*Lymantria dispar asiatica**

*For regulatory purposes, the two subspecies, *L. d. asiatica* and *L. d. japonica,* and the three revised species in Pogue and Schaefer (2007), *L. albescens*, *L. postalba*, and *L. umbrosa*, are all considered Asian gypsy moths.

Figure 1. Adult female of *L.ymantria dispar asiatica* (John H. Ghent, USDA Forest Service, Bugwood.org).

Scientific Name

Lymantria dispar asiatica Vnukovskij

Synonyms:

Bombyx dispar Linnaeus
Hypogymna dispar Linnaeus
Liparis dispar Linnaeus
Lymantria dispar chosenensis Goldschmidt
Lymantria dispar koreiba Bryk
Lymantria dispar kolthoffi Bryk
Ocneria dispar Linnaeus
Phalaena dispar Linnaeus
Phaloena dispar Linnaeus

Porthesia dispar Linnaeus
Porthetria dispar Linnaeus

Figure 2. Larva of *L.ymantria dispar asiatica* (John H. Ghent, USDA Forest Service, Bugwood.org).

Common Name

Asian gypsy moth (AGM)

Type of Pest

Moth

Taxonomic Position

Class: Insecta, **Order:** Lepidoptera, **Family:** Lymantriidae*

*Recent classifications lower Lymantriidae to the subfamily Lymantriinae under the family Erebidae. See Pogue and Schaefer (2007).

Reason for Inclusion in Manual

PPQ Pest of Concern

Pest Description

Eggs: "Egg masses are ovoid, 4–5 cm [approx. $1^{1}/_{2}$ to 2 in] in length and 2–3 cm [approx. $^{13}/_{16}$ to 1 $^{3}/_{16}$ in] in width, contain 100–1000 eggs, and are covered in buff brown hairs from the female's abdomen" (Wallner, 2000).

Larvae: A full description of the larvae can be found in Pogue and Schaefer (2007).

"Newly hatched larvae are 3 mm [approx. $^{1}/_{8}$ in] in length and tan in color, but after 24 hours turn black. Mature larvae have a length of 50–90 mm [approx 2 to 3 ½ in], with two rows of dorsal blue and red spots" (Wallner, 2000). Coloration of larvae from Asian populations of *L. dispar* varies considerably from yellow to "black-backed" to "mottled dark gray," the most common color (Sun, 1988).

Pupae: No description available.

Adults: A full description of the adults can be found in Pogue and Schaefer (2007). Asian and European gypsy moths appear nearly identical and cannot be distinguished reliably in the field unless females are observed in flight (Wallner 2000).

Adult males have grayish-brown wings and a wingspan of 1.5 inches. Adult female moths are white and larger, with wingspans up to 3.5 inches or more (USDA, 2003). Females have distinctive black markings on the wings. This species is almost identical in appearance to *L. d. dispar* (European gypsy moth) (Wallner, 2000).

> Male genitalia: "Lateral processes absent from tegument; uncus elongate, narrow, apex round; valve undivided, not fused ventrally; dorsal process contiguous with costal margin of valve, straight, apex narrowly rounded; juxta a square plate with dorsal margin concave to slightly convex, ventral margin with broad excavation; sacculus apex broadly rounded; saccus variable, V-shaped to narrow U-shaped; aedoeagus 0.70–0.84x height of genital capsule, straight, slightly curved proximal to opening of ductus ejaculatorius; vesica an ovate,

Figure 3. Adult male (top) and female (bottom) of *L.ymantria dispar asiatica* (Image courtesy of Michael Pogue, USDA-ARS).

dorsally produced lobe; cornuti absent" (Pogue and Schaefer, 2007).

Female genitalia: "Ovipositor not telescopic; papillae anales quadrate, dorsal margin truncate; anterior and posterior apophyses short; ventral plate of ostium bursae with sclerotized strap-like process merging to form a circular opening; ductus bursae shorter than in or [sic] *L. d. japonica*; corpus bursae ovate" (Pogue and Schaefer, 2007).

Biology and Ecology

The biology and ecology of both the Asian and European forms of *L. dispar* are similar. The primary differences are: (i) Asian female moths fly (>20 km [>12 mi]) while European female gypsy moths are flightless; and (ii) the Asian strain has slightly different host preferences than the European strain (reviewed in Drooz, 1985; Reineke and Zebitz, 1998; Charlton et al., 1999; reviewed in Wallner, 2000).

Lymantria dispar asiatica has one generation per year (Pogue and Schaefer, 2007).

In China and Korea, oviposition can occur on items close to outdoor lights (like walls, trees, and light poles). Many masses have also been found underneath branches of the pine, *P. tabulaeformis* (Schaefer et al., 1984; Pogue and Schaefer, 2007). In Russia and Mongolia, eggs are laid in cracks or crevices on rock outcroppings and sometimes on soil underneath boulders (Pogue and Schaefer, 2007). Eggs are laid on the undersides of deciduous leaves in the Russian Far East. After the leaves fall, the eggs are covered by snow, protecting them from the extreme cold (reviewed in Pogue and Schaefer, 2007). Overwintering occurs in the egg stage (Pogue and Schaefer, 2007). Remains of egg masses can be found years after hatching (Schaefer et al., 1984).

Females may lay 100-1000 eggs in a mass (Wallner, 2000). They are attracted to outdoor lighting and will often deposit egg masses near these areas (Belova, 1988; Schaefer et al., 1984). Eggs are laid between July and September depending on the weather and location (USDA, 2003).

In China, the larval stage lasts approximately 6 weeks. Larvae hatch from late April to early May (Sun, 1988). Newly hatched *Lymantria* larvae remain on the hair-covered egg cases for a period before moving to buds and leaves to feed in the crown (Sun, 1988). Once eggs hatch, larvae disperse to suitable host plant material through ballooning (Pogue and Schaefer, 2007). This is where larvae drop on a trailing silk thread and utilize air and wind currents to "balloon" to other locations (Zlotina et al., 1999). Both first and second instars can disperse (Wallner, 1996). Males usually have 5 instars; females, 6. Larvae usually feed at night and rest in protected locations on host trees during the day (Wallner, 2000).

Pupation occurs on foliage and in litter (Wallner, 1996). Adults emerge in 10-14 days (NPDN, n.d.). Adults do not feed, but only mate and lay eggs. They live for one to three weeks (USDA, 2003).

Adults are active from July to August, when mating and oviposition occur (Wallner, 2000). Adult females are capable of sustained level or ascending flight and can also fly when gravid (Pogue and Schaefer, 2007); they may disperse distances up to 40 km (24.9 mi) (USDA-FS, 1991). Asian gypsy moths fly at dusk when light intensity reaches <3 *lux* for 2-3 hours, or when disturbed (Wallner et al., 1995; Charlton et al., 1999; reviewed in Keena et al., 2001). Flight of male Asian gypsy moths has been observed between 11-12°C [~52-55°F], while flight activity for the European form ceases below 17°C [63°F] (Cardé et al., 1996). In central Siberia, flight of females has been reported at temperatures as low as 11-13°C [~52-55°F] (Charlton et al., 1999).

Population density is influenced by several factors including the available food supply, host selection and quality, and presence of natural enemies (Drooz, 1985).

Damage

The main damage is caused by larvae defoliating host trees. When populations are high, larvae feed continuously. Defoliation caused by *L. d. asiatica* can weaken trees and make them more vulnerable to secondary pests, both pathogens and insects, which can lead to host mortality (Wallner, 2000).

Lymantria dispar larvae are gregarious defoliators, able to consume whole leaves and sometimes avoid tough veins in older foliage growth. Eggs masses, larvae, and pupae may also be evident on trees (Drooz, 1985). Frass droppings may be evident under hosts if the population density is high (Liebhold and Elkinton, 1988a; 1988b).

Pest Importance

This subspecies can have devastating outbreaks. In the early 2000s, northern Mongolia had a severe outbreak of *L. d. asiatica* over several summers mainly affecting *Larix sibiricus* (Siberian larch) plantings (Schaefer et al., 2005).

Control of *L. d. dispar* (European gypsy moth) populations in the United States is costly. Since 1980, more than $35 million has been spent annually to control *L. d. dispar* in the United States (Wallner, 2000). Efforts to eradicate *L. d. asiatica* from North America have cost $25 million (reviewed in Wallner, 2000).

Lymantria dispar dispar causes economic damage through its adverse impacts on forest productivity and aesthetics. In Pennsylvania, *L. d. dispar* was responsible for the loss of $72 million worth of timber. Because of the extensive volumes of frass produced by larvae (Liebhold and Elkinton, 1988a), *L. d. dispar* can be a severe nuisance and limit recreational opportunities (reviewed in

Wallner, 2000). In extreme cases, gypsy moth can lower property values (reviewed in Wallner, 2000).

Lymantria dispar dispar (European gypsy moth) can cause reduced tree vigor and growth during outbreaks. Outbreak levels may last for 1-3 years. This can lead to accelerated mortality due to secondary invaders. Introduction of *L. d. dispar* has also changed the composition of the forests by decreasing *Quercus* (oak) species leading to the increase of less desirable species (USDA-FS, 1991; Wallner, 2000). Similar impacts should be expected for *L. d. asiatica* if introduced into the United States (Wallner, 2000). *L. d. asiatica* has aggressive feeding habits, especially on *Larix* and *Pseudotsuga* spp. (Wallner, 1996).

Defoliation can affect aesthetics and marketability of host plants (Wallner, 2000) posing a serious threat to nursery stock (Wallner, 1996). Repeated defoliations can lead to mortality of host plants in areas like forests, orchards, and landscaping (USDA, 2011). This subspecies can also hybridize with *L. d. dispar*.

If this subspecies were to become established, it would be harder to contain than *L. d. dispar* (European gypsy moth) as both females and males are capable of flight; it has a larger host range; and it develops faster (Wallner, 1996).

Known Hosts

This subspecies is polyphagous and has an even broader host range than *L. d. dispar* (European gypsy moth). Because of the extensive host range, most hosts are listed at genus level only and not all hosts may be represented on this list. USDA-FS (1991) states that *L. d. asiatica* prefers *Larix* (larch), *Alnus* (alder), and *Salix* (willow).

Main hosts

Alnus spp. (alder), *Larix* spp. (larch), *Larix sibirica* (Siberian larch), *Liquidambar* spp. (sweetgum), *Malus* spp. (apple), *Populus* spp. (poplar), *Quercus* spp. (oak), *Salix* spp. (willow), *Tilia* spp. (linden), and *Ulmus* spp. (elm) (reviewed in Gottschalk, 1988; USDA-FS, 1991).

Other hosts

Abies balsamea (balsam fir), *Acer* spp. (maple), *Betula* spp. (birch), *Callistemon brachyandrus* (prickly bottlebrush), *Carpinus* spp. (hornbeam), *Castanea* spp. (chestnut), *Castanopsis* spp. (chinquapin), *Celtis* spp. (hackberry), *Cerasis* spp., *Corylus* spp. (hazel), *Corymbia maculata* (spotted gum), *Cydonia* spp. (quince), *Diospyros* spp., *D. kaki* (persimmon), *Eriobotrya* spp. (loquat), *Eucalyptus* spp. (gum), *Eurya* spp., *Fagus* spp. (beech), *Fraxinus* spp. (ash), *Hammamelis* spp. (witch-hazel), *Juglans* spp. (walnut), *Lespedeza* spp. (bush clover), *Morus* spp. (mulberry), *Picea* spp. (spruce), *Pinus* spp. (pine), *Prunus* spp. (plum), *Pyrus* spp. (pear), *Rosa* spp. (rose), *Rubus* spp. (blackberry), *Shorea robusta* (sal tree), *Wisteria* spp., *Xylosma* spp. (brushholly), and *Zelkova* spp. (Beeson, 1941;

Roonwal, 1953; Roonwal et al., 1962; Wulf, 1996; Matsuki et al., 2001; Pogue and Schaefer, 2007).

Host plants listed for *Lymantria dispar*
Amelanchier alnifolia (Saskatoon serviceberry), *Aralia nudicaulis* (wild sarsaparilla), *Berberis vulgaris* (common barberry), *Carya* spp. (hickory), *Catalpa* spp., *Cedrus deodara* (Deodar cedar), *Chaenactis stevioides* (Esteve's pincushion), *Citrus* spp., *Clethra alnifolia* (costal sweetpepperbush), *Comptonia peregrina* (sweet fern), *Cornus* spp. (dogwood), *Crataegus* spp. (hawthorn), *Diervilla lonicera* (northern bush honeysuckle), *Gaylussacia frondosa* (blue huckleberry), *Ginkgo biloba* (maidenhair tree), *Gleditsia triacanthos* (honeylocust), *Gymnocladus dioicus, Ilex* spp. (holly), *Iris versicolor* (harlequin blueflag), (Kentucky coffeetree), *Juniperus* spp. (juniper), *Kalmia* spp. (laurel), *Leucothoe* spp. (doghobble), *Ligustrum* spp. (privet), *Lindera benzoin* (northern spicebush), *Liriodendron tulipifera* (tuliptree), *Maclura pomifera* (osage orange), *Myrica* spp. (sweetgale), *Nyssa sylvatica* (blackgum), *Ostrya virginiana* (hophornbeam), *Persea americana* (avocado), *Physocarpus opulifolius* (common ninebark), *Pistacia* spp. (pistache), *Platanus occidentalis* (American sycamore), *Rhododendron* spp., *Rhus* spp. (sumac), *Ribes rubrum* (cultivated currant), *Robinia* spp. (locust), *Rumex* spp. (dock), *Sambucus nigra* (black elderberry), *Sassafras albidum* (sassafras), *Smilax rotundifolia* (roundleaf greenbrier), *Sorbus americana* (American mountain ash), *Spiraea tomentosa* (steeplebush), *Symplocarpus foetidus* (skunk cabbage), *Tamarix* spp., *Taxodium distichum* (pond cypress), *Thuja occidentalis* (arborvitae), *Toxicodendron pubescens* (Atlantic poison oak), *Tsuga canadensis* (eastern hemlock), *Vaccinium* spp. (blueberry), *Viburnum* spp., *Vitis vinifera* (grape), and *Zea mays* (corn) (Robinson et al., 2007)

When insect populations are high, they can defoliate other conifers mixed in with preferred hosts (Wallner, 2000).

Pathogen or Associated Organisms Vectored
This subspecies is not known to vector any pathogens or other associated organisms.

Known Distribution
This species is found throughout temperate Asia: east of the Ural Mountains into the Russian Far East, in the northern $^{2}/_{3}$ of China, and the Korean Peninsula. It is also found in Central Asia, but not south of the Himalayan range in India (reviewed in Pogue and Schaefer, 2007).

Asia: China, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Russia, and Uzbekistan (Wulf, 1996; Orozumbekov et al., 2003; Nielsen et al., 2005a; 2005b; Pogue and Schaefer, 2007), **Europe:** France[1], Germany (Cardé et al., 1996; Wallner, 2000; USDA, 2003).

Although many sources state that Asian gypsy moth is found in Japan, these most likely refer to the subspecies *L. d. japonica* not *L. d. asiatica*.

[1]W.E. Wallner, unpublished data (reviewed in Cardé et al. 1996).

Pathway

Adult females are capable of sustained level or ascending flight and can also fly when gravid (Pogue and Schaefer, 2007). They can be attracted to outdoor lighting and will often deposit egg masses near these areas (Belova, 1988; Schaefer et al., 1984). These behaviors can potentially lead to females being attracted to and laying eggs around dock areas, shipping containers, and vessels (Pogue and Schaefer, 2007). Eggs masses can thus move through international trade easily. The egg stage lasts approximately 9 months (Wallner, 2000) and is very tolerant to temperature and moisture extremes (USDA-FS, 1991).

This subspecies has been intercepted at ports of entry multiple times, most as viable egg masses (AQAS, 2012; queried January 20, 2012). Egg masses have been found on cargo ships, ship containers, cargo, and other outdoor articles from infested areas in both Asia and Europe (Wallner, 2000).

The risk associated with this subspecies travelling through international trade has led to the development of a NAPPO Regional Standards for Phytosanitary Measures (RSPM), “Guidelines for Regulating the Movement of Ships and Cargoes Aboard those Ships from Areas Infested with the Asian Gypsy Moth.” Human mediated spread can also occur across land through movement of firewood, timber, rail cars, automobiles, and other inanimate objects (USDA, 2011).

Natural spread can occur through adult flight and dispersal of early instar larvae (Wallner, 2000).

Potential Distribution within the United States

Lymantria dispar asiatica is polyphagous and has a high host density in most of the eastern United States. There is also a moderate to high host density in much of the western United States. This subspecies is likely to establish in the United States if introductions are left unchecked due to suitable climatic conditions and availability of host plant material (Wallner, 2000).

This subspecies has already been accidentally introduced into several states, including Idaho (2004), North Carolina (1993), Oregon (2000), Texas (2006), and Washington (1997). It has also been found in British Columbia, Canada (1991) (Gray and Kenna, 2005; NAPPO-PAS, 2006; Livingston, n.d.). According to USDA (2011), there have been a total of 20 introductions of *L. d. asiatica* to the United States since 1991, all of which have been eradicated before establishment of this pest.

Based on the reported geographic distribution of Asian gypsy moth, it appears that the insect is most closely associated with biomes characterized as temperate coniferous forest, temperate broadleaf-and-mixed forest, and tropical and subtropical moist broadleaf forest. Detections of Asian gypsy moth in the United States have generally occurred in areas with temperate coniferous forest or temperate broadleaf-and-mixed forest, as predicted. The recent detection of Asian gypsy moth in Texas suggests this insect may also survive in areas with temperate grasslands and savannas.

Survey

CAPS-Approved Method*:

The CAPS-approved method is a trap and lure combination. There are two trap options: the paper delta trap with two sticky sides or the milk carton trap. The lure is available in either a laminate or string dispenser. The laminate is effective for 84 days (12 weeks) and the string lure is effective for 180 days (6 months). Traps should be checked every two weeks. Traps should be checked every two weeks. **It is critical that samples be collected regularly, stored properly, and submitted to the Otis Lab as soon as possible to maintain the integrity of the DNA (see Handling and Submission of Suspect AGM Specimens for Identification below).**

02/03/14: The length of effectiveness for the Gypsy Moth String Lure has been revised from 84 days (12 weeks) to 180 days (6 months). The Gypsy Moth Laminate Lure is still effective for 84 days (12 weeks).

For 2014 surveys, if it is appropriate for your climate/ planned survey season, please use the Gypsy Moth String Lures for the full 180 days. If you ordered the string lures based on the 84 day length of effectiveness and have excess lures, please store the excess lures in unopened packages in a freezer for the next season. The lures may be stored for two years if stored in a freezer below 0°F.

IPHIS Survey Supply Ordering System Product Names:

1) Traps:
    - Milk Carton Trap
    - Paper Delta Trap, 2 sticky sides, Brown
    - Paper Delta Trap, 2 sticky sides, Green
    - Paper Delta Trap, 2 sticky sides, Orange
2) Lures:
    - Gypsy Moth Laminate Lure
    - Gypsy Moth String Lure
3) Pesticide Strip – DDVP (for use in milk carton traps only)

Trap Options

Use the following guidance to determine which trap type to use:

Paper Delta Traps:

Delta traps are used outside of areas that are generally infested with European gypsy moth, where catch is expected to be less than 10 moths per trap. The lure should be stapled inside the trap, to one of the non-sticky panels. The ends of the trap should be folded in. Trap color is up to the State and does not affect trap efficacy.

Milk Carton Traps:
The standard milk carton trap has a much higher capacity and should be used in areas where populations of European gypsy moth are established. The lure is typically stapled to a long garden tie that is, in turn, stapled to the inside of the trap at the top so that the lure hangs more or less in the center of the trap. A killing agent, a DDVP strip, is required for milk cartons traps. The DDVP strip should be stapled to the garden tie below the lure. The DDVP strip is effective for 8 weeks.

Trap Placement:
Traps should be hung in the immediate vicinity of preferred host trees. Milk carton traps should be hung using a string, tied to a branch of a host tree. Delta traps are most effective when attached directly to the bole of a host tree. If no host tree is available, another vertical surface such as a telephone pole can be used to hang the trap. Never hang the traps on branch tips.

Trap Spacing: When trapping for more than one species of moth (that require different lures), separate traps for different moth species by at least 20 meters (65 feet).

Survey Site Selection:
Traps should be placed in the immediate vicinity of preferred host plants.

Time of year to survey:
“Gypsy moths have one generation annually; timing of flight depends on local climate, and can vary from May or June in very warm areas to September in colder climates” (Lance, 2006).

*For the most up-to-date methods for survey and identification, see Approved Methods on the CAPS Resource and Collaboration Site, at http://caps.ceris.purdue.edu/.

Literature-Based Methods:
Trapping: *Lymantria dispar dispar* and *L. d. asiatica* both respond to the same pheromone (Cardé et al., 1996): cis-7R,8S-epoxy-2-methyloctadecane, commercially known as disparlure. Standard protocols for the survey of European gypsy moth using pheromone-based traps also apply to Asian gypsy moth. Detailed protocols are provided by USDA (2006).

Not recommended: *Lymantria dispar asiatica* are attracted to lights, especially UV lights (Wallner et al., 1995). As a result, a monitoring program could be developed using light traps, but the cost of operating the trap and sorting the volume of insects that are captured make this approach less desirable.

Key Diagnostics/Identification

CAPS-Approved Method*:

Molecular. Specimens that are suspected of being AGM should be submitted to the Center for Plant Health Science and Technology (CPHST) Otis Laboratory for testing. **It is critical that samples be collected regularly, stored properly, and submitted to the Otis Lab as soon as possible to maintain the integrity of the DNA. See Handling and Submission of Suspect AGM Specimens for Identification below.**

Keys to first instar larvae and last instar larvae of selected *Lymantria* species can be found in Pogue and Schaefer (2007).

*For the most up-to-date methods for survey and identification, see Approved Methods on the CAPS Resource and Collaboration Site, at http://caps.ceris.purdue.edu/.

Handling and Submission of Suspect AGM Specimens for Identification

Specimens that are suspected of being AGM should be submitted to the Center for Plant Health Science and Technology (CPHST) Otis Laboratory for testing (see Asian Gypsy Moth Trapping Submission Guidelines below). All specimens collected outside of the EGM quarantine areas will be analyzed. Specimens collected within generally-infested areas will be analyzed based on sub-samples of total catch because of the large number of insects which can be caught in some areas. **It is critical that samples be collected regularly, stored properly, and submitted to the Otis Lab as soon as possible to maintain the integrity of the DNA.** If traps cannot be checked regularly, it may be considered to trap when flight is expected rather than spreading resources out across the whole season.

Sample Handling

As a general rule, traps should be checked and samples removed every two weeks in order to reduce the degradation of the specimen's DNA. High temperatures and high humidity speed degradation of specimens and trapping schedules should be adjusted accordingly. If stored unfrozen the specimens should be in containers (paper bags or boxes) which will promote drying. Plastic containers retain moisture that favors the growth of bacteria and fungi, which will quickly degrade the DNA. Specimens should be stored in a freezer if possible (if not, in a cool dry area) and shipped to the Otis Lab as soon as practical. Specimens should not be stored unfrozen for extended periods.

Sample Submission

Milk Carton Traps

- Layer moths loosely between wadded paper towels or tissue paper in a paper bag (brown lunch bag size) to prevent motion and specimen damage during shipment (one bag per trap; if more than one bag is required per trap, label appropriately). Label paper bag clearly with trap numbers matching paperwork.
- Staple or tape paper bag closed.
- Do not attach paperwork to individual bags.
- Do not use plastic bags or paper envelopes as these do not allow moisture release and thus promote fungal growth and decomposition of the moths.
- Do not send traps or paperwork for traps which contain no specimens.

Delta Traps

- Label each trap clearly with trap numbers matching paperwork.
- Package traps to avoid crushing during shipment.
- Do not attach paperwork to individual traps.
- Do not use Styrofoam peanuts or other small packaging materials that could potentially enter the traps.
- Do not disassemble the traps or remove moths from the trap.
- Do not ship traps with sharp staples exposed.

A PPQ Form 305 should be sent with each trap, stating the trap number, collection site, number of specimens (estimates okay), life stage, collection date, and date of last (previous) trap check (to determine maximum time that the moth may have been in the trap prior to the check). Specimens should be shipped via next day delivery for Tuesday through Friday arrival. They should be shipped to:

Molecular Diagnostics Unit
USDA, APHIS, PPQ
CPHST Otis Laboratory
1398 West Truck Road
Buzzards Bay, MA 02542-1329

For questions you can contact John Molongoski at:
Email: john.j.molongoski@aphis.usda.gov
Phone: 508-563-9303 ext. 218
Fax: 508-564-4398

Asian Gypsy Moth Trapping Submission Guidelines

Specimens trapped in the field can be analyzed for the presence of Asian genetic markers by submitting the specimens to the CPHST Otis Laboratory. All specimens submitted from outside the generally-infested area will be analyzed. Because of the quantity of specimens submitted from within the generally-infested area, only a small fraction can be analyzed. **Collect captured moths a minimum of every two weeks to minimize DNA degradation of the specimens, more frequently in warm climates.**

Store specimens in a cool, dry location (frozen if possible).
Ship ASAP after collection

MILK CARTON TRAPS

DO layer loose moths between wadded paper towels or tissue paper in paper bag (brown lunch bag size) to prevent motion and specimen damage during shipment.

DO label paper bag clearly with trap numbers matching paperwork.

DO staple or tape paper bag closed.

DO NOT attach paperwork to bags.

DO NOT use plastic bags or paper envelopes as these promote fungal growth and do not allow moisture release.

DO NOT send traps or paperwork for traps which contain no specimens.

DELTA TRAPS

DO label each trap clearly with trap numbers matching paperwork.

DO package traps to avoid crushing during shipment.

DO NOT attach paperwork to traps.

DO NOT use Styrofoam peanuts for packaging.

DO NOT disassemble the traps or remove moths from the trap.

SHIPPING

DO send a PPQ Form 305 for each trap sent.
Include: • Trap number • Collection Date
• Collection Site • Life Stage
• No. of specimens (estimates OK)

DO package moths / traps to prevent crushing or motion during shipping. Moths must be received whole with antennae and legs attached to body.

DO ship via next day delivery for Tuesday through Friday arrival.

DO ship ASAP after each collection.

DO keep moths frozen until shipment.

DO keep specimens dry.

DO NOT attach paperwork to traps or bags.

DO NOT use Styrofoam peanuts with delta traps.

DO NOT send traps or paperwork for traps with no specimens.

SHIP TO:
John Molongoski
USDA, APHIS, PPQ
CPHST Otis Laboratory
1398 West Truck Road
Buzzards Bay, MA 02542-1329
- Voice: (508) 563-9303 ext 218
- Fax: (508) 564-4398
- Email: john.j.molongoski@aphis.usda.gov

PPQ Form 305 can be obtained from the Otis Lab via phone or email requests. Please do not hesitate to contact us if you have any questions.

Easily Confused Pests

This subspecies is very similar to the subspecies *L. d. japonica* and *L. d. dispar*.

"The males of *L. d. asiatica* differ from those of *L. d. dispar* in the ground color of the forewing, which is either a lighter or darker brown in *L. d. asiatica*. In *L. d. dispar*, there is a grayish cast to the light brown ground color. The females of *L. d. asiatica* have a more prominent postmedial band than in *L. d. dispar*. Among late stage larvae, the black form is found to a limited extent in China" (Pogue and Schaefer, 2007).

Commonly Encountered Non-targets

The trap and lure for *L. dispar asiatica* can also trap *Lymantria monacha* (although there is a more optimal trap and lure for this species). It may also trap *L. concolor* (concolorous tussock moth), *L. mathura* (rosy moth), and *L. obfuscata* (Indian gypsy moth) (Lance, 2006).

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