Scolytus intricatus (Ratzeburg)

Coleoptera: Curculionidae

European Oak Bark Beetle

Host(s)	CAPS-Approved Survey Method
Major/Primary hosts *Castanea sativa* (Sweet chestnut), *Corylus colurna*, *Quercus* spp. (Oak), *Quercus coccifera* (Kermes oak), *Quercus dalechampii* (Dalechamp's oak), *Quercus ilex* (Holly oak), *Quercus petraea* (Durmast oak), *Quercus robur* (Common oak) **Other hosts** *Aesculus* spp. (Buckeye), *Aesculus hippocastanum* (Horse chestnut), *Alnus glutinosa* (European alder), *Betula* spp. (Birch), *Betula celtiberica* (Iberian white birch), *Betula pendula* (Common silver birch), *Betula pubescens* (Downy birch), *Betula verrucosa* (European white birch), *Carpinus* spp. (Hornbeam), *Carpinus betulus* (European hornbeam), *Castanea* spp. (Chestnut), *Castanea vesca* (Sweet chestnut), *Corylus* spp. (Hazelnut), *Fagus* spp. (Beech), *Fagus moesiaca*, *Fagus orientalis* (Oriental beech), *Fagus sylvatica* (Common beech), *Ostrya* spp. (Hop-hornbeam), *Ostrya carpinifolia* (Hop-hornbeam), *Parrotia persica* (Persian parrotia), *Populus* spp. (Poplars), *Populus alba* (White poplar), *Populus tremula* (European aspen), *Quercus canariensis* (Algerian oak), *Quercus castaneaefolia* (Chestnut-leaf oak), *Quercus cerris* (European turkey oak), *Quercus frainetto* (Italian oak), *Quercus hartwissiana*,	Visual

Quercus lusitanica (Lusitanian oak), *Quercus polycarpa*, *Quercus prinus* var. *tomentosa*, *Quercus pubescens* (Downy oak), *Quercus pyrenaica* (Pyrenean oak), *Quercus rubra* (Northern red oak), *Quercus virgiliana* (Italian oak), *Salix* spp. (Willow), *Sorbus* spp. (Mountain Ash), *Tilia cordata* (Small-leaf lime), *Ulmus* spp. (Elms), *Ulmus carpinifolia* (English elm), *Ulmus laevis* (European white elm), *Zelkova carpinifolia* (Caucasian zelkova) (Davis et al., 2006; Kimoto and Duthie-Holt, 2006; CABI, 2008)	

Reason for Inclusion in Manual

Scolytus intricatus was added to the manual in 2010. *Scolytus intricatus* is a target pest on the FY2011 AHP Prioritized Pest List.

Pest Description

Eggs:
Eggs are a pearly white color and oval with a length of 1 mm (<$^1/_{16}$ in) (Haack, 2001).

Larvae:
Larvae are white 'C'-shaped grubs with a mature length of about 4 mm (approx. $^1/_8$ in); the head capsule is amber in color (Haack, 2001).

Pupae:
Pupae are white with some adult features (wings folded behind abdomen) (Haack, 2001).

S. intricatus adult (Pest and Diseases Image Library, Bugwood.org)

Adults:
Adults are 2 to 3 mm (approx. $^1/_{16}$ to $^1/_8$ in) in length. The body is black with light brown antennae and legs and reddish brown elytra (Haack, 2001).

Biology and Ecology

Scolytus intricatus has 1 to 2 generations per year (Yates, 1984a; reviewed in Haack, 2001). Eggs, larvae, pupae, and adults generally occur in the cambial region of a host tree (Duffy, 1953; Yates, 1980; 1984a; reviewed in Haack, 2001). Adults will leave bark to feed on young twigs (i.e., undertake maturation feeding) or find new hosts.

Adult are generally active between May and September, but the period of activity depends on temperature. Adults are unlikely to fly more than 100 m [330 ft] (reviewed in Yates, 1984b; reviewed in Haack, 2001). Newly emerged adults fly to host tree crowns and feed on tender young shoots and year-old growth for 2 to 3 weeks (Yates, 1984b; reviewed in Haack, 2001). Maturation feeding is not obligatory but may increase the fecundity of females (Yates, 1980). Females comprise 50% of the population (Marković and Stojanović, 2001). Mating typically occurs during maturation feeding or at the entrance of the egg gallery (Duffy, 1953; Yates, 1984a; reviewed in Haack, 2001). Males or females can begin the construction of the egg gallery (reviewed in Haack, 2001), but Yates (1980) suggests males are more likely to initially colonize a tree. Presumably males then release attractants to initiate a mass attack on a tree (Yates, 1980), but an attractant for *S. intricatus* has not yet been identified. Hovorka et al. (2005) suggest the male-dominated colonization behavior is generally true for Nearctic, but not Palearctic, scolytids. Thus, the pattern described by Yates (1980) may not apply to *S. intricatus*. Adults seem to prefer weakened, dying trees or fallen branches (> 2 inches [5 cm] in diameter) for breeding, but smaller pieces of wood may be suitable. Egg galleries have been constructed in branches approximately ½-inch in diameter in laboratory studies (reviewed in Haack, 2001). Rearing studies have demonstrated that adults will reproduce in fresh-cut logs (Yates, 1984a; reviewed in Haack, 2001). *Scolytus intricatus* is monogamous, and adults are not known to re-emerge from the host after mating (Yates, 1984a; reviewed in Haack, 2001).

Egg galleries are straight, single-armed, approximately 1 to 3 cm long (approx. ½ to 1¼ in), and oriented into wood; in some cases, the egg gallery superficially may penetrate the sapwood (Fig. 3) (Duffy, 1953). A female will deposit 18 to 83 eggs in niches (1 egg/niche) on both sides of the gallery (Duffy, 1953; Yates, 1984a; reviewed in Haack, 2001). Oviposition typically lasts 2 weeks. Eggs hatch in 10 to 14 days (Yates, 1984a).

Larvae develop through 5 to 6 instars (Yates, 1984a; reviewed in Haack, 2001). The number of larval instars may be difficult to determine for *S. intricatus* (Lekander, 1968). Larvae overwinter between the third and fifth instars or as pupae (Yates 1984a, reviewed in Haack, 2001). On average, overwintering larvae can withstand temperatures to -25.5°C (-14°F) but in some cases may survive as low as -29ºC (-20°F) (reviewed in Yates, 1984a). Pupation occurs in the larval chamber in the late fall or from late spring to early summer either in the outer bark (measuring over 4 mm (approx. $^1/_8$ in) thick) or in the outer sapwood of hosts with thin bark (Yates, 1984a; reviewed in Haack, 2001). Survivorship of developing *S. intricatus* is quite high (32%) but depends on several factors including the ability of adults to find a suitable hosts and the presence of predator and parasitoids (Yates, 1980; Marković and Stojanović, 2001).

Countries of Origin

S. intricatus occurs from the Nordic countries of Europe down to North Africa (Haack, 2001)

Current Distribution

This species is present in: Austria, Azerbaijan, Belgium, Bosnia and Hercegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iran, Italy, Latvia, Lithuania, Luxembourg, Macedonia, Morocco, the Netherlands, Norway, Poland, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tunisia, Turkey, and the United Kingdom (Haack, 2001; CABI, 2008).

Distribution in United States

S. intricatus is not known to occur in the United States (Haack, 2001).

Pathway

Long distance dispersal of all *S. intricatus* life stages can occur through the movement of wood products such as unprocessed logs and lumber, crating, pallets and dunnage containing bark. *S. intricatus* has been intercepted several times at United States ports of entry primarily in dunnage and crating.

Pathogens Vectored

S. intricatus has been associated with at least two fungi, *Ceratocystis piceae* (CABI, 2010) and *Ophiostoma roboris* (Rossnev et al., 1994); both are considered weak pathogens of oaks that contribute to the European oak decline complex. *S. intricatus* has also been associated with *Cryphonectria parasitica* which causes chestnut blight (Frigimelica and Faccoli, 1999). If this pest becomes established in North America, it may serve as an effective vector of the oak wilt fungus, *Ceratocystis fagacearum* (Yates, 1984; Doganlar and Schopf, 1984). *Fusarium*, *Alternaria*, *Penicillium*, *Botyris*, *Gliocladum*, *Aspergillum*, *Geosmithia* and *Sterilia* have been isolated from adults (Davis et al., 2006).

Damage

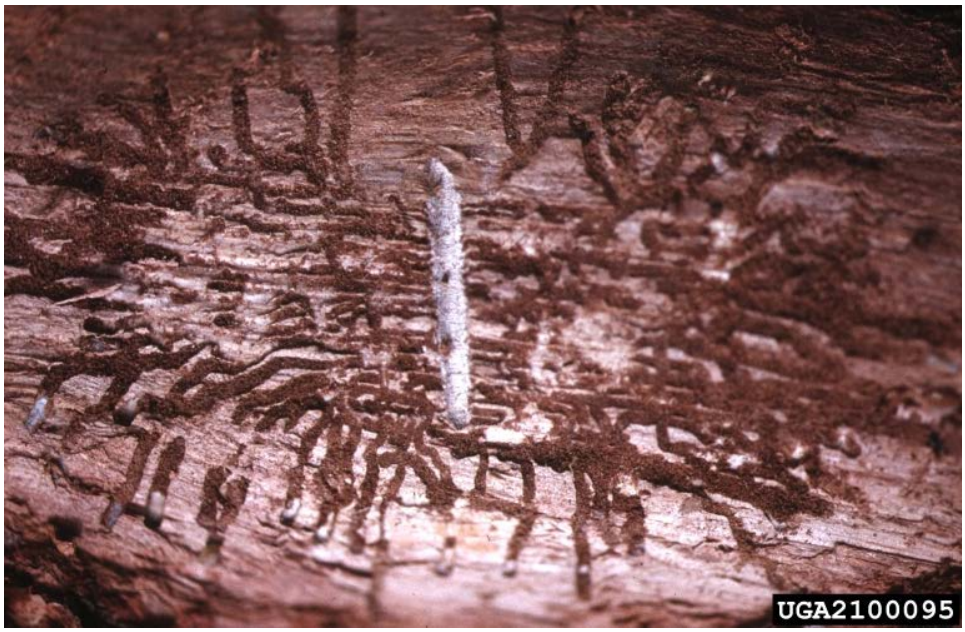
S. intricatus can attack and kill stressed oaks. This species can also transmit pathogens that may lead to further damage to the host plants. Trees may exhibit symptoms of general decline when infested by *S. intricatus* and its associated fungi (Davis et al., 2006).

Survey

CAPS-Approved Method

The CAPS-Approved survey method is visual inspection. There are no known attractants for *S. intricatus*.

Boring dust can be found on the bark surface. Galleries as well as different life stages can be found in the cambium and inner bark of the infested wood. Other symptoms to look for include "reduced growth, sparse and wilted foliage, branch dieback and ultimately tree mortality" (CABI, 2008).



Galleries of *S. intricatus* on *Quercus* spp. (Louis-Michel Nageleisen, Département de la Santé des Forêts, Bugwood.org)

Time of year to survey

Adult emergence in England spans 3-4 weeks from mid-May to mid-July depending on the temperature (Yates, 1984a).

Identification

CAPS-Approved Method

Morphological. Positive identification of adults can be achieved through examination of morphological characters by a well-trained taxonomist with expertise on the Curculionidae family.

Mistaken Identities

S. intricatus is similar to other families of small beetles with the naked eye. Many *Scolytus* species are similar to one another and difficult to distinguish to species. Similar *Scolytus* species present in the United States are *S. quadrispinosus, S. unispinosus,* and *S. ventralis*.

Resources and High Resolution Images

Oak Commodity-based Survey Reference:
http://caps.ceris.purdue.edu/survey_manuals

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