

The gall of it!

Galls, which can range from the delicately beautiful to hideously unattractive bulbous growths, are among Nature's most intriguing phenomena, discovers Deborah Nicholls-Lee

SOME are pinned to leaves like delicate jewel brooches, whereas others are disfiguring bulbous growths that squat on plants like alien invaders. Galls—abnormal growths on plants and trees caused by parasitic organisms—are among the most intriguing of Nature's creations and can be both beautiful and horrifying. The charming cherry gall, for example, adorns oak leaves with delicately speckled red baubles and the unseemly horned oak gall wraps itself around branches like the clawed toes of a hideous monster. All capture the imagination and all are formed from the plant's own tissue, altered by physical injury or alchemised by chemical secretions.

The most common culprits are invertebrates: often tiny gall wasps, less than half an inch in length, or flies, mites and aphids. As aphids nibble plants, chemicals in their saliva induce the formation of galls, creating pop-up furniture among which they can feed and reproduce. For other invertebrates, such as wasps, laying their eggs on a plant stimulates the growth of a gall, which cocoons the larvae in a protective and edible nursery, rather like a chick within an egg.

Due to the range of insects engaging with it, and the many different places on a plant that a gall can form (leaves, catkins, buds, acorns or roots, each with a differing result), a single species of plant can yield an abundant variety of galls. In the UK, about 70 different gall wasps interact with oak, for example, creating an entire curiosity cabinet of galls with evocative names, such as the artichoke, the marble and the silk button.

The ecologist and Nature photographer Alan Watson Featherstone (founder of the rewilding charity Trees For Life) has spied many extraordinary galls in the Caledonian Forest in north-east Scotland, where he lives. 'The most interesting gall for me is the robin's pincushion gall,' he says; he occasionally cuts them open to photograph the larvae inside. Induced by a wasp (*Diplolepis rosae*)



Packed lunch: the larva of the oak marble gall wasp will feast on its surroundings

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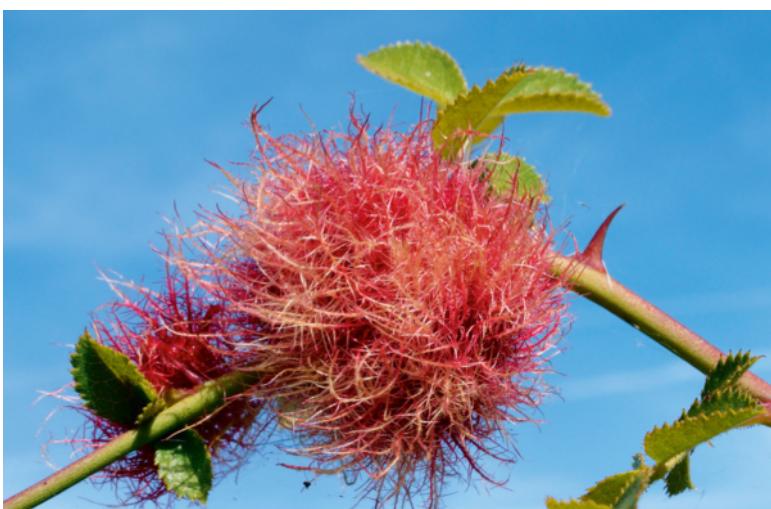
on dog rose (*Rosa canina*), 'it manifests either as an individual gall, with narrow bright red spikes to it, or as a cluster of up to 60 galls grouped together'. These prickly forms can be an arena for a deadly battle of the bugs. Fourteen different insects have been recorded emerging from them, notes Mr Featherstone, including 'various parasitoids and hyper-parasitoids, which feed on and kill the larva of the inducing wasp, or a larva of another wasp that has parasitised it'.

Occasionally, galls emit a slight whiff that hints at these tenants within. Some oak galls, for example, have a somewhat 'bug-like' odour that emanates from their occupiers and helps deter predators, according to Edward T. Connold's *British Oak Galls* (1908). Other researchers quoted in the book describe the aroma in more sommelier-like terms, claiming that it evokes ripe apples, caramel, lemon or malt.

Whatever the smell, the flavour is rather hit and miss. High in tannic acid, most galls cause a nasty tummy ache. One exception is the fragrant apple-like gall of the apple sage (*Salvia pomifera*), which some consider a delicacy when preserved in sugar. Intrepid researchers who have taste tested oak galls have found huge variations according to species. The rind of the barnacle gall, reports Connold, is 'slightly sweet', for example, and the common spangle gall, when formed on catkins, is described as 'soft and very juicy', although the larva inside is 'slightly acidic in taste'.

Fungi can also induce galls, but, in the UK, they are mostly inedible. They do play an interesting role in our ecosystem, however, enabling the fungus, explains Mr Featherstone, 'to live in a substrate in which it would otherwise not be able to thrive'. One example is the scruffy witch's broom fungus, which resembles a bird's nest. 'Those galls persist for years, enabling the fungus to live much longer,' he notes. 'Additionally, because the witch's broom gall often appears high up on a birch tree, it provides more exposure to air currents and the wind, which can help by transporting the fungus's spores over a significantly greater distance.'

Facing page, clockwise, from top left: Rogue's gall-ery: spangle galls on an oak leaf; a thistle gall; young midge galls; oak apple and cherry galls; silk buttons; alder tongue galls on an alder catkin; poplar spirals; a robin's pincushion; lime nail galls





Left: Woolly thistle is the host plant for this female gall fly's larvae. Right: An earwig explores an oak knopper gall enveloping an acorn

In times past, the unfathomable origin of these bizarre protuberances spawned various supernatural explanations, as suggested by their names. Robin's pincushion galls were attributed to the mischievous woodland sprite Robin Goodfellow (better known as Shakespeare's Puck; *'The oldest Old Thing in England'*, June 19, 2024), and the appearance of witch's broom gall in a treetop was thought to be a sign that a witch had recently flown over it. In the Middle Ages, galls were even used to tell the future, as explained by Lucy Clausen in 1954's *Insect Fact and Folklore*. 'The gall, upon being opened, was supposed to contain a maggot, a fly, or a spider,' she writes. 'If it was a maggot, it betokened that the coming year would bring famine; if a fly, it forecast war; and if a spider, pestilence.' Later, a worm came to denote 'plenty,' she explains. It's arguable that it was the most nourishing of the three options.

Even more mysterious, perhaps, are the viruses and bacteria that can also cause galls, which are often harder to determine. Although they disfigure the plant, they are not entirely bad news. The bacteria *Rhizobium*, for example, which causes knobby growths on the roots and stems of some legumes, converts nitrogen in the air into ammonia that feeds the host plant.

In fact, the biggest misunderstanding about galls, asserts Mr Featherstone, is that they harm their host. 'That would not serve the purpose of the gall-inducing organism at all as it needs its host plant to stay healthy, so that it can continue to feed off it,' he stresses. 'I often think of it as being a bit like a wart on my hand: apart from being visually unattractive, it doesn't really cause me any adverse effects.'

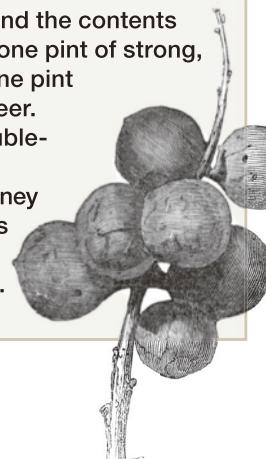
J. Austen

A use universally acknowledged

Jane Austen's friend Martha Lloyd (who married her brother, Frank, and went on to become Lady Austen) kept a well-thumbed *Household Book* of recipes and remedies shared by family and friends. The recipe for iron gall ink below is based on the one in the book and believed to be used by Austen to write her novels. Although her sister-in-law used ferrous sulphate crystals to initiate the reaction with the tannins in the gall, many people simply dropped a rusty nail into the solution instead. Whatever Austen used, it worked: this year marks the 250th anniversary of her birth and her immaculately inked manuscripts are still beautifully legible.

Method

- Crush 4oz blue galls.
- Beat 1½oz gum arabic and 2oz green Copperas (hydrated ferrous sulphate) in a mortar.
- Add the galls and the contents of the mortar to one pint of strong, stale beer and one pint of low-alcohol beer.
- Add a little double-refined sugar.
- Stand in a chimney corner for 14 days and shake two to three times a day.



Someone should have told all this to Shakespeare, who repeatedly makes the gall a symbol of malevolence. Love in *Romeo and Juliet* is described as 'a choking gall and a preserving sweet', for example. In *Hamlet*, Laertes warns Ophelia of innocence's susceptibility to corruption, asserting that 'the canker galls the infants of the spring'.

In fact, despite their negative connotations in literature, galls are actually miniature pharmacies that supposedly offer centuries-old remedies for everything from rabies to hair loss, as recorded in the writings of Pliny the Elder and supported by the discovery in 1961 at the foot of Mount Vesuvius in Italy of a clay *dolia* containing almost 3,000 medicinal galls, thought to date back to a volcanic eruption in AD79. A recent study focused on oak galls, undertaken at the University of Medicine and Pharmacy in Cluj-Napoca, Romania, appears to confirm their healing properties, noting 'the strong antioxidant capacity and anti-inflammatory effects and antibacterial, antifungal, antimalarial and antitumor activities of oak gall extracts, as well as the anti-ageing skin properties'.

Not only has the gall helped ensure our continuation, it has also charted our history with its juices. The Magna Carta, which laid the foundations for a democratic Britain, and the US Declaration of Independence of 1776, which sent us packing, were both written in ink created from the oak gall's rich tannins. Despite his disparaging use of galls in his literary metaphors, Shakespeare still used its ink to pen his famous works. Even Will's will was written in gall ink. 'I gyve vnto my wief my second best bed with the furniture,' he wrote. A lack-lustre legacy that any modern wife would find most galling. 