



SPOTLIGHT ON GROUNDNUT TIKKA DISEASE: A NOVEL STRATEGIES TO COMBAT THE SERIOUS THREAT

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INTRODUCTION

The groundnut, or peanut (*Arachis hypogea* L.), is a legume crop cultivated primarily for its edible seeds. It is significant to both small and large commercial growers, and it is widely grown in the tropics and subtropics regions of India. Groundnut Early Tikka, also known as Cercospora Leaf spot, is a common and economically significant fungal disease affecting groundnut crops worldwide. It is caused by the fungus *Passalora arachidicola* (previously known as *Cercospora arachidicola*), which primarily targets the foliage of groundnut plants. Cercosporin, which is extremely hazardous because it stimulates reactive oxygen species, is primarily responsible for the disease-causing ability of *Cercospora* and its lesion formation characteristics in a variety of crop species. Controlling leaf spots is essential to avoid defoliation and yield losses of at least 50% and above. Cercosporin's damaging effects on cells have made it difficult to develop resistance against *Cercospora*. If not effectively managed, making it a critical concern for groundnut growers. Utilizing an integrated disease management strategy can help control this devastating fungal disease.

Name of the disease: Groundnut Early Tikka leaf spot

Causative agent: *Passalora arachidicola* (earlier. *Cercospora arachidicola*)

Systematic position

Domain: Eukarya

Kingdom: Fungi

Phylum: Ascomycota

Class: Dothideomycetes

Order: Capnodiales

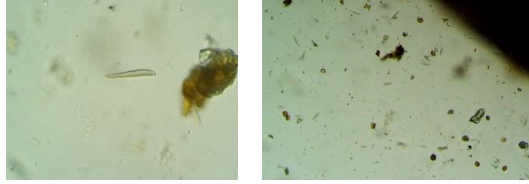
Family: Mycosphaerellaceae

Genus: *Cercospora*

Species: *C. arachidicola*

ECONOMICAL IMPACT

Early Tikka Spot can devastate groundnut crops. These diseases cause significant yield losses, with estimates ranging from 50% to a staggering 70% when combined with rust. These diseases typically target the leaves, reducing their ability to photosynthesis and ultimately affecting pod development. However, weather conditions can play a role. In less favorable environments for the fungus, the damage might be confined to the initial leaves, minimizing yield loss. The situation in Gujarat, India, highlights the seriousness of this issue. Studies there have documented yield losses exceeding 50% due to Early Leaf Spot caused by *Cercospora arachidicola* and Late Leaf Spot caused by *Phaeoisariopsis personata*.



Microscopic image of *Cercospora arachidicola* conidia

SYMPTOMATOLOGY

The fungal pathogens attack any above-ground portion of the plant, but leaf spots are the most conspicuous symptom. In groundnut, leaf spot symptoms usually appear between 30 to 50 days after planting. First appear as brown or black, pinpoint-size dots on the upper leaf surface. Early leaf spot lesions enlarge to become brown to dark brown, circular spots with a distinct yellow border or halo. It reaches a size of about one-fourth of an inch in diameter. The affected areas may coalesce, resulting in larger necrotic patches on the leaf surface. Severe infections can lead to extensive defoliation, weakening the plant and reducing its photosynthetic capacity. The overall impact includes reduced pod development, smaller and fewer nuts, and diminished crop quality.



Adaxial surface



Abaxial surface



Symptom image of Groundnut Leaf spot

FACTORS FAVOURING DISEASE DEVELOPMENT

Primarily through conidia produced on infected groundnut debris. These conidia are dispersed by wind, rain splash, and physical contact, infecting new leaves. The fungus also survives in infected seeds and can spread within fields through equipment and farm practices.

- **Humid and Warm Conditions:** The disease thrives in warm and humid environments, with optimal temperatures ranging from 20°C to 30°C (68°F to 86°F). High humidity and moisture on the foliage provide favourable conditions for fungal spore germination and infection.
- **Overhead Irrigation:** Practices such as overhead irrigation, which can keep the foliage wet for extended periods, create a conducive environment for fungal growth and disease spread.
- **Susceptible Groundnut Varieties:** Certain groundnut cultivars are more susceptible to *Cercospora arachidicola* infection than others. Varietal susceptibility can influence the severity of disease outbreaks.
- **Crop Residue Management:** The presence of infected plant debris from previous crops can serve as a source of inoculum, allowing the fungus to persist and infect new plants.

MANAGEMENT STRATEGIES

Cultural Practices: Implementing practices such as crop rotation, timely planting, and maintaining proper spacing between plants can help reduce disease pressure.

Resistant Varieties: Planting groundnut cultivars with genetic resistance i.e., TNAU CO 6, ALR 3, VRIGn 7 are an effective long-term strategy for disease management.

Sanitation: Removing and destroying infected plant debris after harvest can reduce the overwintering of the fungus and limit its spread to the next growing season.

Fungicide Applications: For groundnut leaf spot, broad spectrum non-systemic fungicide can be employed. Thus, Spray Chlorothalonil @0.1% 1000g/ha at 15 days interval. Proceed with the second round if necessary.

Biological Application: *Trichoderma harzianum* and *Bacillus megaterium* have shown promising results in controlling *Cercospora* leaf spot. Extracts from certain plants with antifungal properties, like neem or pongamia, can be used as a spray to suppress *Cercospora* growth.