

INTEGRATED PEST AND DISEASE MANAGEMENT IN GROUNDNUT

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FOREWORD

Groundnut is an important oilseed and supplementary food crop of the world. Besides, edible oil production, groundnut is consumed as food item and processed for milk as well as butter, etc. India ranks first both in area and production, however its productivity (1257 kg/ha) is quite low as compared to many groundnut producing countries like USA, China and Myanmar. Major states which cover about 90% of total groundnut area in India are Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, Rajasthan and Maharashtra. Besides these groundnut is also cultivated in Madhya Pradesh, Uttar Pradesh, Odisha, Punjab and Chhattisgarh etc.

Low productivity of groundnut in India is due to many reasons of which, rainfed cultivation, erratic or low rainfall, drought, soil salinity, continuous use of popular old cultivars coupled with attack by a variety of diseases and insect-pests are important. This crop is attacked by about 100 different insect-pests *viz.*, leafminer, tobacco caterpillar, gram pod borer, thrips, aphids, leafhoppers, white grub and termite etc. and by more than 50 diseases *viz.*, stem rot, collar rot, leaf spots, rust and bud necrosis virus etc. Besides, nematode diseases like, *Kalahasti* and root-knot are also reported on groundnut. Presently, excessive use of pesticides has been practiced in our agricultural cropping-systems for increasing crop productivity. Unfortunately, this is harming the ecological balance of nature and we are now facing problems like, pesticide residues and resistance, pest resurgence and secondary pest outbreaks etc. Considering the ill-effects of pesticides, many nations are developing agricultural practices that are sustainable and do not have negative impact on environment.

The publication of this bulletin “Integrated Pest and Disease Management in Groundnut” by DGR, Junagadh is a need of hour to reduce the crop-losses caused by insect-pests and diseases. The bulletin provides a brief description about identification, nature of damage of insect-pests and the disease symptoms and suggests their suitable eco-friendly management. The information given in this bulletin will ease farmers to identify a problem and accordingly, they will be able to choose a suitable management practice.

We hope that the information provided in this bulletin would be useful for increasing productivity of groundnut in India and will establish new milestone in both production and productivity of groundnut.

J B Misra
Director

In India, groundnut is cultivated during *kharif*, *rabi* and summer seasons under various cropping systems. The major groundnut growing states are Gujarat, Andhra Pradesh, Karnataka, Tamil Nadu, Rajasthan and Maharashtra covering about 90 per cent of total groundnut area. The productivity is, however, low (around 1257 kg/ha) as compared to other groundnut growing countries like United States of America, China, and Myanmar. Rainfed cultivation of groundnut coupled with attack by plethora of insect-pests and diseases are the major reasons for low productivity.

Knowledge about nature of damage caused by insect-pests and diseases, and identification of key pests are important for proposing a successful management of insect-pests and diseases. This bulletin is developed with a view to ease farmers in identifying pests and diseases, and then selecting an appropriate measure to manage the insect-pests and diseases in an eco-friendly manner.

MAJOR INSECT-PESTS

More than 100 insect-pests are reported to infest groundnut crop. The identification characters of major insect-pests and their nature of damage are described as under.

DEFOLIATORS

Groundnut leafminer (*Aproaerema modicella*)

The adults are dark brownish about 6 mm long with 10 mm wing span. The anterior margin of fore wings has conspicuous pale white spot. The moths lay eggs underneath leaves and are shiny white in colour. Soon after hatching, larvae which are about 1 mm long mine into the leaves. The mines later increase in size and the entire leaflet rolls, shrivels and finally dries up. The crop gives alike burnt appearance in severely infested fields.

Tobacco caterpillar (*Spodoptera litura*)

The adult moths are light brown and lay golden brown eggs in groups on upper surface of leaves. Freshly emerged larvae are light green and feed gregariously on leaves. Fully grown larvae are solitary feeders and are pale greenish-brown with distinctive dark markings. The early instars scrap surface of the leaves while the late instars can cause complete defoliation under severe infestation. The damage is mostly caused during night time and is concentrated on leaves and growing tips. In light soils, the pods can also be damaged by late larval instars.

Red hairy caterpillar (*Amsacta albistriga*, *A. moorei*)

The moths are brownish-white, and young larvae are light brown and turn reddish as they grow and have reddish-brown dense hairs up to 2 cm long on the body. Black bands encircling a red band are present on anterior and posterior parts of the body of the larvae. Young larvae feed gregariously on the under surface of the leaves by scrapping them. The grown-up larvae defoliate the crop and gives field a cattle grazed appearance. Majority of the foliage damage is done during night time.



Groundnut leafminer
(*Aproaerema modicella*)



Tobacco caterpillar
(*Spodoptera litura*)



Red hairy caterpillar
(*Amsacta albistriga*, *A. moorei*)



Gram pod borer
(*Helicoverpa armigera*)



Thrips
(*Caliothrips indicus*, *Frankliniella schultzei*,
Thrips palmi, *Scirtothrips dorsalis*)



Aphids
(*Aphis craccivora*)

Gram pod borer (*Helicoverpa armigera*)

The moths are dull brown and lay creamy eggs individually on young leaves and flower buds. The larvae are greenish-brown and do not have black spots on thorax. The larvae feed voraciously on flowers and foliage, and defoliate the plants. When larvae feed on leaf buds which upon unfolding produce symmetrical holes on leaves.

SUCKING PESTS

Thrips (*Caliothrips indicus, Frankliniella schultzei, Thrips palmi, Scirtothrips dorsalis*)

Thrips are yellowish-brown or black in colour and are small sized insects about 2 mm long. Nymphs and adults cause damage by lacerating the leaf surface. Thrips suck the oozing sap resulting in white patches on lower surface of the leaves. The unfolded leaves become distorted, which results in condition called “pouts”. In severe infestation, plants become stunted. Thrips are also known to transmit groundnut bud necrosis virus.

Aphids (*Aphis craccivora*)

The adults are small sized (2 mm long) having greenish-brown or black colour. Nymphs are mostly dark brown in colour. Wingless adults are mainly responsible for causing infestation. However, winged are responsible for colonization and migration. Damage is caused by adults and nymphs that suck sap from tender shoots and flowers. Plants become stunted with distorted foliage and stem. The characteristic sign of aphid attack is presence of ‘sooty mould’ that is developed on honey dew excreted by aphids. Aphids also act as vectors for viral diseases such as peanut stripe and groundnut rosette.

Leafhopper/Jassids (*Empoasca kerri, Balclutha hortensis*)

The adults are light green in colour and lay eggs near midrib. Nymphs and adults cause damage by sucking the sap from the central portion of leaves and petioles. Prolonged exposure to leafhoppers results in a ‘V’ shaped yellowing on the tips of leaflets, which may spread to entire leaflet turning yellow. Severely infested crop gives a scorched appearance commonly called as “hopper burn”.

Mealybugs (*Phenacoccus solenopsis*)

Mealybugs are soft oval shaped insects measuring 5-8 mm in length and 3-6 mm in width. Adults are covered with white powdery wax layer, hence appear cottony. Moreover, due to presence of wax layer it becomes difficult to control with pesticide spray. The young ones are called crawlers and are pinkish in colour. Mealybugs cause direct damage by sucking sap from leaves and stems.



Leafhopper/Jassids
(*Empoasca kerri*, *Balclutha hortensis*)



Mealybugs
(*Phenacoccus solenopsis*)



White grubs/Root grubs
(*Holotrichia consanguinea*, *H. serrata*)



Termites
(*Odontotermes obesus*, *Microtermes obesi*)



Bruchid
(*Caryedon serratus*)

SOIL PESTS

White grubs/Root grubs (*Holotrichia consanguinea*, *H. serrata*)

The pest is more common in sandy-loam and light-red soils. The adults are dark brown measuring 18-20 mm and lay white round eggs. Damage is caused by both adults and larvae. The young grubs are white translucent, 5 mm long and feed on fine rootlets, while mature grubs are 'C' shaped and attack both roots and pods. The affected plants show varying degrees of wilting, which ultimately die and died plants can easily be pulled out. The grubs cause infestation in patches leading to 'patchy appearance' of field.

Termites (*Odontotermes obesus*, *Microtermes obesi*)

Termites prefer sandy as well as red soils and live in termitaria (termite mound). The termite workers (other castes like king, queen and soldiers do not take part in causing damage) cause damage by penetrating as well as hollowing the taproot causing wilting and premature death of plants. They also feed on pod-shell by removing the corky material between the strands of vascular tissues, resulting in 'scarification', which render them more susceptible to invasion by soil fungi, *Aspergillus flavus* that produces aflatoxin.

STORAGE PEST

Bruchid (*Caryedon serratus*)

The adults are brown in colour, measure 4-7 mm long and 5 mm wide. They lay milky-white eggs. Grubs feed internally on pods and kernels. The larva burrows through the pod wall and starts eating the seed. The characteristic damage can be identified by the presence of 'exit hole' on the pod wall before pupation. Field infested groundnuts are crucial for establishment and damage during storage. The large population of bruchids coupled with their high metabolic activity in storage increases heat and moisture which ultimately increases the risk of mold growth. This indirectly spoils the quality of groundnut by contaminating produce with aflatoxin, rendering it unfit for human and animal consumption, hence leading to huge qualitative losses.