Pests and Diseases of Rabi Castor

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Castor (*Ricinus communis* L.), a member of the Euphorbiaceae family, is an important oilseed crop with considerable economic significance. The seeds of castor contain 41%–64% oil (Olivares et al., 2013), making it a crucial raw material for various industries, including agriculture, medicine, chemicals, and household products (Agyenim-Boateng et al., 2018). On a global scale, India stands as the largest producer of castor, contributing 70% of the cultivated area and 87% of total global production, followed by Brazil and China (FAO, 2020).

India cultivates castor over approximately 1.02 million hectares, achieving an annual production of 1.98 million tons with an average yield of 1,900 kg/ha (INDIASTAT, 2022–23). The primary castor-producing states include Gujarat, Rajasthan, Telangana, Andhra Pradesh, Karnataka, Tamil Nadu, and Odisha. In Telangana, castor is grown on about 5,000 hectares, yielding nearly 5,000 tons at an average productivity of 984 kg/ha.

The crop faces significant obstacles, including pests and diseases, with lepidopteran pests contributing substantially to yield losses. Yield reductions during the kharif season range between 29.1% and 50.9%, while losses escalate to 49.1%–58.5% in the rabi season (Lakshminarayana and Duraimurugan, 2014). Although India's productivity surpasses the global average, pests such as semilooper (*Achaea janata* L.), tobacco caterpillar (*Spodoptera litura* F.), capsule borer (*Conogethes punctiferalis* Guenée), and various sucking pests continue to pose significant threats to production.

Semilooper (*Achaea janata* L.)

The semilooper, active from August to January, is a reddish-brown moth with black hindwings marked by white bands. Females lay about 450 blue-green eggs on leaves, hatching in 2–5 days. The larvae feed aggressively, leaving only midribs and veins, and grow up to 70 mm, displaying greyish-brown bodies with side stripes and a black head with red markings.

Castor semilooper damage

Tobacco Caterpillar (*Spodoptera litura* F.)

Found in tropical and subtropical areas, it damages crops like tobacco, cotton, tomato, and crucifers. Females lay up to 300 eggs in clusters covered with brown hairs, hatching in 3–5 days. Young caterpillars scrape leaves, creating a papery look, while older ones cause complete defoliation.

Management

- Natural enemie (*Snellenius maculipennis*) acts as larval parasite of semilooper whose cocoons may be seen attached to the ventral aspect of the posterior end of the host caterpillar. Avoid chemical spray when 1-2 larval parasitoids are observed per plant.
- Plucking of leaves harbouring egg masses / gregarious larvae and destroying.
- Install pheromone traps (4–8/acre) and bird perches (5–6/acre).
- Apply neem oil (Azadirectin 1500 ppm) at 5 ml/L for early instar larvae.
- Avoid chemical sprays when larval parasitoids (e.g., *Snellenius maculipennis*) are present.
- Use Thiodicarb (1.5 g/L), Profenophos (2 ml/L) (if <25% defoliation)
- Flubendiamide (0.2 ml/L), Spinosad (0.3 ml/L), or Chlorantraniliprole (0.3 ml/L) based on defoliation severity. (if >25% defoliation).

Shoot and Capsule Borer (*Conogethes punctiferalis*)

This pest, active from September to February, damages shoots and capsules. Larvae bore into shoots, causing frass at entry points and webbed capsules covered in dark excreta. The total life cycle spans 25–33 days, with three generations annually.


Spodoptera litura egg mass


1st instar larva


Spodoptera litura larva damage

Management

- Remove and destroy infested shoots and capsules.
- Begin spraying at inflorescence formation and repeat after 20 days.
- Use Profenophos (2 ml/L) or Novaluron (1 ml/L) for >10% capsule damage.

Leafhopper (*Empoasca flavescens* Fabr.)


Leafhopper damage


Severe hopper burn caused by leaf hopper

Light green or greenish yellow nymphs and adults suck sap from undersurface of leaf. As a result, the margins of leaf turn pale initially, later become yellowish and cause hopperburn or drying of leaves and showing brown necrotic patches in severe cases. Plants lose vigor and yield is affected. Peak infestation is during November to January.

Management

- Spray Profenophos (2 ml/L), Acetamiprid (0.2 g/L), or Clothianidin (0.1 g/L) when curling symptoms appear.
- Apply sprays at 15-day intervals during severe infestations.

Thrips (*Scirtothrips dorsalis*)

In the early stages, terminal leaves develop a silvered appearance, followed by dull yellowish-green patches on the upper surface and brown necrotic spots below. Severe infestation causes leaf curling, stunted growth, blackened inflorescences, flower drop, and drying of immature capsules. Thrips can be spotted by tapping leaves or inflorescences over white paper.

Management

- Spray Acetamiprid (0.2 g/L), Clothianidin (0.1 g/L), Fipronil (2 ml/L), or Thiamethoxam (0.5 g/L) at 15-day intervals.
- Alternate chemicals for effective management.


Thrips damage on spike

Wilt Disease (*Fusarium oxysporum f.sp. ricini*)

Wilt affects seedlings and mature plants, causing yellowing, brittle leaves, and vascular discoloration.


Wilt damage

Management

- Practice crop rotation with non-host plants.
- Treat seeds with Thiram (3 g/kg) or Carbendazim (2 g/kg).
- Use biocontrol agents like *Trichoderma viride* (10 g/kg seed).
- Apply *T. viride* (2 kg mixed with 100 kg farmyard manure) to the soil.

- Drench soil with Copper Oxychloride (3 g/L).

Conclusion

Castor is an important oilseed crop, primarily grown in India, but faces significant threats from pests and diseases, including lepidopteran pests and fungal wilt. Integrated pest management strategies, such as using natural enemies, pheromone traps, neem oil, and selective chemicals, along with crop rotation and seed treatment, are crucial for minimizing yield losses and ensuring sustainable production.

References

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