Fall Webworm, *Hyphantria cunea* (Drury) (Insecta: Lepidoptera: Arctiidae: Arctiinae)¹
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**Introduction**

The fall webworm, *Hyphantria cunea* (Drury), is a pest of a number of ornamental trees and shrubs as well as of several agricultural crops. The larvae feed in huge nests and are able to completely defoliate trees and shrubs. Native to North America, this species has become an invasive pest throughout Europe and Asia, and therefore is well studied.

**Synonymy**

*Hyphantria*

*liturata* (Goeze, 1781)

*punctatissima* (Smith, 1797)

*budea* (Hübner, 1823)

*textor* (Harris, 1828)

*mutans* (Walker, 1856)

*punctata* (Fitch, 1857)

*pallida* (Packard, 1864)

*candida* (Walker, 1865)

*suffusa* (Strecker, 1900)

**Distribution**

The fall webworm originally occurred throughout North America to its northernmost limit in southern Canada. The nothern range limit for *Hyphantria cunea* occurs at the latitude of 50–55° (Morris 1963).

The fall webworm was introduced into Yugoslavia in the 1940s, and since then has invaded most of Europe. It now also inhabits parts of China and North Korea, again due to accidental introduction, and it is found in Japan.
Description and Life Cycle

The adult fall webworm moth is bright white, with a hairy body. In the southern part of its range, the moth is white with dark wing spots while in the northern part of its range it is nearly always pure white (MPG 2010) and was once thought to be a separate species from the southern populations. The gregarious larvae form large tents around the host plant. Currently, the taxonomic status of *Hyphantria cunea* as a single species remains intact. The variations in phenotypes of both adults and larvae (presence of dark markings on the wings in some populations and presence of populations with red-headed vs. dark-headed larvae) have caused speculation that more than one species might be involved. For example, in Japan, DNA barcoding studies have shown that two species might be occurring there sympatrically (Takeda 2005).

Like most moths, the fall webworm moths are nocturnal and are attracted to light. Adult moths have a wingspan of between 1.4–1.7 inches (35–42 mm). The bases of the front legs are orange or bright yellow.

The number of generations per year depends greatly on latitude. Southern populations may complete four generations in one year, while in the north the fall webworm completes only one life cycle. The univoltine chiefly black-headed and
dark-bodied larvae tend to occur above 40° latitude, while the multivoltine cycles with green-bodied, red or black-headed larvae tend to be found in the southern part of the distribution area.

Adults emerge as early as March in the south, but do not fly until late spring or early summer in northern areas. Mostly, the adults appear from May to August and deposit their eggs.

**Eggs**

The egg mass of *Hyphantria cunea* is almost iridescent green in color. The egg batch contains 400–1000 eggs. The eggs are usually deposited on the undersides of leaves in the spring, in a single (black-headed larva race) or double (red-headed larvae race) layer of several hundred eggs. The egg mass is lightly covered with scales from the female’s abdomen.

**Larvae**

In one to two weeks, the larvae hatch and immediately begin spinning their silk tent. The neonate caterpillars place the web over single leaves and feed by skeletonizing.
Mature larvae are hairy and either have a lime green body with black spots or can have darker color, especially in the later instars. The head capsules in some populations can be either red or black. In other populations, they are entirely black. The black-headed larvae are thought to be more prevalent in the northern climes, while the red-headed larvae are thought to be dominant in the southern climes. Some behavioral differences have been noted between different larval morphs. For instance, larvae of the red-headed morph stay inside the tent throughout the larval stage, while the black-headed morph leaves the tent in its fifth instar.
Pupae

Full-grown larvae leave the web to pupate in leaf litter or bark crevices. Fall webworms overwinter in the pupal stage. Pupation occurs in thin cocoons. The pupae are brown.

Hosts

Part of Hyphantria cunea’s success as a species can be attributed to the fact that its larvae are consummate generalists, capable of developing on a wide range of host plants. Preferred host plants include hickory, pecan, walnut, elm, alder, willow, mulberry, oak, sweetgum, and poplar.
Figure 19. Fifth instar larvae of the fall webworm, *Hyphantria cunea* (Drury). Photograph taken at Gainesville, Florida.
Credits: Andrei Sourakov, Florida Museum of Natural History, University of Florida

Figure 20. Freshly molted fifth instar larvae of the fall webworm, *Hyphantria cunea* (Drury). Photograph taken at Gainesville, Florida.
Credits: Andrei Sourakov, Florida Museum of Natural History, University of Florida

Figure 21. Dorsal view of a fifth instar larva of the fall webworm, *Hyphantria cunea* (Drury). Photograph taken at Gainesville, Florida.
Credits: Andrei Sourakov, Florida Museum of Natural History, University of Florida

Figure 22. Lateral view of a fifth instar larva of the fall webworm, *Hyphantria cunea* (Drury).
Credits: Lyle J. Buss, University of Florida

Figure 23. Fifth instar larva of the fall webworm, *Hyphantria cunea* (Drury), inside a cocoon. Photograph taken at Gainesville, Florida.
Credits: Andrei Sourakov, Florida Museum of Natural History, University of Florida

Figure 24. Cocoon of the fall webworm, *Hyphantria cunea* (Drury). Photograph taken at Gainesville, Florida.
Credits: Andrei Sourakov, Florida Museum of Natural History, University of Florida

*Fall Webworm, Hyphantria cunea* (Drury) (*Insecta: Lepidoptera: Arctiidae: Arctiinae*)
Host Plants Recorded in Florida (Heppner 2007, and personal observation)

Aceraceae: Acer spp.—A. negundo, A. rubrum, A. saccharinum, A. saccharophorum

Anacardiaceae: Cotinus coggyria

Anacardiaceae: Schinus terebinthifolius

Annonaceae: Asimina triloba

Aquifoliaceae: Ilex spp.—I. decidua, I. opaca

Berberidaceae: Berberis canadensis

Betulaceae: Alnus spp.; Betula spp.—B. alba, B. nigra, B. papyrifera; Carpinus caroliniana; Corylus americana; Ostrya virginiana

Bignoniaceae: Campsis radicans, Catalpa bignonioides, Catalpa speciosa

Buxaceae: Buxus spp.—B. sempervirens

Cannaceae: Canna spp.

Caprifoliaceae: Lonicera spp., Sambucus canadensis, Symphoricarpos albus, Virburnum spp.

Celastraceae: Euonymus atropurpureus

Chenopodiaceae: Chenopodium album, Spinacia oleracea

Comaceae: Cornus spp.—C. alternifolia, C. drummondii, C. florida

Compositae: Helianthus spp., Parthenium argentatum

Cupressaceae: Chamaecyparis thyoides, Cupressus spp., Juniperus virginiana, Taxodium distichum

Ebenaceae: Diospyros kaki, Diospyros virginiana

Ericaceae: Kalmia spp.

Ericaceae: Oxydendrum arboreum, Rhododendron spp.

Euphorbiaceae: Ricinus communis

Fagaceae: Castanea spp.—C. dentata, C. pumila; Fagus grandifolia; Quercus spp.—Q. alba, Q. coccinea, Q. phellos, Q.prinus, Q. rubra

Geraniaceae: Pelargonium spp., Geranium spp.

Gramineae: Zea mays

Hamamelidaceae: Hamamelis virginiana, Liquidambar styraciflua

Hippocastanaceae: Aesculus spp.—A. glabra, A. hippocastanum, A. octandroa

Juglandaceae: Juglans spp.—J. californica, J. nigra, J. regia; Carya spp.—C. glabra, C. illinoinsensis, C. laciniosa

Lauraceae: Sassafras albidium

Leguminosae

Leguminosae: Cercis canadensis; Gleditsia triacanthos; Gymnocladus dioica; Robinia pseudo-acacia; Trifolium spp.; Wisteria spp.—W. frutescens, W. sinensis

Malvaceae: Althaea rosea, Gossypium herbaceum, Hibiscus syriacus

Magnoliaceae: Liriodendron tulipifera, Magnolia spp.

Moraceae: Ficus carica, Maclura pomifera, Morus spp.—M. rubra

Nauclaceae: Cephalanthus occidentalis

Nyssaceae: Nyssa sylvatica

Oleaceae: Chionanthus virginicus; Fraxinus spp.—F. americana, F. excelsior; Jasminum spp., Ligustrum vulgare, Syringa spp.

Platanaceae: Platanus occidentalis
Pinaceae: Larix decidua, Pinus spp.

Portulacaceae: Portulaca oleracea

Ranunculaceae: Clematis spp.

Rhamnaceae: Rhamnus alnifolia

Rosaceae: Amelanchier canadensis; Crataegus spp.; Cydonia oblonga; Malus spp.—M. angustifolia, M. coronaria, M. diversifolia, M. pumila; Prunus spp. - P. americana, P. avium, P. cerasus, P. domestica, P. ilicifolia, P. persica, P. serotina, P. communis; Pyrus communis; Rosa spp.; Rubus spp.—R. allegheniensis, R. idaeus var. strigosus; Spiraea spp.

Rutaceae: Citrus spp.—C. aurantiifolia, C. lemon, C. paradisi, C. sinensis; Zanthoxylum americanum


Saxifragaceae: Ribes spp.—R. lacustre, R. sativum

Scrophulariaceae: Paulownia tomentosa

Simaroubaceae: Ailanthus altissima

Staphyleaceae: Staphylea trifolia

Taxaceae: Taxus spp.

Tiliaceae: Tilia spp.—T. americana, T. europaea

Ulmaceae: Celtis spp.—C. laevigata, C. occidentalis; Ulmus spp.—U. americana, U. rubra

Vitaceae: Parthenocissus quinquefolia, Vitis vulpina

**Economic Importance**

In the wild, within its native range, fall webworm does not usually damage the trees, since the defoliation occurs just before leaf drop. However, *Hyphantria cunea* is known to cause damage to ornamental trees, and is also known as a pest of sericulture because of its preference for mulberry leaves (Franz 1961, Yang & Zhang 2007).

A fall webworm tent normally encloses the foliage at the end of a branch. The caterpillars can build large silk tents that sometimes spread over several branches. At maturity, the larvae may reach one inch in length. Throughout their development, the caterpillars are able to make distinct jerking movements in unison if the nest is disturbed.
Management

Biological Control

Parasitoids attacking *Hyphantria cunea* include:

**DIPTERA**


**HYMENOPTERA**


*Chalcididae*: *Brachymeria obscurata* (Walker)

*Eulophidae*: *Baryscapus esurus* (Riley), *Chouioia cunea* Yang, *Eichertus hyphantriae* Crawford


*Sinophorus validus* (Cresson), *Therion morio* (Fabricius), *Therion sassacus* Vier, *Vulgichneumon brevicinctor* (Say)

*Pteromalidae*: *Dibrachys cavus* (Walker)

*Torymidae*: *Monodontomerus minor* (Ratzeburg)

*Trichogrammatidae*: *Trichogramma dendrolimi* Matsumura

Chemical Control

Florida Insect Management Guide for Commercial Foliage and Woody Ornamentals

Florida Insect Management Guide for Pecans
Selected References


Figure 32. An adult parasitoid (unidentified species) of the fall webworm, *Hyphantria cunea* (Drury). Credits: Thomson Paris, University of Florida