

Biology and Control of Horned/Gouty Oak Galls

Over the past few years, Extension centers around the state have seen an increase in inquiries about galls on the branches of pin and shingle oak trees. Often, a few galls are observed at first and there is steady increase on an individual tree over a period of years until the tree begins to show branch dieback. Homeowners with affected trees often ask what is causing the galls and how the problem might be controlled. There are two types of galls (horned and gouty) caused by two closely related species of tiny wasp. The following is an excellent summary of the definitive study on possible control measures prepared by Dr. Bruce Barrett, State Extension Entomology Specialist at MU. Unfortunately, there have been no breakthroughs in control of horned or gouty oak gall since this research was published.

Research concluded in 1999 by E.A. Eliason at the University of Kentucky examined the use of insecticides in controlling horned oak galls. The following is a brief summary of Dr. Eliason's research findings.

The species of cynipid gall wasps that cause horned/gouty oak galls (the large, woody stem galls often found on pin oak) have what is called an 'alternating generations' biology. What is meant by this is that in the early spring the wasps emerge from the woody stem galls, and the females oviposit in the swelling buds of the host tree. The eggs hatch 1-2 weeks later, and tiny galls begin to form along the veins on the underside of the expanding leaves. Adult wasps emerge from these leaf galls 2-3 months later, and the females from this 'leaf' generation begin to oviposit in the tree's young shoots. The developing wasps in these stem galls may take 2-3 years to complete their development.

As the woody stem galls increase in size they eventually 'girdle' the twig, stopping the movement of water and



Figure 1. Horned Oak Gall

nutrients. Typically, damage from these types of galls range from light to moderate branch dieback. But under severe infestations the galls bring about the decline of the tree as they repeatedly girdle the new growth. Over time this may be fatal to the tree. Current management recommendations for the gall wasps are to either do nothing, prune out gall-infested limbs, or whole-canopy sprays with an insecticide (e.g., carbaryl). The latter two options are often very expensive and/or time consuming.

The research of Dr. Eliason examined controlling the more vulnerable leaf-galling generation by testing the

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effectiveness of three application tactics to disrupt the wasp's life cycle and reduce its overall population. The rationale for these three control tactics is that if the population of wasps were reduced in the leaf-gall generation, resulting in fewer wasps emerging, the development of new stem galls in the subsequent generation would also decline. In addition, controlling existing stem galls with insecticides is not very effective because insecticide uptake is very much reduced in woody tissue compared to leaf tissue.

In the first tactic, trees (pin oak) were sprayed with bifenthrin (e.g., Talstar®) or chlorpyrifos (e.g., Dursban®) in early-spring (late-March) to kill the female wasps emerging from the stem galls before they oviposited into the swelling buds. Both treatments reduced the number of leaf galls developing on the foliage, but more importantly (or unfortunately), did not significantly reduce the number of new developing stem galls.

The second tactic involved injecting concentrated solutions of abamectin (Abacide®), imidacloprid (Imicide®), or bidrin (Injecticide-B®) from pressurized containers (from J.J. Mauget Co.) into tree sapwood and targeted developing larvae in the young leaf galls. These injections were made about mid-April. None of the treatments reduced the

number of leaf galls and did not significantly reduce the number of developing stem galls.

The third tactic involved foliar applications of systemic insecticides that targeted larvae developing within the leaf galls. Treatments included dimethoate (Cygon®), acephate (Orthene Turf, Tree & Ornamental Spray®), abamectin (Avid®), or imidacloprid (Merit®). The treatments were applied in mid-May and sprayed to runoff. None of the treatments significantly reduced the number of gall wasps emerging from the leaf galls.

The conclusion of Dr. Eliason's study was that none of the three tactics examined alone reduced the numbers of new, developing woody stem galls, and that wasp infestations are unlikely to be controlled by a single treatment, regardless of application method. This means that there is still no really effective means of controlling horned/gouty oak galls.

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