

Granulate Ambrosia Beetle (*Xylosandrus crassiusculus*)

History

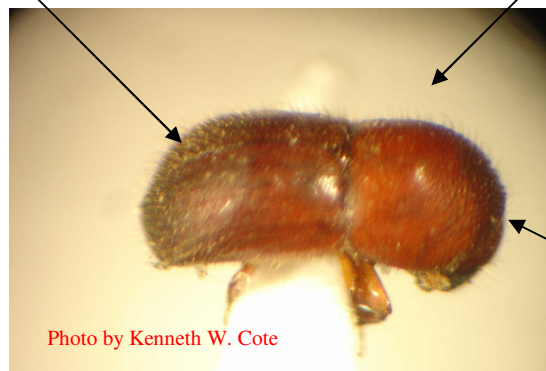
The granulate ambrosia beetle (formally the Asian ambrosia beetle) was first found in the United States on peach trees in 1974 near Charleston, South Carolina. Additional populations were found in 1983 as far south as Florida and as far west as Alabama. The beetle was first detected in Indiana in 1992 by the USDA. Adult beetles were captured with Lindgren funnel traps in Johnson County, southeast of Indianapolis. Granulate ambrosia beetle populations were discovered on Weeping Higan Cherry in Oregon in 1992. The beetle was also discovered in Virginia the same year. In August 2002, granulate ambrosia beetles were found in Indiana nursery stock for the first time. Currently, new populations of this beetle continue to be detected throughout the United States.

Distribution: The granulate ambrosia beetle is a subtropical species found in eastern Africa, India, Sri Lanka, China, Japan and SE Asia. In the past, U. S. populations were found mostly from Zone 7 southward from Missouri to Texas and eastward towards Florida and north to Virginia. However, more recently adults have been captured in zone 5 as far north as northern Indiana. This species has also been reported as far west as Oklahoma, Missouri and Kansas.

Description: Adults: Adults are small and have a reddish brown appearance with a downward facing head. Most individuals have a reddish head region and a dark brown to black elytra. Light colored forms that appear almost yellow have been trapped in Perry County, Indiana. A granulated (rough) region is located on the front portion of the head and long setae (hairs) can be observed on the back end of the elytra (wing covers). Females are 2 –2.5 mm and males are 1.5 mm long. Populations are predominately female and males are rare and do not fly. **Larvae:** Larvae are C-shaped with a defined head capsule.

Short Hairs on Elytra

Reddish Head



Granulated Region

Xylosandrus crassiusculus

Life Cycle: Adult granulate ambrosia beetles overwinter in galleries, but all life stages can be found in the galleries during the growing season. Initial flight usually occurs when daytime temperatures exceed 70°F in the spring months. During the summer, the life cycle is 55-60 days long and there are typically two generations in the southern United States. In the galleries, females mate with their brothers and then disperse to other host trees. The female is responsible for constructing the gallery. Populations are primarily female with at 1:10 male-female ratio. Males cannot fly and are used solely for mating purposes. Small galleries produced inside infested trees are used for rearing symbiotic fungi, which granulate ambrosia beetles use as a food source. *Ambrosiella* and *Fusarium* species have been isolated from granulate ambrosia beetles, but the pathogenicity of these fungi has not been determined. Trees are often mass attacked and can rapidly decline. However, it is difficult to decipher if the abundant numbers of the beetles infesting the tree causes death or if the symbiotic fungi are clogging the xylem, thus resulting in tree death.

Damage: Damage usually appears as small toothpick like projections of frass sticking out of the trunks of infested trees. Frass spikes break off easily in the wind and may not always be seen. Abundant gumosis at multiple sites on tree trunks can occur on hosts such as *Prunus*, which have high levels of resin. However this type of surface damage can be easily confused with damage from shot hole borer (*Scolytus rugulosus*). Damage from granulate ambrosia beetles will differ by going deeper into the wood than shot hole borers, which only cause damage in a tree just beneath the bark. Also, fungal staining from symbiotic fungi is often seen in wood adjacent to ambrosia beetle galleries. Granulate ambrosia beetles usually mass attack trees and numerous exit holes can be observed. Perfectly round, 2 mm entrance holes can be seen when the gumosis and/or frass spikes are removed. Damage usually occurs on the main stem close to the ground, but can be found through out the tree in heavy infestations. Trees of 3 inch DBH or less are more readily infested than larger trees, but large host can be attacked. Heavy infestations usually lead to wilting, dieback and eventual tree death.



Photo by Kenneth W. Cote

Frass Spikes



Photo by Kenneth W. Cote

Multiple Sites of Gumosis

2-mm Perfectly Round Hole



Fungal Staining Near Galleries



Hosts: Granulate ambrosia beetle is considered an aggressive species and can attack trees that are not highly stressed. However, in some cases stress may play an important role in tree infestation. Generally, granulate ambrosia beetle will infest anything but conifers.

Partial Host List

Aspen (**Indiana**)

Azalea

White Ash (**Indiana**)

Beech (**Indiana**)

River Birch (**Indiana**)

Black Walnut (**Missouri**)

Bradford Pears

Chinese Elm

Crabapple (**Indiana**)

Crape Myrtle

Dogwood

Golden Rain Tree

Grape

Hickory

Honey Locust, Thornless (**Indiana**)

Japanese Maple

Japanese Snowbell

Magnolia

Mimosa (**Indiana**)

Persimmon

Prunus sp. (**Indiana**)

Redbud (**Indiana**)

Red Oak (**Indiana**)

Red Maple (**Indiana**)

Sweet Gum

Tulip Poplar (**Indiana**)

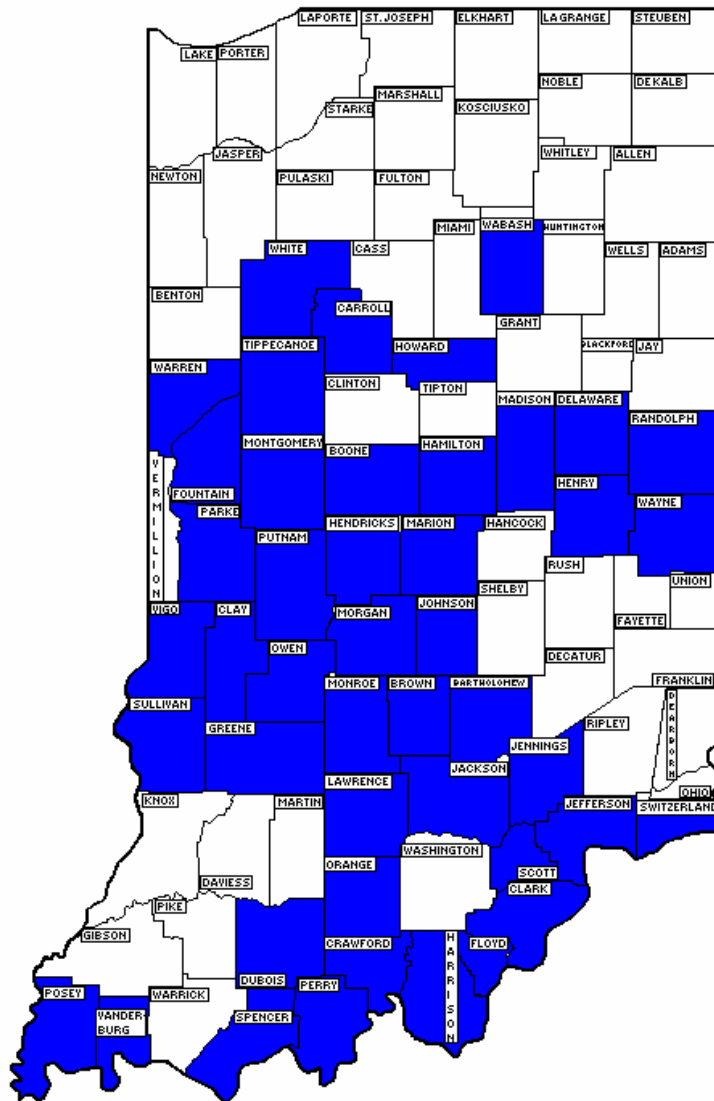
Willow Oak

Monitoring: Damage usually appears in mid spring during peak flight periods and then again in fall. However, damage can be found at any time of the year when beetles are



actively flying. Look for frass spikes and multiple bleeding sites when leaves begin to expand in spring and again in fall. Additional monitoring should be conducted during periods of drought stress. Lindgren funnel traps with ethanol lures should be used to monitor flight periods.

Indiana Counties with Granulate Ambrosia Beetle



Updated January 2008
Information collected from Indiana DNR, CAPS and Purdue University

Control

Control of granulate ambrosia beetle can be difficult. Infested trees should be left in the nursery 20-30 days after initial infestation in order to act as trap trees. This will attract additional beetles to the same tree and reduce the amount of new host damage. Once trap trees have been identified, other host trees in the area should be protected with a residual insecticide labeled for control of boring insects or bark beetles. When the 30-day trap tree period has expired, infested trees should be destroyed by fire. **See trapping Data at then end of this document for timing of pesticide applications.**

Pesticides

- Bifenthrin
- Chlorpyrifos
- Permethrin

*Mention of Trade Name implies no endorsement of a single product or associated company. **Always read pesticide labels before making any pesticide application.***

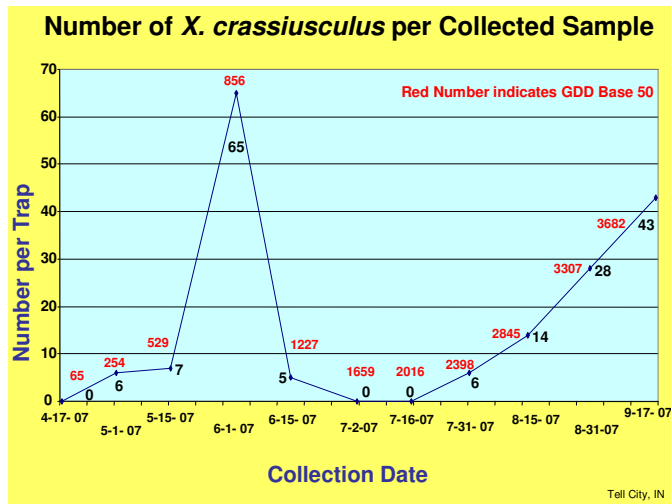
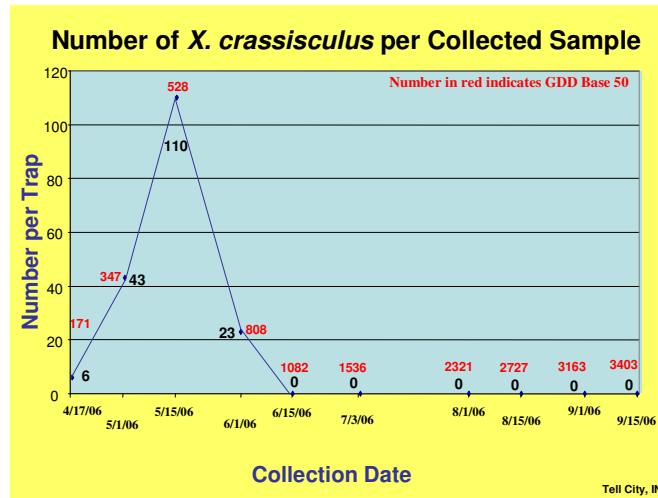
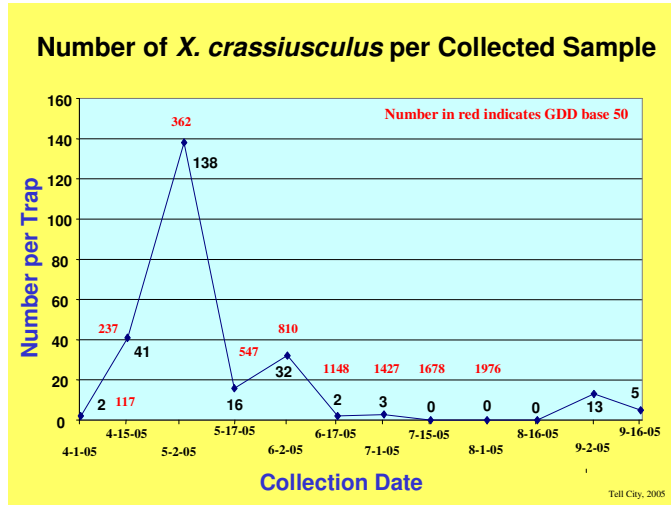
Trapping Data and Control Decisions

The Indiana DNR, Division of Entomology and Plant Pathology has been collecting trapping data in Perry, Jackson and Owen Counties in attempt to better understand flight activity of the granulate ambrosia beetle in the state of Indiana.. The data collected provide evidence that peak flight occurs when the average daily maximum temperature begins to reach 70 degrees F. In most cases this occurs in early May in Southern, Indiana and usually coincides with bud break and leaf expansion of native tree species. In some years, a second smaller peak in granulate ambrosia beetles occurs during late summer.

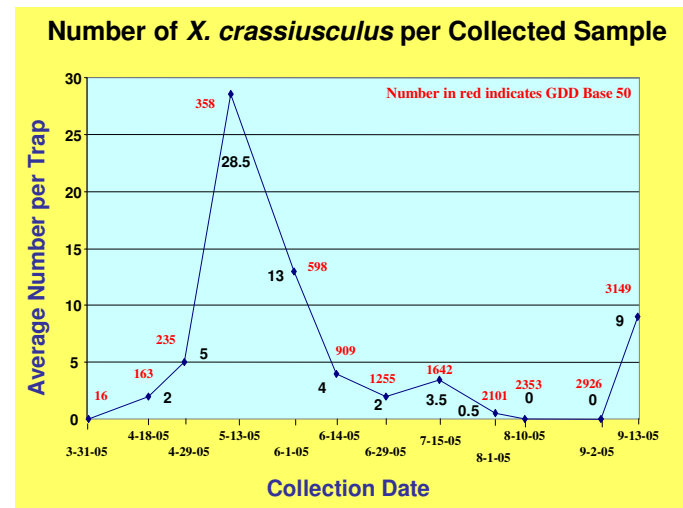
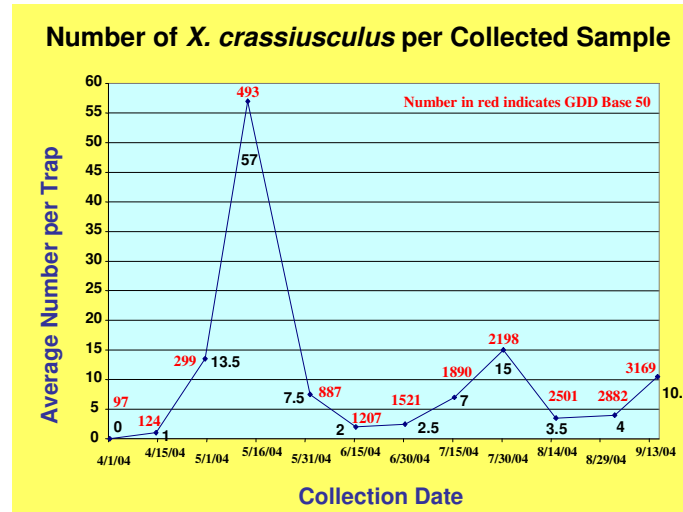
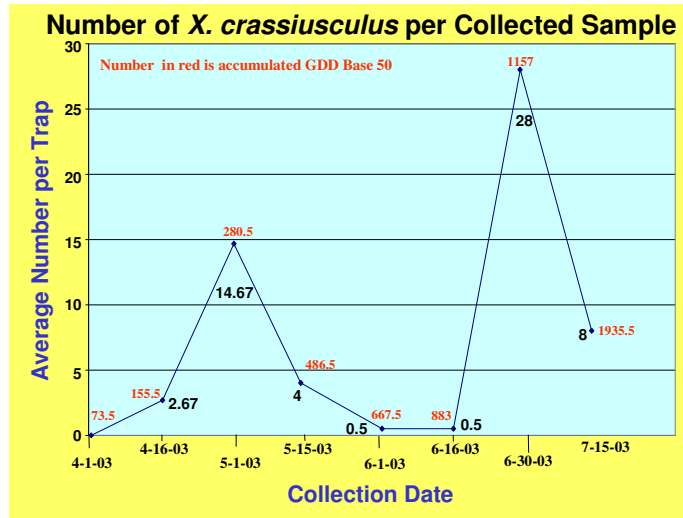
Peak flight does not always mean eminent infestations and host damage. Typically trees are more likely to be infested during peak flight since there are numerous beetles searching for host material. However, in some cases we have collected hundreds of beetle in a single trap, but were not able to located damaged trees in close proximity to the traps. DNR inspectors have also found numerous late summer infestations which occur long after spring peak flight. In the southern US, this species has been reported as an aggressive and attack healthy trees. Currently, this does not appear to be the case in Indiana. DNR nursery inspectors have found many infestations in the state that appear to be related to drought stress in late summer or winter injury in spring, but have found fewer cases of infestation during spring peak flight.

How does this information affect your decision regarding the timing of pesticide applications? Pesticide applications should be conducted immediately prior to and during peak flight activity in spring or when you first discover exiting activity from infested stock. Trees should also be monitored throughout the growing season since granulate ambrosia beetles are active for most of it. Additional pesticide applications may help prevent damage during periods of drought stress or transplant shock, especially in late summer when there is a second smaller peak in flight activity.

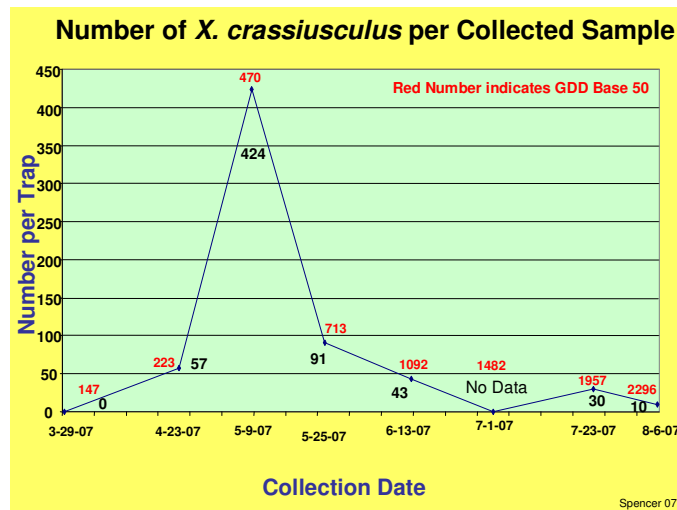
Trapping Data for Perry County, Indiana



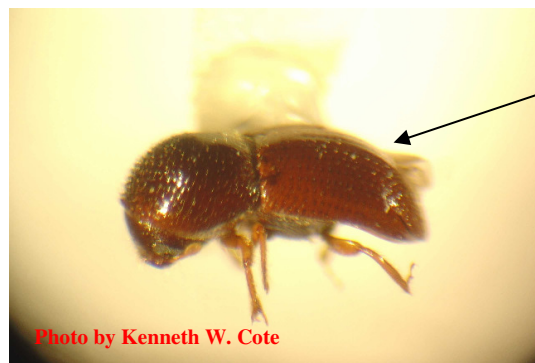
Trapping Data for Jackson County, Indiana



Trapping Data for Owen County, Indiana



Related Species: *Xylosandrus compactus*, the black twig borer occurs primarily along the Gulf Coast states. *Xyloandrus germanus*, the black stem borer is found in Indiana and the Mid-West. Damage from this pest is similar to granulate ambrosia beetle, but entrance holes will only be 1 mm in size. Also, trees infested with this species tend to die at a slower rate than trees infested with granulate ambrosia beetle. The Indiana DNR, has found individual trees infested with both *X. crassiusculus* and *X. germanus*. Proper identification of these species requires a specialist.



Elytra Shiny and abundant hairs absent

Photo by Kenneth W. Cote

Xylosandrus germanus

Written By Kenneth W. Cote, Nursery Inspector, Indiana DNR, Division of Entomology and Plant Pathology, 2005, Updated January 2008.

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