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A SCLEROTIAL DISEASE OF *MUCUNA PRURIENS* DC.

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IN October 1928 attention was drawn to a plant disease at the Experiment Station, Peradeniya. Groups of diseased plants were found to occur in a well-grown plot of *Mucuna pruriens* DC. On close examination of diseased plants, white hyphae were seen in the form of white strands or fan-shaped masses enveloping the creeping stems and the pods. Numerous small, white and yellow-brown sclerotia were present on the masses of hyphae, on the dead tissues and on the surface of the soil. From the characteristic growth of the hyphae and the sizes and shapes of the sclerotia the fungus was identified as *Sclerotium Rolfsii*. Healthy leaves, stems and pods had become infected by contact with diseased tissue from which strong wefts of mycelium developed to infect the healthy tissue. Pods were observed which had become infected by hyphae which had grown from diseased stems via the stalks. Pods touching the soil had become diseased at the point of contact having apparently been infected by the fungus in the soil. The fungus had attached itself to the pods by strong films of mycelium which ran over the surface in a radial manner; the older hyphal growth on the pods was greyish-brown but the advancing hyphae were always white and woolly. With age the greyish-brown area extended and ultimately a rot set in, the pods turning black and sodden, and numerous brown sclerotia were formed on the surface. The seeds also became sodden. In advanced cases the diseased stems became black and spongy. In many of the plants examined the portions above ground only were attacked, the roots being healthy. In two dead plants, however, the stems below ground were affected to a distance of about three inches. The death of the plants in patches suggested independent sources of infection. The photograph is a good illustration of the growth of the fungus on stems and pods.

The age of the plants in the affected plot was three and a half months from sowing. When the plot was examined again on 12th December 1928 there was scarcely a plant in the plot that

was not attacked, and the sclerotia of the fungus were present on the dead and dying plants and on the surface of the soil in enormous quantities. The plot was examined again on 16th April 1929 and the fungus was observed in some places living as a saprophyte on decaying vegetable matter. The manager of the Experiment Station stated in a letter that the previous crop grown in the plot was ginger which was harvested in March 1927 and that subsequently roselle (*Hibiscus sabdariffa* var. *altissima*) was sown but the seeds failed to germinate.

The fungus was readily taken into culture; on maize meal agar it formed a firm mat of mycelium and in five days a large number of sclerotia developed on the surface, and on the hyphae which had ascended the sides of the glass tube. Inoculation experiments were carried out with the fungus in culture on Chinese velvet beans (*Mucuna nivea*), roselle and ginger, in order to test its parasitism.

Two lots of seedlings of velvet beans nine days and fourteen days old from sowing grown in pots of sterilised soil were inoculated at the bases of their stems. The nine-day old seedlings were about three inches high. Three days after inoculation black lesions were formed at the point of inoculation and later the stems became constricted and shrunken at the blackened areas. Hyphae travelled downwards and attacked the seeds which appeared to be very susceptible to infection. Sunken black patches were formed on the green seeds and hyphae were plentiful in the sunken areas. In the fourteen-day old seedlings the fungus ascended the stems with the result that the branches died back; diseased areas turned brownish and then black. The fungus was reisolated readily from pieces of diseased tissue of the seed.

Pods and stems of velvet bean eleven weeks old from sowing, grown in the field, were inoculated with the fungus in culture. The fungus grew readily and in five days the whole surface of the pods was overrun with mycelium. The older growths turned greyish-brown as was observed on pods of *Mucuna pruriens* in nature. On cutting open the pods the flesh was found sodden and permeated with hyphae. The stems were killed, white mycelium enveloping them and spreading in all directions. Sclerotia were produced in abundance on the diseased tissues.

Two lots of seedlings of roselle nine days old and fourteen days old from sowing were grown under the same conditions as the velvet-bean seedlings and similarly inoculated. The nine-day old seedlings damped off in three days' time; their stems became pale brown and constricted at the point of inoculation and sclerotia developed on the seedlings after they had toppled over. In the fourteen-day old seedlings some damped off and in others

the hyphae ascended the stems and a total collapse of the leaves and stems was observed. In the latter case the plants were killed back from the top end.

Full grown flowering plants of roselle in the field twelve weeks old from sowing which had attained a height of about four feet were inoculated on the stems at ground level and on stems six inches above soil level. After placing the fungus in culture on the stems, the latter were surrounded by chimneys and the open ends plugged with cotton wool; in the soil level inoculations it was necessary to plug only one end of the chimney. The fungus grew from the inoculum and the hyphae spread over the stems turning them pale brown. In four to six days after inoculation the plants began to wither. Numerous sclerotia were produced on the diseased portions. In one soil-level inoculation, examined after sixteen days, the fungus had progressed down the root to a distance of about three inches and up the stems to a distance of ten inches.

Rhizomes of ginger were planted in the field and, when they produced aerial stems and green leaves, the stems were inoculated at the base with the fungus mycelium in culture. In three days a light brown discoloration appeared on the stems and spread upwards, attacking the leaves and killing all the plants. Sclerotia were produced all along the stems. Ten days later, on gently holding the aerial stems they came off the rhizomes. On examination it was found that the rhizomes were free from infection, and that the fungus had failed to affect penetration but was producing sclerotia superficially on parts that happened to be exposed. Rhizomes were also placed in a moist chamber and inoculations were made without wounding and after wounding but the fungus failed to infect them.

These inoculation experiments proved that the fungus was able to attack seedlings of *Mucuna pruriens* and the pods and stems of bigger plants, seedlings and full grown plants of roselle and the aerial stems and green leaves of ginger.

The failure of the manager of the Experiment Station to establish roselle on the plot which had carried ginger may be explained by the presence of the fungus in the soil as a saprophyte when the seeds of roselle were sown, which caused the damping off of the young seedlings.

In a recent publication (4) Weir has recorded *Sclerotium Rolfsii* as occurring on four cover crops in Malaya viz. *Dolichos Hosei* (*Vigna oligosperma*), *Calopogonium mucunoides*, *Centrosema pubescens* and *Pueraria javanica*. On cover crops in Ceylon the fungus has been recorded only once on *Dolichos Hosei* in 1924 (2) and now on *Mucuna pruriens*. Inoculation experiments carried out by Weir in Malaya and by the writer (1) in

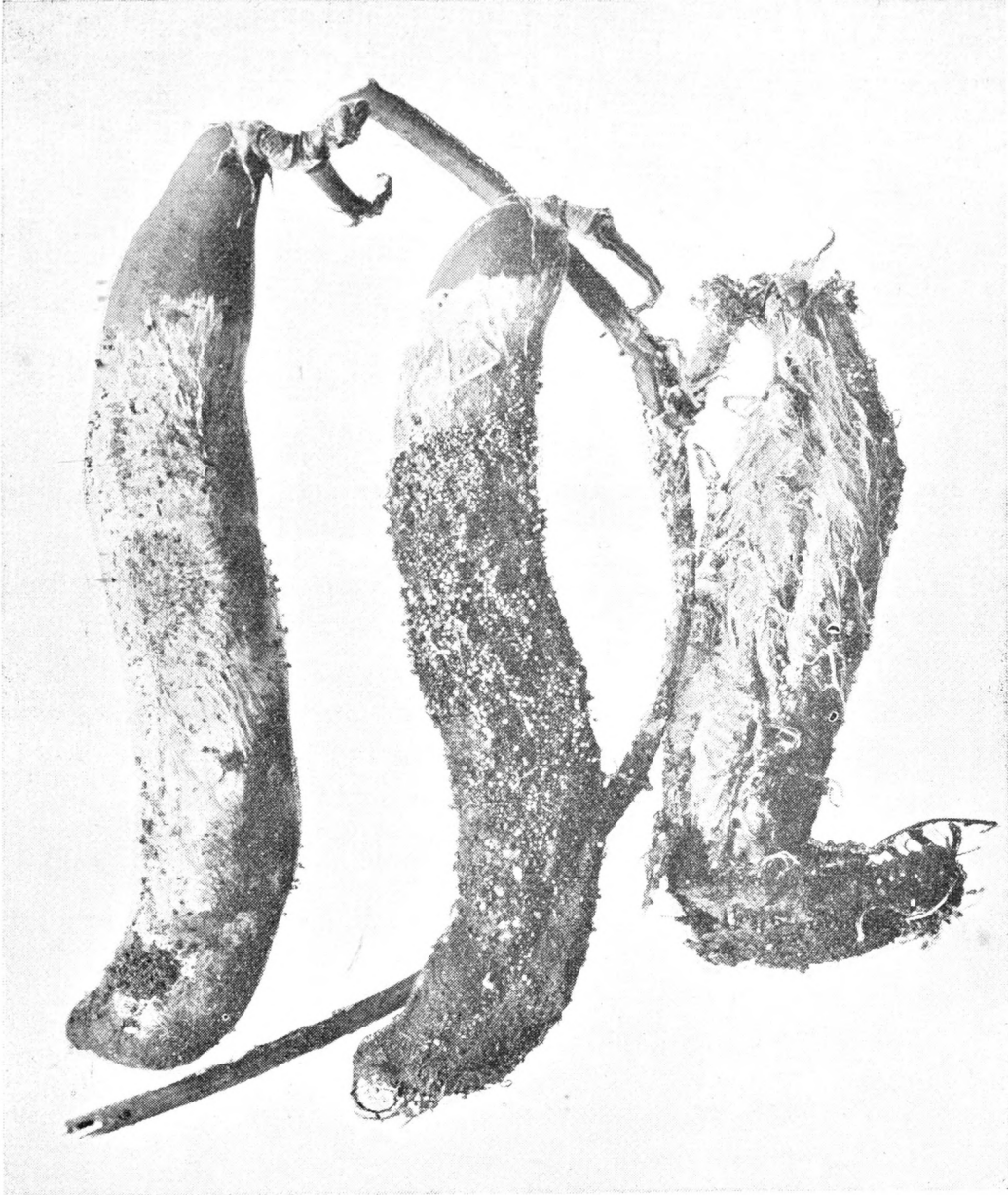


Photo by

L. S. Bertus.

Pods and stem of *Mucuna Pruriens* DC.
attacked by *Sclerotium Rolfsii*.

Ceylon on green manure plants and cover crops have shown that the fungus is capable of parasitizing a large number of these plants in the seedling stage. Seedlings of *Dolichos Hosei* four to nine weeks old from sowing when inoculated on the stems at ground level showed a leaf and stem rot. Some plants were killed outright while others survived by producing new shoots. The importance of using clean, healthy seed in planting cannot be too strongly emphasized.

Mucuna pruriens is known as Cowhage or Cowitch and is grown at the Experiment Station, Peradeniya, as a possible cover crop. Judging from the luxuriant growth and the fine cover made over the surface of the soil, the plant appears to serve this purpose well. The fact that the pods are covered with brown irritant hairs may stand in the way of its being introduced and extended on cultivated land. If, however, this species and *Mucuna nivea* are grown on estates the fact that *Sclerotium Rolfsii* is strongly parasitic on these plants must be borne in mind. *Mucuna nivea* is known in Sinhalese as *wanduru - me*. Macmillan (3) states that it is suited to low and medium elevations but is seldom cultivated and that in Ceylon the seeds only appear to be eaten. In India the fleshy tender pods are also eaten after removal of the outer skin.

REFERENCES.

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