

A CONTRIBUTION TO THE FLORA OF SARISKA TIGER RESERVE, ALWAR DISTRICT, RAJASTHAN

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ABSTRACT

Sariska Tiger Reserve, one of the 15 Tiger reserves of India, is located in the undulating plateau lands and wide valleys of the hill ranges of Aravalli system, near the civil district of Alwar in Rajasthan. Established in the year 1978-79, it is about 140 km from Jaipur on Jaipur-Delhi State Highway and spreads over a total area of 800 sq. km with a core area of 498 sq. km. The reserve consisting of 37 forest blocks is a classic example of a rare amalgamation of natural history and archaeology. The 9th and 10th century ruins of the Siva temple of Grah Rajer, the Mediaeval fort of Kankwari and the Tomb of Lord Bhartihari add to the grandeur of this reserve which abounds in wild life. The paper deals with a short history, Topography, Fauna & Vegetation of the area.

PAST AND PRESENT WORK

There is no published account on the flora of Sariska Tiger Reserve. Vyas (1967) while working on the Flora of north-east Rajasthan, Alwar district collected a few specimens from this area.

The present work which was undertaken to fill this lacuna and bring out a flora of this reserve, is the result of two exhaustive botanical explorations in two different seasons. The specimens collected are deposited in the herbarium of Botanical Survey of India, Jodhpur (BSJO). Specimens marked with an asterisk (*) are included here on the basis of the collections deposited in the herbarium of the Botany department, University of Rajasthan, Jaipur (RUBL).

TOPOGRAPHY AND PHYSICAL FEATURES

The tract is mainly hilly with two big plateaus *i.e.* Kankwari and Kiraska, having undulating grounds and numerous valleys like Kalighati, Pandavpole and Raika. Sariska itself is a wide valley ranging from Baran Tal gate to Thana Gazi. The striking characteristics of the hills are their

homogenetic regularity of height, level summits and uniform appearance. The hills stretch out from north-east to south-west in more or less parallel lines.

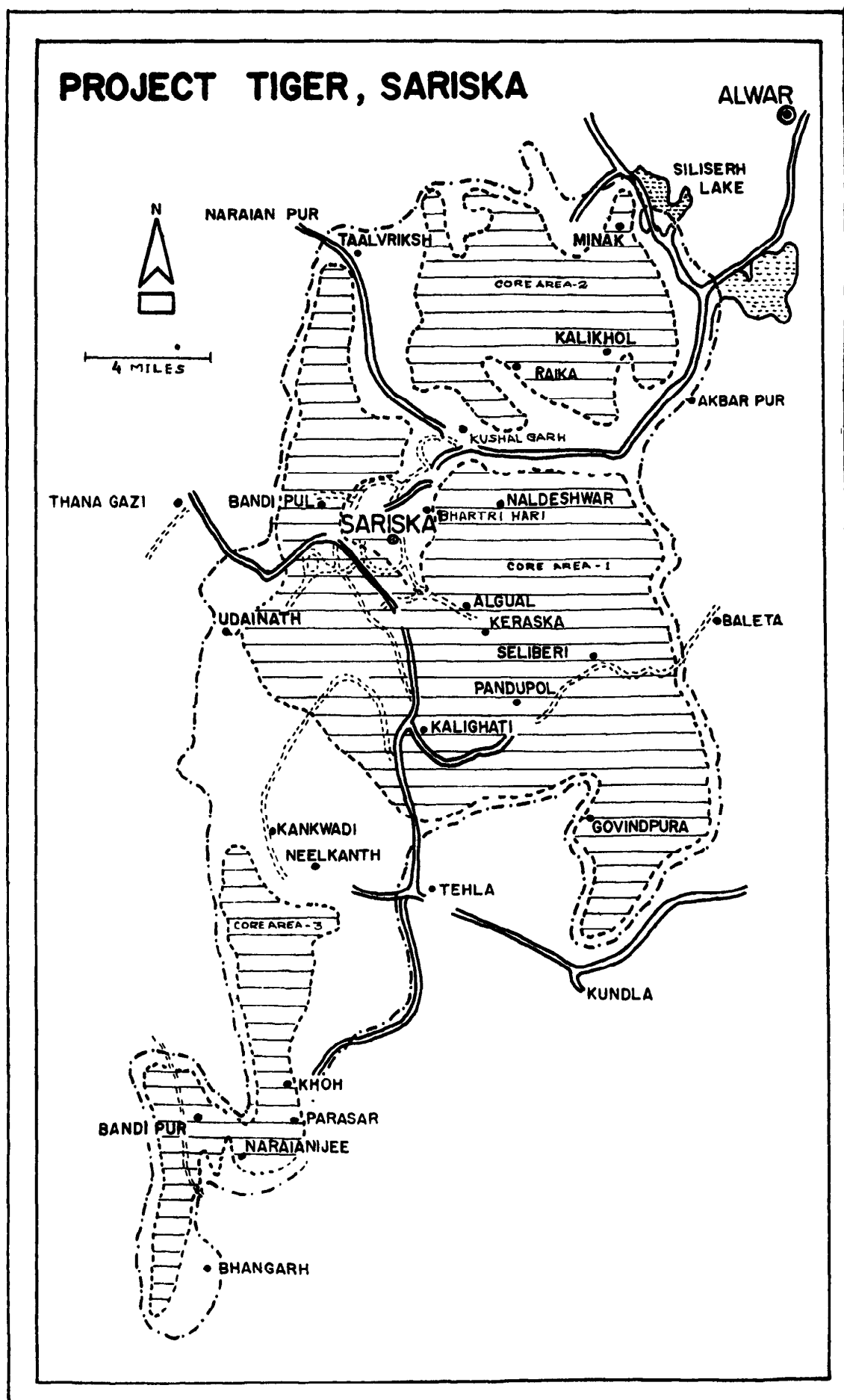
This tract is an ancient base level of denudation, displaying broad alluvial plains where the soft strata have largely been removed and the harder formations stand out in the shape of low hills. The slopes are steeper on their southern aspect than in the other directions.

GEOLOGY AND SOIL

Major parts of the area is occupied by rocks of the Delhi and Aravalli systems, comprising of quartzites, conglomerates, grits, lime-stones, phyllites, granites and schists. Most of the high ridges comprise of quartzite, conglomerates and grits. The inter linking valleys consist of lime-stone, phyllites and schists. The ancient crystalline and metamorphic rocks with gneisses, schists etc. are generally covered by red sandy soil.

CLIMATE

Except for the short south-west monsoon season, which commences from late June and continues till the middle of October, the



climate is dry. The summer begins from the middle of March and extends till June. The winter season is from November and becomes cold during December-January.

The variation in the annual rainfall and the number of rainy days vary from year to year. The average number of rainy days is about 30 and the average annual rainfall is about 650 mm. More than 90% of the rain is received from July to September. The winter showers are few and restricted to the months of January and February.

April, May and part of June are extremely hot, May being the hottest month when the temperature reaches up to 42°C. During this period the humidity is relatively very low and hot westerly winds (Loo) are common. The fall in temperature during the rainy season is slight, but during winter the night temperature goes down to 5°C. Sometimes during January the nights are severely cold and mercury goes down to 0°C.

FAUNA

The fauna of this tract is typical of dry deciduous forest type. Stoppage of exploitations of forest and control of over grazing have proved beneficial to the animals, particularly the tigers whose numbers have increased in the last few years.

Besides the Tiger (*Panthera tigris*) the other carnivora found are : Jungle cat (*Felis chaus*), Caracal (*Felis caracal*), Leopard (*Felis bengalensis*), Palm civet (*Paradoxurus hermaphroditus*), Indian fox (*Vulpes bengalensis*), Striped hyaena (*Hyaena hyaena*), Jackal (*Canis aureus*), Panther (*Panthera pardus*) etc. Among herbivora there are Nilgai (*Boselaphus tragocamelus*), Wild boar (*Sus scrofa cristatus*), Chousinga (*Tetracerus quadricornis*), Chinkara (*Gazella gazella*), Hare (*Lepus rigricollis*), Sambhar (*Cervus unicolar*), Chital (*Axis axis*), Porcupine (*Hystrix indica*), Muskart (*Suneus murinus*) etc. Primates are represented by

the common Langur and Macaque. About 94 types of birds are found in the reserve.

VEGETATION

According to Champion and Seth's (1968) classification the forest met within the tract fall under Group 5 and Group 6 i.e. Tropical dry deciduous forest and Tropical thorn forest.

The forests being scattered and sparse over a large area on various geological and soil formations, vary greatly in composition. In the valleys where better soil and moisture conditions exist, the vegetation is comparatively denser.

Anogeissus pendula is the dominant tree species, covering over 90% area of the forests. *Boswellia serrata* and *Lannea coromandelica* grow on rocks and dry slopes. *Acacia catechu* is common in valleys, whereas *Dendrocalamus strictus* is extremely limited and are found along well drained reaches of the streams and moist and cooler parts of the hills. The trees are generally slow growing and attain poor height. *Albizia lebbek*, *Diospyros melanoxylon*, *Holoptelea integrifolia*, *Mangifera indica*, *Syzygium cumini*, *Tamarindus indica* and *Ficus* spp. which are found in moist localities attain large size both in crown spread and height. *Butea monosperma* grows gregariously, where valleys fan out, and becoming flat and wide.

On the basis of their composition, the forests of Sariska Tiger Reserve can be classified as follows :

1. *Anogeissus pendula* forest
2. *Boswellia serrata* forest
3. *Acacia catechu* forest and
4. Miscellaneous type of forests which can further be divided into three categories, namely :
 - a. *Butea monosperma* forest
 - b. Forests along nallahs
 - c. Scrub forest.

1. *Anogeissus pendula* forest

Anogeissus pendula is the principal tree species, covers over 90% area of the reserve. It is often found in pure stand in the middle slopes of the hills. The usual trees and shrubs associated with it are *Acacia catechu*, *Capparis sepiaria*, *Cassia fistula*, *Commiphora wightii*, *Cordia dichotoma*, *Dichrostachys cinerea*, *Diospyros melanoxylon*, *Ehretia aspera*, *Flacourtia indica*, *Grewia flavescens*, *Holoptelea integrifolia*, *Lannea coromandelica*, *Limonia acidissima*, *Sterculia urens*, *Wrightia tinctoria* and *Ziziphus mauritiana* which are found at the foot of the hills, in valleys and along nallahs. Species like *Ficus racemosa*, *Mallotus philippensis*, *Mitragyna parvifolia* and *Syzygium cumini* are found in moist localities. At some places where steep slopes are excessively stony with conspicuous boulders of rock, *Euphorbia nivulia* and *E. caducifolia* are dominant.

2. *Boswellia serrata* forest

Boswellia serrata is another dominant tree species found at the summit of hills. *Anogeissus pendula* is the common tree species mixed with it up to the middle of slopes. The other common tree species found are *Acacia catechu*, *Anogeissus latifolia*, *Diospyros melanoxylon*, *Flacourtia indica*, *Grewia tiliifolia*, *Lannea coromandelica*, *Soyimida febrifuga*, *Sterculia urens* etc. as in Kalighati, Gamaka area of Sariska range and at Kankwari forest block.

3. *Acacia catechu* forest

Acacia catechu is scattered on hill slopes, mixed with *Anogeissus pendula* and *Boswellia serrata*. The other common species are *Bauhinia racemosa*, *Crateva adansonii* subsp. *odora*, *Capparis sepiaria*, *Grewia flavescens* and *Wrightia tinctoria*. Among climbers mention may be made of *Abrus precatorius*, *Cissampelos pareira*, *Cocculus hirsutus*, *Mucuna prurita* etc.

4. Miscellaneous forests

(a) *Butea monosperma* forest : *Butea monosperma* is the dominant tree species found at the foot of hills and plains throughout the forest. *Acacia senegal*, *Adhatoda zeylanica*, *Albizia lebbek*, *Bombax ceiba*, *Capparis decidua*, *Celastrus paniculatus*, *Erythrina suberosa*, *Gmelina arborea*, *Maytenus emarginatus*, *Moringa pterygosperma*, *Tecomella undulata*, *Vitex negundo*, are the other notable species of this forest.

(b) Forests along nallahs : *Dendrocalamus strictus* is found along the nallahs in the forest with *Anogeissus pendula* and *Boswellia serrata*. Along the nallahs and in the cooler parts of the forest, *Annona squamosa*, *Cordia dichotoma*, *Diospyros melanoxylon*, *Ehretia aspera*, *Ficus racemosa*, *F. tomentosa*, *Flacourtia indica*, *Grewia flavescens*, *Ichnocarpus frutescens*, *Lannea coromandelica*, *Mimosa himalayana*, *Mallotus philippensis*, *Mitragyna parvifolia*, *Nerium indicum*, *Phoenix sylvestris*, *Syzygium cumini*, *Tamarindus indica*, *Woodfordia fruticosa* etc. are met with.

(c) Scrub forest : There are some low, rocky hills with very little top soil in places like Dariba, Bhangarh, Sariska, Narayanijee, Taalvraksh etc. The vegetation here is sparse and scattered with the trees assuming stunted, bushy habit. The common species encountered in this type of forest are *Aegle marmelos*, *Acacia jacquemontii*, *A. leucophloea*, *Adhatoda zeylanica*, *Butea monosperma*, *Balanites aegyptiaca*, *Capparis decidua*, *C. sepiaria*, *Dichrostachys cinerea*, *Grewia flavescens*, *G. tenax*, *Maytenus emarginatus*, *Nyctanthes arborescens*, *Rhus mysorensis*, *Ziziphus mauritiana* and *Z. nummularia* with climbers like *Coccinia grandis*, *Cocculus hirsutus*, *Maerua arenaria*, *Mucuna prurita*, *Rivea hypocrateriformis* and herbs like *Achyranthes aspera*, *Apluda mutica*, *Boerhavia diffusa*, *Commicarpus boissieri*, *Indigofera oblongifolia*, *I. tinctoria*,

I. trita, *Lepidagathis cristata*, *Peristrophe bicalyculata*, *Themeda quadrivalvis*, *Urginia indica* etc.

GROUND FLORA

Since the forests of this tract come mainly under the category of dry deciduous type, the ground flora is fairly dense only during the rainy season. The common herbs and undershrubs present are *Abelmoschus pungens*, *Achyranthes aspera*, *Anisomeles indica*, *Barleria prionitis*, *Blepharis maderaspatensis*, *Boerhavia diffusa*, *Cassia tora*, *Commelina benghalensis*, *Cyanotis cristata*, *Desmodium gangeticum*, *Dipteracanthus patulus*, *Elytraria acaulis*, *Hibiscus* spp., *Indigofera cordifolia*, *Ipomoea pes-tigridis*, *Justicia procumbens*, *Kickxia ramosissima*, *Lantana indica*, *Lepidagathis cristata*, *Lindenbergia indica*, *Melhania futeyporensis*, *Ocimum americanum*, *Peristrophe bicalyculata*, *Pupalia lappacea*, *Rungia parviflora*, *Sida cordifolia*, *Tephrosia pumila*, *Vernonia cinerea* etc. along with common grasses like *Alloteropsis cimicina*, *Bothriochloa pertusa*, *Chloris dolichostachya*, *Cymbopogon martinii*, *Heteropogon contortus*, *Oropetium thomaeum*, *Pennisetum orientale*, *P. pedicellatum*, *Perotis indica*, *Setaria pumila*, *Tetrapogon tenellus*, *Urochloa panicoides* etc. The parasite, *Dendrophthoe falcata* is common on *Boswellia serrata* and the fern species, *Adiantum capillus-veneris*, *A. incisum* and *Actinopteris radiata* are encountered at Bandipul, Kankwari and Sariska growing from moist rock crevices.

The only gymnosperm, *Pinus roxburghii* is found at Bandipul, perhaps introduced long back and now naturalised.

Aquatic/Marshy vegetation

Since there is no permanent or big lakes inside the reserve, the aquatic vegetation is poor. In temporary ponds or nallahs where rain water stagnat for a few months aquatic species like *Hydrilla verticillata*, *Potamogeton crispus*, *P. pectinatus*, *P. perfoliatus*,

Vallisneria spiralis, *Zanichellia palustris* are common. Occasionally, *Nymphoides cristatum*, *Trapa bispinosa* and *Nelumbo nucifera* are also met with.

Alternanthera sessilis, *Ammannia baccifera*, *Bacopa monnieri*, *Eclipta alba*, *Ludwigia perennis*, *L. prostrata*, *Potentilla supina*, *Limnophila indica*, *Polygonum glabrum*, *P. barbatum*, *Veronica anagallis-aquatica* etc. are some of the common species found in marshy habitats around ponds, water-courses and streams. *Typha angustata* is sometimes associated with these, and a pure population of *Pandanus odoratissimus* has been noticed at Bhangarh. Sedges like *Cyperus alopecuroides*, *C. difformis*, *C. laevigatus*, *C. pangorei*, *C. pygmaeus*, *C. rotundus*, *Fimbristylis bisumbellata*, *Scirpus littoralis* etc. are also common in marshy habitats. Grasses commonly found in such habitats are *Cynodon dactylon*, *Echinochloa colonum*, *Eragrostis minor*, *Dichanthium annulatum*, *Imperata cylindrica*, *Paspalum distichum*, *Phragmites karka*, *Polypogon monspeliensis* and *Vetiveria zizanioides* etc.

Phoenix sylvestris is common generally near water bodies, and near Kankwari dam side it forms a pure stand.

PLANTATIONS

In the plantations and in the closed areas of the forest department the common tree and shrub species found are *Acacia leucophloea*, *A. nilotica* subsp. *indica*, *A. senegal*, *Albizia lebbek*, *Azadirachta indica*, *Dalbergia sissoo*, *Delonix regia*, *Eucalyptus* spp., *Leucaena leucocephala*, *Maytenus emarginatus*, *Melia azedarach*, *Prosopis cinerarea*, *P. juliflora*, *Parkinsonia aculeata*, *Sesbania sesban* etc. Climbers like *Coccinia indica*, *Ipomoea pes-tigridis*, *I. sindica*, *Maerua arenaria*, *Mukia maderaspatana*, *Rhynchosia minima* and *Rivea hypocrateriformis* etc. are also met with.

SYNOPSIS OF THE FLORA

A total number of 403 indigenous and

naturalised plant species belonging to 271 genera under 86 families are included in the present work. This includes 4 species of Pteridophytes belonging to 3 genera and 3 families, and a species of Gymnosperm.

The following table gives the number of families, genera and species under Dicotyledons and Monocotyledons, Pteridophytes and Gymnosperm.

TABLE

	<i>Families</i>	<i>Genera</i>	<i>Species</i>
Angiosperm			
Monocotyledons	13	59	90
Dicotyledons	69	208	308
Total	82	267	398
Pteridophytes	3	3	4
Gymnosperm	1	1	1
Total	86	271	403

Except for Poaceae (56 species) and Cyperaceae (17 species) the Monocotyledons are poorly represented. The remaining 16 species of Monocotyledons belong to 10 different families.

Among the Dicotyledons, Fabaceae is the largest family with 30 species and Asteraceae occupy second place with 23 species, the other families having more than ten species are : Acanthaceae (17 species), Amaranthaceae (16 species), Malvaceae (15 species), Euphorbiaceae (14 species), Mimosaceae (13 species) and Scrophulariaceae (12 species).

It is interesting to note that out of the 69 families of Dicotyledons, 50 families are represented by less than 5 species and more than 50% of that i.e. 27 families are represented by only a single species.

ENUMERATION

PTERIDOPHYTES

ADIANTACEAE

***Adiantum capillus-veneris* L.**

***A. incisum* Forssk.**

PTERIDACEAE

***Actinopteris radiata* (Sw.) Link**

EQUISETACEAE

***Equisetum ramosissimum* Desf.**

GYMNOSPERM

PINACEAE

***Pinus roxburghii* Sarg.**

ANGIOSPERMS

ANNONACEAE

***Annona squamosa* L.**

****Miliusa tomentosa* (Roxb.) Sinclair**

MENISPERMACEAE

***Cissampelos pareira* L.**

***Cocculus hirsutus* (L.) Diels**

NELUMBONACEAE

***Nelumbo nucifera* Gaertn.**

PAPAVERACEAE

***Argemone mexicana* L.**

***A. ochroleuca* Sweet**

CAPPARACEAE

***Capparis decidua* (Forssk.) Edgew.**

***C. sepiaria* L.**

***Crataeva adansonii* DC. subsp. *odora* (Buch.-Ham.) Jacobs**

***Maerua arenaria* (DC.) Hook. f. & Thoms.**

FLACOURTIACEAE

***Flacourtia indica* (Burm. f.) Merr.**

PORTULACACEAE

***Portulaca pilosa* L.**

MALVACEAE

***Abelmoschus pungens* (Roxb.) Voigt**

***Abutilon bidentatum* A. Rich.**

***A. indicum* (L.) Sweet**

***A. ramosum* (Cav.) Guill. & Perr.**

***Hibiscus lobatus* (J. A. Murray) Kuntze**

***H. micranthus* L. f.**

***H. vitifolius* L.**

****Kydia calycina* Roxb.**

***Malvastrum coromandelianum* (L.) Garcke**

***Pavonia zeylanica* Cav.**

***Sida acuta* Burm. f.**

***S. cordifolia* L.**

***S. mysorensis* Wight & Arn.**

**Sida rhombifolia* L.

S. yunnanensis Hu

BOMBACACEAE

Bombax ceiba L.

STERCULIACEAE

Helicteres isora L.

Melhanian fuytiporensis Munro ex Mast.

Melochia corchorifolia L.

Sterculia urens Roxb.

TILIACEAE

Corchorus aestuans L.

C. depressus (L.) Stocks

C. olitorius L.

C. trilobularis L.

Grewia damine Gaertn.

G. flavescens A. Juss.

G. subinaequalis DC.

Triumfetta pentandra A. Rich.

ZYGOPHYLLACEAE

Tribulus lanuginosus L.

T. terrestris L.

OXALIDACEAE

Oxalis corniculata L.

RUTACEAE

Aegle marmelos (L.) Corr.

Limonia acidissima L.

Naringi crenulata (Roxb.) Nicolson

BALANITACEAE

Balanites aegyptiaca (L.) Del.

BURSERACEAE

Boswellia serrata Roxb. ex Coleb.

Commiphora wightii (Arn.) Bhandari

MELIACEAE

Azadirachta indica A. Juss.

Melia azedarach L.

Soyimida febrifuga (Roxb.) A. Juss.

CELASTRACEAE

Celastrus paniculatus Willd.

Maytenus emarginatus (Willd.) Ding Hou

RHAMNACEAE

Ziziphus mauritiana Lam.

Z. nummularia (Burm. f.) Wight & Arn.

VITACEAE

Ampelocissus latifolia (Roxb.) Planch.

Cayratia trifolia (L.) Domin

SAPINDACEAE

Cardiospermum halicacabum L.

ANACARDIACEAE

Lannea coromandelica (Houtt.) Merr.

Mangifera indica L.

**Rhus mysorensis* G. Don

MORINGACEAE

Moringa pterygosperma Gaertn.

FABACEAE

Abrus precatorius L.

Aeschynomene indica L.

Alysicarpus monilifer (L.) DC.

A. vaginalis (L.) DC.

Butea monosperma (Lam.) Taub.

Crotalaria hirsuta Willd.

C. medicagenia Lam.

Dalbergia sissoo Roxb.

Desmodium gangeticum (L.) DC.

**D. repandum* (Vahl) DC.

**D. triflorum* (L.) DC.

D. velutinum (Willd.) DC.

Erythrina suberosa Roxb.

Indigofera astragalina DC.

I. cordifolia Heyne ex Roth

I. linnaei Ali

I. tinctoria L.

I. trita L. f.

Mucuna pruriens (L.) DC.

Psoralea odorata Blatt. & Hallb.

Rhynchosia minima (L.) DC. var. *laxiflora* (Camb.) Baker

R. rothii Benth. ex Aitch.

Sesbania sesban (L.) Merr.

Tephrosia pumila (Lam.) Pers.

T. subtriflora Hochst. ex Baker

**T. strigosa* (Dalz.) Sant. & Mahesh.

T. villosa (L.) Pers.

Vigna radiata (L.) Wilczek

**V. unguiculata* (L.) Walp. subsp. *unguiculata*

Zornia gibbosa Span.

CAESALPINIACEAE

Bauhinia racemosa Lam.

Cassia alba L.

C. fistula L.

C. obtusifolia L.

Cassia pumila Lam.

Parkinsonia aculeata L.

Tamarindus indica L.

MIMOSACEAE

Acacia catechu (L. f.) Willd.

A. jacquemontii Benth.

A. leucophloea (Roxb.) Willd.

A. nilotica (L.) Del. subsp. **indica** (Benth.)
Brenan

A. nilotica (L.) Del. subsp. **indica** (Benth.)
Brenan var. **cupressiformis** (Stewart) Ali &
Faruqi

A. senegal (L.) Willd.

Albizia lebbek (L.) Benth.

Dichrostachys cinerea (L.) Wight & Arn.

Leucaena latisiliqua (L.) Gillis

Mimosa hamata Willd.

M. himalayana Gamble

Prosopis cineraria (L.) Druce

P. juliflora (Sw.) DC.

ROSACEAE

Potentilla supina L.

COMBRETACEAE

Anogeissus latifolia (Roxb. ex DC.) Wall.
ex Guill & Perr.

A. pendula Edgew.

Terminalia arjuna (Roxb. ex DC.) Wight &
Arn.

T. bellirica (Gaertn.) Roxb.

MYRTACEAE

Syzygium cumini (L.) Skeels

LYTHRACEAE

Ammannia baccifera L.

***A. multiflora** Roxb.

Woodfordia fruticosa (L.) Kurz

ONAGRACEAE

Ludwigia perennis L.

L. prostrata Roxb.

TRAPACEAE

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

CUCURBITACEAE

Bryonopsis laciniosa (L.) Naud.

Coccinia grandis (L.) Voigt

Cucumis callosus (Rottl.) Cong.

***Luffa acutangula** (L.) Roxb. var. **amara** Cl.

***Momordica balsamina** L.

M. charantia L. var. **muricata** (Willd.)
Chakravarty

M. dioica Roxb. ex Willd.

Trichosanthes cucumerina L.

T. tricuspidata Lour.

CACTACEAE

Opuntia elatior Mill.

AIZOACEAE

Trianthema portulacastrum L.

Zaleya govindia (Buch.-Ham. ex D. Don)
Nair

MOLLUGINACEAE

Glinus lotoides L.

ALANGIACEAE

Alangium salvifolium (L. f.) Wang.

RUBIACEAE

Adina cordifolia (Roxb.) Benth. & Hook. f.
ex Brandis

Mitragyna parvifolia (Roxb.) Korth.

Oldenlandia corymbosa L.

Spermacoce pusilla Wall.

Xeromphis spinosa (Thunb.) Keay

ASTERACEAE

Acanthospermum hispidum DC.

Ageratum conyzoides L.

Bidens biternata (Lour.) Merr. & Sherff

Blainvillea acmella (L.) Philip.

Blumea membranacea DC.

B. mollis (D. Don) Merr.

B. lacera (Burm. f.) DC.

B. sinuata (Lour.) Merr.

Carthamus oxanthocantha Bieb.

***Cotula hemispherica** Wall.

Cyathocline purpurea (D. Don) Kuntze

Echinops echinatus Roxb.

Eclipta alba (L.) Hassk.

Emilia sonchifolia (L.) DC.

Gnaphalium polycaulon Pers.

Lactuca runcinata DC.

Launaea procumbens (Roxb.) Ramayya &
Rajgopal

Sonchus asper (L.) Hill

Tridax procumbens L.

Vernonia anthelmintica (L.) Willd.

Vernonia cinerea (L.) Less.

Vicoa indica (L.) DC.

Xanthium strumarium L.

CAMPANULACEAE

Campanula benthamii Wall. ex Kitamura

PLUMBAGINACEAE

Dyerophytum indicum (Gibs. ex Wight)
Kuntze

Plumbago zeylanica L.

SAPOTACEAE

Mimusops elengi L.

EBENACEAE

Diospyros melanoxylon Roxb.

OLEACEAE

Nyctanthes arborescens L.

Schrebera swietenioides Roxb.

APOCYNACEAE

Carissa carandas L.

Ichnocarpus frutescens (L.) R. Br.

Nerium indicum Mill.

Thevetia peruviana (Pers.) K. Schum.

Wrightia tinctoria R. Br.

ASCLEPIADACEAE

Calotropis procera (Ait.) R. Br.

Leptadenia pyrotechnica (Forssk.) Decne.

Pergularia daemia (Forssk.) Chiov.

Wattakaka volubilis (L. f.) Stapf

GENTIANACEAE

Nymphoides cristatum (Roxb.) Kuntze

BORAGINACEAE

Heliotropium ellipticum Ledeb.

H. strigosum Willd.

Trichodesma indica (L.) R. Br.

EHRETACEAE

Cordia dichotoma Forst. f.

Ehretia aspera Roxb.

E. laevis Roxb.

CONVOLVULACEAE

Convolvulus prostratus Forssk.

Ipomoea carnea Jacq. subsp. *fistulosa* (Mart.
ex Choisy) Austin

I. nil (L.) Roth

I. muricata (L.) Jacq.

I. pes-tigridis L.

I. sepiaria Roxb.

I. sindica Stapf

Rivea hypocrateriformis Choisy

**R. laotica* Ooststr.

CUSCUTACEAE

Cuscuta hyalina Roth

SOLANACEAE

Capsicum annuum L.

Datura innoxia Mill.

Nicotiana plumbaginifolia Viv.

Physalis minima L.

**Solanum anguini* Lam.

S. incanum L.

S. nigrum L.

S. surattense Burm. f.

Withania somnifera (L.) Dunal

SCROPHULARIACEAE

Bacopa monnieri (L.) Pennell

Kickxia ramosissima (Wall.) Janch.

Limnophila indica (L.) Druce

L. rugosa (Roth) Merr.

Lindenbergia indica (L.) Vatke

L. muraria (Roxb. ex D. Don) Bruehl

Lindernia ciliata (Colsm.) Pennell

L. crustacea (L.) F. Muell.

**L. multiflora* (Roxb.) Mukherjee

Mimulus strictus Benth.

Verbascum chinense (L.) Santapau

Veronica anagallis-aquatica L.

BIGNONIACEAE

Kigelia africana (Lam.) Benth.

Tecomella undulata (Seem) Sm.

PEDALIACEAE

Sesamum mulayanum Nair

MARTYNIACEAE

Martynia annua L.

ACANTHACEAE

Adhatoda zeylanica Medic.

Barleria cristata L.

B. prionitis L. var. *prionitis*

B. prionitis L. var. *dicantha* Blatt. & Hallb.

Blepharis madaraspatensis (L.) Roth

B. repens (Vahl) Roth

Dicliptera verticillata (Forssk.) Chirst

Dipteracanthus patulus (Jacq.) Nees

Elytraria acaulis (L. f.) Linden
Eranthemum purpurascens Nees
Hemidelphus polyspermus (Roxb.) Nees
Justicia procumbens L.
J. quinqueangularis Koen. ex Roxb. var.
peploides (Nees) Clarke
Lepidagathis cristata Willd.
Peristrophe bicalyculata (Retz.) Nees
Rungia parviflora Nees

VERBENACEAE

Clerodendrum phlomidis L. f.
Gmelina arborea Roxb.
Lantana camara L. var. *aculeata* (L.) Mold.
L. salvifolia Jacq.
Phyla nodiflora (L.) Greene
Vitex negundo L.

LAMIACEAE

Anisochilus carnosus Wall. ex Benth.
Anisomeles indica (L.) Kuntze
Leucas cephalotes (Roth) Sprengal
L. flaccida R. Br.
L. montana Sprengal
L. pilosa Benth.
Ocimum basilicum L.
O. canum Sims.
O. tenuiflorum L.

NYCTAGINACEAE

Boerhavia diffusa L.
Commicarpus boissieri (Heimerl) Cufod.
C. chinensis (L.) Heimerl

AMARANTHACEAE

Achyranthes aspera L. var. *aspera*
A. aspera L. var. *argentea* Hook. f.
A. aspera L. var. *porphyristachya* Hook. f.
Aerva sanguinolenta (L.) Bl.
Alternanthera pungens Kunth
A. sessilis (L.) DC.
Amaranthus graecizans L.
A. hybridus L.
A. lividus L.
A. spinosus L.
A. tricolor L.
A. viridis L.
Celosia argentea L.
Digera muricata (L.) Mart.

Gomphrena celosioides Mart.
Pupalia lappacea (L.) Juss.

CHENOPODIACEAE

Chenopodium album L.
C. murale L.

BASELLACEAE

Basella rubra L.

POLYGONACEAE

Polygonum plebeium R. Br.
P. barbatum L.
P. glabrum Willd.
Rumex dentatus L.

PROTEACEAE

Grevillea robusta Cunn. ex R. Br.

LORANTHACEAE

Dendrophthoe falcata (L. f.) Ettingsh.

EUPHORBIACEAE

Acalypha ciliata Forssk.
A. indica L.
Bridelia crenulata Roxb.
Emblica officinalis Gaertn.
Euphorbia caducifolia Haines
E. hirta L.
E. hypericifolia L.
E. nivulia Buch.-Ham.
E. prostrata Ait.
E. thymifolia L.
Mallotus philippensis (Lam.) Muell.-Arg.
Phyllanthus amarus Schum. & Thonn
P. virgatus Forst. f.
Ricinus communis L.

ULMACEAE

Holoptelea integrifolia (Roxb.) Planch.

MORACEAE

Ficus benghalensis L.
F. infectoria Roxb.
F. infectoria Roxb. var. *wightiana* King
F. palmata Forssk.
F. racemosa L.
F. tomentosa Roxb.
Morus alba L.

CERATOPHYLLACEAE

Ceratophyllum demersum L.

HYDROCHARITACEAE

Hydrilla verticillata (L. f.) Royle

Vallisneria spiralis L. var. **denseserrulata**
Makino

LILIACEAE

Urginea indica (Roxb.) Kunth

COMMELINACEAE

Commelina benghalensis L.

C. erecta L.

Cyanotis cristata (L.) D. Don

Murdannia nudiflora (L.) Brenan

PANDANACEAE

Pandanus odoratissimus L. f.

ARECACEAE

Phoenix sylvestris (L.) Roxb.

TYPHACEAE

Typha domingensis Pers.

ARACEAE

Cryptocoryne retrospiralis Fisch. ex Wydler

LEMNACEAE

Spirodela polyrrhiza (L.) Schleid.

POTAMOGETONACEAE

Potamogeton crispus L.

P. pectinatus L.

P. perfoliatus L.

ZANNICHELLIACEAE

Zannichellia palustris L.

CYPERACEAE

Cyperus alopecuroides Rottb.

C. alulatus Kern

C. benghalensis Spr.

C. compressus L.

C. flavescens L.

C. laevigatus L.

C. nutans Vahl var. **elusinoides** (Kunth)
Haines

C. pangorei Rottb.

C. pygmaeus Rottb.

C. rotundus L.

Eleocharis dulcis (Burm. f.) Trin. ex Henschel

Eriophorum comosum (Wall.) Wall. ex Nees

Fimbristylis bisumbellata (Forssk.) Bub.

F. miliacea (L.) Vahl

Kyillinga nemoralis (Forst. f.) Dandy ex
Hutchinson & Dalz.

Scirpus affinis Roth

S. litoralis Schard.

POACEAE

Alloteropsis cimicina (L.) Stapf

Apluda mutica L.

Aristida adscensionis L.

Arthraxon lancifolius (Trin.) Hochst.

A. lanceolatus (Roxb.) Hochst.

Bothriochloa pertusa (L.) A. Camus

Brachiaria distachya (L.) Stapf

B. ramosa (L.) Stapf

Cenchrus setigerus Vahl

Chloris dolichostachya Lagasca

C. virgata Sw.

Cymbopogon martinii (Roxb.) Wats.

Cynodon dactylon (L.) Pers.

Dactyloctenium aegyptium (L.) Willd.

D. indicum Boiss.

Dendrocalamus strictus (Roxb.) Nees

Dichanthium annulatum (Forssk.) Stapf

***Digitaria abludens** (Roem. & Schult.) Veldk.

D. ciliaris (Retz.) Koeler

Echinochloa colona (L.) Link

Eleusine indica (L.) Gaertn.

Elionurus royleanus Nees ex A. Rich.

Eragrostis ciliaris (L.) R. Br.

E. japonica (Thunb.) Trin.

E. tenella (L.) P. Beauv. ex Roem. & Schult.

Hemarthria compressa (L. f.) R. Br.

Heteropogon contortus (L.) P. Beauv. ex
Roem. & Schult.

Imperata cylindrica (L.) Racuschel.

Oplismenus burmanii (Retz.) P. Beauv.

Oropetium thomaeum (L. f.) Trin.

***Panicum antidotale** Retz.

P. maximum Jacq.

P. trypheron Schult.

Paspalum distichum L.

Paspalidium flavidum (Retz.) A. Camus

Pennisetum orientale L. C. Rich.

P. pedicellatum Trin.

Perotis indica (L.) Kuntze

Phragmites karka (Retz.) Trin. ex Steud.

Polypogon monspeliensis (L.) Desf.

***Rottboellia exaltata** L. f.

Saccharum bengalense Retz.

Saccharum spontaneum L.
***Schoenefeldia gracilis** Kunth
Setaria intermedia Roem. & Schult.
S. pumila (Poir.) Roem. & Schult.
S. verticillata (L.) P. Beauv.
Sorghum halepense (L.) Pers.
***Sporobolus coromandelianus** (Retz.) Kunth
S. diander (Retz.) P. Beauv.
S. tenuissimus (Schränk.) Kuntze
Tetrapogon tenellus (Koen. ex Roxb.) Chiov.
Themeda quadrivalvis (L.) Kuntze
Urochloa panicoides P. Beauv.
Vetiveria zizanioides (L.) Nash

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