

The Liquidambar Kaleido

Displaying a range of foliage colour, a single liquidambar is one of those eye-catching trees that show-cases the many shades of autumn in its leaves. Gareth Evans describes the history and importance of this garden beauty, with its kaleidoscope of colour.

This story begins at the time of the Spanish colonies in Central America when the natural products of these new territories were being examined for trade and medicine. Francisco Hernández (1514-1587) led a remarkable seven-year expedition in what we now know as Mexico. With single-minded thoroughness he collected specimens of medicinal plants and, through translators, discovered the uses the native peoples put them to.

The Western discoveries of pineapple, cocoa, maize and passion fruit are sometimes claimed for this expedition. Like these, another new species was to adopt the name of its product, a sweet-smelling dried resin that Hernández christened liquidambar – a descriptive name of the resin’s appearance, and possibly its aroma too (page 18). The tree was discovered in the eastern cloud forests of Mexico where large quantities of resin were gathered for tribute to the dominant Aztecs, along with the multi-coloured feathers of the forest bird quetzal. The Aztec found the feathers valuable for decorating their head-dresses, the liquidambar for medicine and incense. At the first meeting with the conquistador Cortés, Montezuma reportedly smoked liquidambar from gilded tubes with ‘herbs they call tabaco’ and fell asleep.

Fragrant foliage

Commercial tobacco can still be scented with the resin. You have only to crumple a fresh leaf to detect



Credit: Gareth Evans

how fragrant a tree it is, the released aroma being compared to that of fine lemon soap. The sweet resin extracted from the wounded bark became an item of trade, a distilled oil was also produced. Hernández’ ethnographical manuscripts record that the resin was being used for inducing sleep and easing headaches – ‘mixed with tobacco it strengthened the head, stomach and heart’. Both the resin and oil were also used internally to increase the strength of the stomach and uterus.

In 1569 the untravelling physician Nicolás Monardes (1493-1588) published in Seville a description of New World novelties. Within eight years the book was translated into English entitled so that it would sell itself, *Joyfull News out of the New Found World*. Not surprisingly the translator, John Frampton, was a merchant and among the newly discovered remedies he promoted were tobacco and chocolate. Frampton describes the extensive Spanish trade in liquidambar (translated as Liquid Amber) resin as already flourishing.

“There is brought much quantitle of Liquid Amber to Spaine ... to perfume in thinges of sweet smelles.” A significant parallel trade was reported in a lower grade oil to fragrance gloves for the ‘common people’.

A century later the Spanish writer Cervantes had his credulous knight Don Quixote believe that his current object of infatuation could only smell of ámbar

líquido. Although the strength of the resin’s aroma was such ‘that wheresoever it be, it cannot be hidden’, Monardes considered the resin primarily as a medicine and its use as a fragrance a waste. Monardes extols an extravagant medicinal dressing, or plaster, that ‘dooth dissolve windes’; a breastplate-shaped skin is spread with liquidambar, storax (from *Liquidambar orientalis* possibly), amber (ambergris) and musk and applied to the torso.

In contrast to its patchy distribution in Central America the species grows continuously throughout the south east of the United States, specimens reaching their highest extent (about 50m) in the warmer south. In the 1770s William Bartram explored the largely unviolated hinterland of Florida, Louisiana and Carolina describing grand forests made up of ‘trees of the first order and magnitude’ such as *Magnolia grandiflora*, *Liriodendron tulipifera* (the tulip tree), Western plane and the liquidambar tree.

Garden interest

Native Americans and early settlers found ‘this gumm ... as healing as [any]. It is likewise a most Agreeable perfume, very little inferior to Ambergris’. Recorded treatments include for herpes, inflammation, fever, and wound healing among others. British explorer Mark Catesby, found the natives ‘esteeming it a preservative of their teeth’ – sweet gum being the American name for both the resin and tree today.

Meet the Liquidambars

Liquidambar and maple foliage can be easily confused for each other. Other than by the fragrance of the leaves you know when you are in the presence of a liquidambar tree when the leaves lie alternately on the branch rather than opposite one another, as on a maple. ‘Worplesdon’ is a popular garden cultivar, however there currently are over 100 listed. The National Collections of Liquidambar are to be found at West Ham Park, Forest Gate, London, and at Birchfleet Nurseries, Petersfield, Hampshire (check for open days on Plant Heritage website, www.nccpg.com).

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Far left: Autumn leaves of *Liquidambar styraciflua*.

Left: Mixed American and Levant liquidambar resin with gum benzoin – a sort of solid Friar's Balsam.

Above: A selection of products made by an Italian natural cosmetic company, L'Erbolario. The products contain liquidambar extract.

These travellers' tales were to encourage further exploration, colonisation and trade but did not predict one enterprise – the developing British interest in gardening.

During the 17th century wealthy and well-connected individuals gained precious specimens of liquidambar trees for their gardens. However it took the effort of two botanical gardeners to help establish the tree more generally. One was the London cloth merchant Peter Collinson; a close correspondent of Swedish botanist Linnaeus who had established *Liquidambar* as a genus name in 1753. The other was William Bartram's father, botanist and *in situ* plant explorer John Bartram (*Herbs*, Vol. 24 no. 3), who at his Philadelphia farm and nursery produced quantities of viable seeds for his overseas clients. The success of their enterprise can be credited to a mixture of organisation and what might be called Quaker conscientiousness. Referring to the resin Collinson wrote 'I thank thee for the Sweet Gum, or Liquidambar as we call it' to acknowledge an aromatic parcel from Bartram. Though it had been once popular, the resin had become rare in London shops by the 1750s.

True to its prolific self-seeding in its native habitat, one batch of Bartram's liquidambar seeds germinated particularly well in Collinson's English garden. 'There are thousands of the Sweet Gum', he complained. This latent vigour is no surprise. Although not half as ancient as that other medicinal tree, the ginkgo,

liquidambar has also been dubbed a living fossil. In a species range that once stretched across what we know as North America and Eurasia, fossil records indicate an age of approximately 50million years. So we have the claim that the most ancient fossilised tree resin so far determined is liquidambar amber. The American species (*Liquidambar styraciflua*) is the most extensive remnant of the primeval distribution. Of the three other species one is confined to SW Turkey (*L. orientalis*) and two to parts of the Far East.

Resins

The resins extracted from these are rich in essential oils, which exhibit their complex chemistry and therapeutic properties. Categorized as oleo-resins they are stored in channels throughout the tree, potentially protecting it from bacterial infection after injury. Biochemists have pointed out the leaf resin has a similar general composition to tea tree essential oil (*Melaleuca alternifolia*), well-known for its speedy and wide-ranging cull of bacteria. Used for inhalation, skin healing and antiseptis, commercial Friars' Balsam contains purified liquidambar (prepared storax) along with gum benzoin from the tree *Styrax benzoin*.

It is tempting to think of the kaleidoscopic appearance of the autumn tree as mirroring its diverse chemical composition. Aromatic compounds for the fragrance industry are found in the resin.

Friars' Balsam

The simplest formulation of Friars' Balsam (compound tincture of benzoin) consists of equal weights of storax (liquidambar resin) and gum benzoin in alcohol: crush ingredients if necessary then mix, macerate for 7 days and filter (for ingredients try a natural product supplier such as G Baldwin & Company, Walworth Road London).

This beautifully elaborate version of Friars' Balsam, from David Hoffman's *Medical Herbalism* 2003, is almost worth having a cold for:

| | |
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| Siam benzoin resin (<i>Styrax tonkinensis</i>) | ...47% |
| Storax (<i>Liquidambar orientalis</i>) | ...17% |
| Balsam of Tolu (<i>Myroxylon balsamum</i> var. <i>palsamum</i>) | ...17% |
| Balsam of Peru (<i>Myroxylon balsamum</i> var. <i>pereirae</i>) | ...9% |
| Aloe leaf latex (<i>Aloe vera</i>) | ...4% |
| Myrrh tears (<i>Commiphora molmol</i>) | ...4% |
| Angelica root (<i>Angelica archangelica</i>) | ...2% |



Liquidambar in fruit with anole lizard from Catesby's book of 1754.

Styrene was first isolated from, and named after, the resin from *L. orientalis*; expanded polystyrene is a ubiquitous but, for some, a banefully squeaky product. The fruits (which are not generally produced on UK-grown trees) were suggested as an alternative to star anise as the precursor of Tamiflu during the bird flu outbreak in the 1990s. Regardless of chemistry, the lingering fragrance will always be appreciated; as the poet Pope said of its mooted namesake, 'Praise is like ambergris; a little whiff of it ... is very agreeable'.

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founde worlde, wherein is declared the rare and singular vertues of diuerse and sundrie hearbes, trees, oyles, plantes, and stones, with their applications, as well for phisicke as chirurgerie. Translated by John Frampton. London 1577.

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'Dictionary Corner': liquid amber, fluid words.

The genus name *Liquidambar* is derived from the combination of the Latin terms for liquid (*liquidus*) and amber (*ambar*). Here amber is routinely interpreted as fossilised resin, but the meaning of this word has changed over time leading some authors to suggest another plausible derivation. Found floating on the ocean surface or washed up on beaches ambergris is a pathological intestinal exudation of the sperm whale. It was a prized fragrance fixative, and still thought so by some. *The Oxford English Dictionary* states that amber originally described this animal product; it is only after it started to be applied to the fossilised resin that the term ambergris (grey amber) appears.

The species name *styraciflua* translates as 'flowing with styrax'; a fragrant resin described by Ancient Greek and Roman writers. This may have been imported from the Near East where it is sourced from *Styrax officinalis*, or alternatively from the Anatolian species *L. orientalis*. *Storax* was a mediaeval English term for the resin of the former tree, however later traders and chemists used it for resin from the latter. This term has now replaced liquidambar to refer to the resin; American and Levant storax are applied to the resin of *L. styraciflua* and *L. orientalis* respectively.

Gareth Evans would like to thank the staff of the Library of the National Maritime Museum, Greenwich. Gareth Evans is a freelance writer and researcher specialising in the history of botany and medicine and is a regular contributor to *Herbs* magazine. He has worked in and with botanic gardens for 16 years, and was a co-ordinator for the Welsh programme 'Plants & Medicine' of the Smithsonian Folklife Festival 2009, Washington DC.