

Black Twig Borer, *Xylosandrus compactus* (Eichhoff) (Insecta: Coleoptera: Curculionidae: Scolytinae)¹

W. N. Dixon, R. E. Woodruff and J. L. Foltz²

Introduction

The black twig borer, *Xylosandrus compactus* (Eichhoff), is one of the few ambrosia beetles that infests healthy plants. In Florida, orchids (*Dendrobium* spp. and *Cattleya* spp.), and avocado (*Persea americana* Mill.) have sustained notable economic losses (Dekle and Kuitert 1968, McClanahan 1951). Although ornamental shrubs and shade trees seldom die from beetle infestations, the loss of growth and aesthetics can be substantial. Elsewhere, the black twig borer is a serious pest of coffee, *Coffea canephora* Pierre (esp. var. *robusta* Ineac) (Brader 1964).

Taxonomy

This species was generally identified as *Xyleborus morstatti* Hagedorn until 1962 when Murayama and Kalshoven recognized the precedence of Eichhoff's 1875 description of *Xyleborus compactus*. At about the same time, Brown (1963) resurrected the genus *Xylosandrus* Reitter (1913) from its long-time synonymy with *Xyleborus*,



Figure 1. Adult female black twig borer, *Xylosandrus compactus* (Eichhoff), in southern magnolia twig. This side view shows the head concealed in the pronotum and the gently rounded declivity. Females are 1.4-1.9 mm in length and males (not shown) are 0.8-1.1 mm. Males do not fly and are rarely found outside the brood chamber. Credits: Photograph by: Lyle J. Buss, University of Florida

Xylosandrus being distinguished by having the anterior coxae widely separated rather than contiguous or narrowly separated. Bright (1968) and Wood (1982) also recognized *Xylosandrus* as a

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 2. W. N. Dixon and R. E. Woodruff, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, and J. L. Foltz, Department of Entomology and Nematology, University of Florida, Gainesville, FL.

distinct genus with about 25 species worldwide and 4 species occurring in the eastern United States.

Distribution

The black twig borer was first collected in the United States at Ft Lauderdale, Florida in 1941 (Wood 1982). By the mid 1970s, its range extended northward to Tallahassee and Savannah, Georgia (Ngoan et al. 1976). The present distribution in the Southeast is along the Coastal Plain from Texas to North Carolina. This beetle is also present in Hawaii. Its pantropical distribution includes Brazil, Cuba, Indonesia, Japan, and Sri Lanka (Ceylon) (Bright 1968, Murayama and Kalshoven 1962, Wood 1982).

Description

Adult female length 1.4 to 1.9 mm, width 0.7 to 0.8 mm; body stout, cylindrical, elongate, brown to black; distinct punctures on pronotum posterior; transversely oriented hair tuft at base of pronotum; and long striae. Adult male length 0.8 to 1.1 mm, width 0.4 to 0.5 mm; body rounded, dwarfed, reddish-brown; all characters poorly formed; flightless and rare. Egg small (0.3 mm wide x 0.5 mm long), white, and ovoid. Mature larva length ca. 2 mm; head capsule pale brown; body creamy white and legless. Pupa length similar to adult; body creamy white; form exarate.



Figure 2. Dorsal view of adult female black twig borer, *Xylosandrus compactus* (Eichhoff), with her brood in a chamber. The white fungus growing on the chamber wall is food for the larvae and adults. Credits: Photograph by: Lyle J. Buss, University of Florida

Diagnosis

Table 1 summarizes various morphological and biological characteristics that can be used to distinguish the four *Xylosandrus* species established in the eastern United States. The first two species are frequent pests of many woody plants throughout Florida. They are readily distinguished with the aid of a microscope by noting that *compactus* is less than 2 mm long and has a shiny declivity, whereas *crassiusculus* is more than 2 mm long and the declivity appears dull and bumpy.

These two species can also be distinguished based on the location of their galleries. *X. compactus*, the black twig borer, attacks twigs less than 2 cm diameter, whereas *crassiusculus* infests larger twigs, branches and stems 2 to 8 cm in diameter. The third species, *germanus*, has not yet extended its range into northern Florida although it does occur as close as central Georgia and Alabama. It, like *crassiusculus*, is longer than 2 mm, but has a shiny rather than dull declivity. Also, it is the species most likely to be found infesting healthy, large-diameter material. The fourth species, *zimmermanni*, is found only in South Florida where it breeds only in severely stressed and recently cut branches 1 to 3 cm in diameter. Small like *compactus*, it requires careful examination to note the longitudinal orientation of the small tuft of hair on the pronotum.

Biology

Only adult females initiate infestation of host plants. Male beetles are flightless, remain solely in brood galleries, and arise from parthenogenesis (production of male progeny without fertilization), thus haploid in genetic composition. In a host twig or branch the female constructs an entrance tunnel into the pith or wood to a depth of 1 to 3 cm where a small cavity is formed and a loose cluster of eggs is deposited. One or more females may occupy a twig or branch. Generally, there is only a single female if twig diameter is less than 7 mm, but up to 20 females for branch diameters from 8 to 22 mm. Larvae feed on a mixture of ambrosial fungus (*Fusarium solani* (Mart.) Sacc.) cultured on chamber walls and host plant tissues. Pupation and mating of brood adults

Table 1. Characteristics of four *Xylosandrus* species present in the southeastern United States.

Character	<i>X. compactus</i>	<i>X. crassiusculus</i>	<i>X. germanus</i>	<i>X. zimmermanni</i>
Female size	1.4-1.9 mm	2.1-2.9 mm	2.0-2.4 mm	1.3-1.5 mm
Surface of declivity	Shining and smooth	Dull and granulate	Shining	Shining
Hair tuft on base of pronotum	Froms <i>transverse</i> row	---	---	<i>Tuft oriented longitudinally</i>
Geographic location	Throughout Florida and from North Carolina to eastern Texas.	Throughout Florida and from North Carolina to eastern Texas.	From Connecticut to Missouri, east Texas, and central Georgia. Might appear in North Florida.	Subtropical South Florida and Mexico to Venezuela.
Common host material	In small twigs on healthy, cut and stressed plants.	In wood of large twigs, small branches and stems.	In wood of large twigs, small branches and stems.	Only in unhealthy, cut, or broken branches 1-3 cm diameter.

occurs in the infested material. The brood adults emerge through the entrance holes of the parent beetles, which are located on branch undersides. Approximately 28 days (at 25°C) are required for development from egg to adult. In north central Florida, adults overwintering in *Cornus florida* emerge during late February, attack twigs in March, and brood production begins in April. Highest population levels occur from June to September. Adults overwinter in damaged twigs and branches (Ngoan et al. 1976, Wood 1982).



Figure 3. Entrance hole, with bark removed, of the black twig borer, *Xylosandrus compactus* (Eichhoff). Small attack-emergence holes, 0.7 to 0.9 mm in diameter, associated with brood chambers in the pith of a dead twig are signs of black twig borer infestation. Credits: Photograph by: Lyle J. Buss, University of Florida



Figure 4. Infested twig with brood of the black twig borer, *Xylosandrus compactus* (Eichhoff), ready to emerge. As many as 40 beetles may develop in a single chamber although 10 to 15 is the typical number. Credits: Photograph by: Lyle J. Buss, University of Florida

Hosts

Over 224 plant species, belonging to 62 families, are susceptible to black twig borer infestation (Ngoan et al. 1976). Known hosts in Florida include: *Acer barbatum* Michx., *A. negundo* L., *A. rubrum* L., *Callicarpa americana* L., *Carya illinoensis* (Wang.) K. Koch, *C. glabra* (Mill.) Sweet, *Cassia fistula* L., *Cattleya skinneri* Lindl., *Celtis laevigata* Willd., *Cercis canadensis* L., *Cinnamomum camphora* (L.) Nees and Eberm., *Cornus florida* L., *Dendrobium pulchellum* Roxb., *Khaya nyasica* Stapbf., *Koelreuteria elegans* (Seem.) A.C. Sm., *Liquidamber styraciflua* L., *Macadamia ternifolia* F.V. Muell.,



Figure 5. Empty brood chamber of the black twig borer, *Xylosandrus compactus* (Eichhoff). Brood chambers range from 2 to 57 mm in length. Credits: Photograph by: Lyle J. Buss, University of Florida

Magnolia grandiflora L., *Malus pumila* Mill., *Mangifera indica* L., *Ostrya virginiana* (Mill.) K. Koch, *Persea americana* Mill., *P. borbonia* (L.) Spreng., *Platanus occidentalis* L., *Quercus laurifolia* Michx., *Q. nigra* L., *Salix* sp., *Sambucus simpsonii* Rehder, and *Symplocos tinctoria* (L.) L'Her.

Survey and Detection

Wilting of twigs and branches usually becomes evident within weeks after beetle infestation. Entrance holes are small (0.8 mm wide) and are located on the underside of branches. Cankers 10 to 210 mm long are common around the attacked area of larger twigs and branches. Flowering dogwood (*C. florida*), redbud (*C. canadensis*), and red maple (*A. rubrum*) are common hosts and may serve useful as monitor plants for timing of control measures. A whitish-exudate is common in avocado twig infestations.

Management

Pruning and destruction of beetle-infested plant material is highly recommended. Simultaneously, apply good tree care practices to promote tree vigor and health to aid in recovery from beetle damage. If an insecticide is warranted, check for phytotoxicity prior to application by spraying one or two branches and follow label directions carefully.



Figure 6. Leyland cypress infested by the black twig borer, *Xylosandrus compactus* (Eichhoff). Credits: Photograph by: Andrew J. Boone, South Carolina Forestry Commission, www.forestryimages.com



Figure 7. Wilted branch infested by the black twig borer, *Xylosandrus compactus* (Eichhoff). On some hosts, like dogwood shown here, the leaves begin to curl and wilt about one week after infestation and turn brown in two weeks. Credits: Photograph by: FDACS - Division of Forestry



Figure 8. Entrance hole of the black twig borer, *Xylosandrus compactus* (Eichhoff), into magnolia twig. The frass around the hole indicates a new infestation. Credits: Photograph by: Lyle J. Buss, University of Florida

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