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AN ACCOUNT OF THE VEGETATION OF KAVARATTI ISLAND, LACCADIVES

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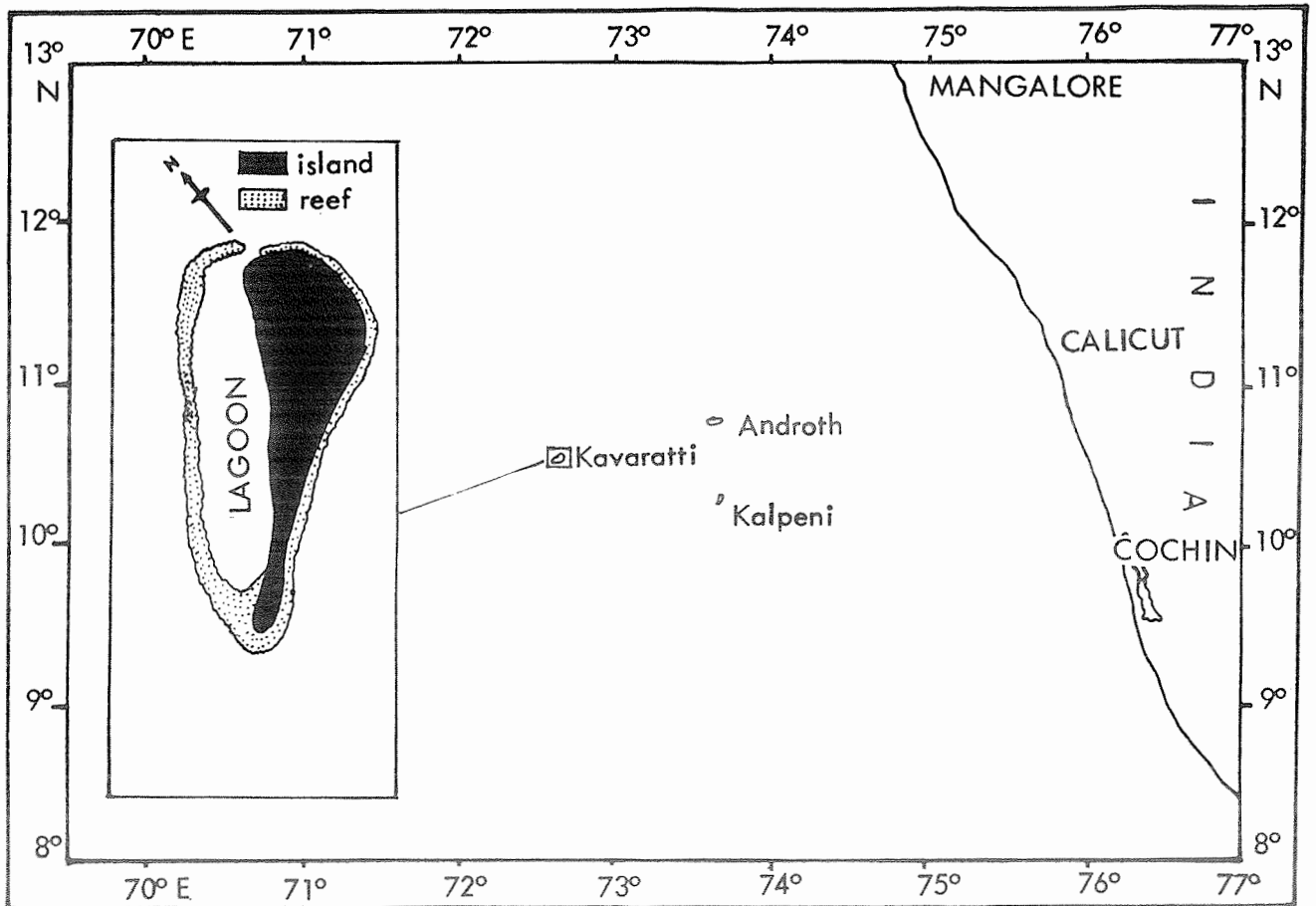


Figure 1. Location map of Kavaratti Island in relation to Indian coast line.

AN ACCOUNT OF THE VEGETATION OF KAVARATTI ISLAND, LACCADIVES

By P. Sivadas¹, B. Narayanan¹ and K. Sivaprasad²

The Laccadive archipelago, consisting of about 20 islands and separated from the Indian peninsula by about a 290 kilometre stretch of sea, offers a unique ground to study the insular flora. A few attempts have been made to describe the flora of these islands in general (Gardiner, 1906; Prain, 1890-94). However, the occurrence and distribution of the plant species and the ecological variations exhibited by them, if any, have hitherto not been studied in these islands. As a prelude to such a comparison, the distribution of the plants of individual islands is being studied. A short account of the climatic conditions and soil chemistry of Kavaratti Island is mentioned before describing its flora.

Kavaratti, Headquarters of the Union Territory of Lakshadweep (Laccadives), lies on a NE-SW axis at $10^{\circ}33'N$ latitude and $72^{\circ}36'E$ longitude (Fig. 1). The length of the island is 5.82 km and the maximum width is 1.53 km, the total area is 3.63 sq. km. The island has an extensive lagoon on the western side which is separated from the sea by a coral reef.

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CLIMATE

Kavaratti has a humid tropical climate. The annual minimum temperature varies from 22.6° to 27°C while the annual maximum temperature varies from 29.3° to 32.6°C. December-January are the coolest months while April-May are the hottest. The island has the benefit of both SW and NE monsoons. The SW monsoon is much more severe, characterized by heavy gales and winds. The NE monsoon is milder. The total number of rainy days varies from 65 to 85. The average monthly rainfall for the years 1970 to 1975 varies from 130 to 190 mm.

SOIL

The soil is formed by the dead, disintegrated and weathered skeletons of corals. It is estimated to contain 95% calcium carbonate in the form of aragonite. The pH of the soil varies from 8 to 8.4. Percentage of organic carbon is 1 to 1.4. Available phosphorus is present at the rate of 98.8 kg/Ha and available potash at the rate of 65 kg/Ha. The nitrification of the soil is affected by the alkalinity to a considerable extent. The soil is of an open character and possesses good drainage and aeration.

VEGETATION

During the present study, emphasis was given to determining the plant species represented in the island. The plants are taxonomically arranged according to the Bentham and Hooker system. For the convenience of collection and recording, the whole island is arbitrarily divided into four zones, and the distributions of some of the plants have been shown in Figs. 2 and 3.

Kavaratti has a good vegetation cover. The northern portion of the island is inhabited and plants like Musa paradisiaca, Colocasia esculenta, Carica papaya, Amaranthus sp., etc., are cultivated here. Moringa oleifera, Artocarpus altilis and Terminalia catappa are seen growing wild in zones 1 and 2. The southern end of the island has a shrub jungle consisting of plants like Scaevola sericea, Premna obtusifolia, Calophyllum inophyllum, Pandanus odoratissimus, Morinda citrifolia, etc. Trees like Casuarina equisetifolia, Zizyphus mauritiana and

Thespesia populnea are distributed throughout zones 1, 2 and 3. Tournefortia argentea and Pemphis acidula are seen on the western side of the island in zones 3 and 4. Ficus bengalensis does not seem to adhere to any specific pattern of distribution and is seen at random in the island.

The ground vegetation consists of plants like Spinifex littoreus, Argemone mexicana, Ipomoea pes-caprae, Aerva lanata, Alysicarpus monilifer, Evolvulus alsinoides, Commelina bengalensis, etc. Distribution of Spinifex littoreus is restricted to certain areas in zones 1, 3 and 4. Zones 1 and 4 have an extensive coverage of herbs like Kyllinga monocephala and Setaria italica. Blumea membranacea is seen distributed in zones 3 and 4. There is an extensive growth of Stachytarpheta indica in zones 2 and 3 especially in front of the Secretariat buildings. Lantana camara and Bougainvillea spectabilis are two plants occurring throughout the island. The Gandhi Centenary Park has a number of recently introduced garden plants like Codiaeum variegatum, Ipomoea quamoclit, Hibiscus rosa-sinensis, Cosmos sulphureus, Nerium indicum, Pedilanthus tithymaloides, etc.

The Lakshadweep administration is maintaining an agricultural farm where a number of common vegetables like Hibiscus esculentus, Solanum melongena, Capsicum minimum, Trichosanthes cucumerina, Cucumis sativus, etc. are grown. Eucalyptus sp. is now grown in this farm as a trial.

It appears that an attempt was made to cultivate Oryza sativa in this island long ago. The information collected from the islanders corroborates well the evidence of soil removed from certain areas in the island to make paddy fields. The soil thus removed was dumped on other portions of the island, thus making artificial sand dunes. However, paddy cultivation here appears to have been unsuccessful. This may be because of the high alkalinity of the soil and the unavailability of sufficient fresh water for irrigation.

Cocos nucifera is the main plantation crop. Two varieties are grown; the common tall variety and the endemic micro-variety. The micro-variety is small and is under 5' or 6' in height. The yield is very high though the size of the fruit is comparatively small. The 'Copra' obtained from these coconuts contains a high level of oil when compared to the ordinary

variety. Some of the islanders are cultivating Piper nigrum and Manihot esculenta in their private lands. Piper betle and Areca catechu are the two other common plants grown by the islanders.

There is a sea grass bed consisting of Thalassia hemprichii and Syringodium isoetifolium on the bottom of the lagoon, growing from about low water neap tide and continuing out to a distance of about 100 m. In certain parts it extends even farther than 100 m forming smaller patches in the lagoon. Usually a huge bulk of dead Thalassia hemprichii is washed ashore and it is possible that it also contributes greatly to the particulate organic carbon of the lagoon.

A total of one hundred and seventeen terrestrial plants have been collected from the 3.629 sq. km island alone. Forty-eight families of angiosperms are represented here. However, this investigation has not revealed any endemic forms.

New plants are being introduced constantly and the human influence is quite visible. Plants like Alysicarpus monilifer, Crotalaria fysonii, Codiaeum variegatum, Ipomoea quamoclit seem to have been introduced since they are not recorded by Gardiner (1906). Following is the complete list of plants collected from Karawatti Island:

	<u>PAPAVERACEAE</u>
<u>Argemone mexicana</u> L.	H 001*, Z1, Z2.
	<u>CAPPARIDACEAE</u>
<u>Cleome viscosa</u> L.	IS, Z1, Z2.
	<u>PORTULACACEAE</u>
<u>Portulaca oleracea</u> L.	IS, Z1, Z2, Z3, Z4.
	<u>GUTTIFERAE</u>
<u>Calophyllum inophyllum</u> L.	IS, Z1, Z2, Z3, Z4.
	<u>MALVACEAE</u>
<u>Abutilon indicum</u> (L.) Sweet	H 002, Z2, C3.
<u>Gossypium barbadense</u> L.	IS, Z1, Z2, Z3.

* H - Herbarium kept in Regional Centre, N10. (No standard symbol available).

IS - Identified on sight.

Z - Zone.

- Names followed by # have been substituted by the editors to correspond to recent changes or in some cases for consistency with what seems the best current usage. Hence they are not the responsibility of the author and his advisors. It is with some hesitation that we publish the numerous sight records that are not supported by specimens. F.R.F., ed.

<u>Hibiscus rosa-sinensis</u> L.	IS, Z2.
<u>Hibiscus esculentus</u> L.	IS, Z2, Z3.
<u>Thespesia populnea</u> (L.) Sol. ex Correa	H 003, Z1, Z2, Z3.
	<u>TILIACEAE</u>
<u>Corchorus trilocularis</u> L.	H 004, Z2, Z4.
<u>Corchorus capsularis</u> L.	IS, Z3, Z4.
	<u>RUTACEAE</u>
<u>Citrus grandis</u> (L.) Osbeck #	IS, Z1.
<u>Citrus medica</u> L.	IS, Z1.
	<u>MELIACEAE</u>
<u>Azadirachta indica</u> A. Juss.	H 005, Z1, Z2, Z3.
	<u>RHAMNACEAE</u>
<u>Zizyphus mauritiana</u> Lamk.	H 006, Z1, Z2.
<u>Zizyphus</u> sp.	H 007, Z1, Z2.
	<u>VITACEAE</u>
<u>Leea</u> sp.	H 008, Z2.
	<u>SAPINDACEAE</u>
<u>Dodonaea viscosa</u> L.	IS, Z3, Z4.
<u>Cardiospermum halicacabum</u> L.	IS, Z2, Z3, Z4.
	<u>LEGUMINOSAE</u>
<u>Alysicarpus monilifer</u> DC.	H 009, Z1, Z2, Z4.
<u>Crotalaria fysonii</u> Dunn.	IS, Z1, Z2, Z3.
<u>Crotalaria verrucosa</u> L.	H 010, Z2.
<u>Crotalaria retusa</u> L.	H 012, Z2.
<u>Cassia occidentalis</u> L.	IS, Z2, Z3.
<u>Cassia tora</u> L.	IS, Z2, Z3.
<u>Cassia</u> sp.	H 013, Z2, Z3.
<u>Clitoria ternatea</u> L.	IS, Z1, Z2.
<u>Desmodium gangeticum</u> (L.) DC.	IS, Z1, Z2, Z3.
<u>Indigofera tinctoria</u> L.	H 014, Z2, Z3.
<u>Phaseolus</u> sp.	H 015, Z2, Z3.
<u>Tephrosia</u> sp.	H 016, Z2, Z3.
	<u>COMBRETACEAE</u>
<u>Terminalia catappa</u> L.	H 017, Z1, Z3.
	<u>MYRTACEAE</u>
<u>Psidium guajava</u> L.	IS, Z2.
	<u>LYTHRACEAE</u>
<u>Pemphis acidula</u> Forst.	IS, Z3, Z4.
	<u>CARICACEAE</u>
<u>Carica papaya</u> L.	IS, Z1, Z2, Z3.
	<u>CUCURBITACEAE</u>
<u>Trichosanthes cucumerina</u> L.	H 018, Z1, Z2, Z3.
<u>Cucumis sativus</u> L.	IZ, Z1, Z2.
<u>Coccinia grandis</u> (L.) Voight	H 019, Z1, Z2, Z3.

	<u>RUBIACEAE</u>	
<u>Morinda citrifolia</u> L.	IS, Z3.	
<u>Hedyotis umbellata</u> (L.) Lamk.	H 020, Z2, Z4.	
	<u>COMPOSITAE</u>	
<u>Blumea membranacea</u> DC	H 021, Z3, Z4.	
<u>Cosmos sulphureus</u> Cav.	H 022, Z2.	
<u>Spilanthes calva</u> DC.	H 023, Z2, Z3, Z4.	
<u>Veronia cinerea</u> (L.) Less.	H 024, Z2, Z3, Z4.	
<u>Tridax procumbens</u> L.	H 025, Z2, Z3, Z4.	
<u>Zinnia</u> sp.	H 026, Z2.	
	<u>GOODENIACEAE</u>	
<u>Scaevola sericea</u> Vahl #	H 027, Z4.	
	<u>SAPOTACEAE</u>	
<u>Chrysophyllum cainito</u> L.	IS, Z2.	
<u>Manilkara zapota</u> (L.) P.V. Royen #	IS, Z2.	
	<u>APOCYNACEAE</u>	
<u>Neisosperma oppositifolia</u> (Lamrk.) Fosberg & Sachet #	H 028, Z2.	
<u>Parsonsia alboflavescens</u> (Dennst.) Mabblerly	H 029, Z2, Z3.	
<u>Nerium oleander</u> var. <u>indicum</u> (Mill.) Deg. #	H 030, Z2, Z3.	
	<u>ASCLEPIADACEAE</u>	
<u>Calotropis gigantea</u> R. Br.	IS, Z1, Z2.	
	<u>BORAGINACEAE</u>	
<u>Tournefortia argentea</u> L.f.	H 031, Z3, Z4.	
	<u>CONVOLVULACEAE</u>	
<u>Ipomoea pes-caprae</u> (L.) Sweet	IS, Z2, Z3, Z4.	
<u>Ipomoea macrantha</u> R. & S. #	H 032, Z3, Z4.	
<u>Evolvulus alsinoides</u> L.	H 033, Z1, Z2, Z4.	
<u>Ipomoea quamoclit</u> L.	H 034, Z2.	
<u>Cuscuta reflexa</u> Roxb.	IS, Z3.	
	<u>SOLANACEAE</u>	
<u>Capsicum minimum</u> Roxb.	IS, Z2.	
<u>Capsicum frutescens</u> L.	IS, Z2.	
<u>Datura stramonium</u> L.	H 035, Z2, Z3.	
<u>Solanum lycopersicum</u> L. #	IS, Z2.	
<u>Solanum melongena</u> L.	IS, Z2.	
	<u>BIGNONIACEAE</u>	
<u>Tecoma stans</u> (L.) H.B. & K.	H 036, Z2, Z3.	
	<u>ACANTHACEAE</u>	
<u>Andrographis</u> sp.	H 037, Z1, Z2, Z3, Z4.	
<u>Justicia procumbens</u> L.	IS, Z1, Z2, Z3, Z4.	

<u>VERBENACEAE</u>	
<u>Clerodendrum inerme</u> (L.) Gaertn.	H 038, Z2.
<u>Lantana camara</u> L.	IS, Z1, Z2, Z3, Z4.
<u>Premna obtusifolia</u> R. Br.	H 039, Z3.
<u>Stachytarpheta indica</u> Vahl	H 040, Z2, Z3.
<u>Lippia nodiflora</u> (L.) Rich.	H 041, Z2, Z4.
<u>LABIATAE</u>	
<u>Ocimum sanctum</u> L.	IS, Z2.
<u>Anisomeles indica</u> O. Ktze.	H 042, Z1, Z2, Z3.
<u>NYCTAGINACEAE</u>	
<u>Boerhavia diffusa</u> L.	H 043, Z1, Z3, Z3.
<u>Bougainvillea spectabilis</u> Willd.?	IS, Z2, Z3.
<u>AMARANTHACEAE</u>	
<u>Achyranthes aspera</u> L.	H 044, Z1, Z2, Z3.
<u>Amaranthus gangeticus</u> L.	IS
<u>Amaranthus spinosus</u> L.	IS
<u>Amaranthus caudatus</u> L.	IS
<u>Amaranthus viridis</u> L.	IS
<u>Aerva lanata</u> (L.) Juss.	H 045, Z1, Z2, Z3, Z4.
<u>Celosia argentea</u> L.	IS, Z2, Z3.
<u>PIPERACEAE</u>	
<u>Piper nigrum</u> L.	IS, Z1, Z2.
<u>Piper betle</u> L.	IS, Z1, Z2.
<u>EUPHORBIACEAE</u>	
<u>Acalypha indica</u> L.	H 046, Z2, Z3.
<u>Codiaeum variegatum</u> L.	H 047, Z2.
<u>Ricinus communis</u> L.	H 048, Z1.
<u>Pedilanthus tithymaloides</u> (L.) Poit.	H 049, Z2, Z3.
<u>Embllica officinalis</u> Gaertn.	H 050, Z2.
<u>Manihot esculenta</u> Crantz	IS, Z1.
<u>Euphorbia tirucalli</u> L.	IS, Z3.
<u>Euphorbia rosea</u> Retz	IS, Z2, Z3, Z4.
<u>Euphorbia thymifolia</u> L.	IS, Z2, Z3, Z4.
<u>Euphorbia hirta</u> L.	IS, Z1, Z2, Z3, Z4.
<u>MORACEAE</u>	
<u>Artocarpus altilis</u> (Park.) Fosberg	IS, Z1, Z2.
<u>Ficus religiosa</u> L.	IS, Z1, Z2, Z3, Z4.
<u>Ficus bengalensis</u> L.	IS, Z1, Z2, Z3.
<u>URTICACEAE</u>	
<u>Pouzolzia zeylanica</u> (L.) Benn.	H 051, Z1, Z2, Z4.
<u>CASUARINACEAE</u>	
<u>Casuarina equisetifolia</u> L.	H 052, Z1, Z2, Z3.
<u>CANNACEAE</u>	
<u>Canna indica</u> L.	IS, Z3.
<u>MUSACEAE</u>	
<u>Musa paradisiaca</u> L.	IS, Z1, Z2, Z3.

<u>Agave</u> sp.	<u>AMARYLLIDACEAE</u> IS, Z2, Z3.
<u>Dioscorea</u> <u>alata</u> L.	<u>DIOSCOREACEAE</u> IS, Z1, Z2, Z3.
<u>Gloriosa</u> <u>superba</u> L.	<u>LILIACEAE</u> H 053, Z2, Z3.
<u>Rhoeo</u> <u>spathacea</u> (Sw.) Stearn	IS, Z2, Z3.
<u>Asparagus</u> <u>racemosus</u> Willd.	IS, Z3.
<u>Commelina</u> <u>benghalensis</u> L.	<u>COMMELINACEAE</u> H 054, Z1, Z2, Z3, Z4.
<u>Areca</u> <u>catechul</u> L.	<u>ARECACEAE</u> IS, Z1.
<u>Cocos</u> <u>nucifera</u> L.	IS, Z2, Z2, Z3, Z4.
<u>Pandanus</u> <u>odoratissimus</u> L.f.	<u>PANDANACEAE</u> IS, Z4.
<u>Alocasia</u> <u>macrorrhiza</u> (L.) Schott	<u>ARACEAE</u> IS, Z1, Z2.
<u>Colocasia</u> <u>esculenta</u> (L.) Schott	IS, Z1, Z2.
<u>Cyperus</u> <u>kyllingia</u> Endl. #	<u>CYPERACEAE</u> IS, Z1, Z2, Z3, Z4.
<u>Spiniflex</u> <u>littoreus</u> Merr.	<u>GRAMINEAE</u> IS, Z1, Z3, Z4.
<u>Saccharum</u> <u>officinarum</u> L.	IS, Z2.
<u>Setaria</u> <u>italica</u> Beauv.	IS, Z1, Z2, Z3, Z4.

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REFERENCES

- Gardiner, J.S. 1906. The fauna and geography of the Maldiva and Laccadive Archipelagoes, being the account of the work carried out and of collections made by an expedition during the years 1899 and 1900, Vol. 2, Cambridge: University Press.
- Prain, D. 1890. A list of Laccadive plants. Sc. Mem. Med. Off. Army India, 5: 47-70.
- _____ 1892-94. Botany of the Laccadives, being natural history notes from H.M.I.M. Survey Steamer "Investigator"...J. Bombay Nat. Hist. Soc., 7: 268-95; 1892; 8: 57-86, 1893; 488, 1894.
(Reprinted in Memo. and Memor. 301-89, 1894.)

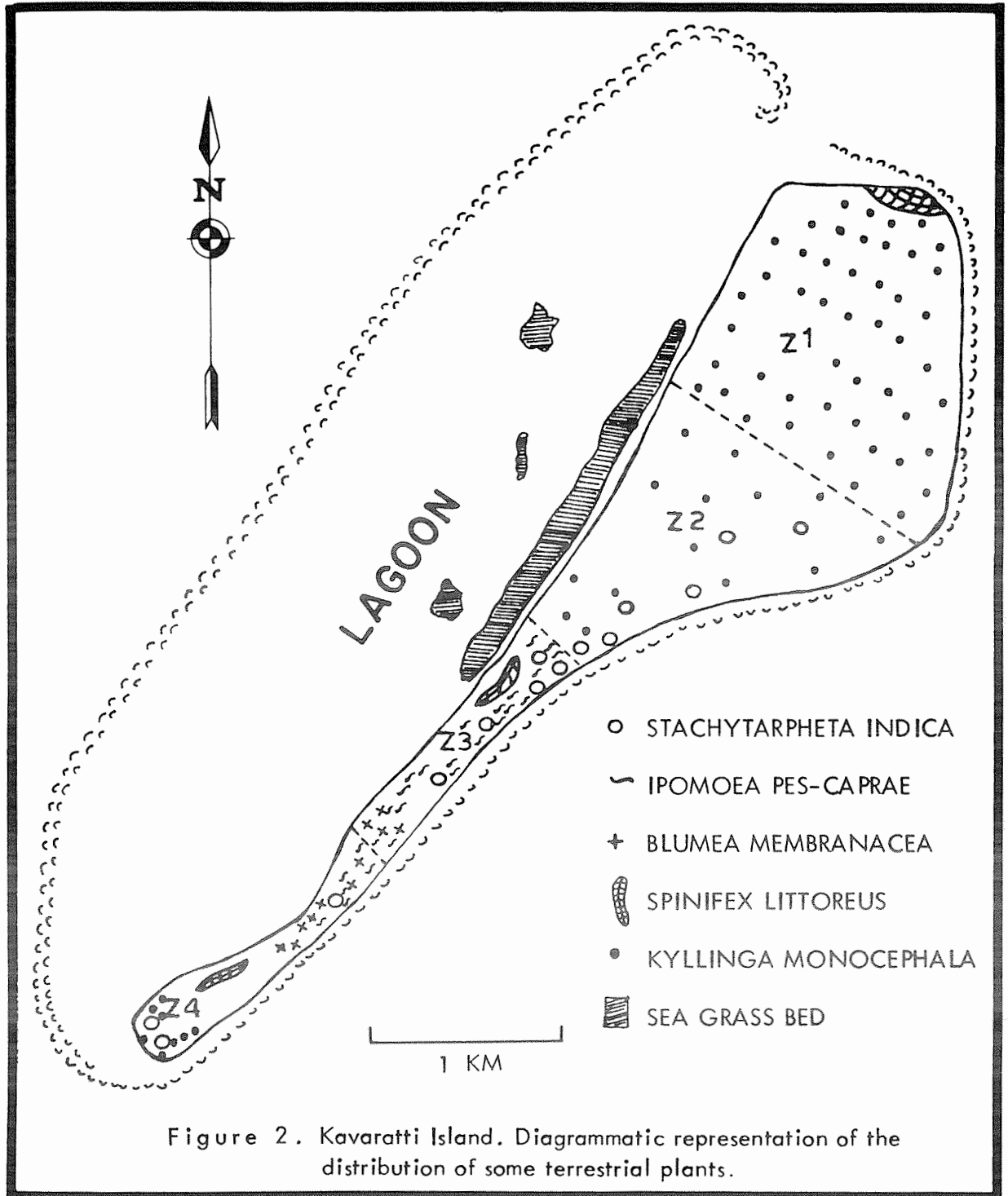


Figure 2. Kavaratti Island. Diagrammatic representation of the distribution of some terrestrial plants.

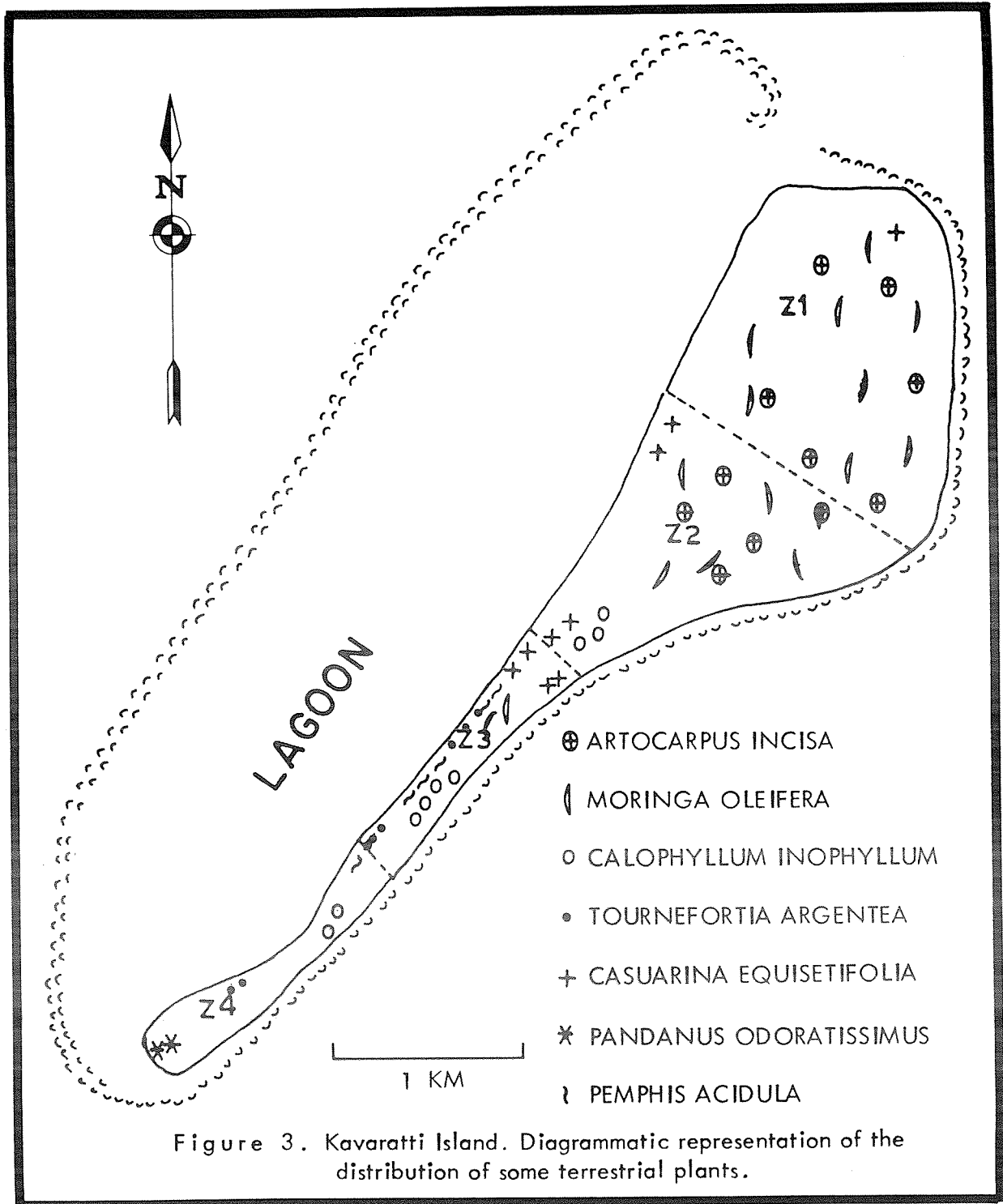




Plate 1. Extensive bed of Thalassia on the intertidal area



Plate 2. Huge bulk of dead Thalassia washed ashore



Plate 3. Spinifex littoreus close-up view



Plate 4. Pemphis acidula on the lagoon side of the beach