

# Insect and Mite Galls

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Galls are abnormal plant growths caused by various organisms (insects, mites, nematodes, fungi, bacteria, and viruses). This publication will deal with galls caused by the feeding or egg-laying activity of insects and mites. Because of their unusual forms and colors, galls often cause homeowners to become concerned. However, galls seldom threaten plant health and their numbers are highly variable from season to season. For those reasons, control is generally not suggested.

## How are Galls Formed?

Galls are formed by insect/mite feeding or egg-laying activity. Either mechanical damage or salivary secretions (introduced by insects and/or mites) initiate increased production of normal plant growth hormones. These plant hormones cause localized plant growth that can result in increases in cell size (hypertrophy) and/or cell number (hyperplasia). The outcome is an abnormal plant structure called a gall.

Gall formation generally occurs during the accelerated growth period (late spring) of new leaves, shoots, flowers, etc. Mature plant tissues are usually unaffected by gall-inducing organisms. The gall-making organism develops inside the gall and the gall continues to grow as the insect/mite feeds and matures. Once gall formation is initiated, many galls will continue to form even if the insect dies. In addition, most galls are usually not noticed until they are fully formed and remain on plants for extended periods of time (more than a season).

## Types of Galls

Leaf Galls (Figs. 1 , 2 , 3 , 4 , 5 , 6 ) - galls appearing on leaf blades or petioles. These are the most common galls and may appear as leaf curls, blisters, nipples, or erineums (hairy felt-like growths) on the upper or lower leaf surface.

Stem and Twig Galls (Figs. 7 , 8 , 9 , 10 , 11 , 12 ) - deformed growth restricted to stems and twigs; ranging from slight swellings to large knot-like growths.

Bud/Flower Galls (Figs. 13 , 14 , 15, 16) - deformed bud or flower structures; the size and shape of these structures is altered.

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## Gall Makers

Eriophyid Mites - these tiny mites typically overwinter on their host plant. They begin feeding and initiate gall formation in spring as leaf or flower buds open. Common galls caused by eriophyid mites include ash flower gall (Figs. 13 & 14), maple bladder gall (Fig. 1), spindle galls on maple and linden (Fig. 18), erineum or velvet galls (Fig. 6) on maple, viburnum, birch, and linden, and a bud gall on birch (Fig. 16). An eriophyid mite, in combination with a powdery mildew fungus, causes hackberry witches'-broom gall (Fig. 12).

Because of the large population of ash and the conspicuous nature of the gall, the ash flower gall (Figs. 13 & 14) generates much interest. This mite begins feeding on male ash trees in the spring before the flower buds fully expand. Because of their tiny size, these mites are able to enter the male flower structure before it appears visibly open. The galls are initially green (Fig. 13) but will turn brown and become more obvious in August and September (Fig. 14). They can remain on the tree for up to two years. Control can be difficult due to the mites ability to enter the flower structure before its fully open. This, combined with the fact that this event usually takes place in mid-late April before most people begin to think about pest management, often results in poor control. Best results are achieved if sprays are done 7 - 10 days before the flower bud is expected to open.

Psyllids or Jumping Plant Lice - hackberry nipple gall (Fig. 2) and hackberry blister gall (Fig. 3) are the most common psyllid-caused galls in Minnesota. These small insects spend the winter on hackberry or in other sheltered locations such as inside homes. In spring, when leaves appear, they begin feeding and produce galls. The larger nipple galls appear on the lower leaf surface (Fig. 2), while the smaller, more numerous blister galls appear on the upper leaf surface (Fig. 3). Because of their small size and ability to pass through most window screens, these insects often become a nuisance in the fall when seeking shelter in homes (see Extension publication Nuisance Invaders: Birch catkin feeders, Hackberry psyllids, and Western conifer seed bugs)

Aphids - many species of aphids occur on plants and some are capable of producing galls. The most common galls are the stem and petiole galls on poplar or cottonwood. An example is poplar petiole gall (Fig. 4).

Adelgids - these aphid-like insects are most prevalent on conifers with the eastern spruce gall (Fig. 7) and Cooley spruce gall (Figs. 8 & 9) being the most common adelgid-caused galls in Minnesota. Although alike in many ways, there are important differences between the two galls and their causal agents.

The eastern spruce gall occurs mainly on Norway and white spruce. This adelgid completes its entire life cycle on a single host. The 1/2 - 1 inch long green, pineapple-shaped galls are formed at the base of the new shoots (Fig. 7). Galls formed in this region can weaken stems making them susceptible to breakage under heavy snow loads or high winds. Tree health is affected only if galls are extremely abundant each year.

The Cooley spruce gall occurs primarily on Colorado blue spruce and white spruce in Minnesota. This adelgid usually requires two hosts to complete its life cycle: spruce and Douglas fir. After forming the gall on spruce, winged adelgids fly to Douglas fir in mid-late summer, lay eggs, and the resulting adelgids

feed and can produce yellow, twisted needles; no galls are produced on Douglas fir. A winged generation of adelgids is then produced on Douglas fir, which fly back to spruce in the fall and lay eggs that produce the overwintering population. These overwintering females then lay eggs in spring that produce the gall-forming adelgids.

The galls are 2 - 4 inches in length, cone-shaped, and initially green-purple (Fig. 8) changing to brown as they dry in mid-summer (Fig. 9). The most distinguishing feature between Cooley and eastern spruce gall (Fig. 7) is that Cooley spruce galls occur at the tips of the new growth (Fig. 9). Because of this, only in rare instances such as when young trees are repeatedly, heavily galled for several consecutive years will any damage take place.

**Gall Wasps** - these tiny wasps are the most common gall-producing insects with various species affecting leaves, stems, and twigs. They usually occur on oak and rose. Examples include jumping oak gall (Fig. 5), oak apple gall (Fig. 17), oak bullet gall (Fig. 10), and stem galls on rose (Fig. 11).

**Gall Midges** - these tiny mosquito-like insects are responsible for causing irregularly shaped structures usually on leaves and buds on a variety of plant species. Some of the more common midge-produced galls include willow pine cone gall (Fig. 15), gouty vein gall on maple, and grape filbert gall.

## **Galls and Plant Injury**

Galls are growing plant parts and require nutrients just like other plant parts. Its possible that galls steal vital plant food and adversely affect plant growth. This is most likely a problem when galls are numerous on very young plants. Injury may also occur if galls are numerous on branches or if abundant for several consecutive years. In most cases, however, galls are not abundant enough to harm the plant.

## **Management**

Most galls do not adversely affect plant health. Therefore, management is generally not suggested to protect plant vitality. Chemical applications are an option, but are often ineffective since the precise timing of sprays is critical. To be effective, sprays must be timed to coincide with initial insect/mite activity before gall formation begins. Once galls start to form, they conceal the causal organism and it is too late for treatment. For insects/mites that overwinter on the host plant, horticultural oil applications can be made before insect/mite activity begins in the spring.



**Figure 1: Maple bladder gall caused by an eriophyid mite.**



**Figure 2: Hackberry nipple gall caused by a psyllid.**



**Figure 3: Hackberry blister gall caused by a psyllid.**



**Figure 4: Poplar petiole gall caused by an aphid.**



**Figure 5: Jumping oak gall caused by a gall wasp.**



**Figure 6: Erineum gall on viburnum caused by an eriophyid mite.**



**Figure 7: Eastern spruce gall caused by an adelgid.**



**Figure 8: Early stage, Cooley spruce gall caused by an adelgid.**



**Figure 9: Cooley spruce gall caused by an adelgid.**



**Figure 10: Oak bullet gall caused by a gall wasp.**



**Figure 11: Stem gall on rose caused by a gall wasp.**



**Figure 12: Hackberry witches- broom gall caused by an eriophyid mite.**



**Figure 13: Ash flower gall caused by an eriophyid mite (Summer).**



**Figure 14: Ash flower gall caused by an eriophyid mite (Fall).**



**Figure 15: Willow pine cone gall caused by a midge.**



**Figure 16: Bud gall on birch caused by an eriophyid mite.**



**Figure 17: Oak Apple Gall**



**Figure 18: Spindle gall on *Prunus***

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