



Understanding Oak Galls

A common occurrence on oak trees is the formation of gall growths or deformities on leaves, twigs, buds, flowers, bark, stems, and even acorns and roots. Most galls are harmless to trees. But in Illinois, both the horned and gouty oak galls can be debilitating, even killing younger trees. There is some evidence that larger trees can also be weakened and die because of excessive gall development. In recent years these two types of galls have been increasingly present.

Oak galls are caused by a group of small insects known as gall makers. Galls are a part of the insect's reproductive cycle and provide a protected enclosure for development of offspring (larvae). The gall is formed by the tree in reaction to insect-released chemicals or other stimuli, which incite plant hormones to form the gall. The inside of the gall is rich with protein and provides a source of concentrated food for the developing larvae.

The types of galls and the insects causing them are specific to various types of oak. Some galls are round or lumpy, some spiny, others flattened and dish-shaped. Sizes can range from a fraction of an inch to several inches in diameter. Often, the larger galls will grow together on stems forming large masses that weigh the branch down.

The majority of gall makers are tiny wasps, though some are fly species. There have been more than 700 species of gall wasps documented in North America. However, proper identification of these species has been challenging for insect taxonomists. The wasp gall makers are unique in that they can have different body structures depending on the generation which, along with a complex life cycle, has confused their identification. Each species causes a distinct type of

gall on a specific plant part. In some species, this habit skips a generation, with the offspring forming a different shaped gall on a different plant part, similar to its grandparent rather than its parent.

The gall maker life cycle involves egg laying on the plant and larvae development occurring within the confines of the gall. Compared to other insects, the life cycle is complicated. For example, with horned oak gall, an all-female generation emerges in the spring from old galls, and they lay eggs on leaves. A leaf gall is formed, the larvae develop, and within a few months, male and female adults emerge and mate. The females then lay eggs on twigs; the larvae hatch and bore into the stem. By the next spring, small, new galls of this generation appear, and the galls grow slowly over time as the larvae develop. Two or more years are required for this all-female generation to hatch and begin the cycle again.

In central and southern Illinois, the most noticeable oak galls are the horned oak gall and the gouty oak gall, caused by two closely related wasp species (*Callirhytis spp.*). Horned oak gall occurs on Pin, Black, and Water Oak, while gouty oak gall occurs on Pin, Scarlet, Red, and Black Oak species.

Approaches to managing these two types of oak galls are limited at best. For younger trees, it is possible to trim out the affected twigs and branches.



Trimming is more difficult on larger trees unless done by a commercial arborist with a lift truck or climbing capability. Affected trees can be fertilized to encourage healthy growth, with late fall being the best time to apply fertilizers.



The gall-making insect has already emerged from this older gall.

Keep in mind that galls are live tissue and are part of the twig. In viable galls, the larvae cannot be reached by

insecticides or oil sprays. Because adults emerge at various times in the spring and mid-summer to lay eggs on leaves or twigs, it is difficult to effectively time sprays, which may also have limited residual effect. In addition, because these are wasp species, many insecticides are not effective or labeled for them. Thus, using chemical insecticides that target eggs, larvae, and adults is a limited control approach. New systemic insecticides with the active ingredient imidacloprid (example: Bayer Advanced™ Tree and Shrub Insect Control) may affect feeding larvae. However, research is inconclusive, and this insect is not currently designated on the product label.

Some of the earlier botanists in North America believed galls were simply a typical structure of a normal plant. To many, these galls are unsightly, but they are a part of the natural system associated with oak species which we have in the landscape. As part of the natural system, there will be high and low population cycles of gall maker insects. And, perhaps in a few years, these galls will be less prevalent than they are now.

An excellent reference from which this article was adapted is *“Insects that Feed on Trees and Shrubs”* by Johnson and Lyon (Cornell University Press). General information about insect and disease control in the home landscape can be found in the *Home, Yard and Garden Pest Guide* (#C1391), available through your local U of I Extension office.



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