

Oak Tree Galls
by
Jim Gormely

When walking down a dusty dirt path as a kid, I would kick black balls that lay on the ground. Most of them would explode into powder. People told me they were poison, so I should leave them alone.

This spring my neighbor saw one of these balls as we walked our dogs. This one was tan in color. He said they were tree galls and, when decorated with art, they made good Christmas decorations.

A touch of curiosity lured me into exploring the unique architecture of tree galls; specifically, oak tree galls. I soon realized that in my own neighborhood, even in my own yard, was a science museum revealing the interaction between insects and plants. This was exciting because I had never before noticed these galls.

Gall formation begins when a very small (barely the size of a fruit fly) female gall wasp, in the family Cynipidae, injects her eggs into oak tissue in the fall. This becomes a nursery site for the offspring. As spring approaches, the eggs begin hatching, then hungry larvae begin feeding on the host tissue surrounding them. The plant's defense reaction is to isolate the toxins or activities of the invader in a tough, tumorous mass of tissue. Thus a gall is born. Larvae are clustered centrally in separate chambers in the tumorous tissue.

Earlier this year, the master gardener hot line received a high volume of calls reporting that oak twigs were dying and falling off the trees. It was determined that this phenomenon was caused by developing stem galls.

The galls I found first appeared on one side of the branch, were a bright lime-green in color and soon grew to the size of a ping pong ball. Galls increase quickly in size due to rapid cell division. A month later another small green growth developed on the other side of the branch. Soon this second growth was larger in size and tan in color; some round and some shaped more like a potato. The first ping pong ball-sized growth had now turned black. By this time I had experienced birth, infancy and childhood in this gall.

Other galls already passed through the teen years to mature adults. The larvae have matured into wasps which eat their way to freedom, leaving a small exit hole in the gall. The mature galls are gray or brown and eventually black in color. Some galls fall from the tree while others hang on for as much as three years.

The symbiotic relationship between the insect and the oak tree demonstrates a complicated yet interdependent existence that explains life on this planet. Every living organism in nature is dependent on another. Some galls secrete a honeydew substance that attracts ants, yellow jackets and bees. These insects in turn protect the larvae inside the gall from predators that harm the tree.

There have been many recorded uses of galls. Native Americans in California ground the galls into a powder used for making eyewash and treating cuts and burns. Galls have been used for hair restoration, medicine, dye for leather and wool, skin tattooing and supplemental livestock feed. Because of the lasting quality of the ink produced from oak galls, gall-based ink has been used for centuries. Monks used gall-based ink in the writing of manuscripts nearly 1000 years ago and gall-based ink became the preferred ink used by the US Treasury.

To the everyday observer galls may appear as growths that seem unattractive. However, the symbiotic relationship between the gall-maker organism and its host plant can produce

important results that may have valuable applications. New plants may be produced that are resistant to insects, viruses and herbicides. Galls have been studied extensively to determine if their rapid cell division can shed light on rapid tumor growth in animals and humans.

When I first researched galls, it was noted that not much was known about these strange growths. We can now better understand the interaction between insects and plants and marvel how nature has a way of providing protection for them.

Jim Gormely is a new master gardener, graduating from the UCCE Central Sierra training program in Tuolumne County in April 2012. He is fascinated by the interactions between insects and plants.