

# Gypsy Moths: A Threat to Texas Forests

## Twelfth of the “Dirty Dozen”

Ron Billings  
Texas Forest Service

Editor’s Note: An introductory article discussing exotic invasive pests that could threaten forest resources in Texas was included in the June 2005 issue of *Texas Forestry*. As a follow-up to that article, a series of 12 short articles about specific exotic pests that are either present in Texas or are at our doorstep is planned. The authors (Joe Pase, Ron Billings, and Kim Camilli) are calling this series the “Dirty Dozen.” Last month, Kim described Chinaberry, the eleventh pest in the series. The gypsy moth is the last article in the series and the third invasive insect pest to be presented.

Etienne Leopold Trouvelot. Few people recognize his name, despite the impact his actions back in 1869 would eventually have on forests in the eastern United States. Mr. Trouvelot, an immigrant from France and an amateur entomologist, brought egg masses of the gypsy moth (*Lymantria dispar*) to the United States from Europe in an attempt to "build a better silk moth." The problem was that producing silk in those days was not always easy because silk moth caterpillars often contracted a disease and died.

Trouvelot's idea was that another species – the gypsy moth - wouldn't have this problem. Unfortunately, a few gypsy moths escaped from his back yard near Boston and began multiplying. The caterpillars started to defoliate street trees and rapidly spread to adjacent neighborhoods, despite early efforts to eradicate them. The rest is history. The "better silk moth" turned out to be Pandora's box and the gypsy moth became a household word in New England. In the last century, this introduced pest has accounted for more defoliation and economic impact to hardwood forests and shade trees than any other insect defoliator in the United States.

Since its first unintentional release, gypsy moth populations have spread throughout New England, south to Virginia and west to Ohio and Michigan, defoliating a wide variety of trees in their path. In recent years, federal and state cooperative programs to “slow the spread” have been effective in reducing the potential rate of spread to southern and midwestern states.

Gypsy moths can feed on 500 different host plants, but oaks are preferred. Other favored hosts include sweetgum, apple, basswood, willow, and many understory plants. In addition to broadleaved plants, late-stage caterpillars also may feed on eastern hemlock, pines, and spruces. Many of these hosts occur in Texas and there are no apparent climatic barriers to prevent survival of the gypsy moth here. Fortunately, gypsy moths do not feed on ash, baldcypress, sycamore, eastern red cedar, and black locust.

Interestingly, there are two strains of gypsy moth - the European and Asian gypsy moths. The gypsy moth is native to most of Europe and Asia. Spread of the European strain is relatively slow, primarily because females are incapable of flight. Local spread occurs as young caterpillars drop on silken threads from host trees, to be carried by wind

to nearby trees. Long distance spread occurs in the egg stage. Females may lay egg masses on any available surface, including outdoor furniture, recreational vehicles, box cars, etc. Thus, the potential for gypsy moths to be inadvertently introduced into Texas is great. The Texas Department of Agriculture monitors gypsy moth survey traps throughout Texas and occasional male moths are encountered in the traps. In the past, all these trap catches have been the European strain, probably having originated from populations established in the eastern U.S.

In 1986, gypsy moth egg masses, cast larval skins, and pupal cases were observed at two locations in Texas – at private trailer parks in Bay City (Matagorda County) and near Bellville (Austin County). Intensive trapping in these two areas the following year produced no adults, indicating that populations failed to become established.

The gypsy moth strain from Asia differs behaviorally from the European variety in that the female Asian gypsy moths can fly, greatly increasing the dispersal capabilities of this strain. Accordingly, discovery of Asian gypsy moths in the U.S. creates much more concern among government regulatory agencies, compared to occurrence of the more common European strain. Several accidental introductions of Asian gypsy moth have occurred in the North America in recent years, but each has been successfully eradicated. Alarmingly, one of the most recent introductions was in Travis County, Texas. A single male moth was found in a Texas Department of Agriculture survey trap along Highway 290 west of Austin in September 2005. The moth turned out to be a hybrid of both strains.

This detection event triggered immediate action by the federal agency responsible for pest introductions – the USDA Animal and Plant Health Inspection Service (APHIS). One of two options was recommended for treatment of the surrounding area, just in case a population of these gypsy moths had become established. The first choice of APHIS was to aerielly spray several applications of *Bacillus thuringiensis* (Bt) – an effective bacterial control agent for defoliating insects– to a one square mile area surrounding the trap. The second alternative was to deploy a single application of the synthetic gypsy moth pheromone (male attractant) to prevent any emerging moths from finding mates.

The action plans were complicated by the presence of multiple private property owners within the target area. APHIS personnel held public meetings this past spring to seek 100% approval for spraying Bt, their preferred control option. As it turned out, the mid-March window of opportunity for applying the first Bt spray (timed to coincide with predicted larval emergence) passed before the Bt option could be pursued. Thus, the mating disruption treatment was applied from the air on April 18, 2006. The Texas Department of Agriculture will conduct an intensive trapping survey in the treated and surrounding areas from May through August 2006 to monitor the effectiveness of the application. Hopefully, this unwanted immigrant won't be leaving any descendents in Texas.

The European and Asian varieties of gypsy moth are indistinguishable to the eye. Use of genetic markers is the principal means for distinguishing between the two. The

gypsy moth has a single generation per year in the eastern U.S. Eggs are laid in hair-covered masses during late summer. The eggs hatch in March or April of the following year and the larvae (caterpillars) pass through five (males) or six (females) stages, prior to pupating. Mature gypsy moth caterpillars can be recognized by the hairy bodies and, in particular, by the parallel row of spots along the back. Spots on the forward half of the caterpillar are blue and those on the rear half are red. The caterpillar stage, which varies from 1/8 inch up to 3 inches in length, causes defoliation and associated economic damage. Most trees can recover from a single defoliation, but multiple defoliations can result in growth losses and tree mortality.

The level of gypsy moth populations within infested states may vary greatly from year to year. For example, populations of the European gypsy moth expanded into Virginia from the northeast in 1980. In 1994 in Virginia alone, more than 450,000 acres were defoliated and in 1995, gypsy moth caterpillars consumed 850,000 acres of forested lands and impacted many residential areas. Virginia landowners were braced for an even greater outbreak in 1996, but the population totally collapsed and no defoliation occurred. The sudden collapse was attributed to a fungus, *Entomophaga maimaiga*, which killed the feeding caterpillars.

This very fungus had been introduced into the U.S. from Asia in 1910 near Boston to control a gypsy moth outbreak. But there was no effect at the time and the introduction was considered a failure. Then, some 80 years later, this same fungus was found responsible for gypsy moth population crashes in several New England states. Currently, scientists are working to incorporate the fungus into gypsy moth management programs.

If you find caterpillars that appear to be gypsy moths in Texas, please send preserved samples to Joe Pase, TFS pest management specialist in Lufkin, so that their identification can be confirmed. Joe can be reached by phone at 936-639-8170, by e-mail at [jpase@tfs.tamu.edu](mailto:jpase@tfs.tamu.edu), or by regular mail at Texas Forest Service, P.O. Box 310, Lufkin, TX 75901. More information and photos of the gypsy moth are available on the USDA Forest Service gypsy moth web page at <http://www.fs.fed.us/ne/morgantown/4557/gmoth/>.

Correction: In last month's *Dirty Dozen* article on Chinaberry, the following statement on page 13 requires clarification: "Since Arsenal AC and Pathway are nonselective herbicides, they will affect all green vegetation in the area." This statement refers to all broadleaved vegetation, and excludes pines, since both Arsenal AC and Pathway are herbicides labeled for pine release.