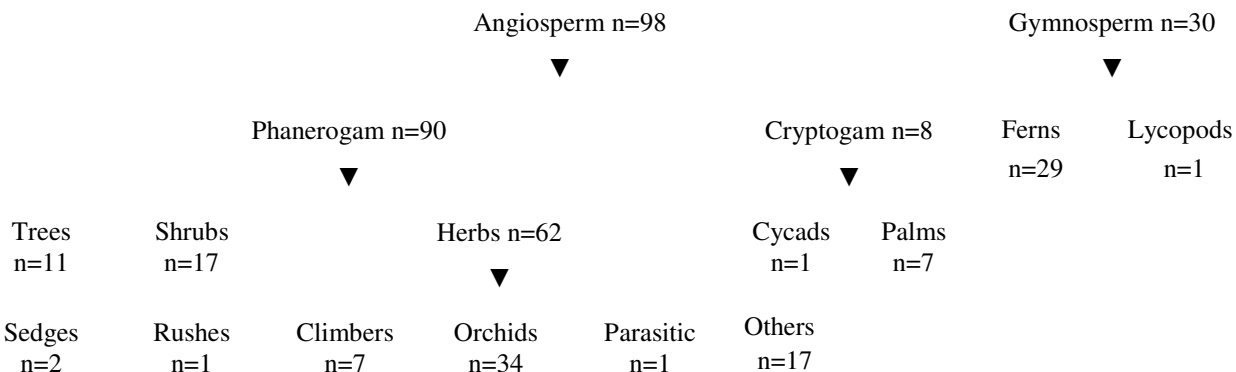


Rare, endangered and threatened plants from Sikkim Himalaya: First List

This short list provides notes on the plant species which presently have become rare, endangered and threatened (RET) in the Sikkim Himalaya owing to various factors. The List is prepared for undertaking conservation action on a priority basis taking into account the urgency of the situation. Preventing the species going one step further towards the danger zone, or in the worst case scenario, becoming extinct from the region, remains the basic objective of the List. Threatened species falling under the different life forms and major plant groups are depicted in Figure 1/Table 1 with the aim to facilitate where to direct the required action under the present situation.

Figure 1. Rare, endangered and threatened plants from the Sikkim Himalaya (n= number of taxa)



In regard to the relative numbers of surviving species or groups the cycad stands out as the most prominent one (represented only by *Cycas pectinata* Griff.). The threat level at 100 % (Table 1) means its removal may bring up 100 % exclusion of Cycad group from the region. Other groups, e.g., the palms and rhododendrons are the next in line under threat. The herbs, shrubs and tree group show low score for now, however, in view of its higher total species count subsequent study will possibly reveal more species as threatened. Threats perceived in individual species are scored highest for the palms followed by lycopods (Table 1). The singular case of how even a parasitic plant (*Rhopalocnemis phalloides* Jungh.) is becoming rare is a cause for concern and needs review. Notable is also the absence of species from major plant groups, e.g., Poaceae and Fabaceae and only one species from Asteraceae. Herbals and economic plants are the other major groups which will be covered in the Second List of the RET species. The type and magnitude of threat factors are varied and also observed to be relative to time and space in the region. These will be covered in the Third List with final assessment of species under IUCN Red List categorization.

Table 1. RET species from the Sikkim Himalaya under different threat levels

Plant groups	Life forms	Total species	Total RET species	Relative threat level (in % presence)	
				For Group	For individual species
Phanerogam	Herbs	3246	65	2.00	0.03
	Shrubs	487	17	3.50	0.20
	Trees	702	11	1.57	0.14
Cryptogam	Palms	11	7	63.00	9.00
	Cycads	1	1	100.00	100.00
Fern & fern allies	Ferns	468	29	6.20	0.21
	Lycopods	12	1	8.33	8.33
Major groups of Angiosperm	Orchids	523	34	6.50	0.19
	Rhododendrons	36	15	42.00	2.80

[N.B.] - 1. The "Sikkim Himalaya" mentioned here denotes the erstwhile geographic Sikkim Himalaya (prior to 1850s) comprising the natural drainage of Tista river, 2. Conservation status, wherever mentioned, are taken from *Red Data Book of Indian Plants* (Nayar & Sastry 1987,1988,1990) and not from the IUCN Red List.

ENUMERATION OF THREATENED PLANT SPECIES

1. *Acer sikkimense* Miq. ACERACEAE

A temperate tree reaching up to 16 m in height. Holotype collected by Thomas Anderson in October 1862 in Sikkim. No further collection from its Type locality or from elsewhere in Sikkim and Darjeeling or other states is reported till date. Cited as DD (Data Deficient) in the IUCN *Red List of Maples* (2009) with the notes "...considered V (Vulnerable) in China, but also found in additional countries where its conservation status is unknown."

2. *Acer osmastonii* Gamble ACERACEAE

Status: Endangered

A natural hybrid of *Acer laevigatum* Wall. and *Acer campbelli* Hook.f. et Thomson ex Hiern, it has been reported only 4 times (1904, 1915, 1958 and 1972) since its discovery by B.B. Osmaston in 1903. The species is unique in its bearing, as it is the only natural hybrid occurring among the Indian maples.

3. *Acer stachyophyllum* Hiern ACERACEAE

A rare deciduous tree growing up to 15 m, dioecious. Found between 1400-3500 m amsl under mixed temperate to lower alpine forests. Flowers during Apr-May, samaras appear between Sep-Oct.

4. *Aconitum ferox* Wall. ex Ser. RANUNCULACEAE

Status: Vulnerable

Excessive collection as a medicinal herb in the earlier days has led to a drastic reduction in its number in Sikkim. Very few individuals are found in the location where population thrived in the past (3300-5000 m amsl).

5. *Acronema pseudotenara* P.K.Mukh. APIACEAE

Status: Indeterminate

A naturally rare biennial rhizomatous herb. Reported from Yumay Samdong in North Sikkim. This is a taxonomic-ally complex genus with often indistinct species boundaries and problematic generic delimitation with *Sinocarum*.

6. *Actinidia callosa* Lindl. ACTINIDIACEAE

Large deciduous scandent bush or climber of the upper temperate forests found between 1800-2300 m amsl under moist surroundings. Stem reaches ca. 12 cm in diameter, bark corky, brown and rough. Fruits much similar to the Kiwi fruit of commerce, gray-green, 2-5 cm long, fragrant, edible.

7. *Aleuritopteris argentea* (S.G.Gmel.) Fée PTERIDACEAE

Very rare. Not seen again in 150 years in India and possibly requiring reaffirmation in case it was collected later during Hooker's onward journey in Sikkim (Chandra et al. 2008).

8. *Angelica nubigena* (C.B.Clarke) P.K.Mukh. APIACEAE

Status: Indeterminate

Originally described under *Heracleum* (Clarke 1879) it was later transferred to genus *Angelica* by P.K. Mukherjee in 1983. Represented in herbaria by only two or three specimens it is considered a poorly worked out species. Recorded from Chola and Yakla passes at ca. 3800 m amsl.

9. *Aphyllorchis parviflora* King & Pantl. ORCHIDACEAE

Status: Rare

In India this species is found only at two locations in the Himalaya. It was first collected from Lachen and Yumthang in northern Sikkim (1896) and in due time it has become remarkably rare. Also reported from Nepal and South-East

Tibet between 3200-3400 amsl.

10. *Arenaria thangoensis* W.W. Sm. CARYOPHYLLACEAE

Status: Vulnerable

The taxon has not been sighted since its collection made in 1912. It is endemic to Sikkim and is found at Thango (4200 m amsl) and Chugya (4500 m amsl).

11. *Asplenium delavayi* (Franch.) Copel. ASPLENIACEAE

Very rare fern reported from Sikkim apart from Western Nepal, Bhutan and Manipur (Chandra et al. 2008).

12. *Asplenium pellucidum* L. ASPLENIACEAE

Very rare (Chandra et al. 2008). Recorded from South Sikkim (Lingtam). Also reported from Silent Valley, Kerala.

13. *Athyrium repens* (Ching) Fras.-Jenk. WOODSIACEAE

Very rare in Sikkim Himalaya (Chandra et al. 2008). Also recorded from Nepal, Bhutan and South-West China.

14. *Athyrium roseum* Christ WOODSIACEAE

Very rare. Reported from North-East India (Darjeeling, Palmajua) and Central Nepal. Previously unrecorded from the Indian subcontinent (Chandra et al. 2008).

15. *Begonia rubella* Buch.-Ham. ex D.Don BEGONIACEAE

Status: Rare

The species has medicinal properties and as such is valued. It is naturally found in very small numbers. The species was first collected by Wallich in 1821 from Eastern Himalaya (Darjeeling, Sikkim). The plant has a distinction of being an interesting species of disjunctive distribution. Three populations of *B. scutata* were located near Yangyang in Tista Valley and Legship in Rangit Valley at altitudes between 300-1200 m (Nautiyal et al. 2009).

16. *Begonia satrapis* Clarke BEGONIACEAE

Status: Rare

Located earlier in a very limited growing area (slopes of Rangit Valley below Badamtam at an altitude of 700 m) this was reported in 1879. It is of horticultural value and presently very scarcely seen. Recently a few populations were located at Sumbuk and Kitam in Rangit Valley, South Sikkim at 550-1100 m amsl (Nautiyal et al. 2009).

17. *Biermannia bimaculata* (King & Pantl.) King & Pantl. ORCHIDACEAE

A miniature monopodial epiphytic orchid found in warm area. Two spots on the flower are characteristic of this plant. A species with much horticultural value.

18. *Boehmeria rugulosa* Wedd. URTICACEAE

Small dioecious tree found between 300-1700 m amsl, usually close to the streams. It is considered the best material for local turnery products and as such is in constant threat. Trees of good size have become scarce.

19. *Bulleyia yunnanensis* Schltr. ORCHIDACEAE

Epiphytic on tree trunks in forests or lithophytic on rocks along valleys between 700-2700 m amsl.

20. *Calamus inermis* T. Anderson ARECACEAE

Status: Endangered

This cane is under considerable threat. Populations at the roadsides were the first to go because of the set transport facilities. The species is now represented with a few clumps in Latpanjar hill near Kurseong, West Bengal. Recently, it has been reported from Arunachal Pradesh and Manipur as well as from Dzongu in north Sikkim.

21. *Calanthe alpina* Hook.f. ex Lindl. ORCHIDACEAE

Status: Rare

Terrestrial plants growing up to 25-50 cm. It is found in forest fringes and grassy slopes between 1500-3500 m elevations. Destruction of its habitats has rendered the species to become rare. It is one of the few *Calanthes* found in the subalpine region.

22. *Calanthe manni* Hook.f. ORCHIDACEAE

Status: Rare

Small populations and much localized this species is a natural rarity. It is also a species of horticultural value attracting all sorts of collectors and nurserymen.

23. *Calanthe trulliformis* King & Pantl. ORCHIDACEAE

Terrestrial herbs about 25-40 cm tall with inconspicuous rhizome. Found inside forests between 2300-2600 m amsl. Flowers during the rains.

24. *Calanthe whiteana* King & Pantl. ORCHIDACEAE

Found under forests and slopes covered in shrubberies between 1000-1800 m amsl. The plants grow up to 80 cm and produces flowers in May-Jun.

25. *Calanthe chloroleuca* (Lindl.) ORCHIDACEAE

V e r y r a r e . F e w d e t a i l s e x i s t .

26. *Callicarpa rubella* Lindl. VERBENACEAE

An erect, single-stemmed shrub, 3-7 m, with horizontal branches. It grows at around 600 m amsl.

27. *Carex kingiana* C.B. Clarke CYPERACEAE

Status: Indeterminate

This plant is known only from its Type collection made at Phodong in northern Sikkim. The species is comparatively new to plant science but due to habitat damage it has suddenly become very scarce. Gradual drying up of the habitat may be one of the causes of its getting scarce.

28. *Ceropegia hookeri* C.B. Clarke. ex Hook.f. ASCLEPIADACEAE

Status: Endangered

This is a little known taxon and probably grows in area ranging between 3000-4000 m amsl at alpine grassy meadows. Reported from the Zemu Valley in northern Sikkim it is a very scarce species. Habitat loss and tourism practices are reported as the major threats to its survival. Recently a population has been reported from Lachen at 2700 m amsl (Nautiyal et al. 2009).

29. *Ceropegia lucida* Wall. ASCLEPIADACEAE

Status: Endangered or possibly extinct in India

Throughout the last 100 years no collection has been made of this plant. Recently two populations of *C. lucida* were rediscovered near Lachung village in north Sikkim at 1750 m (Nautiyal et al. 2009). The Red Data Book suggests intensive search in its habitat, which is river Reyang in Sikkim.

30. *Cinnamomum glanduliferum* Meissn. LAURACEAE

A rare [evergreen](#) tree of *ca.* 12 m height and growing in evergreen broad-leaved forests between 1500-2600 m amsl. The leafy branchlets contain volatile oil and camphor. The wood is used for furniture and the bark and roots are reportedly used in herbals.

31. *Cissus spectabilis* Planch. VITACEAE

Large lianas, branchlets terete with longitudinal ridges. Grows in forests or shrublands by the rivers between 200-1600 m amsl. Endemic to Sikkim and West Bengal.

32. *Codonopsis affinis* Hook.f. & Thomson CAMPANULACEAE

Status: Rare

Roots much thickened, fusiform, branched. Stems twining, yellow-green or green, more than 2 m. Leaves on main stems and major branches alternate, those on branchlets subopposite. Reported from Darjeeling and Sikkim between 1830-3335 m amsl.

33. *Coelogyne treutleri* Hook.f. ORCHIDACEAE

Status: Possibly extinct

Epiphytic on tree trunks in dense forests at around 2000 m amsl. First collected in 1875 by Treutler on the basis of which Hooker described the species in the *Flora of British India*. Since then it has never been sighted. Also reported from North-Western Yunnan.

34. *Cotonester simonsi* Hort. ex Baker ROSACEAE

Status: Indeterminate

This is represented by only four specimens in the Central National Herbarium (CAL) which were from the Lachung Valley at 3150 m amsl in the northern Sikkim. The species is of immense horticultural value, here and abroad. Endemic to Sikkim Himalaya.

35. *Cyathea andersoni* (J.Scott ex Bedd.) Copel. CYATHEACEAE

At Risk (Chandra et al. 2008) in Sikkim Himalaya. Also reported from North-Eastern India Arunachal Pradesh (including the Duphla Hills), Meghalaya and Bhutan.

36. *Cyathea brunoniana* (Wall. ex Hook.) C.B.Clarke & Baker CYATHEACEAE

At Risk (Chandra et al. 2008). Found in Darjeeling and Sikkim hills, Arunachal Pradesh, Manipur, Nagaland and Meghalaya.

37. *Cyathea chinensis* Copel. CYATHEACEAE

At Risk (Chandra et al. 2008). Reported from Darjeeling, Sikkim, Arunachal Pradesh, Manipur, Nagaland and Meghalaya.

38. *Cyathea contaminans* (Wall. ex Hook.) Copel. CYATHEACEAE

At Risk (Chandra et al. 2008). Reported from Darjeeling, Sikkim, Arunachal Pradesh, Manipur and Meghalaya.

39. *Cycas pectinata* Griff. CYCADACEAE

Status: Vulnerable

Foothills to 900 m elevations, the central pith is full of starchy granules and gives coarse sago. For this the plant was of value earlier to the tribal people. Few small populations or scattered individuals remain at present. This is the only

species of Cycadaceae from the region. Listed in Appendix II of the CITES List.

40. *Cymbidium eburneum* Lindl. ORCHIDACEAE

Status: Vulnerable

Due to over-exploitation and habitat destruction the species has become very scarce. It is included in the Appendix II of CITES. Endemic to Eastern Himalaya and North Eastern India the species is found between 1000-1500 m amsl.

41. *Cymbidium hookerianum* Rchb.f. ORCHIDACEAE

Status: Vulnerable

Species is recorded under Appendix II of CITES. Though it has a distribution from Eastern Nepal to Bhutan it is vulnerable at each of the locations. In the earlier days it was much common between 1700-2500 m amsl. Became vulnerable due to collection by nurserymen as well as the common people.

42. *Cymbidium whiteae* King & Pantl. ORCHIDACEAE

Status: Endangered

This has an extremely limited growing area hardly spreading 1 square kilometer. Not reported for a long time from its original habitat (Gangtok, 1750 m amsl) which is now largely disturbed. Rediscovered at Rumtek.

43. *Cypripedium elegans* Rchb.f. ORCHIDACEAE

Status: Rare

Particularly in Sikkim this species has become extremely rare and all likelihood to become an endangered species. It has a scattered distribution of small populations in the subalpine region of Sikkim between 3300-4200 m amsl.

44. *Cypripedium himalaicum* Rolfe ex Hemsl. ORCHIDACEAE

Status: Rare

Grows in similar location as *C. elegans* and is found quite occasionally. This is the second lady's slipper orchid from Sikkim out of three recorded *Cypripedium* species. *Cypripedium himalaicum* is found growing on limestone boulders, crevices, and slopes between 2800 to 4900 m amsl.

45. *Dendrobium praecinctum* Rchb.f. ORCHIDACEAE

Very rare. Few information available.

46. *Didickea cunninghami* King et Prain ORCHIDACEAE

Status: Endangered

First discovered in the Lachen Valley of northern Sikkim it is now hardly seen in the wild. This is one of the few monotypic orchids of India. Plants 10-20 cm tall. Pseudobulbs often connected in clumps or rows.

47. *Diglyphosa macrophylla* King & Pantl. ORCHIDACEAE

Plants between 25-40 cm tall and flowering in June at damp places in forests, along valleys at ca. 1200 m elevation. Monotypic.

48. *Diplazium heterophlebium* (Mett. ex Baker) Diels WOODSIACEAE

At Risk. Reported from Darjeeling and Sikkim. Very rare or perhaps extinct in the Darjeeling area (Chandra et al. 2008).

49. *Diplomeris hirsuta* (Lindl.) Lindl. ORCHIDACEAE

Status: Vulnerable

This species is included in the IUCN Red Data Book and its export presently is banned under CITES Appendix II. The plant is of considerable horticultural value and of botanical interest. It is vulnerable and likely to disappear soon due to landslides and habitat encroachment. Its vulnerability was first recorded in the mid-70s by two orchid specialists from Kalimpong, namely, G.M. Pradhan (1974) and U.C. Pradhan (1974).

50. *Dryopteris alpestris* Tagawa DRYOPTERIDACEAE

Very rare (Chandra et al. 2008). Reported also from Nepal, North-East India (Sikkim) and Tibet.

51. *Dryopteris angustifrons* (T.Moore) Kuntze DRYOPTERIDACEAE

Very rare (Chandra et al. 2008). Probably extinct in Nepal and India (Sikkim).

52. *Dryopteris assamensis* (C.Hope) C.Chr. & Ching DRYOPTERIDACEAE

Very rare. Reports from Darjeeling Terai, Dulkajhar, near Naxalbari. Very probably extinct in West Bengal due to the draining and cultivation of Dulkajhar, which was formerly a marshy grassland (Chandra et al. 2008).

53. *Dryopteris costalisora* Tagawa DRYOPTERIDACEAE

Very rare. Reported from the Tonglo Peak in Darjeeling. It may be expected further east in North-East India, but has not so far been collected elsewhere in the area (Chandra et al. 2008).

54. *Dryopteris nobilis* Ching DRYOPTERIDACEAE

Very rare. Records from Darjeeling, Kurseong area and perhaps now extinct in Kurseong due to habitat encroachment. Sikkim at B2 Bridge, North of Gangtok (Chandra et al. 2008).

55. *Fraxinus suaveolans* W.W. Sm. OLEACEAE

Tree to 16 m, found below 900 m elevations. Naturally found in less number though gregarious. Recorded earlier from the Tista Valley near Labdah and at Melli. The bark has herbal value and repeated debarking usually destroys the tree.

56. *Galeola falconeri* Hook.f. ORCHIDACEAE

Plants 1-3 m tall with bright yellow flowers which come out during Jun-Jul. Found at open places in forests, bamboo forests, sunny slopes between 800-2300 m amsl. It is parasitic upon fungi. *Galeola* is of biological interest because of its exclusive myco-heterotrophic nature. The seeds are the biggest orchid seeds in the world. They are winged, which is also extraordinary for an orchid.

57. *Galeola lindleyana* (Hook.f. & Thomson) Rchb. ORCHIDACEAE

Herbs, tall. Rhizome stout, 2-3 cm in diam., flowers during May-Aug. Found in sparse forests and thickets, humus-rich and moist rocky places along valleys between 700-3000 m amsl.

58. *Galeola nudifolia* Lour. ORCHIDACEAE

Most rare among the regional species of *Galeola* it is also the only climbing orchid of the region. Rhizome nearly creeping; stems erect, 1-3 m, branched, often with 1 aerial root at each node. Flowers come out during Apr-Jun. Found in forests or shaded slopes along valleys at 400-500 m amsl.

59. *Garcinia cowa* Roxb. ex DC. CLUSIACEAE

A straight extensively branched tree, the branches sometimes reaching the ground, 8-15 m tall. Found in humid mixed forests on hills or in valleys between 100-1300 m amsl. The mature fruit is edible. The seeds yield *ca.* 9% oil.

60. *Gastrochillus affinis* (King & Pantl.) ORCHIDACEAE

Found between 2700-2900 m amsl in the Eastern Himalaya (Nepal, Sikkim). A CITES Appendix II plant.

61. *Gmelina arborea* L. VERBENACEAE

Unarmed tree about 15 m tall. Found in open forests below 1300 m amsl. The *Gmelina arborea* is fast-growing tree, attains moderate to large height up to 30 m. Its timber is highly prized for making door and window panels, joinery and furniture especially for drawers, wardrobes, cupboards, kitchen and camp furniture, and musical instruments because of its lightweight, stability and durability. Root, bark and seeds sometimes used medicinally. Considered one of the best woods for turnery in the region and due to this attracts considerable threat.

62. *Oldenlandia monocephala* Kuntze RUBIACEAE

Reported only from Darjeeling and Assam. Few details exist.

63. *Oldenlandia scabra* (Wall. ex Kurz) Kuntze RUBIACEAE

Reported from Darjeeling, Assam and Arunachal Pradesh. Few details exist.

64. *Juncus sikkimensis* Hook.f. JUNCACEAE

Status: Rare

A perennial herb so far known only from the Sikkim Himalaya. The first record was made by Hooker in 1892. Nothing whatsoever is known over its growing conditions. Found in temperate semi-evergreen forests, rhododendron forests, wet grasslands slopes, swamps, bogs and wet places by streams between 4000-4500 m amsl.

65. *Lactuca cooperi* Anthony ASTERACEAE

Status: Endangered

Endemic to Sikkim Himalaya and known only from the Type collection made in September 1913 from alpine and subalpine regions at ca. 5000 m elevation. Intensive field surveys in the type locality are the proposition made in Red Data Book (Nayar & Sastry 1987, 1988, 1990).

66. *Lagerstroemia minuticarpa* Debberm. ex P.C.Kanjilal LYTHRACEAE

Classified as rare by Nayar and Sastry (op cit.) and known only from two localities, i.e, Garampani in Assam and Singtam in Sikkim. The species is classified as Endangered under IUCN threatened status. Recently few populations have been located in Arunachal Pradesh where it is under threat due to shifting cultivation and dam construction.

67. *Licuala peltata* Roxb. ex Buch.-Ham. ARECACEAE

Rare gregarious fan palm of about 3.5 m height. Found in Lower Hill Forests at drier locations and ascending up to 1800 m amsl. Leaves orbicular, peltate, segments joined in groups.

68. *Livistona jenkinsiana* Griff. ARECACEAE

An endangered fan palm of 6-10 m height. Not very common, chiefly found in the Tista valley. Earlier used for thatching and umbrella purpose.

69. *Lloydia himalensis* Royle LILIACEAE

Status: Rare

The species is sporadic in distribution and represented by a few specimen collected from the Himalayan region only (3695-3810 m amsl). In Sikkim it is localized in the Tsomgo lake area, a high altitude tourist destination.

70. *Loxogramme grammitoides* (Baker) C.Chr. POLYPODIACEAE

Very rare (Chandra et al. 2008). Reported from Gairibas, near Maneybhanjyang, Darjeeling.

71. *Lycopodium annotinum* L. subsp. *alpestre* (Hartm.) Å.Löve & D.Löve LYCOPODIACEAE

Reported from North-East India (Sikkim, Arunachal Pradesh) and Uttarakhand. At risk (Chandra et al. 2008).

72. *Malaxis saprophyllum* (King & Pantl.) Tang & Wang ORCHIDACEAE

V e r y r a r e . F e w i n f o r m a t i o n e x i s t s .

73. *Matteuccia orientalis* (Hook.) Trevis. WOODSIACEAE

Very rare. Not collected for many years. Replaced in the Western, Central and Eastern Indo-Himalaya, including Sikkim, by the uncommon (though not very rare) *M. intermedia* C.Chr., which has strongly narrowed frond-bases, especially noticeable in sterile fronds (Chandra et al. 2008).

74. *Nardostachys grandiflora* DC. VALERIANACEAE

Status: Vulnerable

Known commercially as the *Jatamashi* it has been incessantly collected from the subalpine tracts of Sikkim. But now the supply has trickled down to a few quintals, which shows that the species is gradually entering the next higher level of threatened status.

75. *Oberonia micranthus* King & Pantl. ORCHIDACEAE

Very rare. Few details exist.

76. *Ophiorrhiza lurida* Hook.f. RUBIACEAE

Naturally rare herbs, procumbent to ascending, to 20 cm tall. Found in broad-leaved forests and *Tsuga* forests between 1800-2300 m amsl.

77. *Oreopteris elwesi* (Bak.) Holtt. THELYPTERIDACEAE

Status: Rare

The rarity status is believed to be due to its habitat destruction. The first description of this species was made by Baker from Lachen Valley, northern Sikkim in 1874. It was rediscovered in 1985 but the status is very scarce. Grows between 2700-4200 m amsl at Lachen, Lachung and Kataw area which are exposed to tourist incursions. IUCN listing identifies it from Sikkim only, however, it is reported from SW China also (Chandra et al. 2008).

78. *Osmunda regalis* L. OSMUNDACEAE

The Royal Fern once graced the areas of Tiger Hill, Darjeeling but has now become extremely scarce. The plant produces osmunda fiber which is used as a growing medium for cultivated orchids, especially the epiphytic ones. Considered as rare by Chandra et al. (2008).

79. *Pandanus unguifer* Hook.f. PANDANACEAE

One of two screwpines from the Sikkim Himalaya this one is much scarce than *Pandanus nepalensis* H.St.John. Holotype collected from Mongpu, Darjeeling. Very few individuals survive at present.

80. *Panax pseudo-ginseng* Wall. ARALIACEAE

Status: Vulnerable

Medicinal properties attached to it make it a commercial prize and extensive collections in the region in the past have made this an endangered species. Of the three varieties of *P. pseudo-ginseng*, viz., var. *angustifolium* (Burkill) Li, var. *bipinnatifidus* (Seem) Li and var. *himalaicus* Hara, the second one has become extremely rare. In some aspects the therapeutic value of *P. pseudo-ginseng* is reported to be even better than the Korean ginseng (*P. ginseng*).

81. *Paphiopedilum fairreanum* (Lindl.) Stein ORCHIDACEAE

Indiscriminate collection, forest fires and grazing pressure have led to decline of its availability. In situ conservation at Selingdong-Tinkitam Fairreanum Conservation Reserve at South Sikkim is a commendable step towards its conserva-

tion. This species was described by Lindley in 1857. It was rediscovered after about half a century by G.C. Searight from Torsa or Amuchu Valley, Chumbi district in west Bhutan. A CITES Appendix I plant.

82. *Paphiopedilum venustum* (Wall. ex Sims) Pfitz. ORCHIDACEAE

Status: Vulnerable

An ornamental species of considerable value this was earlier collected in quantity. Compounded with the destruction of its natural habitats the species is in grave danger of annihilation. Found in the Tista valley often near to streams. Included in the Appendix I of CITES which restricts its export.

83. *Phoenix rupicola* T. Anderson ARECACEAE

Status: Rare

The species is naturally rare and occurs sporadically at subtropical levels at around 450 m amsl in the Tista and Mahanadi valleys. Generally grows on rocky areas and especially on very steep cliffs on both sides of the Tista above Sevoke. Stem grows to 4.5-6 m high and leaves are *ca.* 3 m long. Leaflets bright green, shiny and all in one plane. The inner part of the stem was eaten earlier by Lepcha tribe. The plant being dioecious also has a strong bearing on its reproduction making the regeneration process fraught with difficulties.

84. *Phymatopteris nigrovenia* (Christ) Pic.Serm. POLYPODIACEAE

Very rare (Chandra et al. 2008). Reported from Darjeeling and Sikkim and also from Nepal. This species is closely related to *P. veitchi* (Baker) Pic.Serm. from Japan and to *P. shensiense* (Christ) Pic.Serm. from China.

85. *Phymatopteris tibetana* (Ching & S.K.Wu) W.M.Chu POLYPODIACEAE

Very rare (Chandra et al. 2008). Reported only from Sikkim and Nepal.

86. *Picrorhiza kurrooa* Royle ex Benth. SCROPHULARIACEAE

Status: Vulnerable

A plant with age-old herbal repute this is collected from its native habitat in bulk. The total harvest of *P. kurrooa* in 1990-1991 from Sikkim was 6200 kg (Rai & Sharma 1994). This over-exploitation and disturbance to its growing site has made the plant scarce at present. From the Darjeeling hills no collection has been made from the past many years which mean it is scarce and thereby not economically viable to the collectors. Grows between 3300-5000 m amsl at open slopes and forest fringes.

87. *Pimpinella tongloensis* P.K.Mukh. APIACEAE

Status: Endangered, if not extinct already

After its collection made in the years 1857 and 1968 no collection record is available. The species has a very small growth pocket in the Singalila Ridge in the Sikkim Himalaya.

88. *Pimpinella wallichii* Clarke APIACEAE

Status: Endangered

First collected in 1870 by Clarke and no sighting has been recorded till date. Southern district of Sikkim at Heeloo and Hee.

89. *Podophyllum hexandrum* Royle PODOPHYLLACEAE

A medicinal plant of importance it was extracted from the wild in quantity in the past and very few populations exist today.

90. *Polygala arillata* Ham. POLYGALACEAE

Small shrub occurring between 600-2000 m amsl. Not common. Found in forest fringes and sometimes in old cultivation. Collected extensively for making the *marcha*, a brewing agent for the local beer. As the root part is procured for the brewing purpose the threat to the plant is immense.

91. *Polystichum glaciale* Christ DRYOPTERIDACEAE

Very rare (Chandra et al. 2008). Reported from North-East India (Sikkim), Bhutan, Tibet and China.

92. *Pteridrys cnemidaria* (Christ) C.Chr. & Ching DRYOPTERIDACEAE

Very rare (Chandra et al. 2008). Reported from North-East India (Darjeeling, not collected for many years; Assam, Meghalaya and possibly in Sikkim).

93. *Pteris barbigera* Ching PTERIDACEAE

Very rare (Chandra et al. 2008). Record from North-East India (Rungbi, below Mongpo, West Bengal). Not seen in India for ca. 130 years.

94. *Pyrrhosia boothi* (Hook.) Ching POLYPODIACEAE

Very rare. Reported from North-East India (?West Bengal, Darjeeling; Sikkim) and Bhutan (Chandra et al. 2008).

95. *Pyrularia edulis* (Wall.) ADC. SANTALACEAE

Trees between 6-10 m tall, bark gray, with oblong lenticels. Fruits come out during Jul-Oct which is guava-like and edible. Found in open forested areas at 600-2000 m amsl. This is the only tree under Santalaceae in the region.

96. *Pternopetalum radiatum* (W.W.Sm.) Mukh. APIACEAE

Status: Indeterminate

This is also known as *Pimpinella radiata* W.W. Smith. Found in north Sikkim at Yumthang and Shebu Valley at an altitude of ca. 3500 m. It has not been observed or collected since 1892. Endemic.

97. *Rhododendron baileyi* Balf.f. ERICACEAE

First report made in 1919 by Balfour from River Tsangpo in southern Tibet. This is a much localized species and found only between Lachung-Yumthang at 3600 m amsl. It is one of the highly localized species of rhododendron in Sikkim Himalaya. Easy access through pliable roads and low availability makes this one a species to be taken in for serious conservation.

98. *Rhododendron barbatum* Wall. ex G.Don ERICACEAE

Discovered by Wallich from Gosainthan, Nepal and described by G.Don in 1834. Much similar to *Rhododendron arboreum* this one also grows close to human habitations, however, because of small populations compared to *R. arboreum* this species is under considerable threat. Vulnerable status (VU) under *The Red List of Rhododendrons* (IUCN) it is noted as "...under significant pressure from forest loss, habitat degradation and firewood collection".

99. *Rhododendron glaucophyllum* Rehder ERICACEAE

A shrub growing up to 1.5 m in height. In the region it is found in small and scattered populations at disturbed area. The holotype was recorded from Lachen and Lachung at ca. 3300 m amsl and named as *Rhododendron glaucum* Hook.f. by Hooker (1849). Reported as DD in the IUCN Red List of Rhododendrons.

100. *Rhododendron campanulatum* subsp. *aeruginosum* (Hook.f.) Chamb. ERICACEAE

First report made by Hooker in 1849 from Lachen and Lachung. Earlier it was known as *Rhododendron aeruginosum*

Hook.f. but lately, Chamberlain (1982) has assigned it to *Rhododendron campanulatum* subsp. *aeruginosum* (Hook.f.) Chamb. Found between 3800-4300 m elevations the populations are rather scattered and at largely vulnerable areas. It survives well on level grounds as well as on rockeries at moist slopes. Endemic.

101. *Rhododendron dalhousiae* subsp. *tashi* Pradhan & Lachungpa ERICACEAE

Found so far only from the Pangthang hills (2000 m amsl) in eastern Sikkim this one is a naturally scarce species. It is an epiphyte and found in the temperate oak-chestnut forests. Because of scattered presence within its growing range no compact populations are noticed. Endemic.

102. *Rhododendron decipiens* Lacaita ERICACEAE

Reported from Chiabhanjyang, Singalila Ridge (western Sikkim) and Shingba and Chachuzak (northern Sikkim). *R. decipiens* growing sites in the region are small and characterized usually by a canopy cover, humus-rich substrata, low daylight and moist condition. First report from Sikkim in 1916 by Lacaita (collected between Chiabhanjyang and Singalila ridge at 3300 m amsl). Considered by Balfour to be a natural hybrid of *R. falconeri* and *R. hodgsoni*.

103. *Rhododendron griffithianum* Wight ERICACEAE

Recorded from several places, namely, Chungthang, Lachen, Lachung (northern Sikkim), Rathong Chhu (western Sikkim) and Jaubari, Kalapokhri (Darjeeling hills) between 2000-2800 m amsl. However, as individual plants are widely scattered the number is less although the area covered is extensive. Grows within open woodland but favors sloping land. Reported as DD in the IUCN Red List of Rhododendrons.

104. *Rhododendron leptocarpum* Nuttall ERICACEAE

This species is so far reported only from Tsokha (western Sikkim at 3600 m amsl). It grows on large live trees as well as on fallen logs but never is seen on the grounds. The ones that grow on the logs are vulnerable to disturbances. First report made in 1854 by Nuttall it was rediscovered from Sikkim by Starling at Tsokha (1984).

105. *Rhododendron maddenii* Hook.f. ERICACEAE

First report from Chungthang (northern Sikkim at 1300 m amsl) in 1849 by Hooker. This one is taxonomically a very complex and variable species. Reported also from Ratey Chu catchment at 2400 m by Pradhan & Lachungpa (1990). Shows a wide altitudinal range (1300 to 2900 m) in its distribution, however, it was found to be growing and producing flowers at 900 m also (forced acclimatization).

106. *Rhododendron niveum* Hook.f. ERICACEAE

Reported earlier from Lachung, Lachen and Chola Range (northern Sikkim) between 3000-3600 m elevation. The original material for holotype was collected from Yakchay (ca. 3000 m amsl, northern Sikkim) by Hooker in 1853. It is endemic to Sikkim and Bhutan, and collected only once in Lao at 3100 m in central Bhutan by Ludlow and Sheriff in May 1949. A recent report of a new habitat at Khangchendzonga National Park in Sikkim was made by Badola & Pradhan (2010). Found in rocky valleys, mixed forests at 3000-3600 m amsl. This is a distinctive species with no close allies (Cullen 1980). Reported as VU in the IUCN Red List of Rhododendrons.

107. *Rhododendron pendulum* Hook.f. ERICACEAE

Epiphytic shrub up to 1.3 m. Small patches of scattered populations are found at Yakchay, Dombang, Lachen, Phedang and Dzongri. First report (Holotype) from Lachen by Hooker in 1849 but recorded also at eastern Nepal, Bhutan and south-east Tibet. Reported very scarce from the latter areas also (Pradhan & Lachungpa 1990).

108. *Rhododendron pumilum* Hook.f. ERICACEAE

First report made by Hooker in 1849. This is by far a scarce species found only at the vicinity of Bhirum lake (4600 m) and a few at Chachuzak (3800) (Pradhan & Lachungpa 1990). First report made by Hooker in 1849. Rare in Sikkim it is found only in remote areas of Zemu, Lhonak and Bhirum lake at around 4600 m amsl. A much dwarf-sized rhododendron it grows in the alpine region over sandy or gravelly soil or on avalanche slopes.

109. *Rhododendron sikkimense* Pradhan & Lachungpa ERICACEAE

Quite rare species found so far only from Yumthang at ca. 3700 m elevations (northern Sikkim). Grows on level ground within *Rhododendron campanulatum* D. Don community. Scattered presence and not forming compact community or uniform population. Endemic to Sikkim.

110. *Rhododendron thomsoni* var. *candelabrum* Clarke ERICACEAE

This species is found between a very limited range of 3000-3300 m elevation. Considered a natural hybrid of *Rhododendron thomsoni* Hook.f. (Chamberlain 1982). This seems plausible considering its habitat which is always confined within large tracts of *R. thomsoni* shrubbery. Differs from *R. thomsoni* in its pink flowers, glandular ovaries and relatively small calyces. In India it is reported only from Sikkim.

111. *Rhododendron virgatum* Hook.f. ERICACEAE

The plant grows scattered or sometimes in relatively small groups in the open. It also has an extremely restricted growing range (between 2400-2700 m elevations). Also recorded in eastern Nepal, Bhutan, Arunachal Pradesh and southern China under similar conditions. Normally grows on scrubland and stony slopes.

112. *Rhopalocnemis phalloides* Jungh. BALANOPHORACEAE

Status: Rare

This root parasite grows under diffused sunlight in dense evergreen virgin forests and thickets between 1000-2700 m amsl. The main cause of its rarity is ascribed to the loss of the host plants through disturbance to its natural habitats. The host plants are mostly species of Araliaceae (*Dendropanax*), Euphorbiaceae, Fagaceae, and Moraceae.

113. *Rhynchospora rugosa* subsp. *browni* (Roem. & Schult.) T. Koyama CYPERACEAE

A grass of the marshy habitat this species is endemic to Sikkim. Only three growing spots are reported from the Khechopalri lake area in western Sikkim.

114. *Rhyncostylis retusa* (L.) Bl. ORCHIDACEAE

Considered host-specific epiphytic orchid (Luckson 2012) this is a highly prized ornamental orchid from the region. Heavy and protracted collections from the wild have rendered it much rare. Appended under CITES.

115. *Risleya atropurpurea* King & Pantl. ORCHIDACEAE

Plants 6-21 cm tall. Rhizome narrowly conic to cylindrical, flowers dark purple, blooms during Jul-Aug. Found in *Picea* forests or thickets between 2900-3700 m amsl. Naturally rare and monotypic.

116. *Selliguea tricuspis* (Hook.f) Fras.-Jenk. POLYPODIACEAE

Status: Indeterminate

As per the Red Data Book, it is probably depleted from the type locality in Darjeeling due to deforestation and change in habitat. Endemic to Sikkim and Darjeeling it was described by Hooker in 1864. The last collection is recorded in the year 1900 and afterwards sightings are nil. Considered very rare in Darjeeling and Sikkim, probably extinct in Darjeeling hills. (Chandra et al. 2008).

117. *Sphaeropteris brunoniana* (Wall. ex Hook.) Tryon CYATHEACEAE

Rare tree fern of the higher hills reaching up to lower temperate level. Leaf rachis spiny. Earlier record shows its availability in Kalimpong and Darjeeling.

118. *Taeniophyllum retro-apiculatum* (King & Pantl.) ORCHIDACEAE

Very rare. Few details exist.

119. *Taeniophyllum crepidiforme* (King & Pantl.) ORCHIDACEAE

Very rare. Few details exist.

120. *Thrixspermum centipeda* Loureiro. ORCHIDACEAE

Thrixspermum are small or medium-sized [monopodial epiphytic](#) orchids. It is naturally rare in the region. They have a typical flattened [raceme](#) that bears flowers in either two distinct ranks or any direction. Flowers are fragrant and last 2 to 3 days. Found at around 1200 m amsl.

121. *Trachycarpus martianus* subsp. *sikkimensis* Lorek ARECACEAE

A dioecious fan palm of the region reaching heights between 10-15 m. Naturally rare and very few individuals survive. Earlier used for edible pith by the tribal people. A patch is surviving at Rissom (Dumsong range, Darjeeling at ca. 2000 m amsl. Also reported much earlier from Rungbong (Darjeeling at about 1200 m amsl) by Clarke but has not been rediscovered till now.

122. *Trichomanes parvifolium* (Baker) Copel. HYMENOPHYLLACEAE

Very rare (Chandra et al. 2008). Reported from Nepal, North-East India (Sikkim), Myanmar and Thailand.

123. *Uncifera lancifolia* (King & Pantl.) Schltr. ORCHIDACEAE

Small-sized monopodials found at ca. 2000 m amsl. Few details exist.

124. *Vanda pumila* Hook.f. ORCHIDACEAE

Epiphytic orchid found on tree trunks and branches. Recorded between 500-1800 m amsl. Flowers come out during Mar-May. Rarest one among *Vanda* species from the region.

125. *Wallichia disticha* T. Anderson ARECACEAE

A palm with distinctive habit and growing up to 6 m. A few individuals survive in Darjeeling (Peshok, 1400 m amsl) and above Sevoke. Earlier the Lepcha tribes used to eat the pulp/pith. Leaves long, 3 m, distichous. In the region this species is much rare than *Wallichia oblongifolia*.

126. *Wallichia oblongifolia* Griff. ARECACEAE

A rare stemless palm. Mostly growing over rocks on shaded river banks up to 1200 m elevations. The midribs were made into hair combs by the locals in the earlier days. Well-developed and adult plants have become scarce.

127. *Woodsia cycloloba* Hand.-Mazz WOODSIACEAE

Very rare (Chandra et al. 2008). Reported from North-East India (Sikkim), North-West India (Uttarakhand), Nepal and China.

128. *Zeuxine pulchra* King & Pantl. ORCHIDACEAE

Status: Endangered, Extinct possibly

Terrestrial orchid from the Lachung Valley at around 2000 m amsl. Holotype was collected from Khedum, Lachung Valley at 2300 m amsl.

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