

GALL MITES IN OHIO¹

by W. E. Styer and L. R. Nault

Every year many homeowners become alarmed when they discover wart-like growths on leaves of some of their favorite trees and shrubs. All this concern is caused by microscopic arthropods called eriophyid mites, or more commonly the gall mites.

The damage produced by these mites is expressed in a wide variety of symptoms. Some mites cause distortion of developing buds while others damage the leaves or flowers. Leaf effects include edge rolling, curling, "rusting," stunting, crinkling, or the familiar production of galls. The various galls, which may occur on upper or lower leaf surfaces, are shaped like beads, purses, bladders, fingers, or nipples. Other galls are expressed as fuzzy patches called erineums. These may occur either flat on the surface or inside indented pockets. Galls and other leaf distortions are induced by salivary phytotoxins secreted by the feeding mites.

The gall mites have been known to be pests of deciduous trees for only about 140 years. Up until the 1830's, biologists considered the various eriophyid galls as being caused by fungi. In fact, four fungal genera had been established to account for these galls.

Generally, damage to the host is negligible and control measures are not recommended. However, in some instances high mite populations on a small tree can cause injury to the extent that premature leaf fall will occur. In cases where severe bud proliferation, or the "witches broom" effect occurs, deformity and subsequent poor growth is detrimental to the tree. In such situations, control measures are certainly warranted. In Research Center tests, the insecticide carbaryl has been shown to be more effective against eriophyids than are the commonly used miticides.

Eriophyids are not only important because of the direct damage they cause but because they are also vectors of plant pathogens. The wheat curl mite, an eriophyid, has been incriminated as

the vector of two viruses of wheat in Ohio. Other species are known to transmit at least 10 other disease-causing plant pathogens.

Eriophyids have a very strict association with their plant hosts. With few exceptions, the malformations produced are a specific response by the plant to a specific eriophyid mite feeding upon it.

The maples serve host to a number of gall mites species. Perhaps the most striking symptom of these is a crimson erineum on the upper surface of sugar maple leaves. Its brilliant, deep, red color attracts attention. On this same maple are commonly found long, thin, pointed galls, caused by the maple finger gall mite.

The maple bladder gall mite produces one of the most commonly seen galls in Ohio. Found on the leaves of silver maple, this condition has attracted particular attention because of the conspicuous galls and the wide distribution of the host plant in the state. The eruptions on the upper leaf surface are initially green, later becoming tinted with pink and red.

Although some eriophyids are gall-formers, most cause no discernible host injury. These va-

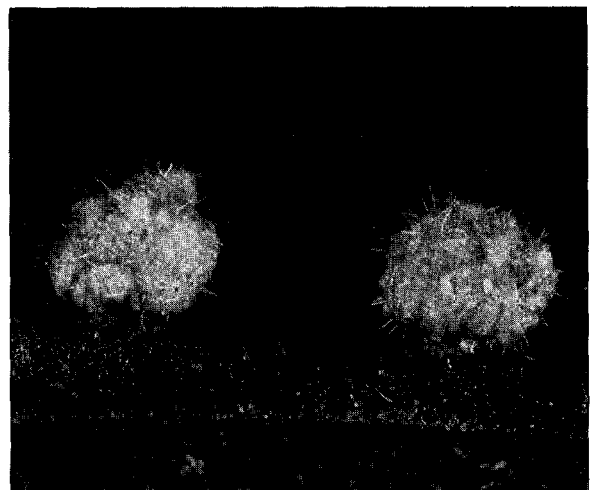


Fig. 1. This is a closeup view of bead galls, sparsely covered with trichomes, as found on elm leaves.

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grants are generally as host specific as the gall-formers.

The life history of species found on deciduous hosts usually involves two forms. The primary form is found on leaves and in galls during the summer. A secondary form is produced in late summer and autumn. It is this form which overwinters in secluded places beneath bud scales or in bark crevices. The secondary form leaves

these protected areas in the spring as soon as buds begin to swell. All their progeny will be of the primary form.

Eriophyid mites have remained a curiosity for most biologists, but the investigation of such obscure groups becomes necessary if we are to understand complex ecosystems. Recent studies indicate that eriophyids are important in the population dynamics of other pest mite species

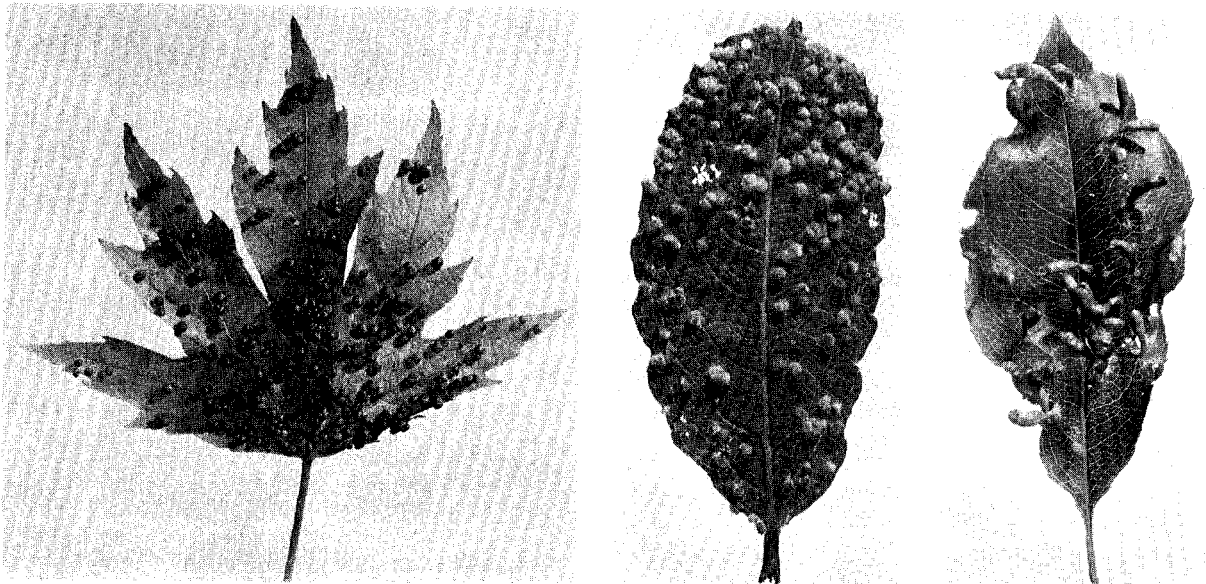


Fig. 2. Bladder galls on a silver maple leaf. This is one of the most commonly noticed galls in Ohio and the same mite causes smaller eruptions on red maple. Center: Bead galls covered with fuzzy trichomes on pussy willow leaf. Right: Elongate finger galls on wild black cherry leaf are common in Ohio.



Fig. 3. Left: Patches of yellow, glassy erineum on lower surface of beech leaves show through to the upper surface. Right: Sharply pointed finger galls on leaves of sugar maple. This same gall is found on leaves of black maple.

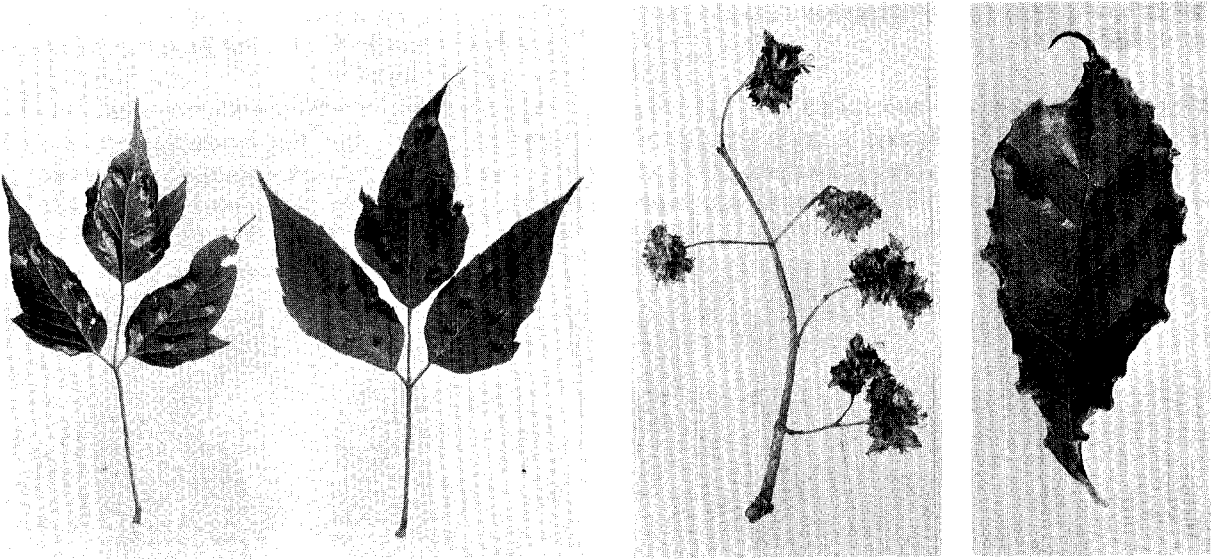


Fig. 4. Wart-like swelling from the under side, filled with felt-like masses of trichomes, on leaves of boxelder. Center: Irregular masses of green tissue formed on the stems of male white ashflowers. Right: Edge rolling on black gum gives a holly leaf effect.

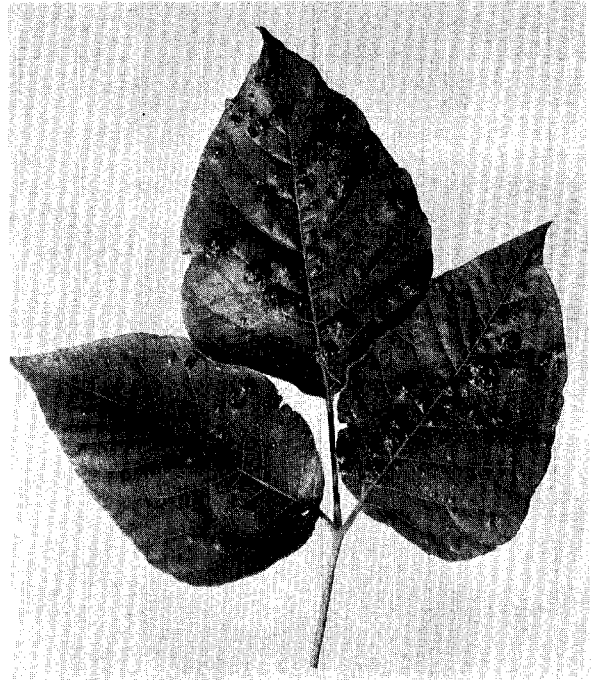


Fig. 5. Left: Proliferation of buds on hackberry causes the "witches broom" effect shown here. Right: Even poison ivy has galls. These irregular green or red bladder galls are common on poison ivy leaves.

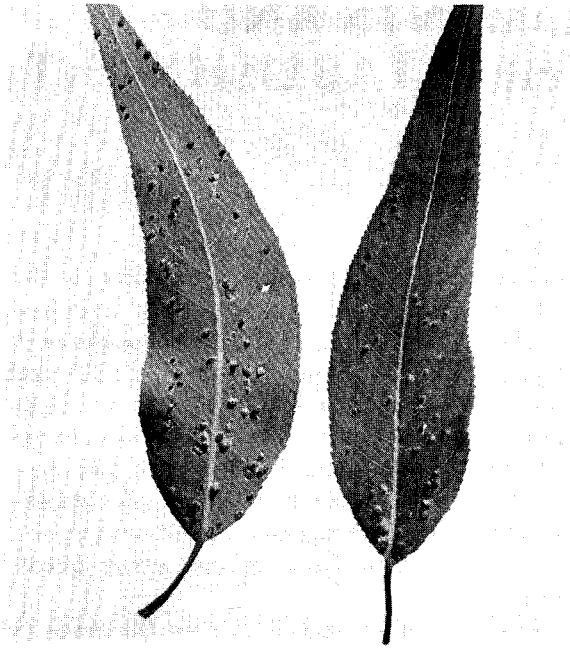


Fig. 6. These are bead galls, found on both surfaces of peachleaf willow.

and their predators.

Eriophyids become active in early spring and immediately begin to reproduce. They provide food for predaceous mites which also overwinter as adults, and are important for their survival. These predators increase their numbers sufficiently in the early season until the appearance later in the year of economically important pests such as the European red mite and 2-spotted

spider mite. The predaceous mites then become important predators of these injurious species.

We are currently investigating the eriophyid fauna of Ohio to bring up-to-date the number of species present in the state. The only previous such survey of the state was conducted in the early 1920's. Although the presence of some species may have been suspected, only about 20 species had been reported.

Descriptions of the early-named gall mites were based entirely on host injury, and not mite morphology. This unfortunate practice has resulted in much confusion. The present study, which is supported in part by the Ohio Biological Survey, will alleviate much of the confusion. To date, 110 plant species from 30 Ohio counties have been collected and examined for the presence of eriophyid mites. Ninety of these plant species have yielded more than 80 eriophyid mites new to the state of Ohio, and more importantly, over 30 of these species are new to science. Currently, descriptions and names are being given to these new species for presentation to the scientific community in technical journals.

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ABSTRACT

Shurtleff, M. C. 1975. **How to train a spray crew.** *J Grounds Maintenance* 10(3): 56-60, 65, 72, 75-76.

Let's assume you have just hired several new persons who have never applied any type of pesticide outside the home, or handled a spray gun. This article will progress in a logical manner, step by step, and outline for you the way to develop a dependable spray crew. It is important that you and your co-workers know the latest state and federal regulations. New regulations went into effect in October 1974; others start in October 1975. The latest regulations can be obtained by contacting your regional Federal Environmental Protection Agency (EPA) Office or your State Department of Agriculture.

Training schools and examinations are usually given during the winter and early spring months. The information given in this and succeeding articles should help your spray crew(s) pass state examinations and, incidentally, keep you out of trouble. Supplement these articles with information from your State Department of Agriculture land-grant university, or local county extension office.