

Data Sheets on Quarantine Pests

*Malacosoma americanum***IDENTITY**

Name: *Malacosoma americanum* Fabricius

Taxonomic position: Insecta: Lepidoptera: Lasiocampidae

Common names: Eastern tent caterpillar, orchard tent caterpillar, apple tent caterpillar (English)

Livrée d'Amérique (French)

Amerikanischer Ringelspinner (German)

Bayer computer code: MALAAM

EPPQ A1 list: No. 276

HOST

M. americanum is an oligophagous species, whose preferred hosts are wild cherries (*Prunus serotina*, *P. pennsylvanica*, *P. virginiana*), wild apples (*Malus coronaria*) and other Rosaceae. During outbreaks, the caterpillars also feed on a large variety of hosts, e.g. *Acer rubrum*, *A. saccharum*, *Alnus* spp., *Amelanchier* spp., *Berberis vulgaris*, *Betula alleghaniensis*, *B. papyrifera*, *Carya illinoensis*, *Corylus* spp., *Crataegus* spp., *Fagus grandifolia*, *Fraxinus americana*, *F. excelsior*, *Hamamelis* spp., *Liquidambar styraciflua*, *Nyssa sylvatica*, *Populus balsamifera*, *P. grandidentata*, *Quercus alba*, *Q. rubra*, *Rosa* spp., *Salix* spp., *Sorbus* spp., *Tilia americana* and *Ulmus thomasii*. The following fruit trees are also recorded hosts: apples (*Malus pumila*), peaches (*Prunus persica*), plums (*P. domestica*), but not cherries (*P. avium*).

GEOGRAPHICAL DISTRIBUTION

M. americanum is common and widespread in the eastern part of the United States as far west as the Rocky Mountains, and in southern Canada. In the west, it is replaced by *M. californicum* and other species (see below).

EPPQ region: Absent.

North America: Canada (New Brunswick, Nova Scotia, Ontario, Quebec), USA (Arkansas, Connecticut, Florida, Georgia, Illinois, Kentucky, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Rhode Island, West Virginia).

EU: Absent.

It may be noted that related species, with similar host ranges, occur in other parts of North America: *M. californicum pluviale*, the western tent caterpillar, on many broad-leaved hosts (e.g. *Alnus rubra*, *Malus fusca*, *Populus tremuloides*, *Rosa* spp.) in western USA (Arizona, California, New Mexico, Oregon, Washington) and Canada (British Columbia, Alberta, Saskatchewan), and locally also in the north-eastern states of the USA and in Quebec; *M. californicum lutescens*, the prairie tent caterpillar, on *Prunus* and *Salix* in the Great Plains area east of the Rocky Mountains to central Texas; *M. constrictum*, the

Pacific tent caterpillar, on *Quercus* spp. in Washington, Oregon and California; *M. incurvum*, the southwestern tent caterpillar, on *Populus*, *Prunus* and *Salix* in Colorado, Utah, Nevada and Arizona; *M. tigris*, the Sonoran tent caterpillar, on *Quercus* spp. in the southern part of USA and Mexico. The polyphagous *M. disstria*, whose larvae do not form tents, is also an EPPO A1 quarantine pest (EPPO/CABI, 1996).

BIOLOGY

There is one generation each year. The moths fly late in the spring. The females lay about 350 eggs in distinctive masses, deposited around smaller twigs and branches of the host plant. The eggs are covered with 'spumaline', a substance protecting the eggs against desiccation and low temperatures (Segarra-Carmona & Barbosa, 1983). After a month the eggs already contain a fully-grown embryo, but they hatch in the spring about the time the wild cherry leaves begin to unfold. The young larvae feed gregariously and gather in major branch forks to construct a common web or tent. After feeding and during unfavourable weather conditions, the larvae return to the tent to rest. The larvae leave webs wherever they go, and when populations are large, whole trees become covered with webs. The tents create a protected environment for the larvae (Joos *et al.*, 1988). After six weeks the larvae become fully grown, leave the nest and feed in a more solitary manner on almost any deciduous tree and shrub. They pupate in white cocoons in various hiding places, such as crevices in bark, dead leaves, and occasionally fences or buildings. After two weeks, the adults appear. In Florida, adults may appear and lay their eggs even before hatching starts in the northern parts of the range. General accounts of the species are given by Prentice (1962) and Johnson & Lyon (1988).

DETECTION AND IDENTIFICATION

Symptoms

The larvae construct common webs or tents in major branch forks, from where they crawl through the entire tree or shrub. During outbreaks infested trees may be completely defoliated and become covered with webbing.

Morphology

Eggs

The eggs are deposited in black or brown cylindrical masses and wrapped around branches and other parts of the hosts. These masses are as long as 19 mm and covered with 'spumaline', which gives them a varnished appearance.

Larva

The larvae are dark-coloured with a black head, a white median stripe along the back, and a smaller blue and a larger black lateral spot on both sides of each segment. The median stripe is bordered by small yellow-orange stripes. The body is covered with a dense pubescence without any distinct pattern. Full-grown larvae are about 5 cm long.

Pupa

The pupae are enclosed in oval cocoons, which are covered with a yellowish-white waxy powder.

Adult

Moths are more or less dark-brown with a wingspan of 37-50 mm. Forewings with two white to yellowish bands and scattered white scales. The hindwings are chocolate-brown with an inconspicuous transverse white band.

MEANS OF MOVEMENT AND DISPERSAL

Locally, dispersal takes place by flight of moths and wandering of larvae. In international trade, the eggs, young larvae or pupae may be carried by host plants, or on bark. Dormant plant material could carry the very distinctive egg clusters.

PEST SIGNIFICANCE

Economic impact

The presence of *M. americanum* in the USA was reported as early as 1646, and the species is a familiar and conspicuous pest in the eastern USA (Dethier, 1980; USDA, 1985; Dixon & Foltz, 1991). At regular intervals of about 10 years, the population increases enormously. At times, the whole countryside seems festooned with silken tents. Most of the hosts of *M. americanum* have little economic value and are not killed, even when totally defoliated. The species is primarily a nuisance pest of trees in unsprayed orchards, parks, recreational areas and along roadsides. Before the outbreaks of the introduced species *Lymantria dispar*, *M. americanum* was considered the major defoliator of deciduous shade trees in the eastern part of the USA.

Control

More than twenty species of natural enemies attacking *M. americanum* are known, most of them ichneumonid or braconid wasps. Populations can be decimated by a polyhedrosis virus. Also, birds, other predators and unfavourable weather conditions can be important regulating factors. Larvae can be controlled by treatments with *Bacillus thuringiensis*. Integrated approaches are needed in amenity situations, as proposed by Pinnock *et al.* (1978) for *M. californicum*. See also Collman & Antonelli (1994).

Phytosanitary risk

M. americanum is an EPPO A1 quarantine pest, but does not appear in the quarantine lists of any other regional plant protection organization. If introduced into the EPPO region, *M. americanum* could be a considerable nuisance in forests, parks, orchards etc., much as *Lymantria dispar* is in the USA. If local natural enemies are not able to control the pest, major outbreaks could lead to unacceptable damage in orchards, deciduous forest and shade trees.

PHYTOSANITARY MEASURES

Consignments of host species from Canada and USA should come from a place of production that has been found free from *M. americanum* during the last growing season.

BIBLIOGRAPHY

- Collman, S.; Antonelli, A. (1994) *Biology and control of tent caterpillars*. Extension Bulletin No. EB1106 (revision). Washington State University, Pullman, USA.
- Dixon, W.N.; Foltz, J.L. (1991) Caterpillars that are not the gypsy moth caterpillar. Some forest Lepidoptera in Florida (Lepidoptera: Arctiidae, Lasiocampidae, Lymantriidae). *Entomology Circular Gainesville* No. 344. FDACS, Gainesville, USA.
- Dethier, V.G. (1980) *The world of the tent-makers. A natural history of the eastern tent caterpillar*. University of Massachusetts Press, Amherst, USA.
- Johnson, W.T.; Lyon, H.H. (1988) *Insects that feed on trees and shrubs* (2nd edition). Comstock, Ithaca, USA.
- Joos, B.; Casey, T.M.; Fitzgerald, T.D.; Buttemer, W.A. (1988) Roles of the tent in behavioral thermoregulation of eastern tent caterpillars. *Ecology USA*. **69**, 2004-2011.

- Pinnock, D.E.; Hagen, K.S.; Cassidy, D.V.; Brand, R.J.; Milstead, J.E.; Tasson, R.L. (1978) Integrated pest management in highway landscapes. *California Agriculture* **32**, 33-34.
- Prentice, R.M. (1962) *Forest Lepidoptera of Canada recorded by the Forest Insect Survey. Volume 2. Nycteolidae, Noctuidae, Notodontidae, Liparidae*. Publication No. 128. Forest Entomology and Pathology Branch, Department of Forestry, Ottawa, Canada.
- Segarra-Carmona, A.; Barbosa, P. (1983) Overwintering egg mass adaptations of the eastern tent caterpillar, *Malacosoma americanum*. *Journal of the New York Entomological Society* **91**, 68-74.
- USDA (1985) Insects of eastern forests. *USDA Miscellaneous Publication* No. 1426. USDA Forest Service, Washington, USA.