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REDBUD INSECTS

A Guide to Recognition and Habits
of Species Damaging Foliage of
Ornamental Redbud Trees in Alabama

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*Information contained herein is available to all persons
regardless of race, color, sex, or national origin.*



REDBUD INSECTS

A GUIDE TO RECOGNITION AND HABITS OF SPECIES DAMAGING FOLIAGE OF ORNAMENTAL REDBUD TREES IN ALABAMA

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Introduction

REDBUD, OR JUDAS-TREE², is a small, shrub-like, deciduous tree that grows commonly and naturally in the forest understory. It has no value as timber; however, it flowers prolifically and is valued as an ornamental landscape tree. Flowering occurs in late winter/early spring and, for a time, provides welcome color to a landscape still largely bare from winter.

Redbud is cultivated and used in many urban and suburban areas of Alabama as an ornamental and/or green-space tree. As with many such cultivated ornamental plants, it provides favorable habitat for a variety of insects. Flowers provide nectar or pollen to bees, but without harm to blooms or trees. Foliage, however, is prime food for leaf-feeding insects. Damage to leaves primarily destroys the ornamental quality and environmental value of the tree; however, heavy or complete defoliation can result in loss of growth, dieback of twigs and branches, or even tree mortality.

During research at the Alabama Agricultural Experiment Station devoted to identification and habits of insects associated with Alabama trees,

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²According to history, it was an old-world redbud tree from which Judas hanged himself.

several species that feed on, or damage in some manner, redbud leaves have been encountered. Included are species in the orders of Lepidoptera (moths and butterflies/caterpillars), Diptera (flies and midges), Homoptera (leafhoppers, aphids, whiteflies, cicadas, and scale and spittle insects), Coleoptera (beetles and weevils), and Hymenoptera (bees, wasps, and ants). For two species, and possibly three, redbud may be the primary, or only, host. The remaining species are known to occur on a variety of trees, but in Alabama, ornamental redbud appears to be a common host. This publication lists, describes, and depicts those species encountered and provides information on the life cycles and habits as found to usually occur in Alabama. Seasonal activity reported for most species is as it occurs in the Auburn vicinity of East-Central Alabama and may vary somewhat in other areas of the state.

REDBUD INSECT PESTS

WHITE FLANNEL MOTH³

Norape ovina (Sepp)

Order Lepidoptera, Family Megalopygidae

The white flannel moth, *Norape ovina*, is one of the most destructive leaf-feeders identified in the study. In 1993, an infestation occurred in a planting of redbuds at the state hardwood tree seed orchard in Lee County near Auburn. Caterpillars were numerous and small trees were completely defoliated (Photo 1). The species and its activities in Alabama were unknown before this time; consequently, a study of the insect, its life history, habits, and potential as a pest of redbud began and continued through subsequent years 1994-98. Findings are as follows.



Photo 1- Redbud infested with white flannel moth larvae; larvae are about full-grown.

³The insect has no approved, universally accepted common name. Name given is one commonly used or assigned for the species.

Range and Hosts

The moth occurs from New Jersey and Pennsylvania south to Florida and west to Louisiana and Missouri. Beech, black locust, hackberry, mimosa, and redbud are commonly listed as host trees. In Alabama, the caterpillar has been collected also from honeylocust, but is found more often on redbud.

Description

The adult is described⁴ as a medium-sized moth, wingspan 27-33 mm⁵. Wings are pure white and the body is white and hairy.

Eggs (Photo 2) are small, less than 1 mm long, yellow and covered with fine, soft hairs from the body of the female. They are found end-to-end in strands or rows on the underside of leaves.

Larvae (Photo 3) are colorful and distinctively marked. The body is yellow with a broad, dark brown to black band down the back. Within the band is a double row of yellow tubercles, or spots, from which arise clumps of short setae (hairs), some of which are urticaceous and may irritate skin when touched; similar clumps also occur along the sides. Overall, the body is sparsely clothed with long hairs. The full-grown caterpillar is 28-32 mm long.

Cocoons (Photo 4) are tough, parchment-like, brown, and oval (8-9 x 15-16 mm). They are somewhat "crumpled" in appearance, with a thin, flimsy covering of silken threads and particles of soil or leaf litter.



Photo 2, top – Typical strands of eggs on underside of redbud leaf. Leaf contains approximately 90 eggs.

Photo 3, middle – Full-grown white flannel moth caterpillar.
Photo 4, bottom – Cocoons (left) and prepupa (right) of the white flannel moth.

⁴Description from Covell, "Eastern Moths," Peterson Field Guide. See references.

⁵One inch equals about 25 mm.

Life History and Habits

Only one brood of white flannel moth caterpillars occurred each year in the AAES study. The insect spent winter in the cocoon in duff, trash, and/or soil. Moths were never seen during the study, their activity apparently being restricted to the hours of darkness. However, based on time of appearance of eggs and newly hatched larvae, emergence of moths apparently occurred during early to mid-July. The earliest date in any year that eggs were found was July 12 (1997); in all other years, oviposition (egg-laying) began subsequently but not later than July 25. Once begun, egg-laying continued for two to three weeks, into the first week of August in some years. Eggs were laid end-to-end in rows or strands (Photo 2) on the underside of leaves. The number of strands per leaf and number of eggs per strand varied from a single short strand with a few eggs to that depicted in Photo 2.

Eggs hatched in about seven days. In the Auburn vicinity, hatch usually began each year during the last 10-12 days of July; however, unhatched and hatching eggs were found as late as August 10 (1995) and 13 (1996). Newly hatched larvae (Photo 5) fed in groups on the lower surface of the leaf, skeletonizing and killing patches of leaf tissue. Caterpillars continued to feed together through early stages of development (Photo 6), then tended to disperse and consume the entire leaf (photos 1 and 3). Larval development was usually complete by the end of September but sometimes extended into early October. Full-grown caterpillars descended to the ground to construct cocoons for overwintering.

In the laboratory, caterpillars collected from the field readily formed cocoons in soil and/or among leaves on



Photo 5 – Newly hatched larvae skeletonizing the lower surface of redbud leaf.

Photo 6 – Group-feeding typical of early and mid-stage *N. ovina* larvae.

the surface of soil provided in holding cages. Subsequent examinations of cocoons found caterpillars in the prepupal stage (Photo 4). Some species of flannel moths spend the winter as prepupae and pupate in spring. This appears to also be the manner and form of overwintering for *N. ovina* in Alabama.

Occurrence, Damage, and Importance

Infestations of the white flannel moth have been infrequent and localized in Alabama. However, the recent appearance of caterpillars in sufficient numbers to completely strip full-foliaged redbuds in the seed orchard demonstrates clearly the serious pest potential of the species. Damage, for the most part, has been aesthetic; however, heavy to complete defoliation can seriously affect tree growth, form, and survival.

In addition to causing damage to foliage, the caterpillar sometimes poses another problem on ornamental redbuds. Its urticating setae, when touched, produce a stinging or nettling reaction. The reaction is usually mild and short-lived, but nevertheless, quite noticeable⁶.

REDHUMPED CATERPILLAR

Schizura concinna (J.E. Smith)

Order Lepidoptera, Family Notodontidae

Range and Hosts



Photo 7 – Full-grown redhumped caterpillar on redbud.

The redhumped caterpillar (Photo 7) occurs throughout the United States. Larvae feed on a variety of forest, fruit, shade, and ornamental trees and shrubs – apple, plum, cherry, black locust, dogwood, elm, persimmon, sweetgum, and members of the walnut-hickory and willow-poplar families. Most available lists of hosts do not include red

⁶For information on stinging caterpillars see AAES Bulletin 633, "Stinging Caterpillars."

bud, but in the Auburn area of East Alabama, open-grown ornamental red-buds seem to be common host trees.

Description, Life History, and Habits

The caterpillar overwinters in a cocoon in the soil or in leaf litter on the surface of the soil. The cocoon (Photo 8) is flimsy, oval, about 17 mm long and 11 mm in diameter. Emergence of moths takes place in spring. The moth (Photo 8) is grayish brown with a wingspan of 30-37 mm. Each front wing has a light-colored area along the front edge at the base; hind wings of the female are gray, those of the male are white.



Females lay eggs in groups of 25-100 on the underside of leaves. Newly hatched larvae feed gregariously, skeletonizing the leaf (Photo 9); subsequently, older larvae consume entire leaves, except for the larger parts of midrib and veins. Mid- and late-stage caterpillars tend to separate but still feed generally in groups, defoliating one branch then moving to another.



Photo 8, top – Cocoon (left) and adult (right) of the redhumped caterpillar.

Photo 9, bottom – Leaf partially skeletonized by newly hatched larvae. Note mass of hatched eggs.

Early stage caterpillars (Photo 10) are tan-orange with black heads. As larvae grow, body color and markings change. Late-stage and full-grown caterpillars (photos 7 and 10) have coral red heads and a conspicuous red hump (the basis for the common name) on the first segment of the abdomen. The body has alternating black and yellow longitudinal lines, a pair of white lines along the margins of the back, and a double row of black spines down the back. The full-grown caterpillar is 30-40 mm long. Full-grown caterpillars leave foliage and spin cocoons in plant debris or soil.



Photo 10 – Early- (left) and late-stage (right) redhumped caterpillars.

Redhumped caterpillars are most commonly found in the Auburn area during August, September, and October. Two broods apparently occur; early stage larvae have been found in late July-early August and again in mid-September, with corresponding mature larvae present about the end of August and again in the last half of October. Typically, infestations have been small and isolated, confined mostly to scattered individual trees. Trees are usually only partially defoliated and damage is mainly aesthetic. However, the species has the potential to produce large populations and cause serious defoliation of landscape trees.

The full-grown redhumped caterpillar possesses a specialized gland located on the underside the thorax just behind the head. From this it can emit an acidic spray. This apparently is primarily a defensive action against predators, but if sprayed on human skin the spray may cause irritation.

FALSE UNICORN CATERPILLAR³

Schizura ipomoeae Doubleday

Order Lepidoptera, Family Notodontidae

Range and Hosts

The false unicorn, also called morning-glory prominent, occurs throughout much of the United States but is most common in the East. The caterpillar (Photo 11) feeds on a variety of trees and shrubs, including apple, beech, birch, cherry, elm, maple, and oak. In Alabama, it has been collected

also from buckeye, silverbell, and boxelder, and has been found regularly on ornamental redbud.

Description, Life History, and Habits

Details of life history and habits in Alabama are not well-known. The insect overwinters as a prepupa or pupa in a cocoon in the soil or in plant debris on the surface of the soil. Adults emerge in spring.

Moths are grayish brown. Front wings are streaked with black; hind wings are grayish; wingspan is 35-45 mm.

Activity begins in the Auburn vicinity in May. Larvae are present from late May into mid-October. The number of broods that occur per year is uncertain; two or more probably occur in Alabama. Broods overlap, and caterpillars differing widely in size and age are often present simultaneously.

These caterpillars are solitary feeders throughout development. Newly hatched and early-stage caterpillars skeletonize patches on the lower surface of leaves (Photo 12, left); older ones feed at leaf margins (Photo 12, right) and consume all but the midrib. Full-grown caterpillars (photos 11 and 12, right) are 30-35 mm long. The head is gray or tan with two dark brown to black parallel stripes on each side. There is a large, fleshy, forked hump on the



Photo 11 – False unicorn caterpillar.



Photo 12 – (left) Early-stage larva skeletonizing leaf; (right) late-stage false unicorn feeding typically at leaf margin. Note how caterpillar appears to be part of the margin of the damaged leaf.

first segment of the abdomen and smaller ones on abdominal segments five and eight. There is a white patch on the back of abdominal segments one and two and a white “V” on segments six and seven (Photo 11). Sides of the second and third segments of the thorax are green, and the rest of the body is mottled gray, reddish brown, and tan. The combination of brown-green coloration and “jagged” form makes caterpillars blend into leaf margins to appear as a part of the damaged leaf (Photo 12 B), affording the caterpillar some protection from predators.

False unicorn caterpillars are present from May into October but are usually most common during August and September. They are solitary feeders and usually do not occur in sufficient numbers to injure trees – foliage loss is minimal. However, in some years, patch-kill of leaf tissue from skeletonizing by early stage larvae, and “ragging” of leaves by late-stage caterpillars may become noticeable and reduce the attractiveness of landscape redbud trees.



Photo 13 – Fall webworm cocoon and pupa.

FALL WEBWORM

Hyphantria cunea (Drury)

Order Lepidoptera, Family Arctiidae

Range and Hosts

This common webworm occurs throughout the United States and infests a variety of broadleaf trees. Some common hosts in Alabama are pecan, persimmon, sweetgum, willow, sourwood, cherry, elm, mulberry and redbud.

Description, Life History, and Habits

The webworm is unique in that there are two distinct forms (races) within the species, each differing somewhat from the other in appearance, habits, and host preference. The races are commonly referred to as orange or black, based primarily on color of the head and wart-like tubercles on the body of larvae. A few common host tree species are acceptable to either race; other trees, however, are commonly infested only by one race or the other. Webworm infestations on redbud are commonly black race.

Both races of the fall webworm overwinter as pupae in thin brown cocoons (Photo 13) in leaf litter on the ground or in the upper layer of soil. Black-race moths (Photo 14) emerge in April in the Auburn vicinity (orange-

race moths emerge four to five weeks later⁷). Females are pure white; males also are white, but commonly with black spots on the forewings.

The first black-race generation is usually a small one, and often goes unnoticed. Sweetgum and mulberry are the most common hosts of the early brood. A subsequent brood of the race occurs in July-August-September; it is this brood that infests redbud. Females lay 300 to more than 1,000 small greenish eggs in single-layer masses on the underside of leaves, and covers the masses lightly with hairs from her body (Photo 14). Eggs hatch in about a week.

Early stage larvae skeletonize by feeding on leaf surfaces, forming webs as they feed (Photo 15). Larvae feed in colonies, enlarging webs as they grow. Full-grown larvae (Photo 16) of the black race are about 22 mm long, have black heads and tubercles along the body, and are densely clothed with long hairs. In the late stages, larvae abandon the web, feed some on foliage outside, then pupate in thin cocoons in or on surface of the soil.

⁷See AAES Circular 324 "The Fall Webworm" for hosts and habits of the orange race and for habits of the black race on other hosts.



Photo 14 - Black-race fall webworm moths; female and egg mass (left) and male (above).



Photo 15 - Skeletonizing (above) and webbing (below) of leaves typical of early stage webworm larvae.



Photo 16 – Full-grown black-race fall webworms (spring brood on sweetgum).

In most years, webworm populations are low and webs on redbud are small and scattered. Infestations mostly result in unsightly trees, made so from presence of webs and skeletonized leaves. However, the webworm has high reproductive potential, and can occur periodically in “outbreak” numbers, becoming a serious pest of landscape trees.

REDBUD LEAFFOLDER

Fascista cercerisella (Chambers)

Order Lepidoptera, Family Gelechiidae

The leaffolder occurs from Maryland to Florida and west to Texas and Kansas. It is common in Alabama. As far as is known, redbud is its only host. Little information is available on the redbud leaffolder and its life history and habits. The insect apparently overwinters as a pupa among leaves or other plant material on the ground or in the soil. Leaffolder activity begins in spring promptly following leaf development – during April in East-Central Alabama. The moth (Photo 17, top left) is small with a wingspan of about 15 mm. The head is white and the thorax and forewings are black. Each forewing is marked with three white spots along the costal, or outer (when folded), margin.

Egg-laying habits are not well-known. One larva is usually found per leaffold, indicating that eggs are probably laid singly or in small groups. Larvae feed by skeletonizing leaf surfaces within “nests” made by tying together parts of two leaves (Photo 17, top right) or by folding the margin of the leaf blade inward over the upper surface and tying it with strands of silk (Photo 17, bottom left). The full-grown larva (Photo 17, bottom right) is about 15 mm long, and black with white cross-stripes. The number of leaffolder generations per year is not known but, in the Auburn vicinity, larvae have been found in every month of the season from May through September. Over the



Photo 17 – Redbud leaffolder adult (top left); typical “nests” and skeletonizing damage of redbud leaffolder larvae (top right, bottom left); full-grown leaffolder larva (bottom right).

years, damage to foliage by the leaffolder has not been serious enough to injure trees; however, on small trees, folds and skeletonized areas of leaves become noticeable and reduce the attractiveness of landscape ornamentals.

REDBUD PETIOLE GALL MIDGE³*Dasineura* sp.⁸

Order Diptera, Family Cecidomyiidae

The specific identity of this gallmaker has not yet been determined. As far as is known, the gall has not before been encountered in this area. At Auburn, it has been seen only on redbud, and redbud may, indeed, be its preferred,

possibly only, host tree. Following discovery of the gall at Auburn, a similar, or same, gall on the petiole of redbud has been reported from West Virginia⁸. Larvae from the galls have been identified to genus *Dasineura*. It seems possible, even likely, that the midges from the two localities may be the same, so the Auburn midge is tentatively identified also as a species of *Dasineura*.

To date, no published information has been found on the life history and habits of the midge. Findings from preliminary studies at Auburn are as follows. The gall is formed at the base of petioles of young, developing leaves (Photo 18). Galled petioles and leaves wilt, die, and turn dark brown to black. In the Auburn area, damage to foliage occurs in April and resembles that caused by late frosts or freezes (Photo 19), events not uncommon in this area in early spring. Examination of damaged leaves reveals the gall and evidence of larval feeding (Photo 18); galls examined so far have each contained only a single larva. At Auburn, damage

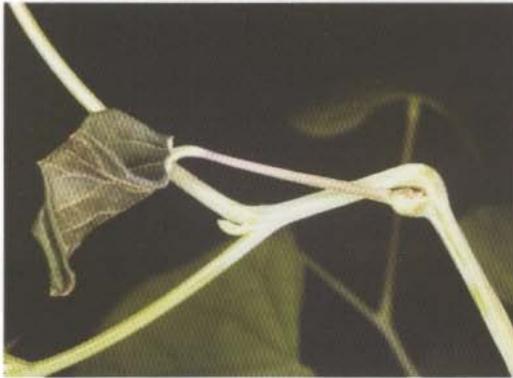


Photo 18 – Typical gall formed by the midge at the base of redbud leaf petiole (above); open gall showing signs of larval feeding (below).

⁸Personal communication from Dr. R.J. Gayne, Research Entomologist, Emeritus; Systematics Entomology Laboratory, USDA, U.S. National Museum, Washington, D.C. 20500-0168 to Dr. Wayne Brewer, Dept. of Entomology and Plant Pathology, Auburn University.



Photo 19 - Young redbud foliage damaged by frost (above) and gall midge (right).

to foliage, and apparently midge activity, ceases by about the end of April; apparently only one brood occurs each year. Overwintering is believed to be as a puparium in the soil beneath trees.

In the springs of 1999 and 2000, infestations occurred on a number of ornamental and green-space redbuds on the Auburn University campus. Many young leaves in crowns just recently in full flower were killed, severely reducing the attractiveness of the trees. It seems apparent that this gall maker can be a serious pest of ornamental redbud.





Photo 20 – (above) Redbud leaf with typical leafhopper damage; (below) “Redbud” leafhopper.

REDBUD LEAFHOPPER³

Erythroneura sp.

Order Homoptera, Family
Cicadellidae

Many species of leafhoppers feed on foliage of a wide range of plants, including trees. A species tentatively identified as a member of the genus *Erythroneura* is common on redbud in the Auburn vicinity. Whether the species has other host plants in the area has not been determined. Adults and developing nymphs have sucking-type beaks and feed by extracting leaf sap. Leaf tissue at points of feeding dies and fades, leaving foliage discolored, or “stippled” (Photo 20, above). Feeding is from the underside of leaves, but damage is most visible on the upper.

The adult leafhopper (Photo 20, below) encountered

on redbud is 2-3 mm long and pale yellow-green with reddish-brown markings on thorax and wings. The life cycle of the species in the Auburn area has not been determined. Some species of *Erythroneura* are known to overwinter as adults in hibernation. Adults emerge in spring, feed, and lay eggs in leaf tissue; two or more generations may occur each season. It appears likely that this species on redbud in Alabama has a similar cycle.

BROADNOSED WEEVILS

Fuller Rose Beetle

Asynonychus godmanni Crotch

Whitefringed Beetle

Graphognathus leucoloma (Boheman)*Atrichonotus taeniatulus*⁹ – (Berg)

Order Coleoptera, Family Curculionidae

Adults of three related species of broadnosed weevils sometimes feed on and damage foliage of redbud. Feeding usually begins at the margins of leaves and progresses to partially or completely destroy all but the midrib and larger veins (Photo 21). Adults are similar in form, each with the short, broad "snout" typical of the group. The fuller rose beetle (Photo 22, top) is brown and 7-8 mm long; the whitefringed beetle (Photo 22, middle) is about 12 mm long, and dark gray with white stripes along the sides and on the dorsal surface of the head and thorax; *A. taeniatulus* (Photo 22, bottom) is black with gray scales, and about 5 mm long.



Photo 21 – Redbud leaf with typical damage caused by broadnosed weevil adults.

Hosts for the fuller rose and whitefringed beetles include a wide variety of plants ranging from vegetables, field crops, nursery plants, flowers, shrubs, and some trees other than redbud. Local hosts of *A. taeniatulus* have not been determined, but likely include a similar variety of plants.

In the Auburn vicinity, the fuller rose beetle has been the most common of the three. Adults first become active in spring. Eggs are laid in or on the soil or low on plants in the area. Newly hatched larvae (grubs) burrow into the soil and feed on roots of various plants. New adults emerge in sum-

⁹Species identified by Dr. Wayne Clark, Taxonomist, Department of Entomology and Plant Pathology, Auburn University.



mer – they are usually most common on redbud in the Auburn vicinity during August and September. Only one generation occurs each year.

Whitefringed beetle life cycle and habits are much the same as those of the fuller rose beetle. One generation occurs each year; eggs are laid on the soil or on objects/plants at points near ground level; grubs feed on roots of plants. In some plant systems, such as nursery and field crops, grubs of whitefringed beetle cause mortality.

Life cycle and habits of *A. taeniatulus* in the Central Alabama area are not known. General information and observations, however, indicate that they are likely similar to those of fuller rose and whitefringed beetles.

Adults of these three beetles cannot fly. They must climb from soil to foliage of hosts to feed. Consequently, it is the low-growing shrub hosts and lowest leaves of tree hosts, in this case redbud, that are most heavily damaged.

Photo 22 – Broadnosed weevils: (top) fuller rose beetle; (middle) whitefringed beetle; (bottom) *Atrichonotus taeniatulus*.

LEAFCUTTER BEES

Megachile spp.

Order Hymenoptera, Family Megachilidae

Leafcutter bee adults (Photo 23) are important pollinators. They visit blossoms, collect pollen, and feed on nectar, processes that harm neither blossom nor plant. However, adults do produce conspicuous damage (Photo 24) to leaves of various plants, including several species of broadleaf trees. In Alabama, leaves of maples, oaks, and redbud are commonly damaged. Damage is not from feeding, but from the unique nesting habit of the bees.

Females rear young in cavities such as those provided by hollow twigs (Photo 25). Eggs are deposited and larvae develop in cylindrical leaf cells (Photo 25) constructed by the female. Oblong sections (Photo 24) are cut from leaf margins to form sides of the cell; circular sections are cut to form caps at ends of the cell. Cells are provided with pollen and nectar for larval food. A single egg is placed in each provisioned cell and the cell is closed with circular sections of leaf. Several cells may be constructed end-to-end in nesting cavities.

In the Auburn vicinity, leaf cutting and nesting usually begin in early May. Cut leaves remain alive and persist throughout the season. Precise, symmetrical cuts in leaf margins more arouse curiosity than injure trees.

Photo 23, top - Adult leafcutter bee.

Photo 24, middle - Redbud leaf showing typical work of the female leafcutter bee.

Photo 25, bottom - Typical twig nest and leaf cell in which the larva develops.



STINGING CATERpillARS

Puss Caterpillar

Order Lepidoptera, Family Megalopygidae

Saddleback, Spiny Oak Slug³, Stinging Rose, and Hag Moth Caterpillar–

Order Lepidoptera, Family Limacodidae

From time to time larvae of the above listed species of Lepidoptera are found on foliage of ornamental redbud trees. While they do feed on leaves, they are not usually present in sufficient numbers to cause noticeable damage. However, these caterpillars are worthy of note because all possess urticating setae and/or spines that, if brought in contact with human skin, produce netting or stinging reactions. Reactions vary from mild to severe, depending on species of caterpillar and susceptibility of the victim. The caterpillars are pictured here (Photo 26) to provide a means for identification. For more on urticating caterpillars on trees, see AAES Bulletin 633, "Stinging Caterpillars."

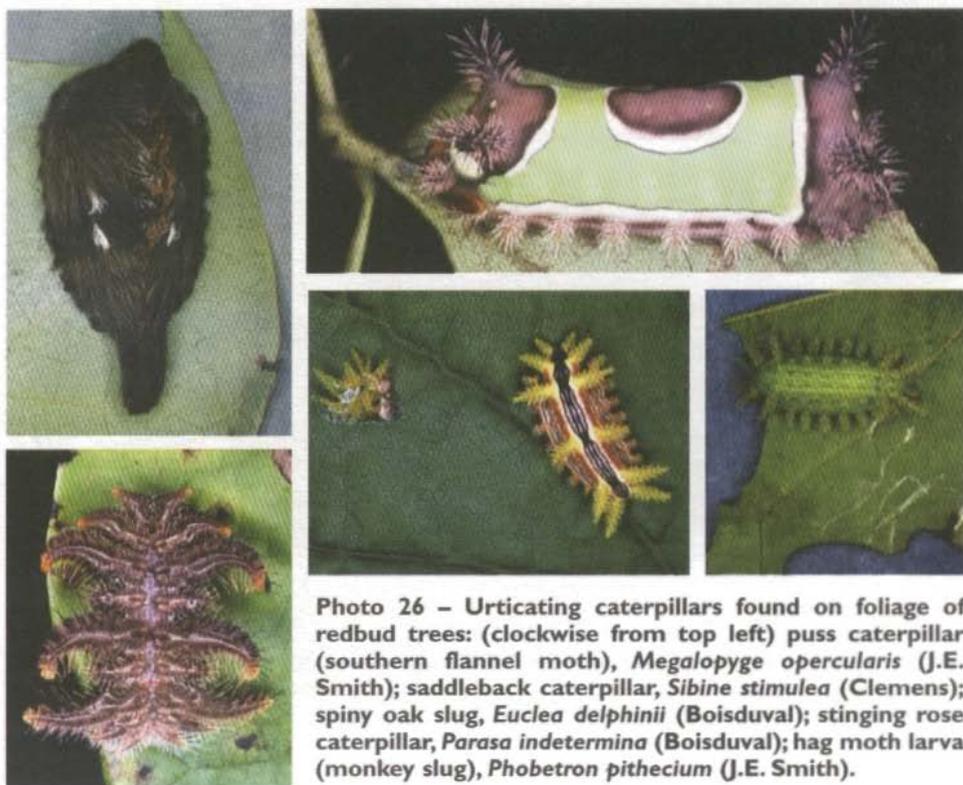


Photo 26 – Urticating caterpillars found on foliage of redbud trees: (clockwise from top left) puss caterpillar (southern flannel moth), *Megalopyge opercularis* (J.E. Smith); saddleback caterpillar, *Sibine stimulea* (Clemens); spiny oak slug, *Euclea delphinii* (Boisduval); stinging rose caterpillar, *Parasa indetermina* (Boisduval); hag moth larva (monkey slug), *Phobetron pithecium* (J.E. Smith).

IMPORTANCE AND CONTROL OF REDBUD FOLIAGE INSECTS

The importance of an insect as a pest of trees depends on a number of things, one being the value of the tree as determined by its use, yield, product, or contribution. In mixed natural forest stands, the redbud is a small understory tree; it produces no merchantable wood and currently has no value as timber. In that setting and circumstance, insects infesting redbud cause no measurable loss and are of no concern as pests. However, in many urban and suburban areas of Alabama, redbud is prized and widely used as an ornamental landscape tree. Here its value is measured by its aesthetic and environmental contributions; and here those insects of no importance in natural timber stands often become serious pests and control may become necessary or desirable. For information and recommendations on control of insects attacking foliage of redbud and other ornamental landscape trees, contact the appropriate county extension office or extension entomologists.

For more information on insect pests of Alabama trees visit the Auburn University Department of Entomology and Plant Pathology Web site at www.ag.auburn.edu/dept/ent/hyche/insects.html

For more information on AAES publications, visit <http://www.ag.auburn.edu/resinfo/publications/index.html>

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Alabama's Agricultural Experiment Station AUBURN UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the state has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

- ★ Main Agricultural Experiment Station, Auburn.
- ★ Alabama A&M University
- ☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Research and Extension Center, Belle Mina.
2. Sand Mountain Research and Extension Center, Crossville.
3. North Alabama Horticulture Station, Cullman.
4. Upper Coastal Plain Research Station, Winfield.
5. Chilton Area Horticulture Station, Clanton.
6. Piedmont Research Station, Camp Hill.
7. Prattville Experiment Field, Prattville.
8. Black Belt Research and Extension Center, Marion Junction.
9. Lower Coastal Plain Research Station, Camden.
10. Monroeville Experiment Field, Monroeville.
11. Wiregrass Research and Extension Center, Headland.
12. Brewton Experiment Field, Brewton.
13. Ornamental Horticulture Station, Spring Hill.
14. Gulf Coast Research and Extension Center, Fairhope.