

Development of Robust and Reliable Phenotyping Technique for Screening of Groundnut against Stem Rot Disease

Stem Rot: A Persistent Soil Borne Threat to Groundnut Production

- Stem rot, caused by *Agroathelia rolfsii* (Sacc.) Redhead & S-T. Mullineux is a major soil borne disease that significantly affects groundnut production in India and several other groundnut-growing countries.
- Yield losses due to stem rot typically range up to 27%, but may exceed 80% in severely infested fields.
- In addition to direct yield reduction, the disease leads to indirect losses by reducing kernel dry weight, oil content and the overall quality of pods and fodder.
- The occurrence of stem rot is widespread across India, with symptoms commonly observed between 30–45 days after germination and again at the time of harvest.
- The pathogen is a destructive, non-target, soil-inhabiting fungus with a broad host range.
- Although the stem is its primary infection site, *A. rolfsii* can attack roots, leaves, flowers, and pods, making it difficult to control using conventional management practices.
- The persistence of sclerotia in soil and the wide host range often limit the success of chemical and cultural control measures.
- Cultural practices integrated with resistant genotypes offer greater promise for sustainable disease management; however, the development of resistant varieties has been constrained.
- One of the major bottlenecks in breeding for stem rot resistance has been the absence of a consistent and reliable field screening method.
- Non-uniform distribution of the pathogen in natural fields and challenges associated with establishing and maintaining artificial sick plots with optimal inoculum load have hindered effective evaluation of large breeding populations.

A Breakthrough in Stem Rot Screening

Until recently, no dependable technique existed to screen large numbers of groundnut breeding lines, RILs, germplasm under field conditions while generating consistent and reproducible resistance data.

To address this critical gap, ICAR–Indian Institute of Groundnut Research (ICAR-IIGR) has developed a robust, simple and reliable artificial field screening technique for evaluating resistance to stem rot under natural field conditions.

- This standardized phenotyping protocol allows large-scale, uniform screening of breeding material, ensuring accurate assessment of disease response and facilitating the identification of resistant genotypes.
- The technique has significantly enhanced the efficiency of resistance breeding programmes for stem rot.

Impact and Adoption

- The stem rot screening technique developed by ICAR-IIGR are now widely adopted by groundnut breeders across India and by several international research organizations.
- The method has become an essential tool for generating reliable phenotypic data and accelerating the development of stem rot resistant groundnut varieties.



Plot is covered with polythene sheet followed by inoculation and watering



Screening block covered with polythene sheet and green shade net



Profuse growth of fungus in the screening block



Profuse growth of fungus



White mat of fungus in the screening block



Stem fully covered with fungus

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