Major Insect Pests of Cotton Crop in Pakistan

- Sucking pest complex
- Bollworms complex
Insect pests of cotton

Whitefly (*Bemisia tabaci*; Aleyrodidae, Homoptera)

- Whitefly
- Eggs
- 1st instar
- 2nd instar
- 3rd instar

Sooty mold on lint

CLCV symptoms
Insect pests of cotton

Aphid (*Aphis gossypii*; Aphidae, Homoptera)

Stunted growth with shriveling/withering
Insect pests of cotton

Thrips (Thrips tabaci; Thripidae, Thysanoptera)

Rasping/withering
Silvery white crumple shaped leaves
Premature boll opening
Insect pests of cotton

Jassid (Amrasca bigutella; Cicadellidae, Homoptera)

Cup-shaped leaves of brick red color (Hopper-burn)
Insect pests of Cotton

American bollworm (*Helicoverpa armigera*; Noctuidae, Lepid.)
Insect pests of Cotton

Spotted bollworm (Noctuidae, Lepidoptera)

Earias insulana

Earias vittella
Insect pests of Cotton

Pink bollworm (*Pectinophora gossypiella*; Gelechiidae, Lepidoptera)
Major Insect Pests of Sugarcane in Pakistan
Insect pests of Sugarcane

Top borer

Dead-heart formation
then
Bunchy top (by side shoots development)
Insect pests of Sugarcane
Stem borer
Insect pests of Sugarcane  

Root borer
Insect pests of Sugarcane

Leaf hopper (Pyrilla)
Insect pests of Sugarcane  
Termites (*Microtermes obesi*, *Odontotermes obesus*; Isoptera)
Major Insect Pests of Rice Crop in Pakistan
Insect pests of Rice

Yellow stem borer (*Scirpophaga incertulius*: Pyralidae)
Insect pests of Rice

White stem borer (*Scirpophaga innotata*: Pyralidae)

- Egg mass
- White Stem Borer

![Image of White stem borer mature larva and adults](image_url)
Insect pests of Rice

Damage of Stem Borers

Dead-hearts formation

Milky or White-ears formation
Insect pests of Rice  

White-backed plant hopper (*Sogatella furcifera*: Delphacidae)
Insect Pests of Maize and Sorghum
Insect pests of Maize & Sorghum

**Stem borer (Chilo partellus: Pyralidae: Lepidoptera)**

**Host plants:** wild and cultivated grass species, including maize, sorghum, millets and rice

**Identification (Spotted stem borer)**
- Adult: Forewings are yellowish grey
- Eggs: Clusters of 10-70 oval shaped eggs laid on leaves near midribs.
- Larvae: Creamy-white to yellowish-brown in colour with purple strips on dorsal side
- Conspicuous dark-brown spots on dorsal side

**Life history:**
- Life cycle: 3-4 weeks
- Larvae: 1-2 weeks (diapause as larva)
- Pupation: 1-1.5 weeks (inside stems)
- No. Og generations: 5-7

**Damage:**
1. Active period: April to October
2. Early stage crop is more susceptible.
3. Young larvae feed inside the leaf whorl (leaving shot holes on leaves)
4. Stem boring and feeding on growing tissues
5. Producing ‘deadhearts’ and weakening stem with holes on them on internodal region.

**Control:**
- Destruction of crop stubbles.
- Granular/dust insecticide to plant whorls.
- Biological control by *Cotesia flavipes, Bracon spp.*
- Carbofuran / Cypermethrin / Deltamethrin

**Host plants:** wild and cultivated grass species, including maize, sorghum, millets and rice
Host plants: Sorghum, corn, millets, wheat, other grasses

Identification:
Adult: small dark flies like house flies
Eggs: elongated whitish in color laid singly on leaf lowersides (30-40 eggs /female)
Larvae: yellowish brown in color
Pupae: Pale white (turns brown later on)

Life history:
Life cycle:
Adult: 1 month
Egg hatching: 3-5 days
Larva (maggot): 6-10 days
Pupation: 7 days (in-side stems)

Damage:
1. Active period: February to October
2. Maggots bore into the shoot of young plants, Central shoot dries (dead-heart).
3. Side tillers formation (which may be further attacked).

Control:
• Pull-out and discard the infested plants
• Higher seed rate than normal to ensure optimum plant density in the field
• Folier spray of Deltamethrin, Cypermethrin, Chlorpyrifos etc.
Insect Pests of Vegetable Crops in Pakistan
Hadda beetle (*Henosepilachna chrysomelina*: Coccinellidae: Coleoptera)

**Host plants:** All plants of cucurbitaceae family  
A serious pest of these plants

**Identification**
Adult: Reddish brown forewings with many black prominent spots on dorsal side (6-8 on each forewing)  
Eggs: Singly laid eggs (in clusters of 20-30), Yellowish in color on leave upper sides. (about 300 eggs per adult female)  
Larva (grub): Yellowish in color with spines.

**Life history:**
Life cycle: 1.5 to 2 months (male short lived than females)  
Adult: 2-3 weeks  
Larva: 10 days  
Pupat: 4-5 days  
No. of generations per annum: 5-7  
Overwinters as adult in crop stubbles or in soil structures

**Damage:**
• Active period: March to November (max. damage June/July)  
• Larval feeding on lower leaf sides making them sieved-like and ultimately drying and falling of leaves.

**Control:**
• Destruction of crop stubbles.  
• Biological control by *Pediobius foveolatus; P. epilachnae* (larval/pupal parasitiod wasp as shown in photo right)  
• Folier spray of Cypermethrin/ Lambda-cyhalothrin/ Bifenthrin
Red pumpkin beetle (*Aulacophora foveicollis*: Chrysomelidae: Coleoptera)

**Host plants:** Major pest of pumpkin crop and other cucurbitaceous plants

**Identification**
- Adult: Red orange colored body
- Eggs: Initially yellow, later turns on orange brown (50-300 eggs laid singly or in batches)
- Larva (grub): Creamy white or yellowish with dark black ends
- Pupa: Creamy white

**Life history:**
- Life cycle: About 1.5 to 2.5 months
- Adult: 1 month
- Larvae: 2-3 weeks
- Pupation: 1-2 weeks
- No. of generations per annum: 5

**Damage:**
- Active period: March to November (max. damage April/May)
- Adult and larvae feed on germinating young cucurbit seedlings in spring season.
- Grubs attack on roots, stems and fruits as well.
- At early stage, severe infestation cause complete crop eradication, so re-sowing becomes necessary.

**Control:**
- Destruction of crop stubbles.
- Foliar spray of Cypermethrin/ Lambda-cyhalothrin/ Abamectin
Brinjal fruit borer (*Leucinodes orbonalis*: Crambidae: Lepidoptera)

**Host plants:** Brinjal, Okra etc.
Most destructive pest of eggplant crop

**Identification**
Adult: Milky white forewings with brown irregular spots
Eggs: Laid singly on leaf, stem, shoot or fruit ventral surface (under-side)
Larvae: Pink in color with brown head capsule

**Life history:**
Life cycle: 2.5 to 3.5 months
Adult: 3 weeks
Larvae: 1 month
No. of generations: many overlapping generations per annum

**Damage:**
- Active period: March to Nov. (maxi. Damage June/July)
- Boring of tender shoots and stems (drying of central terminal shoots)
- Shedding of flowers and premature fruits
- Buds and fruit boring and infestation (entry holes clogged with excreta)
- Vectors of brinjal bacterial wilt

**Control:**
- Removal of crop stubbles
- Sowing of resistant varities
- Manual removal of infested plants (dead shoot removal)
- Biological control (by Ichneumonid wasps: larval parasitoids)
- Chemical control (Foliar spray with Cypermethrin, Spinosad etc.)

Host plants: Brinjal, Okra etc.
Most destructive pest of eggplant crop

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- Sowing of resistant varities
- Manual removal of infested plants (dead shoot removal)
- Biological control (by Ichneumonid wasps: larval parasitoids)
- Chemical control (Foliar spray with Cypermethrin, Spinosad etc.)
Insect Pests of Fruit Crops in Pakistan
Insect pests of Fruit Crops  
Citrus caterpillar (*Papilio demoleus*: Papilionidae, Lepidoptera)

Also called Citrus swallowtail butterfly

**Host plants:** Major pest of Rutaceae (citrus family) and also of Fabaceae.

**Identification**

Adult: Bluish green wings with irregular black and whitish-yellow patches.

- Red tornal spot with blue edging on forewing

Eggs: Smally creamy and round eggs laid singly on tender plant shoots or twigs.

Larvae: First instar larvae-bird dropping look, stays in the leaf middle portion on upper side

- Full grown larvae green in color with oblique brownish strips on abdomen.

Pupa: Rugose, dimorphic

**Life history:**

Life cycle: 1 – 1.5 month

- Adult: 1 week / Larvae: 2 to 4 weeks / Pupa: 1 – 3 weeks
- No. of generations: 6 – 8 per annum

**Damage:**

- Active period: April to Nov. (maxi. Damage July/ August)
- Vigorously eating leaves from edge to midrib.
- Devaste tender shoots and young sprouts.
- Complete defoliation of citrus nursery or no fruiting on trees.

**Control:**

- Manidual picking and destruction of larvae
- Biological control (larval paristoids like *Apanteles, Bracon hebetor*)
  - Pupal parasitods like *Brachymeria (Chalicidae)*
- Chemical control (Foliar spray with Imida, Cypermethrin, Spinosad etc.)
Host plants: Major pest of citrus plants and widely distributed in citrus growing areas of Pakistan.

Identification
Adult: Silvery white tiny (2 mm long) moth with hair-fringes on fore- and hind-wings.
Eggs: Minute round eggs (looks like tingy water droplets in mines) laid singly under side of plant tender sprouts and leaves. (50 eggs / female)
Larvae: Pale greenish in color
Pupa: Tiny brownish in color, pupate in mine near rolled-leaf edge.

Life history:
Life cycle: 3 – 10 weeks
Adult: 2 – 8 weeks / Larvae: 1 to 4 weeks / Pupa: 1 – 2 weeks
No. of generations: 12 plus

Damage:
• Active period: March to Nov. (maxi. Damage July/ August)
• Zigzag galleries on young foliage silvery when on young leaves turns into brown patches on older leaves
• Leaves and sprouts twisting and retarded growth occurs later on on attacked portion
• Rarely infest the stems and fruits.

Control:
• Horticultural oil sprays (to reduce egg laying)
• Fertilization in late winter/ Limited irrigation in late summer
• Biological control: Chrysoperla carnea (lacewings)*
• Cirrospilus coachellae (Eulophid wasps) larval parasitoid
• Chemical control difficult (low efficiency).
Insect pests of Fruit Crops  Citrus psylla (*Diaphorina citri* : Psyllidae, Homoptera)

Also called Asian Citrus Psyllid

**Host plants:** Major pest of citrus.

**Identification**

* Adult: Small (4 mm long) hoppter with brown and white patches (moteled body)
* Aphids are sedentary and psyllids are active.
* Egg: Pale yellow small eggs laid on young foliage
* Nymph: Five nymphal instars with light yellow color of full grown nymph

**Life history:**

**Damage:**

- Active period: March to October (maxi. Damage March-April)
- De-saping of young foliage
- Withering, deformation and yellowing of plant leaves and twigs
- Pre-mature fruit dropping and defoliation
- Sooty mold on sugary secretions produced by Psyllids
- Vector of citrus greening disease

**Control:**

- Biological control (*Tamarixia radiata* hoverflies, lacewings, several species of ladybird)
**Host plants:** Mango
A destructive pest of Mango plant, widely distribute in mango orchards

**Identification**
Adult: Pale brown in color
Eggs: 200, laid singly in panicle tissues, unopened flowers, and your foliage.
Nymph: Pale yellowish in color

**Life history:**
Life cycle: One month
Eggs: about 200 eggs per female (hatching in one week)
Nymph: One to three weeks
No. of generations: 2 per year (Feb. And in June)

**Damage:**
- Active period: Throughout the year (Maxi. population in May, June)
  Maximum damage caused in February-March (to inflorescence and young sprouts).
- De-saping of young foliage and sprouts, and tender leaves and twigs.
- Withering, deformation and yellowing of plant leaves and twigs
- Pre-mature fruit dropping and poor-quality fruits

**Control:**
- Chemical control (Acetamiprid, Imidacloprid, Bifenthrin, Lamda-cyhalothrin)
- Biological control by releasing lacewings, coccinellid beetles etc.
Insect pests of Fruit Crops  Mango mealybug (*Drosicha stebbingi* ; Monophlebidae, Homoptera)

**Host plants:** Mango, Mulberry, Peaches, guava, fig, rose etc.
A destructive pest of Mango plant/ widely distribute in mango orchards in Pakistan.

**Identification**
Adult: Females are wingless, oval, flattend body covered with a white mealy powder
Males are dipterous with black forewings and hindwings modified as halteres and with crimson colored body.
Eggs: Pink clored minute egg (masses), which later on turns pale near maturity.
Pupa: Only occurs in Male lifespan.

**Life history:**
Life cycle: One year
Eggs: about 200 eggs/ female laid singly which hatch in 1-2 weeks.
Nymph: 3 – 6 months
Pupa: 4 – 7 months (in soil near trunk)
No. Of generations per annum: One

**Damage:**
- Active period: Jan. to June (Maxi. Population in Jan. to April)
- After egg-laying adults die in June
- Egg hatching in 2nd fortnight of December and nymphs crawl up on the tree trunk in January and cluster around twigs, shoots, leaves, inflorescence, young fruits etc.
- De-saping of young foliage and sprouts, and tender leaves and twigs.
- Retarded plant growth and pre-mature fruit falling

**Control:**
- Regular ploughing of soil under tree trunk from May to November
- Collection and desctruction of egg masses
- Mealybug sticky traps on tree trunks
- Chemical control (Imidaclorpid, Deltamethrin, Lamda-cyhalothrin)
**Insect pests of Fruit Crops**  
**Mango fruit fly (Ceratitis cosyra; Tephritidae, Diptera)**

**Host plants:** Mango, guava, ber, peach  
A destructive pest of Mango plant/ fairly distributed in mango orchards

**Identification**
- **Adult:** Brownish yellow with shiny black spots  
- **Eggs:** Whitish yellow elongated eggs laid inside the mature green fruits.  
- **Larvae:** Apodous, creamy white maggots  
- **Pupa:** Yellowish brown in color (in 5-10 cm upper soil layer)

**Life history:**
- **Life cycle:** 1 – 1.5 month  
- **Adult:** 4 – 5 days  
- **Eggs:** Hatching takes place in 2 – 3 days.  
- **Larvae:** One to two weeks  
- **Pupa:** 2-3 weeks  
- **No. Of generations:** 2 per year

**Damage:**
- **Active period:** March to November  
  (Pupal hibernation: November to February)  
- **Maximum damage caused in August to November**  
- **Egg-laying in fruits by puncturing with ovipositors**  
- **Attacked fruit skin got rotten, giving strong smell and contain several maggots later on.**  
- **Fruit quality deterioration**

**Control:**
- **Plouging of soi under tree trunk**  
- **Regular removal and destruction of rottened and fallen fruits**  
- **Pheromone traps (methyl eugenol oil)**  
- **Chemical control (Acetamiprid, Imidacloprid, Bifenthrin, Lamda-cyhalothrin)**
Stored grain insect pests
Red flour beetle _susri_ (*Tribolium castaneum*; Tenebrionidae, Coleoptera)

**Identification**
Adul: Reddish brown with 11 segmented antennae (body length 4-5 mm)
Larva/grub: Yellowish white with light brown head (10 mm long)

**Damage:**
Larvae feed on broken kernels and grain dust (flour particles)
- Active period: March to November
- Overwintering as adult
- Infestation in wheat flour and other stored grain products produces disagreeable odor and flavor through production of benzoquinones from pest’s abdominal glands
- High rate of dispersal (flying adults) and reproduction under optimum temperature and conditions
Identification
Adult: Reddish brown to black with a developed rostrum, elytra with 4 brownish orange spots (adult body length 2.5 – 3.5 mm)
Larva/grub: dirty white found inside rice grains (10 mm long)

Damage:
• Active period: March to October-November
• Overwintering as larva inside grains
• Female oviposits inside grains (egg-site) where grubs begin to feed on germ material, leaving only intact grain shells.
• Single weevil grub may consume one third of a grain during its development.
Identification
Adult: Dark brown beetles with 11 segmented clubbed-shape antennae (body length 1.5 – 3.5 mm)
Larva/grub: Dark reddish brown (4 – 6 mm long) with long spicisetae hair tuft on 9\textsuperscript{th} abdominal segment.

Damage:
• Active period: March to November
• Overwintering as larva
• Adults rarely eat or drink and do not fly.
• Development is more high in warm and humid conditions inside the grain godowns.
• The pest is resistant to low humidity, temperature conditions, insecticides etc. but sensitive to oxygen supply inside the grain heap. Therefore it is a surface feeder and not infest beyond a certain depth.
Stored grain insect pests  Lesser grain borer (*Rhyzopertha dominica*; Bostrichidae, Coleoptera)

**Identification**
Adult: Dark brown beetles (body length up to 5 mm)
Larva/grub: Creamy white cylindrical (2.5 – 3.5 mm long), found inside grains

**Damage:**
- Active period: March to November
- Overwintering as larva
- Both adults and larvae bore into the grains and feed on grain contents including germ-plasm.
- Infestation of Lesser grain borer develops more frequently on milled rice and flour than highly polished rice.
Identification
Adult: Reddish brown body with usually brownish elytra and pectinate antennae (body length up to 3-4 mm)
Larva/grub: Pale yellowish (2-3 mm long), usually lie inside the grains

Damage:
• Active period: March to November
• Overwintering as larva
• Major pest of chick pea and other pulses and lentils.
• Grubs bore and fees on the internal seed cotyledons and excavate a growth chamber inside the grain.
House fly (*Musca domestica*; Muscidae: Diptera)

Mechanical transmission of organisms on its hairs, mouthparts, vomitus and feces:

**Parasitic diseases**: cysts of protozoa e.g. *Entamoeba histolytica* (dysentery), *Giardia lamblia* (diarrhea)

**Eggs of helminths**, e.g., *Ascaris lumbricoides*, *Trichuris trichiura*, *Hymenolepis nana*, *Enterobius vermicularis*. (all causes stomach diseases),

**Bacterial diseases**: typhoid, cholera, dysentery, pyogenic cocci, etc.

House flies have been demonstrated to be vectors of *E. Coli*

**Viruses**: enteroviruses: poliomyelitis, viral hepatitis (A & E).etc.

Management:

1. Dispose of manures, garbage, sewage, food waste, human excrement and dead animals
2. Use Sticky papers
3. Use Fly-flappers
4. Use of electric trap
5. Use Poison baits (coding with dichlorvos etc)
6. Spray insecticides inside homes (Trichlorphon 0.5%)
Mosquito (Aedes spp., Culex spp., Anopheles spp.; Culicidae: Diptera)

Disease transmission: malaria, dengue fever virus, yellow fever virus, japanese encephalitis virus, filariasis (disease due to Nematodes)

Management:
1. Destroy the mosquito breeding places (e.g., old tyres, water storage tank, room coller, flower vase etc to avoid dengue fever)
2. Remove the stagnant water (to avoid malaria)
3. Use of insecticide treated nets (ITN)
4. Screening of doors and windows
5. Vaccinate the children against malaria
6. Use of mosquito repellent (e.g., mospal, mos free etc)
7. Grasses around the house should be cut and sprayed with permethrin (0.25 %)
8. Spray on Vegetation around house against mosquito permethrin (0.25 %)
9. Use temephos to kill the larvae of mosquito
Cockroaches (*Periplaneta americana*; Blattidae: Dictyoptera)

1. Vectors and/or reservoirs of antibiotic resistant microbes (enterococci)
2. Move freely from building to building or from drains, gardens, sewers and latrines to human habitations.
3. Feed on old damp books and leather articles, human faeces as well as human food they can spread germs that cause disease.
4. They are proven or suspected carriers of the organisms causing:
   - Diarrhoea
   - Dysentery
   - Cholera
   - Leprosy
   - Plague
   - Typhoid fever
   - Viral diseases such as poliomyelitis.
5. May cause allergic reactions, including dermatitis, itching, swelling of the eyelids and more serious respiratory conditions (asthma).
6. Sugary and starchy substances in the houses are destroyed by their excreta and produce offensive smell.
7. Common in unclean kitchens, restaurants and old musty buildings and other filthy places.

**Management:**

1. Close all cracks and crevices to control the entry of cockroaches.
2. Keep the kitchen clean.
3. Keep the drains sealed.
4. Use of sticky traps.
5. Spray rooms with chlorpyriphos (0.5 %).
6. Spray dichlorvos (0.5 %).
7. Fipronils in poison baits.
8. Flufenoxuron (0.001 %) as IGR in baits.