7) Horn worms - *Hippotion celerio*, *H. oldeniandia* and *H. boerhaviae*

The caterpillars feed on leaf leaves. They have a horn like structure at the tail end.

8) Bag worm - *Clania cramerii*

The caterpillars are unique in having characteristic bags fabricated out of silk, grasses and sticks inside which they live and feed on the leaves and tender shoots. The fully grown caterpillar measures 3 cm in length with stout head and thorax and soft abdomen. The caterpillar attaches itself to a twig and pupates inside the bag.

9) Bark eating caterpillar - *Inderbela sp.*

The caterpillar tunnels into the stem usually at the junction of bunches, comes out and feed on the bark after constructing galleries with pieces of bark and faecal pellets. Incase of severe incidence, the branches dry up. Removal of galleries and insertion of aluminium phosphate tablet or injection dichlorvos/chlorpyriphos is recommended to kill the caterpillar.

10) Hairy caterpillars - *Euproctis fraterna* & *E. lunata*

The caterpillars feed on the leaves in groups.

**MANAGEMENT OF CATERPILLARS**

1. Plough deeply to expose the pupae present in the soil in case of *Hellecoverpa* and *Spodoptera*.
2. Setting up of pheromone traps @ 8-10/ha to lure the moths and kill them in case of *Hellecoverpa* and *Spodoptera*.
3. Application of Nuclear Pseudovirus (*NPV*) @ 250 LE/ha for the control of *Hellecoverpa* and *Spodoptera*.
4. Spray Bacillus thuringensis (Bt) @ 3 kg/ha for the control of all the caterpillars.
5. Insecticides can also be used to control the caterpillars by keeping the PHI in mind. These insecticides have to be applied on the appearance of the pest. It is very difficult to control these caterpillars in the later stage.

**List of chemicals recommended to control the caterpillars**

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Dose</th>
<th>Pre Harvest Interval (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methomyl 40 SP</td>
<td>1.00 g/L</td>
<td>61</td>
</tr>
<tr>
<td>Phosalone 35 EC</td>
<td>2.00 mL/L</td>
<td>40</td>
</tr>
<tr>
<td>Chlorpyriphos 20 EC</td>
<td>2.00 mL/L</td>
<td>40</td>
</tr>
<tr>
<td>Endosulfan 35 EC</td>
<td>2.0 mL/L</td>
<td>40</td>
</tr>
<tr>
<td>Carbyl 40 WP</td>
<td>2.0 g/L</td>
<td>40</td>
</tr>
<tr>
<td>Lambda-Cyhalothrin 05 EC/CS</td>
<td>0.50 mL/L</td>
<td>30</td>
</tr>
<tr>
<td>Spinosad 45 SC</td>
<td>0.25 mL/L</td>
<td>28</td>
</tr>
<tr>
<td>Erramcetin benzoate 05 SG</td>
<td>0.22 g or mL/L</td>
<td>25</td>
</tr>
</tbody>
</table>

* Not permitted on export table grapes as per European Commission Regulation 65/2011/EC dt. 30-5-2011.

** Recommendation of chemicals for the management of caterpillars is of advisory nature for the good viticulture practices and therefore, not covered under any legal scrutiny.**

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**National Research Centre for Grapes**

P. B. No. 3, Miraj Farm P.O., Solapur Road  
Pune - 412 307, Maharashtra, India
Several caterpillars are known to damage the bark, leaves, flower petals and bunches leading to severe loss to grape growers.

1) Gram caterpillar - Helicoverpa armigera

The pest appears on berries 70-80 days after October pruning, usually in December-February. The caterpillar initially feeds on the leaves and then on the berries of peanut size by inserting its head into the berry leaving the rest of the body outside. The damage goes up to 50%.

Leaf damage  
Berry damage

Adult moth is stout and yellowish brown with a V shaped spec on light brown fore wings and dark border on the white hind wings. It lays about 500 spherical yellowish white eggs singly on tender parts. Eggs hatch in 4-5 days. The larvae are greenish brown with dark grey yellow stripes along the sides of body. There are five larval instars completing in 14-19 days. Pupation takes place in the soil. Pupal period lasts for 12-15 days. The life cycle is completed in 30-40 days.

Life stages of Helicoverpa

3) Leaf roller/folder - Sylepta lunalis

The caterpillar rolls up leaf margins towards the midrib and feeds inside the rolled leaf. Under field conditions the presence of the pest is masked by funnel shaped leaf rolls.

Leaf roller damage  
Larval feeding

Adults are dirty brown with white spots on the fore and hind wings. The body is covered with hairs and the head is brownish black. They lay about 100 creamy white oval eggs on the lower surface of leaves. Eggs hatch in 2-3 days. The larva is greenish with transversely dark brown head. There are five larval instars completing in about 15 days. The parasitoids Apanteles dita and Cardiochiles fuscus are found attacking the larva up to 70% in nature. Pupation takes place inside leaf rolls and plant debris on the ground. Pupal stage lasts for 6-7 days. The life cycle is completed in about 25 days.

4) Castor capsule borer - Conogthys punctiferalis

The pest is noticed in December-April. The caterpillar bores into the stalk and construct the silken web. The feeding is also noticed on berries, and pupation takes place within the galleries of frass and excreta. The loss goes up to 50%.

Adult moths are orange yellow with black markings on both the wings. They lay eggs individually on the stalk of tender berries. Eggs are pinkish oval flat laid singly or in groups. Eggs hatch in 6 days. The larva is pinkish with fine hairs. There are five larval instars completing in 15-20 days. Pupation takes place in silken cocoon inside the bunches or in the frass that collected after feeding. Pupal stage lasts for 7 days. The whole life cycle is completed in 30 days.

5) Leaf and berry webber - Adoxophyes prevatana

The caterpillars initially feed on the leaves and later migrate into berries. They web and feed within causing direct yield loss. The presence of a single caterpillar within a bunch destroys the entire bunch.

6) Berry plum moth - Oxypolis regulus

The larva feed on berries by remaining outside. They are brownish with radiating hairs all over the body. Pupation takes place within the damaged bunch.