

Mycological Notes (6).

Further Notes on *Rhizoctonia bataticola* (Taub.) Butler.

W. SMALL, M.B.E., M.A., B.Sc., Ph.D., F.L.S.,

Mycologist, Department of Agriculture.

IN the following notes several new hosts of *Rhizoctonia bataticola* are recorded and a few points of interest in connection with occurrences of the fungus on other plants are set forth.

(1) *Cassia multijuga* Rich.—Examination of the roots of a sickly specimen of this tree in the Royal Botanic Gardens, Peradeniya showed them to be attacked by *Rhizoctonia bataticola* and the fungus of brown root disease, *Fomes lamaoensis* Murr.

(2) *Cupressus Lawsoniana* Murr. (Lawson's Cypress).—Examples of diseased seedlings of Lawson's Cypress were provided by the Divisional Forestry Officer, Nuwara Eliya. The presence of *Rhizoctonia bataticola* was not immediately apparent, but the fungus was found eventually to be common in the bark and cortex of the roots of the seedlings in the form of small sclerotia.

(3) *Tibouchina (Lasiandra)* sp. (Glory Bush?).—The *Rhizoctonia* has occurred on the roots of this plant along with *Diplodia*.

(4) *Dahlia* (hort.)—A number of dahlia plants died in a bed in a garden which had provided examples of *Rhizoctonia bataticola* root disease of several other plants. The sclerotia of the *Rhizoctonia* were found in both roots and stems of the dahlias, and the fungus also developed on the skin of apparently healthy tubers of plants which had diseased stems and roots.

(5) *Garcinia mangostana* L. (Mangosteen).—To date only one case of *Rhizoctonia bataticola* root disease of this valuable fruit tree has been encountered. The fungus was present in the smaller roots. The collar of the tree was cracked but no fungus was found in association with the cracks.

(6) *Artocarpus integrifolia* L. (Jak).—Young jak stumps planted for re-forestation purposes have died of root disease. Examination of their roots showed that *Rhizoctonia bataticola* and *Diplodia* were present.

(7) *Cocos nucifera* L. (Coconut).—*Rhizoctonia bataticola* has been found on roots of young coconuts in Mannar by Mr. Park, Assistant Mycologist (1), and also by Mr. Ragunathan, Assistant in Mycology, on coconut roots included by chance in a consignment of diseased plantains (bunchy-top) from the Rambukkana Observation Plots. Although the possibility of the presence of *Rhizoctonia bataticola* in coconut roots was indicated by the writer at a meeting of the Estate Products Committee in July, 1926, it has been possible to devote full attention to the study of coconut root fungi only since Mr. Park's recent return from leave. His work on coconut root disease is being continued, and it is hoped to extend it to include root-disease of the areca palm. The discovery of the *Rhizoctonia* on coconut roots is further evidence of the wide distribution of the fungus in Ceylon and of the fact that it is present in different types of soil.

(8) *Phaseolus vulgaris* L. (French beans).—An interesting specimen of bean disease has been provided by the Divisional Agricultural Officer, Central. The disease takes the form of a stem blight with which is associated a pycnidial fungus called *Macrophoma phaseoli* Maubl. The same blight has attracted attention of late in the United States of America (2) where it is stated to be doing considerable damage to the bean crops of Georgia, Mississippi and South Carolina. It is called "ashy stem blight." The point of interest in the occurrence of the bean blight in Ceylon is not that it is caused by the same fungus as the bean blight of America but rather that the blight fungus of both Ceylon and America, *Macrophoma phaseoli*, is the pycnidial stage of the soil sclerotial fungus, *Rhizoctonia bataticola*. That the aerial stem-attacking *Macrophoma* of the bean is related genetically to the soil root-attacking *Rhizoctonia* of some thirty-four Ceylon plants has been proved in the laboratory by growing single spores of the bean *Macrophoma* in culture media. In each case the *Macrophoma* spore has given rise to growths of the sclerotial fungus, *Rhizoctonia bataticola*. As beans attacked by *Macrophoma phaseoli* are thus a possible source of supply of *Rhizoctonia bataticola* to the soil, blighted plants should be uprooted and burned. It is possible that the pycnidial *Macrophoma* occurs on plants other than beans in Ceylon, and a search for it is in progress. It may be added that the writer is informed by Mr. S. F. Ashby, Mycologist of the Imperial Bureau of Mycology, that the *Macrophoma* may be renamed *Macrophomina phaseoli* (Maubl.) comb. nov.

Root disease of beans caused by *Rhizoctonia bataticola* also occurs in Ceylon. As far as is known, the root disease may occur independently of the *Macrophoma* stem blight. Again, an examination of the roots of the specimen of the *Macrophoma*

stem blight shows that the root *Rhizoctonia* form of the fungus is not present on the same plant. It therefore seems as if the *Rhizoctonia* and *Macrophoma* forms, although they are in reality stages in the life-history of a single fungus, need not occur together on a bean plant attacked by one of them; in addition, they may attack independently and cause distinct diseases of the bean. On the other hand, it is shown in the following paragraph that they may occur together on the same plant and be associated with the same case of disease.

(9) *Sesamum indicum* L. (Gingelly).—The writer had experience in Uganda of the attack of *Rhizoctonia bataticola* on the roots of gingelly, a plant which seems to be susceptible to the fungus, and he has recently been enabled to examine diseased gingelly from Burma. The material was typical of *Rhizoctonia bataticola* disease, and the sclerotia of the fungus were present in large numbers on the roots and stems of the specimens. Further, pycnidia which resembled strongly those of *Macrophoma phaseoli* of the bean stem blight discussed above were present among the sclerotia of the *Rhizoctonia*. Attempts were made to germinate the spores of the pycnidia but they were unsuccessful. The material was collected in September 1925 and was therefore old. The fact that the *Macrophoma* spores refused to germinate in May 1927 throws a little light on the length of time for which they may remain viable. The *Macrophoma* has been found among *Rhizoctonia* sclerotia on Uganda gingelly material and has been proved to give rise, as in the case of the bean fungus, to the sclerotial *Rhizoctonia bataticola* form. The record of *Rhizoctonia bataticola* in Burma and a recent record of its parasitism on cotton in Trinidad by Professor Britton-Jones of the Imperial College of Tropical Agriculture (3) are extensions of the known distribution of the fungus which are of interest inasmuch as they support the writer's contention that *Rhizoctonia bataticola* is more widely distributed in tropical and sub-tropical regions than is realised.

(10) **Tobacco.**—In the list of pests and diseases recorded during 1926 which was published in the *Tropical Agriculturist* for March (page 187), *Rhizoctonia bataticola* was recorded as having occurred on tobacco. The fungus was only suspected to be present, and, as it was not found, the citation is an error which ought to be corrected. Tobacco, however, has been reported as a host plant of *Rhizoctonia bataticola* in India, and it may prove to be a host plant also in Ceylon.

(11) **Tea.**—*Sphaerostilbe repens* is well known in Ceylon as a supposed parasite of the roots of rubber trees growing in damp soils, but it has not been recorded hitherto on tea roots in this country. It occurs on tea in India, however, and has also

been found lately on tea in Ceylon. In both cases, tea and rubber, it is accompanied by *Rhizoctonia bataticola*. The *Rhizoctonia* is regarded as the primary cause of root disease and the *Sphaerostilbe* as a fungus of only secondary account.

(12) **Plantains.**—The fact that *Rhizoctonia bataticola* and an eelworm (*Heterodera radicum*) cause root disease of plantains and so may lead to the condition known locally as bunchy-top has been published (4). Numerous further cases of bunchy-top have been examined in recent months, and the evidence from the frequent presence of the fungus and the eelworm is strongly in favour of the view that Ceylon bunchy-top disease of plantains is more likely to be due primarily to root disease than to any other cause. It has been noted that, whereas the roots of plants affected by bunchy-top are attacked consistently by *Rhizoctonia* or eelworm, the associated insects, that is, the aphid (*Pentalonia nigronervosa* Coq.), the borer (*Cosmopolites sordidus* Germ.) and the stem-boring weevil (*Odoiporus longicollis* Oliv.), may be present in small amount or altogether absent. In other words, the insect pests associated with bunchy-top disease are less consistently present on affected plants than the fungus and eelworm which attack the roots of the same plants. It is worthy of note that both fungus and eelworm have been found lately to attack different roots of the same bunchy-top plant. At the same time, it is realised that an exhaustive study of the symptoms and development of local bunchy-top and of the parts played by the various causal factors is required.

References.

- (1) *Tropical Agriculturist*, 69, No. 1, p. 7, July, 1927.
- (2) *Review of Applied Mycology*, 6, p. 138, March, 1927.
- (3) *Tropical Agriculture*, 4, No. 5, p. 88, May, 1927.
- (4) *Tropical Agriculturist*, 68, No. 2, p. 73, February, 1927.