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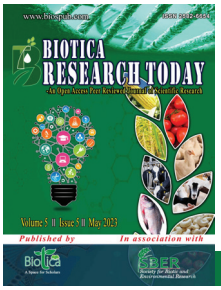

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Groundnut Stem Rot, (*Sclerotium rolfsii*) - An Emerging Threat to Groundnut Production

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Abstract

Groundnut Stem Rot, caused by the soil-borne fungus *Sclerotium rolfsii*, is becoming an increasingly serious threat to groundnut production. This fungal pathogen infects the stem of the groundnut plant and causes stem rot, which can ultimately lead to the plant's death. The disease has been reported in many countries and is particularly prevalent in tropical and sub-tropical regions where groundnut is a staple crop. This article provides an overview of the disease and its symptoms, as well as current management strategies and future research directions to combat this emerging threat to groundnut production.

Keywords: Groundnut, Management, *Sclerotium*, Stem rot

Introduction

The groundnut, also known as *Arachis hypogaea* L., is a legume crop that holds significant importance worldwide. The primary purpose of cultivating this crop is to produce edible cooking oil, with 48% edible oil, 26% protein, 20% carbohydrates, and 3% fibre. Moreover, it is a rich source of calcium, thiamine, and niacin. Groundnut, grown in tropical and sub-tropical regions worldwide, is a major crop in these areas. However, its production is threatened by biotic and abiotic factors like pests, diseases, drought, low input usage, and insufficient socio-economic infrastructure. Among these threats, the stem rots disease caused by the soil-borne pathogen *Sclerotium rolfsii* Sacc. is a significant concern for the successful cultivation of groundnut. The pathogen produces cell wall degrading enzymes and phytotoxin (oxalic acid), resulting in key symptoms such as abundant white mycelia production and the formation of small brown spherical sclerotia with a melanized outer layer that enables the fungus to survive for more than three years in unfavorable soil conditions (Pawar *et al*., 2022). The severity of field infestation caused by *Sclerotium rolfsii* can result in losses of 10-25% in pod yield, and in severe infections, the losses can escalate up to 80%. Peg and pod rots caused by this disease are major consequences that can lead to significant pod losses during harvest.

Symptoms

The fungus predominantly infects the stem by forming a whitish mycelial mat around it (Figure 1). However, it can also infect other parts of the plant, such as the leaf, pod, and root. In young plants, the fungus can cause foot rot, leading to complete girdling and plant death. The key symptoms of stem rot include the growth of abundant white mycelium on the infected sections, along with the production of organic acids that are toxic to living plant tissue. Furthermore, the presence of small brown spherical sclerotia is also a characteristic symptom of the disease.

The whole plant can be destroyed, but in some situations only two or three branches are infected. Infection of pegs, pods and roots occurs either individually or in conjunction with the stem infection. Developing peg lesions can delay pod growth, significantly contaminated pods are coated with a white mycelial mat and gradually decay. In some instances, the seeds of the diseased pods display a distinctive bluish-

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Figure 1: Stem rot of groundnut

gray testa discoloration.

Pathogen

The fungus develops plenty of white fluffy, branched, septate mycelium with clamp connections only on the central hyphae, spreading like a fan. Small white tufts were developed on aerial mycelium that later turns flat, hard and dark brown mature sclerotia (Figure 2). Sclerotia can exhibit spherical or irregular shapes and resemble mustard seeds at maturity. Initially, the sclerotia were white in color, but as they mature, they become medium brown or dark brown, sub-spherical in shape, and finely wrinkled on the surface, often flattened. The size of sclerotia can range from 0.1 mm to 3.0 mm.

Integrated Disease Management

• Soil solarization decreases pathogen survival and susceptibility to antagonists, significantly reducing stem rot (Grinstein *et al*., 1979; Mihail and Alcom, 1984); suitable for hot areas with irrigation.

• Deep summer ploughing is another effective method that involves burying plant debris deep into the soil and exposing dormant fungal structures to direct sunlight.

• Bahia grass can also be grown as a trap crop for stem rot in groundnut.

• To treat seeds, Carbendazim can be used at a rate of 2-3 g kg^{-1} seed.

• Finally, *T. viride* can be multiplied in farmyard manure for 15 days (2 kg *T. viride* formulation + 50 kg FYM) and applied to soil before sowing.

Figure 2: Pure culture of *Sclerotium rolfsii*

Conclusion

Groundnut Stem Rot is an emerging threat to groundnut production that can cause significant economic losses. Early detection and effective management strategies are essential to minimize its impact. Further research is necessary to develop more sustainable and integrated disease management approaches to mitigate the risk posed by this pathogen.

References

Grinstein, A., Katan, Z.J., Razik, A.A., Zeydan, O., Elad, Y., 1979. Control of *Sclerotium rolfslii* and weeds in peanuts by solar heating of the soil. *Plant Disease Reporter* 63(12), 1056-1059.

Mihail, J.D., Alcorn, S.M., 1984. Effects of soil solarization on *Macrophomina phaseolina* and *Sclerotium rolfsii*. *Plant Disease* 68(2), 156-159.

Pawar, G.S., Gholve, V.M., Navale, M.D., 2022. Ecofriendly management of stem rot of groundnut (*Arachis hypogaea* L.) caused by *Sclerotium rolfsii* Sacc. *The Pharma Innovation Journal* 11(8), 37-42.