

PEST ALERT

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Sweetgum Inscriber

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INTRODUCTION:

The sweetgum inscriber, *Acanthotomicus suncei* Cognato (Curculionidae: Scolytinae) is a recently discovered bark beetle native to China that is lethal to American sweetgum (*Liquidambar styraciflua* L.) (Gao et al. 2017, 2021). It was detected in Shanghai, China around 2013 and has resulted in a mass death (>30,000 tree individuals) of planted American sweetgum in that region (Gao et al. 2021). Although it has not been introduced to North America yet, the increasing trade between Asia and the United States in recent years increases the likelihood of its invasion (Susaeta et al. 2017).

IDENTIFICATION:

Acanthotomicus suncei is a small bark beetle, about 2.5 mm long, and orange to light brown in color. Among American bark beetles, it most closely resembles small species of *Orthotomicus*, and it belongs to the same tribe, Ipini. It is also superficially similar to *Xyleborus* or *Pityophthorus* because of the color, shape and size. It can be identified by the four pairs of elytral declivital spines, equal in size, arising from the margins of the declivity (unlike *Orthotomicus*) on interstriae 2, 4, 6 and 8. The spines in females are smaller than in males. Lateral tibiae of both foreleg and midleg have four denticles (Gao and Cognato 2018). The antenna resembles that of *Orthotomicus*; it is flat and has two prominent, hairy, procurved sutures.

Care needs to be taken not to confuse *A. suncei* with *Pityophthorus liquidambarus* Blackman, a bark beetle native to the eastern U.S. *Pityophthorus liquidambarus* is also small, elongated and light-brown colored, and it is ubiquitous in dead sweetgum branches, thus presenting the possibility of misidentification. *Pityophthorus liquidambarus* can be distinguished from *A. suncei* by the absence of the spines on declivity.

BIOLOGY:

Sweetgum inscriber occupies the inner bark and phloem of American sweetgum (*L. styraciflua*), Chinese sweetgum (*L. formosana* Hance) and *Altinga* sp. (all Altingiaceae). It appears that only the American species is attacked while alive, while the Chinese sweetgum is only colonized after the tree dies. Most attacks are on the trunk, but branches and twigs are also colonized. According to the records in China, *A. suncei* has two generations per year, with the emergence of adults in April, two peaks in May and July and no occurrence after September. The sex ratio is slightly female-biased in galleries (about 1.0:1.4 males:females), although the beetle reproduces via regular outbreeding, not by haplodiploidy and inbreeding like some other scolytine beetles.

The species appears to require temperatures above 20°C for regular development. The time between initial gallery construction by the parental adults and emergence of new adults is 130–190 days at 20°C and 57–106 days at 30°C; there is no development at 15°C. The most common fungus species isolated from *A. suncei* is *Geosmithia luteobrunnea* (Zhang et al., 2022). This fungus is not a systemic pathogen, but it does create lesions in live sweetgum if inoculated experimentally or by the beetle (Gao et al., 2021); the role of the fungus in the sweetgum mortality is being investigated.

DISTRIBUTION:

The current known distribution of *A. suncei* is in eastern and southeastern China. Nurseries that used to grow American sweetgums are also found in that region, but this tree species is no longer being commercially grown in China because of the beetle outbreak (Li et al. 2021). The beetle occurs at outbreak density in close proximity to the ports of Shanghai.



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POTENTIAL DAMAGE IN FLORIDA:

Sweetgum trees attacked by *A. suncei* show wilted foliage on branches and sap flow from numerous entrance holes. The tree starts wilting from the top and rapidly progresses to lower branches.

Although *A. suncei* has not been detected in the U.S., observations from China suggest it may be capable of causing severe damage if it were introduced. According to the Forest Inventory Analysis (EVALIDator 2021), sweetgum is the sixth most abundant hardwood species in Florida, the most abundant hardwood in Georgia and in the top 10 of most abundant trees in other eastern states. The climate in southern China, where the sweetgum inscriber occurs, is similar to that of the southern U.S. It is not known whether the same damage that is seen in China would occur in the U.S., because the greatest damage was observed in afforestation projects in species-poor, uniform-age stands around Shanghai. In most of the eastern U.S. forests, sweetgum is more dispersed. However, the American sweetgum is still one of the most common trees in many eastern states, and their death may resemble the epidemic of ash mortality caused by the emerald ash borer or the loss of elms due to Dutch elm disease.

The potential economic loss from the death of American sweetgum on timberlands is estimated at \$4.6 million annually (Susaeta et al. 2017). However, this estimate does not account for damages in urban settings and environmental damages. Sweetgum is a host for many native organisms, including the iconic Luna moth.

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Figure 1. Sweetgum inscriber, *Acanthotomicus suncei*, male. Length: 2.5 mm. Female is nearly identical, only the declivital spines are smaller. Photo by J. Hulcr, University of Florida



Figure 2: Numerous sap flow points and wilted foliage are the symptoms of sweetgum inscriber attack on the American sweetgum. Photo by J. Hulcr, University of Florida