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Sclerotial Disease of Ginger

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Cultivation of ginger (*Zingiber officinale* Rosc.) is widespread in Malabar district. This crop is subject to a serious disease viz., rhizome rot and wilt, caused by three species of *Pythium* (*P. aphanidermatum* (Edson) Fitzpatrick, *P. myriotylum* Dreschler and *P. vexans* de Bary). Infection is prevalent in storage and in field. During 1950 when large quantities of seed material had to be purchased from the growers for experimental purposes at the Agricultural Research Station, Pattambi, it was found that many of the rhizomes were considerably shrunk and had a white growth of fungal mycelium on the surface. Careful examination of the diseased material showed that the rhizomes were infected by *Sclerotium rolfsii* Sacc. Mustard-seed-like sclerotia were observed on several of the diseased rhizomes. Park (1937) has recorded from Ceylon, the occurrence of this fungus, infecting ginger rhizomes superficially, Examination of the local material revealed that the infection was not merely superficial but also internal. Therefore experiments were conducted to find out the role of *S. rolfsii* in causing the rotting of rhizomes in ginger.

Materials and Methods: Typical diseased rhizomes were selected for the isolation of the fungus. It was brought into culture from single sclerotia and by using bits of tissue aseptically removed from surface-sterilised rhizomes. Inoculation experiments were conducted on healthy rhizomes kept in moist chambers as well as on healthy plants in pots.

Cultural Studies: The isolate grows rapidly on common agar media producing a number of sclerotia in the course of a week. The cultural characters observed on oat, french bean, and malt agars (5% malt and 2% agar) after a lapse of 10 days' growth are described below. The cultures were grown at room temperatures varying from 76 to 86°F.

Macroscopic growth characters of Sclerotium rolfsii,

Media	Mycelial characters	Sclerotial characters
French bean agar	Thick, white, woolly aerial growth, turning light buff in certain portions.	Sclerotia numerous along the margin of dishes, brown, mustard-seed-like. Size 1·05×0·84 mm (0·72–1·6×·65 – 1·0).
Oat agar	White, stringy and thinner aerial growth.	Sclerotia fewer in number but scattered over the surface. Size 1·13×1.0 mm (0·8 – 2·05× 0·7 – 1·2)
Malt agar	Thin, stringy, white aerial growth.	Sclerotia not formed.

French bean and oat agars appeared to be more suitable for the culture of this fungus.

Infection Experiments

1. **Inoculation of rhizomes:** Healthy rhizomes of ginger were obtained and surface disinfected with 0·1% mercuric chloride solution. These were further washed in two changes of sterile water and kept in sterilised moist chambers. Inoculations were made by placing bits of culture on the surface of these rhizomes. In the course of seven days the fungus grew over the rhizomes in strands causing shrinkage of the rhizome. Sclerotia also developed on the surface. The controls remained healthy and did not exhibit shrinkage.

2. **Inoculation of rhizomes in pots:** Healthy rhizomes were first wounded by sterilised needles and then inoculated by placing bits of culture on the wounded portions. These were later planted in pots. Twenty units were inoculated and 12 were kept as control. After 25 days all the rhizomes in the control pots had germinated producing aerial shoots while only 6 of the inoculated rhizomes gave rise to aerial shoots. The unsprouted rhizomes were taken out and examined. They had rotted and the fungus was re-isolated from them. In another fortnight the sprouts from the inoculated rhizomes died down and *S.rolfsii* was re-isolated from the dead shoots. All the controls remained quite healthy.

3. **Inoculation of aerial shoots:** Healthy ginger plants were raised in pots by planting selected rhizomes. After the shoots had grown for a month and produced a number of leaves they were inoculated with the culture of the fungus by placing the inoculum at the base of the aerial shoots. After inoculation the shoots were kept covered by bell jars for 72 hours. In ten days the shoots turned yellow and in a fortnight they completely rotted. The fungus grew on the surface as a white thin film twelve shoots were inoculated and all of them were affected. The controls remained healthy. The fungus was re-isolated from the infected shoots.

Sections through the leaf sheath exhibited the presence of hyphæ both inside and between the cells. The concerned rhizomes also commenced to rot, beginning from the base of the infected shoots. The shoots and rhizomes of the controls were quite healthy.

The above experiments conclusively prove that *S. rolfsii* is pathogenic on ginger and is capable of causing rotting of rhizomes and aerial shoots. It is clear that *S. rolfsii* should also be considered as an important agent in the causation of rhizome rot and wilt of ginger in Malabar in addition to the three species of *Pythium* mentioned above.

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Reference.

1. Park (Malcolm.) (1937) *Trop. Agriculturist.* **89.** p. 3–7