare; N.C. India (Sikkim; very rare); N.E. India (Arunachal Pradesh; very rare); Tibet; China; Taiwan; Japan; Philippines; New Guinea. **EN.**
237. *Matteuccia orientalis* (Hook.) Trevis. — N.E. India (Arunachal Pradesh; Meghalaya; very rare); China; Taiwan; Korea; Japan. Widely over-reported from throughout Himalayan N. India in error for the commoner *M. intermedia*. **VU.**
238. *Woodsia alpina* (Bolton) Gray — Europe; Pakistan, rare; N.W. India (Jammu & Kashmir; Himachal Pradesh; Uttarakhand; very rare); W. Nepal; Tibet; N. Asia; N. America. **NT.**
239. *Woodsia cycloloba* Hand.-Mazz. — ?Pakistan (Swat, Utrot, very rare, *CRFJ*, identity uncertain, specimen taken away from herb. *CRFJ* to *GENT*); N.W. India (Uttarakhand, very rare); N.C. India (Sikkim, very rare); Nepal, rare; China. **EN.**
240. *Woodsia glabella* R. Br. ex Richardson — N.W. India (Ladakh; Uttarakhand; very rare); N.C. Nepal, very rare. **EN.**
241. *Woodsia hancockii* Baker — N.W. India (Himachal Pradesh; Uttarakhand; very rare); W. Nepal, very rare; China. **VU.**
242. *Woodsia lanosa* Hook. — N.W. India (Uttarakhand; very rare); N.C. India (Sikkim; very rare); ?N.E. India (Arunachal Pradesh; very rare; but not certain that it is not *W. rosthorniana*?); China. **VU.**
- Dryopteridaceae** (syn.: Hypodematiaceae, Tectariaceae).
243. *Acrorumohra diffracta* (Baker) Ching — N.E. India (Arunachal Pradesh; very rare); China; Taiwan; Vietnam. This genus is near to *Arachniodes* and *Leptorumohra* and probably does not constitute a separate genus. **CR.**
244. *Arachniodes miqueliana* (Maxim. ex Franch et Sav.) Ohwi — N.E. India (Arunachal Pradesh; very rare); China; Japan. **CR.**
245. *Arachniodes* sp. near *nipponica* (Rosenst.) Ohwi — ?Bhutan; ?N.E. India (Arunachal Pradesh, if not confused with juvenile *A. henryi*; Meghalaya, Shillong; very rare, erect rhizome); China; Japan. **EN.**
246. *Arachniodes ?spectabilis* (Ching) Ching —

- N.E. India (Arunachal Pradesh; very rare); China; Thailand. **EN**.
247. *Arachniodes superba* Fraser-Jenk. (syn.: *Lithostegia foeniculacea* (Hook.) Ching) — E. Nepal, very rare; N.C. India (Darjeeling; Sikkim; restricted and rare); Bhutan; N.E. India (Arunachal Pradesh; very rare); Tibet; China; N. Myanmar. **NT**.
248. *Ctenitis fengiana* Ching — N.E. India (Arunachal Pradesh, Siang, Swan to Monigong track, A. K. Baishya 91408B, 11.1986, ASSAM, det. CRFJ; very rare); Tibet; China. Not previously recorded in India. **CR**.
249. *Ctenitis ferruginea* (Baker) Ching — S. India (Tamil Nadu; very rare). **Endemic** to S. India, though related to the distinct species, *C. obtusiloba* of Sri Lanka. **CR; Globally threatened**.
250. *Ctenitis manipurensis* (Bedd.) Ching — N.E. India (Arunachal Pradesh; Manipur; Meghalaya, very rare); Philippines; New Guinea. Misreported from Nepal by Wallich due to confusion in localisation of sheets; reported from N.W. India (Uttarakhand, Gini) by Kholia and Bhakuni (2009) from an old specimen of uncertain provenance, but perhaps from N.E. India. **EN**.
251. *Ctenitis mannii* (C. Hope) Ching — N.E. India (Assam State; ?Meghalaya; very rare); ?China (sub *Ctenitis fulgens*?). Not present in Arunachal Pradesh as listed by Fraser-Jenkins in Chandra *et al.* (2008) in error for Lakhimpur, Assam. Reported from Thailand and Malaysia in error for other species. As known so far perhaps **endemic** to N.E. India (if *C. fulgens* is not synonymous as was found by Holttum), but likely to occur in Myanmar and/or China. **EN**
252. *Ctenitis paucisora* (Copel.) Copel. — N.E. India (Arunachal Pradesh; very rare); Malaysia (Borneo; very rare). **CR**.
253. *Ctenitis scabrosa* (Kunze) Ching — S. India (Kerala; Tamil Nadu; very rare). **Endemic** to S. India. Reported from Meghalaya in error. **VU; Globally threatened**.
254. *Cyrtomium* probably *clivicola* (Makino) Tagawa — N.E. India (Arunachal Pradesh; very rare); China; Japan. **CR**.
255. *Cyrtomium fortunei* J. Sm. — E. Bhutan, very rare; N.E. India (Nagaland; Manipur; very rare); China; Korea; Japan; Vietnam. Reported from Arunachal Pradesh by Fraser-Jenkins in Chandra *et al.* (2008) in error for the closely related *C. clivicola*. **EN**.
256. *Cyrtomium micropterum* (Kunze) Ching (?syn.: *C. lonchitoides* Christ) — Africa; Madagascar; S. India (Tamil Nadu; very rare); ?China. **EN**.
257. *Didymochlaena truncatula* (Sw.) J. Sm. — Africa; Madagascar; N.E. India (Nagaland; Manipur; ?Meghalaya; Mizoram; very rare); Myanmar; Thailand; Malaysia; Indonesia; Philippines; Polynesia; C. and S. America. **EN**.
258. *Dryopteris alpestris* Tagawa — Nepal, very rare; N.C. India (N. Sikkim, Lachen, B. S. Kholia, det. CRFJ; very rare); N.E. India (Arunachal Pradesh; very rare); Tibet; China; Taiwan; Myanmar. **EN**.
- [*Dryopteris angustifrons* (T. Moore) Kuntze — ?"Nepal", but the specimens not with original collector's labels and probably collected in Myanmar; Myanmar, very rare; China (Yunnan; very rare). Reported from Sikkim in error for *D. carolihopei* Fraser-Jenk., so probably never present in India or Nepal. *D. camusiae* Fraser-Jenk. was mistakenly illustrated as *D. angustifrons* in the *Flora Reipublicae Popularis Sinicae*].
259. *Dryopteris assamensis* (C. Hope) C. Chr. et Ching — N.C. India (W. Bengal, Dulkajhar, near Siliguri; extinct); N.E. India (Arunachal Pradesh; Assam State; Meghalaya; very rare); ?Myanmar; China. **VU**.
260. *Dryopteris austroindica* Fraser-Jenk. — S. India (Tamil Nadu; very rare and extinct in the Shevaroy Hills part of its range). **Endemic** to S. India. **EN; Globally threatened**.
261. *Dryopteris basisora* Christ — N.W. India (Uttarakhand; very rare); Nepal, very rare; Bhutan, rare; N.E. India (Arunachal Pradesh; very rare). **VU**.
262. *Dryopteris camusiae* Fraser-Jenk. — N.E.

- India (Manipur; very rare); ?Myanmar; China. **CR.**
263. *Dryopteris costalisora* Tagawa — E. Nepal, very rare; N.C. India (Darjeeling; Sikkim; very rare); N.E. India (Arunachal Pradesh; very rare); China; Taiwan. **EN.**
264. *Dryopteris deparioides* (T.Moore) Kuntze subsp. *concinna* C.Chr. — Sri Lanka; S. India (Tamil Nadu; very rare, perhaps extinct). **Endemic** to Sri Lanka and S. India. **CR** or **EX**; **Globally threatened.**
265. *Dryopteris dickinsii* (Franch. et Sav.) C. Chr. — Pakistan, very rare; N.W. India (Jammu & Kashmir; very rare); China; Taiwan; Japan. The extraordinary disjunction of this species — from W. China to Kashmir — is similar to that of *Dennstaedtia wilfordii* and like that species, it has not been recollected in India for many years. **CR** or **EX.**
266. *Dryopteris fangii* Ching — N.C. India (Sikkim; very rare, *B. S. Kholia*, BSHC, det. CRFJ); N.E. India (Arunachal Pradesh; very rare); Tibet; China. **EN.**
267. *Dryopteris flemingii* Fraser-Jenk. — N.W. India (Himachal Pradesh; Uttarakhand; very rare); C. Nepal, rare; ?China (?as *D. minjiangensis* H.S. Kung and *D. nyingchiensis* Ching, unidentified earlier names). **VU.**
268. *Dryopteris hasseltii* (Blume) C. Chr. — N.E. India (Arunachal Pradesh; Assam State, very rare or extinct; Meghalaya; Mizoram; very rare); Thailand; Vietnam; China; Taiwan; Japan; Malaysia; Indonesia; Philippines; New Guinea; Australia; Polynesia. Listed under *Arachniodes hasseltii*, in error (see Fraser-Jenkins, 1989), from China by IUCN (2004) as Endangered. **EN.**
269. *Dryopteris himachalensis* Fraser-Jenk. — N.W. India (Himachal Pradesh, above Manali; very rare); China. **CR.**
270. *Dryopteris khullarii* Fraser-Jenk. — N.W. India (Uttarakhand; very rare). Neo-**endemic** to the W. Himalaya. **EN**; **Globally threatened.**
271. *Dryopteris meghalaica* Fraser-Jenk. — N.E. India (Manipur, very rare; Meghalaya, very restricted); Myanmar. **NT**; **Globally threatened.**
272. *Dryopteris microlepis* (Baker) C. Chr. — N.E. India (Arunachal Pradesh, Siang, Mechuka area, *A. K. Baishya* 91420, 11.1986, ASSAM, det. CRFJ; very rare); China. Previously unknown from India. **CR.**
273. *Dryopteris namegatae* (Sa. Kurata) Sa. Kurata — N.W. India (Himachal Pradesh; very rare); N.E. India (Arunachal Pradesh; very rare); China; Taiwan; Japan. **VU.**
274. *Dryopteris nobilis* Ching — N.C. India (Darjeeling; Sikkim; very rare); N.E. India (Arunachal Pradesh; very rare); Tibet; China. **VU.**
275. *Dryopteris odontoloma* (Bedd.) C. Chr. — S. India (Kerala; Tamil Nadu; very restricted). **Endemic** to S. India. Many records have been made from N. India in error for *D. nigropaleacea* and *D. juxtaposita*; one specimen of true *D. odontoloma* from Assam State (N.C. Hills, Haflong, *Subhash Chandra* s.n., Oct. 1963, LWG, det. CRFJ) is probably due to some confusion of labels. **NT**; **Globally threatened.**
276. *Dryopteris rubrobrunnea* W. M. Chu — N.E. India (Arunachal Pradesh; very rare); China. **EN.**
277. *Dryopteris sikkimensis* (Bedd.) Kuntze — N.C. India (Sikkim; very restricted and rare); Bhutan; N.E. India (Arunachal Pradesh; very rare); Tibet; China. **VU.**
278. *Dryopteris sledgei* Fraser-Jenk. — Sri Lanka, very rare; S. India (Tamil Nadu; very rare). **Endemic** to Sri Lanka and S. India. **EN**; **Globally threatened.**
279. *Dryopteris varia* (L.) Kuntze — N.E. India (Meghalaya/Assam border; very rare); ?Myanmar; China; Taiwan; Korea; Japan; Vietnam; Philippines. **CR.**
280. *Dryopteris vidyae* Fraser-Jenk. — N.C. India (Darjeeling; very rare or extinct); N.E. India (Arunachal Pradesh; Meghalaya; very rare). As known so far **endemic** to N.E. India, but is also very likely to occur in Tibet, S.W. China and/or Myanmar. **EN**; **Globally threatened.**
281. *Heterogonium pinnatum* (Copel.) Holttum —

- Indian Islands (Andaman Islands; very rare); Malaysia; Indonesia; Philippines. **EN**.
282. *Hypodematium crenatum* (Forssk.) Kuhn subsp. *mehrae* Fraser-Jenk. — N.W. India (Uttarakhand; very rare as known so far). As known so far **endemic** to N.W. India, but probably likely to occur further east. **NT; Globally threatened.**
283. *Lastreopsis tenera* (R. Br.) Tindale — Sri Lanka, common; S. India (Kerala; Tamil Nadu; very rare); Indonesia; Philippines; New Caledonia; Australasia; Polynesia; China; Taiwan. **VU**.
284. *Phanerophlebiopsis balansae* (Christ) Fraser-Jenk. et Baishya, **comb. nov.** (basionym: *Polystichum balansae* Christ, *Trudy Hort. Bot. Imp. St. Petersburg* [Act. Hort. Bot. Petrop.] 28: 193 (1908)) — N.E. India (Arunachal Pradesh, Siang, Yapik, A. K. Baishya 90709, 1.11.1986, ASSAM; very rare, specimen unusual in having fronds with subapical proliferous bulbils, otherwise identical to Chinese etc. material); China; Japan. Not previously recorded from India. **CR**.
285. *Phanerophlebiopsis polyodon* (Ching) Fraser-Jenk. — N.E. India (Arunachal Pradesh; Manipur; Meghalaya, very locally restricted and rare). As known so far **endemic** to N.E. India, though to be expected in Myanmar and/or S.W. China. **NT; Globally threatened.**
286. *Pleocnemia conjugata* C. Presl — Indian Islands (Andaman Islands; very rare; omitted by Dixit and Sinha (2001)); Myanmar; Malaysia; Indonesia; Philippines. Although within the range of the species, as noted by Holttum, the Andamans material has the sori confined to further up the pinnule-lobes than commonly occurs in this species, though this feature is not unique to the Andamans and intermediates occur elsewhere. **EN**.
287. *Polystichum adungense* Ching et Fraser-Jenk. ex H. S. Kung et Li Bing Zhang — N.E. India (Arunachal Pradesh, Siang, Libong to Pangri, A. K. Baishya 33, 17.11.1986, ASSAM, det. CRFJ; very rare); Myanmar; China. Previously overlooked in India. Note that the authorities were written the wrong way round by Johns (1997), but correctly by IPNI. **CR; Globally threatened.**
288. *Polystichum anomalum* (Hook. et Arn.) J. Sm. (syn.: *P. eximium* (Mett. ex Kuhn) C. Chr.) — Sri Lanka, rare; sori above or beneath or both; S. India (Kerala; Tamil Nadu; very rare; sori beneath). **Endemic** to Sri Lanka and S. India. Listed by IUCN (1998) from Sri Lanka only as Indeterminate. "*P. eximium*" continues to be widely reported from Thailand, China, Taiwan and Japan in error for *P. scarosum*, as pointed out by Fraser-Jenkins (1991), which latter name has been overlooked elsewhere. Listed from Sri Lanka only by IUCN (1998) as Indeterminate. **EN; Globally threatened.**
289. *Polystichum duthiei* (C. Hope) C. Chr. — N.W. India (Uttarakhand; very rare); W. and C. Nepal, very rare); China; Taiwan. This species can be indusiate or exindusiate (see Fraser-Jenkins, 1991). **CR**.
290. *Polystichum glaciale* Christ — N.C. India (Sikkim; very rare); Bhutan, very rare; Tibet, China. Reported from Taiwan in error for *P. duthiei*. **CR**.
291. *Polystichum grandifrons* C. Chr. (syn.: *P. kiusiense* Tagawa) — N.E. India (Manipur; very rare); China; Taiwan; Japan; Vietnam; Philippines. **CR**.
292. *Polystichum hecatopterum* Diels — N.E. India (Arunachal Pradesh; very rare); China; Taiwan. **CR**.
293. *Polystichum manickamianum* Benniamin, Fraser-Jenk. et Irud. — S. India (Tamil Nadu, Agastyamalai Hills; very rare). **Endemic** to S. India. **CR; Globally threatened.**
294. *Polystichum palniense* Fraser-Jenk. — S. India (Tamil Nadu, Palni Hills; very locally restricted). **Endemic** to S. India. **NT; Globally threatened.**
295. *Polystichum subinermis* (Kunze) Fraser-Jenk. — S. India (Kerala; Tamil Nadu; very rare). **Endemic** to S. India. **EN; Globally threatened.**
296. *Polystichum tangmaiense* H. S. Kung et Tateishi — N.E. India (Arunachal Pradesh;

- Nagaland; Manipur; very rare (see Fraser-Jenkins and Benniamin (2010)); Tibet; China. **VU**.
297. *Polystichum wattii* (Bedd.) C. Chr. — N.E. India (Arunachal Pradesh; Manipur; very rare); Tibet; China; Myanmar. Listed by IUCN (1998) under both *Lastreopsis* and *Polystichum* from Manipur only, as Extinct and Extinct or Endangered, respectively. **VU**.
298. *Pteridrys cnemidaria* (Christ) C. Chr. et Ching — N.C. India (Darjeeling; very rare, not collected for many years); N.E. India (Assam State; Meghalaya; very rare, not recently collected); China; Taiwan; Myanmar; Thailand; Vietnam. **CR**.
299. *Pteridrys syrmatica* (Willd.) C. Chr. et Ching — Sri Lanka, very rare or extinct; S. India (Tamil Nadu; Kerala; very rare, not collected for many years); Thailand; Vietnam; Malaysia; Indonesia; Philippines. Listed by IUCN (1998) from Sri Lanka only as Indeterminate. **CR**.
300. *Pteridrys zeylanica* Ching — Sri Lanka, very rare or extinct; S. India (Kerala; Andhra Pradesh; very rare). ?**Endemic** to Sri Lanka and S. India. Listed by IUCN (1998) from Sri Lanka only, as Indeterminate. **EN; Globally threatened**.
301. *Tectaria chattagramica* (C. B. Clarke) Ching — N.E. India (Assam State; Meghalaya; Manipur; Tripura; Mizoram; very rare); Bangladesh; Myanmar; Thailand. Listed by IUCN (1998) from Bangladesh only as Vulnerable. **VU**.
302. *Tectaria dubia* (C.B. Clarke et Baker) Ching — N.E. India (Assam State; ?Arunachal Pradesh (Singh and Panigrahi, 2005, but may be in error for *T. griffithii*; very rare); China; Taiwan. This species is very little known in India and may sometimes have been overlooked within *T. griffithii*. The tentative report from Nepal by Fraser-Jenkins (2008b) and Fraser-Jenkins and Benniamin (2010) could be in error for a more glabrous form of *T. coadunata*, as was the report from Pithoragarh, Uttarakhand by Pangtey and Punetha (1987), but the Nepalese plant appears to be a taxon distinct from *T. coadunata*. At present in India it is only known for certain from its type collection. **CR**.
303. *Tectaria fauriei* Tagawa — Bhutan; N.E. India (Assam; Arunachal Pradesh; very rare); Myanmar; Thailand; Malaysia; China; Taiwan; Japan. **VU**.
- [*Tectaria fissa* (Kunze) Holttum — ?Indian Islands (Andaman Islands (Dixit and Sinha (2001), *sub T. polymorpha* var. *cuneifolia*), rare, but requiring confirmation in case of confusion with a similarly narrow-pinna'd specimen of *T. polymorpha*); Malaysia; Indonesia.]
304. *Tectaria ingens* (Atk. ex C.B. Clarke) Holttum — N.C. India (Darjeeling; Sikkim; very rare); N.E. India (Arunachal Pradesh; Manipur; Meghalaya; very rare); Tibet. **NT**.
305. *Tectaria kehdingiana* (Kuhn) M.G. Price — Indian Islands (Nicobar Islands; very rare); Sumatra. **EN**.
306. *Tectaria melanocaulon* (Blume) Copel. — Indian Islands (Andaman Islands; very rare); Thailand; Malaysia; Indonesia; Philippines; New Guinea. **VU**.
307. *Tectaria* sp. near *T. siifolia* — Bhutan, rare; N.E. India (Arunachal Pradesh; very rare). As known so far **endemic** to N.E. India, but very likely to occur also in China or Myanmar. Fronds ternate or with two pairs of pinnae, the lowest usually without a basal lobe or sometimes with small, shallow lobe in large specimens; differs from *T. siifolia* in the fronds not being at all dimorphic; narrow scales at stipe-base concolorous dark-brown or blackish, without scarious margins; pinnae never with a proliferous bulbil; costae and veins beneath with more prominent and denser hairs. **VU; Globally threatened**.
308. *Tectaria siifolia* (Willd.) Copel. (syn.: *T. ternifolia* (Alderw.) C. Chr.) — Indian Islands (Andaman Islands; very rare (Dixit and Sinha (2001)); Thailand; Malaysia; Indonesia; Philippines. Fraser-Jenkins and Benniamin (2010) reported it from N.E. India *sub T. ternifolia* in error for *T. sp.* above; and Banerjee and Mukhopadhyay (2010) reported it from India pre-

sumably in error. **EN**.

309. *Tectaria simonsii* (Baker) Ching — N.C. India (W. Bengal; Sikkim; very rare); N.E. India (Arunachal Pradesh; Assam State; very rare); Bangladesh; Myanmar; Thailand; Malaysia; China; Taiwan. **NT**.
310. *Tectaria trimenii* (Bedd.) C. Chr. — Sri Lanka; S. India (Tamil Nadu; very rare). **Endemic** to Sri Lanka and S. India. **CR**; **Globally threatened**.
311. *Tectaria zeilanica* (Houtt.) Sledge — Sri Lanka, S. India (Kerala; Tamil Nadu; very rare); Thailand; Vietnam; Malaysia; China; Taiwan. **EN**.

Oleandraceae

312. *Arthropteris palisotii* (Desv.) Alston — Sri Lanka, very rare; S. India (Tamil Nadu; very rare or extinct); Africa; China; Taiwan; Thailand; S.E. Asia; Australasia; Polynesia. **CR** or **EX**.
313. *Oleandra undulata* (Willd.) Ching — N.E. India (Nagaland; Manipur; Mizoram; very rare); China; Myanmar; Thailand; Malaysia. The S. Indian species, *O. musifolia* (Blume) C. Presl, was misreported from Arunachal Pradesh by Rawat and Sahu (2006) in error for *O. wallichii*. **VU**.

Lomariopsidaceae

314. *Bolbitis medogensis* (Ching et S.K. Wu) S.Y. Dong — N.E. India (Arunachal Pradesh; very rare); Tibet. **CR**; **Globally threatened**.
315. *Bolbitis presliana* (Fée) Ching — S. India (Karnataka; Kerala; very rare). **Endemic** to S. India. **NT**; **Globally threatened**.
316. *Bolbitis semicordata* (Baker) Ching — S. India (Kerala; Tamil Nadu; very rare). **Endemic** to S. India. **VU**; **Globally threatened**.
317. *Bolbitis sinuata* (C. Presl) Hennisman — Indian Islands (Nicobar Islands; very rare); Thailand; Malaysia; Indonesia; Philippines; New Guinea. **EN**.
318. *Bolbitis subcordata* (Copel.) Ching — N.E. India (Meghalaya, Umkiong, *A. Bennia-*

min 26187, 19.10.2010, det. CRFJ; very rare); China; Taiwan; Japan; Vietnam. Not previously recorded in India. **CR**.

319. *Bolbitis tibetica* Ching et S.K. Wu — Nepal, very rare; N.E. India (Arunachal Pradesh; very rare); Tibet. **EN**; **Globally threatened**.
320. *Elaphoglossum beddomei* Sledge — S. India (Kerala; Tamil Nadu; rare and very restricted). **Endemic** to S. India. Listed from S. India by IUCN (1998) as Rare. **NT**; **Globally threatened**.
321. *Elaphoglossum nilgircum* Krajina ex Sledge — S. India (Kerala; Tamil Nadu; very rare). **Endemic** to S. India. **EN**; **Globally threatened**.
322. *Elaphoglossum stigmatolepis* (Fée) T. Moore — S. India (Tamil Nadu; very rare). **Endemic** to S. India. Listed from S. India by IUCN (1998) as Endangered. **EN**; **Globally threatened**.
323. *Lomagramma sorbifolia* (Willd.) Ching (syn.: *Bolbitis nagalandensis* R. R. Rao et Jamir, type in LWG!; *Lomagramma matthewii* (Ching) Holttum) — N.E. India (Arunachal Pradesh; Nagaland; very rare); China; Myanmar; ?Thailand (*sub L. grossoserrata*); Malaysia; Indonesia. **NT**.
324. ?*Lomagramma sumatrana* Alderw. — Indian Islands (Nicobar Islands; very rare (Dixit and Sinha 2001), perhaps requiring confirmation of identity); Malaya; Sumatra. ?**EN**.

Davalliaceae

325. *Araiostegia hymenophylloides* (Blume) Copel. — Sri Lanka; S. India (Kerala; Tamil Nadu; Karnataka; very rare); Thailand; Malaysia; Indonesia; Philippines; ?Polynesia. **EN**.
326. *Araiostegiella perdurans* (Christ) M. Kato et C. Tsutsumi — ?N.C. India (?Sikkim; very rare); Bhutan, rare; N.E. India (Arunachal Pradesh; Nagaland; Meghalaya; ?Mizoram; all very rare); Myanmar; Thailand; Tibet; China; Taiwan. Erroneously combined with *A. hookeri* (*sub A. clarkei*) by Nooteboom (1994). **NT**.
327. *Davallia denticulata* (Burm.f.) Mett. ex

- Kuhn — Africa; Madagascar; Mascarenes; Seychelles; Sri Lanka; Indian Islands (Andaman Islands; Nicobar Islands; very rare); South India (Kerala; very rare); Myanmar; Thailand; Vietnam; Laos; Cambodia; China; Malaysia; Indonesia; Philippines; Australia; Polynesia. **VU**.
328. *Davallia divaricata* Blume (syn.: *D. orientalis* C. Chr.) — N.E. India (Assam State; Arunachal Pradesh; Manipur; Meghalaya; very rare); Myanmar; Thailand; Vietnam; China; Malaysia; Indonesia; Philippines; Solomon Islands. **EN**.
329. *Davallia heterophylla* Sm. — Indian Islands (Nicobar Islands; very rare); Thailand; Vietnam; Malaysia; Indonesia; Philippines; Polynesia. **EN**.
330. *Davallia pectinata* Sm. — Indian Islands (Nicobar Islands; very rare); Taiwan; Myanmar; Malaysia; Indonesia; New Guinea; New Caledonia; Australia; Polynesia. **EN**.
331. *Davallia repens* (L.f.) Kuhn, *nom. cons.*, *non* (Bory) Desv. (syn.: *Humata repens* (L.f.) Diels; *Davallia pedata* Sm.) — Madagascar; Mascarenes; Seychelles; Sri Lanka; Indian Islands (Andaman Islands, very rare); S. India (Tamil Nadu; very rare); N.C. India (Sikkim; very rare); Bhutan, very rare; N.E. India (Arunachal Pradesh; Assam State; Nagaland; Manipur; Meghalaya; Mizoram; very rare); Myanmar; Thailand; Vietnam; China; Taiwan; Malaysia; Indonesia; Philippines; Australia; Polynesia. **VU**
332. *Davallia solida* (G. Forst.) Sw. — Indian Islands (Andaman Islands; Nicobar Islands; very rare); N.E. India (Manipur; Mizoram; very rare); Myanmar; Thailand; Vietnam; China; Taiwan; Malaysia; Indonesia; Australia, New Zealand; Polynesia. **EN**.
- Blechnaceae**
333. *Blechnum finlaysonianum* Hook. et Grev. — Indian Islands (Andaman Islands; Nicobar Islands; very rare); Thailand; Malaysia; Indonesia; Philippines; New Guinea. **VU**.
334. *Blechnum melanocaulon* (Brack.) T.C. Chambers et P.A. Farrant subsp. *pallens* T.C. Chambers et P.A. Farrant (misapplied names: *B. colensoi* and *B. patersonii sensu auct. Ind.*) — Sri Lanka, very rare; S. India (Tamil Nadu; very rare); Malaysia; Indonesia; ?Philippines; Polynesia. **EN**.
335. *Blechnum melanopus* Hook. — Bhutan, very rare; N.E. India (Arunachal Pradesh; Meghalaya; very rare); China; Taiwan. **EN**.
336. *Blechnum indicum* Burm.f. (misapplied name: *B. cartilagineum sensu* Clarke (1880)) — N.E. India (Arunachal Pradesh, Mishmi Hills, *W. Griffith*, K; very rare; identified by Tagawa and Iwatsuki (1988) as being *B. indicum* (see Fraser-Jenkins, 2008b: 636)); Thailand; Vietnam; Malaysia; Indonesia; Philippines; Australia; Polynesia. **CR**.
337. *Brainea insignis* (Hook.) J. Sm./*Blechnum insigne* (Hook.) C.M. Kuo — N.E. India (Nagaland; Manipur; very rare; Meghalaya, very local and being depleted by fire; Mizoram, very rare); Myanmar; Thailand; Vietnam; Malaysia; Sumatra; China; Taiwan. **NT**.

Note: *Azolla cristata* Kaulf. is an American close segregate of *A. filiculoides* and is known from Jammu and Kashmir, where it has invaded the Kashmir Valley at some stage post 1990 and has recently been confirmed by Prof. C. Van Hove, of Louvain. Records of *A. filiculoides* from the Indian subcontinent have not distinguished between them, and the distinction depends only on minutely different microcharacters (some of which also display variability and intermediacy). Thus the present author's previous reports of *A. filiculoides*, though identified in what is now understood to be a broad sense by the late Prof. C. Evrard, of Louvain, now require further study. But the two taxa are obviously very closely related and may only represent geographical races, even though according to Prof. C. van Hove (personal communication, May 2012) they maintain themselves as distinct without any known hybridisation. *A. cristata* is therefore treated as a subspecies, *Azolla filiculoides* Lam. subsp. *cristata* (Kaulf.) Fraser-Jenk.,

comb. nov., basionym: *Azolla cristata* Kaulf., *Enum. Filic.*: 274. 1824. As this subspecies is only adventive in India it is not listed here as a threatened species.

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