

STUDIES ON THE FLORA AND VEGETATION OF COASTAL ANDHRA PRADESH, INDIA

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ABSTRACT

In this paper a brief account of the vegetation and flora of the Coastal Andhra Pradesh has been given based on field observations and plant collections made during four tours. The enumeration includes 257 species with short ecological annotations under each.

INTRODUCTION

Coastal Andhra Pradesh approximately occupies two-thirds of the Peninsular India, along the east coast. In the back ground of the coastal plain, to a greater part, runs the eastern ghat division. The entire coastal plain on an average is below the elevation of 20 m MSL. The shore relief from Bhimilipatnam to Pulicat Lake has been surveyed with particular reference to Waltair, Poodimadaka, Uppada, Kakinada, Coringa estuary, Machilipatnam, Manginapudi, Maypadu, Krishnapatnam, Sriharikota and Pulicat Lake and their adjoining regions for botanical collections and ecological observations. The vast sandy strip of limited width intercepted by extensive deltaic regions built by the rivers Godavari, Krishna and their tributaries, the rocky promontories of limited size projecting into the sea at Waltair and Poodimadaka and the large saline and mud flats noticeable at Kakinada, Machilipatnam, in the Coringa estuarine region and in the vicinity of Pulicat Lake form salient physiographic features of coastal Andhra Pradesh. Salt marshes are seen in the northern parts of Pulicat Lake, on way to Sriharikota Island.

Geologically the state lies on very ancient peninsular massif of Archaean rocks. Khondolites and Charnokites are usually met with. At places, lateritic formations are also notice-

able. In the entire coastal belt, recent alluvium and deltaic alluvium form the chief constituents. The deltaic alluvium is built up by the two major rivers Godavari and Krishna and their tributaries. The soils are mostly alluvial and sandy of fluvial and marine origin. The beaches consist of mostly non-calcareous, coarse to fine sand. In the hinterland, red soils, laterite soils, black soils and alluvial deltas are common, on which crops of rice, sugarcane, tobacco, millets, ground nuts and coconut plantations are raised. Along this coast line the average rainfall is about 1000 mm with a gradual increase up to 1125 mm from south to the north-ward direction under the influence of north-east monsoon and is spread over the months from June to September followed by a long spell of dry period. The mean annual temperatures during the hottest and coldest months are 28°C and 9°C respectively. Climatically, the coastal area has been classified under 'Tropical rainy zone' and 'semi-arid' type. Cyclonic weather prevails usually in the months of November and December in the entire coastal belt and under its influence the area experiences occasional cyclonic storms.

VEGETATION

Studies on the coastal vegetation in India, until recently have not received due attention and accounts dealing with the structure

and floristics on a regional basis have been scanty. The earlier works of Roxburgh (1795-1819), Hooker (1872-1897) and Gamble (1956) are the most important amongst a few others which dealt with the coastal plants of Andhra Pradesh. In the recent years, Venkateswarulu (1944), Rao (1959), Raju (1968), Rao *et al.* (1972), Rao and Sastry (1971, 1972, 1973) and Venkateshwarlu *et al.* (1972) have contributed much to our knowledge on the coastal flora of Andhra region.

The coastal vegetation of Andhra Pradesh is divisible into two sub-groups, *viz.* Strand and Estuarine. The strand vegetation is characteristic with open, mat forming pioneer species followed by scattered herbs, shrubs and trees dispersed along the relief beyond the high tide limit or the back-shore region. This is further divisible into two substrata types, namely, sand strand and rock strand.

I. STRAND VEGETATION:

(a) Sand strand:

The sand strand vegetation along the sandy beaches exhibits zonations distinguishable into open pioneer, closed herbaceous, middle mixed or bushy and inner woodland zones.

(i) *Open pioneer zone*: This zone is the first in the supra tidal region immediately preceding the drift line. In this, the vegetation is rather sparse with a few plants like *Ipomoea pes-caprae* (L.) R. Br., *Cyperus arenarius* Retz., *Launaea sarmentosa* (Willd.) Alst., *Trachys muricata* Steud., and *Zoysia matrella* (L.) Merr.

(ii) *Closed herbaceous zone*: Here, the vegetation attains a little more density with some matforming herbaceous plants, of which *Ipomoea pes-caprae* (L.) R. Br., *Goniogyna hirta* (Willd.) Ali, *Trachys muricata* (L.) Pers. ex Trin., *Tribulus terrestris* L., *Portulaca tuberosa* Roxb., *P. oleracea* L., *P. quadrifida* L., *Perotis indica* (L.) O. Ktze., *Phyla nodiflora* (L.) Greene, *Mollugo nudicaulis* Lamk., *Gisekia pharnaceoides* Linn.,

Fimbristylis polytrichoides (Retz.) Vahl, *Solanum surattense* Burm. f., and *Spinifex littoreus* (Burm. f.) Merr., are some of the common plants.

(iii) *Middle mixed or bushy zone*: There is a mingling of herbaceous plants with some sub-shrubby/bushy plants giving rise to a mixed vegetation in this zone. The commonly noticeable herbaceous plants are, *Euphorbia rosea* Retz., *Synostemon bacciforme* (L.) Webs., *Gemnosporum tenuiflorum* (L.) Merr., *Phyllanthus rotundifolius* Klein., *Borreria articularis* (L. f.) F. N. Will., *Zornia gibbosa* Span., *Coldenia procumbens* L., *Almania nodiflora* (L.) R. Br. ex Hook. f., *Boerhavia diffusa* L., *Asystasia gangetica* T. Ander., and sub-shrubby/bushy plants like *Crotalaria linifolia* L. f., *C. verrucosa* L., *Tephrosia hirta* Ham., *T. purpurea* Pers., *Opuntia dillenii* Haw., *Calotropis procera* R. Br., *Solanum surattense* Burm. f., *S. trilobatum* L., *Carissa spinarum* L., *Jatropha gossypifolia* Roxb., *Dodonaea viscosa* Jacq., and *Clerodendrum inerme* Gaertn., are usually met with.

(iv) *Inner woodland zone*: This zone is chiefly dominated by tree species like *Borassus flabellifer* L. and *Prosopis cineraria* (L.) Macbr., *Cocos nucifera* L., *Morinda citrifolia* L., *Thespesia populnea* (L.) Soland. ex Correa., *Pongamia pinnata* (L.) Pierre, *Calophyllum inophyllum* L., and *Syzygium ruscifolium* (Willd.) Sant. & Wagh. Of these, *Borassus flabellifer* L., and *Prosopis cineraria* (L.) Macbr. are self-sowing, forming extensive pure stands at some places. Also, some climbing species like *Gloriosa superba* L., *Leptadenia reticulata* Wt. & Arn., *Pergularia daemia* (Forsk.) Chiov., *Tiliacora acuminata* Miers., and *Hemidesmus indicus* R. Br., grow. At places, dense groves of the screw-pine, *Pandanus odoratissimus* L. f., with branching stems bearing dense, long leaved crowns supported by stilt roots and with extremely sweet-scented inflorescences and large sized multiple fruits form an eye-

catching aspect. This zone gradually merges into the wastelands/cultivated fields in the hinterland region in the coastal belt.

(b) Rock strand: This particular type of habitat although predominant in Saurashtra, Kutch and at places along the rest of the west coast, is much limited to small strips at Waltair, and Poodimadaka, in the whole of Andhra coast, where the inland hillocks and their rocky promontories project into the sea. The vegetation and flora are mostly a mixture of coastal and inland plants, occurring in the following zones.

(i) *The wave cut rocky humps and slopes*: This zone, subjected to regular sea water inundation is seen exposed only during low tide and supports a rich growth of marine algae belonging to species of *Padina*, *Sargassum*, *Enteromorpha*, *Caulerpa* and *Ulva*.

(ii) *Rocky relief sloping inland having a thin mantle of sand in crevices, pot-holes and crannies*: In this, *Blepharis repens* (Vahl) Roth, *Euphorbia thymifolia* L., *Portulaca tuberosa* Roxb., *Goniogyna hirta* (Willd.) Ali, *Vernonia cinerea* Less and *Hybanthus enneaspermus* (L.) F.v. Muell., are commonly met with.

(iii) *Inland gravelly/rocky habitat*: The vegetation in this zone resembles a scree type characteristic with spiny thickets and shrubby herbs. *Carissa spinarum* L., *Toddalia asiatica* (L.) Lamk., *Zizyphus oenophia* (L.) Mill., *Maytenus emarginatus* (Willd.) Ding Hou, *Dichrostachys cinerea* Wt. & Arn., *Stachytarpheta urticaefolia* (Salisb.) Sims., *Barleria prionitis* L., and *Euphorbia tirucalli* L., are the dominant shrubby species. The common herbaceous plants are, *Hybanthus enneaspermus* (L.) F. v. Muell., *Pavonia zeylanica* Cav., *Acanthospermum hispidum* DC., *Echinops echinatus* Roxb., *Caralluma attenuata* Wt., *Indoneesiella longipedunculata* (Sreem.) Sreem., and *Acalypha indica* L., *Tylophora asthmatica* Wt. & Arn., and *Cissus quadrangularis* L., are common climbing plants noticeable in this zone.

II. ESTUARINE VEGETATION:

The mangrove vegetation which develops along muddy tidal banks, is primarily restricted to the Godavari and Krishna estuarine systems in Andhra Pradesh. Unlike in the Sunderbans and in the Mahanadi deltas where the estuarine region as well as species composition forms a bigger complex exhibiting certain plant groupings into soil-vegetational units having a preference to certain habitats or niches of their own, the mangroves in Andhra region are comparatively few and consequently the vegetational units or zonations are also fewer.

In the Coringa and Gaderu tidal estuaries of the Godavari estuarine system on the newly formed silt deposits in the intertidal region, the grass, *Porteresia coarctata* (Roxb.) Tateoka, grows as a pioneer together with a few seedlings of *Avicennia* and *Sonneratia*. Further interior, *Avicennia alba* Bl., and *Sonneratia apetala* Buch.-Ham., dominate forming a *Avicennia/Sonneratia* 'Crop'. They attain ca 6 m height with a straight, slender bole and beautiful foliage of cottony-white and green respectively. Along the sheltered banks of the side creeks near the estuarine mouth, well grown trees of *Rhizophora apiculata* Bl., *R. mucronata* Lamk., and *Bruguiera gymnorhiza* (L.) Lamk., are commonly noticeable. Further away from the estuarine mouth, the vegetation is composed of mixed mangrove species like *Avicennia alba* Bl., *A. marina* Vierh., *A. officinalis* L., *Aegiceras corniculatum* Blanco, *Bruguiera gymnorhiza* (L.) Lamk., and *Ceriops decandra* (Griff.) Ding Hou. Behind this zone, under the influence of more fresh water influx, *Excoecaria agallocha* L., *Hibiscus tiliaceus* L., *Lumnitzera racemosa* Willd., *Sonneratia apetala* Buch.-Ham., *Xylocarpus granatum* Koen., and *Avicennia officinalis* L., grow well giving a mosaic appearance. These trees are overgrown by prickly climbers like *Caesalpinia crista* L., *Dalbergia spinosa* Roxb., and *Derris trifoliata* Lour.,

forming dense impenetrable thickets. *Ipomoea macrantha* Roem. et Sch., and *Sarcobolus carinatus* Wall., are the two commonly noticeable climbers. *Clerodendrum inerme* Gaertn., *Acanthus ilicifolius* L., *Myriostachya wightiana* Hook. f., and *Cyperus rotundus* L., mostly grow along the water margins. The upland dry 'blank' areas that lie behind and away from tidal influx, support a sparse growth of halophytic species.

Another very interesting aspect of the existing natural vegetation along the Andhra coast is noticeable in Sriharikota Island, and in certain sandy tracts of Irakkam Island in the Pulicat Lake. Not very far from the coast line in Sriharikota, in some undisturbed areas, the vegetation is composed of tree species of *Strychnos nux-vomica* L., *Terminalia arjuna* Wt. & Arn., *Hydnocarpus* sp., *Sapindus emarginatus* Vahl, *Albizia amara* Boiv., and *Tamarindus indicus* Linn., and the shrubby zone is chiefly dominated by *Memecylon umbellatum* Burm. f., and *Dodonaea viscosa* Jacq. The common climbers in these areas are *Abrus precatorius* L., *Ichnocarpus frutescens* R. Br., and *Hemidesmus indicus* R. Br. The margins of ponds are fringed with luxuriantly growing dense thickets of *Calamus* sp. The above floristic composition suggests the existence of a moist deciduous type of vegetation in the island in the past. Extensive plantations of Eucalyptus, Casuarina and Cashew-nut exist now. The casuarina plantations in this island are the best examples in quality, perhaps, for the entire east coast.

The vast mudflats/saline flats that occur particularly at places in the vicinity of Kakinada, Machilipatnam and Tada (Pulicat Lake) support sparse vegetation, composed of halophytic species like *Suaeda maritima* Dumort., *S. nodiflora* Moq., *Salicornia brachiata* Roxb., *Sesuvium portulacastrum* L., *Heliotropium curassavicum* L., *Enicostema hyssopifolium* (Willd.) Verd., *Aeluropus lagopoides* (L.) Trin. ex Thw.,

and *Cressa cretica* L. The occurrence of *Exacum pedunculatum* L., *Osbeckia zeylanica* Willd., and a lonely orchid plant of *Eulophia epidendrea* Fisch., on silty-clay loam saline flats adjoining the Pulicat Lake in the vicinity of Tada is of considerable interest. Besides these, *Drosera burmanni* Vahl and *Eriocaulon xeranthemum* Mart., also occur in certain restricted wet areas bordering cultivated fields here. *Psilostachys sericea* Hook. f., is to be seen only at Krishnapatnam for the entire east coast as earlier reported by Gamble.

The mud flats along the creeks harbour low bushes of *Avicennia marina* Vierh., *Dalbergia spinosa* Roxb., *Derris trifoliata* Lour. and *Acanthus ilicifolius* L., to give rise to a secondary type of mangrove vegetation.

Ecologically annotated list of vascular plants from coastal Andhra Pradesh.

(Specimens cited below are deposited in the Ecology unit Herbarium, B.S.I., Howrah.)

MENISPERMACEAE

Tiliacora acuminata (Lam.) Miers

Climber on road side hedges in sandy soil, Bhimilipatam, Rao 7240; Maypadu, Rao 7487.

NYMPHAEACEAE

Nymphaea stellata Willd.

In a small pond in the island, Moosamani-Pulicat Lake, Sastry 7755.

CLEOMACEAE

Cleome viscosa Linn.

Along sandy rice field bund in the back-shore, Venadu Island, Pulicat Lake, Sastry 7835; Dolphin Nose Hill, Visakhapatnam, Rao 7161.

VIOLACEAE

Hybanthus enneaspermus (Linn.) F.v. Muell.

In gravelly soil at the foot of the Dolphin Nose Hill, Visakhapatnam, Rao 7166; in dry sandy situation along with grasses, Karimantal, Pulicat Lake, Sastry 7726.

POLYGALACEAE

Polygala arvensis Willd.*P. chinensis* auct. non Linn.Rare herb in dry situation, Kakinada, *Rao* 7269.**P. erioptera** DC.Frequent in the sandy backshore region, Mahabalipuram, *Rao* 7869.

CARYOPHYLLACEAE

Polycarpaea corymbosa Lamk.Along sandy beach, Waltair, *Rao* 7126; Poodimadaka, *Rao* 7204; in the grassy meadow in the sandy backshore, Krishnapatnam, *Rao* 7553.

PORTULACACEAE

Portulaca oleracea Linn.Along sandy backshore, Waltair, *Rao* 7113; Uppada, *Rao* 7341; Manginapudi, *Rao* 7412.**P. quadrifida** Linn.Along sandy backshore, Waltair, *Rao* 7110; Uppada, *Rao* 7325; Sriharikota Island, *Sastry* 7852.**P. tuberosa** Roxb.In sandy shore, Waltair, *Rao* 7114; in the sand filled rock crevices, Poodimadaka, *Rao* 7209; frequent along the sandy-loamy bund in the backshore area, Uppada, *Rao* 7328; rare in the backshore grassy meadow, Maypadu, *Rao* 7514, rare in dry sandy soil, Karimanal Island-Pulicat Lake, *Sastry* 7720.

MALVACEAE

Hibiscus tiliaceus Linn.Frequent, along tidal river banks, Korangi, *Rao* 7287, *Sastry* 7363, 7369.**Malachra capitata** Linn.Frequent along the Godavari river bank, Yanam, *Rao* 7309.**Pavonia zeylanica** Cav.In gravelly soil on Dolphin Nose Hill, Waltair, *Rao* 7144; in the sandy backshore, Bhimilipatnam, *Rao* 7248; rare in the sandy backshore, Manginapudi, *Rao* 7480.**Sida cordifolia** Linn.In loamy soil in the backshore, Uppada, *Rao* 7317; rare in sandy soil, Krishnapat-nam, *Rao* 7548; Ennore shore, *Rao* 7635; Karimanal, Pulicat Lake, *Sastry* 7722.**S. cordata** (Burm. f.) Boiss.Frequent in the dry sandy backshore, Moosamani, Pulicat Lake, *Sastry* 7747.**Thespesia populnea** (L.) Sol. ex Corr.Along the banks of the tidal river, Korangi, *Sastry* 7379; planted in coastal areas, Krishnapatnam, *Rao* 7549; Light House Island, Pulicat Lake, *Sastry* 7765.

STERCULIACEAE

Helicteris isora Linn.In scrub jungle on gravelly hill slope Dolphin Nose Hill, Waltair, *Rao* 7172.

TILIACEAE

Corchorus aestuans Linn.Sporadic, in sandy soil under the shade of Casuarina plantation, Manginapudi, *Rao* 7463.**C. urticaefolius** Wt. & Arn.?In sandy backshore, Manginapudi, *Rao* 7459.

ZYGOPHYLLACEAE

Tribulus terrestris Linn.Along sandy coast at several places, Waltair, *Rao* 7115; Uppada, *Rao* 7342; Manginapudi, *Rao* 7407.

OXALIDACEAE

Biophytum sensitivum DC.Rare, in the shade of *Acacia* tree on sandy-loam soil, Yanam, *Rao* 7311.

RUTACEAE

Toddalia asiatica (Linn.) Lamk. var. *gracilis* GambleCommon in the thorny scrub on the Dolphin Nose Hill, Waltair, *Rao* 7140; frequent in the sandy backshore, Manginapudi, *Rao* 7406.

MELIACEAE

Xylocarpus granatum KoenigAlong river bank in tidal forests, Koringa, *Sastry* 7381.

CELASTRACEAE

Maytenus emarginatus (Willd.) Ding HouRare, in sandy soil, Light House Island-Pulicat Lake, *Sastry* 7763.

RHAMNACEAE

Zizyphus oenoplia (Linn.) Mill.

In the thorny scrub on the Dolphin Nose Hill-Waltair, *Rao* 7171.

VITACEAE

Cissus quadrangularis Linn.

Common, amidst *Carissa* thickets in scrub jungle, Dolphin Nose Hill-Waltair, *Rao* 7180.

SAPINDACEAE

Allophyllus serratus Radlk.

In scrub jungle on top of Dolphin Nose Hill, Waltair, *Rao* 7177.

Dodonaea viscosa (Linn.) Jacq.

Common in the sandy soil forming a *Dodonaea-Strychnos-Carissa* association in the island, Venadu Island-Pulicat Lake, *Sastry* 7826.

ANACARDIACEAE

Anacardium occidentale Linn.

Cultivated plant for its edible fruits and kernels, at many places in sandy backshore.

PAPILIONACEAE

Abrus precatorius Linn.

Frequent in loose sandy soil, Venadu Island-Pulicat Lake, *Sastry* 7845.

Aeschynomene indica Linn.

Rare, along moist rice field bund, Irakkam-Pulicat Lake, *Sastry* 7812.

Alysicarpus hamosus DC.

On sandy soil in shade, Bhimilipatnam, *Rao* 7242.

A. monilifer DC.

On dry grass covered gravelly soil, Waltair, *Rao* 7238; Manginapudi *Rao* 7462.

Canavalia gladiata (Jacq.) DC.

Frequent in forest along the shore, Sriharikota Island, *Sastry* 7864.

Crotalaria linifolia Linn. f.

In sandy soil, Kakinada, *Rao* 7274.

C. retusa Linn.

Frequent in sandy area, Velamjedi-Pulicat Lake, *Sastry* 7751.

C. verrucosa Linn.

In the shade of *Casuarina* plantation,

Poodimadaka, *Rao* 7201; Maypadu, *Rao* 7525.

Dalbergia spinosa Roxb.

Common, in the mangrove forest, Kakinada, *Rao* 7264; frequent along river banks in the tidal forest, Korangi, *Sastry* 7368.

Derris trifoliata Lour.

Frequent in the mangrove forest, Kakinada, *Rao* 7268.

Desmodium biarticulatum Benth.

Rare in the sandy shore, Light House Island-Pulicat Lake, *Sastry* 7709; Sriharikota Island, *Sastry* 7854.

D. triflorum DC.

In sandy shore along with grasses, Waltair, *Rao* 7102; Moosamani island-Pulicat Lake, *Sastry* 7743.

Goniogyna hirta (Willd.) Ali*Heylandia latebrosa* DC.

In open areas, frequent, Machilipatnam, *Rao* 7432; in rock crevices filled with sand, Poodimadaka, *Rao* 7211.

Indigofera aspalathoides Vahl

Along sandy shore, common, Irakkam Island-Pulicat Lake, *Sastry* 7797.

I. linnaei Ali

On rocky hillock projecting into the sea, soil gravelly-sandy, Poodimadaka, *Rao* 7215; Maypadu, *Rao* 7519.

Phaseolus trilobus Ait.

Along sandy shore in the shade of *casuarina* plantation, Bhimilipatnam, *Rao* 7241; Moosamani, *Sastry* 7748.

Pongamia pinnata (Linn.) Pierre

Frequent in the sandy backshore, Krishnapatnam, *Rao* 7550.

Rothia indica (Linn.) Druce

Frequent all along sandy shore, Waltair, *Rao* 7124; Pulicat, *Sastry* 7698; Uppada, *Rao* 7346.

Stylosanthes mucronata Willd.

Sporadic in the sandy backshore, Maypadu, *Rao* 7510; frequent, Karimanal-Pulicat Lake, *Sastry* 7727.

Tephrosia hirta Ham.

Frequent along the sandy shore, Manginapudi, *Rao* 7413; Maypadu, *Rao* 7494; Pulicat Lake, *Sastry* 7700.

T. purpurea Pers.

Frequent all along the east coast, Waltair, *Rao* 7128; Pulicat, *Sastry* 7701.

Zornia gibbosa Span.

In open sandy backshore, Kakinada, *Rao* 7306.

Z. zeylonensis Pers.

Along sandy shore, Bhimilipatnam, *Rao* 7257.

CAESALPINIACEAE

Caesalpinia crista Linn.

Frequent along river banks in tidal forest, Korangi, *Rao* 7289, *Sastry* 7367.

Cassia auriculata Linn.

Abundant in sandy situations, Moosamani and Venadu Islands, Pulicat Lake, *Sastry* 7733, 7828.

C. occidentalis Linn.

In the shade of Casuarina plantation in sandy soil, Manginapudi, *Rao* 7481.

C. pumila Lamk.

Frequent in sandy backshore with grasses, Maypadu, *Rao* 7512.

MIMOSACEAE

Acacia nilotica (Linn.) Del. ssp. **indica** (Benth.) Brenan

Common along the Godavari river bank, Yanam, *Rao* 7310.

Albizia amara Boiv.

Venadu Island-Pulicat Lake, *Sastry* 7839.

Desmanthus virgatus Willd.

On Dolphin Nose Hill, Visakhapatnam, *Rao* 7138.

Dichrostachys cinerea Wt. & Arn.

Frequent in scrub jungle on Dolphin Nose Hill, Visakhapatnam, *Rao* 7152.

Prosopis cineraria (Linn.) Macbr.

Abundant, forming pure stands, Machilipatnam, creek, *Rao* 7439; Moosamani-Pulicat Lake, *Sastry* 7757.

SAXIFRAGACEAE

Vahlia dichotoma (Murr.) Kuntz.

V. oldenlandioides Roxb.

In wet sandy areas, rare, Poodimadaka, *Rao* 7205; Sriharikota Island, *Sastry* 7861.

DROSERACEAE

Drosera burmanni Vahl

Common, in a cultivated field, soil wet, sandy, Tada, *Sastry* 7769.

RHIZOPHORACEAE

Bruguiera gymnorhiza (Linn.) Lamk.

Common along banks of creeks, Coringa estuary, *Sastry* 7348, 7388.

Ceriops decandra (Griff.) Ding Hou

Frequent along banks of creeks in tidal forest, Coringa estuary, *Sastry* 7352.

Rhizophora apiculata Bl.

Frequent, in tidal forest, Coringa estuary, *Sastry* 7347, 7383.

R. mucronata Lamk.

Frequent, in the tidal forest, Coringa estuary, *Sastry* 7349.

COMBRETACEAE

Lumnitzera racemosa Willd.

Frequent along the river banks in tidal forest, Coringa estuary, *Sastry* 7356, 7362; Machilipatnam creek, *Rao* 7428.

MYRTACEAE

Syzygium ruscifolium (Willd.) Sant. & Wagh

Eugenia bracteata Roxb.

In open scrub on sandy soil, Venadu Island-Pulicat Lake, *Sastry* 7827; Sriharikota Island, *Sastry* 7871.

MELASTOMATACEAE

Osbeckia zeylanica Willd.

Very rare in moist, fine sandy soil, Tada, *Sastry* 7777.

SONNERATIACEAE

Sonneratia apetala Buch.-Ham.

Common, forming pure associations near estuarine mouth, Coringa estuary, *Sastry* 7292; Hope Island, Coringa estuary, *Sastry* 7351, 7358.

TURNERACEAE

Turnera ulmifolia Linn.

A Garden escape along roadside, Kakina-da, Rao 7305.

PASSIFLORACEAE

Passiflora foetida Linn.

In sandy shore, Bhimlipatnam, Rao 7253.

CUCURBITACEAE

Citrullus colocynthis (Linn.) Schrad.

Along sandy shore, Waltair, Rao 7134; Manginapudi, Rao 7417.

Coccinea cordifolia (L.) Cogn.

Rare in sandy backshore, climbing on *Pandanus*; Waltair, Rao 7121.

AIZOACEAE

Gisekia pharnaceoides Linn.

In sandy backshore, Poodimadaka, Rao 7218; Ennore, Rao 7630.

Glinus oppositifolius (Linn.) A. DC.

Common, on sandy gravelly soil in the backshore, Poodimadaka, Rao 7231; Uppada, Rao 7330; Gopalapuram, Rao 7533; in sandy backshore, Manginapudi shore, Rao 7457.

Mollugo cerviana Ser.

Frequent in sandy backshore, Pulicat Lake, Sastry 7706.

M. disticha Ser.

Along sandy shore, Waltair, Rao 7127; Bhimilipatnam, Rao 7260; Maypadu, Rao 7521; Pulicat, Sastry 7707; Sriharikota, Sastry 7863.

M. pentaphylla Linn.

In rock crevices, Dolphin Nose Hill, Visakhapatnam, Rao 7163; in sandy shore, Poodimadaka, Rao 7228.

Sesuvium portulacastrum Linn.

In dry open field adjoining a salt creek, Visakhapatnam, Rao 7198; Manginapudi, Rao 7418; Pulicat, Sastry 7759.

Trianthema portulacastrum Linn.

On top of a hillock, Poodimadaka, Rao 7219; Kakina-da, Rao 7282.

T. triquetra Rottl. ex Willd.

Frequent in the backshore, Uppada, Rao 7316; Maypadu, Rao 7524.

RUBIACEAE

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

Common in the grassy meadow in the sandy backshore, Manginapudi, Rao 7403; Moosamani Island-Pulicat Lake, Sastry 7744; Pulicat, Sastry 7709.

Guettarda speciosa Linn.

Often cultivated at many places along east coast, Yanam Botanic Garden, Rao 7307.

Hydrophylax maritima Linn. f.

Common along the sandy coast, Sriharikota, Sastry 7851.

Morinda citrifolia Linn.

Tree, in the coastal areas, Bhimilipatnam, Rao 7259.

Oldenlandia arenaria Haines

In sandy areas, Pulicat, Sastry 7705.

O. corymbosa Linn.

In sandy backshore, Waltair, Rao 7103; Poodimadaka, Rao 7221; Uppada, Rao 7330.

O. herbacea Roxb.

Sparsely distributed on sandy soil, Karimanal-Pulicat Lake, Sastry 7730; Moosamani, Pulicat Lake, Sastry 7753; in sandy shore, Manginapudi, Rao 7450.

Pavetta indica Linn.

On gravelly hill top, Dolphin Nose Hill, Visakhapatnam, Rao 7156.

COMPOSITAE (ASTERACEAE)

Acanthospermum hispidum DC.

Frequent weed on gravelly soil in open situations, Light House vicinity, Dolphin Nose Hill, Visakhapatnam, Rao 7141; on sandy soil, Krishnapatnam-Gopalapuram, Rao 7557.

Blumea obliqua (Linn.) Druce

In sandy backshore, Maypadu, Rao 7488; frequent in slightly moist, shady, sandy areas, Karimanal-Pulicat Lake, Sastry 7723; Venadu, Pulicat Lake, Sastry 7836.

Echinops echinatus Roxb.

Frequent in open gravelly situations, Dolphin Nose Hill, Visakhapatnam, Rao 7153.

Eclipta prostrata (Linn.) Linn.

In wet sandy loamy soil along river bank, Yanam, Rao 7314; in sandy soil under Casu-

arina plantation, Manginapudi, *Rao* 7451; Pulicat Lake, *Sastry* 7712; Ennore Creek, *Sastry* 7896.

***Emilia sonchifolia* DC.**

In sandy shore, Uppada, *Rao* 7337.

***Launaea sarmentosa* (Willd.) Alston**

Very common in sandy backshore all along east coast, associated with *Spinifex littoreus* and *Ipomoea pes-caprae*; Waltair, *Rao* 7130; Bhimilipatnam, *Rao* 7250; Uppada, *Rao* 7336; Tada-Pulicat Lake, *Sastry* 7785.

***Sphaeranthus indicus* Linn.**

Rare, in sandy backshore, Tada, Pulicat Lake, *Sastry* 7771; frequent along wet sandy bunds of rice fields, Venadu Island-Pulicat Lake, *Sastry* 7837.

***Tridax procumbens* Linn.**

Frequent in the sandy backshore, Manginapudi, *Rao* 7461.

***Vernonia cinerea* Less.**

On rocky hill protruding into the sea, Poodimadaka, *Rao* 7208; in sandy backshore, Manginapudi, *Rao* 7475.

MYRSINACEAE

***Aegiceras corniculatum* (L.) Blanco**

Frequent in the supra tidal regions in tidal forests, Coringa tidal forests, *Sastry* 7357; Machilipatnam creek, *Rao* 7427.

SALVADORACEAE

***Azima tetracantha* Lamk.**

Rare, in the dry hinterland areas of the tidal forests, Hope Island, Coringa tidal forest, *Sastry* 7353.

APOCYNACEAE

***Carissa spinarum* Linn.**

In the thorny scrub on gravelly soil, Dolphin Nose Hill, *Rao* 7155; along open sandy belt, Moosamani, Pulicat Lake, *Sastry* 7740.

***Ichnocarpus frutescens* R. Br.**

In sandy soil creeping on shrubs, Venadu Island-Pulicat Lake, *Sastry* 7846; in forest along the coast, Sriharikota, *Sastry* 7866.

ASCLEPIADACEAE

***Calotropis procera* R. Br.**

Very frequent plant all along the coastal areas, in waste places in the backshore and hinterland areas, Maypadu, *Rao* 7495; Sriharikota, *Sastry* 7857.

***Caralluma attenuata* Wt.**

Frequent in the scrub jungle along gravelly hill slope, Dolphin Nose Hill, Visakhapatnam, *Rao* 7146.

***Cryptostegia grandiflora* (Roxb.) R. Br. ex Lindl.**

In sandy shore, frequent, Light house Island, Pulicat Lake, *Sastry* 7766.

***Hemidesmus indicus* R. Br.**

Rare, in Palmyra groves in sandy soil, Irakkam Island, Pulicat Lake, *Sastry* 7817.

***Leptadenia reticulata* Wt. & Arn.**

In inland situations, Krishnapatnam, *Rao* 7556; Yanam, *Rao* 7312.

***Pentstemon capensis* (Linn. f.) Bullock**

Rare, in dry regions of tidal forest, Coringa estuary, *Sastry* 7371; in inland waste places, Korangi, *Sastry* 7389.

***Pergularia daemia* (Forst.) Chiov.**

Climber on road side hedges in waste places, Machilipatnam, *Rao* 7437.

***Sarcolobus carinatus* Wall.**

A frequent creeper in the mangrove forest, Coringa estuary, *Sastry* 7375.

***Tylophora asthmatica* Wt. & Arn.**

Climbing over Carissa thickets, Dolphin Nose Hill, Visakhapatnam, *Rao* 7181; in sandy backshore, Maypadu, *Rao* 7493.

LOGANIACEAE

***Strychnos nux-vomica* Linn.**

Common, in the sandy parts of the Island, Irakkam-Pulicat Lake, *Sastry* 7825.

GENTIANACEAE

***Enicostema hyssopifolium* (Willd.) Verd.**

E. verticillatum (Linn.) Engl.

Common in sandy areas adjoining salt fields, Poodimadaka, *Rao* 7203; Kakinada, *Rao* 7281; in sandy soil, Manginapudi, *Rao* 7445; Moosamani, *Sastry* 7739; Tada, *Sastry* 7779.

Exacum pedunculatum Linn.

Very rare, in sandy alkaline blank area adjoining Pulicat Lake, Tada, *Sastry* 7770.

Nymphoides indicum (Linn.) Kuntz.

In a small pond, Venadu Island, Pulicat Lake, *Sastry* 7844.

BORAGINACEAE

Coldenia procumbens Linn.

Frequent in the sandy backshore with grasses, Maypadu, *Rao* 7515.

Heliotropium curassavicum Linn.

Frequent all along the east coast in alkaline areas, Visakhapatnam, *Rao* 7196; Uppada, *Rao* 7344; Machilipatnam, *Rao* 7426; Manginapudi, *Rao* 7452; Chenigunta, Pulicat Lake, *Sastry* 7786.

CONVOLVULACEAE

Cressa cretica Linn.

In gregarious patches on saline flat areas, Uppada, *Rao* 7318; Maypadu, *Rao* 7496; Velamjedu-Pulicat Lake, *Sastry* 7718.

Evolvulus alsinoides Linn.

In all situations along the east coast, Dolphin Nose Hill, Visakhapatnam, *Rao* 7168; Poodimadaka, *Rao* 7213; Karimanal-Pulicat Lake, *Sastry* 7728.

Ipomoea aquatica Forsk.

Frequent water plant in temporary pools adjoining rice fields in the hinterland, Krishnapatnam, *Rao* 7558.

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

In sandy shore, rare, Lawsons Bay, Waltair, *Rao* 7235.

I. obscura Ker-Gawl.

Frequent, in sandy loamy bunds of rice fields in the backshore, Maypadu, *Rao* 7506.

I. pes-caprae (L.) R. Br.

Very common creeper all along the sandy east coast, Waltair, *Rao* 7104; Uppada, *Rao* 7335; Velamjedu-Pulicat Lake, *Sastry* 7716; Adiyar, *Sastry* 7877.

I. pes-tigridis Linn.

On sandy areas in the island, Irakkam, Pulicat Lake, *Sastry* 7804.

I. reptans Poir.

In moist, shady, sandy areas in the hinterland, Maypadu, *Rao* 7509.

I. macrantha Roem. et Schult.

I. tuba (Schlt.) G. Don

Extensively spreading climber in Coringa tidal forests, *Rao* 7287.

Merremia tridentata (Linn.) Hall. f. var. **tridentata**

In sandy backshore under the shade of Prosopis trees, Maypadu, *Rao* 7513; frequent all along the coast.

SOLANACEAE

Physalis minima Linn.

Stray undergrowth in the Casuarina plantation, Manginapudi, *Rao* 7460.

Solanum surattense Burm. f.

Frequent in the coastal areas, Maypadu, *Rao* 7507; Pulicat, *Sastry* 7713.

S. trilobatum Linn.

In sandy moist situations in the coastal areas, Lawson's Bay-Waltair, *Rao* 7234; Machilipatnam, *Rao* 7441.

SCROPHULARIACEAE

Bacopa monneieri (Linn.) Pennell

Frequent in moist, loose, sandy soils in the coastal areas, Tada, *Sastry* 7774.

Centranthera humifusca Wall.

Frequent in moist sandy situations along coast, Manginapudi, *Rao* 7416.

Lindernia crustacea (Linn.) F. v. Muell.

In wet sandy shore, Manginapudi, *Rao* 7448.

Stemodia viscosa Roxb.

In wet sandy area, Manginapudi, *Rao* 7485.

Striga angustifolia (D. Don) Saldanha

S. euphrasioides auct. non Benth.

Frequent in grassy open situations along coast, Poodimadaka, *Rao* 7227; Manginapudi, *Rao* 7458.

ACANTHACEAE

Acanthus ilicifolius Linn.

Common, along banks of tidal creeks, Visakhapatnam, *Rao* 7195; Kakinada, *Rao*

7285; Coringa tidal forests, *Sastry* 7378; Machilipatnam, *Rao* 7421.

Asystasia gangetica T. And.

Frequent, along sandy sea-shore amidst *Pandanus*, *Spinifex* and *Carissa* thickets, Waltair, *Rao* 7111; Manginapudi, *Rao* 7404; Moosamani-Pulicat Lake, *Sastry* 7734.

Barleria prionitis Linn.

Frequent, soil gravelly, Dolphin Nose Hill, Visakhapatnam, *Rao* 7154; Sriharikota, *Sastry* 7862.

Blepharis repens (Vahl) Roth

Frequent, in sand filled rock crevices along the shore, Poodimadaka, *Rao* 7206.

Indoneesiella longipedunculata (Sreem.) Sreem.

Frequent, amidst rock crevices on hill projecting into sea, Dolphin Nose Hill, Visakhapatnam, *Rao* 7135.

Justicia glauca Rottl.

Frequent in red gravelly soils of the hill, Dolphin Nose Hill-Visakhapatnam, *Rao* 7174.

J. prostrata Gamble

In wet sandy backshore, Maypadu, *Rao* 7497.

J. simplex Don

Few, in the shady slopes of a sand dune in the leeward side in the backshore, Bhimilipatnam, *Rao* 7246.

J. vahlii Roth

Dolphin Nose Hill, Visakhapatnam, *Rao* 7173.

Rungia parviflora Nees var. *muralis* Cl.

Frequent, in grassy meadows in dry open sandy areas, Karimanal-Pulicat Lake, *Sastry* 7729.

AVICENNIACEAE

Avicennia alba Bl.

Abundant, forming a mixed stand with *Sonneratia* in swampy regions of the tidal forest at Coringa river mouth, Coringa estuary, *Rao* 7296, *Sastry* 7387.

A. marina (Forsk.) Vierh.

Common, in the tidal swampy regions, Kakinada Port vicinity, *Rao* 7277; along the

muddy tidal banks of the Coringa river and other creeks, associated with *Sonneratia* and *Avicennia*, Coringa estuary, *Sastry* 7384.

A. officinalis Linn.

Common, in the high regions in the tidal forests, Coringa estuary, *Rao* 7295, *Sastry* 7385.

VERBENACEAE

Clerodendrum inerme (L. f.) Gaertn.

Frequent, in wet sandy area along the shore, Poodimadaka, *Rao* 7202; common, along the margins of Coringa river, Coringa estuary, *Rao* 7290; along the Gaderu river, Coringa estuary, *Sastry* 7350, 7372; Machilipatnam, *Rao* 7429.

Lantana camara Linn. var. *aculeata* (L.) Mold.

Stray plant in the sandy regions of the backshore, Bhimilipatnam, *Rao* 7249.

Phyla nodiflora (L.) Greene

Common, often forming dense mat in grassy meadows in wet sandy backshore region, Manginapudi, *Rao* 7476; Tada, *Sastry* 7783.

Premna serratifolia Linn.

Rarely planted in sandy beach, Krishnapatnam, *Rao* 7561.

Stachytarpheta urticaefolia (Salisb.) Sims.

S. indica auct. non Linn.

Rare, on Dolphin Nose Hill, Visakhapatnam, *Rao* 7178; along the moist sandy bunds of cultivated fields, in the backshore, Maypadu, *Rao* 7505.

Vitex negundo Linn.

Frequent, in the interior of the island, soil sandy dry, Moosamani, Pulicat Lake, *Sastry* 7756.

LABIATAE (LAMIACEAE)

Geniosporum tenuiflorum (Linn.) Merr.

Very common all along the sandy coast associated with grasses and sedges forming carpets in the backshore, Maypadu, *Rao* 7489; Krishnapatnam, *Rao* 7552; Moosamani-Pulicat Lake, *Sastry* 7738; Tada, *Sastry* 7782; Sriharikota, *Sastry* 7853.

Leucas lavandulaefolia Rees

In sandy open situations, Venadu Island, Pulicat Lake, *Sastry* 7834.

L. stricta Benth.

Frequent, in the backshore regions, Gopalapuram, *Rao* 7530; Karimanal Island-Pulicat Lake, *Sastry* 7725; Chenigunta, Tada, *Sastry* 7789.

L. urticifolia (Vahl) J. Donn.

In open gravelly area, Dolphin Nose Hill, Visakhapatnam, *Rao* 7182.

Ocimum canum Sims.

In waste places in the coastal areas, Krishnapatnam, *Rao* 7551; Manginapudi, *Rao* 7464; in sandy backshore, Uppada, *Rao* 7319.

NYCTAGINACEAE

Boerhavia diffusa Linn.

Very common, in all situations along sandy coast, Bhimilipatnam, *Rao* 7252.

AMARANTHACEAE

Aerva lanata (Linn.) Juss.

In red gravelly slopes of the Dolphin Nose Hill, Visakhapatnam, *Rao* 7147.

Allmania nodiflora (L.) R. Br. ex Hook. f.

Frequent, all along the sandy backshore, Uppada, *Rao* 7334; Manginapudi, *Rao* 7405; Tada, *Sastry* 7795; Irakkam Island-Pulicat Lake, *Sastry* 7805; Sriharikota, *Sastry* 7856.

Amaranthus polygonoides Linn.

A. polygamus auct. non Linn.

Rare, in open gravelly situation on the top of Dolphin Nose Hill, Visakhapatnam, *Rao* 7143.

A. spinosus Linn.

Frequent, in open waste places in coastal region, Machilipatnam, *Rao* 7425.

Gomphrena decumbens Jacq.

Common, in the grassy sandy backshore, Maypadu, *Rao* 7491.

Psilostachys sericea Hook. f.

Frequent (locally) on sand dune in the shade of a Tamarind tree, Krishnapatnam, *Rao* 7539.

Pupalia atropurpurea (Lam.) Moq.

Frequent in *Clerodendrum inerme* bushes

along the sandy backshore, Lawson's Bay, Waltair, *Rao* 7236.

P. lappacea Moq.

Rare, on sandy soil in Casuarina plantation, Bhimilipatnam, *Rao* 7244.

P. orbiculata Wt.

Frequent, in sandy back shore in the shade of Casuarina plantation, Bhimilipatnam, *Rao* 7243.

CHENOPODIACEAE

Atriplex repens Roth

Frequent, on sand dune slope adjoining salt pans, near Gopalpuram, *Rao* 7546.

Salicornia brachiata Roxb.

Very common in alkaline soil all along the east coast, Visakhapatnam, *Rao* 7199; Bhimilipatnam, *Rao* 7273; Uppada, *Rao* 7343; Gopalpuram, *Rao* 7545; Velamjidu, Pulicat Lake, *Sastry* 7717.

Suaeda maritima Dumort.

Common throughout the coasts, a good indicator of saline flats, Visakhapatnam, *Rao* 7197; Uppada, *Rao* 7321; Saline blanks, Coringa tidal forests, *Sastry* 7365; Tada, *Sastry* 7787.

S. monoica Forsk.

Frequent in the foreshore of the sandy coast associated with *Spinifex*, *Ipomoea* and *Launaea*, Manginapudi, *Rao* 7476; Machilipatnam creek, *Rao* 7420.

S. nudiflora Moq.

Common along the margin of creeks, Visakhapatnam, *Rao* 7193; Uppada, *Rao* 7323; abundant on saline alkaline blanks in tidal forest, Coringa tidal forest, *Sastry* 7364; Gopalpuram, *Rao* 7547.

POLYGONACEAE

Coccoloba uvifera Linn.

Under cultivation in the Botanic Garden, Yanam, *Rao* 7308.

ARISTOLOCHIACEAE

Aristolochia bracteata Retz.

Frequent, along sandy backshore, Lawson's Bay, Visakhapatnam, *Rao* 7237.

LAURACEAE

Cassytha filiformis Linn.

Parasitic on shrubs and trees in the coastal areas, Dolphin Nose Hill, Visakhapatnam, Rao 7184.

LORANTHACEAE

Viscum nepalense Spreng.

Viscum articulatum auct. non Burm. f.

Semi-parasitic on *Terminalia* tree in the forest along the coast, Sriharikota, Sastry 7865.

EUPHORBIACEAE

Acalypha indica Linn.

Frequent, amidst rock crevices, Dolphin Nose Hill, Visakhapatnam, Rao 7148.

Croton bonplandianum Baill.

Frequent weed in waste places along the coast, Waltair, Rao 7120.

Euphorbia hirta Linn.

Frequent in sandy shores, Venadu Island, Pulicat Lake, Sastry 7840; Manginapudi, Rao 7454.

E. bombaiensis Sant.

E. microphylla Heyne ex Roth

Common, in open salt pan areas, Machilipatnam, Rao 7422.

E. tirucalli Linn.

Common, in scrub jungle on the hill, Dolphin Nose Hill, Visakhapatnam, Rao 7145.

E. thymifolia Linn.

On rocky hillock projecting into the sea, in sand filled crevices along with grasses, Poodimadaka, Rao 7207.

E. rosea Retz.

Common all along the east coast in sandy situations, Waltair, Rao 7132; Ennore, Rao 7627; Irakkam Island-Pulicat Lake, Sastry 7802; Sriharikota, Sastry 7850.

E. orbiculata H.B.K.

In sandy areas in the hinterland, Gopalpuram, Rao 7535.

Excoecaria agallocha Linn.

Common, along creeks in tidal swamps, Visakhapatnam, Rao 7188; Kakinada, Rao 7271; Coringa estuary, Sastry 7361; Machilipatnam, Rao 7419.

Jatropha gossypifolia Roxb.

On Dolphin Nose Hill, Rao 7175; in the sandy coasts of the island, introduced and planted near habitations, Karimanal Island-Pulicat Lake, Sastry 7731.

Kirganelia reticulata (Poir.) Baill.

Common along road sides in coastal areas, Machilipatnam, Rao 7440.

Micrococca mercurialis (L.) Benth.

Frequent on old walls, Corangi village, Rao 7304.

Neopeltandra suberosa Gamble

Very common in the scrub jungle on Dolphin Nose Hill, Visakhapatnam, Rao 7139.

Phyllanthus fraternus Web.

P. niruri auct. non Linn.

In sandy coastal areas, Bhimilipatnam, Rao 7247; Machilipatnam, Rao 7422; Gopalpuram, Rao 7542.

P. maderaspatensis Linn.

On gravelly soil, in scrub jungle, Dolphin Nose Hill, Visakhapatnam, Rao 7160.

P. rotundifolius Klein.

In sandy back shore, Waltair, Rao 7125; Uppada, Rao 7332.

Securinega virosa (Roxb. ex Willd.) Pax. et Hoff.

Frequent in the scrub jungle on the hill projecting into the sea, Dolphin Nose Hill, Visakhapatnam, Rao 7169; in the scrub jungle in the tidal forest, Hope Island, Coringa estuary, Sastry 7354.

Synostemon bacciforme (L.) Web.

Frequent, in dry elevated area adjoining to mangrove swamp, Kakinada Port, Rao 7270; Uppada, Rao 7333; along the sandy coast, Maypadu, Rao 7503; Moosamani, Pulicat Lake, Sastry 7742.

CASUARINACEAE

Casuarina equisetifolia Forst.

Extensively planted all along the sandy east coast, Manginapudi, Rao 7482.

HYDROCHARITACEAE

Ottelia alismoides Pers.

In fresh water canals and in cultivated

fields in the hinterland, Krishnapatnam, Rao 7560.

Halophila ovalis Hook. f.

Submerged plant in extensive, gregarious patches, in shallow waters, Venadu Island-Pulicat Lake, Sastry 7847.

ORCHIDACEAE

Eulophia epidendrea Fisch.

Very rare ground orchid in open sandy situation, Tada (Pulicat Lake), Sastry 7781.

AMARYLLIDACEAE

Crinum defixum Ker-Gawl

In wet sandy shore, Manginapudi, Rao 7486.

LILIACEAE

Asparagus racemosus Willd.

Prickly, climbing on hedges and bushes, Coringa village, Sastry 7390; under the shade of Palmyra tree, in sandy soil, Venadu Island, Pulicat Lake, Sastry 7829.

Gloriosa superba Linn.

Frequent, in sandy backshore, climbing on bushes, Maypadu (seen).

COMMELINACEAE

Amischophacelus axillaris (Linn.) Rolla et Kammathy

In shady moist places in the sandy coast, Maypadu, Rao 7518; Tada, Sastry 7776; along the wet sandy bunds of cultivated fields, Venadu Island, Sastry 7831.

Commelina attenuata Koen. ex Wall.

Frequent, in sandy backshore, Adiyar, Rao 7563; Krishnapatnam, Rao 7540; Venadu Island, Pulicat Lake, Sastry 7830.

Cyanotis cristata (L.) D. Don

In moist places, Dolphin Nose Hill, Visakhapatnam, Rao 7176.

Murdannia nudiflora (L.) Brenan

In between rock boulders, Dolphin Nose Hill, Visakhapatnam, Rao 7165; in sandy places, amidst grasses, Poodimadaka, Rao 7223.

M. spirata (L.) Brueck.

Common, in wet sandy grassy meadow in the backshore, Pulicat, Sastry 7711; Moosamani, Pulicat Lake, Sastry 7752.

PANDANACEAE

Pandanus odoratissimus Linn. f.

P. tectorius Soland ex Parkinson

Frequent, forming dense grooves in the sandy backshore, Waltair, Rao 7119; Mahabalipuram, Rao 7626.

ARACEAE

Pistia stratiotes Linn.

Floating herbs in Coringa river, Coringa tidal forest, Rao 7303.

ERIOCAULACEAE

Eriocaulon xeranthemum Mart.

Very common in wet, grassy, sandy fields associated with *Drosera burmanni*, Tada, Sastry 7767; Irakkam Island-Pulicat Lake, Sastry 7822.

CYPERACEAE

Bulbostylis barbata (Rottb.) Clarke

Very frequently seen sedge all along the shore, Waltair, Rao 7133; Bhimilipatnam, Rao 7258; Maypadu, Rao 7502; Krishnapatnam, Rao 7555.

Cyperus arenarius Retz.

Along sandy shore, Machilipatnam, Rao 7409.

C. aristatus Rottb.

Common, in wet sandy backshore, Manginapudi, Rao 7409.

C. compressus Linn.

In sandy backshore, Uppada, Rao 7326; Manginapudi, Rao 7466.

C. difformis Linn.

Frequent in wet rice fields in coastal areas, Venadu Island, Pulicat Lake, Sastry 7833.

C. esculentus Linn.

In sandy backshore, Manginapudi, Rao 7483; in wet sandy places, Karimanal, Pulicat Lake, Sastry 7724; Sriharikota, Sastry 7860.

C. iria Linn.

Along sandy bank of a fresh water pond in the backshore area, Uppada, Rao 7339; frequent along rice field bunds, Venadu Island, Pulicat Lake, Sastry 7832.

Cyperus pumilus Linn.

In moist sandy areas in the backshore, Poodimadaka, *Rao* 7225.

C. rotundus Linn.

Common along river banks in tidal forest, Coringa tidal forest, *Rao* 7291; *Sastry* 7380.

Eleocharis capitata Br.

In wet sandy areas, Poodimadaka, *Rao* 7222.

Fimbristylis ferruginea Vahl

Frequent in open dry areas, Coringa tidal forest, *Rao* 7293; *Sastry* 7374; Manginapudi, *Rao* 7468; Light House Kuppam, Pulicat, *Sastry* 7759.

F. miliacea Vahl

In marshy areas, Venadu Island, Pulicat Lake, *Sastry* 7848.

F. polytrichioides (Retz.) Vahl

Frequent, along moist bund of a salt water creek in open situations, Visakhapatnam, *Rao* 7192; Kakinada, *Rao* 7276; Uppada, *Rao* 7340; Krishnapatnam, *Rao* 7536; Light House Island, Pulicat Lake, *Sastry* 7761.

F. spathacea Roth

Frequent along the bund of back water canal, Visakhapatnam, *Rao* 7164, 7191; Kakinada, tidal flat, *Rao* 7286; common in wet sandy backshore, Manginapudi, *Rao* 7471.

Kyllinga triceps Rottb.

Rare in dry sandy open situations, Krishnapatnam, *Rao* 7531.

Mariscus dubius Kük.

In wet areas along harbour creek, Visakhapatnam, *Rao* 7150.

GRAMINEAE (POACEAE)

Aeluropus lagopoides (L.) Trin. ex Thw.

Common creeping grass on saline soils, Kakinada, *Rao* 7266; Uppada, *Rao* 7324; Tada, Pulicat Lake, *Sastry* 7780; Venadu Island-Pulicat Lake, *Sastry* 7841.

Alleteropsis cimcina (L.) Stapf.

Frequent on gravelly hill slope, Dolphin Nose Hill, Visakhapatnam, *Rao* 7167.

Aristida adscensionis Linn.

In sandy backshore, Maypadu, *Rao* 7498.

A. setacea Retz.

Common in sandy areas, Irakkam Island, Pulicat Lake, *Sastry* 7806.

Aristida sp.

In sandy hinterland, Krishnapatnam, *Rao* 7541.

Brachiaria ramosa (L.) Stapf

Frequent in sandy backshore, Maypadu, *Rao* 7576; Manginapudi, *Rao* 7470.

Coelachyrum lagopoides (Burm. f.) Senaratna

Common, in the wet sandy backshore, Uppada, *Rao* 7320; Manginapudi, *Rao* 7401; Maypadu, *Rao* 7490.

Chloris virgata Sw.

In sandy backshore, Manginapudi, *Rao* 7473; Kakinada, *Rao* 7268.

Dactyloctenium aegyptium (L.) P. Beauv.

On sandy soil under Casuarina plantation, Manginapudi, *Rao* 7469; Waltair, *Rao* 7106.

D. henrardianum Bor

Common in sandy backshore, Manginapudi, *Rao* 7447.

Digitaria marginata Link.

Frequent in sandy soil, Manginapudi, *Rao* 7477.

D. tomentosa (Koenig) Henr.

In gravelly soil, Dolphin Nose Hill, Visakhapatnam, *Rao* 7136.

Eragrostiella walkeri (Stapf) Bor

Frequent in sandy soil, Maypadu, *Rao* 7501.

Eragrostis coarctata Stapf

Sandy coast, Moosamani Island, Pulicat Lake, *Sastry* 7737; Manginapudi, *Rao* 7479.

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

Common in sandy soil in dry situations; Moosamani, Pulicat Lake, *Sastry* 7736.

Heteropogon contortus (L.) P. Beauv.

Common on sandy soil in the backshore, Irakkam Island, Pulicat Lake, *Sastry* 7807.

Leptochloa chinensis (L.) Nees

In water logged areas in the backshore, *Rao* 7559.

Melanocenchris jacquemontii Jaub. et Spach.

In sandy backshore, Maypadu, *Rao* 7511.

Myriostachya wightiana Hook. f.

Common grass along the bank of tidal creeks, Machilipatnam, *Rao* 7431; Coringa tidal forest, *Rao* 7294; *Sastry* 7373.

Oryza sativa Linn.

Extensively cultivated in the hinterland, Maypadu, *Rao* 7526.

Paspalum vaginatum Sw.

On wet newly formed muddy areas in estuarine region, a pioneer plant, Coringa estuary, *Sastry* 7377.

Paspalum sp.

Rare grass spreading on sandy soil in the shade of Casuarina plantation, Manginapudi, *Rao* 7470.

Perotis indica (L.) O. Kuntze

Frequent tufted grass along coastal situations, amidst rock boulders, Dolphin Nose Hill, Visakhapatnam, *Rao* 7137; in sandy backshore, Maypadu, *Rao* 7492.

Porteresia coarctata (Roxb.) Tateoka

Gregarious, pioneer grass on newly formed muddy flats in estuarine regions, Coringa estuary, *Sastry* 7360, 7376.

Saccharum spontaneum Linn.

In the sandy backshore, Manginapudi, *Rao* 7478.

Sporobolus diander Beauv.

Frequent in sandy backshore, Manginapudi, *Rao* 7465.

S. tremulus (Willd.) Kunth

In open, dry, gravelly areas near a back water canal, Harbour bridge area, Visakhapatnam, *Rao* 7190.

Trachys muricata Steud.

Frequent along the east coast in sandy backshore, Waltair, *Rao* 7116; Bhimilipatnam, *Rao* 7251; Uppada, *Rao* 7331; Irakkam Island, Pulicat Lake, *Sastry* 7821.

Tragus biflorus Schult.

Frequent along moist sandy situations, Gopalpuram, *Rao* 7532.

Zoysia matrella Merr.

Frequent, along sandy coast, Machilipatnam, *Rao* 7434.

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