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SOME OBSERVATIONS ON ENDEMIC SPECIES AND RARE PLANTS OF THE MONTANE FLORA OF THE NILGIRIS, SOUTH INDIA*+

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ABSTRACT

In the present paper, observations on habitat, distribution and rarity of some endemic species of the montane flora of the Nilgiris and the cytology of a rare plant *Lilium neilgherrence* are presented and discussed.

The natural vegetation of the montane region of the Nilgiris above an altitude of 1800m consists chiefly of sholas and grasslands. This region experiences a cold-climate. There are 1092 species of flowering plants in this region. Of this, 430 species are confined exclusively to the montane stage while the rest extend to lower submontane region (based on Sharma *et al.*, 1977). Over an area of 4, 09, 568, 25 acre that represents the montane stage, one can count 61 endemic species of flowering plants leaving the varieties and other infraspecific categories. Among these endemics, 26 species are rare and 35 species are common. In addition to the rare endemic species, there are certain non-endemic species that are rare and threatened. Our observations on distribution, rarity of some endemic/non-endemic species; and the cytology of a rare and threatened plant. *Lilium neilgherrense* Wt. are presented. The possible causes of depletion of species are discussed.

Chatterjee (1939) listed *Baeolepis* Decne ex Moq. and *Willisia* Warm. as endemic genera in the Nilgiris. Nayar (1980) enumerated two genera, *Baeolepis* and *Ascopholis* Fischer as endemic to the Nilgiris. Blasco (1970) counted 82 endemic species in the montane flora of the Nilgiris.

Subramanyam and Sreemadhavan (1970) reviewed the situation of endangered plant species in India and their habitats. Recent study has shown that there are 224 species of flowering plants in danger of extinction in South India (Henry *et al.*, 1979). Out of this atleast 38 species are from the Nilgiris. An inventory of rare and endangered species of Indian flora has been given by Jain and Sastry (1980). This inventory consists of 120 plants from different geographical regions of India.

In the present account a census of endemic species is presented based on information from a study of the relevant literature on the

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flora of the region (Hooker, 1872-97; Gamble, 1915-36; Fyson, Sharma *et al.*, 1977), collections preserved in the Madras Herbarium (MH) and actual collections made from this region. On the basis of available information, the endemic species are grouped either as rare or common.

Conventional squash technique was followed for the study of cytology of root tips of *Lilium neilgherrense*.

A. LIST OF RARE ENDEMIC SPECIES

1. *Acacia hohenackeri* Crab
2. *Alysicarpus bcddomei* Schindl.
3. *Andrographis stellata* Cl.
4. *Arisaema tuberculatum* Sicher.
5. *Berberis nilghiriensis* Ahrendt.
6. *Carex pseudo-aperta* Boeck.
7. *Cirrhopetalum acutiflorum* Hook. f.
8. *Eriocaulon pectinatum* Ruhl.
9. *Habenaria polyodon* Hook. f.
10. *Hedyotis sisaparensis* Gage
11. *Helichrysum wightii* Cl. ex Hook. f.
12. *Impatiens debilis* Turcz.
13. *I. laticornis* Fischer
14. *I. lawsonii* Hook. f.
15. *I. neo-barnesii* Fischer
16. *I. nilagirica* Fischer
17. *I. rufescens* Benth. ex Wt. & Arn.
18. *Memecylon flavescens* Gamble
19. *Nilgirianthus papillosus* (T.Anders.) Bremek.
20. *Ophiorrhiza pykarensis* Gamble
21. *Pavetta hohenackeri* Bremek.
22. *Piper pykarahense* C.DC.
23. *Pogostemon nilagiricus* Gamble
24. *P. paludosus* Benth.
25. *Senecio kundaicus* Fischer
26. *Youngia nilagiriensis* Babc.

These species are either not represented or very poorly represented in MH being collected from one or two restricted localities. We could not collect any of these species during our several field trips to this region.

B. LIST OF COMMON ENDEMIC SPECIES

1. *Anaphalis neelgherryana* (Sch.-Bip. ex DC.) DC.
2. *A. notoniana* (DC.) DC.
3. *Andrographis lawsoni* Gamble
4. *A. lobelioides* Wt.
5. *Arisaema tylophorum* Fischer
6. *Baeolepis nervosa* (Wt. & Arn.) Decne ex Moq.
7. *Biophytum polyphyllum* Munro
8. *Cinnamomum perrottetii* Nees
9. *Crotalaria barbata* Grah. ex Wt. & Arn.
10. *C. candicans* Wt. & Arn.
11. *C. formosa* Grah. ex Wt. & Arn.
12. *Dalbergia gardneriana* Benth.
13. *Eriochrysis rangacharii* Fischer
14. *Hedyotis hirsutissima* Bedd.
15. *Heracleum hookerianum* Wt. & Arn.
16. *Helictotrichon polyneuron* (Hook. f.) Henr.
17. *Impatiens orchioides* Bedd.
18. *I. tenella* Heyne ex Wt. & Arn.
19. *Isachne oreades* (Domin) Bor
20. *Leptacanthus amabilis* (Cl.) Bremek.
21. *Leucas rosmarinifolia* Benth.
22. *Mackenziea violacea* (Bedd.)Bremek.
23. *Melicope indica* Wt.
24. *Microtropis ovalifolia* Wt.
25. *Nilgirianthus wightianus* (Nees) Bremek.
26. *Poa gamblei* Bor
27. *Schefflera rostrata* Harms.
28. *Senecio lawsoni* Gamble
29. *S. lessingianus* (Wt. & Arn.) Cl.
30. *S polycephalus* (DC.) Cl.
31. *Swertia trichotoma* (Wt. & Arn. ex Wt.) Wall. ex Cl.
32. *Symplocos microphylla* Wt.
33. *Taxillus recurvus* (DC.) van Tiegh.

34. *Teucrium wightii* Hook. f.
35. *Viburnum hebanthum* Wt. & Arn.

These species are comparatively well represented by collections in MH. Some of these species were collected by us during the course of last few years.

C. OBSERVATION ON RARE NON-ENDEMIC SPECIES

1. Hypericum humifusum Linn. (Hypericaceae)

Based on Wight's collection, Thiselton Dyer (1874) in Hooker's *Flora of British India* recorded Nilgiris as the place of Indian distribution of this species. This species is also distributed in Europe, Atlantic islands and S. Africa. This species has not been recorded from the Palnis and apparently also from the Himalayas. Gamble (1915-36) also gave Nilgiris as the distribution, probably based on Wight's collection. Fyson (1932) however remarked that he has not seen this plant. This species is represented in MH by only two collections. This species is now collected from a road-cutting in Doddabetta reserve forest (*Z. Abraham and party*, 12442 CDRI). This species is rare in the Nilgiris and probably in danger of extinction here.

2. Lilium neilgherrense Wt. (Liliaceae)

Though this species was recorded as common on the open downs of the Nilgiris. Palnis, Billingiri Rangan Hills, Anamalais, and Tinnevelly Hills (Hooker, 1872-97;Gamble,1915 36; Fyson, 1932) it has become rare now and is restricted to certain refugial pockets of these hills. Efforts by the senior author to grow this plant in the Ethnobotanical Garden at Madura-voyal (Madras) did not yield good result. It survived there for 60 days when introduced during January 1977 and did not at all establish while introduced during September 1979. This species requires a cold-humid climate for survival. This species is endemic to a few high mountain ranges in South India. This is of rare occurrence in the Nilgiris being found in very restricted slope inside the Snowdown reserve forest (*Z. Abraham*, 166 & 236-Herbarium of South Indian Medicinal Plants, Madras).

D. CYTOLOGY OF *LILIUM NEILGHERRENSE* WT.

The somatic compliment from root tip cells consists of twenty four chromosomes. Chromosomes in general show difference in length. According to the length of whole chromosome as well as the relative length of the arms and centromeric indices based on both arms, 10 chromosome types have been recognised. Type A is nearly submedian (nsm): B is nearly subterminal (nst); C is submedian (SM) D, E and F are nearly subterminal (nst); G is nearly submedian (nam); H is nearly subterminal (nst); and I is nearly submedian (nsm).

DISCUSSION

Baeolepis is the only endemic genus of the montane flora of the Nilgiris. Chatterjee (1939) included the genus *Willisia* also as endemic to this region. Nayar (1980) added the *Ascopholis* also as endemic to this hill. However the only species of *Willisia, W. selagipoides* (Bedd.) Warm. ex Willis accurs in Anamalais beyond the limits of the Nilgiris. (Gamble 1915-36; Subramanyam, 1962) and the only species of *Ascopholis, A. gamblei* Fischer is also found near Arisikera in Hassan district, Karnataka (Hooper, 1976). These two genera are not restricted to the Nilgiris and hence not endemic to it.

Blasco (1970) counted 82 endemic species in the montane flora of the Nilgiris. Without

counting the varieties *Arundinaria wightiana* Nees var. *hispida* Gamble; *Coelogyne odoratissima* Lindl. var. *angustifolia* (Rich.) Lindl.; *Dendrophthoe neelgherrensis* (Wt. & Arn.) van Tiegh var. *clarkii* Hook.f.; *Hypericum japonicum* Thunb. var. *major* Fyson; *Orthosiphon rubicundus* Benth. var. *hehenackeri* Hook.f.; *Pavetta brevifolia* DC. var. *ciliolata* Gamble; *Pleocaulus sessilis* (Nees) Bremek. var. *sessiloides* Wt. and *Rubus rugosus* Sm. var. *thwaitesii* Focke and those species that are also found outside our area *Argyreia nellygherya* Choisy; *Ascopholis gamblei* Fischer; *Bupleurum plantaginifolium* Wt.; *Dalechampia velutina* Wt.; *Eriocaulon robustum* Steud.; *Garnotia elata* (Arn. ex Miq.) Jan.; *Impatiens beddomei* Hook.f.; *Isachne deccanensis* Bor; *Liparis biloba* Wt.; *Phlebophyllum lanatum* (Nees) Bremek.; *Prunus ceylonica* (Wt.) Miq.; *Syzygium montanum* (Wt.) Gamble; and *Viscum heyneanum* A.DC. We have estimated the number of endemic species in the montane flora of the Nilgiris as 61. Of these, 26 are rare and possibly in danger of extinction and 35 are fairly common. As these endemics, atleast the rare ones are confined to very restricted areas in some respects fall in the category of threatened plants. Any disturbance or imbalance in their narrow range of distribution could mean the extermination of the species (Jain and Sastry, 1980). The Nilgiris form several elevated summits and ranges resulting in natural barriers and bringing in isolation as in the case of island floras.

Besides these endemics, certain non-endemics which are rare and require to be conserved are to be studied. Botanical explorations and studies on taxonomy and phytogeography have revealed that *Hypericum hunifusum* is rare in this flora. *Lilium neilgherrense*, the Nilgiri lily is another plant of rare occurrence in the Nilgiris which is endemic to a few high ranges in South India. It occures in refugial niches along shola edges in the Nilgiris. Fyson (1932) recorded this species as common on the open downs of the Nilgiri and Palni hills. The senior author saw the species in an open down in Upper Coonoor about 8 years back and now it is not available there. One population of this species is traced in Snowdon reserve forest in a shaded rocky slope inside the shola. Habitat disturbance owing to increase in grazing animals in the hills during the last few decades is possibly one of the causes for its occurrence in restricted localities. Besides this, as its flower is attractive, conscious transplantations of the species to the gardens while the plant is in flower have made this species to become rare. Lily bulbs are delicate movers and so the resultant rarity.

The Nilgiri hills have long been infiltrated by man and his anthropogenic associates. The principal agricultural community of the region, the Badagas, first migrated to this place, probably before 1602 A D. They were followed by the other communities from the surrounding plains during the end of last century and begining of this century. Shifting cultivation once practised by the aboriginal people (Irulars) and grazing by the cattle of some of the aboriginal inhabitants (Todas and Kotas) and the immigrant population; and by several other mechanical means to increase land under cultivation and plantation crops, have all accelerated disastrous conditions on the natural ecosystem. These anthropogenic activities together with the vigorous competitive alien weeds have been sources of threat to the native flora. Programmes like deforestation for culturing wattle and *Eucalyptus* species, and construction

of hill roads have greatly altered the, original landscape and vegetaton resulting in removing forest cover under which several species have been evolving for millions of years.

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