Vol. 23, Nos, 3 & 4 : pp. 126-128, 1981

OBSERVATIONS ON THE VEGETATION OF NALLAMALAIS

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Oriented in a north-south direction the Nallamalais stretch across 12,000 sq. km., occupying an area situated in what are popularly called Ceded Districts in Peninsular India, which are generally dry due to scanty rainfall.

In Telugu—the language of the local region—Nallamala means Black Hills, perhaps alluding to the scourge of Black Water Fever and Malaria, Furthermore, the forests were almost impenetrable because of wild animals, including tigers, panthers, bears, cheetas and others. However, the Nallamalais are famous because of Shivaite temples at Srisailam and Mahanandi and Vishnuvaite temples at Ahobilam.

The hill ranges are intersected by two passes, viz. M'antralakanama in the north and Nandikanama in the south; the former has a road link between Atmakaur and Dornal across it, the latter has a rail link between Nandyal and Giddalur across it.

The underlying rocks are of Archean age with Cuddapah and Kurnool formations. Quartzites, shales, barytes and manganese ores occur. The lower beds are formed by highly folded Bairenkonda quartzites, the succeeding Cumbum shales forming the centres of synclinal folds. There are some abandoned excavations for mining diamonds in several localities. The soil is generally red with calcareous shales; mixed varieties occur along the base of Nallamalais.

Among rivers which take their origin in

Nallamalais, Gundlakamma originating in Gundlabrahmeswaram is the most important, followed by Vakkaleru river, and others. The Krishna river forming almost the northern boundary of Nallamalais has entrenched a deep gorge along its course across which a hydel dam is being constructed at Srisailam.

Climatically the Nallamalais are generally dry : the hot period is from March to June, with the South-West monsoon starting at the end of June. This extends up to end of September to be followed in November-January by the retreating North-East monsoon, bringing the temperature down to as low as 13° C at nights. The average annual rainfall is 127 cm, the main bulk of which is from the South-West monsoon.

The tribals called *Chenchus* live in groups called *Gudems* amidst these hill ranges. The forests are affected, though not very significantly, by their nomadic activities.

Botanically Nallamalais have remained almost unexplored but for some scanty collections totalling to 100 of Beddome (1872-74), Gamble (1882-85), Barber (1904-06), Jacob (1917), Fischer (1935), and some grass collections by Raman (1956), and Aggarwal (1958). Since 1963 J. L. Ellis has made 7 tours of Nallamalais, collecting in all 743 taxa of angiosperms and 15 taxa of spermatophytes spread over 1385 field numbers.

There are mainly 3 different types of vegetation, viz. (i) Dry Deciduous, (ii) Moist Deciduous and (iii) Scrub, Amidst these there are other types of localized vegetations, mainly due to edaphic factors. These different types of vegetation are here described following in the main classification as given by Champion and Seth (1968), but with slight modifications.

The Dry Deciduous type [Champion and Seth treat it under Southern Dry Mixed Deciduous Forests] of forests have dominantly the following plants : Anogeissus latifolia (Roxb. ex DC.) Wall. ex Guill. & Pers., Cleistanthus collinus (Roxb.) Hook. f., Cochlospermum religiosum (L.) Alston, Commiphora caudata (Wt. & Arn.) Engler, Dalbergia lanceolaria L. f., Dendrocalamus strictus (Roxb.) Nees, Gardenia gummifera L. f., G. latifolia Aiton, G. resinifera Roth, Gmelina arborea Roxb., Hardwickia binata Roxb., Holarrhena antidysenterica (Reth) Wall. ex A. DC., Nyctanthes arbortristis Linn., Phyllanthus emblica Linn., P. indofischeri Bennet, comb. nov. Pterocarpus marsupium Roxb., Semecarpus anacardium L. f., Strychnos nuxvomica L., S. potatorum L. f., Tectona grandis L. f., Terminalia coriacea (Roxb.) Wt. & Arn., Wrightia tinctoria R. Br., W. tomentosa (Roxb.) Roem. & Schult.

Moist Deciduous forests [Champion and Seth treat these under South Indian Moist Deciduous Forests] have the following plants predominantly : Bauhinia vahlii Wt. & Arn., Clerodendrum serratum (L.) Moon, Costus speciosus (Koenig) Smith, Dioscorea hispida Dennst., Dillenia pentagyna Roxb., Entada pursaetha DC., Leea indica (Burm. f.) Merr., Limnophila rugosa (Roth) Merr., Lepisanthes tetraphylla (Vahl) Radlk., Lygodium flexuosum (L.) Swartz, Naravelia zeylanica (L.) DC., Pueraria tuberosa (Roxb.) DC., Piper attenuatum Buch.-Ham. ex Miq., P. hymenophyllum Miq., P. nigrum L., Schleichera oleosa (Lour.) Oken, Stereospermum colais (Dillw.) Mabberley Tacca leontopetaloides Ktze., (L.) 0. Trema orientalis (L.) Bl., etc. Of great interest is Oryza granulata Nees & Arn. ex Steudel ex Hook. f. which forms a dense undercover below the canopy, at some places in Gundlabrahmeswaram. Also here, Oryza malampuzhaensis Krishnaswamy & Chandrasekharan, a plant occurring in the Western Ghats has been collected. Phoenix humilis Royle var. pedunculata Beccari forms almost a pure vegetation near Gundlabrahmeswaram on way to Ramanapenta. Champion and Seth treat this vegetation under Slightly Moist Teak Forests. Occurrence of Athyrium hohenackerianum (O. Ktze.) T. Moore apud. Bedd., a fern of very wet localities on the Western Ghats, near Ramanapenta is most interesting.

Scrub vegetation is generally seen at fringes of moist and dry deciduous forests and foot of hills. They are typically represented by the following plants : Anisochilus carnosus (L.) Wall., Balanites aegyptiaca (L.) Delile, Bar--Canthium leria prionites L., parviflorum Lamk., Carissa spinarum L., Erythroxylum monogynim Roxb., etc., Flacourtia indica (Burm. f.) Merr., Lepidagathis subarmata (C. B. Cl.) Gamble, Premna tomentosa Willd. Pupalia lappacea (L.) Juss, Ziziphus spp. and others. Southern Euphorbia Scrub (according to Champion and Seth) vegetation is commonly seen at the foot hills on the Eastern Nallamalais, having populations of Cassia auriculata L., Dodonaea viscosa L., Euphorbia antiquorum L., Grewia tenax (Forsk.) Fiori, Mundulea sericea (Willd.) A. Cheval.

Of the localized vegetations, cane—Calamus rotang L.—is confined to Krishnandi where the area is fed by the perennial stream formed by the hot spring in Mahanandi. Bosweliia serrata Roxb. ex Colebr., is yet another to form almost pure stands near Chelama where the top soil has been eroded and boulders are exposed. Champion and Seth treat it under Edaphic Climax Type. In several localities Hardwickia binata Roxb., is present, though not densely, to be called Hardwickia Forests of Champion and Seth, Thorny vegetation having dominantly several species of Acacia, viz. A. leucophlaea (Roxb.) Willd., A. horrida (L.) Willd., A. nilotica Willd. ex Del. subsp. indica (Benth.) Brenan, A. catechu Willd. var. chundra (Roxb.) Duthie, and others occur near Peddachama situated in the Eastern Nallamalais. Acacia horrida is not in great numbers so that it can be called Carnatic Umbrella Thorn Forest of Champion and Seth.

There is also Tropical Riparian Fringing Forests (according to Champion and Seth) along the Krishna river and several other small streams. The following trees are conspicuous in these areas : Barringtonia acutangula (L.) Gaertn., Celtis cinnamomea Lindley, Manilkara roxburghiana (Wt.) Dubard, Terminalia arjuna (Roxb. ex DC.) Wt. & Arn., etc. In slower flowing streams, Blyxa octandra (Roxb.) Planchon ex Thwaites, Aponogeton natans (L.) Engler & Krause, and an aquatic fern. Ceratopteris thalictroides (L.) Brongn., are common.

Evergreen elements in forests called Tropical Dry Evergreen Forests by Champion and Seth are present amidst Dry Deciduous Forests in Srisailam and other localities, the main elements being Drypetes sepiaria (Wt, & Arn.) Pax & Haffm., Glochidion zeylanicum (Gaertn.) A. Juss., Manilkara hexandra (Roxb.) Dubard, Memecylon umbellatum Burm. f., Limophila indica (L.) Druce, Suregada angustifolia (Muell.-Arg.) Airy Shaw, etc., generally along perennial water courses. Santalum album L., is yet another evergreen plant occurring in several localities amidst dry deciduous forests, especially near Srisailam and Diguvametta. Interestingly, wild mango, Mangifera indica L. has been collected along a stream near Gundlabrahmeswaram.

Grasses are abundant soon after the rains during July-August, specially along abandoned

footpaths and unused roads. Generally they are not seen inside the forests, except for Oplismenus compositus (L.) Beauv., Oryza granulata Nees et Arn. ex Steudel ex Hook. f., and a few others. Altogether 68 taxa of grasses have been collected. Eulalia phaeothrix (Hack.) O. Ktze., which generally prefers an orophytic habitat also occurs here. Of bamboos, Dendrocalamus strictus (Roxb.) Nees assumes a huge size; this is being exploited for papermaking.

The following are the common ferns in Nallamalais : Actinopteris radiata (Swartz) Link, Adiantum caudatum L., A. philippense L., Cheilanthes farinosa (Forsk.) Kaulf, Tactaria macrodonta (Fée) Christensen and others. Among fern allies, Marsilea quadrifolia L. occurs along small streams and on fringes of drying ponds. Ophioglossum pedunculosum Desv., is restricted to moist deciduous forests.

The following are the new taxa discovered during the present explorations : Andrographic nallamalayana Ellis, Euphorbia linearifolia Roth var. nallamalayana Ellis, Crotalaria madurensis Wight var. kurnoolica Ellis et Swaminathan, Rostellularia vahlii (Roth) Nees var. rupicola Ellis. Among new records, the following are interesting : Liparis prazeri King & Pantl, Oryza malampuzhaensis Krishnaswamy & Chandrasekharan, Parthenium hysterophorus L. etc. Surprisingly enough, Lantana camara L. var. aculeata (L.) Moldenke has been spotted in only one locality, obviously a very recent introduction, for it has never been sighted anywhere else.

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