Aeolesthes sarta

Scientific Name
Aeolesthes sarta Solsky

Synonyms:
Pachydissus sartus Solsky
Aealesthes sarta Gahan
Aeolesthes sarta Gahan
Aelesthes sarta Stebbing
Aeolesthes sarta Beeson & Bhatia
Aeolesthes sarta Beeson

Common Names
City longhorned beetle, Town longhorned beetle, Sart longhorn beetle, Uzbek longhorned beetle, Quetta longhorned beetle

Type of Pest
beetle, wood borer

Taxonomic Position
Kingdom: Animalia, **Phylum:** Arthropoda **Order:** Coleoptera, **Family:** Cerambycidae

Reason for Inclusion in Manual
Exotic Forest Pest Information System – classified as a very high risk pest with the potential to attack oaks,
CAPS Priority Pest (FY 2008 – FY 2013)

Pest Description
Larvae: “Larvae – Length about 6 mm in the first stage but nearly 80 mm when fully grown. Yellowish and about 15 mm when full grown” (reviewed in USDA 1968).

Fig. 1 Adult male *Aeolesthes sarta*.
[Image from M. Hoskovec, http://www.cerambyx.uochb.cz//aeolsarta.htm]

Adults: “Adult beetle large elongate, cylindrical, steel grey in colour, elytra covered with thick coating of pubescence, shining white when newly emerged disappearing with age. [Note that USDA (1968) and Sengupta and Sengupta (1981) describe the color as reddish brown.] Body length vary [*sic*] from 22 to 42.2 mm in males and 29.2 to 43 mm in females. Antennae more than double the body length in males and shorter than body in females. Elytra obliquely truncate at the apex,

the outer angle being unarmed and the sutural angle dentate or shortly spined" (Ahmad et al. 1977).

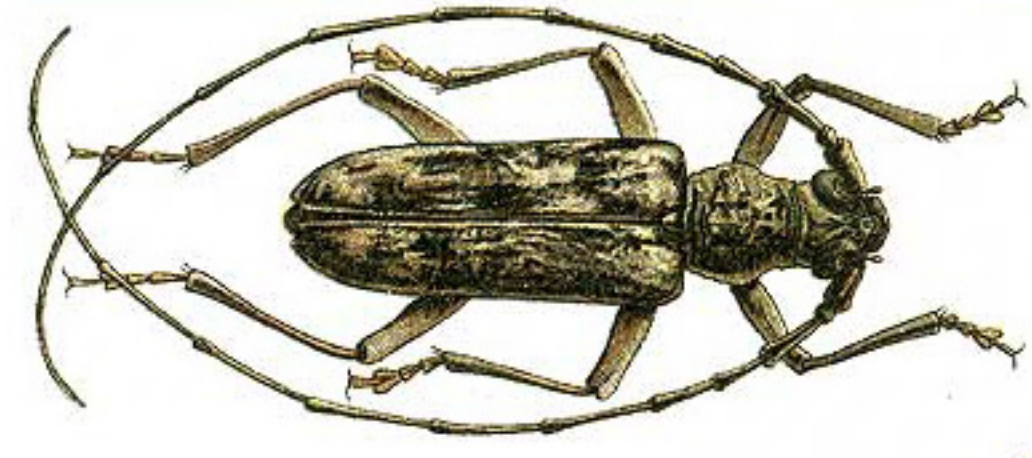

Fig. 2. Drawing of *Aeolesthes sarta* adult male
[Image from http://www.zin.ru/animalia/Coleoptera/rus/jacobs65.htm]

Biology and Ecology

Little is known about the biology of *A. sarta*, primarily because this pest is often concealed inside a host plant (Duffy 1968, reviewed in USDA 1968, Ahmad et al. 1977). Much of the biology of *A. sarta* was described by Ahmad et al. (1977) from a laboratory study using poplar logs.

Aeolesthes sarta completes its life cycle in two years (Ahmad et al. 1977). Adults emerge in April to early May when the average daily temperature reaches 20°C [68°F] (reviewed in EPPO 2005). Beetles are active at night until early morning and seek shelter during the day in old excavated tunnels, pupal chambers or under bark (reviewed in EPPO 2005). Beetles are infrequent fliers, and adults typically remain on the surface of the host on which they developed. Mating takes place between 8 hrs to 2 days following emergence. Males can mate multiple times.

Oviposition begins 1 to 5 days following emergence and lasts about 1 to 3 weeks. Females make slits in the bark of the trunk or large branches and deposit eggs in groups of 1 to 13. One female produces up to 270 eggs (Ahmad et al. 1977), but 50 eggs is more typical (Duffy 1968). Viable eggs are produced at a minimum temperature of 15°C [59°F]. However, oviposition does not occur at temperatures of 10°C [50°F] or above 35°C [95°F] (Ahmad et al. 1977). Maximum egg hatch occurs at 22 to 24°C [72 to 75°F], 12 to 13 days following oviposition. Adult males live 7 to 15 days and females live 19 to 25 days (Ahmad et al. 1977).

Larvae hatch within 10 to 17 days (Ahmad et al. 1977). Early instars (up to 1 month old) form galleries just beneath the bark. Later instars penetrate into the sapwood. Towards the end of the first season of development, larvae bore up a tree about 25 cm [~10 in] along the long axis of the trunk or branch and then turn downward to form a gallery

approximately 15 cm [~6 in] long (reviewed in EPPO 2005). Larval galleries will be filled with wood dust and frass. The larva overwinters at the base of the downward gallery protected by a thick plug constructed from wood borings (reviewed in EPPO 2005).

In the following spring, larvae continue to feed, making progressively deeper tunnels. At the end of July, larvae prepare pupation cells that are once again protected by a thick plug constructed from wood borings. The pupal stage lasts approximately 4 months. The adults stay in the pupation cells for 1 to 2 months overwinter then emerge in the spring through a round exit hole.

Damage

Occasionally, larvae of *A. sarta* eat so much of the cambial tissues that the overlying bark falls off the tree (Ahmad et al. 1977, reviewed in Orlinski 2000). Extensive feeding in the cambium can lead to girdling, branch die back and subsequent death of the tree (Duffy 1968, USDA 1968, Ahmad et al. 1977, reviewed in Orlinski 2000). Evidence of infestation also includes wood borings near the surface of the entry hole or at the base of the host tree, and round exit holes (Ahmad et al. 1977, reviewed in EPPO 2005).

Pest Importance

Aeolesthes sarta is a polyphagous, stem-boring longhorn beetle and an economically important pest of forest, ornamental and fruit trees throughout its range (Duffy 1968, reviewed in USDA 1968, Sengupta and Sengupta 1981, reviewed in Orlinski 2000, reviewed in EPPO 2005). Ahmad et al. (1977) call *A. sarta* “one of the most destructive borer[s] of poplar.” Similarly, Gaffar and Bhat (1991) list this beetle as “one of the most destructive pests of nut trees” in India. *Aeolesthes sarta* is also a pest of economic concern in Kashmir and Iran (Duffy 1968, Farashiani et al. 2001). *A. sarta* is known to attack stressed and apparently healthy trees, and as few as 1 to 3 larvae per tree can cause mortality (reviewed in Orlinski 2000). In Quetta, Pakistan a severe infestation of *A. sarta* in 1904-06 severely injured 5000 trees (Duffy 1968).

Larvae make extensive galleries in the cambium and sapwood, and this boring activity will often kill a tree (Ahmad et al. 1977). Even if the infested tree is not killed outright, the wood is of limited commercial value due to the galleries and borer holes (Ahmad et al. 1977, Gaffar and Bhat 1991). Larval tunnels cause the tree to dry out and the branches to break off readily in wind (reviewed in USDA 1968). An infestation of *A. sarta* typically causes tree death in 2 to 4 years (reviewed in USDA 1968, Thakur 1999).

Risks associated with *A. sarta* for North American forests have been evaluated previously. Orlinski (2000) considered the insect to pose a very high risk, but this assessment was very uncertain. The potential for establishment, spread, economic injury, and environmental damage were each rated high, but these evaluations assume that North American hardwood species would be suitable.

Known Hosts

Aeolesthes sarta attacks a wide range of deciduous tree species:

Hosts	References
Acer sp. (maple)	(Gressitt 1951, Duffy 1968, Orlinski 2000, EPPO 2005)
Acer cultratum (bakimu)	(Ahmad et al. 1977, Sengupta and Sengupta 1981)
Aesculus sp. (buckeye)	(Gressitt 1951)
Aesculus indica (Indian horse-chestnut)	(Duffy 1968, Ahmad et al. 1977, Sengupta and Sengupta 1981)
Alnus subcordata (Caucasian alder)	(Farashiani et al. 2001)
Betula sp. (birch)	(Orlinski 2000, EPPO 2005)
Carya sp. (pecan)	(Gaffar and Bhat 1991)
Castanea sp. (chestnut)	(Gaffar and Bhat 1991)
Corylus colurna (Turkish hazelnut)	(Gressitt 1951, Duffy 1968, Ahmad et al. 1977, Sengupta and Sengupta 1981)
Cydonia sp. (quince)	(Duffy 1968, USDA 1968, Gaffar and Bhat 1991)
Elaeagnus sp. (elaeagnus)	(Orlinski 2000, Farashiani et al. 2001, EPPO 2005)
Fraxinus sp. (ash)	(Duffy 1968, Orlinski 2000, EPPO 2005)
Gleditsia sp. (locust)	(Orlinski 2000, EPPO 2005)
Juglans sp. (walnut)	(Gressitt 1951, USDA 1968, Gaffar and Bhat 1991, Orlinski 2000, EPPO 2005)
Juglans regia (English walnut)[1]	(Duffy 1968, Yagdyev and Tashlieva 1976, Ahmad et al. 1977, Sengupta and Sengupta 1981, Orlinski 2000, Farashiani et al. 2001, EPPO 2005, Mir and Wani 2005)
Malus sp. (apple)	(USDA 1968, Gaffar and Bhat 1991, Orlinski 2000, EPPO 2005)
Malus pumila (=*M. domestica*) (paradise apple)[1]	(Ahmad et al. 1977, Orlinski 2000, EPPO 2005)
Malus sylvestris (=*Pyrus malus*) (European crabapple)	(Duffy 1968, Ahmad et al. 1977, Sengupta and Sengupta 1981)
Morus sp. (mulberry)	(Duffy 1968, Orlinski 2000, Farashiani et al. 2001, EPPO 2005)
Platanus sp. (plane)	(Gressitt 1951, Ahmad et al. 1977, Orlinski 2000, EPPO 2005)
Platanus acerifolia (=*P. hybrida*, =*Platanus* ×*hispanica*) (London planetree)	(Orlinski 2000, EPPO 2005)
Platanus orientalis (Oriental planetree)	(Duffy 1968, Ahmad et al. 1977, Sengupta and Sengupta 1981,

Hosts	References
	Orlinski 2000, Farashiani et al. 2001, EPPO 2005)
Populus sp. (poplar)	(Gressitt 1951, USDA 1968, Ahmad et al. 1977, Sengupta and Sengupta 1981, Thakur 1999, Orlinski 2000, EPPO 2005)
Populus alba (white poplar)	(Duffy 1968, Ahmad et al. 1977, Sengupta and Sengupta 1981, Orlinski 2000, Farashiani et al. 2001, EPPO 2005)
Populus ciliata (Himalayan poplar)	(Ahmad et al. 1977)
Populus diversifolia (huyang)	(Orlinski 2000, EPPO 2005)
Populus euphratica (Euphrates poplar)	(Duffy 1968, Yagdyev 1975, Ahmad et al. 1977, Orlinski 2000, EPPO 2005)
Populus nigra (Lombardy poplar)	(Duffy 1968, Ahmad et al. 1977, Farashiani et al. 2001)
Populus talassica (Talas poplar)	(Orlinski 2000, EPPO 2005)
Populus × *canadensis* (*P. deltoides* × *nigra*) (=*P.* × *euramericana*) (Carolina poplar)	(Ahmad et al. 1977, Orlinski 2000, EPPO 2005)
Prunus sp. (stone fruit)	(Gressitt 1951, Duffy 1968, Gaffar and Bhat 1991, Orlinski 2000, EPPO 2005)
Prunus amygdalus (=*Amygdalus communis*) (almond)	(Mustafa and Janjua 1942, Duffy 1968, USDA 1968, Ahmad et al. 1977, Gaffar and Bhat 1991, Farashiani et al. 2001)
Prunus armeniaca (apricot)	(Duffy 1968, USDA 1968, Ahmad et al. 1977, Sengupta and Sengupta 1981, Gaffar and Bhat 1991)
Prunus racemosa (bird cherry)	(Duffy 1968, Ahmad et al. 1977)
Pyrus sp. (pear)	(Gressitt 1951, Ahmad et al. 1977, Gaffar and Bhat 1991, Orlinski 2000, EPPO 2005)
Pyrus communis (pear)	(Duffy 1968, Ahmad et al. 1977)
Quercus sp. (oak)	(Orlinski 2000, EPPO 2005)
Robinia sp. (locust)	(Duffy 1968, Orlinski 2000, Farashiani et al. 2001, EPPO 2005)
Salix sp. (willow)	(Gressitt 1951, USDA 1968, Ahmad et al. 1977, Sengupta and Sengupta 1981, Orlinski 2000, Farashiani et al. 2001, EPPO 2005)
Salix acmophylla	(Duffy 1968, Orlinski 2000, EPPO 2005)

Hosts	References
Salix alba (white willow)	(Duffy 1968, Ahmad et al. 1977, Sengupta and Sengupta 1981)
Salix babylonica (weeping willow)	(Duffy 1968, Ahmad et al. 1977)
Salix songarica	(Orlinski 2000, EPPO 2005)
Salix tetrasperma	(Duffy 1968)
Salix turanica	(Orlinski 2000, EPPO 2005)
Ulmus sp. (elm)	(Gressitt 1951, Duffy 1968, USDA 1968, Ahmad et al. 1977, Orlinski 2000, Farashiani et al. 2001, EPPO 2005)
Ulmus minor (European field elm)	(Orlinski 2000, EPPO 2005)
Ulmus pulmila (dwarf elm)	(Orlinski 2000, EPPO 2005)
Ulmus wallichiana (Himalayan elm)	(Duffy 1968, Ahmad et al. 1977, Sengupta and Sengupta 1981)

1. Listed in Orlinski (2000) as a "preferred host".

Known Distribution

Aeolesthes sarta occurs in the Palearctic and Orient (Duffy 1968). It has specifically been reported from:

Asia: Afghanistan, China, India, Iran, Japan, Kazakhstan, Kyrgyzstan, Malaysia, Pakistan, Sri Lanka, Tajikistan, Turkmenistan, and Uzbekistan

(Mustafa and Janjua 1942, Gressitt 1951, Duffy 1968, USDA 1968, Yagdyev and Tashlieva 1976, Ahmad et al. 1977, Sengupta and Sengupta 1981, Gaffar and Bhat 1991, Thakur 1999, Orlinski 2000, Farashiani et al. 2001, EPPO 2005, Mir and Wani 2005).

Pathway

Natural spread through adult flight is considered relatively slow. Different life stages may be transported through trade, specifically with untreated wood. This species is unlikely to be moved with plants for planting because it does not attack small branches, trunks, or rootstocks. Adults may move as contaminating pests on various commodities (EPPO, 2005).

This species has not been intercepted at U.S. ports of entry; however, *Aeolesthes* sp. have been intercepted twice. Intercpetions originiated from India and China and in both cases occurred on wood packing (AQAS 2013, queried January 24, 2013).

Potential Distribution within the United States

The potential distribution of this insect in the United States is difficult to predict. Based on the worldwide distribution of the species, *A. sarta* seems to be more closely associated with biomes classified as montane grassland and tropical and subtropical moist broadleaf forest. Montane grassland does not occur in the United States and

subtropical moist broadleaf forest only occurs in southern Florida. The insect may occur in temperate broadleaf and mixed forests, but the information from Asia is not detailed enough to know for certain.

In general, the species is most problematic in areas that are hot and dry (reviewed in CAB 2006).

A recent host analysis by USDA-APHIS-PPQ-CPHST, illustrates the abundance of host material in the eastern portion of the United States.

Survey

CAPS-Approved Method*:
Visual survey is the approved survey method for *A. sarta*.

*For the most up-to-date methods for survey and identification, see Approved Methods on the CAPS Resource and Collaboration Site, at http://caps.ceris.purdue.edu/.

Literature-Based Method:
Visual inspection of trees is the only practical method to survey for this insect; no attractants have been identified. Exit holes in tree trunks or large branches are one of the most obvious symptoms (EPPO 2005). Dust from larval boring may be present at the base of a tree (Orlinski 2000). Trees may have large areas with apparently rotting bark (Mustafa and Janjua 1942). Infested trees may also show symptoms of dieback (EPPO 2005).

Key Diagnostics

CAPS-Approved Method*: Confirmation of *A. sarta* is by morphological identification. An identification aid can be found on the CAPS website: http://caps.ceris.purdue.edu/webfm_send/90.

*For the most up-to-date methods for survey and identification, see Approved Methods on the CAPS Resource and Collaboration Site, at http://caps.ceris.purdue.edu/.

Easily Confused Pests

This species is not likely to be confused with any other pests.

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