

INSECT GALLS on Trees and Shrubs

Introduction

Galls are distinctive swellings or abnormal growths of plant tissue caused by an attack of a living organism. Insects, mites, nematodes, bacteria, fungi, and viruses can trigger these plant deformities. Galls can also form as a result of mechanical injury. This publication deals only with tree and shrub galls caused by insects and mites.

There are hundreds of unique galls caused by insects and mites. They are formed on a variety of plants and in a broad range of sizes, shapes, colors, and textures. Galls may be found on leaves, stems, twigs, branches, trunks, and roots (Table 1).

The insects or mites that initiate gall formation are called gallmakers (Figure 1). The primary gallmakers are certain species of aphids, midges, mites, psyllids, or wasps. Galls result from an intricate interaction between the highly specialized gallmaker and a specific part of the host plant (tree or shrub). The resulting distortion is a distinctive gall that is different from galls caused by other species.

Galls form at the time of plant cell multiplication in meristematic (growing) tissue. Normal plant growth is abruptly changed and the unique, identifiable gall replaces the ordinary growth. Gall formation cannot take place after a leaf or stem has stopped growing.

Galls grow to surround the tiny insects and mites that form them, providing some protection from adverse weather, predators, and parasites. In addition, the gall is a ready source



Figure 1. Oak bullet gall wasp



Figure 2. Aphids inside petiole gall

of food for the gallmaker, rich in protein and carbohydrates (Figure 2).

The insect or mite develops and grows inside the gall during the summer and emerges as an adult either in the summer or the following spring. The galled tissue may remain on plants through the growing season or longer.

Damage

Despite their unsightly appearance, most insect galls do not seriously affect the health and vigor of healthy, well-established trees and shrubs. Leaf galls may be aesthetically displeasing but they do not directly harm the plant. Occasionally, a heavy gall infestation may cause premature leaf drop (Figure 3). However, these annoyances usually do not cause long-term damage to the tree. Twig galls may cause stem dieback that could bring about the demise of small trees.



Figure 3. Leaf drop from hickory petiole galls

Control of galls

Galls cannot be “cured” after they have formed and spraying the galls does not make them go away. On young trees, stem galls can be pruned out, but pruning is not practical on larger trees. Removal of leaf galls is not necessary.

Insecticides or miticides applied prior to gallmaker attack may prevent galls from forming, but effectiveness is not certain. The time to spray a contact insecticide to kill the gallmaker prior to attack is not known for most plants. Systemic insecticides would need to be applied 4 to 6 weeks before gallmakers are active in the spring and may not protect all vulnerable plant tissues. Unneeded treatments may adversely impact pollinators, natural enemies, and other beneficial insects.

Table 1. Descriptions of common galls and gallmarkers

Host	Gall		Gallmaker/description/location/nonchemical control
Ash	Ash flower gall		Mite. Round, swollen, distorted flowers of male trees. Green at first, then brown. Variable size.
Cottonwood	Leaf-petiole gall		Aphid. Also known as basal leaf gall and poplar stem gall. Smooth, spherical gall, 6-12 mm in diameter. At junction of leaf blade and petiole; transverse slit.
Cottonwood	Poplar petiole gall		Aphid. Also known as poplar leaf stem gall. Similar to leaf-petiole gall except on petiole near middle.
Grape	Grape phylloxera		Aphid. Small, irregular, wart-like gall, 2-3 mm in diameter. Upper and lower leaf surface. Destroys wild grapes in the area. Commercial grape cultivars are grafted onto resistant root-stocks, minimizing impact.
Hackberry	Hackberry nipple gall		Psyllid. Nipple-shaped, 4.5 mm in diameter. Lower leaf surface.
Hackberry	Witch's broom		Mite. Cluster of twigs on stem terminal.

Host	Gall		Gallmaker/description/location/nonchemical control
Hickory	Hickory petiole gall		Aphid. Large round swelling of petiole, 5-25 mm in diameter. Filled with aphids in spring; leaves turn brown in summer.
Honeysuckle	Witch's broom		Aphid. Cluster or tassel-like proliferation of twigs at the end of stems.
Maple	Maple bladder gall		Mite. Small red or black galls. Irregularly spherical, 2.5 mm in diameter. Common on silver maple and related cultivars.
Maple	Maple erineum gall		Mite. Bright red, glossy patches of tiny pustules that look like velvet on upper leaf surface.
Maple	Maple spindle gall		Mite. Slender, spindle-shaped leaf gall, 5 mm in length.
Maple	Gouty vein gall		Midge. Thickened, pouch-like swelling along leaf veins. Green or red.
Oak	Succulent oak gall		Wasp. Green succulent, globular leaf gall resembling a grape or gooseberry on pin oak. Hollow with loose kernel, 5-12 mm in diameter.

Host	Gall		Gallmaker/description/location/nonchemical control
Oak	Noxious oak gall (leaves)		Wasp. Irregular swollen mass starting at midvein but deforming entire leaf. Green and succulent at first, later shriveling and drying.
	Noxious oak gall (stems)		Also on twigs as irregular potato-shaped twig gall.
Oak	Jumping bullet gall		Wasp. Also known as jumping oak gall. Globose, thin-shelled, slightly pointed leaf gall on lower leaf surface. 1 mm in diameter. Blister above. Detached galls hop like a Mexican jumping bean.
Oak	Marginal fold gall		Midge. Folds or pockets in leaf margins.
Oak	Oak apples		Wasp. Globular. Hard outer shell, spongy interior with central hard kernel. On leaf vein, 2-5 cm in diameter.
Oak	Oak pill gall		Midge. Globose or subglobose, irregular, wrinkled leaf gall, 3-4 mm in diameter. Dark red. Usually on upper surface.
Oak	Vein pocket gall		Midge. Elongated, pocket-like swelling of leaf midrib.
Oak	Oak bullet gall		Wasp. Globular, hard single or clustered twig galls, 8-16 mm in diameter.

Host	Gall		Gallmaker/description/location/nonchemical control
Oak	Gouty oak gall		Wasp. Large, irregular, globose gall, clustered along twig, 3 cm in diameter, up to 10 cm in length.
Oak	Wool sower gall		Wasp. Globular, white woolly growth on stem marked with pink, seed-like grains, 3-4 cm in diameter.
Oak	Horned oak gall		Wasp. Globose twig gall; irregular, woody. Hornlike projections. Variable in size. May cause twig dieback. Prune to remove galls when green.
Rose	Mossy rose gall		Wasp. Mossy spheres along stems, 2.5 cm in diameter. Common on <i>R. rugosa</i> cultivars. Prune and destroy galls.
Rose	Spiny rose gall		Wasp. Globular, green or red, prickly twig galls, 5-15 mm in diameter. Usually clustered.
Willow	Willow pinecone gall		Midge. Rosette of tightly-clustered leaves resembling a pine cone, up to 2.5 cm in diameter.
Willow	Willow blister gall		Mite. Clustered, fuzzy, grayish-white and red leaf gall on upper and lower leaf surfaces, especially on pussy willow. Leaves may become curled and distorted.

Table 2. Insecticides and miticides labeled for preventive gall treatment

Ingredients	
The following active ingredients are labeled for one or more common tree and shrub gallmakers found in Iowa. None of these pesticides will control galls after they have formed. Carefully read and follow all label directions. Check the label to determine which insects or mites are controlled and which tree species can be treated. Proper timing of application is critical to prevent gall formation.	
azadirachtin	horticultural oil (dormant)
dimethoate	imidacloprid
dinotefuran	spinosad
emamectin benzoate	thiamethoxam

Image credits

Figure 1. Oak bullet gall wasp. Todd Voss, Iowa Department of Agriculture and Land Stewardship

Figure 2. Aphids inside petiole gall. Joe Boggs, Ohio State University Extension

Figure 3. Leaf drop from hickory petiole galls. Joe Boggs, Ohio State University Extension

Ash flower gall. Iowa State University Extension and Outreach

Cottonwood leaf-petiole gall. Simon Leather, Don't Forget the Roundabouts

Poplar petiole gall. Wooten's Landing Maryland Biodiversity Project

Grape phylloxera. Joe Boggs, Ohio State University Extension

Hackberry nipple gall. Lynn Schulte, Iowa State University Extension and Outreach

Hackberry witch's broom. William M. Ciesla, Forest Health Management International, www.Bugwood.org

Hickory petiole galls. Joe Boggs, Ohio State University Extension

Honeysuckle witch's broom. Whitney Cranshaw, Colorado State University, www.Bugwood.org

Maple bladder gall. Becky Shuck Tama

Maple erineum gall. Ronald S. Kelley, Vermont Department of Forests, Parks, and Recreation, www.Bugwood.org

Maple spindle gall. Lilysecret42, www.flickr.com

Gouty vein gall. E. Bradford Walker, Vermont Department of Forests, Parks, and Recreation, www.Bugwood.org

Succulent oak gall. M.J. Raupp, University of Maryland Extension

Noxious oak gall on leaves. Russell Labs, University of Wisconsin – Madison

Noxious oak gall on stems. University of Minnesota

Jumping bullet gall. The Georgia Gardener, www.WalterReeves.com

Marginal fold gall. Joe Boggs, Ohio State University Extension.

Oak apples. James Solomon, USDA Forest Service, www.Bugwood.org

Oak pill gall. Richard Orr, www.MarylandInsects.com

Vein pocket gall. Kansas State University Extension Entomology

Oak bullet gall. Todd Voss, Iowa Department of Agriculture and Land Stewardship

Gouty oak gall. New Hampshire Garden Solutions

Wool sower gall. Eric R. Day, Virginia Polytechnic Institute and State University, www.Bugwood.org

Horned oak gall. University of Kentucky

Mossy rose gall. Milan Zubrik, Forest Research Institute-Slovakia, www.Bugwood.org

Spiny rose gall. Paul and Bernice Noll

Willow pinecone gall. Laura Iles, Iowa State University

Willow blister gall. W.P. Armstrong, Palomar College

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