Some New Insect Pests of Trees and Shrubs in Indiana[1]

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A number of insect pests of trees and shrubs new to Indiana have been discovered during the past several years. Several of these insects portend serious economic problems for the nurserymen, Christmas tree growers and home owners. These new pests are the Zimmerman pine moth, mimosa webworm, honey locust borer, Fullers rose beetle, spruce bud scale, tea scale, hypericum mealybug and holly leaf miner. The purpose of this paper is to bring these pests to the attention of the public and to publicize their presence in the state.

The Zimmerman pine moth, *Dioryctria zimmermani* (Grote) (fig. 1), was discovered infesting red and scotch pines in LaPorte County, Indiana in the fall of 1956 (U. S. D. A. determination). In the spring and summer of 1957 infestations ran as high as 25 percent in a commercial Christmas tree planting near LaPorte with an estimated loss of $20,000 to the growers.

The adult of the Zimmerman pine moth has a wing span of approximately one and a half inches. The body and fore wings are gray. The forewings have red markings and light and dark gray zigzag lines. The hind wings are tan to whitish with the color intensified along the margins. There is one generation per year.

Adult Zimmerman pine moths emerge during August and September with peak emergence occurring about August 14th. Being noctural they are observed only when disturbed. The eggs are deposited under bark flakes near wounds and pruning scars at the edge of resin masses. Under Indiana conditions most of the eggs hatch the following May and the young larvae tunnel in the newly developing leader or lateral growth. The larvae resemble a large European corn borer larvae and have a series of black dots on the body. The developing larvae girdle in the area of the first whorl of branches and when about mature may tunnel in the pith of the main stem for a distance of a foot or more. Full grown larvae are slightly less than an inch in length.

Illinois foresters report (9) that the insect can be controlled by applying two percent DDT in early August.

The mimosa webworm, *Homadaula albizziae* Clarke (fig. 2), which attacks mimosa and thornless honey locust in the southern half of the state, has been noticed since 1953 in the Indianapolis area. Determinations were made by the writer. Injury to honey locust is particularly noticeable in late August after attack by the second generation.

The moths are gray with a silvery sheen and the wings are lightly stippled with black spots. The adults, about ½ inch long, appear in June and lay eggs on the foliage. The larvae, dark brown diffused with pink, are about ½ inch long. They feed in colonies in the webbing spun

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Figure 1. Zimmerman pine moth adult, larva and injury to whorl of Scotch pine, slightly reduced.

Figure 2. Mimosa webworm adult, larva pupa and injury to honey locust foliage, about one half normal size.

Figure 3. Honeylocust borer adults, larva and injury, about half normal size.

over the foliage where they skeletonize the underside of the leaflets. The injured leaves turn brown as if scorched by fire. In mid-summer the larvae pupate in the webs or drop to the soil or trunk where they spin flimsy cocoons in cracks and crevices of the bark or in the ground cover. Second generation adults emerge in early August.

Injury by the mimosa webworm can be prevented by spraying trees of susceptible species in mid-June and mid-August with either DDT or lead arsenate (11).

The honey locust borer, *Agrilis difficilis* Gory (fig. 3), was found attacking vigorously growing honey locust at Lafayette in 1956. Determinations were made by Dr. L. Chandler. The larval stage is a typical flat headed borer which burrows beneath the bark and eventually girdles the tree. One of the first symptoms of infestation is the exudation of large quantities of sap from infested areas. The adult beetles which emerge in June are about ½ inch long. The adult is elongated, black with a metallic lustre. There is one generation annually. No control measures are known at present (1, 4).

The fuller rose beetle, *Pantomorous godmani* (Crotch) (fig. 4), never before recorded from Indiana, was submited by County Agent E. T. Bond from Boonville for identification in late September, 1957. Determination was made by Dr. L. Chandler. This grayish-brown weevil was found eating ragged holes in the foliage of crape myrtle. The female weevils, which are wingless and reproduce parthenogenetically, lay from 10 to 60 eggs in late summer. The female places the eggs beneath bark flakes at the base of the stem. The eggs hatch in about a month and the larvae feed on the roots of the host plant (2, 11).

These weevils may be controlled by dusting with DDT, Lindane or Chlordane (11).

The holly leaf miner, *Phytomyza ilicis* (Curt.), was found damaging American holly in extreme southern part of Indiana in the summer of 1956 by the writer. The larval stage of this species produces serpentine mines in the leaves of holly which ruins their appearance since the infested leaves turn brown. The insect has one generation a year, and over-winters as a pupa in the leaf. Adults begin emerging in May and deposit eggs in slits in the leaf. The maggot mines in the leaves all summer and reaches maturity in the fall.

The holly leaf miner injury can be prevented by applying DDT or dieldrin when the adults start to emerge. The spray should be repeated in ten days. Young larvae in the leaves may be controlled by applying lindane or dieldrin in July (10, 11).

The spruce bud scale, *Physokermes piceae* (Schr.) (fig. 5), attacks spruce throughout the state but has never been listed as present in

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Figure 4. Fullers rose beetle and injury to crepe myrtle, about halr normal size.
Figure 5. Spruce bud scales at the node of a spruce branch, about half normal size.
Figure 6. Juniper mealybugs on a juniper twig, about half normal size.
Figure 7. A colony of hypericum mealybugs on twig of St. John's wort, about normal size, Note crawlers.
Figure 8. Tea scales on a holly leaf, about normal size. Black scales are females and white scales the males.

Indiana until identified by the writer. The mature scales are about ⅛ inch in diameter, round and dark brown in color. They usually occur in clusters of 3 to 5 at the nodes and so closely resemble spruce buds that they are difficult to detect. The insect secretes large quantities of honeydew which attracts bees and acts as a substratum for growth of sooty black mold. There is one generation each year. The crawlers hatch in June and winter as partially grown scales.

The spruce bud scale can be controlled by applying dormant oil sprays during the winter or by spraying the crawlers in June with malathion or nicotine sulphate (3).

The juniper mealybug, *Spilococcus juniperi* Ehrborn (fig. 6), was collected from junipers at South Bend by P. T. Ulman in August 1954 and identified by the writer. The adult female is broadly oval, 1.5 - 2 mm. in length; dark red in color and the body is covered with a coarse, whitish powdery secretion, except for two narrow longitudinal stripes. The waxy filaments around the margin of the body are short, stubby and indistinct. The legs are very slender. The ovisac is small (6, 8).

The hypericum mealybuy, *Trachycoccus hyperici* Ferris (fig. 7), has been taken frequently on *Hypericum prolificum* (F) in a nursery at Lafayette by the writer and has been reported by Ferris, 1956, from Bloomington. The determination was made by Dr. G. F. Ferris. The adult female averages about 1.18 mm. in length and is an elongated oval in outline. In color the female is a dark reddish-purple dusted with a white powdery secretion. Reproduction is viviparous and there are two generations annually. The adult females overwinter and begin producing young in mid-May.

This mealybuy can be controlled by applying one of the phosphate insecticides in late May or early June while crawlers are being produced.

The tea scale, *Fiorinia theae* Green (fig. 8), was taken on *Ilex cornuta Burfordi* at Goshen by P. T. Ulman in 1955 and identified by the writer. The scale of the female is approximately oval, varying in length from 1-1.3 mm., with a width of about 0.5 mm. Color varies from a dark brown to almost black. There is a prominent central ridge and the posterior end is pointed. The males are about 1 mm. long and snow-white in color. Groups of male scales appear to be covered with white cottony threads. There are many over-lapping generations so that different stages can be present throughout the summer months (5, 8).

Applications of phosphate insecticides give effective control.

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