Megaplatypus mutatus

Coleoptera: Platypodidae

No common name, an ambrosia beetle

Host(s)	CAPS-Approved Survey Method
Major hosts *Juglans* spp. (Walnut), *Juglans regia* (English walnut), *Malus* spp. (Apple), *Populus* spp. (Poplar) *Populus alba* (White poplar), *Populus* x *canadensis* (=*Populus* x *euramericana*) (Carolina poplar), and *Populus deltoides* (Eastern cottonwood), (reviewed in Giménez and Etiennot, 2003; Alfaro et al., 2007). **Other hosts** *Acacia* spp. (Acacia), *Acacia mearnsii* (Black wattle), *Acer* spp. (Maple), *Acer negundo* (Boxelder), *Ailanthus* spp. (Ailanthus), *Ailanthus altissima* (Tree of heaven), *Balfourodendron* spp., *Balfourodendron riedelianum* (Marfim), *Calophyllum* spp. (Calophyllum), *Calophyllum brasiliense* (Antilles calophyllum), *Castanea* spp. (Chestnut), *Casuarina* spp. (Sheoak), *Casuarina cunninghamiana* (River sheoak), *Casuarina verticillata* (=*C. stricta*) (Drooping sheoak), *Cedrela* spp. (Cedrela), *Cedrela tubiflora*, *Citrus* spp., *Corylus avellana* (Hazel), *Erythrina* spp. (Erythrina), *Erythrina crista-galli* (Crybabytree), *Eucalyptus* spp. (Gum), *Eucalyptus camaldulensis* (=*E. rostrata*) (River redgum), *Eucalyptus dunni*, *Eucalyptus robusta* (Swampmahogany),	*Megaplatypus mutatus* lure in a translucent cross vane panel trap.

Eucalyptus tereticornis (Forest redgum), *Eucalyptus urophylla* x *Eucalyptus camaldulensis*, *Eucalyptus urophylla* x *Eucalyptus grandis*, *Fraxinus* spp. (Ash), *Fraxinus excelsior* (European ash), *Grevillea* spp. (Grevillea), *Grevillea robusta* (Silkoak), *Laurus* spp. (Laurel), *Laurus nobilis* (Sweet bay), *Ligustrum* spp. (Privet), *Ligustrum lucidum* (Glossy privet), *Liquidambar* spp. (Sweetgum), *Liquidambar styraciflua* (Sweetgum), *Luehea divaricata*, *Magnolia* spp. (Magnolia), *Magnolia grandiflora* (Southern magnolia), *Malus domestica* (Apple), *Malus sylvestris* (European crab apple), *Melia* spp. (Melia), *Melia azedarach* (Chinaberrytree), *Persea americana* (Avocado), *Pinus* spp. (Pine), *Platanus* spp. (Sycamore), *Platanus* x *acerifolia*, *Prunus* spp. (Plum), *Prunus cerasus* (Cherry), *Prunus persica* (Peach), *Pyrus* spp. (Pear), *Pyrus communis* (Pear), *Quercus* spp. (Oak), *Quercus palustris* (Pin oak), *Quercus robur* (English oak), *Quercus rubra* var. *ambigua* (=*Quercus borealis*) (Northern red oak), *Robinia* spp. (Locust), *Robinia pseudoacacia* (Black locust), *Salix* spp. (Willow), *Salix alba* (White willow), *Salix babylonica* (Weeping willow), *Salix nigra* (Black willow), *Sebastiania klotzschiana* (=*S. commersoniana*), *Taxodium* spp. (Bald cypress), *Taxodium ascendens* (=*T. distichum*) (Pond cypress), *Tilia* spp. (Basswood), *Tilia moltkei*, *Ulmus* spp. (Elm),	

Ulmus pumila (Siberian elm), and *Vitex megapotamica* (Wood and Bright, 1992; reviewed in Giménez and Etiennot, 2003; reviewed in EPPO, 2004a; b; reviewed in Girardi et al., 2006; EPPO, 2009; Zanuncio et al., 2010; Gatti et al., 2011). A review of hosts can be found in Giménez and Etiennot (2003).	

Synonyms:
Platypus mutatus Chapuis, 1865
Platypus plicatus Brèthes, 1909
Platypus sulcatus Chapuis, 1865

Reason for Inclusion in Manual
CAPS Target: AHP Prioritized Pest List - 2014

Pest Description
Eggs: Eggs are whitish, translucent, and elliptical. They are about 1 mm long and 0.6 mm wide (<$^1/_{16}$ in) (reviewed in EPPO, 2009).

Larvae: Larval shape changes over time, from elliptical (1st instar) to cylindrical (5th instar). The mature larvae are around 7.2 mm (approx. $^5/_{16}$ in) long. The color changes over time from brilliant white (1st instar) to yellowish around maturity (reviewed in EPPO, 2009).

Pupae: The pupae are whitish in color and about 8 to 9 mm (approx. $^5/_{16}$ to $^3/_8$ in) long (reviewed in EPPO, 2009).

Figure 1. Adult of *Megaplatypus mutatus* (Image by G. Allegro, CRA- Istituto di Sperimentazione per la Pioppicoltura, Casale Monferrato (IT), EPPO Gallery).

Adults: Adults are small, about 7 – 8 mm (approx. $^1/_4$ to $^5/_{16}$ in) in length. "The adult has a cylindrical body with sulcate elytral striae...The male is about 7.5 mm [$^5/_{16}$ in] long, dark brown above, clearer below; the female is 8 – 9 mm [approx. $^5/_{16}$ to $^3/_8$ in] long, brown above and reddish-yellow below. Tarsi and antennae are reddish" (EPPO, 2009). Adults are brown or black with "a head as long as its pronotum and short antennae." Adults are sexually dimorphic; the female has a rounded elytral declivity, whereas the male has a slanted elytral declivity (Alfaro et al., 2007).

Biology and Ecology

In Buenos Aires, Argentina, adults begin to emerge between November and January (Alfaro et al., 2007). Adult males emerge a few days before females. Males fly to host tree trunks that are over 15 cm (approx. 6 in) in diameter and begin boring a radial gallery towards the center of the trunk of usually a few centimeters (EPPO, 2009; Funes et al., 2011). Males build a crown shaped rim around the gallery entrance with the boring dust (Funes et al., 2009). Males then attract females by releasing a pheromone (Gonzalez Audino et al., 2005). This species is monogamous and females do not leave the host after they mate (reviewed in Funes et al., 2011). Adults attack trees primarily in late spring (from September to November in the southern hemisphere) (Alfaro et al., 2007).

After mating, the adults begin boring new galleries inside the trunk. Over a period of two to three months, the female lays about 100 to 200 eggs (EPPO, 2009). The females construct most of the galleries as they lay their eggs. The parental gallery is extensive and spiral shaped; it is found exclusively in the transversal plane of the xylem (Alfaro et al., 2007). While the female lays her eggs, the adults inoculate the galleries with a symbiotic fungus used for food by younger larvae (EPPO, 2009). Both the adult and larval galleries are covered in mycelia of *Raphaelea santoroi* (Alfaro et al., 2007).

The first and second instars are mycetophagous, feeding directly on the mycelium. As larvae grow, they become xylophagous and begin feeding on the wood (EPPO, 2009). Larvae tunnel vertically to the parental galleries (Alfaro et al., 2007). It takes about five months for larvae to reach maturity (EPPO, 2009). Overwintering occurs mainly as mature larvae or immature adults (reviewed in EPPO, 2009). Pupation occurs in spring, and adults begin emerging in late spring to early summer (EPPO, 2009).

This species spends about nine months of its life within the host tree (Alfaro et al., 2007). EPPO (2009) states that *Megaplatypus mutatus* has only one generation per year in both South America and Italy, while Funes et al. (2011) state that there are likely two generations in both Argentina and Italy (reviewed in Funes et al., 2011).

Countries of Origin

This species is native to tropical and subtropical regions of South America but has begun expanding into temperate regions. This species was discovered in Italy in 2000 (Alfaro et al., 2007).

Known Distribution

Europe: Italy; **South America:** Argentina, Bolivia, Brazil, French Guiana, Paraguay, Peru, Uruguay, and Venezuela (Wood and Bright, 1992; Alfaro et al., 2007).

Distribution in United States

This species is not known to occur in the United States.

Alfaro et al. (2007) state that this species would be able to thrive in habitats ranging from tropical to cool temperate due to its current broad geographic distribution. This species could serve as a threat to California, Oregon, and Washington which have large plantations of hybrid poplars as well as a large fruit industry.

Pathway

It is unknown how this species was introduced into Italy. It is likely that it was introduced through untreated wood packaging due to interceptions associated with solid wood packaging material (reviewed in Alfaro et al., 2007).

This species is likely to be transported through host material as it spends approximately nine months of its life within the host tree during its various life stages (Alfaro et al., 2007). This species can be carried on recently felled wood; debarking does not eliminate the possibility of moving the pest. It may also be moved on host plants for planting, provided they were large enough to be attacked (EPPO, 2009). Movement is most likely through trade of planting stock, logs, sawn timber, and wood-based packaging (Allegro and Griffo, 2008).

This species can disperse locally through adult flight. In the search for new host trees, adults can generally move 50 to 100 m from their emergence hole. Adults are not likely to move more than 100 m as the adults are not good fliers (EPPO, 2009).

Pathogens Vectored

Ambrosia beetles feed on wood and fungi and carry their associated fungi with them to new host material. This species carries a *Raffaelea* spp.; Guerrero (1966) identified the ambrosial fungus associated with *Megaplatypus mutatus* as *Raffaelea santoroi* (EPPO, 2009). Although the fungus is not harmful to the tree, the growth on the gallery walls discolors the wood, giving it a blackish color (EPPO, 2009). Wood quality can be reduced by the presence of ambrosia fungi.

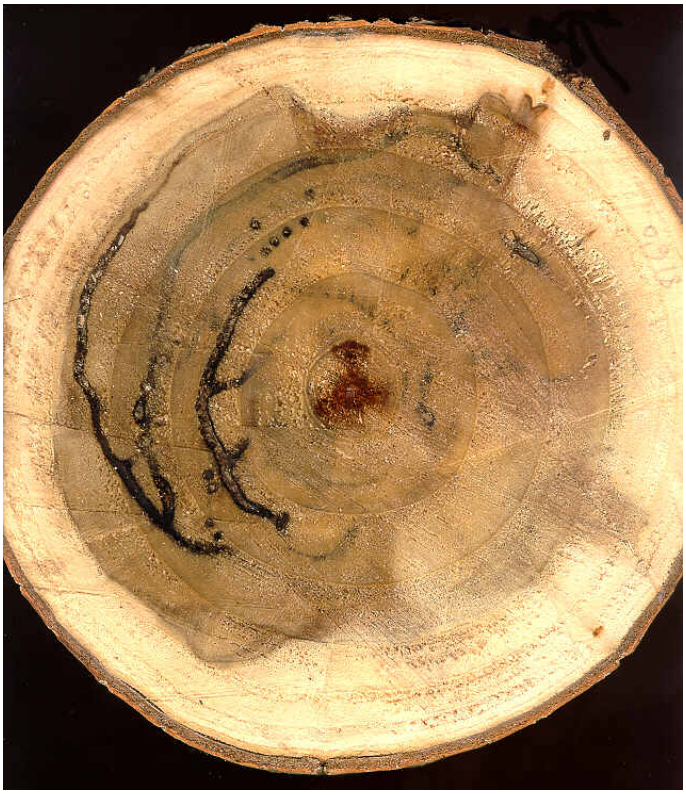

Figure 2. Galleries of *Megaplatypus mutatus* (Image by G. Allegro, CRA- Istituto di Sperimentazione per la Pioppicoltura, Casale Monferrato (IT), EPPO Gallery).

Damage

Damage is caused by adults when boring galleries into living hosts. Adults attack the stems, boring large tunnels in the xylem (Alfaro et al., 2007). Adults prefer to attack tree trunks that are over 15 cm (approx. 6 in) in diameter (EPPO, 2009). Entrance holes are about 3 mm (approx.

1/8 in) wide and approximately 4 m (approx. 13 1/8 ft) above ground level (EPPO, 2004a). The galleries degrade lumber and weaken the tree stems, making them more susceptible to breakage during wind storms (Alfaro et al., 2007).

This species emits two types of sawdust from the trunk of the infested tree (Girardi et al., 2006). Coarse boring dust can be found on newly attacked trees (EPPO, 2009). Males build a crown shaped rim around the gallery entrance with the boring dust (Funes et al., 2009). This sawdust is composed of long particles from adult digging. The other is produced as a result of larval feeding (Girardi et al., 2006).

Trees can also exude sap through the entrance holes (Alfaro et al., 2007). Entrance holes are about 3 mm (approx. 1/8 in) wide (EPPO, 2009). In Eucalyptus trees in Brazil, emergence holes were found at a height of 3 m (approx. 10 ft) above the soil line, while galleries ranged from 3 to 15 cm (approx. 1 3/16 to 5 7/8 in) in length (Zanuncio et al., 2010).

The internal galleries are lined with black mycelium of their associated symbiotic fungus (EPPO, 2009).

This species does not mass attack host trees (Alfaro et al., 2007).

Pest Importance

Megaplatypus mutatus is only known to attack living, standing trees (Alfaro et al., 2007). This species may be present in declining or cut trees as a result of an earlier primary attack (EPPO, 2009). It causes serious problems in commercial plantations of many broadleaf tree species, especially to poplars in Argentina (Giménez and Etiennot, 2003; Alfaro et al., 2007). Casaubon et al. (2006) state that this species is the most important pest of poplars in Argentina. Wood quality is reduced due to dark staining caused by the ambrosial mycelia that grow on the gallery walls. Damaged wood cannot be used for certain things, including veneer production, and has a lower market value (Alfaro et al., 2007). Wood damaged by ambrosial fungi is prevented from attaining the quality required for exporting (Giménez and Etiennot, 2003). It also reduces yield (in wood volume) (EPPO, 2009).

In Brazil, this species was found attacking an experimental plantation of Brazilwood which is popular for use in violin bows due to its unique vibrational properties and dimensional stability (Girardi et al., 2006).

Megaplatypus mutatus was found in Italy causing damage to a poplar plantation in the province of Caserta, near Naples. Its distribution in Italy has increased moderately since its introduction; however, eradication is not likely due to the species' wide host range. It has been reported to seriously affect apple, hazel, poplar, and walnut (Alfaro et al., 2007). The greatest economic damage has occurred in walnut and poplar plantations used for timber production. The apple cultivar Annurca, which is grown in the infested area, may also suffer significant economic losses (Alfaro et al., 2007). Attack on fruit trees can lead to less fruit production as well as weakening which can lead to breakage by wind (EPPO, 2009).

This species has been studied to determine what types of control methods would be effective. Work has been done on trapping as well as mating disruption. Due to the insect's cryptic lifestyle, insecticides are not considered a good control option (Funes et al., 2011).

Survey

1.1 Survey Site Selection

Select locations with host species present, preferably near warehouses or other businesses that receive wood crating, pallets, and dunnage from foreign sources. *Megaplatypus mutatus* is only known to attack living, standing trees (Alfaro et al., 2007). Follow the general instructions on **General Site Considerations for Trap Placement** in the **Introduction** to the **Exotic Wood Borer/Bark Beetle Survey Reference.**

1.2 Trap and Lure

The CAPS-approved survey method for *Megaplatypus mutatus* is the *Megaplatypus mutatus* Lure, the synthetic sex pheromone for *M. mutatus* (Gonzalez-Audino et al., 2005; Gonzalez-Audino et al., 2012). The lure contains the following three compounds: 1) sulcatone, 2) 3-pentanol, and 3) sulcatol.

Each lure unit will contain the three attractants. Depending on the supplier, all three attractants may be delivered in one dispenser or separately, as a series of polysleeves or bubble caps. The length of effectiveness for this lure is 28 days (4 weeks).

IPHIS Survey Supply Ordering System Product Names:

1) *Megaplatypus mutatus* Lure
2) Cross Vane Panel Trap, Translucent

IMPORTANT: Do not include lures for other target species in the trap when trapping for this target.

Trap spacing: When trapping for exotic wood borers and bark beetles, separate traps with different lure combinations by at least 30 meters (98 feet).

*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/.

1.3 Trap placement

Follow the general instructions on **Trap Placement** and **Trap Setup** for cross-vane panel traps.

1.4 Time of Year to Survey

In the Campania region of Italy, beetles were trapped from May through October; the highest number of beetles was caught in June through September (González-Audino et al., 2011). In the southern hemisphere, attacks occur primarily in later spring (Alfaro et al., 2007). In Argentina, Funes et al. (2009) trapped during the flight season, November through February. This translates to early spring through summer for the northern hemisphere.

Literature-Based Methods:
Trapping: Field experiments by Funes et al. (2009) found that single funnel traps equipped with cross-vanes captured significantly more *M. mutatus* than both multiple funnel traps and simple funnel traps. Traps were hung from trees with ropes approximately 1.8 m above ground level (Funes et al., 2009). Further trapping studies have shown that significantly more males and females of *M. mutatus* were captured in small and large translucent cross-vane traps than in black cross-vane traps (González-Audino et al., 2011).

The pheromone of the males is chiefly made up of (+)-6-methyl-5-hepten-2-ol (known as (+)-sulcatol or retusol), and 6-methyl-5-hepten-2-one (known as sulcatone) (Gonzalez-Audino et al., 2005; Funes et al., 2009). The compound 3-pentanol is also found in a small percentage of samples of male volatile emissions (Gatti Ligouori et al., 2008), and females reactive positively to it (Funes et al., 2011; Gatti et al., 2011).

Identification

CAPS-Approved Method*:
Morphological. The genus *Megaplatypus* does not occur in North America and a key to genera of the world exists (Wood, 1993).

*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 could be confused with other ambrosia beetles. The genus *Megaplatypus* does not occur in North America.

Resources and High Resolution Images

Images
http://www.padil.gov.au/pests-and-diseases/Pest/Main/142242.

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