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Walnut Caterpillar

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The walnut caterpillar (*Datana integerrima* Grote and Robinson) is a a relatively common insect in hardwood forests of eastern North America. It has been recorded from Ontario, through most of the Eastern States west to Minnesota, and south to northern Mexico. Periodically, it heavily defoliates host trees.

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Hosts

The larvae feed only on the foliage of trees in the family *Juglandaceae.* Hosts include black and English walnut, butternut, pecan, and various species of hickory. Larvae have also been reported on other tree species, weeds, and grasses; but no feeding occurs.

Injury

Trees of all sizes are attacked. Damage is usually most severe on isolated individual trees (fig. 1). The greatest amount of feeding usually occurs in August. Trees can withstand 2 or 3 consecutive years of heavy defoliation before they die. Severe infestations occur infrequently and are usually restricted to small geographic areas. Epidemics seldom last longer than 2 years, during which tree growth and vigor are reduced.

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Figure 1.—*Tree defoliated by walnut caterpillar.*

Description

Pale, green eggs with white caps are deposited in clusters of 120 to 880 on the lower leaflet surfaces (fig. 2). The eggs are spherical and about 0.7 millimeters (0.03 in) high and 0.5 millimeters (0.02 in) in diameter. As the embryo develops, egg color changes to light blue-gray.

A newly hatched larva is light green but changes to reddish brown as it grows older. Short white hairs cover most of the body. White lines on the top and sides extend the length of the body. A fully grown larva is black, covered with long white hairs, and 2.5 to 5.0 centimeters (1 to 2 in) long. The head color in all stages is black.

The pupa is about 2.0 centimeters (0.75 in) long, shiny and dark reddish brown.

The moth has a wing expanse of 4.2 to 4.8 centimeters (1.6 to 1.9 in). Each forewing is dark tan with four rust-colored lines. The hindwings are light tan (fig. 3).

Life History and Habits

One generation per year occurs in the northern area of the walnut caterpillar's range north of about 40° N latitude, two per year in the central areas of the range between 30° and 40° N latitude, and three per year south of about 30° N latitude. In areas where two or more generations occur, they may overlap. The second generation is usually the most destructive. Development time varies from year to year, depending on local weather conditions or latitude.

In the central portions of the range, walnut caterpillar moths begin to emerge from overwintering pupae near mid-May and can be present until late July. The adults deposit eggs soon after they emerge. The eggs hatch in 8 to 10 days. Larvae feed until late June and then pupate in the soil. Second-generation adults begin emerging in mid-July. They deposit eggs within 2 to 3 days; the eggs hatch and larvae begin feeding by late July. Most of these larvae stop feeding and drop to the soil by September; however, some larvae hatching from eggs deposited late in the season can be present in early October.

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Figure 2.—*Egg cluster on lower surface of leaflet.*

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Figure 3.—*Adult female moth.*

The larvae are gregarious during most of their development. After they hatch, the larvae skeletonize the upper leaflet surface. Later, they feed on both surfaces and eventually consume all but the petiole. During molting, larvae in the group usually congregate on the bole of a tree or large branch. (See cover.) Five or more larval aggregates can completely defoliate trees about 7.5 meters (25 ft) tall, while only one or two groups can defoliate trees less than 3 meters (10 ft) tall. Larvae abandon a tree and disperse when the foliage becomes sparse or when the tree has been defoliated.

When disturbed, second- through fourth-stage larvae assume a defensive posture in which the front and hind body segments are raised (fig. 4); however, fifth-stage larvae simply fall to the ground.

When fully grown, the larvae drop to the ground and burrow into the soil and/or litter where pupation takes place. No cocoon is spun. The last generation of the year overwinters as pupae until the following spring.

Natural Control

Parasites, predators, and diseases are the major factors influencing the irregularity of outbreaks.

Egg parasites (*Trichogramma* sp. and *Telenomus* sp.) may kill about 20 percent of the eggs. Infertility may account for an additional 20-percent egg loss.

At least 13 species of parasites attack the larval and pupal stages of walnut caterpillars. The most important species are: the tachinid flies (*Archytas metallicas* (R.D.), *Lespesia datanarum* (Townsend), and *Winthemia datanae* (Townsend)) and the ichneumonid wasps (*Tamypelma datanae* (Riley) and *T. fluvicorne* (Tws.)). Predators may kill half of a larval colony. Insect predators include the ground beetle (*Calasoma scrutator* (F.)), the spined soldier bug (*Podisus maculiventris* (Say)) (fig. 5), the wheel

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Figure 4. — *Fourth- and fifth-stage larvae.*

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Figure 5. — *Spined soldier bug attacking mature caterpillar.*

bug (*Arilus cristatus* L.), and the eastern yellowjacket (*Vespula maculifrons* (Buysson)). *Phidippus* and *Misumenops* spp. are important spider predators.

The house mouse (*Mus musculus* L.) and the white-footed mouse (*Peromyscus leucopus* L.) may consume about 15 percent of the pupae.

A microsporidian (*Nosema necatrix* Kramer) kills a small percentage of the larvae, and viruses and other diseases may kill approximately 50 to 60 percent of the fully developed larvae and pupae.

Cultural Control

The following cultural techniques may be used when a few or isolated trees are suffering heavy damage from the walnut caterpillar:

1. Clip and destroy leaflets containing egg masses.
2. Clip foliage or small branches with larvae and destroy by burning, mashing, or dropping into a can of kerosene or diesel fuel.
3. Remove groups of molting larvae from tree trunks, foliage, or low branches and destroy.
4. Spread a sticky insect barrier around the tree trunk below branches to entrap the larvae as they descend to molt.
5. Disk shallowly around and between tree rows to destroy the pupae.
6. Use resistant trees with pubescent leaves when available. (Pubescent leaves are more resistant to the feeding of young caterpillars.)

Direct Control

Although some trees may be heavily defoliated, outbreaks occur infrequently and tree mortality is rare. Chemical control is usually not necessary and may be harmful if parasites and predators are affected. In certain situations, however, localized treatments using pesticides may be necessary. Persons encountering high populations of larvae should consult their county extension agent, State agricultural experiment station, State forester, or the local Forest Service representative to obtain current information on recommended control procedures and materials.

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