

A CONTRIBUTION TO THE FLORA OF PAKHAL AND SURROUNDING REGIONS IN NARASAMPET TALUK, WARANGAL DISTRICT, ANDHRA PRADESH

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ABSTRACT

The paper presents a detailed account of the flora of the Pakhal Reserve Forest and the surrounding regions in Narasampet Taluk, Warangal District, Andhra Pradesh. Intensive botanical explorations were carried out by the authors in the region during the years 1960-63.

As a result of the explorations 254 species of plants belonging to 198 genera and 70 families have been collected and recorded for the region. The paper contains an enumeration of the above species.

INTRODUCTION

Pakhal Reserve Forest and surrounding regions situated in Narasampet Taluk, Warangal District, Andhra Pradesh lie between 17° & 18°N and 79° & 80°E. The whole tract which is about 32 km broad encloses the Pakhal lake. The altitude is about 280 to 300 m. This region remained botanically unexplored so far; three seasonal exploration trips were made for the collection of plants during November-December 1960, August 1961 and February-March 1963.

GEOLOGY, ROCK AND SOIL

This region is characterised by phyllites, quartzites, sand stones and shales. Phyllites contain mica. The quartzites normally are white but sometimes are pink due to ferruginous mixture and are the products of metamorphism and sand stones. There are also iron ore bearing quartzites and phyllites occurring in Pakhal blocks.

CLIMATE

The climate is dry and hot. There are 3 seasons—Rainy season from June to September, Cool season from November to February and Summer season from March to June. The maximum temperature attained during the month of May is 45.5°C and the minimum temperature for the year attained during the month of February is 15.1°C.

The annual average rainfall is 122.5 cm and it is precipitated by the South-west and North-east monsoons.

GENERAL PATTERN OF VEGETATION

The forests surrounding the lake are of mixed deciduous type. By the end of February or the beginning of March, most of the trees and shrubs

shed their leaves. There are, however, a few evergreen trees like *Aegle marmelos* Corr. and *Mallostus philippensis* (Lamk.) Muell.-Arg. scattered all along the forests, but their distribution is not sufficient to change the deciduous appearance of the forests. The deciduous trees, forming the chief components of these forests are *Adina cordifolia* Hk. f. ex Brandis, *Bombax ceiba* Linn., *Bridelia retusa* (Linn.) Spreng., *Cleistanthus collinus* (Roxb.) Benth., *Cochlospermum religiosum* (Linn.) Alston, *Embllica officinalis* Gaertn., *Dalbergia latifolia* Roxb., *Flacourtia indica* (Burm. f.) Merrill, *Garuga pinnata* Roxb., *Gmelina arborea* Roxb., *Gyrocarpus jacquini* Gaertn., *Lannea coromandelica* (Houtt.) Merrill, *Madhuca indica* Gmel., *Sterculia urens* Roxb., *Tectona grandis* Linn. f., *Terminalia tomentosa* Wt. & Arn. and *Xylia xylocarpa* (Roxb.) Taub. Another dominant tree near about the lake is *Barringtonia acutangula* (Linn.) Gaertn. with its conspicuous long pendant racemes of pink flowers, followed by angular fruits. *Xeromphis uliginosa* (Retz.) Maheshwari is also rarely met with.

Growing all over these forests, and at times going over the high trees are some climbers of which only the following are common: *Ampelocissus latifolia* (Roxb.) Planch., *A. tomentosa* (Heyne) Planch., *Butea superba* Roxb., *Canavalia gladiata* (Jacq.) DC., *Combretum roxburghii* Spreng., *C. ovalifolium* Roxb., *Jacquemontia paniculata* (Burm. f.) Hall. f., *Mucuna hirsuta* Wt. & Arn., *Operculina turpethum* (Linn.) Silva Manso and *Passiflora foetida* Linn.

The permanent undergrowth vegetation of these forests is rather sparse and is made up of woody herbs and shrubs like *Andrographis paniculata* (Burm. f.) Nees, *Barleria prionitis* Linn., *Blepharis*

maderaspatensis (Linn.) Roth, *Blumea eriantha* DC., *Eranthemum purpurascens* Nees, *Grewia hirsuta* Vahl, *Hemigraphis latebrosa* Nees var. *heyneana* Brem., *H. venosa* C. B. Cl., *Hibiscus lobatus* (Murr.) O. Ktze., *H. vitifolius* Linn., *Moghania strobilifera* (Linn.) St. Hill. ex Jacks., *Pavonia odorata* Willd., *Securinega virosa* (Roxb. ex Willd.) Pax & Hoffm., *Solanum indicum* Linn., *Uraria picta* Desv. and *Urena lobata* Linn.

The dominant monsoon plants which form the temporary undergrowth vegetation of these forests are *Curcuma amada* Roxb. which was in full bloom during August and *Costus speciosus* (Koenig ex Retz.) Smith with spirally twisted stems and white flowers with red bracts. The other common associates of this undergrowth vegetation are: *Acalypha ciliata* Forsk., *Borreria articularis* (Linn.) F. N. Will., *Catharanthus pusillus* (Murr.) G. Don, *Celosia argentea* Linn., *Euphorbia geniculata* Ortega, *Evolvulus alsinoides* (Linn.) Linn., *Habenaria platyphylla* Spr., *Mollugo pentaphylla* Linn., *Oldenlandia biflora* Linn., *Phyllanthus simplex* Retz., *Sesamum indicum* Linn. and *Vicoa indica* (Willd.) DC.

There are also extensive grassy plains near about the lake. These grasslands are mainly composed of *Apluda mutica* Linn., *Echinochloa colonum* (Linn.) Link, *Eragrostis pilosa* (Linn.) Beauv., *E. tenella* (Linn.) Beauv. ex Roem. & Schult., *Hackelochloa granularis* (Linn.) O. Ktze. and *Heteropogon contortus* (Linn.) Beauv. *Vetiveria zizanioides* (Linn.) Nash also occurs abundantly and can form a source of revenue for the Forest Department.

In the Pakhal lake and along its margin an interesting and luxuriant aquatic and marshy vegetation is met with. The vegetation is mainly characterised by populations of *Blyxa octandra* (Roxb.) Planch. ex Thw., *Ceratophyllum demersum* Linn., *Glossostigma spathulatum* Arn., *Hydrilla verticillata* (Linn. f.) Royle, *Ipomoea aquatica* Forsk., *Nechamandra alternifolia* (Roxb.) Thw., *Nymphaeodes cristatum* (Roxb.) O. Ktze., *N. indicum* (Linn.) O. Ktze., *Scirpus supinus* Linn., *Tenagocharis latifolia* (D. Don) Buchen., *Utricularia inflexa* Forsk. var. *stellaris* (Linn. f.) P. Taylor and *Vallisneria spiralis* Linn. Moreover, it is interesting to observe along the margin of the lake, the mixed populations of *Isoetes coromandelina* Linn. and *I. panchananii* Pant & Srivastava.

OBSERVATIONS

In the enumeration given below the system of Bentham and Hooker is followed; species under each family are arranged in alphabetical order. Every attempt is made to bring the nomenclature up-to-date. Data on frequency, occurrence of

flowers and fruits, date of collection and collection number are given for each species.

In all 70 families with 198 genera and 254 species, native or naturalized in the forest are found. The families with the largest number of species are Gramineae (33), Papilionaceae (24), Acanthaceae (15), Euphorbiaceae (14) and Compositae (10). These five families contain 37.9% of the total flora of the forest.

The collector for the field numbers of plants enumerated here is Dr. K. M. Sebastine except for 1963 collections which is Shri A. N. Henry.

ENUMERATION

ISOETACEAE

Isoetes coromandelina Linn.

Common along the margins of the lake, fertile, 25-2-63, 15917.

I. panchananii Pant & Srivastava

Common along the margins of the lake, fertile, 2-3-63, 15982.

POLYPODIACEAE

Cyclosorus parasiticus (Linn.) Farw.

Rare, fertile, 11-8-61, 13176.

C. unitus (Linn.) Ching

Common, fertile, 11-8-61, 13177.

PARKERIACEAE

Ceratopteris siliquosa (Linn.) Copel.

Abundant in the lake, fertile, 26-11-60, 11616.

MENISPERMACEAE

Cocculus hirsutus (Linn.) Diels

Occasional, in flower, 27-11-60, 11626.

CAPPARACEAE

Cleome chelidonii Linn. f.

Common along the margins of the lake. in flowers and fruits, 8-8-61, 13106.

C. viscosa Linn.

Common, in flowers and fruits, 8-8-61, 13103.

COCHLOSPERMACEAE

Cochlospermum religiosum (Linn.) Alston

Rare, in flowers, 27-2-63, 15948.

FLACOURTIACEAE

Flacourtia indica (Burm. f.) Merrill

Rare, along roadsides, in flowers and fruits, 26-2-63, 15940.

POLYGALACEAE

Polygala elongata Klein

Common, in flowers and fruits, 10-8-61, 13164.

MALVACEAE

Abelmoschus ficulneus (Linn.) Wt. & Arn.

Common, in flowers and fruits, 24-11-60, 11578.

Abutilon hirtum (Lamk.) Sweet

Common, in flowers and fruits, 25-11-60, 11593.

Hibiscus lobatus (Murr.) O. Ktze.

Rare, in flowers and fruits, 26-11-60, 11598.

H. vitifolius Linn.

Common, in flowers and fruits, 24-11-60, 11577.

Pavonia odorata Willd.

Common, in flowers and fruits, 8-8-61, 13118.

Sida acuta Burm. f.

Common, in flowers and fruits, 24-11-60, 11565.

S. rhombifolia Linn.

Common in open fields, in flowers and fruits, 26-11-60, 11600.

Urena lobata Linn.

Rare, in flowers and fruits, 24-11-60, 11579.

BOMBACACEAE

Bombax ceiba Linn.

Occasional, in flowers, 26-2-63, 15918.

STERCULIACEAE

Buettneria herbacea Roxb.

Common, in flowers and fruits, 8-8-61, 13132.

Helicteres isora Linn.

Abundant, in fruits, 26-11-60, 11602.

Sterculia urens Roxb.

Common, in flowers, 27-11-60, 11643.

Waltheria indica Linn.

Common in open space, in flowers and fruits, 25-11-60, 11587.

TILIACEAE

Corchorus capsularis Linn.

Common, in flowers and fruits, 27-11-60, 11637.

C. fascicularis Lamk.

Rare, in fruits, 1-3-63, 15970.

Grewia hirsuta Vahl

Common, in flowers and fruits, 8-8-61, 13115.

G. rothii DC.

Common, in flowers, 8-8-61, 13116.

Triumfetta rotundifolia Lamk.

Common, in flowers and fruits, 25-11-60, 11590.

OXALIDACEAE

Biophytum sensitivum (Linn.) DC.

Common, in flowers and fruits, 29-11-60, 11688.

RUTACEAE

Aegle marmelos Corr.

Occasional, in flowers, 26-2-63, 15919.

BURSERACEAE

Boswellia glabra Roxb.

Common, in flowers and fruits, 27-2-63, 15951.

Garuga pinnata Roxb.

Rare, in flowers, 28-2-63, 15952.

FLINDERSIACEAE

Chloroxylon swietenia DC.

Rare, in flowers, 27-2-63, 15950.

OLACACEAE

Ola x scandens Roxb.

Common, in flowers and fruits, 2-8-61, 13142.

RHAMNACEAE

Zizyphus nummularia (Burm. f.) Wt. & Arn.

Common, in flowers and fruits, 4-12-60, 11706.

Z. oenoplia (Linn.) Mill.

Common, in flowers, 10-8-61, 13156.

Z. xylopyra (Rétz.) Willd.

Rare, in flowers, 8-8-61, 13127.

VITACEAE

Ampelocissus latifolia (Roxb.) Planch.

Rare, in flowers and fruits, 8-8-61, 13123.

A. tomentosa (Heyne) Planch.

Common, in flowers and fruits, 8-8-61, 13122.

Cissus vitiginea Linn.

Rare, in flowers and fruits, 9-8-61, 13138.

ANACARDIACEAE

Buchanania lanzan Spreng.

Rare, in flowers and fruits, 28-2-63, 15953.

Lannea coromandelica (Houtt.) Merrill

Occasional, in flowers and fruits, 26-2-63, 15941.

PAPILIONACEAE

Aeschynomene indica Linn.

Common along the margin of the lake, in flowers, 26-11-60, 11620.

Atylosia scarabaeoides (Linn.) Benth.

Rare, in flowers and fruits, 1-3-63, 15968.

Butea superba Roxb.

Common, in flowers, 26-2-63, 15939.

Canavalia gladiata (Jacq.) DC.

Common, in flowers and fruits, 27-11-60, 11644.

Crotalaria ramosissima Roxb.

Common, in flowers and fruits, 13-11-60, 11693.

Dalbergia latifolia Roxb.

Rare, in flowers, 1-3-63, 15961.

Derris scandens (Roxb.) Benth.

Rare, in flowers, 14-8-61, 13195.

Desmodium diffusum DC.

Common, in flowers and fruits, 24-11-60, 11570.

D. heterocarpon (Linn.) DC.

Common, in flowers and fruits, 28-11-60, 11656.

D. triflorum (Linn.) DC.

Common, in flowers and fruits, 28-11-60, 11660.

Heylandia latebrosa (Linn.) DC.

Common, in flowers and fruits, 25-11-60, 11589.

Indigofera cassioides Rottb. ex DC.

Common, in flowers and fruits, 28-11-60, 11646.

I. trita Linn. f.

Common, in flowers and fruits, 26-11-60, 11602.

Moghania strobilifera (Linn.) St. Hil. ex Jacks.

Common, in flowers and fruits, 26-2-63, 15934.

Mucuna hirsuta Wt. & Arn.

Common, in flowers and fruits, 27-11-60, 11635.

Phaseolus trilobus Ait.

Common, in flowers and fruits, 29-11-60, 11689.

Pseudarthria viscida (Linn.) Wt. & Arn.

Common, in flowers and fruits, 27-11-60, 11638.

Psoralea corylifolia Linn.

Common, in flowers and fruits, 24-11-60, 11573.

Rhynchosia minima DC.

Common, in flowers and fruits, 29-11-60, 11688.

R. suaveolens DC.

Common, in flowers and fruits, 26-11-60, 11608.

Tephrosia hirta Ham.

Common, in flowers and fruits, 12-8-61, 13182.

T. purpurea (Linn.) Pers.

Rare, in flowers and fruits, 12-8-61, 13185.

Uraria picta Desv.

Common, in flowers and fruits, 12-8-61, 13190.

Zornia gibbosa Span.

Common, in flowers and fruits, 10-11-60, 11700.

CAESALPINIACEAE

Bauhinia racemosa Lamk.

Rare, in flowers and fruits, 10-8-61, 13163.

Cassia auriculata Linn.

Common, in flowers, 24-11-60, 11564.

MIMOSA CEAE

Acacia pennata (Linn.) Willd.

Rare, in fruits, 9-8-61, 13149.

Dichrostachys cinerea (Linn.) Wt. & Arn.

Rare, in flowers, 8-8-61, 13113.

Mimosa prainiana Gamble

Common, in flowers, 9-8-61, 13145.

Xylia xylocarpa (Roxb.) Taub.

Occasional, in flowers, 26-2-63, 15936.

COMBRETACEAE

Calycopteris floribunda (Roxb.) Lamk.

Common, in flowers, 25-2-63, 15912.

Combretum roxburghii Spreng.

Rare, in flowers, 26-2-63, 15929.

C. ovalifolium Roxb.

Common, in flowers, 1-3-63, 15967.

Terminalia tomentosa Wt. & Arn.

Rare, in flowers and fruits, 10-8-61, 13159.

LECYTHIDACEAE

Barringtonia acutangula (Linn.) Gaertn.

Common, in flowers and fruits, 8-8-61, 13110.

LYTHRACEAE

Rotala indica (Willd.) Koehne

Occasional, in flowers and fruits, 25-2-63, 15913.

ONAGRACEAE

Ludwigia perennis Linn.

Common, in flowers and fruits, 28-11-60, 11671.

PASSIFLORACEAE

Passiflora foetida Linn.

Common, in flowers and fruits, 29-11-60, 11685.

CUCURBITACEAE

Coccinia cordifolia (Linn.) Cogn.

Common, in flowers and fruits, 24-11-60, 11575.

Cucumis melo Linn. var. *agrestis* Naud.

Rare, in flowers and fruits, 8-8-61, 13108.

Melothria maderaspatana (Linn.) Cogn.

Common, in flowers and fruits, 9-8-61, 13153.

Trichosanthes cucumerina Linn.

Common, in flowers, 9-8-61, 13137.

MOLLUGINACEAE

Glinus oppositifolius (Linn.) A. DC.

Common, in fruits, 9-8-61, 13147.

Mollugo pentaphylla Linn.

Common, in flowers, 26-11-60, 11622.

RUBIACEAE

Adina cordifolia Hk. f. ex Brandis

Rare, in flowers and fruits, 12-8-61, 13181.

Borreria articularis (Linn. f.) F. N. Will.

Common, in flowers and fruits, 26-11-60, 11599.

Dentella repens Forst.

Common, in flowers and fruits, 8-8-61, 13109.

Mitragyna parvifolia (Roxb.) Korth.

Common, in fruits, 12-8-61, 13183.

Morinda tomentosa Heyne ex Roth

Rare, in fruits, 14-8-61, 13193.

Oldenlandia biflora Linn.

Common, in flowers and fruits, 10-8-61, 13167.

O. corymbosa Linn.

Common, in flowers and fruits, 26-11-60, 11614.

Xeromphis uliginosa (Retz.) Maheshwari

Rare, in flowers and fruits, 12-8-61, 13189.

COMPOSITAE

Ageratum conyzoides Linn.

Common, in flowers and fruits, 26-11-60, 11604.

Blumea eriantha DC.

Common, in flowers and fruits, 26-2-63, 15938.

B. virens DC.

Rare, in flowers, 26-2-63, 15928.

Caesulia axillaris Roxb.

Common, in flowers, 30-11-60, 11694.

Epaltes divaricata Cass.

Common, in flowers, 28-11-60, 11674.

Lagascea mollis Cav.

Common, in flowers and fruits, 24-11-60, 11571.

Sphaeranthus indicus Linn.

Occasional, in flowers, 25-11-60, 11592.

Tridax procumbens Linn.

Common, in flowers and fruits, 28-11-60, 11669.

Vicoa indica (Willd.) DC.

Common, in flowers, 24-11-60, 11532.

Xanthium strumarium Linn.

Abundant, in flowers and fruits, 28-11-60, 11665.

SAPOTACEAE

Madhuca indica Gmel.

Occasional along roadsides, in flowers, 28-2-63, 15957.

EBENACEAE

Diospyros montana Roxb.

Common, in fruits, 11-8-61, 13178.

APOCYNACEAE

Catharanthus pusillus (Murr.) G. Don

Common on open fields, in flowers and fruits, 8-8-61, 13105.

ASCLEPIADACEAE

Oxystelma secamone (Linn.) Karst.

Rare, in flowers, 12-8-61, 13191.

LOGANIACEAE

Strychnos nux-vomica Linn.

Rare, in flowers and fruits, 1-3-63, 15963.

GENTIANACEAE

Nymphoides cristatum (Roxb.) O. Ktze.

Common in the lake, in flowers and fruits, 1-2-63, 11705.

N. indicum (Linn.) O. Ktze.

Common in the lake, in flowers, 26-11-60, 11613.

HYDROPHYLLACEAE

Hydrolea zeylanica (Linn.) Vahl

Common along the margins of the lake, in flowers, 26-11-60, 11617.

BORAGINACEAE

Heliotropium ovalifolium Forsk.

Common, in flowers and fruits, 10-8-61, 13166.

EHRETIACEAE

Coldenia procumbens Linn.

Common on clayey soil, in flowers and fruits, 8-8-61, 13112.

CONVOLVULACEAE

Evolvulus alsinoides (Linn.) Linn.

Common, in flowers, 30-11-60, 11691.

Ipomoea aquatica Forsk.

Common in the lake, in flowers, 26-11-60, 11619.

I. maxima (Linn. f.) Don ex Sweet

Common, in flowers, 24-11-60, 11584.

Jacquemontia paniculata (Burm. f.) Hall. f.

Common, in flowers and fruits, 26-11-60, 11627.

Merremia hederacea (Burm. f.) Hall. f.

Rare, in flowers and fruits, 1-3-63, 15971.

M. quinquefolia (Linn.) Hall. f.

Common, in flowers, 25-11-60, 11594.

M. tridentata (Linn.) Hall. f.

Common, in flowers and fruits, 26-11-60, 11601.

Operculina turpethum (Linn.) Silva Manso

Common, in flowers and fruits, 26-2-63, 15931.

SOLANACEAE

Solanum incanum Linn.

Common, in flowers and fruits, 28-11-60, 11666.

S. indicum Linn.

Common, in flowers, 12-8-61, 13192.

SCROPHULARIACEAE

Dopatrium junceum (Roxb.) Buch.-Ham. ex Benth.

Common along the margin of the lake, in flowers, 30-11-60, 11697.

Glossostigma spathulatum Arn.

Common along the margin of the lake, in fruits, 30-11-60, 11698.

Limnophila indica (Linn.) Druce

Common, in flowers, 26-11-60, 11609.

Sopubia delphinifolia (Roxb.) G. Don

Common in cultivated fields, in flowers and fruits, 28-11-60, 11677.

Striga lutea Lour.

Occasional, in grassy slopes near the lake, in flowers and fruits, 1-3-63, 15966.

S. euphrasioides (Vahl) Benth.

Common, in flowers and fruits, 28-11-60, 11676.

LENTIBULARIACEAE

Utricularia inflexa Forsk. var. **stellaris** (Linn. f.) P. Taylor

Occasional, in flowers, 28-2-63, 15955.

PEDALIACEAE

Sesamum indicum Linn.

Common around the Forest Rest House, Pakhal, in flowers, 8-8-61, 13104.

MARTYNIACEAE

Martynia annua Linn.

Rare, in flowers and fruits, 14-8-61, 13197.

ACANTHACEAE

Andrographis echiioides (Linn.) Nees

Common in open and cultivated fields, in flowers and fruits, 28-11-60, 11653.

A. paniculata (Burm. f.) Nees

Common, in flowers and fruits, 27-11-60, 11633.

Barleria prionitis Linn.

Common, in flowers and fruits, 27-11-60, 11624.

Blepharis maderaspatensis (Linn.) Roth

Common, in flowers, 27-11-60, 11625.

Elytraria acaulis (Linn. f.) Linn.

Occasional in open fields, in flowers, 2-9-63, 15981.

Eranthemum purpurescens Nees

Common as undergrowth in dry forests, in flowers and fruits, 26-2-63, 15923.

Hemigraphis latebrosa Nees var. **heyneana** Brem.

Common, in flowers, 27-2-63, 15944.

H. venosa C. B. Cl.

Occasional, in flowers, 26-2-63, 15924.

Hygrophila auriculata (Schumach.) Heine

Common near the lake, in flowers, 28-11-60, 11657.

H. polysperma (Roxb.) T. And.

Occasional, in flowers, 26-2-63, 15954.

Justicia betonica Linn.

Common, in flowers, 27-11-60, 11645.

J. glauca Rottler

Occasional, in flowers and fruits, 8-8-61, 13130.

J. vahlii Roth

Common, in flowers and fruits, 28-11-60, 11654.

Lepidagathis cristata Willd.

Common, in flowers, 28-11-60, 11650.

Rungia parviflora Nees

Common, in flowers and fruits, 28-11-60, 11652.

VERBENACEAE

Clerodendrum phlomidis Linn. f.

Rare, in flowers, 24-11-60, 11566.

Gmelina arborea Roxb.

Rare along roadsides, in flowers, 28-2-63, 15958.

Premna tomentosa Willd.

Rare, in fruits, 10-8-61, 13157.

Stachytarpheta urticaefolia (Salisb.) Sims

Common, in flowers, 14-8-61, 13199.

Tectona grandis Linn. f.

Common, in flowers, 10-8-61, 13155.

LABIATAE

Anisomeles indica (Linn.) O. Ktze.

Rare, in flowers and fruits, 11-8-61, 13174.

Hyptis suaveolens (Linn.) Poit.

Abundant, in flowers and fruits, 24-11-60, 11563.

Leucas mollissima Wall. var. **scaberula** Hk. f.

Common, in flowers and fruits, 28-11-60, 11647.

NYCTAGINACEAE

Boerhavia chinensis (Linn.) Druce

Common on hedges, in flowers, 27-11-60, 11629.

AMARANTHACEAE

Achyranthes aspera Linn.

Common in dry places, in flowers and fruits, 27-11-60, 11632.

Aerva lanata (Linn.) Juss.

Common, in flowers, 24-11-60, 11567.

A. monsoniae (Linn. f.) Mart.

Common, in flowers, 29-11-60, 11684.

Allmania nodiflora (Linn.) R. Br. ex Wt.

Common, in flowers and fruits, 8-8-61, 13125.

Alternanthera sessilis (Linn.) DC.

Common, in flowers, 29-11-60, 11690.

Celosia argentea Linn.

Occasional, in flowers, 26-11-60, 11597.

Gomphrena celosioides Mart.

Common, in flowers, 28-11-60, 11670.

Pupalia lappacea (Linn.) Juss.

Common, in flowers and fruits, 27-11-60, 11630.

HERNANDIACEAE

Gyrocarpus jacquini Gaertn.

Occasional, in flowers and fruits, 27-2-63, 15947.

LORANTHACEAE

Viscum nepalense Spreng.

Rare, parasitic on *Terminalia tomentosa* Wt. & Arn., in flowers and fruits, 30-11-60, 11699.

EUPHORBIACEAE

Acalypha ciliata Forsk.

Common, in flowers and fruits, 11-8-61, 13170.

Antidesma ghaesembilla Gaertn.

Rare, in fruits, 12-8-61, 13184.

Bridelia hamiltoniana Wall.

Rare, in flowers; 9-8-61, 13150.

B. retusa (Linn.) Spreng.

Rare, in flowers, 14-8-61, 13200.

Cleistanthus collinus (Roxb.) Benth.

Common, in fruits, 26-2-63, 15933.

Emblica officinalis Gaertn.

Common, in fruits, 10-8-61, 13165.

Euphorbia geniculata Orteg.

Common in waste lands near Pakhal Forest Rest House, in flowers and fruits, 8-8-61, 13136.

E. hirta Linn.

Rare, in flowers and fruits, 1-3-63, 15969.

E. parviflora Linn.

Common, in flowers, 24-11-60, 11572.

Kirganelia reticulata (Poir.) Baill.

Rare, in flowers and fruits, 12-8-61, 13186.

Mallotus philippensis (Lamk.) Muell.-Arg.

Common, in flowers, 27-11-60, 11636.

Phyllanthus asperulatus Hutch.

Common, in flowers, 30-11-60, 11692.

P. simplex Retz.

Rare, in flowers and fruits, 9-8-61, 13146.

Securinega virosa (Roxb. ex Willd.) Pax & Hoffm.

Rare, in fruits, 8-8-61, 13126.

ULMACEAE

Holoptelea integrifolia (Roxb.) Planch.

Occasional, in fruits, 27-2-63, 15942.

Trema orientalis (Linn.) Bl.

Common, in flowers and fruits, 27-11-60, 11634.

MORACEAE

Ficus glomerata Roxb.

Rare, with syconia, 10-8-61, 13188.

Ficus hispida Linn. f.

Rare, with syconia, 27-2-63, 15946.

F. lacor Buch.-Ham.

Rare, with syconia, 27-2-63, 15943.

F. tomentosa Roxb.

Rare, with syconia, 10-8-61, 13154.

CERATOPHYLLACEAE

Ceratophyllum demersum Linn.

Common in the lake, in flowers, 29-11-60, 11682.

HYDROCHARITACEAE

Blyxa octandra (Roxb.) Planch. ex Thw.

Occasional, in flowers, 25-2-63, 15909.

Hydrilla verticillata (Linn. f.) Royle

Common in the lake, in flowers, 25-2-63, 15904.

Nechamandra alternifolia (Roxb.) Thw.

Common in Pakhal lake, in flowers, 25-2-63, 15907.

Ottelia alismoides (Linn.) Pers.

Rare in a puddle near the lake, in flowers and fruits, 28-11-60, 11655.

Vallisneria spiralis Linn.

Common in the lake, in flowers and fruits, 25-2-63, 15902.

ORCHIDACEAE

Habenaria platyphylla Spreng.

Rare in shade, in flowers, 8-8-61, 13133.

ZINGIBERACEAE

Costus speciosus (Koenig ex Retz.) Smith

Common, in flowers and fruits, 8-8-61, 13101.

Curcuma amada Roxb.

Common, in flowers and fruits, 8-8-61, 13129.

HYPOXIDACEAE

Curculigo orchoides Gaertn.

Common, in flowers, 9-8-61, 13152.

DIOSCOREACEAE

Dioscorea bulbifera Linn.

Common, in flowers, 8-8-61, 13117.

D. hispida Dennst.

Rare, in flowers, 8-8-61, 13102.

D. pentaphylla Linn.

Common, in fruits, 26-11-60, 11607.

D. tomentosa Koenig ex Roxb.

Rare, in flowers and fruits, 9-8-61, 13139.

PONTEDERIACEAE

Monochoria vaginalis (Burm. f.) Presl

Rare, in flowers and fruits, 2-3-63, 15979.

COMMELINACEAE

Amischophacelus axillaris (Linn.) Rao & Kam.

Common, in flowers and fruits, 28-11-60, 11659.

Commelina hasskarlii Clarke

Common, in flowers and fruits, 24-11-60, 11580.

C. longifolia Lamk.

Common, in flowers and fruits, 2-3-63, 15974.

Cyanotis cristata (Linn.) Schult. f.

Common, in flowers, 24-11-60, 11585.

Murdannia nudiflora (Linn.) Brenan

Common, in flowers and fruits, 9-8-61, 13151.

M. spirata (Linn.) Brueck.

Common, in flowers and fruits, 28-11-60, 11673.

BUTOMACEAE

Tenagocharis latifolia (D. Don) Buchen.

Common, in flowers, 26-11-60, 11610.

APONOGETONACEAE

Aponogeton natans (Linn.) Engl. & Krause

Rare, in flowers and fruits, 27-2-63, 15945.

ERIOCAULACEAE

Eriocaulon quinquangulare Linn.

Common, in flowers, 28-11-60, 11675.

CYPERACEAE

Cyperus iria Linn.

Common, in flowers, 12-8-61, 13188.

C. procerus Rottb.

Common, in flowers, 29-11-60, 11680.

C. pygmaeus Rottb.

Common, in flowers, 24-11-60, 11581.

C. tenuispica Steud.

Occasional, in flowers, 29-11-60, 11679.

C. triceps (Rottb.) Endl.

Common, in flowers, 8-8-61, 13121.

Eleocharis dulcis (Burm. f.) Hensch.

Common, in flowers, 8-8-61, 13111.

Fuirena ciliaris (Linn.) Roxb.

Common, in flowers, 30-11-60, 11701.

Scirpus articulatus Linn.

Common, in flowers, 30-11-60, 11695.

S. supinus Linn. var. **lateriflorus** (Gmelin) Koyama

Common, in flowers, 26-11-60, 11621.

GRAMINEAE

Acrachne racemosa (Heyne) Ohwi

Common, in flowers, 11-8-61, 13180.

Alloteropsis cimicina (Linn.) Stapf

Common, in flowers and fruits, 8-8-61, 13120.

Apluda mutica Linn.

Common, in flowers, 24-11-60, 11569.

Bothriochloa pertusa (Linn.) A. Camus

Common, in flowers, 28-11-60, 11668.

Brachiaria ramosa (Linn.) Stapf

Common, in flowers and fruits, 11-8-61, 13171.

Chloris dolichostachya Lagasca

Common, in flowers and fruits, 28-11-60, 11648.

Chrysopogon fulvus (Spreng.) Choiv.

Common, in flowers, 28-11-60, 11651.

Cymbopogon coloratus (Nees) Stapf

Common, in flowers, 27-11-60, 11642.

- Cymbopogon martinii** (Roxb.) Wats.
Occasional, in flowers and fruits, 1-3-63, 15972.
- Cynodon arcuatus** F. S. Presl ex C. B. Presl.
Occasional, in flowers and fruits, 28-2-63, 15960.
- C. dactylon** (Linn.) Pers.
Occasional, in flowers, 2-3-63, 15976.
- Dichanthium annulatum** (Forsk.) Stapf
Common, in flowers and fruits, 2-3-63, 15978.
- Digitaria granularis** (Trin.) Henr.
Common, in flowers, 8-8-61, 13128.
- Echinochloa colonum** (Linn.) Link
Common, in flowers, 12-8-61, 13187.
- Eragrostiella brachyphylla** (Stapf) Bor
Common, in flowers, 10-8-61, 13160.
- Eragrostis gangetica** (Roxb.) Steud.
Common, in flowers and fruits, 25-2-63, 15911.
- E. pilosa** (Linn.) Beauv.
Common, in flowers, 14-8-61, 13196.
- E. tenella** (Linn.) Beauv. ex Roem. & Schult.
Common, in flowers, 28-11-60, 11667.
- E. unioloides** (Retz.) Nees
Common, in flowers, 28-11-60, 11662.
- Hackelochloa granularis** (Linn.) O. Ktze.
Common, in flowers, 11-8-61, 13172.
- Heteropogon contortus** (Linn.) Beauv.
Common, in flowers, 27-11-60, 11641.
- Ischaemum indicum** (Houtt.) Merrill
Common, in flowers, 28-11-60, 11661.
- I. rugosum** Salisb.
Common, in flowers, 28-11-60, 11663.
- Iseilema laxum** Hack.
Common, in flowers and fruits, 2-3-63, 15977.
- Ophiuros exaltatus** (Linn.) O. Ktze.
Common, in flowers, 24-10-60, 11574.
- Oplismenus burmannii** (Retz.) Beauv.
Common, in flowers, 27-11-60, 11640.
- Oryza sativa** Linn.
Common, in flowers and fruits, 14-8-61, 13194.
- Paspalidium flavidum** (Retz.) A. Camus
Common, in flowers and fruits, 10-8-61, 13158.
- Pennisetum pedicellatum** Trin.
Common, in flowers and fruits, 26-11-60, 11596.
- Sacciolepis interrupta** (Willd.) Stapf
Occasional, in flowers, 26-11-60, 11618.
- Setaria pallide-fusca** (Schumacher.) Stapf et C. E. Hubb.
Common, in flowers and fruits, 8-8-61, 13119.
- S. verticillata** (Linn.) Beauv.
Common, in flowers and fruits, 11-8-61, 13169.
- Vetiveria zizanioides** (Linn.) Nash
Common, in flowers and fruits, 29-11-60, 11683.