

Toxic Honey. by Brian P. Dennis

Although honey is promoted as a pure, natural, health giving food, there are rare occasions when honey can be harmful.

The spores of the *Clostridium botulinum* bacteria can be found in honey and when ingested can release a toxin that causes botulism, a rare but potentially fatal infection. Infants under 12 months have an undeveloped digestive system & cannot deal with the spores. The spores are in the environment [e.g. in the soil] and may be picked up by bees. A Canadian survey found low numbers of spores in <5% of honey samples. There have been 16 cases of infant botulism since 1979, 3 associated with honey. A US study isolated spores from 10% of shop bought honeys. Less than 5% of infant botulism cases were associated with honey. In the UK, there have been 11 confirmed cases of infant botulism in the last 30 years; the last 3 cases had possible links with honey (*BBC News Health* 3 June 2010). Although the risk is minimal, some beekeepers label their honey: *Unsuitable for infants under 12 months*. It is safe for children over 1 year of age.

According to Xenophon, soldiers returning to Greece from a campaign in the Persian Empire (the retreat of the Ten Thousand) in 400 BC came across some hives & ate the honey from them. The soldiers were inflicted with vomiting and purging and lost their senses. This happened in what is now Turkey. A later reference indicates that the honey of that region was also used against soldiers of the Roman army under General Pompey. In 67 BC, Roman soldiers invaded the Black Sea region. Those loyal to King Mithridates left jars of honey along the roadside as a "tribute" to the advancing army. The soldiers who ate the honey lost their senses and were easily slain. The source of this toxic honey was probably *Rhododendron ponticum*. Mithridates was an expert on poisons and lived in such fear that he inured himself by taking small doses of several poisons regularly, a practice now known as 'mithridatism' (Dorian Pritchard – *Inspired by Bees* [*Bee Craft* September 2015].)

In modern times, it is possible to buy *deli bal* ('crazy babe') or 'mad honey' in the towns around the mountains of the Black Sea coast in Turkey. It is a mono-crop honey produced from the spring flowers of the *Rhododendron ponticum*. The nectar contains the glycoside (or grayanotoxin) *andromedotoxin*, a neurotoxin, a substance that can cause all sorts of weird effects in humans. Consuming small quantities brings on light-headedness and, sometimes, hallucinations. Larger quantities can cause low blood pressure & heartbeat irregularities that bring on nausea, numbness, blurred vision, fainting, potent hallucinations, seizures and even death. Cases of 'mad honey' occur every few years, usually in travellers to Turkey. When bees produce honey from *R. ponticum*, no other nectars are collected making *deli bal* potent.

Although *deli bal* honey makes up only a small percentage of the Black Sea's honey production, many Turkish people believe that it is a medicine and use it to treat hypertension, diabetes & stomach diseases. Some believe it improves their sexual performance! The honey is not spread on toast or stirred into tea but is consumed in small amounts, sometimes in boiled milk, typically just before breakfast.

There are several references to poisoning associated with toxic honeys. For example, it was reported that an American beekeeper became violently ill after consuming honey from his hives and was hospitalized for several days. The honey was found to contain two

grayanotoxins & the source was thought to be *Kalmia latifolia*, the mountain laurel, calico bush or spoon wood (the state flower of Connecticut & Pennsylvania). This type of toxic honey is not common but is reported about every 20-30 years.

Other plants considered to produce toxic honeys in America include *Gelsemium sempervirens*, yellow jessamine & *Hyoscyamus muticus*, Egyptian henbane. Ragwort honey from the nectar of *Jacobaea vulgaris* (syn. *Senecio jacobaea*), ragwort, has been found to contain small quantities of pyrrolizidine alkaloids, but the quantities have been judged as too minute to be of concern.

In New Zealand, it is reported that anyone who eats honey made from the nectar of *Melicope temata*, the wharangi bush plant, can die quickly. *Nerium oleander*, oleander, is believed to be one of the most poisonous plants known. Eating honey made from the nectar causes, vomiting, abdominal pain, diarrhoea, seizures & even coma. *Adromeda*, bog rosemary, contains a grayanotoxin which causes humans, who eat honey made from its nectar, to become paralyzed in their limbs and then the diaphragm, constricting breathing, which leads to death. Honeydew honey containing the poisons tutin & hyenanchin can be produced by bees feeding on honeydew produced by sap sucking passion vine leaf hoppers, *Scolytopa australis*, feeding on *Coriaria arborea*, the tutu bush. However, the last recorded deaths from eating honey containing tutin were in the 1890s, although sporadic outbreaks of toxic honey poisoning continue to occur. Poisoning symptoms include delirium, vomiting, and coma. [<http://healthmad.com/nutrition/honey-are-you-toxic>]

In the UK poisonous honey is almost unknown, although there have been one or two instances where rhododendron may have been responsible for toxic honey. For example, there is a recorded case of boys who had robbed a bumble bees' nest suffering from vomiting, purging and abdominal pains (*Scottish Beekeeper* Feb.-March 1942). Bumble bees have longer tongues and are better able to obtain rhododendron nectar.

Plants producing toxic nectars do not occur in profusion in the UK. The main sources of unpalatable honey are ragwort & privet. Privet hedges are usually trimmed and do not produce flowers – overgrown & neglected privet hedges produce an abundance of blossom rich in nectar. Fortunately neither grows in abundance and they are not considered to be a problem. Both flower late in the season, usually after the honey crop has been removed, and are used as winter feed. Both resulting honeys are said to be strongly flavoured and bitter

Bees can also suffer ill effects from the nectar of some plants. The nectar from buckeye trees or shrubs, *Aesculus* (closely related to the horse chestnut), in southern America affects the brood & young bees. Loco weed, *Astragalus spp.*, is held responsible for poisoning adult bees in North America. Some European conifer honeydew is believed to be a cause of bee paralysis. In this country, the nectar of some limes (lindens), in some seasons, appears to cause bee deaths (both honey and bumble bees):

- *Tilia euchlora*, Caucasian lime, is thought to be a narcotic, inducing a state of sleep or drowsiness.
- *Tilia tomentosa*, silver lime, is especially toxic for bumblebees, but apparently not so toxic for honeybees.
- *Tilia dasystyla* & *Tilia orbicularis* are considered toxic to bees.
- *Tilia oliveri*, Chinese Lime, is toxic for bees

[<http://www.buzzaboutbees.net/Which-Lime-Trees-Are-Toxic-For-Bees.html>]

It has been suggested that the cause of bee deaths is related to the presence of the sugar mannose in lime tree nectar, which bees are unable to digest. However, there are conflicting reports e.g.

A widespread belief is that the nectar of this species (*T. tomentosa*) contains (the sugar) mannose, which can be toxic to some bees. This is incorrect; the sight of numerous comatose bees found on the ground at flowering time is rather a result of the paucity of nectar sources in late summer in urban areas.

The Foraging Behaviour of Honeybees and Bumblebees on Late Blooming Lime Trees:
Ingrid Illies (2007).

The metabolism of mannose was studied in the bee for which this sugar is toxic...

Mannose metabolism: a comparison ... E. Van Handel:
Comparative Biochemistry and Physiology Jan. 1971.

Papaver somniferous, the opium poppy, may also have a stupefying effect on bees.

[*Plants and Beekeeping – F.N. Howes*]

A recent report (2014) states that flowers like lupins and rhododendrons produce chemicals as a means of defence against herbivorous insects such as aphids. They can accumulate in the pollen and nectar. Rhododendron nectar is toxic to bees because of the diterpenoid content. Bumble bees that visit lupins produce fewer offspring owing to the presence of lupanine.

Brian P. Dennis 2015

This article has been printed off Dave Cushman's website. <http://www.dave-cushman.net/>