

IPM IN GROUNDNUT

Insect Pests of Groundnut



- **Defoliators**
- **Sucking pests**
- **Root and Pod feeder**

Defoliators

Leafminer, *Aproaerema modicella* (Lepidoptera: Gelechiidae)

Damage Symptoms

- Young larvae mine into leaflets and form brown blotches on leaf
- Later stages web leaflets together and feed remaining within folds
- Severely attacked field looks "burnt" from a distance



Adult



Egg



Larva



Larvae



Pupa



Damage symptom

Tobacco caterpillar, *Spodoptera litura* (Lepidoptera:Noctuidae)

Damage Symptoms

- Freshly hatched larvae feed gregariously, scraping chlorophyll
- Larvae feed by making small holes on the leaf
- Sometimes feeding is heavy - only petioles and branches



Adult



Egg



Larvae



Pupa

Bihar hairy caterpillar: *Spilosoma (Spilarctia) obliqua* (Lepidoptera: Arctiidae)

Damage Symptoms

- Young larvae feed gregariously on the under surface of leaves
- Feed on leaves and cause loss by defoliation
- In severe cases only stems are left behind



Adult



Larvae



Pupa

Gram pod borer, *Helicoverpa armigera* (Lepidoptera: Noctuidae)

Damage Symptoms

- Larvae feed on the foliage, prefers flowers and buds
- When tender leaf buds are eaten symmetrical holes or cuttings upon unfolding of leaflets



Larvae



Pupa



Adult

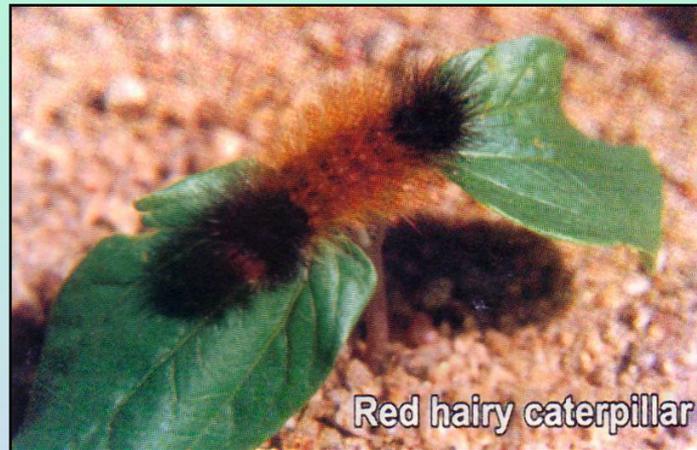


Egg

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

Damage Symptoms

- Young larvae feed gregariously on under surface of leaves by scrapping
- Larvae are voracious feeders, defoliate the crop - cattle grazed field
- Feed on leaves, flowers and growing points

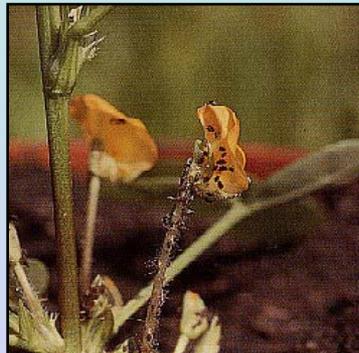


Sucking pests

Aphids, *Aphis craccivora* (Homoptera: Aphididae)

Damage Symptoms

- Sucks saps from young leaves, leaf buds and flowers
- Stunting and distortion of the foliage and stems
- Excrete honeydew on which sooty molds flow forming a black coating
- Vector for peanut stripe virus and groundnut rosette virus complex

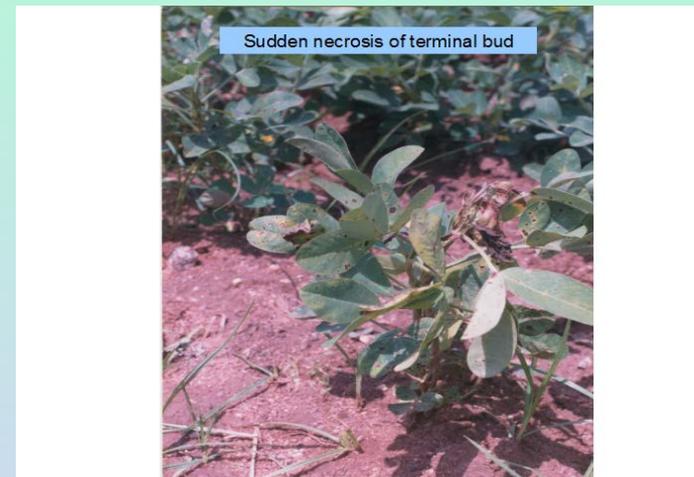
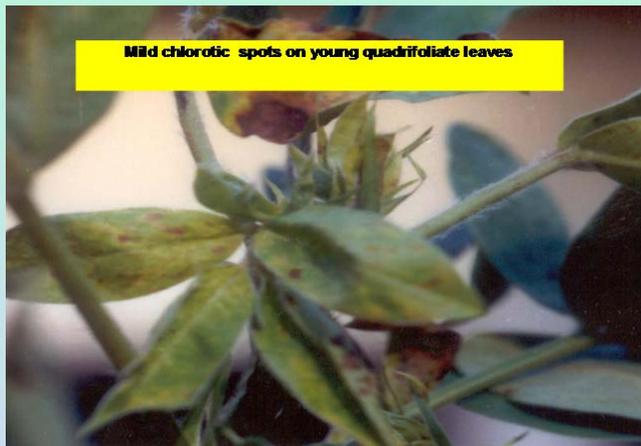
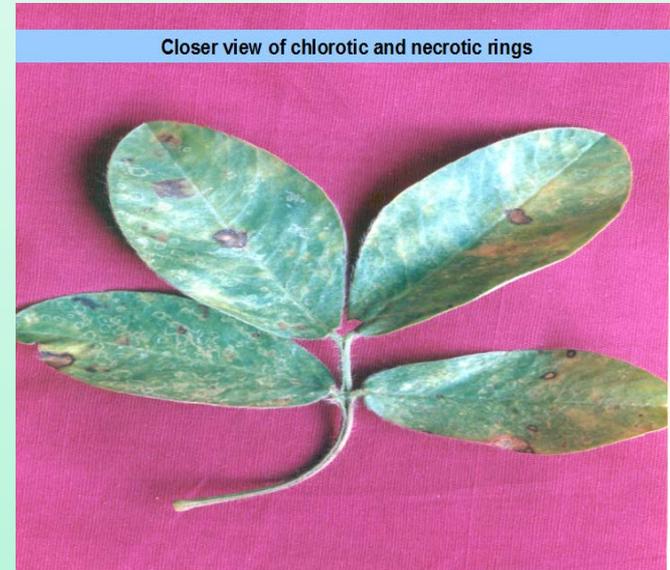
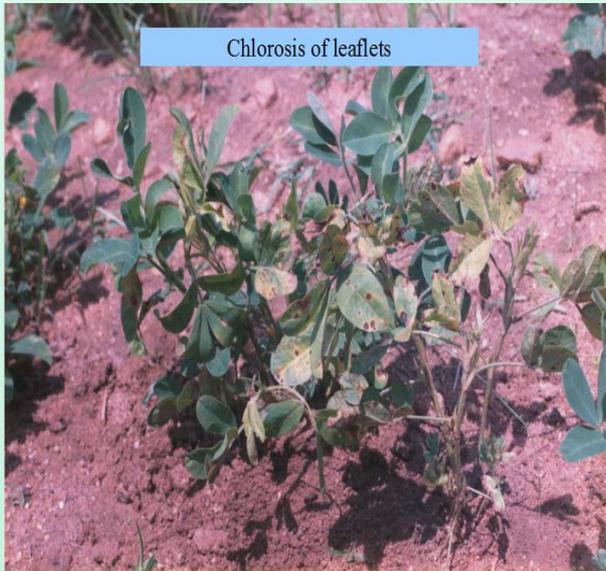


Thrips, *Scirtothrips dorsalis*, *Frankliniella schultzei*, *Thrips palmi*, *Caliothrips indicus* (Thysanoptera: Thripidae)

Damage Symptoms

- Tender leaves showing yellowish green patches on the upper surface and brown necrotic areas and silvery sheen on the lower surface
- Severe infestations cause stunted plants





Primary Symptoms of PBND

Leafhopper (Jassid), *Empoasca kerri* (Homoptera: Cicadellidae)

Damage Symptoms

- Nymphs and adults inject toxins resulting in whitening of veins and chlorotic patches especially at the tips of leaflets
- Crop looks yellow and gives a scorched appearance known as 'hopper burn'



Adult leafhopper



Damage

Root and pod feeders

White grub, *Holotrichia consanguinea* and *H. serrata*
(Coleoptera: Scarabidae)

Damage Symptoms

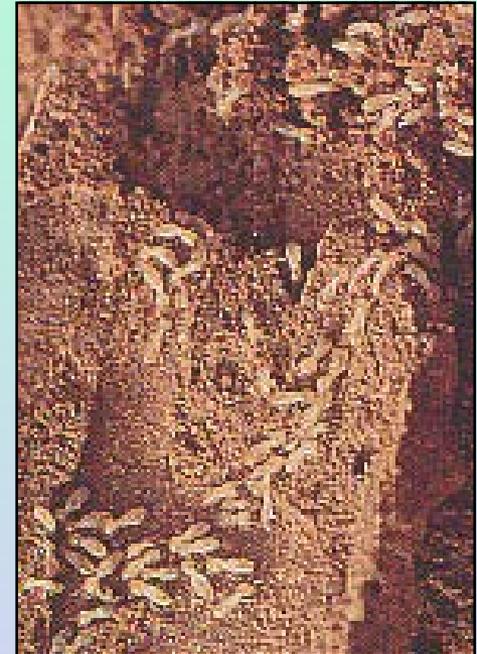
- Grubs feed roots and damage pods
- Grubs feed on fine rootlets - wilted plants, dying in patches



Termite, *Odontotermes* sp. and *Microtermes* sp. (Isoptera: Termitidae)

Damage Symptoms

- Wilting of plants in patches
- Termites penetrate and hollow out tap root and stem thus kill the plant
- Bore holes into pods and damage the seed



Jewel beetle, *Sphenoptera indica* (Coleoptera: Buprestidae)

Damage Symptoms

- Wilting of plants in patches
- Grub burrows into stem close to soil surface and kills plant
- Infested fields show dead and dying plants, which when pulled up and examined grub/pupa can be seen in hollowed stem



Grub & Adult



Damage

Wireworms (Coleoptera: Elateridae)

False wireworms (Coleoptera: Tenebrionidae)

Damage Symptoms

- White or cream, shiny, hard bodied larvae
- Feed on roots and pods



Earwig, *Anisolabis stali* (Dermaptera: Forficulidae)

Damage Symptoms

- Nymphs and adults bores developing pods & feed on seeds



IPM in Groundnut

Cultural practices

- Use of trap crops such as cowpea/soybean (for leafminer and leafhopper) and castor (for *Spodoptera*) as border crops
- Growing tall crops like pearl millet, sorghum or maize as border to reduce the incidence of thrips, vector for peanut stem necrosis disease
- Vegetative trapping of RHC with twigs of *Jatropha* or *Calotropis*; neem branches for trapping adult white grubs



Mechanical control

- Collection and destruction of egg masses, early instar larvae (mesh like leaves with larvae) of *Spodoptera*, *Spilosoma*; late instar larvae of *Helicoverpa* and defoliators



- Erection of bird perches @ 10-12/ac

Behavioural / Botanical and Biological Control

- Pheromone traps @ 10 traps/ha for *Spodoptera* and *Helicoverpa* and 25 traps/ha for leafminer or Light trap (RHC)
- Spraying NSKE5% or commercial neem formulations or neem oil @5 ml/l with nirma powder 1g/l – defoliators and sucking pests
- Spray SI NPV / HaNPV 250 LE/ha or *Bacillus thuringiensis* @ 1 g/l against *Spodoptera litura* and *H. armigera*
- *Nomuraea rileyi* – spraying 2×10^{11} conidia/l – *Spodoptera*



ETLs for important insect pests of groundnut

Leafminer

5 mines/plant up to 30 DAS

10 mines/plant up to 45 DAS

15 mines/plant up to 55 DAS

Spodoptera and

Other defoliators

20-25% defoliation upto 40 DAS

Leafhopper

5 to 10 adults/plant upto 30 days

Thrips

5 adults/terminal bud

Chemical control

- **Leafminer, Defoliators & Hairy caterpillars: Spraying Quinalphos 2ml/l or Chlorpyrifos 2.5ml/l or Thiodicarb 1.5g/l ; Dusting Quinalphos 1.5% @ 25kg/ha**
- **Sucking pests (Aphid, Jassid, thrips): Seed treatment with imidacloprid @ 2 ml/kg; Spray imidacloprid or acetamiprid @ 0.3ml/l**
- **White grub: Seed treatment with Chlorpyrifos20EC @ 6ml/kg; Soil treatment with phorate 10G 15 kg/ha**

REGISTERED INSECTICIDES, CIB, GOI, 2013 - GROUNDNUT

| Insecticides | Insect Pests | Dosage |
|---------------------------------|---|------------------|
| Diflubenzuron 25% WP | Tobacco caterpillar, Leaf webber | 0.75 ml/l |
| Dichlorvos 76% EC | Red hairy caterpillar | 0.75ml/l |
| Quinalphos 20% AF | <i>Spodoptera</i> | 1.8 ml/l |
| Malathion 50% EC | Leaf miner | 1.25ml/l |
| Deltamethrin 2.8% EC | Leaf miner | 1 ml/l |
| Phosalone 35% EC | Leaf webber | 1.5ml/l |
| Phenthoate 50% EC | Leaf webber | 1ml/l |
| Quinalphos 25% EC | Leaf miner, Leafhopper, Thrips | 1.4ml/l |
| Lambda-Cyhalothrin 5% EC | Leaf miner, Thrips, Leafhopper | 0.6ml/l |
| Oxydemeton–Methyl 25% EC | Leaf miner, Aphid | 1ml/l |

REGISTERED INSECTICIDES, CIB, GOI, 2013 - GROUNDNUT

| Insecticides | Insect Pests | Dosage |
|------------------------------|---|------------------------------|
| Imidacloprid 17.8% SL | Aphid, Jassid | 0.3 ml/l |
| Dimethoate 30% EC | Whiteflies | 1.7ml/l |
| Carbofuran 3% CG | Pod borer, White grub | 33 kg/ha |
| Phorate 10% CG | Aphid, Leaf miner, White grub | 15 kg/ha 25 kg/ha |
| Phosalone 4% DP | Leaf Webber | 20kg/ha |
| Quinalphos 1.5% DP | Thrips, Jassids, Red hairy Caterpillar | 23 kg/ha |

Groundnut - Varieties released / Recommended

- ***Kharif*** : TPG-41, TG 37A, **Narayani (TCGS 29)**, **Kalahasti (TCGS 320)**, Kadiri 5, Vikas (GPBD 4), Kadiri 6, Kadiri 7, **Kadiri 8**, Kadiri 9, Prasuna (TCGS 341), **Abhaya (TPT 25)**, GG 16 (JSP 39), ICGV 91114, AK 265, Ajeya (R 2001-3), ICGV 00348, VRI (Gn) 6, **Greeshma**, Mallika (ICHG 00440), JSP-39, Bheema, Rohini, ICGV-00350
- ***Rabi-Summer*** : **Narayani (TCGS 29)**, **Kalahasti (TCGS 320)**, TG 37A, Prutha (Dh 86), **Abhaya (TPT 25)**, VRI (Gn) 6, **Greeshma**, **Kadiri 8**, JSP-39, Vijetha (R 2001-2), Bheema, Rohini, ICGV-00350