Observatree
monitoring tree health

www.observatree.org.uk

'**Host of the month**' is a series of information sheets and blogs that highlight a tree host and their associated priority pests and diseases that are best seen and recorded in that month. For May we're looking at true cedars (*Cedrus* species) and *Sirococcus* blight.

True cedars belong to the Genus *Cedrus* within the *Pinaceae* family alongside Pines (*Pinus*), Firs (*Abies*), Spruce (*Picea*) and Larch (*Larix*) among others. Four species are currently recognised: Cedar of Lebanon (*C. libani*), Atlas cedar (*C. atlantica*), Cyprus cedar (*C. brevifolia*) and Deodar (*C. deodara*). The first three are Mediterranean and closely related, Deodar however hails from the Himalayas. Lebanon, Atlas and Deodar cedars are reasonably common across the UK. Atlas and Lebanon in particular were extremely popular specimen trees in the grounds of stately homes and parks where older individuals display their distinctive layered appearance.

Figure 1: Atlas cedar. Bodnant Garden, North Wales.

Cedar of Lebanon and Deodar have deep connections with myth and legend. The titular hero of the Epic of Gilgamesh travels to the sacred cedar forest to kill its guardian and cut down the trees. In the Bible Cedar of Lebanon provided the timber for Solomon's temple and Moses suggested the use of its bark to cure leprosy. Farther east Deodar features in a Hindu legend where Bhikshatana (an aspect of Shiva) visited a cedar forest to lead the Sages living there to true knowledge, seducing their wives along the way. Incidentally Deodar literally means 'wood of the Gods' in Sanskrit

True cedars have durable and highly aromatic wood which made them popular in construction, particularly in religious buildings and furniture making, for at least five millennia. Unfortunately this popularity led to once vast forests being reduced to the remnant stands we see today. Against this background Cedar of Lebanon may have been the first tree to benefit from conservation action when it received special protection by order of the

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Roman Emperor Hadrian. Both Cedar of Lebanon and Cyprus cedar are classified as Vulnerable by the IUCN, Atlas cedar as endangered, and Deodar as 'Least concern'.

True cedars are relatively straightforward to tell from other *Pinaceae*, all are evergreen with stiff needles that have a quadrangular cross-section arranged in two ways; spiralling and single on long terminal shoots, and in whorls of 20+ on short lateral shoots (fig. 2). Larches (*Larix* species) have the same needle arrangement, but they are deciduous, the needles are soft and flat in cross-section, and their cones are smaller and don't shatter at maturity but remain intact and are retained on the tree for a number of years.

Figure 2: Cedar of Lebanon showing needles attached singly on young shoots and arranged in whorls on short older shoots.

Male cones are produced in the autumn (fig. 3) and fall from the tree once pollen has been dispersed, often littering the ground beneath trees. The barrel-like female cones are always upright on the branches (fig. 3) and rarely fall to the ground intact, breaking apart in situ to release the winged seeds (fig. 4).

***Figure 3**:* Male cones of Deodar (left) and immature female cone of Atlas cedar (right).

Figure 4: Shattered ripe cone of Atlas cedar (left) and cone scale of Deodar with winged seed (right).

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Outside of their native ranges telling the three commonly found species apart is not straight forward. The well-used assertion that 'Atlas ascends, Lebanon is level and Deodar droops' refers to the tips of young branches and gives a quick and dirty way of splitting them but is not fully reliable. Similarly, there's a pretty good chance that any 'blue' cedar will most likely be Atlas, though blue forms of the other species do exist. In reality a consensus formed from a group of characters is needed as per the table below.

	Atlas	**Lebanon**	**Deodar**
Mean needle length (on whorls)	<1.8 cm	1.5-3.0 cm	3-6 cm
Needles per whorl	20 - 45	20 - 35	20 - 30
Shoot hairs (x10 hand lens)	Minutely hairy	More or less hairless	Minutely hairy
Translucent needle-tip (x10 lens)	Gradual taper, 0.5mm long	Abrupt taper, 0.2mm long	Gradual taper, 0.4mm long
Foliage colour	More often glaucous aka 'blue' in cultivation	Light to dark green, very rarely glaucous green.	Green to grey-green
Lead shoot	Erect	Erect	Drooping
Young branch tips	Ascending (usually, but can sometimes be drooping)	Mostly level/horizontal	Drooping
Male cones	3-4cm	4-5cm	>5cm
Male cones mature	Mid-September	Early November	Early November
Major stems	Often multiple	Often multiple	Usually single

Many other trees have 'Cedar' in their common names but are not related. Species such as Western red-cedar (*Thuja plicata*), Japanese cedar (*Cryptomeria japonica*) or Incense cedar (*Calocedrus decurrens*) are not affected by *Sirococcus tsugae*.

For all conifers The Gymnosperm Database is an extremely thorough and useful resource. For photographs of specimens the Wespelaar Arboretum is well worth a look.

Priority pathogen - Siroccocus blight (*Sirococcus tsugae*)

Sirococcus tsugae is a fungal pathogen which affects true Cedars and Hemlocks (*Tsuga* species). It was first confirmed in the UK in 2014 and has been reported affecting all three Cedar species commonly found in England, Scotland, Wales and Northern Ireland. There are two confirmed spreading mechanisms, via rain-

splash in the immediate vicinity and possibly over longer distances when combined with strong winds, and via planting stock.

Identification

The most obvious sign of infection with *S. tsugae* on Atlas cedar is the striking pink-ish discoloration of infected needles most visible in early to mid-summer (figure 5). In other species infected needles turn brown. Cankers can be difficult to spot but resin patches on shoots or fruit bodies can indicate their presence beneath the bark (fig. 6).

Infected needles are shed early from the tree and defoliation can be severe and often results in a thinning, patchy crown. Although tree death is common it is not inevitable, but many trees are removed for aesthetic reasons.

Figure 5: 'pink' discoloration of needles and wilting shoot tips of Atlas cedar caused by *S. tsugae* infection. ©Crown copyright. Forest Research

Figure 6: Black fruit bodies of *S. tsugae* on the surface of a canker (left) and resin patches associated with cankers (right) on shoots of Atlas cedar. ©Crown copyright. Forest Research

Lookalikes

Sirococcus conigenus is a closely related fungal pathogen which can infect a range of conifer species including Cedar of Lebanon. Needles affected by *S. conigenus* turn orange rather than pink and shoots take on a shepherd crook shape (fig. 7).

Figure 7: Typical orange branchlet tips (left) and 'shepherd crook' deformation caused by *S. conigenus* on Cedar of Lebanon. ©Crown copyright. Forest Research

Allantophomopsiella pseudotsugae can cause symptoms similar to those caused by *S. tsugae* on *Cedrus* species, often resulting in shoot and branch death as a result of lesions girdling the stem.

Reporting

Sirococcus tsugae is a priority disease in the UK so please report possible sightings via TreeAlert.

For more information and resources on this disease check the Observatree website.

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