

# Pest and Diseases Management in Castor

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Castor (*Ricinus communis* L.) is an important non-edible oilseed crop of the spurge (Euphorbiaceae) family and is believed to have originated in Abyssinia. Mainly grown in arid and semiarid regions. It has gained great potential as its oil is being used in aircrafts as lubricant and also for grease, hydraulic fluids, soaps, printing inks and for ayurvedic medicine also. India is the major producer in the world, castor seed with a production of 17.95 lakh tonnes (lt) during 2021-22 season, against 17.89 in 2020-21 (Anon, 2022). Among states, Gujarat is leading with 6.52 lakh ha (13.45 lakh tonnes) under castor followed by Rajasthan 1.77lakh ha (2.76 lakh tonnes), Andhra Pradesh 0.16 lakh ha (0.064 lakh tonnes), and Telangana 0.022 lakh ha (0.037 lakh tonnes). According to government 2<sup>nd</sup> advance estimates, all India castor production in 2022-23 is at area 8.917 lakh ha, production 18.82 lakh tonnes. [Source: Directorate of Economics and Statistics (DES). \* 2<sup>nd</sup> Advance estimates.

Development of location-specific varieties and hybrids with appropriate crop production technologies lead to increased production and productivity of the crop. However incidence of insect pests is becoming major obstacle in castor production. Castor is majorly grown in areas where mean monthly temperature across the growing season ranges from 22.7 to 34.3° C. These temperatures are favorable for the incidence of several insect pests viz., semilooper (*Achoea janata* L.), tobacco caterpillar (*Spodoptera litura* F.), shoot and capsule borer (*Conogethes punctiferalis* Guen.) and leaf hopper (*Empoasca flavescens* Fabr.) of castor causing severe economic losses. More than 60 species of insects and pests were reported to cause damage to the castor crop and the yield losses were estimated to be about 40- 89%. Multitude of insect pests attack was reported at all phenological stages viz., seedling, vegetative and reproductive of the crop. The defoliators, viz., castor semilooper, *Spodoptera* & other hairy caterpillars, and sucking pests, such as jassid, whitefly, thrips and mites, cause huge damage to the castor crop.

## Semilooper (*Achoea janata* L)

It occurs during August-January, also damages rose, citrus pomegranate, *Tridax procumbens*. *A. janata* is a pale reddish-brown moth, stoutly built with black hindwings having white band medially and three large white spots on the outer margins

A single female moth lays about 450 blue green rounded and ridged eggs singly @ 1 to 6 eggs per leaf. Egg period is 2 to 5 days The caterpillar feeds sparingly at first and feeds voraciously during later stages leaving only mid rib and veins. Defoliated leaves, in severe cases only mid rib and veins of the leaves Caterpillar is a semilooper, long, smooth, greyish brown in colour.

The first pair of prolegs is reduced and as such a semilooper. Caterpillar possess red or whitish side stripes. Full grown larva has black head, a red spot on the black loop and red anal tubercles and measures 60-70 mm in length, larval period is 11- 15 days. Pupation takes place in the soil or among fallen leaves. Pupal period is 10-14 days during warm weather, few months in cold weather.

## Tobacco caterpillar (*Spodoptera litura* F)

It is found throughout the tropical and sub-tropical parts of the world, wide spread in India. Besides castor it feeds on tobacco cotton, groundnut, tomato, cabbage and various other cruciferous crops. Moth is medium sized and stout bodied with forewings pale grey to dark brown in colour having wavy white crisscross markings. Hind wings are whitish with brown patches along the margin of wing. Pest breeds throughout the year. Moths are active at night. Female lays about 300 eggs in clusters. The eggs are covered over by brown hairs and they hatch in about 3-5 days.

In early stages, the caterpillars are gregarious and scrape the chlorophyll content of leaf lamina giving it a papery white appearance. Later they become voracious feeders making irregular holes on

the leaves and finally leaving only veins and petioles and cause complete defoliation or skeletonized leaves.

#### Management of Semilooper and Tobacco caterpillar

- Collection and destruction of the infested material from the field.
- Plucking of leaves harbouring egg masses / gregarious larvae and destroying.
- Setting up of pheromone traps @ 4-8/acre for *Spodoptera litura*
- Erection of bird perches 5-6 per acre.
- Application of *Azadirachtin* 1500 ppm i.e. neem oil 5 ml/L for management of early instars larvae.
- Natural enemy (*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.
- Spray of Acephate 1.5 g/L or Thiodicarb 1.5g/L of water (if <25% defoliation)
- Spray Profenophos @ 2ml/ L or Flubendamide 0.2ml/L or Spinosad 0.3ml/L of water or chlorantraniliprole 0.3ml/l of water (if >25% defoliation).

#### Shoot and capsule Borer (*Conogethis punctiferalis*)

It is a potential pest and occasionally becomes serious. It is active from September to February when crop is in flowering. It also damages ginger, cardamom, turmeric, guava, peaches, cacao, pear, mango inflorescence, sorghum ear heads, soapnut tree etc. Moth is medium sized having bright orange yellow-coloured wings with numerous black dots or spots.

The body length is about 10 mm while the wingspan is 22 mm. Female moth lays pinkish oval, flat eggs singly or in groups on tender parts of plant and developing capsules. Incubation period is 6 to 7 days Larvae bore into the shoots as well as capsules and destroy them. Occasionally the larva is found at the junction of the petiole with the lamina and rarely in thick mid rib.

The symptoms are Frassy matter at the bored shoots & Webbed seed capsules covered with dark excreta. Caterpillar is brownish with pinkish tinge and fine hairs arising from warts on the body. The head and prothorax are brown. Larval period is 12- 16 days Pupation occurs inside the damaged stem or capsule, in a thin silken cocoon. Pupal period is 7-10 days. Total life history takes 25-33 days with three generations per year.

#### Management

- Collection and destruction the shoots and capsules infested by capsule borer.
- Spraying should be commenced from the time of formation of inflorescence and again after 20 days.
- Spray Profenofos @ 2ml/L or Novaluraon @ 1ml/L of water, if at least 10% capsules are damaged.

#### Leafhopper (*Empoasca flavescens* Fabr.)

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

- When 10% of leaves in a plant show curling, spray Profenophos 2 ml/L of water.
- Under severe infested conditions spray Acetamirpide @ 0.2g/L or Clothionidin 0.1g/L of water.
- Atleast two sprays required at 15 days intervals based on severity.

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

When seedlings are attacked cotyledonary leaves turn to dull green colour, wither and die subsequently. In mature plants the leaves become yellow and brittle, droop and drop off leaving behind only top leaves. Diseased plants are sickly in appearance. Cut opened stems will show

discolouration of the vascular bundles and presence of white mycelium on infected portion. Monocropping of castor in same field. Infected seed is the main cause for wilt.

### Management

- Crop rotation with non host plants
- Seed treatment with thiram @ 3g/ kg or carbendiazim @ 2g/ kg seed.

- Seed treatment with biocontrol agent *Trichoderma viride* @10g /kg.
- Soil application of *T. viride* @2kg of talc formulation mixed in 100kg farm yard manure and incubate it for 15 days and apply to the soil before ploughing.
- Drenching with Copper Oxy Chloride @ 3 g/L of water.

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