

## 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 2 km to the north of the mainland of Okhamandal, situated 22°30' 22" N and the Gulf of Catch is reviewed in this paper. Based on the types of soil, rocks and salinity features the vegetation of the island has been distinguished into 3 main categories: (1) Strand, (2) Salt pans, dunes 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 Catch and Okhamandal to the coastal area has been traced. 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 2 km to the north of the mainland of Okhamandal in the Gulf of Catch. 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 Shank 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°35'N and 69°9'E, with an area of 10.2 km<sup>2</sup> (Anon., 1958). 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 southwest 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 the island 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 hot sultry. Mean annual rainfall of the nearest meteorological

station at Dwarka (22°42'N & 69°05'E) to which reference may be made is 13.53 inches (338.8 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 6.93 inches (176.5 mm) is the wettest month. Annual mean of daily maximum temperature is 84.6°F and that of daily minimum temperature 73.0°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. 1.

### GEOLOGY AND SOILS

The island is made up of non-metablic beds which are common in the islands of the Gulf of Catch and reach as far as the Okha Rann and throughout Okha (Anon., 1884). These beds are much covered by new groups. Miocene 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 gypsiferous with iron-stained harder bands are found exposed in the island.

The south-west half of the island extending upto Shankhodhar 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

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 plumosus* are found growing in abundance. The sandy bars on the island side have the shrubby *Sesuvium portiflorum* 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 *Hedyotis latifolia* 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 *Fragaria cretica*, *Panicum patens*, *Setaria indica*, *Clinum latifolium*, *Anaphalis cutchica*, *Emicostema 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 habitats 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 (7.98.0) indicates moderate alkalinity. Organic matter contents (0.31-0.65%) are low due to the sparse vegetation cover. Total dissolved solids (0.0025-0.128%) and sodium chloride contents (0.0150-0.031%) are also low indicating sea water spray but no inundation with sea water. The sands are very highly calcareous (38.12-55.54%  $\text{CaCO}_3$ ).

#### 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

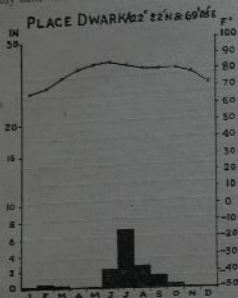


Fig. 1. Histogram showing distribution of Rainfall and Temperature Ceres.

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 Beyr 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

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 1 below:

TABLE 1

Soil sample No.	439	443	444
Location	Sandy strand habitat northern shore	Sandy lare on the north-eastern side	Sandy lare on the north-eastern side
Depth of sampling in cm	0-10	0-10	0-10
Vegetation cover	<i>Cyperus conglomeratus</i> and <i>Aporosa densa</i>	<i>Setaria purpurea</i>	<i>Setaria purpurea</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	7.0	8.0	8.0
Organic matter %	0.65	0.57	0.51
Total dissolved solids %	0.113	0.128	0.073
Sodium chloride %	0.031	0.023	0.013
Calcium carbonate %	51.80	35.54	38.12

TABLE 2

Soil sample No.	437	445
Location	Salt pan on way to Hazman Danda	Muddy flat adjacent to the internal scrub-land
Depth of sampling in cm	0-10	0-10
Vegetation cover	<i>Aeluropus lappaceus</i> and <i>Sporobolus bromoides</i>	<i>Sporobolus bromoides</i> and <i>Cressa cretica</i>
Soil colour	Grey	Light grey
Clay %	3.9	1.7
Silt %	4.7	1.7
Fine sand %	88.2	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 %	0.045	0.009
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 (1.278-1.262%) 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  $\text{CaCO}_3$  content of 18.82-24.50%.

### 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*, *Pouzosia 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	443	445
Location	Inland mixed scrub forest			Rocky scrub-land adjacent to muddy flats	Shankholia point inland 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>Albizia 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>Cassia tora</i>
Soil colour	Dull yellow with blackish tinge	Dull yellow	Dull yellow	Very light brown	Very light brown
Clay %	3.2	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	3.0	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 %	1.30	0.30	0.46	2.65	2.72
Total dissolved solids %	0.219	0.100	0.065	6.203	0.134
Sodium chloride %	0.093	0.029	0.013	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 micula* 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 0.26% at 30.90 cm depth. Total dissolved solids decrease from 0.219% to 0.055% and sodium chloride contents from 0.035% to 0.013% from surface to bottom horizon in the profile. The soils with CaCO<sub>3</sub> contents of 35.24 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 sandy 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 (7.2-7.5) indicates mild alkalinity. Organic matter contents range between 2.05-2.72%. Total dissolved solids 0.134-0.205% and sodium chloride contents 0.026-0.055% are fairly low. The soils are calcareous with CaCO<sub>3</sub> contents of 6.81-27.79%.

#### SANIMAR BEYT

A tiny islet locally known as *Sanimar Beyt* near Shankholia point composed of solid exposed rock around 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 *Salsola persica* and *Commiphora rosbergii* from a mixed association. Next the mixed secondary associates include such plants like *Maerua arvensis* and *Lycium europaeum*.

The ground flora is composed of *Boerhaavia diffusa*, *Barleria pruriens*, *Portulaca quadrifida*, *Ternstroemia cuneifolia*, *Asparagus gonoclados*, *Polycarpa 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 micula* 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 *Boerhaavia diffusa*, *Elephantopus scaberifolius* and *Ammanium bacciferum*.

#### Salient features of the flora:

The flora of Beyt island has an affinity both with the flora of Okhamandal to Dia coastal area and the flora of Catch, 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 adapted to coast conditions. Plants like *Cyperus conglomeratus* and *Asparagus diandrus* 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 Catch. *Euphorbia* clumps are very prominent and their occurrence is a clear case of hortic 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), *Secanum eriocha*, *Phyllanthus amarus*, *Sporobolus diander*, *Cyperus pangorei*, *Asparagus gonoclados* and *Lactuca rosivata* which have not been recorded from the adjacent areas is a matter of distributional interest.

### SYSTEMATIC CENSUS

#### MENISPERMACEAE

*Coccoloba hirsuta* (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* (Forst.) Edgew.

A small tree found common. Rao 1233.

*Cleome gynandra* Linn.

A herb in rocky wastes. Rao 1382.

- Maera arenaria* var. *glabra* Hk. f. & Thoms.  
A shrub found in abundance. Rao 1916.  
*M. arenaria* var. *scabra* Hk. f. & Thoms.  
A common climber throughout the island. Rao  
1276.

## CARYOPHYLLACEAE

- Polycarpha spicata* Wt. & Arn.  
A herb on the rocky peripheral portions of the  
island. Rao 1915.

## 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 eriopetra* 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.) Chion.  
A herb in rocky crevices. Rao 526.  
*Senra incana* Cav.  
A shrub near rocks. Rao 1995.

## TILIACEAE

- Cochchorus depressus* (L.) Spenks  
A prostrate herb on sandy shores. Rao 1243.  
*C. trilobularis* 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

- Cumminsophora 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 halicacabom* 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* (Roxb.) 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  
597.  
*Indigofera oblongifolia* Forsk.  
A very common shrub. Rao 547.  
*I. binifolia* 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 canefolia** Arn.  
 An erect shrub found in abundance. *Rao* 1917.

## AZOACEAE

**Glinus lotoides** L.  
 A prostrate herb on muddy soil. *Rao* 1271.  
**Trianthema pentandra** L.  
 A prostrate herb on sandy shores. *Rao* 395.

## CUCURBITACEAE

**Cucumis prophetarum** L.  
 A prostrate herb in open field. *Rao* 1283.  
**Kedrostis rostrata** (Rottk.) Cogn.

A climber on hedges. *Rao* 1914.  
**Luffa acutangula** Roxb. var. *amara* Cl.  
 A climber on hedges. *Rao* 568.  
**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

**Encostema hyssopifolium** (Willd.) Verd.  
 A herb on rocky and sandy shores. *Rao* 1296, 517.

## BORAGINACEAE

**Cordia ghani** (Forsk.) Elmerb.  
 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* 1248.

**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.

**Crotalaria cretica** L.  
 An erect or prostrate herb on salty and drying muddy fields. *Rao* 1272.

**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, 505.

**Solanum dubium** Fresen.  
 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.

## AGANTHACEAE

**Barleria prionitis** L.  
 A bushy shrub among the hedges. *Safui* 2460.

**Dipteracanthus patulus** (Jacq.) Nees  
 A stunted herb on rocky-sandy areas. *Rao* 521.

**Lepidogathis trinervis** Wall.  
 A stunted diffuse under-shrub in the rocky-sandy wastes. *Rao* 456.

**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.) Greuter  
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 327.

## 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 1351.
- 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.

## EUPHORBIAEAE

- 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. & Thonn.  
A small herb in rocky crevices. Rao 1236.
- P. fraterus** 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 1922.

## LILIACEAE

- Aloe vera** L.  
A succulent herb in abundance near grave yard. Rao 534.

**Asparagus dumosus** Baker

A very common undershrubs on bushes near sea shore. Rao 1229.

**A. gonocladus** Baker

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

**A. racemosus** Willd.

A climber on hedges. Saji 2436.

## 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 1237.

## CYPERACEAE

**Cyperus pangorei** Retz.

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 1392, 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. ternstroemii** Kunth.

A creeper on dry muddy areas. Saji 2462, 1234.

## GYMNOSPERMIS

**Ephedra foliata** Boiss.

A climbing shrub in Thor jungle. Rao 1242.

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