

ECOLOGICAL STUDIES OF SAURASHTRA COAST AND NEIGHBOURING ISLANDS II. BEYT ISLAND

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ABSTRACT

The plant ecology of Beyt island, a narrow crooked strip of sand rock to the east of Okhamandal point and about 3 km to the north of the mainland of Okhamandal situated $22^{\circ}35' : 72^{\circ}21'$ in the Gulf of Cutch is presented in this paper. Based on the types of situations and edaphic features the vegetation of the island has been distinguished into 3 main categories : (1) Strand, (2) Salt pans, slacks and mud formations and (3) Inland mixed scrub forest. Main features of the vegetation and analysis of soils are described under the above mentioned heads. The flora is a mixture of coastal and inland types. Further, the affinity of the flora with the adjacent lands of Cutch and Okhamandal to Diu coastal area has been studied. A list of the plants occurring in the island is enumerated.

LOCATION AND GENERAL DESCRIPTION OF THE AREA

Beyt or the island of Shankhodhar is a narrow crooked strip of sand rock to the east of Okhamandal point and about 3 km to the north of the mainland of Okhamandal in the Gulf of Cutch. The island from north-east to south-west measures 8 km but, being a narrow and crooked strip of land is in its windings half long again. All round the island Conch or Chank shells are found in abundance. They form an article of commerce and have given their name to the island "Shankhodhar" i.e. the Gate of Conch shells or perhaps the name is from its fancied resemblance to this shell (Anon., 1884).

The island contains only one town, Beyt, situated in $22^{\circ}35'N$ and $69^{\circ}9'E$, with an area of 10.2 km^2 (Anon., 1908). It is famous for its temples and visited by many pilgrims from all over India. The principal temples are the old and new sacred shrines of Shankh Narayan, and those dedicated to Krishna's four wives and his mother.

The south-west half of the island is a rocky table-land 17-20 m high and the east end which is composed of sand hills and bushes is called Monkey or Hanuman point from a temple to Hanuman about 0.8 km within the point. The reef to the north of this point is called Hanuman-danda and extends west for about 2 km to the north of the sand hills that border the north side of Beyt island.

Between the sandy south-east side of Beyt island and the mainland of Okhamandal the passage is very shallow, having a bank in mid-channel which is nearly dry at low tide. Beyt is one of the ports of Okhamandal and forms a safe shelter during the whole south-west monsoon.

CLIMATE

The climate of the island is dry but sultry. Mean annual rainfall of the nearest meteorological

station at Dwarka ($22^{\circ}22'N$ & $69^{\circ}05'E$) to which reference may be made is 13.93 inches (358.8 mm) only (Anon., 1953). Practically the whole of the precipitation, which is due to the south-west monsoon is experienced in the months of June to September. July with an average rainfall of 6.95 inches (176.5 mm) is the wettest month. Annual mean of daily maximum temperature is $84.4^{\circ}F$ and that of daily minimum temperature $73.0^{\circ}F$. Annual mean of relative humidity figures are 80% and 65% at 8-30 hours and 17-30 hours respectively. This type of climate is recognized as arid or desert type. Histogram showing distribution of rainfall throughout the year and curve for mean temperatures during different months of the year are presented in the Fig. I.

GEOLOGY AND SOILS

The island is made up of nummulitic beds which are common in the islands of the Gulf of Cutch and reach as far as the Okha Rann and throughout Okha (Anon., 1884). These beds are much covered by new groups. Miliolite sand-stone also occurs in a section of the island. Dwarka beds consisting of the variously coloured lime-stones and yellow, earthy, marly or clayey beds, partly gypseous with iron-stained harder bands are found exposed in the island.

The south-west half of the island extending upto Shankholia point in the extreme south is rocky table-land, 17-20 m high covered with a thin mantle of brownish sandy soil at places but rock outcrop can generally be seen in the area. The east end called the Hanuman point is composed of sand hills, which are continued on the border of the north side of Beyt island and then extend west for about 2 km. These sand hills are composed of quartz derived sands with many fragments from the broken shells. Adjacent to these sand hills

towards the interior, sand appears in the form of sandy flats, where the thickness of the sand layer is

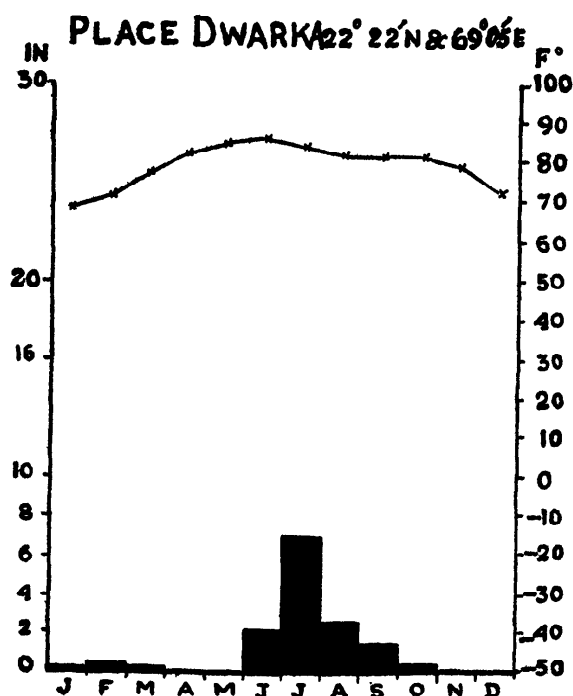


Fig. 1. Histogram showing distribution of Rainfall and Temperature Curve.

1-2 m. The occurrence of shell fragments although quite frequent in this sand is not so high as in the sand from the sand hills. On way to Hanuman Mandir from the town of Beyt some mud formations can also be seen. These are the low lying areas in the island subject to sea water inundation during tide but presenting a muddy appearance when water recedes.

METHODS EMPLOYED

Three tours were undertaken during different seasons of the years 1961-63 and the field data were collected for the floristic composition. With a view to studying the soil characteristics of different habitats, soil samples were collected either from the surface layer or in other cases to different depths in profiles and analysed in the laboratory for mechanical composition, pH, organic matter contents, total dissolved solids, sodium chloride and calcium carbonate contents. Methods referred to by Rao *et al.* (1964 a) were employed for analysis except for pH determinations which were made by the direct reading Cambridge pH meter.

VEGETATION

The vegetation consisting of the strand formation and inland mixed scrub forests mainly with

occasional interception of salt pans and mud formations may be studied under the following heads:

- 1.. Strand vegetation.
2. Salt pans, slacks and mud formations.
3. Inland mixed scrub forest.

1. The Strand Vegetation :

Throughout the island the foreshore upto tidal mark is free from any vegetation. However, rocky areas submerged in water often exhibit luxuriant algal growth. Beyond the tidal mark towards the sea side and also on the summit of sandy bars a few pioneers like *Cyperus conglomeratus* and *Asparagus dumosus* are found growing in abundance. The sandy bars on the island side have the shrubby *Sericostoma pauciflorum* dominating the strand flora. The vegetation is of open type, more or less homogenous groups of annuals or perennials. The dominating prostrate plants throughout the monsoon period are *Heylandia latebrosa* and *Indigofera cordifolia*. Gradually as the strand conditions change, *Cissus quadrangularis* and *Lycium europaeum* are frequently found growing in abundance. Rocky strand situations exhibit plants which resemble inland. The few characteristic species of this area which are frequently observed are *Fagonia cretica*, *Pavonia patens*, *Senra incana*, *Glinus lotoides*, *Anaphalis cutchida*, *Enicostema verticillatum*, *Heliotropium strigosum* and *Sporobolus diander*. Often they are found mixed up and at no time do they form extensive patches.

Analysis of soil samples collected from the strand habitat is presented in Table 1.

The soil from the sandy bars and sand hills are dull white in colour and fine sand in texture. The pH value (7.9-8.0) indicates moderate alkalinity. Organic matter contents (0.31-0.65%) are low due to the sparse vegetation cover. Total dissolved solids (0.073-0.128%) and sodium chloride contents (0.015-0.031%) are also low indicating sea water spray but no inundation with sea water. The sands are very highly calcareous (38.12-55.54% CaCO_3).

2. Salt pans, slacks and mud formations :

The habitat is often flooded by tidal waters and occasionally one can see the formation of slacks in the depressed areas, surrounded by muddy saline flats. The vegetation in this zone is more or less dominated by *Aeluropus lagopoides* closely followed by *Sporobolus* sp. Another interesting feature

is the presence of *Cressa cretica* in patches on slightly dried salt pans. In this zone towards sandy areas it is not uncommon to see the mixed herbaceous plants such as *Cyperus pangorei*, *Bergia*

odorata, *Oldenlandia umbellata* and *Phyla nodiflora* from frequent to abundant.

Analysis of samples collected from this habitat is given in Table 2 below:

TABLE 1

Soil sample No.	439	443	444
Location	Sandy strand habitat northern shore	Sandy bar on the north-eastern side	Sandy bar on the north-eastern side
Depth of sampling in cm	0 — 10	0 — 10	0 — 10
Vegetation cover	<i>Cyperus conglomeratus</i> and <i>Asparagus dumosus</i>	<i>Sericostoma pauciflorum</i>	<i>Sericostoma pauciflorum</i> and <i>Cyperus conglomeratus</i>
Soil colour	Dull white	Dull white	Dull white
Clay %	5.1	5.6	3.4
Silt %	4.7	2.8	2.2
Fine sand %	81.6	83.3	67.0
Coarse sand %	8.6	8.3	27.4
Soil texture	Fine sand	Fine sand	Fine sand
pH	7.9	8.0	8.0
Organic matter %	0.65	0.57	0.31
Total dissolved solids %	0.113	0.128	0.073
Sodium chloride %	0.031	0.023	0.015
Calcium carbonate %	51.80	55.54	38.12

TABLE 2

Soil sample No.	437	445
Location	Salt pan on way to Hanuman Danda	Muddy flat adjacent to the internal scrub-land
Depth of sampling in cm	0 — 10	0 — 10
Vegetation cover	<i>Aeluropus lagopoides</i> and <i>Sporobolus tremulus</i>	<i>Sporobolus tremulus</i> and <i>Cressa cretica</i>
Soil colour	Grey	Light grey
Clay %	3.9	1.7
Silt %	4.7	1.7
Fine sand %	80.2	90.1
Coarse sand %	11.2	6.5
Soil texture	Fine sand	Fine sand
pH	7.8	8.0
Organic matter %	2.46	1.17
Total dissolved solids %	1.362	1.278
Sodium chloride %	0.945	0.889
Calcium carbonate %	18.82	24.30

The soil of this habitat, which is under sea water during tide presents a muddy appearance after the water has receded. Water is retained more or less permanently in the depressed areas. The soils are light grey to grey in colour and fine sand in texture. The pH (7.8-8.0) indicates mild to moderate alkaline reaction. The organic matter contents (1.17-2.46%) are comparatively higher due to leaching down of the same from higher levels and its accumulation in the depressions with a partial contribution by the vegetation of this habitat. Total dissolved solids (1.278-1.362%) and sodium chloride contents (0.889-0.945%) are very high as a result of inundation and saturation of the soil with sea water. The soil is highly calcareous with CaCO_3 content of 18.82-24.30%.

3. Inland mixed scrub forests:

Adjacent to the sand hills in the north-east part of the island towards the interior the area is covered with sandy soil in 1-2 m thickness and supports mixed scrub forests of *Euphorbia nivulia*

and *Acacia nilotica* with the secondary association of *Maytenus senegalensis*. Wherever there is clearance of *Euphorbia nivulia* clumps or *Acacia nilotica* trees one could see the dominance of the *Maytenus senegalensis*, a very promising secondary associate. The clumps of *Euphorbia nivulia* shelter *Barleria prionitis*, *Pavonia zeylanica*, *Cassia auriculata* and *Commiphora roxburghii*. In this area the other sparsely distributed plants are *Capparis decidua* and *Lycium europaeum*. Apart from this in the extreme southern part of the island on the rocky table-land touching Shankholia point, there is the mixed formation of *Euphorbia nivulia* and *Acacia nilotica* with the secondary association of *Grewia tenax* shrubs. *Maytenus senegalensis* a secondary associate in the south-west of the island is scarcely present in the region. The other shrubby plants of occasional occurrence are *Salvadora persica*, *Grewia villosa*, *Capparis decidua*, *Cadaba fruticosa*, *Zizyphus nummularia* and *Lycium europaeum*.

Analysis of soil samples from inland mixed scrub forests is presented in Table 3 below:

TABLE 3

Soil sample No.	Profile				
	440	441	442	438	446
Location	Inland mixed scrub forest			Rocky scrub-land adjacent to muddy flats	Shankholia point inshore forest
Depth of sampling in cm	0 — 15	15 — 30	30 — 90	0 — 10	0 — 10
Vegetation cover	<i>Euphorbia nivulia</i> , <i>Acacia nilotica</i> and <i>Maytenus senegalensis</i>			<i>Euphorbia nivulia</i> , <i>Acacia nilotica</i> and <i>Zizyphus nummularia</i>	<i>Euphorbia nivulia</i> , <i>Acacia nilotica</i> and <i>Grewia tenax</i>
Soil colour	Dull yellow with blackish tinge	Dull yellow	Dull yellow	Very light brown	Very light brown
Clay %	5.2	2.1	3.8	3.9	7.6
Silt %	4.8	4.0	4.6	4.3	31.1
Fine sand %	81.6	85.3	81.4	86.0	46.5
Coarse sand %	8.4	8.6	10.2	5.8	14.8
Soil texture	Fine sand	Fine sand	Fine sand	Fine sand	Fine sandy loam
pH	7.8	8.0	8.0	7.8	7.2
Organic matter %	1.98	0.50	0.46	2.05	2.72
Total dissolved solids %	0.219	0.108	0.065	0.203	0.134
Sodium chloride %	0.035	0.029	0.015	0.026	0.035
Calcium carbonate %	26.67	25.24	27.00	27.70	6.81

All the soils from the profile studied in the interior of the south-west half of the island supporting fairly dense mixed scrub forests of *Euphorbia nivulia* and *Acacia nilotica* are fine sand in texture. The dull yellow colour of sand in the surface layer has a blackish tinge, which diminishes in the profile downwards. The pH values (7.8-8.0) of the soils indicate mild to moderate alkalinity. Organic matter content (1.98%) in the surface layer decreases to 0.46% at 30-90 cm depth. Total dissolved solids decrease from 0.219% to 0.065% and sodium chloride contents from 0.035% to 0.015% from surface to bottom horizon in the profile. The soils with CaCO_3 contents of 25.24 to 27.00% are highly calcareous. Soil was found practically dry upto the depth sampled at the time of collecting the samples.

In the extreme southern part of the island, touching Shankholia point and adjacent areas and also in the rocky scrub-land adjacent to muddy flats a very thin cover of soil mixed with gravel pieces is present on the rocky land. The soil is coloured very light brown and fine sand to fine sandy loam in texture. The pH (7.2-7.8) indicates mild alkalinity. Organic matter contents range between 2.05-2.72%. Total dissolved solids 0.134-0.203% and sodium chloride contents 0.026-0.035% are fairly low. The soils are calcareous with CaCO_3 contents of 6.81-27.70%.

SANIMAR BEYT

A tiny islet locally known as *Sanimar Beyt* near Shankholia point composed of solid exposed rock alround but with a thick mantle of sand just above supports a rich type of vegetation. Every inch of the soil is being covered with herbaceous plants and stunted woody perennials. This area is almost free from human influence and is not accessible to animals for grazing. The vegetation especially woody perennials like *Salvadora persica* and *Commiphora roxburghii* from a mixed association. Next the mixed secondary associates include such plants like *Maerua arenaria* and *Lycium europaeum*.

The ground flora is composed of *Boerhavia diffusa*, *Barleria prionitis*, *Portulaca quadrifida*, *Taverniera cuneifolia*, *Asparagus gonoclados*, *Polycarpaea spicata* and a rare plant *Kedrostis rostrata*. As remarked earlier although this patch of land is densely covered with vegetation, yet it is surprising to see that the dominating association of *Euphorbia nivulia* and *Acacia nilotica* of the nearby Beyt island and mainland is scarcely present in this tiny islet. On the other hand the secondary asso-

ciates of the mainland form the dominating association here.

The ground cover consists of *Boerhavia diffusa*, *Blepharis linariaefolia* and *Ammania baccifera*.

Salient features of the flora :

The flora of Beyt island has an affinity both with the flora of Okhamandal to Diu coastal area and the flora of Cutch, the affinity with the former being a little more than the affinity with the latter.

The flora is a mixture of coastal and inland types. The interesting coastal types are essentially Perso-Arabian whereas the majority of inland types belong to Indian or Indo-Malayan group. The coastal strand types are adopted to coast conditions. Plants like *Cyperus conglomeratus* and *Asparagus dumosus* even though they are beach plants, they are not halophytes but constitute a special group of xerophytic psammophytes. The pH value of the habitat (8.0) indicates moderate alkalinity. The inland types composed of mixed scrub forests occur more or less pure or with a number of associates. The scrub forests are like that of adjacent part of Okhamandal and Cutch. *Euphorbia* clumps are very prominent and their occurrence is a clear case of biotic interference viz. intense grazing and indiscriminate cutting of all other types of vegetation. The recorded presence of certain plants like *Kedrostis rostrata* (Rao & Safui, 1963), *Secamone emetica*, *Phyllanthus amarus*, *Sporobolus diander*, *Cyperus pangorei*, *Asparagus gonoclados* and *Lactuca runcinata* which have not been recorded from the adjacent areas is a matter of distributional interest.

SYSTEMATIC CENSUS

MENISPERMACEAE

Cocculus hirsutus (L.) Diels

A climbing under-shrub on hedges. Rao 1300.

C. pendulus (Forst.) Diels

A climber found in abundance. Rao 1908.

CRUCIFERAE

Brassica nigra Koch.

A herb along shores. Rao 1907.

CAPPARIDACEAE

Cadaba fruticosa (L.) Druce.

A shrub amidst hedges. Rao 1909.

Capparis decidua (Forsk.) Edgew.

A small tree found common. Rao 1233.

Cleome gynandra Linn.

A herb in rocky wastes. Rao 1282.

Maerua arenaria var. **glabra** Hk. f. & Thoms.

A shrub found in abundance. Rao 1910.

M. arenaria var. **scabra** Hk. f. & Thoms.

A common climber throughout the island. Rao 1270.

CARYOPHYLLACEAE

Polycarpaea spicata Wt. & Arn.

A herb on the rocky peripheral portions of the island. Rao 1913.

PORTULACACEAE

Portulaca quadrifida L.

A prostrate herb on the coastal rocks. Rao 1912.

P. oleracea L.

A prostrate herb on the peripheral rocks. Rao 1911.

POLYGALACEAE

Polygala erioptera DC.

An erect herb in rocky places. Rao 525.

ELATINACEAE

Bergia odorata Edgew.

A prostrate herb spreading on sandy and rocky areas. Rao 600.

-MALVACEAE

Abutilon indicum Sweet

A shrub along hedges. Rao 1249.

Gossypium arboreum L.

A shrub in rocky crevices. Rao 1265.

Hibiscus micranthus L. f.

A herb on sandy-rocky soils. Rao 518.

Paysonia patens (Andr.) Chiov.

A herb in rocky crevices. Rao 526.

Senra incana Cav.

A shrub near rocks. Rao 1995.

TILIACEAE

Corchorus depressus (L.) Stocks

A prostrate herb on sandy shores. Rao 1243.

C. trilocularis L.

A common shrub in drying muddy area. Rao 1246.

Grewia tenax (Forsk.) Fiori

A shrub near rocks. Rao 1266.

G. villosa Willd.

A shrub in rocky crevices. Rao 1263.

ZYGOPHYLLACEAE

Fagonia cretica L.

A spiny herb near sandy-rocky coastal slacks. Rao 515.

Tribulus terrestris L.

A prostrate herb on rocky soil. Rao 536.

BURSERACEAE

Commiphora roxburghii (Stocks) Engler

A bushy shrub on hard rocky soils. Rao 1284.

CELASTRACEAE

Maytenus senegalensis (Lamk.) Exell

A shrub along hedges. Rao 1250.

RHAMNACEAE

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

A shrub found all over the island. Rao 1248.

VITACEAE

Cissus quadrangularis L.

A climber found in abundance throughout the island. Rao 1244.

SAPINDACEAE

Cardiospermum halicacabum L.

A creeping herb common in shady hedges. Rao 1276.

LEGUMINOSAE

Acacia nilotica (L.) Del.

A tree found common all over the island. Rao 1236.

A. senegal Willd.

Shrub or small tree with spines; in sandy rocky areas. Rao 1273.

A. tomentosa Willd.

A small tree on the hard sandy rocky soils. Safui 2453.

Alysicarpus longifolius (Rottl.) Wt. & Arn.

A semi-erect herb in the rocky crevices. Rao 524.

Butea monosperma (Lamk.) Taub.

A tree on hard rocky soils. Rao 1230.

Cassia italica (Mill.) Lamk.

A closely growing herb or under-shrub on sandy mixed plains. Rao 514.

C. auriculata L.

A shrub on sandy mixed ground near shore. Safui 2464.

Clitoria ternatea L.

A climber on hedges. Rao 510.

Crotalaria medicaginea Lamk.

An erect herb in the rocky crevices. Rao 545.

Delonix elata (L.) Gamble

A tree near rocky shore. Rao 1274.

Heylandia latebrosa (L.) DC.

A common prostrate herb on the slacks. Rao 507.

Indigofera oblongifolia Forsk.

A very common shrub. Rao 547.

I. linifolia Retz.

A sub-erect herb on hard sandy grounds. Safui 2454.

Mimosa hamata Willd.

A much branched shrub in the hedges. Rao 1277.

Prosopis glandulosa Tour.

A shrub near the peripheral rocks. *Safui* 2463.

Taverniera cuneifolia Arn.

An erect shrub found in abundance. *Rao* 1917.

AIZOACEAE

Glinus lotoides L.

A prostrate herb on muddy soil. *Rao* 1271.

Trianthema pentandra L.

A prostrate herb on sandy shores. *Rao* 505.

CUCURBITACEAE

Cucumis prophetarum L.

A prostrate herb in open field. *Rao* 1283.

Kedrostis rostrata (Rottl.) Cogn.

A climber on hedges. *Rao* 1914.

Luffa acutangula Roxb. var. **amara** Cl.

A climber on hedges. *Rao* 508.

Melothria maderaspatana (L.) Cogn.

A climber along the hedges. *Rao* 533.

RUBIACEAE

Oldenlandia umbellata L.

An erect herb on dry soils. *Rao* 509.

COMPOSITAE

Acanthospermum hispidum DC.

A fast spreading herb on sandy tracts. *Rao* 1286, 501.

Anaphalis cutchica Cl.

A semi-erect herb on sandy meadows. *Rao* 513.

Eclipta prostrata (L.) L.

A prostrate herb in moist places. *Rao* 1245.

Lactuca runcinata DC.

A common tall herb found in shades. *Rao* 542.

Launaea sarmentosa (Willd.) Merr.

A procumbent herb on sandy coastal areas. *Rao* 1239.

Pluchea arguta Boiss.

An under-shrub found only in the peripheral areas. *Safui* 2459.

SALVADORACEAE

Salvadora persica L.

A stunted tree near muddy sea shore. *Rao* 1918.

ASCLEPIADACEAE

Calotropis gigantea (L.) R. Br.

A shrub commonly found near shore. *Rao* 1241.

Cryptostegia grandiflora (Roxb.) R. Br.

A climber commonly found towards Hanuman Dandi area. *Rao* 1231.

Leptadenia reticulata W. & A.

A twining shrub on *Euphorbia* sp. *Safui* 2450.

Secamone emetica Br.

A shrub in green flowers. *Rao* 535.

GENTIANACEAE

Enicostema hyssopifolium (Willd.) Verd.

A herb on rocky and sandy shores. *Rao* 1296, 517.

BORAGINACEAE

Cordia gharaf (Forsk.) Ehrenb.

A tall shrub along the hedges. *Rao* 1299.

Heliotropium strigosum Willd.

A prostrate or semi-erect herb on wet and muddy places. *Rao* 1252.

H. supinum L.

A prostrate herb common on muddy places. *Rao* 1240.

Sericostoma pauciflorum Stocks

A stunted branching shrub along the sea shore. *Rao* 1258.

Trichodesma indicum R. Br.

A herb on sandy places. *Rao* 1280.

CONVOLVULACEAE

Convolvulus microphyllus Sieb. ex Spreng.

A prostrate herb spreading near moist places. *Rao* 1238.

Cressa cretica L.

An erect or prostrate herb on salty and drying muddy fields. *Rao* 1232.

Cuscuta chinensis Lamk.

A twining herb on sandy banks. *Rao* 543.

Ipomoea nil (L.) Roth.

A climber on hedges. *Rao* 511.

SOLANACEAE

Lycium europaeum L.

A shrub found all over the island. *Rao* 1278, 503.

Solanum dubium Fressen

A herb found in abundance all along the sandy tracts. *Rao* 1279.

PEDALIACEAE

Pedaliium murex L.

A common branched herb along the sandy plains. *Rao* 1247.

Sesamum indicum L.

An erect herb on sandy hard soils. *Rao* 532.

ACANTHACEAE

Barleria prionitis L.

A bushy shrub among the hedges. *Safui* 2460.

Dipteracanthus patulus (Jacq.) Nees

A stunted herb on rocky-sandy areas. *Rao* 521.

Lepidagathis trinervis Wall.

A stunted diffuse under-shrub in the rocky-sandy wastes. *Rao* 496.

Peristrophe bicalyculata (Retz.) Nees

An erect spreading herb growing on shady regions. *Rao* 531.

Rostellularia procumbens (L.) Nees

A very common herb in sandy-rocky slacks. *Rao* 502.

VERBENACEAE

Phyla nodiflora (L.) Greene

A prostrate herb on marshy places. *Rao* 1291.

Priva cordifolia (L. f.) Druce.

An erect branching herb near hedges; white flowers on drawn out racemes; fruit enclosed in enlarged calyx; two pyrenes. *Rao* 527.

NYCTAGINACEAE

Boerhavia diffusa L.

A running herb all over the island. *Rao* 1920.

AMARANTHACEAE

Achyranthes aspera L.

An erect herb found in abundance all over the island. *Rao* 544.

Aerva javanica (Burm. f.) Spreng.

A herb common in sandy plains. *Rao* 1251.

Amaranthus tricolor Willd.

A prostrate herb in the rocky crevices. *Rao* 1904.

Digera muricata (L.) Mart.

A spreading herb in open fields. *Rao* 1285.

CHENOPODIACEAE

Atriplex stocksii Boiss.

A semi-erect in the rocky crevices along the sea-shore. *Rao* 1257.

POLYGONACEAE

Polygonum plebejum R. Br.

A prostrate herb near moist places. *Rao* 1258.

EUPHORBIACEAE

Acalypha ciliata Forsk.

An erect herb found in the peripheral portion of the island. *Rao* 1906.

Euphorbia tirucalli L.

A tree like tall shrub mostly used for fencing purposes. *Rao* 506.

Phyllanthus amarus Schum. & Thorn.

A small herb in rocky crevices. *Rao* 1256.

P. fraternus Webster

A herb in the dry areas along the coasts. *Rao* 1915.

URTICACEAE

Ficus religiosa L.

A tree on the rocky areas. *Rao* 1901.

F. glomerata Roxb.

An evergreen tree along the coasts. *Rao* 1902.

LILIACEAE

Aloe vera L.

A succulent herb in abundance near grave yard. *Rao* 534.

Asparagus dumosus Baker

A very common undershrub on bushes near sea shore. *Rao* 1229.

A. gonoclados Baker

A much branched shrubby plant spreading on other trees. *Rao* 1268.

A. racemosus Willd.

A climber on hedges. *Safui* 2456.

PALMAE

Hyphaene indica Becc.

A tall branching palm. Only a single male plant was seen. *Rao* 1002.

Phoenix sylvestris (L.) Roxb.

A tree found very rare throughout the island. *Rao* 1235.

CYPERACEAE

Cyperus pangorei Rottb.

A tall sedge on sandy shores. *Rao* 530.

GRAMINEAE

Aeluropus lagopoides (L.) Trin. ex Thw.

A runner abundant in salty creeks. *Rao* 1287.

Cenchrus biflorus Roxb.

A grass in abundance in rocky sandy areas. *Rao* 548.

Dichanthium annulatum (Forsk.) Stapf

A tall grass found all over the island. *Rao* 1292, 529.

Eragrostis ciliaris (All.) Link.

A common grass along the sandy plains. *Rao* 530.

Pennisetum typhoides (Burm.) Stapf & Hubb.

Cultivated. *Rao* 1288.

Setaria verticillata Beauv.

An erect grass along the rocky coasts. *Rao* 1905.

Sporobolus diander (Retz.) Beauv.

A slender grass found in abundance. *Rao* 528.

S. termulus Kunth.

A creeper on dry muddy areas. *Safui* 2462, 1234.

GYMNOSPERMS

Ephedra foliata Boiss.

A climbing shrub in Thor jungle. *Rao* 1242.

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