



## CANADIAN FOREST SERVICE

### Insect Production Services

# Cabbage Looper

(*Tricoplusia ni*)

## Biology

### Introduction

The cabbage looper (*Tricoplusia ni*) is found throughout North America. It is a major pest of crucifer crops, including cabbage, broccoli, cauliflower, and may also be found feeding on other agricultural crops, such as beets, celery, lettuce, peas, spinach, tomatoes and flowers, including carnations and nasturtiums. Cabbage looper cannot survive Canadian winters. Every year, they migrate from the southern US and arrive in Canada in July and August, depending on temperatures and wind patterns. Although they normally produce two to three overlapping generations in a growing season, the actual number depends on when they arrive here. It takes approximately one month of warm weather for the cabbage looper to complete its life cycle and produce the next generation of offspring.

### Life Cycle

The cabbage looper does not require an overwintering period as a part of its life cycle—in fact, conditions colder than 10°C can prove fatal. Once adults migrate into an area, they deposit their eggs on the upper or lower surface of host foliage. Eggs are hemispherical in shape with longitudinal ridges, yellowish-white to a light green in colour, and approximately 0.6 mm in diameter. They are usually laid individually but may be found in masses containing 2 to 10. The length of time required for eggs to hatch is temperature dependant. Eggs hatch after three days at 27°C or 10 days at 15°C into small, green, first-instar larvae that are initially hairy but lose their hair as they develop. They will shed their skins and moult through a total of five larval stages known as instars. Larvae are light green with faint white stripes running dorsally along their bodies. Their torso at the anterior end is narrow, containing three pairs of forelegs, gradually getting wider to the posterior end with three pairs of prolegs. Larvae move by holding on with their prolegs, projecting their front end forward, grabbing hold with their forelegs and then arching their bodies to bring the prolegs up to meet the forelegs. This method of locomotion is characteristic of loopers, which are also sometimes referred to as “inchworms.” Larvae feed for two to three weeks on the underside of leaves, damaging and killing plants by chewing large holes between plant veins. Mature larvae reach lengths of 3–4 cm before they pupate within fragile, thin, white cocoons attached to the stems or undersides of leaves. Pupae are initially green but as they develop



## Care Instructions

Cabbage looper is shipped during the egg stage within cups of artificial diet. Each cup contains 20–25 eggs attached to a piece of gauze. Eggs may hatch during transit.

1. Upon receipt of the insects, turn the rearing cups upside down so that the diet is at the top. The tiny larvae will move up towards the light to find food. Breathable trays (e.g., cardboard) should be used to hold the cups of larvae. Maintain the cups at 27°C, 60% relative humidity and a 16h:8h light:dark cycle.
2. Transfer the larvae to fresh food one week after the shipping date. Reduce the larval rearing density to 3 per cup when using ¾ oz. (22 ml) cups of prepared artificial diet.
3. Natural foods (e.g., cabbage or any other cruciferous vegetable) may be used for feeding. However, these foods are a potential source of microbial pathogens that may infect the insects, and are therefore not recommended. If using these foods, remove uneaten foliage and clean rearing chambers regularly to minimize the accumulation of frass. As larvae become larger, the rearing density must be reduced because the larvae become cannibalistic.
4. Larvae will start to pupate about 14 days after egg hatch and may be removed from the diet. Pupae should be maintained in a vented container at 24°C, 60% relative humidity and a 16h:8h light:dark cycle.
5. Adults will emerge 6–8 days after pupation (i.e., 20–22 days after egg hatch) and survive longest when fed a sugar-honey solution.

they turn dark-brown or black in colour and are about 2 cm in length. Development of adults within pupae takes about six days at 27°C, after which they emerge as mottled greyish-brown moths with distinctive silvery markings on their forewings. Adults are considered to be semi-nocturnal and may be active at dusk and during cloudy days, but are most active late in the evening. Moths are capable of flying up to 200 km to locate new crops, where females will produce 300–600 eggs to initiate the next generation.

### Damage and Nuisance

Cabbage looper larvae in their first three instars generally feed on the undersides of leaves, keeping the upper surfaces of leaves intact. During their fourth and fifth instars, larvae chew large holes in leaves and may bore into the developing heads of cabbage. At this stage, larvae can consume three times their body weight daily. Their wet and sticky fecal material, called frass, accumulates at feeding sites and may even stain vegetables such as cauliflower and broccoli, rendering them unmarketable. Feeding during the first half of the growing season may not always affect crop yields, since larvae feed predominately on the wrapper leaves of the plants (e.g., cabbage).

### Natural Control

Cabbage looper is susceptible to numerous entomopathogens, including fungi, protozoa, bacteria and viruses. The most common is a nucleopolyhedrovirus (NPV), which under some conditions may prove to be a natural regulator of cabbage looper populations. Once infected by the virus, the larvae turn milky yellow and then brown at death. These dead larvae decompose and release virus particles into the surrounding area. Natural enemies such as parasitic wasps and tachinid flies may also contribute to population suppression. Parasitoids have been retrieved from cabbage looper eggs, larvae and pupae. Predators for cabbage looper include

ground beetles, lady beetles, bugs, spiders, birds and small mammals. Although natural predators do play an important role in wide-scale control, quite often their impact may not be significant on small local populations of cabbage looper.

### What Can I Do?

For small gardens and backyard plants and flowers, hand-picking of caterpillars several times a week may do the trick. Starting plants indoors and planting very early in the growing season allows for harvesting of vegetables before peak insect population outbreaks. Planting cultivars of plants that are less palatable to insects is also recommended. Attracting natural predators and parasitoids can be achieved by planting flowers (pollen and nectar) around gardens. Beneficial insects are especially attracted to plants such as dill, fennel, coriander and alyssum. Collecting dead diseased larvae, grinding them in water and spraying with a mist bottle may speed up the natural process and prove to be effective. If insect control is necessary, the microbial insecticide *Bacillus thuringiensis* (Bt) is available at most gardening centres. Bt has long been used for effective suppression and is much safer to use than chemical insecticides. Spraying chemical insecticides might also greatly affect natural cabbage looper predators and non-target species, so read the label carefully before using these products and strictly follow the instructions.

### Contact

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