SPC INFORMATION CIRCULAR

Date October 1979 Classification Serial No. 83

Plant Protection

COCONUT DISEASE CAUSED BY MARASMIELLUS COCOPHILUS IN SOLOMON ISLANDS

by

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The fungus Marasmiellus cocophilus causes a 'lethal bole rot disease' of coconuts in Kenya and Tanzania (Bock et al, 1970: Pegler 1969). There the disease is mainly one of young palms, seedlings being highly susceptible on transplanting from the nursery to the field. Until recently the fungus was only known from East Africa.

M. cocophilus (Fig. 1) has a small (up to 2 cm in diameter but usually less) white toadstool with a white stalk. The white gills are of two different lengths. The spores are tear-drop shaped; this easily distinguishes the fungus from the otherwise similar M. inoderma which has elliptical spores.

OCCURRENCE OF THE DISEASE

In August 1978, at the field nursery of Lever's Plantations Ltd., Yandina (Russell Islands), Solomon Islands a few eight to nine month-old Malayan Dwarf x Rennell coconut seedlings snapped at the junction of stem and nut. Of several thousand seedlings present only 30 were affected. A second outbreak occurred in March 1979. This time about 7,000 plants were affected; these were destroyed and the remaining 6,000 apparently healthy seedlings planted on Failau Island. Many of the latter subsequently succumbed to the disease.

IDENTIFICATION OF THE FUNGUS

Samples of infected seedlings were sent to Dodo Creek Research Station, Guadalcanal and toadstools were found growing abundantly from the nuts and from the base of dead leaves. Specimens were sent to Dr E. McKenzie (Plant Diseases

Division, Department of Scientific and Industrial Research, Auckland, New Zealand) who identified them as M. cocophilus. His identification was confirmed by Dr D. N. Pegler (Royal Botanic Gardens, Kew, England) who had originally described the fungus as a new species in 1969.

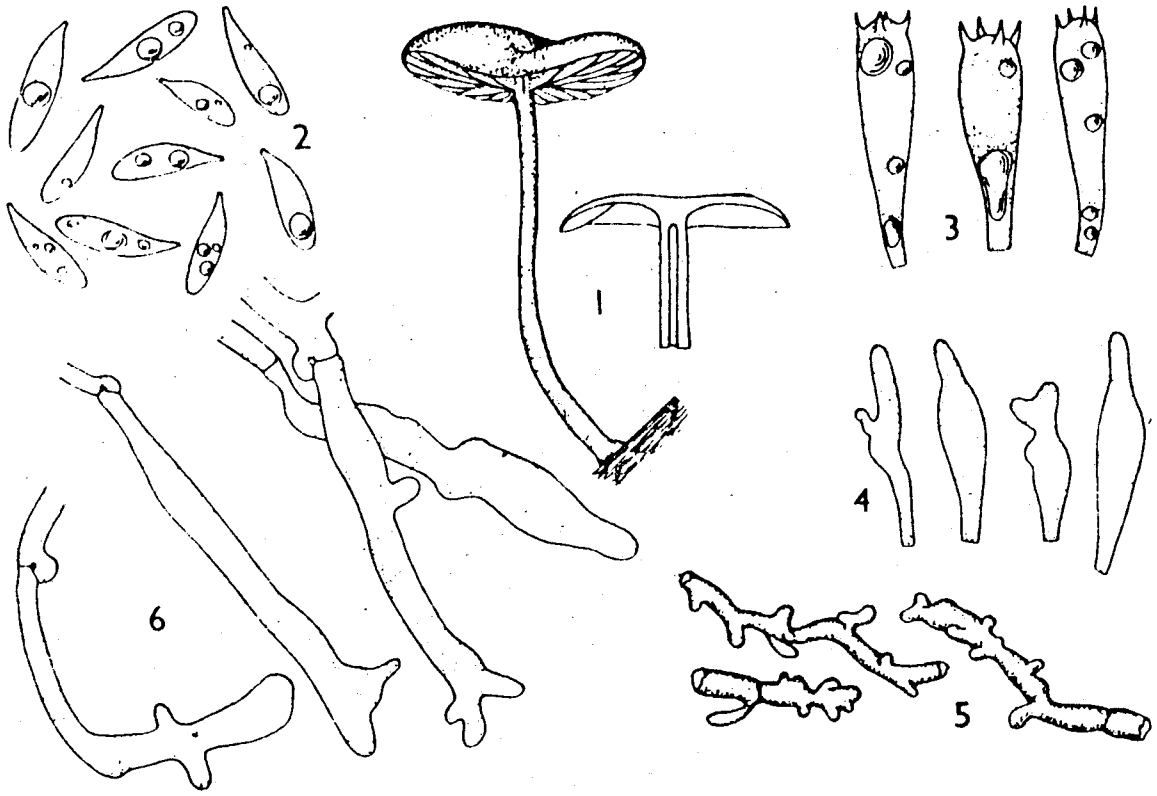

Fig. 1: Marasmiellus cocophilus.

1. habit and section, x 5;
2. spores;
3. basidia;
4. cheilo-cystidia;
5. epicuticular elements;
6. caulocystidia.

All x 1000 unless otherwise stated. (Reproduced by permission of the Controller of Her Britannic Majesty's Stationery Office from Pegler (1969))

NURSERY PRACTICE AT LEVER'S PLANTATIONS LTD

At Yandina seednuts are collected directly from the palms. The husks are trimmed at the end where the shoot will emerge and the nuts placed vertically in the soil in a pre-germination nursery. Germinated nuts are planted in soil in polybags and spaced one metre apart in a field nursery. About six to nine months later they are planted in the field.

SYMPTOMS OF THE DISEASE IN THE FIELD NURSERY

The first symptom noticed was the premature death of the oldest two or three leaves. At the base of these leaves a white mycelium and toadstools of the fungus were present. Younger leaves were infected successively as the fungus colonised the leaf bases producing a brown rot. Cracks were common in the leaf bases. The outer tissues of the bole region were often cankered and had isolated rots, 1-1.5cm deep with shallow, reddish-brown margins, extending into the stem. Only rarely was the entire bole region decayed; where this occurred it was due to bacterial soft rot.

Roots emerging from the base of the nuts were mostly healthy; some had small areas of decay but it was not certain that these were caused by M. cocophilus. But the fungus did infect new roots as they grew through the decayed leaf bases.

SYMPTOMS AFTER TRANSPLANTING

Symptomless but infected seedlings planted in the field produced very small leaves which started to unfurl before they fully emerged (Fig. 2) There were cankered areas in the bole, leaf bases were often swollen, roots were decayed and mycelium and toadstools were present.

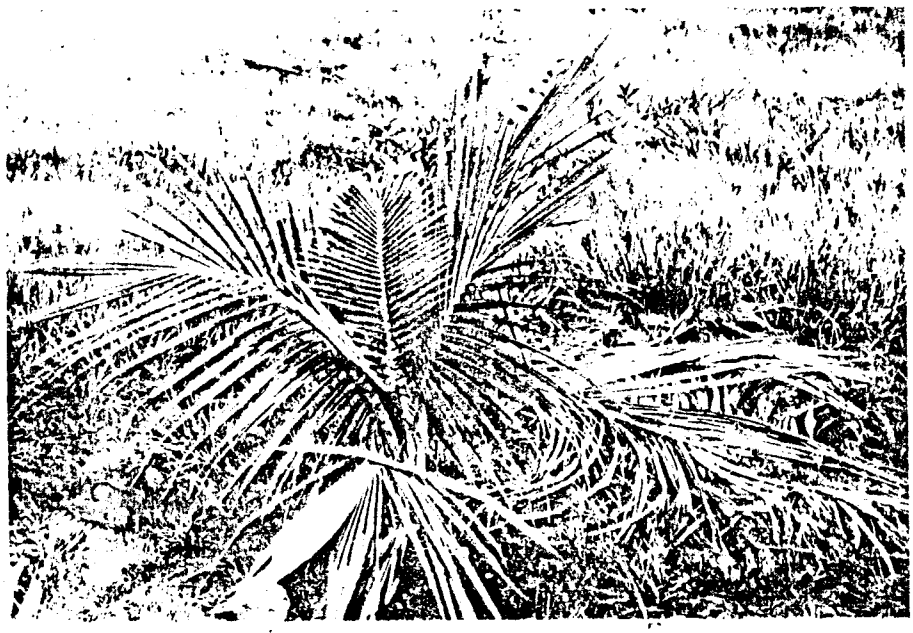

Fig. 2: Infected seedling 5 months after planting out showing small central leaf.

In contrast to the nursery situation few of the transplanted seedlings died. The majority began to recover after five to six months. New uninfected roots were produced and new leaves were progressively more normal.

SOURCES OF INFECTION

Coconut plantings on Yandina were surveyed in June 1979 and toadstools found on coconut debris in an area of 15-year-old FMS (Federated Malay States)

coconuts but not elsewhere. The fungus has not been found in other parts of Solomon Islands.

In the field nursery toadstools of the fungus were found around the bagged seedlings growing from roots and leaves of the grasses Echinochloa colonum and Eleusine indica (Fig. 3).

Fig. 3: Toadstools of M. cocophilus growing from roots and leaves of the grass Eleusine indica around a polybag in the field nursery, x a third.

ANOTHER COMMON MARASMIELLUS

A related fungus M. inoderma is superficially similar to M. cocophilus and was very commonly found in the same habitats. Toadstools of M. inoderma but not of M. cocophilus occurred on nuts in the pre-germination nursery. Frequently M. inoderma was found to colonise the husks, infect the embryos as they developed and invade the nut cavities.

WORK IN PROGRESS ON M. COCOPHILUS

In Solomon Islands the disease caused by M. cocophilus has so far only been found on seedlings. The effect of the fungus on older palms is not known but is being investigated.

On Yandina 50 ha of FMS palms are abnormal. The condition first occurred in 1971 when palms were seven years old. Older leaves dry out and die but do not immediately fall to the ground. Younger leaves show yellowing and progressive necrosis which appears first on the sides of the leaflets exposed to sunlight. On some palms no spadices emerge and on others they rapidly decay; even when spadices develop normally nuts often fall prematurely. There are few surface roots on affected palms.

Because of the known pathogenicity of M. cocophilus and because it occurs in the FMS plantation its possible role in this disease syndrome is being investigated

MORE INFORMATION ON DISTRIBUTION OF M. COCOPHILUS IS NEEDED

It is important to know the distribution of M. cocophilus in the SPC region. It is hoped that countries will report to SPC any nursery disease or mature palm symptoms similar to those described here.

Further information can be obtained from the SPC Plant Protection Officer, Box 2119, Suva, Fiji but specimens should not be sent to him.

REFERENCES

Bock, K.R., Ivory, M.H. & Adams, B.R. (1970). Lethal bole rot disease of coconut in East Africa. Annals of Applied Biology 66: 453-464.

Pegler, D.N. (1969). A new pathogenic species of Marasmiellus Murr. (Tricholomataceae). Kew Bulletin 23 : 523-525.