

BOLLWORM

Helicoverpa armigera (Hübner)

1 PEST PROFILE

1.1 Distribution and status

Bollworm is exclusively a spring pest that occurs sporadically in all production areas. It is an important pest because it can cause major crop damage and loss within a few days.

1.2 Description

The adult moths are nocturnal and are seldom seen during the day. They have an olive grey colour and a wingspan of about 22 mm. At night the females are attracted by the colour and scent of blossoms for oviposition purposes. Pearl white eggs about the size of a pinhead are laid on blossoms. The eggs darken with age and the incubation period lasts four to six days. Larval colouration varies and can range from green to grey or brown with longitudinal stripes. Larvae moult six times as they grow. The mature larva is about 40 mm long and pupates in the soil.

1.3 Infestation sites on tree

Eggs are laid on petals or sepals in the blossom clusters. Larvae feed on blossoms, fruitlets and sometimes young leaves.

1.4 Damage

1.4.1 Symptoms

All damage is caused by the feeding activity of the larvae. Fruitlets are the primary feeding targets. They can be destroyed before all the blossom petals have fallen. Heavily damaged fruitlets can drop. However, infestation would have to be extremely severe to result in any crop reduction. After fruit set, the appearance of damage can range from shallow marks to deep holes in the peel. On mature fruit, the damage leaves unsightly blemishes of uneven shape and depth which make fruit unacceptable for export. On navel oranges, 86% of bollworm-induced damage has been recorded on the navel end of fruit. This may result in unacceptable enlargement or malformation of the navel end. The edges of young leaves can also be eaten, but this

damage is of secondary importance.

Mature Valencia oranges can occasionally also be attacked. This only happens in spring where fruit have not yet been harvested when trees begin to blossom.

1.4.2 Seasonal occurrence

Bollworm damage is limited to the blossom period and shortly thereafter. Attacks are sporadic and vary between orchards and seasons.

2 MANAGEMENT ASPECTS

2.1 Infestation/damage assessment

Infestations occur only on bearing trees.

2.1.1 Inspection

During blossom to petal fall, inspections must be conducted at least weekly to determine the presence of eggs and larvae on blossom clusters. Sweep surveys must be conducted on an extensive scale in order to identify localised areas that may be threatened by heavy infestations. Commercial pheromone traps are also available for monitoring this pest, although treatment thresholds have not yet been developed.

2.1.2 Treatment threshold

An increase in egg presence on blossoms will provide an indication of the extent of the larval attack to come. A treatment should be applied when more than 20% of blossom clusters are infested with larvae or mature eggs. Enlarged navel end problems in navel oranges can be further exacerbated by bollworm attack. In such an instance, a threshold of 11% of clusters infested should be used. Only once around 40% or more clusters are infested, will a reduction in crop load result.

2.2 Control options

2.2.1 Biological

There are various parasitoids that attack bollworm eggs and larvae, e.g., *Trichogrammatoidea lutea* Girault and *Chelonus curvimaculatus* Cameron,

respectively. However, the speed and intensity of bollworm attacks are of such a nature that natural enemies are unable to prevent crop damage once the recommended treatment threshold is exceeded.

Product	Dosage / 100 ℓ water
Lannate SP	500 g

2.2.2 Cultural

There are no cultural options that can be used to prevent or reduce damage by bollworm.

2.2.3 Plant protection products

Spray treatments are registered for use with both tractor-powered machinery and aircraft.

2.2.3.1 Dilute sprays

One of the following treatments (in order of decreasing IPM compatibility) can be applied as an outside cover, diffuse spray with tractor-powered machinery:

Product	Dosage/100 ℓ water
Helicovir ¹	12 ml
Dipel 2X ¹	12.5 g
Tracer	20 ml
Delegate	12 g
Mevinphos EC	100 ml
Phosdrin SL	30 ml
Lannate SL	90 ml
Lannate SP	20 g
Dursban	75 ml / 48 g
Selecron ²	50 ml

¹ Helicovir and Dipel are preferred IPM treatments because of their specificity. However, to be effective they must be applied soon after the eggs hatch. A second application of Dipel may be necessary, especially where there is a prolonged blossom.

² May be phytotoxic on grapefruit, easy peelers or mid-season cultivars.

2.2.3.2 Aerial treatment

The following treatment can be applied from an aircraft at the rate of 50 litres mixture per hectare.