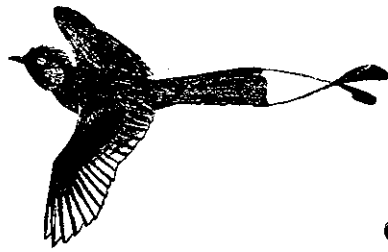

CENTRE FOR
ECOLOGICAL SCIENCES

MULTIDISCIPLINARY EXPEDITION TO THE NILGIRI BIOSPHERE RESERVE 10 April to 18 April 1986

PRELIMINARY INVESTIGATIONS

Cecil J. Saldanha
with collaboration of
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MULTIDISCIPLINARY EXPEDITION TO THE NILGIRI BIOSPHERE RESERVE
(Upper Bhavani and Mukurti Areas)

At the Scientific Research Committee meeting on the Nilgiri Biosphere Reserve held in March 1986 at the CES, IISc., Bangalore it was decided to organise a preliminary multidisciplinary scientific field expedition to the Upper Bhavani and Mukurti Peak areas of the Nilgiri Biosphere Reserve in April. A cordial inivtation from Thiru S. Kondas, Chief Conservator of Forests, Tamilnadu, together with the help of the Forest Department in the Nilgiris made this expedition possible. The coporation of the members of the team was also forthcoming despite the very short notice given to them. The objective was to visit a few areas of the proposed N.B.R. and evolve some strategies for a scientific study in the area.

The Scientists in the team were:

		Special Interest
1.	P. Vijayakumaran Nair Divison of Wild Life Biology Kerala Forest Research Institute Peechi P.O., 680 653, KERALA	Mammals
2.	P.S. Easa Division of Wild Life Biology Kerala Forest Research Institute Peechi P.O., 680 653, KERALA	Mammals
3.	R.J. Ranjit Daniels Centre for Ecological Sciences Indian Institute of Science BANGALORE 560 012	Birds
4.	R. Ansari Botanical Survey of India Lawley Road P.O. COIMBATORE 641 003	Plant Studies
5.	R. Gopalan Botanical Survey of India Lawley Road P.O. COIMBATORE 641 003	Plant Studies
6.	H.S. Suresh Centre for Ecological Sciences Indian Institute of Science BANGALORE 560 012	Plant Studies
7.	C.J. Saldanha Centre for Ecological Sciences Indian Institute of Science BANGALORE 560 012	Plant Studies (Leader of the expedition)

R.B. Harikantra and R.M. Furtado from the CES were part of the supporting staff.

From among the 11 divisions in the Nilgiri Biosphere Reserve (Gadgil & Sukumar 1986 pp. 21-34) the Upper Nilgiri Plateau coming under the Nilgiri South Division of the Tamilnadu Forest Department was selected for the field visit. Two camps each of 4 days were established. Camp I was at Korakunda with access to Kokkathurai, Narikulimund, Bangitappal, Avalanche and Taishola. Camp II was at Mukurti Fishing Hut with approaches to Parsons Valley, Portamund, II & III Western Catchment Areas as well as to the proposed Nilgiri Tahr Sanctuary.

Preliminary observations could also be made on the way to the camp sites e.g. in the Bandipur, Mudumalai Sanctuaries, in the Central Nilgiri Plateau and along the Western ridge of the Nilgiris looking down into the Attapadi and New Amarambalam areas of Kerala.

Investigations: Since the team was interested in Mammals, Birds and Higher Plants after a preliminary survey of Korakunda (Camp I) and adjacent areas, the Narikulimund Shola and Bog was selected for trying out qualitative and quantitative analysis. Similarly in the Mukurti Fishing Hut area (Camp II) a day was spent in a quick overview of the Western Catchment and Tahr Sanctuary areas. The remaining time at the II Camp was devoted to trying out more detailed studies in the shola and grasslands surrounging the Mukurti Fishing Hut.

The observations of the members of the multidisciplinary team:

MAMMALIAN FAUNA (Vijayakumaran Nair & P.S. Easa)

The Upper Nilgiri Plateau harbours the elephant, sambar, wild boar, barking deer, Nilgiri tahr, porcupine, jackal, wild dog and Nilgiri langur. The Sambar seemed to be the most abundant animal of the area. The team observed 8 sambar deer, one wild boar, one barking deer, 3 troupes of Nilgiri langur, two jackals and a wild dog during this visit. The region is one of the most important habitats for Nilgiri tahr and the Forest Department has censussed about 250 animals. Six transects of 10 m each were taken and presence of animals in Sholai, grassland and marsh were recorded with a view to evolving a methodology for quantification of data for the Biosphere. Presence of sambar, and wild boar were recorded from grassland and sholai. There was no sign of animals except that of elephants in the marshy area sampled during this period of the year.

Conservation

The large scale afforestation of grasslands with wattle may affect the herbivores of the area. No animals were found to feed on the wattle. The dense regeneration of wattle in certain areas may also affect the free movement of animals. Elephants are reported only from the southern part of the region. Some physical barriers associated with construction of dams are reported to be the reason for its absence on the northern side. It was also reported that the elephants come to the cooler plateau in summer from the drier parts. The sambar seems to feed on Ochlandra sp. and Pinus saplings.

The remaining grasslands where the wattle plantations have failed seem to be very essential for maintaining the Nilgiri tahr population of the area. Any further attempt to afforest these grasslands may seriously affect the Nilgiri tahr. Even now, there exists the danger of isolated wattle plants remaining in the grasslands spreading because of enhanced fire protection. A study on the habitat utilisation by the larger herbivores may throw light on the impact of afforestation of grasslands on animals.

Avian Fauna: Ranjit Daniels

Methodology:

To get an idea of the bird communities that use the montane shola and grassland habitats of the Nilgiris, brief surveys were done in 2 different localities viz., Narikulimund (Camp I) and Mukurti Fishing Hut (Camp II). Both these localities had isolated sholas with grasslands surrounding them and were at an altitude of about 2000 m above MSL.

Two hours were spent in each locality between 8.00 A.M. and 10.00 A.M. and the birds that were encountered during this period were recorded. Transects were used as the sampling method (600 m long in each case) and the birds seen, heard and flying were recorded separately. This categorisation allows for not treating birds casually flying over the shola or grasslands and those which are typical of these habitats with the same importance. By recording the birds heard separately we avoid overestimating the bird species richness in the sampling area without ignoring the different species in the vicinity outside the limits of the area actually sampled. It has to be emphasised here that during the appropriate season all birds are more often heard than seen. In dense forests it is easier to miss a bird if it stays quiet.

Results:

Narikulimund (12.4.86)

The transect covered 2 small sholas and a patch of marshy grassland inbetween. 19 species of birds were seen during the 2 hours. Of these birds 2 were flying overhead and 4 were only heard. Of the 13 species sighted from the transect, the Nilgiri Laughing Thrush (Garrulax cachinnans) and the Black Bulbul (Hypsipetes madagascariensis) were the most abundant followed by the White Eye (Zosterops palpebrosa) and the Nilgiri Verditor Flycatcher (Muscicapa albicaudata). The Grey-backed Shrike (Lanius schach) was common in the grasslands.

Mukurti Fishing Hut (17.4.86)

The transect covered nearly equal amounts of shola and a wattle patch surrounding it. 14 species of birds were recorded. 2 of these were flying and 4 were only heard. Of the 8 sighted from the transect the Velvet-fronted Nuthatch (Sitta frontalis) was the most abundant followed by the Nilgiri Laughing Thrush and the White-eye. 6 species and 12 individuals were recorded in the shola within 35 minutes while only 4 species and 5 individuals were seen over a period of 70 minutes in the wattle plantation.

During the brief survey of birds on the Nilgiris (9.4.86 to 17.4.86) 47 species of birds were identified as occurring above 1800 m MSL. Of these the Nilgiri Wood Pigeon (Columba elphinstonii), the Nilgiri Verditer Flycatcher (Muscicapa albicaudata), the Black and Orange Flycatcher (Muscicapa nigrorufa), the Small Sunbird (Nectarinia minima), the Nilgiri Laughing Thrush (Garrulax cachinnans) and the Nilgiri Pipit (Anthus nilghoriensis) are endemic to the Western Ghats. All except the Nilgiri Wood Pigeon and the Small Sunbird are restricted to the southern Western Ghats. The Laughing Thrush is endemic to the Nilgiris. Systematic samplings carried out in two different localities viz. Narikulimund and Mukurti Fishing Hut have shown that this species is probably the most common species of these high altitude sholas

Since the number of bird species of these sholas and grasslands is small very detailed studies can be taken up on the different species laying more emphasis on the endemics. Overall patterns of distribution on the Nilgiris, their abundance, habitat choice, breeding and seasonality (if observed) are areas of interest if attempts are being made to conserve the birds of this region.

BIRDS OF THE NILGIRIS (>1800 MSL)

1.	Blackwinged Kite	Elanus caeruleus
2.	Crested Honey Buzzard	Pernis ptilorhynchus
3.	Shikra	Accipiter badius
4.	Black Eagle	Ictinaetus malayensis
5.	Kestrel	Falco tinnunculus
6.	Grey Jungle Fowl	Gallus sonneratii
7.	Blue Rock Pigeon	Columba livia
8.	Nilgiri Wood Pigeon	Columba elphinstonii
9.	Spotted Dove	Streptopelia chinensis
10	Alpine Swift	Apus melba
11.	House Swift	Apus affinis
12.	Ceylon Hoopoe	Upupa epops
13.	Small Green Barbet	Megalaima viridis
14.	Malabar Goldenbacked three toed Woodpecker	Dinopium javanense
15.	Larger Goldenbacked Woodpecker	Chrysocolaptes lucidus
16.	Malabar Crested Lark	Galerida malabarica
17.	Dusky Crag Martin	Hirundo concolor
18.	Nilgiri House Swallow	Hirundo tahitica
19.	Indian Greybacked Shrike	Lanius schach
20.	Jungle Myna	Acridotheres fuscus
21.	Jungle Crow	Corvus macrorhynchos
22.	Pied Flycatcher Shrike	Hemipus picatus
23.	Redwhiskered Bulbul	Pycnonotus jocosus
24.	Redvented Bulbul	Pycnonotus cafer
25.	Black Bulbul	Hypsipetes madagascariensis
26.	Nilgiri Laughing Thrush	Garrulax cachinnans
27.	Scimitar Babbler	Pomatorrhinus schisticeps
28.	Black and orange Flycatcher	Muscicapa nigrorufa
29.	Nilgiri Verditer Flycatcher	Muscicapa albicaudata
30.	Greyheaded Flycatcher	Culicicapa ceylonensis
31.	Whitespotted Fantail Flycatcher	Rhipidura albifrons
32.	Ashy Wren Warbler	Prinia socialis
33.	Blyth's Reed Warbler	Acrocephalus dumetorum
34.	Tickell's Leaf Warbler	Phylloscopus affinis
35.	Greenish Leaf Warbler	Phylloscopus trochiloides
36.	Large Crowned Leaf Warbler	Phylloscopus occipitalis
37.	Pied Bushchat	Saxicola caprata
38.	Nilgiri Blackbird	Turdus merula
39.	Grey Tit	Parus major
40.	Velvetfronted Nuthatch	Sitta frontalis
41.	Nilgiri Pipit	Anthus nilgheriensis
42.	Grey Wagtail	Motacilla caspica
43.	Nilgiri Flowerpecker	Dicaeum concolor
44.	Small Sunbird	Nectarinia minima
45.	White-Eye	Zosterops palpebrosa
46.	House Sparrow	Passer domesticus
47.	Rosefinch	Carpodacus erythrinus

ANGIOSPERM FLORA

A) Shri R. Gopalan and R. Ansari

An extensive floristic survey of Nilgiris has been made by the regional station of the Botanical Survey of India at Coimbatore through a number of repeated collections from 1970 onwards and an up-to-date list of the flowering plants with their distribution data has been published by B.D. Sharma, et. al. in 1977. In addition Dr. J. Joseph of B.S.I. has studied the orchids of the Nilgiris and published his illustrated work "Orchids of Nilgiris" in 1982.

During the present multidisciplinary fied work we could collect specimens of a number of beautiful Nilgiri Orchids and other scientifically interesting species and about 72 photographs of such plants were taken. A general study of the vegetation of the area has also been made.

It is interesting to hear from Mr. S. Balaji, I.F.S., District Forest Officer, Nilgiri (S) that the Tamil Nadu Forest Department has taken up a project under M.A.D.P. for conservation of the sholas in Nilgiris. One of the protective measures to be taken up is the construction of a chain funcing around the sholas. It is a welcome initiative provided it is practicable. However, the rapid cultivation of wattle trees along the grasslands near sholas will certainly have an adverse effect on sholas. The appearance of wattle trees right in the sholas at Kokkathurai certainly points towards the probable encroachment of wattle even into the sholas in the near future. As a part of the Biosphere Conservation Programme it is hence suggested that at least few patches of these sholas and the nearly natural grasslands can be preserved for future scientific studies. The introduction of Agave sp. as a fire protection barrier as we learnt from the Forest Officer, is also unjustifiable since these exotic plants can spread rapidly to the whole area replacing the local species.

B) Angiosperm Flora - C. Saldanha & H.S. Suresh

As indicated by Ansari and Gopalan, a good inventory of the Angiosperms in the Nilgiris is available especially in Gamble, Flora of the Presidency of Madras, Fyson, Flora of the Nilgiri and Pulney Hilltops and Sharma & al., Studies on the Flora of the Nilgiris.

The investigating team has to be thoroughly acquainted with these plants and able to recognise and name them in the field. Habitat, frequency, species diversity have to be determined both qualitatively and quantitatively. These will help in management techniques in consonance with carrying capacities of the ecosystem.

The following plan of work would therefore be desirable.

1. Collection of a representative set of plants, their preservation and identification.
2. Observations on habitat, frequency, phenology and importance within the community.
3. Study of earlier collections and pertinent literature.
4. Bench mark studies in different habitats to determine species area curves and species diversity by statistical analysis.
5. Comparative studies under different land uses to determine changes brought about by these uses.
6. Formulation of guidelines for resource utilisation on a sustainable basis.
7. Conservation of biological diversity in the context of resource utilisation.

In keeping with these objectives an attempt was made during this field trip to know the plants and evolve strategies for later studies.

Over 200 collections were made. The specimens were preserved by the wet method and on return to Bangalore processed and mounted. A preliminary identification gives about 105 species. This exercise was found useful both to know the plants and to build up a representative reference collection.

Quantitative studies were conducted in both the camp sites by laying quadrats and linear transects. This was to test sampling methods given the torrein and the nature of this montane vegetation.

2 quadrates of 10 x 10 m each were laid at Narikulimund - the first in the middle of the shola and the second at the upper margin. The results of the analysis are as follows:

QUADRAT I

Category	Genus	No. of plants	Total
Trees	Euonymus	1	
	Glochidion	1	
	Ilex	3	
	Litsea	1	
	Rhodomyrtus	3	1
	Syzygium	3	
	X_1 (only in leaf)	3	
	X_2 (only in leaf)	1	
	X_3 (only in leaf)	1	17
Shrubs	Reeds (? Arundinaria)	21	
	Hedyotis	8	
	Lasianthus	5	
	Mahonia	1	
	Psychotria	19	
	Juvenile Litsea	3	
	Juvenile Cinnamomum	2	59
Epiphytic Orchids (Clusters)	Aerides	10	
	Coelogyne	9	
	Oberonia	8	
	Schoenorchis	1	28

QUADRAT II

Category	Genus	No. of plants	Total
Trees*	Euonymus	2	
	Ilex	1	
	Michelia	1	
	Symplocos	1	
	Syzygium (2 sp.)	2	7

*Trees fewer, taller with larger crowns.

Shrubs	Reed (? Arundinaria)	5	
	Hedyotis	3	
	Lasianthus	1	
	Mahonia	1	
	Psychotria	38	
	Juvenile Cinnamomum	6	54
Epiphytic Orchids (Clumps)	Aerides	1	
	Coelogyne	4	
	Oberonia	6	11

Transects

Two line transects of 30 x 10 m were laid along the margin of the shola adjacent to the Mukurti Fishing Hut at an elevation of 2,200 m above MSL.

Line Transect I

Category	Genus	No. of plants	Total
Trees (more than 30 cm girth at B.H)	Daphniphyllum	3	
	Michelia	2	
	Rhododendron	10	
	Rhodomyrtus	6	
	Symplocos	1	
	Syzygium	2	24
Shrubs	Reeds (?Arundinaria)	12	
	Gaultheria	4	
	Hedyotis	1	17

Line Transect II

Category	Genus	No. of plants	Total
Trees	Cinnamomum	1	
	Eurya	1	
	Litsea	6	
	Michelia	1	
	Symplocos	4	
	Syzygium	2	15
Shrubs	Reeds (?Arundinaria)	5	
	Lasianthus	5	
	Leucas	1	
	Mahonia	1	
	Psychotria	6	
	Rubus	1	19
Epiphytic Orchids	Aerides	1	
	Oberonia	3	
	Schoenorchis	2	6

The interior of the shola had some large trees. The trunks of many were decaying and some had fallen leaving gaps in the canopy. Regeneration of canopy species was poor. The periphery of the sholas is being invaded by reeds. These seem to have already dominated smaller sholas.

The majority of the shola trees are habitat specific and occur only in the Nilgiris and Palni Hills. Their frequency varies within the shola and from shola to shola. As it is difficult to have sufficiently large quadrats with replicates in most of the sholas, plots could either be laid in the 2 large sholas i.e. Taishola and Avalanche shola or one plot could be selected in each of three similar shol s.

Grasslands

The bog at the bottom of Narikulimund Valley was partially drained during the dry month of April. Since the major plant cover was made up of clumps of a grass in vegetative condition only, the number of clumps in the 10 x 10 m quadrat were counted. Each axis of the quadrat had an average of 25 clumps giving a total of625 clumps in the quadrat.

The following plants which were in flower were collected from this bog :

Cirsium, Eriocaulon, Hypericum, Laurembergia, Pleiocraterium, Potentilla, Ranunculus, Spiranthes. Pleiocraterium was the most prominent among these.

Except for a small portion of grass lands reserved as pasture for cattle belonging to the Todas, the grassy blanks have been planted with Acacia, Eucalyptus and Pinus.

A thorough collection of plant species both in the bogs and on the grasslands throughout the year would be necessary to evaluate the species diversity of the grasslands.

The rate of plant biomass production on the grasslands will have to be ascertained and related to the herbivorous population to find out the carrying capacity of these downs.

PROVISIONAL LIST OF PLANTS COLLECTED IN THE
UPPER NILGIRIS
10th to 18th April 1986

Family: Species	Frequency	Altitude in m	Habitat
ACANTHACEAE			
Andrographis lobelioides Wt.	Common	2010	Grassland
Phlebophyllum kunthianum Nees	Common	2010	Grassland
APIACEAE			
Bupleurum distichophyllum Wt. & Arn.	Frequent	2010	Grassland
Pimpinella leschenaultii DC.	Common	2100	Grassland
AQUIFOLIACEAE			
Ilex wightiana Wall. ex Wt.	Common	2100	Shola
ARACEAE			
Arisaema leschenaultii Bl.	Frequent	1800-2100	Shola
ASCLEPIADACEAE			
Tylophora sp.	Rare	2300	Shola
ASTERACEAE			
Anaphalis aristata DC.	Common	2000	Grassland
Anaphalis wightiana (DC.) DC.	Common	2200	Grassland
Blumea sp.	Common	2200	Grassland
Erigeron karvinskianus DC.	Common	2100	Roadside
Helichrysum buddleoides DC.	Common	2300	Roadside
Hypochoeris glabra L.	Common	2200	Grassland
Senecio sp.	Frequent	2000	Shola
Vernonia sp.	Frequent	2000	Shola
BALSAMINACEAE			
Impatiens leschenaultii (DC.) Wall. ex Wt. & Arn.	Frequent	2100	Shola
BERBERIDACEAE			
Berberis tinctoria Lesch.	Common	2200	Shola
Mahonia leschenaultii (Wall. ex Wt.) Takeda	Common	2200	Shola
BUXACEAE			
Sarcococca trinervia Wt.	Frequent	2010	Shola
CAMPANULACEAE			
Campanula alphonsii Wall. ex DC.	Rare	2300	Roadside
Wahlenbergia marginata (Thunb.)DC.	Common	2100	Grassland
CAPRIFOLIACEAE			
Viburnum sp.	Frequent	2100	Shola

CELASTRACEAE			
Euonymus sp.	Frequent	2100	Shola
Microtropis ramiflora Wt.	Fraquent	2000	Shola
CLUSIACEAE			
Hypericum japonicum Thunb.	Common	2100	Bog
CRASSULACEAE			
Kalanchoe grandiflora Wt. & Arn.	Occasional	2300	Rock crevice
CYPERACEAE			
Carex baccans Nees	Common	2100	Shola
Cyperus sp.	Common	2100	Grassland
Eleocharis sp.	Common	2100	Bog
Fimbristylis sp.	Common	2300	Grassland
DROSERACEAE			
Drosera burmannii Vahl	Frequent	2000	Bog
ELAEAGNACEAE			
Elaeagnus sp.	Common	2100	Thicket
ELAEOCARPACEAE			
Elaeocarpus recurvatus Corner	Occasional	2200	Shola
ERICACEAE			
Gaultheria fragrantissima Wall.	Common	2000	Thicket&Shola
Rhododendron nilagiricum Zenk.	Common	2100	Shola&grassland
ERIOCAULACEAE			
Eriocaulon sp.	Common	2100	Grassland
Eriocaulon sp.	Common	2300	Bog
FABACEAE			
Acacia sp.	Frequent	2300	Grassland
Rhynchosia sp.	Frequent	2100	Grassland
Sarothamnus scoparius (L.) Wimm. ex Koch	Common	2100	Naturalised
GENTIANACEAE			
Gentiana quadrifaria Bl.	Common	2100	Bog
Swertia corymbosa (Griseb.) Cl.	Common	2100	Grassland
JUNCACEAE			
Juncus effusus L.	Common	2200	Stream bank
Juncus prismatocarpus R. Br.	Frequent	2100	Bog
LAMIACEAE			
Leucas helianthemifolia Desf.	Common	2010	Grassland
Leucas lanceafolia Desf.	Common	2100	Grassland
Micromeria biflora Benth.	Common	2000	Grassland
Scutellaria wightiana Benth.	Frequent	1920	Shola

LAURACEAE			
Cinnamomum macrocarpum J. Hk.	Frequent	1800	Shola
Litsea oleoides (Meisn.) J. Hk.	Frequent	2100	Shola
Litsea sp.	Frequent	1800	Shola
Litsea sp.	Frequent	1800	Shola
LENTIBULARIACEAE			
Utricularia sp.	Frequent	2300	Bog
LILIACEAE			
Curculigo orchioides Gaert.	Common	2015	Grassland
Disporum leschenaultianum D. Don	Frequent	2100	Shola
LOBELIACEAE			
Lobelia leschenaultiana(Presl)Scot.	Frequent	2300	Grassland
LOGANIACEAE			
Gardneria ovata Wall.	Frequent	2100	Shola
LORANTHACEAE			
Korthalsella japonica (Thunb.)Eng.	Frequent	2300	Shola
MAGNOLIACEAE			
Michelia nilagirica Zenk.	Common	2000	Shola
MELASTOMATACEAE			
Sonerila grandiflora R. Br.	Rare	2200	Stream bank
MYRTACEAE			
Rhodomyrtus tomentosus (Ait.) Wt.	Common	2000	Shola
Syzygium arnottianum Walp.	Frequent	2200	Shola
Syzygium calophyllifolium Walp.	Common	2000	Shola
Syzygium sp.	Frequent	2100	Shola
OLEACEAE			
Jasminum bignoniaceum Wall.	Frequent	2200	Thickets
Ligustrum sp.	Occasional	2200	Thickets
ORCHIDACEAE			
Acriden linguna (Lindl.) Fischer	Common	2000	Shola
Calanthe sp.	Frequent	2100	Shola
Coelogyne odoratissima Lindl.	Common	2100	Shola
Choirostylis flabellata (A.Rich.) Wt.	Occasional	2200	Shola
Eulophia sp.	Frequent	1900	Grassland
Oberonia sp.	Common	2100	Shola
Schoenorchis filiformis (Wt.)Schl.	Common	2100	Shola
Spiranthes sinensis (Pers.) Ames	Frequent	2100	Grassland&Bog
Trichoglottis tenera (Lindl.)Schl.	Rare	2200	Shola
OXALIDACEAE			
Biophytum sp.	Common	2200	Grassland
PASSIFLORACEAE			
Passiflora edulis Sims	Frequent	2100	Naturalised
Passiflora leschenaultii DC.	Occasional	2100	Shola

PIPERACEAE			
Peperomia tetraphylla Hk. & Arn.	Common	2100	Shola
Piper 3 spp.	Frequent	2100	Shola
PITTOSPORACEAE			
Pittosporum sp.	Frequent	2000	Shola
POACEAE			
4 spp.			
RANUNCULACEAE			
Ranunculus sp.	Frequent	2100	Bog
POLYGALACEAE			
Polygala sibirica L.	Common	2200	Grassland
POLYGONACEAE			
Polygonum sphaerocephalum Wall. ex Meisn.	Frequent	2300	Roadstream
PROTEACEAE			
Leucadendron argenteum (L.) R. Br.	Rare	1900	Naturalised
ROSACEAE			
Fragaria nilgherrensis Schindl.	Common	2100	Grassland
Potentilla leschenaultiana Ser.	Common	2100	Grassland
Rosa leschenaultiana Wt. & Arn.	Frequent	2100	Shola
Rubus racemosus Roxb.	Common	2200	Thicket
RUBIACEAE			
Cinchona sp.		1800	Plantation
Hedyotis stylosa R. Br.	Common	2100	Shola
Knoxia sumatrensis (Retz.) R. Br.	Frequent	2200	Grassland
Ixora sp.	Frequent	2100	Grassland
Lasianthus sp.	Common	2100	Shola
Nanotis sp.	Frequent	2100	Grassland
Pleiocraterium verticillare (Wt. & Arn.) Bremek.	Common	2100	Bog
Psychotria sp.	Common	2100	Shola
SABIACEAE			
Meliosma pinnata (Roxb.) Walp.	Frequent	1800	Shola
Meliosma simplicifolia (Roxb.)Walp.	Common	2100	Shola
SCROPHULARIACEAE			
Striga asiatica (L.) Kuntze	Common	2100	Grassland
SMILACACEAE			
Smilax sp.	Occasional	2100	Thicket
STAPHYLEACEAE			
Turpinia nepalensis Wall. ex Wt. & Arn.	Frequent	2200	Shola
SYMPLOCACEAE			
Symplocos sp.	Frequent	2200	Shola

THEACEAE			
Eurya nitida Korthals	Common	2100	Shola
VACCINIACEAE			
Vaccinium sp.	Frequent	2200	Thicket
VALERIANACEAE			
Valeriana leschenaultii DC.	Occasional	2300	Grassland
VERBENACEAE			
Verbena rigida Spr.	Occasional	2300	Grassland
VIOLACEAE			
Viola serpens Wall. ex Roxb.	Common	2100	Shola
NOT IDENTIFIED 3 SPECIES			

All specimens have been integrated with earlier collections from the Nilgiri Biosphere Reserve Area and form a separate section of the Herbarium, Centre for Ecological Sciences, Indian Institue of Science, Bangalore.

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