

A CONTRIBUTION TO THE FLORA OF UDAIPUR FORESTS IN CHAMPARAN DISTRICT, NORTH BIHAR

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A B S T R A C T

The paper relates to a floristic account of Udaipur forests in Champaran District, North Bihar. The vegetation can be broadly classified as follows : Deciduous forest, Evergreen forest, Vegetation in plantation and open areas and Aquatic vegetation. A floristic analysis is presented and a systematic enumeration appended. The occurrence of *Arnebia hispidissima* DC. in Udaipur forests constitutes a new record for Bihar state.

INTRODUCTION

As the information on the botany of Champaran District in North Bihar is scanty, the present study was undertaken to present a floristic account of Udaipur forests in that district. The Udaipur forests are situated 14.5 km west of Bettiah town in the Champaran District and extend over a total area of 548.75 ha of which 222.5 ha have recently been converted into plantations for raising forest trees of economic importance.

PHYSICAL FEATURES

The terrain is almost plain with a gentle slope towards the west. Three-fourths of the area is situated around the horse-shoe shaped, natural lake 'Sareyaman' which forms the main catchment area.

SOIL

The soil is of immature riverain type. It consists of mostly sandy loam with the depth of top soil varying from 0.3 to 2 m. Below this is found pure sand which appears to be the abandoned bed of the Gandak river or its tributaries.

CLIMATE

The hot weather begins from the middle of March and is at its height in May when westerly winds prevail. The cold weather is ushered in November by a chilly wind, blowing from the hills and persists till January. The average annual temperature for the year 1962 has been recorded as 26°C. The rainfall is heavy, the total annual rainfall being 168 cm for the year 1962. During June, July and August maximum rain has been recorded.

VEGETATION

The vegetation of Udaipur forests falls under four distinct categories namely, 1. Deciduous forest ; 2. Evergreen forest ; 3. Vegetation in plantation and open areas and 4. Aquatic vegetation of the Sareyaman Lake.

1. Deciduous forest : The most important forest type, judging from its apparent abundance is, the deciduous type. These forests gregarious in character, are situated on the western side of the horse-shoe-shaped lake, with *Maltotus philippensis* and *Streblus asper* growing in close association forming the dominant vegetation. The former grows 10-15 m tall while the latter attains 8-9 m in height. Other tree species co-existing with these are *Aegle marmelos*, *Mitragyna parvifolia*, *Putranjiva roxburghii*, *Syzygium cumini* and less frequently *Acacia catechu*, *Tamarindus indica* and *Ehretia laevis* var. *floribunda*. *Casaria elliptica*, *Cordia dichotoma*, *Trema orientalis* and *Xeromphis spinosa* are some smaller trees of rare occurrence. *Holoptelea integrifolia* is the tallest tree reaching a height of 15-20 m.

The shrubby undergrowth of the forest is chiefly composed of *Colebrookea oppositifolia* and *Murraya koenigii*. The latter occurs abundantly everywhere, running wild. *Colebrookea-Murraya* association forms the bulk of the shrubby growth. Among other common shrubs, mention may be made of *Bridelia stipularis*, *Callicarpa macrophylla*, *Kirganelia reticulata*, *Mimosa rubicaulis*, *Solanum surattense*, *S. verbascifolium* and *Zizyphus oenophia*. There are a few undershrubs and even they are not frequent. Examples are *Desmodium*

gangeticum and *Urena lobata*. Climbers are represented by *Cayratia carnosae*, *Clematis gouriana*, *Ichnocarpus frutescens*, *Porana paniculata* and *Vallisneria spiralis*.

The forest floor has a poor herbaceous growth and is covered with dead twigs and leaves in summer. Wherever there is little moisture, herbaceous plants such as *Andropogon saxifragaeifolia*, *Bothriospermum tenellum*, *Centaurium roxburghii*, *Hemigraphis hirta*, *Jacobaea vestita*, *Launaea nudicaulis*, *Oldenlandia corymbosa*, *Salvia plebeia* and *Verbascum chinense* are noticed. Immediately after rains plants like *Acalypha indica*, *Adenostemma lavenia*, *Biophytum reinwardtii*, *Cynodon dactylon*, *Evolvulus nummularius*, *Lindernia brachiata*, *Peperomia pellucida*, *Polygonum barbatum* subsp. *gracile* and *Rungia pectinata* appear on the forest floor.

II. Evergreen forest: These forests are found in patches along the eastern side of the extensive lake. Adjoining the banks is a pure forest of *Syzygium cumini*. The forest undergrowth is sparse, consisting of small trees like *Crataeva nurvala* and herbs like *Polygonum plebeium*, *Sida veronicifolia*, *Veronica anagallis* and *Wahlenbergia marginata*. Behind the 'Jamun' forest is a patch of open grass land to be followed by pure stands of *Woodfordia fruticosa*. This plant grows abundantly in large populations and during bloom becomes very conspicuous with its brilliant, scarlet flowers. A few, tall trees of *Bombax ceiba* were also observed. On the north-eastern side is situated the 'Sissoo' forest consisting mainly of *Dalbergia sissoo*, among which are interspersed *Syzygium cumini*. The trees of the former average about 20 m in height. *Ehretia acuminata* var. *serrata*, *Holarrhena antidysenterica*, *Ichnocarpus frutescens* and *Melanthera rhamnoides* are some of the smaller trees and shrubs in this forest.

III. Vegetation in plantation and open areas: The forests in Udaipur do not contain many forest species of economic value and hence nearly 222.5 ha have been cleared for raising important, forest species like Teak (*Tectona grandis*), Sisham (*Dalbergia sissoo*), Sal (*Shorea robusta*) and Blue-gum (*Eucalyptus saligna*). A number of herbs and undershrubs are found in these plantations and some of the representatives of the latter are *Cassia tora*, *C. occidentalis*, *Dodonaea viscosa*, *Solanum surattense* and *Sida rhombifolia*. The herbaceous species include *Ageratum conyzoides*, *Arnebia hispidissima*, *Blumea laciniata*, *B. mollis*, *Campanula canescens*, *Cynoglossum lanceolatum*, *Erigeron asteroides*,

Euphorbia granulata, *Hemigraphis hirta*, *Kohautia gracilis*, *Laggera aurita*, *Leucas laevandulaefolia*, *Leonotis nepetaefolia*, *Nepeta hindostana*, *Oldenlandia biflora*, *Peristrophe bicalyculata*, *Saussurea candidans*, *Vernonia cinerea* and *Youngia japonica*. Intermingled with these herbs and undershrubs and growing luxuriantly with them are the grasses, of which the common species are *Cymbopogon jawarancusa*, *Desmostachya bipinnata*, *Dichanthium annulatum*, *Hackelochloa granularis*, *Imperata cylindrica*, *Saccharum arundinaceum*, *Schizachyrium brevifolium*, *Sporobolus diander* and *Vetiveria zizanioides*.

Open areas occur in patches amidst the Sissoo and Jamun forests where an interesting type of vegetation is met with. In one such patch on the eastern side of the lake, a large population of *Calotropis gigantea* and *C. procera* was noticed. The former grows to a height of about 4 m. The other areas are dominated by small populations of *Arnebia hispidissima*, *Jacobaea vestita* and *Launaea nudicaulis*. *Alysicarpus bupleurifolius*, *Anisomelis indica*, *Atylosia scarabaeoides*, *Cnicus arvensis*, *Heliotropium strigosum*, *Indigofera linifolia*, *Murdannia nudiflora*, *Oldenlandia pumila*, *Polygala chinensis* and *Vernonia cinerea* are the prominent herbs met with. The common grasses associated with these are *Bothriochloa intermedia* var. *punctata*, *Cynodon dactylon*, *Dactyloctenium aegyptium*, *Dichanthium annulatum*, *Imperata cylindrica*, *Paspalidium flavidum* and *Setaria glauca*.

IV. Aquatic vegetation: Hydrophytes are found in plenty in the extensive lake Sareyaman in Udaipur forest. *Cyperus corymbosus* and *Typha angustata* form large populations close to water margins, the latter growing 1½ to 2 m tall above the surface of water. The marshy plants growing along the banks are *Alternanthera sessilis*, *Carex fedia*, *Limnophila indica* and *Scirpus supinus*. These are followed by a population of *Ottelia alismoides*, growing in shallow water. *Nymphoides cristatum* with its white flowers is commonly noticed here. *Hydrilla verticillata* and *Najas marina* grow abundantly both in submerged and floating conditions. *Ceratophyllum demersum*, *Nechamandra alternifolia*, *Nymphaea nouchali*, *Potamogeton nodosus*, *P. pectinatus* and *Trapa natans* var. *bispinosa* are some of the other components. *Caldesia parnassifolia*, *Ipomoea aquatica* and *Ludwigia adscendens* are also present but infrequent. *Cyperus alopecuroides*, *C. platystylis*, *Hygroryza aristata*, *Phragmites karka* and *Cyperus globosus* constitute the aquatic and marshy grasses and sedges.

FLORISTIC ANALYSIS

The two explorations conducted in the Udaipur forest have yielded a total number of 215 species, distributed over 177 genera and 56 families. Among the dominant families in the flora, Gramineae rank first, followed by Compositae and Leguminosae.

The occurrence of *Arnebia hispidissima* DC. in Udaipur forests, Champaran District constitutes a new record for Bihar State as it has so far been reported from Punjab, Delhi, Uttar Pradesh, Rajputana westwards and Gujarat.

ENUMERATION

DICOTYLEDONS

RANUNCULACEAE

Clematis gouriana Roxb.

In forest, common, in flower (9-11-63), *Shetty* 102.

NYMPHAEACEAE

Nymphaea nouchali Burm. f.

In lake, common, in flower and fruit (11-11-63), *Shetty* 210.

CAPPARIDACEAE

Crataeva nurvala Buch.-Ham.

In forest, common, in flower (7-4-63), *Thothathri* 9950.

FLACOURTIACEAE

Casearia elliptica Willd.

In forest, common, in flower (6-4-63), *Thothathri* 9406.

POLYGALACEAE

Polygala chinensis Linn.

In forest, rare, in flower (7-4-63), *Thothathri* 9925.

CARYOPHYLLACEAE

Polycarpon prostratum (Forsk.) Aschers. & Schweinf.

In Mazaria colony, in flower (11-11-63), *Shetty* 232.

PORTULACACEAE

Portulaca oleracea Linn.

In Mazaria colony, common, in flower (11-11-63), *Shetty* 227.

MALVACEAE

Sida rhombifolia Linn.

In forest and plantation, common, in flower and fruit (9-11-63), *Shetty* 129 and *Thothathri* 9882.

S. rhombifolia Linn. var. *obovata* (Wall.) Mast.

In forest, common, in flower and fruit (9-11-63), *Shetty* 137.

S. veronicifolia Lamk.

In forest, rare, in flower (7-4-63), *Thothathri* 9918 and *Shetty* 132.

Urena lobata Linn.

In forest, in flower and fruit (9-11-63), *Shetty* 149.

U. repanda Roxb.

Near Mazaria colony, common, in flower and fruit (11-11-63), *Shetty* 235.

TILIACEAE

Corchorus aestuans Linn.

Near the plantation, common, in fruit (10-11-63), *Shetty* 202.

Triumfetta rhomboidea Jacq.

In forest, common, in flower and fruit (9-11-63), *Shetty* 141.

OXALIDACEAE

Riophytum reinwardtii Walp.

In forest, common, in flower and fruit (9-11-63), *Shetty* 130.

Oxalis corniculata Linn.

In plantation, common, in flower (6-4-63), *Thothathri* 9870.

RUTACEAE

Aegle marmelos Corr.

Near the plantation, common, in fruit (10-11-63), *Shetty* 199.

Murraya koenigii Spreng.

In forest, most common, in flower (6-4-63), *Thothathri* 9877.

MELIACEAE

Azadirachta indica A. Juss.

In forest, rare, in flower (6-4-63), *Thothathri* 9903.

RHAMNACEAE

Zizyphus oenoplia Mill.

In forest, common, in fruit (9-11-63), *Shetty* 104.

VITACEAE

Cayratia carnosa (Lamk.) Gagnep.

In Mazaria colony, common, in fruit (11-11-63), *Shetty* 220.

SAPINDACEAE

Dodonaea viscosa (Linn.) Jacq.

In plantation, not common, in fruit (8-4-63), *Thothathri* 9975.

LEGUMINOSAE

Acacia catechu Willd.

In forest, common, in fruit (9-11-63), *Shetty* 142.

A. farnesiana Willd.

In forest and open areas, in fruit (7-4-63), *Thothathri* 9932.

Alysicarpus bupleurifolius (Linn.) DC.

Near Mazaria colony, common, in flower (11-11-63), *Shetty* 241.

A. rugosus DC.

In forest, common, in bud (10-11-63), *Shetty* 160.

Atylosia scarabaeoides Benth.

Near Mazaria colony, in fruit (11-11-63), *Shetty* 233.

Cassia occidentalis Linn.

In forest, common, in flower and fruit (10-11-63), *Shetty* 166.

C. tora Linn.

In forest, very common, in fruit (10-11-63), *Shetty* 178.

Crotalaria prostrata Rottler ex Willd.

In plantation, rare, in flower and fruit (8-4-63), *Thothathri* 9959.

C. sessiliflora Linn.

Near Mazaria colony, in flower (11-11-63), *Shetty* 236.

Dalbergia sissoo Roxb. ex DC.

In forest, common and abundant, in pod (7-4-63), *Thothathri* 9935.

Desmodium gangeticum DC.

In plantation and forest, common, in flower and fruit (6-4-63), *Thothathri* 9868, 9962 and *Shetty* 146.

D. triflorum DC.

In forest and plantation, very common, in flower and fruit (9-11-63), *Shetty* 127 and *Thothathri* 9886.

Indigofera linifolia Retz.

In forest, common, in flower (7-4-63), *Thothathri* 9924 and *Shetty* 135.

Medicago lupulina Linn.

In plantation, rare, in flower (8-4-63), *Thothathri* 9964.

Mimosa himalayana Gamble

In forest, common, in fruit (9-11-63), *Shetty* 103.

Sesbania sesban (Linn.) Merr.

In plantation, not common, in flower (8-4-63), *Thothathri* 9968.

MYRTACEAE

Syzygium cumini (Linn.) Skeels

In forest, most common, in bud (6-4-63), *Thothathri* 9907.

BARRINGTONIACEAE

Barringtonia acutangula Gaertn.

Near lake, common, in flower and fruit (11-11-63), *Shetty* 219.

LYTHRACEAE

Woodfordia fruticosa (Linn.) Kurz

In forest, very common, in flower (7-4-63), *Thothathri* 9919.

Ammanium baccifera Linn.

In forest, common, in flower and fruit (9-11-63), *Shetty* 150.

ONAGRACEAE

Ludwigia adscendens (Linn.) Hara

In lake, in flower (7-4-63), *Thothathri* 10129.

TRAPACEAE

Trapa natans Linn. var. **bispinosa** (Roxb.) Makino.

In lake, common, in flower (11-11-63), *Shetty* 218.

CUCURBITACEAE

Coccinia cordifolia (Linn.) Cogn.

In plantation and forest, not common, in flower (6-4-63), *Thothathri* 9875 and *Shetty* 175.

Cucumis callosus (Rottl.) Cogn. ex Cogn. & Harm.

In plantation, rare, in flower (8-4-63), *Thothathri* 9958.

Diplocyclos palmatus (Linn.) C. Jeffery

In Mazaria colony, in flower and fruit (11-11-63), *Shetty* 221.

Mukia maderaspatana (Linn.) Roem.

Near the plantation, common, in fruit (10-11-63), *Shetty* 207.

Trichosanthes cucumerina Linn.

In forest, common, in flower and fruit (10-11-63), *Shetty* 176.

UMBELLIFERAE

Centella asiatica (Linn.) Urban

In marshy areas near lake, common, in flower (7-4-63), *Thothathri* 9916.

Trachyspermum copticum (Linn.) Link.

Near lake, common, in flower (8-4-63), *Thothathri* 9981.

RUBIACEAE

Borreria stricta Schum.

In forest, common, in flower and fruit (9-11-63), *Shetty* 144.

Dentella repens (Linn.) Forst.

In forest, in flower and fruit (7-4-63), *Thothathri* 9929.

Knoxia corymbosa Willd.

Near the stream, Halahi, not common, in flower (10-11-63), *Shetty* 203.

Kohautia gracilis (Wall.) DC.

In plantation, rare, in flower (8-4-63), *Thothathri* 9956.

Mitragyna parvifolia Korth.

In forest, very common, in fruit (9-11-63), *Shetty* 148.

Oldenlandia biflora Linn.

In plantation, common, in flower (8-4-63), *Thothathri* 9967.

O. corymbosa Linn.

In forest and plantation, common, in flower and fruit (6-4-63 & 10-11-63), *Thothathri* 9884, 9926 and *Shetty* 125, 184.

O. paniculata Linn.

By the stream, Halahi, in fruit (10-11-63), *Shetty* 189.

Oldenlandia pumila (Linn. f.) DC.

In Mazaria colony, common, in flower and fruit (11-11-63), *Shetty* 223.

Wendlandia heynei (R. & S.) Sant. & Merch.

In plantation and forest, rare, in flower (6-4-63), *Thothathri* 9865.

Xeromphis spinosa (Thunb.) Keay

In forest, very common, in fruit (9-11-63), *Shetty* 124.

COMPOSITAE

Adenostemma lavenia (Linn.) Kuntze

In forest, in flower and fruit (9-11-63), *Shetty* 108.

Ageratum conyzoides Linn.

In forest, common, in flower (9-11-63), *Shetty* 152.

Blumea laciniata (Roxb.) DC.

In plantation, in flower (6-4-63), *Thothathri* 9888.

B. mollis (Don) Merrill

In plantation, in flower (6-4-63), *Thothathri* 9895.

Caesulia axillaris Roxb.

By the side of the stream, Halahi, common, in flower (10-11-63), *Shetty* 192.

Centrantherum anthelminticum O. Ktze.

In forest, in flower and fruit (9-11-63), *Shetty* 107.

Chrysanthellum indicum DC.

In forest, common, in flower and fruit (9-11-63), *Shetty* 139.

Crisium arvense (Linn.) Scop.

In forest, common, in flower (7-4-63), *Thothathri* 9923.

Elephantopus scaber Linn.

In forest, very common, in flower (9-11-63), *Shetty* 115.

Erigeron asterioides Roxb.

In plantation, common, in flower (6-4-63), *Thothathri* 9889.

Gnaphalium luteo-album Linn.

In marshy areas near lake, common, in flower (7-4-63), *Thothathri* 9917.

Jacobaea vestita O. Ktze.

In plantation and forest, common, in flower (6-4-63), *Thothathri* 9883.

Laggera aurita Sch.-Bip ex Cl.

In plantation, in flower (6-4-63), *Thothathri* 9891.

Launaea nudicaulis Hook. f.

In plantation and in forest, rare, in flower (6-4-63), *Thothathri* 9876.

Sassurea candidans Clarke

In plantation, in flower (6-4-63), *Thothathri* 9892.

Sonchus oleraceus Linn.

In forest, common, in flower (6-4-63), *Thothathri* 9899.

V. cinerea (Linn.) Less.

In forest, common, in flower and fruit (10-11-63),

Shetty 167 and *Thothathri* 9915.

Youngia japonica (Linn.) DC. subsp. *japonica*.

In plantation, common, in flower (6-4-63), *Thothathri* 9881.

CAMPANULACEAE

Campanula canescens Wall.

In plantation, not common, in flower (8-4-63), *Thothathri* 9957.

Wahlenbergia marginata (Thunb.) A. DC.

In marshy areas near lake, common, in flower and fruit (7-4-63), *Thothathri* 9914.

PRIMULACEAE

Androsace saxifragaefolia Bge.

In forest, common, in flower (6-4-63), *Thothathri* 9879.

APOCYNACEAE

Ichnocarpus frutescens (Linn.) Ait. & Ait. f.

In forest, common, in flower (9-11-63), *Shetty* 154 and *Thothathri* 9983.

Holarrhena antidysenterica (Linn.) Wall.

In forest, rare, in flower (7-4-63), *Thothathri* 9921.

Rauvolfia serpentina (Linn.) Benth.

In plantation, in flower (6-4-63), *Thothathri* 9900.

Vallisneria spiralis (L.) O. Ktze.

In forest, rare, in flower and fruit (6-4-63), *Thothathri* 9880.

ASCLEPIADACEAE

Calotropis gigantea (Linn.) R. Br.

In forest, common and abundant, in flower (7-4-63), *Thothathri* 9930.

C. procera R. Br.

In forest, in flower (7-4-63), *Thothathri* 9931.

Cryptolepis buehneri Roem. & Sch.

In plantation, rare, in flower (8-4-63), *Thothathri* 9974.

LOGANIACEAE

Cynoctonum mitreola (Linn.) Britton

In forest, common, in flower (9-11-63), *Shetty* 122.

GENTIANACEAE

Centaurea roxburghii (G. Don) Druce

In plantation and forest, common, in flower (6-4-63), *Thothathri* 9869.

Nymphoides cristatum (Roxb.) O. Ktze.

In lake, common, in flower (7-4-63), *Thothathri* 9943.

N. indicum (Linn.) O. Ktze.

In lake, common, in flower (11-11-63), *Shetty* 209.

BORAGINACEAE

Arnebia hispidissima DC.

In plantation and in the forest, common, in flower (6-4-63), *Thothathri* 9866. A new record for Bihar.

Bothriospermum tenellum Fisch. & Mey.

In forest, common, in flower (6-4-63), *Thothathri* 9872.

Cordia dichotoma Forst. f.

In forest, rare, in flower (6-4-63), *Thothathri* 9908.

Cynoglossum lanceolatum Forsk.

In forest and plantation, in fruit (9-11-63), *Shetty* 114 and *Thothathri* 9887.

Ehretia acuminata R. Br. var. *serrata* (Roxb.) Johnston

In Sissoo forest, rare, in flower (7-4-63), *Thothathri* 9934.

E. laevis Roxb. var. *floribunda* Brandis

In forest, common, in flower and fruit (6-4-63), *Thothathri* 9890.

Heliotropium strigosum Willd.

In forest, in flower (7-4-63), *Thothathri* 9928.

CONVOLVULACEAE

Cuscuta reflexa Roxb.

Near the plantation, common, in flower (10-11-63), *Shetty* 201.

Evolvulus alsinoides Linn.

In plantation and forest, common, in flower (8-4-63), *Thothathri* 9953 and *Shetty* 133.

E. nummularius Linn.

In plantation and forest, common, in flower (8-4-63), *Thothathri* 9955 and *Shetty* 126.

Ipomoea aquatica Forsk.

In lake, common, in flower (7-4-63), *Thothathri* 9944 and *Shetty* 194.

I. nil (Linn.) Roth.

In forest, in flower and fruit (10-11-63), *Shetty* 106, 163.

I. pes-tigridis Linn.

Near Mazaria colony, (11-11-63), *Shetty* 234.

Porana paniculata Roxb.

In forest, common, in flower (9-11-63), *Shetty* 131.

SOLANACEAE

Solanum indicum Linn.

Near the plantation, common, in flower and fruit (10-11-63), *Shetty* 198.

S. nigrum Linn.

In plantation, common, in flower and fruit (8-4-63), *Thothathri* 9960.

S. surattense Burm. f.

Near Mazaria colony, common, in flower and fruit (11-11-63), *Shetty* 238 and *Thothathri* 9874.

S. verbascifolium Linn.

In plantation, rare, in flower (8-4-63), *Thothathri* 9966 and *Shetty* 179.

SCROPHULARIACEAE

Adenosma indianum (Lour.) Merrill

In forest, common, in fruit (9-11-63), *Shetty* 116.

Centranthera nepalensis D. Don

Near Mazaria colony, common, in fruit (11-11-63), *Shetty* 239.

Limnophila indica (Linn.) Druce

In lake, in flower (7-4-63), *Thothathri* 9945 and *Shetty* 211.

Lindernia brachiata (Colsm.) Pennel

In forest, common, in flower and fruit (9-11-63), *Shetty* 136.

L. crustacea (Linn.) F. Muell.

In forest, common, in flower and fruit (9-11-63), *Shetty* 143.

Scoparia dulcis Linn.

In plantation and forest, not common, in flower (6-4-63), *Thothathri* 9873 and *Shetty* 151.

Vandellia verbenaeifolia Haines

Near Mazaria colony, in flower (11-11-63), *Shetty* 237.

Verbascum chinense (Linn.) Santapau

In forest, in flower (6-4-63), *Thothathri* 9885.

Veronica anagallis Linn.

In marshy places near lake, common, in flower (7-4-63), *Thothathri* 9913.

ACANTHACEAE

Hemigraphis hirta T. Anders.

In forest and plantation, rare, in flower (8-4-63), *Thothathri* 9952.

Hygrophila polysperma T. Anders.

In forest near lake, common, in flower (6-4-63), *Thothathri* 9878 and *Shetty* 188.

Peristrophe bicalyculata Nees

In forest, very common, in flower and fruit (10-11-63), *Shetty* 157.

Rungia parviflora Nees

In plantation, common, in flower (8-4-63), *Thothathri* 9973.

R. pectinata Nees

In forest, common, in flower (9-11-63), *Shetty* 110.

VERBENACEAE

Callicarpa macrophylla Vahl

Near the plantation, common, in fruit (10-11-63), *Shetty* 180.

Clerodendrum viscosum Vent.

In forest, common, in flower (6-4-63), *Thothathri* 9905.

Lippia alba (Mill.) N.E. Br. ex Britton & Wilson

In marshy places near lake, common, in flower (7-4-63), *Thothathri* 9920.

Phyla nodiflora (Linn.) Greene

In shore and lake, in flower (6-4-63), *Thothathri* 9867.

LABIATAE

Acrocephalus indicus (Burm.) O. Ktze.

In forest, (9-11-63), *Shetty* 123.

Anisomeles indica O. Ktze.

In forest, very common, in flower and fruit (9-11-63), *Shetty* 153.

Colebrookia oppositifolia Smith.

In forest, common, in flower (6-4-63), *Thothathri* 9901 and *Shetty* 105.

Leonotis nepetaefolia Br.

In forest, in flower (10-11-63), *Shetty* 162.

Leucas cephalotes Spreng.

In forest, common, in flower (10-11-63), *Shetty* 161.

L. lavandulaefolia Rees.

In plantation, common, in flower (8-4-63), *Thothathri* 9963.

Nepeta hindostana (Roth.) Haines

In plantation, common, in flower (8-4-63), *Thothathri* 9954 and *Shetty* 183.

Ocimum basilicum Linn.

In forest, common, in flower (10-11-63), *Shetty* 156.

Salvia plebeia R. Br.

In forest, in flower (6-4-63), *Thothathri* 9896.

NYCTAGINACEAE

Boerhaavia diffusa Linn.

In plantation and forest, common, in flower (8-4-63), *Thothathri* 9961 and *Shetty* 165.

AMARANTHACEAE

Achyranthes aspera Linn.

In forest, common, in flower (9-11-63), *Shetty* 111.

Aerva sanguinolenta (Linn.) Blume

In plantation and forest, rare, in flower (8-4-63), *Thothathri* 9976 and *Shetty* 109.

Alternanthera sessilis (Linn.) R. Br. ex R. & S.

In lake, common, in flower (7-4-63), *Thothathri* 9946, 9965.

Amaranthus gracilis Desf.

Near the plantation, in flower (10-11-63), *Shetty* 182 and *Thothathri* 9970.

Digera alternifolia Aschers.

In Mazaria colony, common, in flower and fruit (11-11-63), *Shetty* 226.

POLYGONACEAE

Rumex dentatus Linn.

In plantation, not common, in flower (8-4-63), *Thothathri* 9969.

Polygonum barbatum Linn. subsp. **gracile** Danser

By the stream, Halahi, common, in flower (10-11-63), *Shetty* 185, 243.

P. plebejum R. Br.

In marshy places near lake, rare, in flower (7-4-63), *Thothathri* 9912.

PIPERACEAE

Peperomia pellucida Kunth

In forest, common, in flower and fruit (9-11-63), *Shetty* 113.

LORANTHACEAE

Dendrophthoe falcata (Linn. f.) Etting.

In forest, rare, in flower (9-11-63), in fruit (6-4-63), *Thothathri* 9911 and *Shetty* 147.

EUPHORBIACEAE

Acalypha indica Linn.

In forest, common, in flower (9-11-63), *Shetty* 112.

Bridelia stipularis Bl.

In forest, rare, in flower (9-11-63), in fruit (6-4-63), *Thothathri* 9904 and *Shetty* 134.

Chrozophora rottleri A. Juss.

Near lake, common, in flower (6-4-63), *Thothathri* 9909.

Euphorbia granulata Forsk.

In plantation, common, in flower (6-4-63), *Thothathri* 9871.

E. hirta Linn.

In plantation and forest, common, in flower (8-4-63), *Thothathri* 9971 and *Shetty* 145.

E. hypericifolia Linn.

In Mazaria colony, common, in flower (11-11-63), *Shetty* 231.

E. prostrata Ait.

In plantation, in flower and fruit (10-11-63), *Shetty* 393.

E. thymifolia Linn.

In forest, not common, in flower (10-11-63), *Shetty* 169.

Kirganelia reticulata Baill.

In forest, common, in flower (6-4-63), *Thothathri* 9898 and *Shetty* 222.

Mallotus philippensis Muell.-Arg.

In forest, in flower (9-11-63), in fruit (6-4-63), *Thothathri* 9910 and *Shetty* 101.

Melanthesa rhamnoides (Retz.) Bl.

In forest, rare, in flower and fruit (7-4-63), *Thothathri* 9922.

Phyllanthus simplex Retz.

In forest, common, in flower (7-4-63), *Thothathri* 9927.

P. urinaria Linn.

Near the plantation, not common, in flower and fruit (10-11-63), *Shetty* 181.

Putranjiva roxburghii Wall.

In forest, common, in fruit (6-4-63), *Thothathri* 9893, 9972.

ULMACEAE

Holoptelea integrifolia Planch.

In forest, not very common, in fruit (7-4-63), *Thothathri* 9936.

Trema orientalis Bl.

In Mazaria colony, common, in fruit (11-11-63), *Shetty* 230.

MORACEAE

Streblus asper Lour.

In forest, very common, in flower (6-4-63), *Thothathri* 9894, 9897.

URTICACEAE

Pouzolzia indica Gaud.

In forest, common, in flower and fruit (10-11-63), *Shetty* 164.

CERATOPHYLLACEAE

Ceratophyllum demersum Linn.

In lake, common, in flower (11-11-63), *Shetty* 217.

MONOCOTYLEDONS

HYDROCHARITACEAE

Hydrilla verticillata (Linn. f.) Royle

In lake, common, in flower (11-11-63), *Shetty* 216 and *Thothathri* 9941.

Nechamandra alternifolia (Roxb.) Thw.

In stream, Halahi, very common, in flower (10-11-63), *Shetty* 196.

Ottelia alismoides (Linn.) Pers.

In lake, common, in flower and fruit (7-4-63), *Thothathri* 9938 and *Shetty* 197.

DIOSCOREACEAE

Dioscorea bulbifera Linn.

Near the plantation, in fruit (10-11-63), *Shetty* 200.

COMMELINACEAE

Commelina benghalensis Linn.

In Mazaria colony, common, in flower and fruit (11-11-63), *Shetty* 228.

C. hasskarlii Clarke

Near the stream, Halahi, in flower (10-11-63), *Shetty* 205, 209.

Murdannia nudiflora (Linn.) Brenan

In Mazaria colony, common, in flower and fruit (11-11-63), *Shetty* 225.

ALISMACEAE

Caldesia parnassifolia (Bassi ex L.) Parl.

In lake, common, in flower and fruit (6-4-63), *Thothathri* 9902.

POTAMOGETONACEAE

Potamogeton nodosus Poir.

In lake, very common, in flower and fruit (7-4-63 & 11-11-63), *Thothathri* 9939 and *Shetty* 208.

P. pectinatus Linn.

In lake, rare, (7-4-63), *Thothathri* 10126.

NAJADACEAE

Najas marina Linn.

In lake, common, (7-4-63), *Thothathri* 9940.

CYPERACEAE

Carex fedia Nees

Near lake, most abundant, in spike (7-4-63), *Thothathri* 9949.

Cyperus alopecuroides Rottb.

By the stream, Halahi, common, in flower (10-11-63), *Shetty* 187.

C. corymbosus Rottb.

In forest, common, in spike (7-4-63), *Thothathri* 9951.

C. globosus All.

By the stream, Halahi, in spike (10-11-63), *Shetty* 190.

C. platystylis R. Br.

In lake, common, in flower (11-11-63), *Shetty* 214.

Eleocharis congesta D. Don

Near Mazaria colony, common, in flower (11-11-63), *Shetty* 242.

Fimbristylis dichotoma (Linn.) Vahl

By the side of the stream, Halahi, common, in flower (10-11-63), *Shetty* 193.

Scirpus supinus Linn.

Near the stream, Halahi, in spike (10-11-63), *Shetty* 204 and *Thothathri* 9948.

GRAMINEAE

Bothriochloa intermedia (R. Br.) A. Camus var. **punctata** (Roxb.) Keng

In forest, common, in flower (10-11-63), *Shetty* 174.

Cymbopogon jwarancusa (Jows) Schult.

In forest, common, in flower (10-11-63), *Shetty* 158.

Cynodon dactylon (Linn.) Pers.

In open areas in forest, common, in spike (7-4-63), *Thothathri* 9947.

Dactyloctenium aegyptium (Linn.) P. Beauv.

By the stream, Halahi, not common, in forest (10-11-63), *Shetty* 186.

Desmostachya bipinnata (Linn.) Stapf

In plantation, in spike (8-4-63), *Thothathri* 9980.

Dichanthium annulatum (Forsk.) Stapf

In plantation, common, in spike (8-4-63), *Thothathri* 9978.

Digitaria stricta Roth. ex Roem. & Schult.

In forest, common, in flower (9-11-63), *Shetty* 140.

Echinochloa colonum (Linn.) Link.

By the side of the stream Halahi, common, in flower (10-11-63), *Shetty* 195.

Echinochloa stagnina (Retz.) P. Beauv.

Near stream, Halahi, common, in flower (10-11-63), *Shetty* 191.

Eragrostis gangetica (Roxb.) Steud.

Near Mazaria colony and in forest, common, in flower (11-11-63), *Shetty* 240 and *Thothathri* 9937.

E. japonica (Thunb.) Trin.

In forest, common, in flower (10-11-63), *Shetty* 171.

E. tenella (Linn.) P. Beauv. ex Roem. et Schult.

In forest, common, in flower (9-11-63), *Shetty* 138.

Hackelochloa granularis (Linn.) O. Ktze.

In forest, in flower (9-11-63), *Shetty* 128, 159.

Hygroryza aristata (Retz.) Nees

In lake, (7-4-63), *Thothathri* 9942.

Imperata cylindrica (Linn.) P. Beauv.

In plantation, (8-4-63), *Thothathri* 9977.

Oplismenus burmannii (Retz.) P. Beauv.

In forest, common, in flower (9-11-63), *Shetty* 117.

O. compositus (Linn.) P. Beauv.

In forest, common, in flower (9-11-63), *Shetty* 118.

Oryza sativa Linn.

In lake, in flower (11-11-63), *Shetty* 212, 213.

Panicum repens Linn.

In forest, common, in flower (9-11-63), *Shetty* 119.

Paspalidium flavidum (Retz.) A. Camus

In forest, not common, in flower (10-11-63), *Shetty* 168.

Paspalum scrobiculatum Linn.

In forest, common, in flower (9-11-63), *Shetty* 120.

Perotis indica (Linn.) O. Ktze.

In forest, common, in flower (9-11-63), *Shetty* 121.

Phragmites karka (Retz.) Trin.

In lake, common, in flower (11-11-63), *Shetty* 215.

Saccharum arundinaceum Retz.

In forest, common, in flower (10-11-63), *Shetty* 173.

Schizachyrium brevifolium (Sw.) Nees

In forest, common, in flower (10-11-63), *Shetty* 170.

Setaria glauca (Linn.) P. Beauv.

In forest, common, in flower and fruit (10-11-63), *Shetty* 172.

Sporobolus diander (Retz.) P. Beauv.

In forest, common, in flower and fruit (10-11-63), *Shetty* 177.

Vetiveria zizanioides (Linn.) Nash

In forest, common, in flower (10-11-63), *Shetty* 155.

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