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MYXOMYCETES OF ALDABRA ATOLL

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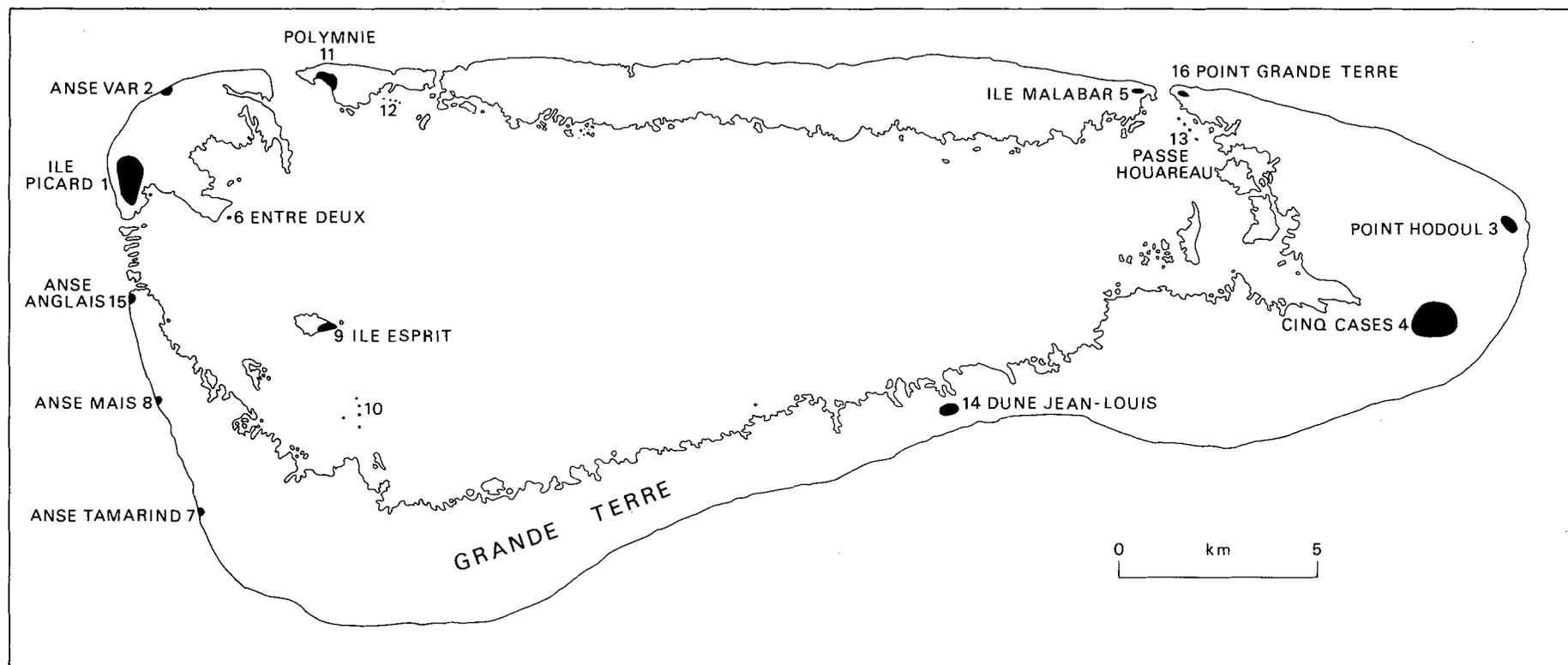


Fig 1. Aldabra Atoll showing the position of the collecting sites.

MYXOMYCETES OF ALDABRA ATOLL

by Bruce Ing¹ and R. J. Hnatiuk²

ABSTRACT

A first list of myxomycetes from the coral atoll of Aldabra in the Indian Ocean is given. 55 species are recorded of which ten are new to the African region. *Didymium floccosum* Martin, Thind & Rehill and *Physarum dictyosporum* Martin are rare species previously known from India and America respectively. Ecological notes are provided, the majority of species occur in litter under scrub, on coconut husks or rotten wood.

INTRODUCTION

Myxomycetes have been recorded infrequently from remote, oceanic islands. Intensive searching of such locations at optimal times of year has not often been possible. The records presented here are some of the most extensive reported from an isolated, tropical island.

Aldabra is a coral atoll in the western Indian Ocean (9°24'S lat., 46°20'E long.) located about 640 km east of Tanzania and 420 km north-west of Madagascar. The atoll consists of an oblong ring of islands around a shallow lagoon. Low calcareous dunes occur at several places around the coast, but in the main the land surface (155 km²) is composed of low-lying limestone which is often rugged, fissured and pitted, but may in some places be flat or undulating sheets and plates. Soil, apart from the coastal sands, is thin and tends to accumulate only in pockets and depressions. The age of the land surface is estimated to be about 80,000 years since the most recent emergence from the sea (Braithwaite *et al.*, 1973). The climate is strongly seasonal: summers are hot and humid while winters are cooler and drier. Most of the annual precipitation (940 mm, Stoddart & Mole, 1977) falls as violent showers from December to April. The cool season receives almost no

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effective rain.

Three major vegetation types dominate the atoll, although many subdivisions are possible (Hnatiuk & Merton, 1979). The low, species-rich shrublands are the most widespread and have only a sparse understorey. Tall woodlands of *Casuarina equisetifolia* and *Cocos nucifera* occur primarily in areas of deep sand along the coast. Grasslands and herblands are found along the coast and in special habitats inland. Litter accumulation is least in most of the grasslands, intermediate in shrubland (but often only in undisturbed places such as pits in limestone where giant tortoises cannot reach), and greatest in woodlands, especially where coconuts accumulate in abandoned plantations.

The most favourable habitats for myxomycetes, in terms of abundance of sporangia, are the old, rotting piles of coconut husks and nuts. The husks hold much water and dry out only slowly, thus providing ideal conditions for extended periods. This is particularly true at the beginning of the dry season when most other habitats have long since dried out. In the grassland, only *Fuligo septica* was found and then only during the main wet season. In shrubland several species in low concentration were found in habitats that ranged from deep, protected leaf litter, to ephemeral litter under seaside scrub, to rotting wood.

COLLECTING SITES

The collections were made by R. Hnatiuk between January and July 1974. The sites are listed under sixteen headings and recorded in the list of species as numbers.

1. Ile Picard. The habitats sampled include groves of *Cocos nucifera* L., in which the piles of rotting husks and other litter were particularly productive; rotten wood and leaf litter in planted *Casuarina equisetifolia* L. woodland; mangrove poles in woodpile; litter in scrub communities composed of various combinations of *Acalypha claoxyloides* Hutch., *Maytenus senegalensis* (Lam.) Exell, *Mystroxyton aethiopicum* (Thunb.) Leosn., *Ochna ciliata* Lam., *Pemphis acidula* Forst., *Sideroxyton inerme* L., *Tarenna supra-axillaris* (Hemsley) Bremek., *Tournefortia argentea* L.f., and *Tricalysia sonderiana* Hiern; litter under *Carica papaya* L. and *Terminalia catappa* L.; on decayed parts of *Agave sisalana* Perrine. In addition collections were made in turf of *Sporobolus virginicus* L. and on moss-covered coral-rock. Nine sets of collections were made between January 24 and July 31.
2. Anse Var. Collections were made near the beach in litter under *Acalypha* and *Maytenus*. (February.)
3. Point Hodoul. Materials were gathered on rotten *Ochna* wood and on litter under dense scrub of *Mystroxyton*, *Sideroxyton* and *Tricalysia* some 40 m from the sea. (February.)

4. Cinq Cases. Several habitats were sampled between the coast and the lagoon, including scrub of *Lumnitzera racemosa* Willd., 800 m inland; dead wood of *Apodytes dimidiata* E. Mey. ex Bernh.; living foliage of *Cyperus* sp., and the remains of *Solanum nigrum* L., as well as scrub of *Mystroxyton* and *Sideroxyton*. (February.)
5. Ile Malabar. Collections from *Tricalysia* litter in a pit in the limestone. (February.)
6. Islet at Entre Deux. Specimens from litter. (February.)
7. Anse Tamarind. Litter under dense coastal *Mystroxyton* scrub. (February.)
8. Anse Mais. The collections were made from *Cocos* litter in the stand behind the beach. (April and May.)
9. Ile Esprit. A mixture of dense scrub, *Cocos* husks and litter, dead wood and alga films on coral rock faces. (April.)
10. Islets in the south-west corner of the lagoon, south of Ile Esprit. Mostly covered with *Pemphis* scrub, collections from wood and leaf litter. (April.)
11. Polymnie. Specimens collected on rotten wood. (April.)
12. Islets in the lagoon south of Polymnie. Mostly wood, bark and leaf litter of *Sideroxyton*. (April.)
13. Islets in the lagoon south-east of Passe Houareau. Wood and litter under *Pemphis* and *Sideroxyton* scrub. (April.)
14. Dune Jean Louis. Moss-covered coral rock under scrub and in litter of *Mystroxyton*, about halfway between sea and lagoon. (April.)
15. Anse Anglais. Husks of *Cocos* in stand behind the beach. (May.)
16. Near Point Grande Terre. On dead wood in stand of *Casuarina*. (June.)

These sites are marked on Fig. 1.

LIST OF SPECIES

- Arcyria cinerea* (Bull.) Pers.
 On husks and other *Cocos* litter, and on dead wood. 1,8,9,10,12.
 (10 gatherings.)
 Cosmopolitan. (A,I,M; Mad.)
- A. denudata* (L.) Wettst.
 On *Cocos* husks. 1. (3 gatherings.)
 Cosmopolitan. (A,I,M; Mad, Maur; Marsh.)

- A. incarnata* (Pers.) Pers.
On rotten wood. 9. (1 gathering.)
Cosmopolitan. (A,I,M.)
- Ceratiomyxa fruticulosa* (Müll.) Macbr.
On rotten wood. 9,13. (3 gatherings.)
Cosmopolitan - very common in the tropics. (A,I,M; Mad; Marsh.)
- Clastoderma debaryanum* de Blytt
On Cocos husks. 1,8. (5 gatherings.)
Cosmopolitan - very common in the tropics. (I,M.)
- Craterium leucocephalum* (Pers.) Ditm.
On *Mystroxyton* litter. 14. (2 gatherings.)
Cosmopolitan. (A,I,M.)
- Cribraria languescens* Rex
On Cocos husks and rotten bark. 8,9. (2 gatherings.)
Probably cosmopolitan but much commoner in the tropics than elsewhere. (A,I.)
- C. microcarpa* (Schrad.) Pers.
On Cocos husks. 1. (1 gathering.)
Probably cosmopolitan, common in the tropics. (A,I,M.)
- C. violacea* Rex
On Cocos husks and rotten bark. 8,15. (2 gatherings.)
Cosmopolitan. (A,I,M.)
- Diachea bulbillosa* (Berk. & Br.) Lister
On litter under *Mystroxyton*, *Sideroxyton*, *Tournefortia* and *Tricalysia*. 1,3. (2 gatherings.)
Recorded from Central, North and South America, Sri Lanka and eastern Asia.
- D. leucopodia* (Bull.) Rost.
On litter of *Casuarina equisetifolia*, *Lumnitzera*, *Mystroxyton* and *Terminalia catappa*. 1,4. (3 gatherings.)
Cosmopolitan. (A,I,M.)
- D. radiata* G. Lister & Petch
On litter under *Pemphis* and *Tournefortia*. 1. (2 gatherings.)
Recorded from Nigeria, India, Sri Lanka, Thailand, Panama, Chile and Florida.
- Diderma effusum* (Schw.) Morgan
On litter of *Acalypha*, *Maytenus*, *Mystroxyton*, *Pemphis*, *Sideroxyton*, *Tarena supra-axillaris* and *Tricalysia*. 1,5,10,12,13. (12 gatherings.)
Cosmopolitan. (A,I,M.)

- D. hemisphaericum* (Bull.) Hornem.
On litter, including *Acalypha*. 2,10. (2 gatherings.)
Cosmopolitan. (A,I,M.)
- Didymium anellus* Morgan
On litter under *Sideroxylon*. 13. (1 gathering.)
Recorded from Europe, North America, India, Sri Lanka and the
Phillipines.
- D. eximium* Peck
On litter of *Mystroxyton*. 7. (1 gathering.)
The distribution of this species is uncertain as it is part of the
group of taxa related to *D. nigripes*, recently reviewed by
Nannenga-Bremekamp (1972). It is widely recorded in Europe and
may be cosmopolitan.
- D. floccosum* Martin, Thind & Rehill
On bark litter in coconut grove. 1. (1 gathering.)
This distinctive species was previously known only from the type
locality, in the Mussoorie Hills of northern India (Martin, Thind
& Rehill, 1959) but has now been found in Venezuela (Farr, 1974.)
- D. intermedium* Schroet.
On woody litter and dead *Tricalysia* leaves. 1,4,16. (4 gatherings.)
Recorded from Brazil, Central and North America and Japan, and
considered to be a rare species.
- D. leoninum* Berk. & Br.
On woody litter under scrub. 9. (2 gatherings.)
Recorded from India, Sri Lanka, Singapore, Java, the Philippines,
Japan and, recently, from Jamaica (Farr, 1974.)
- D. melanospermum* (Pers.) Macbr.
On dead branch of *Solanum nigrum*. 4. (1 gathering.)
Cosmopolitan. (A,I,M.)
- D. minus* (Lister) Morgan
On leaf litter of *Maytenus* and *Tricalysia*. 1. (1 gathering.)
Cosmopolitan. (A,I,M.)
- D. nigripes* (Link) Fr.
On leaf litter under dense mixed scrub. 1,3,9. (4 gatherings.)
Cosmopolitan. (A,I,M.)
- D. squamulosum* (Alb. & Schw.) Fr.
On litter of *Cocos*, *Maytenus* and *Sideroxylon*. 1,2,6.
(8 gatherings.)
Cosmopolitan. (A,I,M.)
- D. verrucosporum* Welden
On *Mystroxyton* litter. 4. (1 gathering.)
Recorded from Central and South America and Europe, but probably
widespread.

Fuligo septica (L.) Web.

On rotten *Casuarina* wood, on *Sporobolus* turf and on sedge turf in open coconut grove. 1,8. (4 gatherings.) Cosmopolitan.
(A,I,M; Mad, Maur; Marsh.)

Hemitrichia calyculata (Speg.) Farr (*stipitata* (Mass.) Macbr.)

On Cocos husks. 1,8,9. (10 gatherings.)
Cosmopolitan, especially common in the tropics. (A,I,M; Maur; Marsh.)

H. serpula (Scop.) Rost.

On Cocos husks. 1. (1 gathering.)
Cosmopolitan, especially common in the tropics. (A,I,M; Mad; Marsh.)

Lycogala epidendrum (L.) Fr.

On *Agave* stump. 1. (1 gathering.)
Cosmopolitan. (A,I,M; Maur.)

Metatrichia vesparium (Batsch) Nann.-Brem.

On Cocos husks. 1,8,15. (5 gatherings.)
An essentially North Temperate species, not common in the tropics or the southern hemisphere. (A,I,M; Mad; Marsh.)

Perichaena corticalis (Batsch) Rost.

On very rotten wood. 1. (1 gathering.)
Cosmopolitan. (A,I,M.)

P. depressa Libert

On dead wood. 16. (1 gathering.)
Cosmopolitan. (A,I,M; Mad; Marsh.)

Physarum bogoriense Racib.

On moss on rocks and on litter under *Mystroxyton*, *Sideroxyton* and *Tricalysia* scrub. 1,3,5,9,10,11. (7 gatherings.) Widespread, but especially in the tropics. (A,I,M.)

P. cinereum (Batsch) Pers.

On rotting stem of *Carica papaya*. 1. (1 gathering.)
Cosmopolitan. (A,I,M.)

P. compressum Alb. & Schw.

On rotting *Agave* leaf. 1. (1 gathering.)
Cosmopolitan. (A,I,M.)

P. crateriforme Petch

On algae on steep rock faces. 9. (3 gatherings.)
A widespread species, but nowhere common. (A,I.)

- P. dictyosporum* Martin
 On unidentified litter. 12. (1 gathering.)
 Known previously only from North America and Costa Rica (Farr, 1976.)
 This species has very distinctive spores but superficially resembles
 the cosmopolitan *Didymium difforme* (Pers.) S.F. Gray, which is not
 yet known from Aldabra but is reported from Seychelles.
- P. echinosporum* Lister
 On litter of *Carica papaya*, *Cocos nucifera*, *Lumnitzera racemosa* and
Terminalia catappa, and under dense scrub. 1,4,7. (5 gatherings.)
 Widespread in the tropics. (A,I,M.)
- P. globuliferum* (Bull.) Pers.
 On *Cocos* husks, *Casuarina* logs and mangrove poles. 1,9,16.
 (17 gatherings.)
 Cosmopolitan. (I,M.)
- P. leucopus* Link
 On moss-covered rock under scrub. 1. (1 gathering.)
 Cosmopolitan. (A,I,M.)
- P. melleum* (Berk. & Br.) Masee
 On litter under dense *Sideroxylon* scrub. 4. (1 gathering.)
 Cosmopolitan, especially common in the tropics. (A,I,M.)
- P. mutabile* (Rost.) G. Lister
 On living *Cyperus* and leaf litter of *Cyperus*, *Mystroxyton* and *Ochna*.
 1,3,4,5. (5 gatherings.)
 Scattered throughout the world, generally rare; recorded from South
 Africa and Sri Lanka.
- P. nicaraguense* Macbr.
 On moss-covered rock under scrub, and moss on *Ochna* trunk. 3,14.
 (2 gatherings.) Widespread in the tropics, known from West Africa,
 India and Sri Lanka; also recorded from an atoll in the Caroline
 Islands.
- P. nutans* Pers.
 On wood and husks in *Cocos* grove. 1,8. (2 gatherings.)
 Cosmopolitan. (A,I,M.)
- P. oblatum* Macbr.
 On *Cocos* litter. 1. (1 gathering.)
 Cosmopolitan. (A,I,M.)
- P. pusillum* (Berk. & Curt.) G. Lister
 On decaying spathes of *Cocos*. 1. (1 gathering.)
 Cosmopolitan. (A,I,M.)
- P. roseum* Berk. & Br.
 On *Cocos* husks. 1,8. (3 gatherings.)
 An essentially tropical species. (A,I,M.) The Aldabran material
 approaches *P. pulcherrimum* Berk. & Rav. and strengthens the view that
 the two taxa are closely related.

- P. serpula* Morgan
On bark and litter of *Agave*, *Cocos*, *Mystroxyton* and *Sideroxyton*; a collection was also made on the litter in an old nest of a tropic bird (*Phaethron* sp.) 1,9,12,13. (8 gatherings.)
Recorded from Yugoslavia, Central and North America, India and Japan.
- P. stellatum* (Masse) Martin
On *Cocos* husks, and bark in a pile of mangrove poles. 1.
(5 gatherings.)
Widespread in the tropics. (A,I,M.)
- P. tenerum* Rex
On *Cocos* husks. 1,8. (3 gatherings.)
Cosmopolitan. (A,I,M; Marsh.)
- P. viride* (Bull.) Pers.
Very abundant on *Cocos* husks, also on woody litter under *Sideroxyton*.
1,4,8,13. (19 gatherings.)
Cosmopolitan. (A,I,M; Mad; Marsh.)
- Stemonitis flavogenita* Jahn
On *Cocos* husks and *Ochna* leaf litter. 1. (2 gatherings.)
Probably cosmopolitan but rarely recorded from the tropics. (A,I,M.)
- S. fusca* Roth
On dead wood, including ?*Apodytes*. 4,10. (2 gatherings.)
Cosmopolitan. (A,I,M; Maur; Marsh.)
- S. herbatica* Peck
On leaf litter of *Tournefortia argentea*. 1. (2 gatherings.)
Cosmopolitan. (A,I,M.)
- S. splendens* Rost.
On rotting *Casuarina* log. 1. (1 gathering.)
Cosmopolitan. (A,I,M; Marsh.)
- Stemonitopsis typhina* (Wiggers) Nann.-Brem. (*Comatricha typhoides* (Bull.) Rost.)
On decaying logs and *Cocos* husks. 1,4,8. (4 gatherings.)
Cosmopolitan. (A,I,M; Marsh.)

All specimens were examined by both authors but the final determinations were the responsibility of B. Ing. Nomenclature follows Martin & Alexopoulos (1969). Voucher specimens for all taxa reported here are deposited in BM and K. The following abbreviations refer to the distribution records: A - reported from the mainland of Africa (various sources); I - reported from India and/or Sri Lanka, formerly Ceylon (various sources); M - reported from the Malesian region (various sources); Mad. - reported from the Malagasy Republic, formerly Madagascar (Patouillard, 1928); Maur. - reported from Mauritius (Wiehe, 1948), and Marsh. - reported from the Marshall Islands, Central Pacific (Rogers, 1947).

DISCUSSION

When considering any island flora it is interesting to speculate on the biogeographical relationships with the neighbouring island groups and continents. In the case of myxomycete floras it would be incautious to assume too much from field observations made over a short period of time. Even when long-term data are available it must be remembered that with efficient and effective spore dispersal and transport myxomycetes are not restricted by ocean barriers. Where they occur suggests more about the microecology and local climatic conditions than the geographical limitations of species.

In the present study the 55 species recorded include 40 which are more or less cosmopolitan, occurring equally commonly in tropical and temperate regions; eight species are scattered throughout the world and are not common in any region; five species are scattered in and restricted to the tropics. Two species were previously known from single regions, *Didymium floccosum* from the Mussoorie Hills, India, and *Physarum dictyosporum* from North America. In all, ten species are newly recorded for Africa *sensu lato*.

Of the total, 50 species are known from India and Sri Lanka, while 43 are recorded from Africa and the same number from the Malesian region. There is a slight suggestion in the flora that the species have a closer similarity with India rather than with Africa, a bias which may be shared by the lichen flora (P.W. James, personal communication.)

The other island groups in the Indian Ocean have not been intensively searched for myxomycetes. Patouillard (1928) listed ten species from Madagascar and a few have been added since. Eight of these are known from Aldabra. Twelve myxomycetes are recorded from Mauritius (Wiehe, 1948) of which five have been found on Aldabra. There is one record, of *Didymium difforme*, from the Seychelles (specimen in K.) The only other coral islands which have been investigated are the Marshall group in the Central Pacific (Rogers, 1947) where sixteen species are listed, twelve of these being found on Aldabra. Finally, the atolls forming the Caroline Islands have yielded *Physarum nicaraguense*, also known from Aldabra.

The richness of the myxomycete flora of Aldabra appears to result from an adequate rainfall, the presence of a varied, and often deep, litter layer under woody plants (26 species of foliicolous myxomycetes), the piles of rotting coconut husks and related litter (20 species) and reasonable quantities of rotting wood (15 species). These microhabitats in turn reflect the relatively small amount of human disturbance of the island's ecosystem (Beamish, 1970).

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