I swear (and else may insects prick | Each leaf) into a gall, | This girl, for whom your heart is sick | Is three times worth them all.

Tennyson 'The Talking Oak'

What are plant galls?

If you have ever looked at a tree and been puzzled to see that it seems to be producing more than one kind of fruit at the same time, you have probably seen a plant gall. Defined as 'an abnormal growth produced by a plant or other host under the influence of another organism' (*British Plant Galls)*, galls are the host plant's reaction to some kind of infestation, often caused by insects but also by fungi (especially rusts and smuts) as well as viruses or bacteria.

Where can galls be found?

Galls can be found on many types of plant including trees, shrubs and herbaceous plants. Once you start to notice them you will realise how many different types there are! Galls can form on buds, leaves, flowers, fruits, seeds, stems and roots. Some of the best known galls are Oak apples (on oak trees), Robin's pincushion (on Dog Rose) and Witches broom (on Silver Birch).

In the UK oak trees produce about 35 different types of gall. This is more than any other plant species. Willows are another species commonly affected by galls. Younger oaks at the edge of woods seem to host a large variety of galls compared to more mature trees in enclosed woodland. Galls can occur throughout the year but probably the best times to find freshly formed galls are during the spring and autumn.

Knopper galls on acorns

In most cases galls do no real harm to their host, but reproduction can be affected when fruits or seeds are galled.

Galls on Shotover

Anywhere the host plant is found can be a worthwhile place to look for galls, and a walk on Shotover is an ideal way to begin your search. The woodland edges, hedgerows and grasslands at Shotover are all worth investigating.

Galls formed by invertebrates

Many invertebrates can cause gall formation. These include aphids, mites, psyllids, gall-midges (Cecidomyiidae), gall-flies (Tephritidae), sawflies (Symphyta) and especially gall-wasps (Cynipidae), as well as a wide range of other invertebrates.

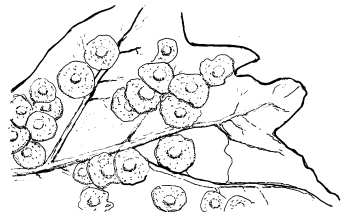
The galls provide shelter and food for the invading organism, generally during their stages as eggs or larvae before they emerge as adults. When the female lays her eggs in the growing tissue of the host plant, she also leaves a substance similar to the plant's own growth hormones. This causes the plant's surrounding cells to grow and develop in a particular way, producing a protective chamber for the developing young.

Galls on oaks on Shotover

English Oak (*Quercus robur)*, Sessile Oak (*Q. petraea*) and Turkey Oak (*Q. cerris)* act as hosts to many galls. Almost all are caused by gall wasps (Hymenoptera, Cynipidae), tiny insects which look quite different to the well-known yellow-striped variety which plagues picnics. Many have alternating sexual (♀♂) and asexual parthenogenetic (all female: ♀♀) generations which cause different galls at different times of the year.

Many galls forming on buds completely obliterate them, appearing to sit directly on the twig.

Currant gall (♀♂). Red currant-like galls on male oak catkins and on the underside of leaves during spring are caused by the wasp *Neuroterus quercusbaccarum*. Both male and female winged adults emerge from these and mate,



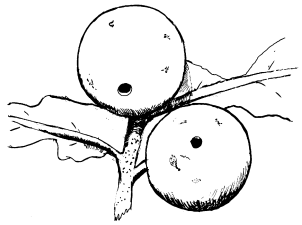
Spangle gall

the female then lays eggs on the underside of oak leaves which cause the formation of small disc-like **Common spangle galls** (♀♀), in late summer and autumn.

Silk-button gall (♀♀) is a small 'disc' with a thickened rim and central pit, covered with yellow hairs on the underside of the leaves in late summer and autumn. It is caused by the gall wasp *Neuroterus numismalis.*

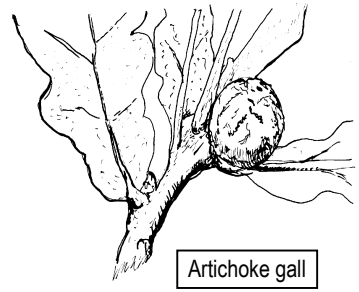
Cola nut gall (♀♀). This is a very hard, spherical gall (5mm across) often with a scaly surface on the buds. Green initially, it darkens with age and can last for many years. It is caused by the gall wasp *Andricus lignicola.*

Marble gall (♀♀). This smooth, spherical gall (10mm) is found on the developing bud. It is bright green in spring, then hardens and turns brown with maturity. It is caused by the gall wasp *Andricus kollari.*



Marble gall

Oak apple gall (♀♂).This is a large (45mm) spongy gall forming in spring on a developing bud. It is cream, tinged with pink and green at first then turning brown and papery. It has numerous chambers inside, each containing larva of the gall wasp *Biorhiza pallid*.



Artichoke gall

Artichoke gall (♀♀). This is caused by the gall wasp *Andricus fecundator* and looks like a small artichoke, covered with bud scales.

Cherry gall (♀♀). This spherical gall (10-20mm) is smooth on English Oak and warty on Sessile Oak. Found on the underside of leaves, it is reddish-green at first, turning brown when mature and is caused by the wasp *Cynips quercusfolii*.

Hedgehog gall (♀♀). As the name suggests, this is a spiny ball (5-20 mm) that forms on buds (or rarely on the edge of the acorn cup). Reddish at first, it turns green, darkening to brown and becoming woody with maturity. It is caused by the gall wasp *Andricus lucidus*.

Knopper gall (♀♀) is a ridged, multi-faceted gall forming on the acorn cup. Green and sticky when fresh, it darkens to brown as it matures. It is caused by the gall wasp *Andricus quercuscalicis.*

Galls on other trees and plants on Shotover

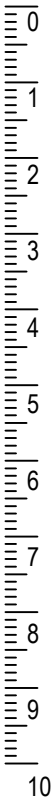
Robin's pin cushion or **Bedeguar gall** (see cover). This spectacular gall develops on Dog Rose (*Rosa canina)* from a leaf or flower bud. Up to 6cm across, it is covered with a mass of long, wiry, reddish-green hairs and is caused by the gall wasp *Diplolepis rosae*.

Stem gall. Found on Creeping Thistle (*Cirsium arvense),* the green fleshy swelling of the thistle stem turns hard and woody later in the season. It is caused by the picture-wing fly *Urophora cardui*. Swollen stems contain one or more chambers each occupied by a larva.

Witches broom. Silver Birch (*Betula pendula)* is the host tree of this tight broom-like mass of short rigid dark shoots. It is caused by the fungus *Taphrina betulina.*

Red bean gall. Found on willow (*Salix* spp.), this red bean-shaped gall protrudes through the leaf surface and is caused by the sawfly *Pontania proxima.*

Two **fungal galls** found in 2008 on the plant Moschatel (*Adoxa moschatellina)* cause leaf and stem distortions. The rust *Puccinia adoxae* causes chocolate brown spore cases to form, whilst those caused by *Puccinia albescens* are whitish yellow.



Galls Galore

There are so many galls to be found on Shotover that space precludes a complete list. They are a fascinating aspect of wildlife in the reserve and we hope you enjoy seeking them out! Please let us know if you find anything you suspect may be an interesting gall.

Further reading

Redfern M. & Shirley P. (2002) *British Plant Galls – Identification of Galls on Plants and Fungi* Field Studies Council. This is a comprehensive key to galls found in the UK.

The British Plant Gall Society:
www.british-galls.org.uk

Many photos of oak galls can be found at
http://www.hainaultforest.co.uk/3Oak%20galls.htm.uk

Shotover Wildlife is an independent voluntary organisation founded to research and communicate the importance of Shotover Hill for wildlife

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Related leaflet titles:

Woodland Flowers	Trees
Heathland Flowers	Habitats

Cover picture: Robin's pincushion gall on Dog Rose.

Leaflet written by Roger Parker, Lawrence Bee and Rachel Locklin. Illustrated by John-the-Pen.

PLANT GALLS on SHOTOVER

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Shotover Wildlife