

SCIENTIFIC NOTE

FIRST REPORT OF *AMASA TRUNCATA* (ERICHSON) (COLEOPTERA: CURCULIONIDAE: SCOLYTINAE) IN BRAZIL

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We report the first record of the keyhole ambrosia beetle, *Amasa truncata* (Erichson) (Coleoptera: Curculionidae: Scolytinae), a native Australian ambrosia beetle, in the Western Hemisphere. Four specimens were trapped in a five-year-old plantation of *Eucalyptus grandis* W. Hill ex Maid (22°49'19.0"S 48°53'35.5"W) in the west-central region of the state of São Paulo, Brazil. Collections occurred weekly between April 2006 and May 2007, using flight intercept traps (Berti Filho and Flechtmann 1986). One specimen was collected in July 2006 and the others in February 2007. Two specimens were collected in traps baited with α -pinene + ethanol, one in a trap baited with sulcatol + ethanol, and another in a trap baited with α -pinene plus both alcohols. Traps baited with α -pinene + ethanol were the most attractive for this species in Australia and New Zealand (Robinson 1987; Brockerhoff *et al.* 2006b; Wylie *et al.* 2008; E. G. Brockerhoff 2011 personal communication). All Brazilian specimens were compared to the holotype and have been deposited in the Museu de Entomologia da FEIS/UNESP and the A. J. Cook Arthropod Research Collection, Michigan State University.

The genus *Amasa* Lea (Xyleborini) contains over 40 species from the Oriental and Australian regions (Wood and Bright 1992; Bright and Skidmore 1997). *Amasa truncata* was described from Tasmania, Australia (Erichson 1842), and later reported from New South Wales, Australia (Lea 1894). In New Zealand, it was first found in the field in 1968 (Milligan 1969), however, the species may have been present on the island since 1930 (Kuschel 1990). Reports of *A. truncata* in Sri Lanka (Green 1912; Speyer 1923) are doubtful and likely refer to *Xyleborus*

manicus Blandford or an allied species (Schedl 1959; Roger Beaver 2010 personal communication).

Amasa truncata superficially resembles *Xyleborus neotruncatus* Schedl because both species have truncated elytra. However, *A. truncata* is distinguished from *X. neotruncatus* and other South American Xyleborini by its contiguous procoxae, antennal club with large, pubescent second and third segments, and truncated, flattened elytral declivity which is devoid of tubercles (Fig. 1a, b). It is distinguished from other *Amasa* species by the glabrous elytral declivity with three deeply punctured stria rows and granulated interstriae. Among other *Amasa* species, it is similar to *Amasa orbicaudata* (Eggers), *Amasa resecta* (Eggers), and *Amasa versicolor* (Sampson) except that these species have appressed setae on the elytral declivity. *Amasa truncata* is similar to *Amasa striatotruncata* (Schedl) and *Amasa schlichii* (Stebbing) except these species have punctured interstriae and a shagreened elytral declivity, respectively.

In its native Australia, *A. truncatus* species is associated mainly with *Eucalyptus* L'Hér. and closely related species of Myrtaceae, with the only exception being *Alphitonia petriei* Braid and C. T. White, a member of the Rhamnaceae. In Australia, *A. truncata* has been recorded only from live standing trees, all of them eucalypt species (Froggatt 1926; Moore 1959, 1962; Robinson 1987). In New Zealand, it was reported from live plants of several myrtaceous taxa, namely *Kunzea ericoides* (A. Rich.) J. Thomp., *Metrosideros excelsa* Sol. ex Gaertn., and several *Eucalyptus* species (Milligan 1969), but it also was found to breed in dead wood of several hosts outside Myrtaceae (Zondag 1977; Schedl 1980; Brockerhoff and Bain 2000) (Table 1). In

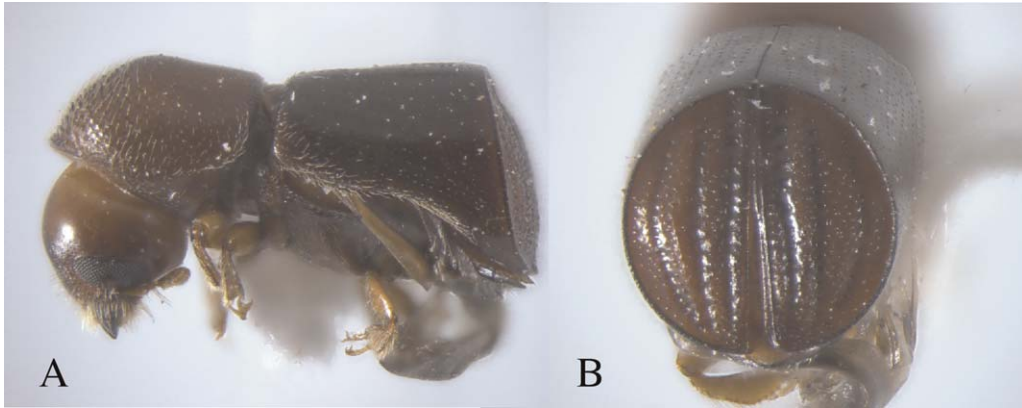


Fig. 1. *Amasa truncata*, habitus. A) Lateral view, ~ 2.0 mm from the apex of the pronotum to the base of the elytral declivity, B) Elytral declivity.

Brazil, *A. truncata* may potentially utilize native trees given its observed polyphagy in New Zealand. In addition, this beetle's preferred host family, Myrtaceae, is one of the most common plant families in Brazil, with about 1,000 species, being one of the dominant families in some Brazilian biomes (Mori *et al.* 1983; Landrum and Kawasaki 1997 and references therein). Thus, the movement of *A. truncata* from eucalypt plantations into native Brazilian forests seems likely.

Little biological research has been conducted on this species' life history outside its association with eucalypts. This species prefers to attack stressed eucalypt trees, but also will attack healthy trees (Moore 1959, 1962). Attacks start and are usually confined to wounded tissue (Froggatt 1926; Robinson 1987), but they can also infest undamaged and smooth bark (Moore 1959). As a result of its tunnels, the wood becomes stained by symbiotic fungi at varying distances surrounding the entrance hole (Moore 1959, 1962). Females bore as deep as 4.5 cm within branches or trunks (Moore 1962), where they build usually one to three flat chambers (Robinson 1987) which are approximately 2 mm wide, 5 mm high and 4 mm long (Moore 1959; Robinson 1987). Oviposition may extend for several months (Moore 1959, 1962), and eggs are laid in the chambers where larvae develop gregariously (Moore 1962). Larvae feed on symbiotic fungi which grow on the chamber walls (Moore 1962). Brood stages overlap; eggs, larvae, pupae and adults may be found in the same chamber (Moore 1959, 1962; Zondag 1977; Robinson 1987). A maximum of 86 larvae have been found in a single brood (Robinson 1987). The sex ratio is female-biased (1:10) as it is for all Xyleborini (Roberts 1977; Kirkendall 1993; Biedermann 2010). Beetles potentially overwinter as adults (Robinson

1987). The life cycle of *A. truncata* varies between 3–4 months in the summer and 6–8 months in the overwintering generation (Brimblecombe 1953; Moore 1962; Robinson 1987). Some females have been observed, under laboratory conditions, to live for six months (Froggatt 1926), which is unusually long for xyleborines (Norris and Moore 1980).

Parasitoids and predators are not known for *A. truncata* (Moore 1959; Zondag 1977; Robinson 1987). This observation likely reflects the paucity of studies on this beetle, rather than the absence of natural control agents because parasitoids have been observed for other ambrosia beetles (*e.g.*, Darling and Roberts 1999).

Amasa truncata is likely of little economic importance in either Australia or New Zealand (Moore 1959; Withers 2001), despite attacks of apparently healthy trees (Moore 1962). The species is occasionally associated with wilting foliage and terminal dieback of eucalypts, especially *Eucalyptus globulus* Labill., caused by the transmission of a *Ceratocystis* fungus (Milligan 1969; Zondag 1977). There is also some minor concern of infestations in green sawn timber for export from New Zealand (Zondag 1977). Nevertheless, there is widespread concern over the introduction and spread of quarantine pests via wood packaging material due to increased commerce among different countries around the world (Haack 2001; IPPC 2009). *Amasa truncata* is considered a species of high risk via the importation of *Eucalyptus* and *Pinus* logs from Australia as rated as by the United States Department of Agriculture (USDA), Forest Service (Kliejunas *et al.* 2003, 2006). *Amasa truncata* is also considered a potential pest to the Caribbean region by the USDA Animal and Plant Health Inspection Service (Meissner *et al.* 2009). Despite the risk that *A. truncata* could be introduced to Brazil through

Table 1. List of known host plants of *Amasa truncata*¹. NZ = New Zealand, AU = Australia, N = native, E = exotic, B = breeding in host plant, A = adults only in host plant, U = not reported.

Family	Host species	Country record	Host origin	Brood	Reference
Cunoniaceae	<i>Weinmannia racemosa</i> L.	NZ	N	B	Zondag (1977)
Fabaceae	<i>Paraserianthes lophantha</i> (Willd.)	NZ	E	B	Zondag (1977)
Mimosaceae	<i>Acacia decurrens</i> Willd. var. <i>mollis</i>	NZ	E	B	Zondag (1977)
	<i>Acacia verticillata</i> (L'Hérit.)	NZ	E	B	Zondag (1977)
	<i>Angophora floribunda</i> (Smith)	AU	N	U	Moore (1959, 1962)
	<i>Corymbia maculata</i> (Hook.)	AU	N	B	Schedl (1942), Brimblecombe (1953), Moore (1962), Robinson (1987)
	<i>Corymbia citriodora</i> (Hook.)	AU	N	U	Brimblecombe (1953), Moore (1962)
	<i>Eucalyptus acmenoides</i> Schauer	AU	N	U	Brimblecombe (1953)
	<i>Eucalyptus botryoides</i> Smith	NZ	E	B	Milligan (1969), Zondag (1977)
	<i>Eucalyptus camaldulensis</i> Dehn.	AU	N	B	Froggatt (1926), Moore (1962)
	<i>Eucalyptus globulus</i> Labill.	AU	N	B	Kliejunas <i>et al.</i> (2006)
	<i>Eucalyptus maidenii</i> F. Muell.	AU	N	U	Moore (1962)
Myrtaceae	<i>Eucalyptus obliqua</i> L'Hérit.	NZ	E	B	Zondag (1977)
	<i>Eucalyptus ovata</i> Labill.	NZ	E	B	Zondag (1977)
	<i>Eucalyptus pilularis</i> Smith	AU	N	U	Moore (1972)
	<i>Eucalyptus piperita</i> Smith	AU	N	U	Moore (1959, 1962)
	<i>Eucalyptus propinqua</i> Deane and Maiden	AU	N	U	Moore (1959, 1962)
	<i>Eucalyptus rubida</i> Deane and Maiden	AU	N	U	APPD (2001)
	<i>Eucalyptus saligna</i> Smith	AU	N	B	Moore (1959, 1962, 1972)
	<i>Eucalyptus sieberi</i> L. Johnson	AU	N	U	APPD (2001)
	<i>Eucalyptus tenuiramis</i> Miq.	AU	N	U	APPD (2001)
	<i>Eucalyptus triantha</i> Link	AU	N	U	Moore (1962)
	<i>Eucalyptus viminalis</i> Labill.	NZ	E	B	Zondag (1977)
	<i>Kunzea ericoides</i> (A. Rich.)	NZ	N	B	Milligan (1969), Zondag (1977), Kuschel (1990)
	<i>Leptospermum scoparium</i> Forst.	NZ	N	B	Zondag (1977)
	<i>Metrosideros excelsa</i> Sol. ex Gaertn.	NZ	N	B	Milligan (1969), Zondag (1977), Kuschel (1990)
	<i>Metrosideros robusta</i> A. Cunn.	NZ	N	B	Zondag (1977)
Pinaceae	<i>Pinus radiata</i> D. Don.	NZ	E	A	Zondag (1977)
	<i>Pseudotsuga menziesii</i> (Mirbel)	NZ	E	A	Zondag (1977)
Podocarpaceae	<i>Prumnopitys taxifolia</i> (Banks et Sol. ex Don.)	NZ	N	A	Zondag (1977)
Proteaceae	<i>Knightia excelsa</i> R. Br.	NZ	N	B	Zondag (1977)
Rhamnaceae	<i>Alphitonia petriei</i> Braid and C. T. White	AU	N	B	Schedl (1980)
Verbenaceae	<i>Vitex lucens</i> Kirk.	NZ	N	U	Brockerhoff and Bain (2000)

¹ Based on the Australian and New Zealand databases, we assume that the following records/countries, listed in Kliejunas *et al.* (2006), *P. radiata*/AU, *C. citriodora*/NZ, *C. maculata*/NZ, *A. floribunda*/NZ, are erroneous.

trade, *A. truncata* is not listed as a quarantine pest by the Brazilian Ministry of Agriculture (Ministério da Agricultura, Pecuária e Abastecimento) (Brasil 2008). Hence, the introduction of *A. truncata* to the Western Hemisphere seemed inevitable in retrospect.

It is likely that the introduction of *A. truncata* into Brazil is recent given that no *A. truncata* were collected during trapping studies between 1988 and 1990 within a six-year-old coppice *E. grandis*

stand in the area described above (Flechtmann and Gaspareto 1997). In 1996, eucalypt harvesting became mechanized in that area, and several machines and machine parts were imported for many years, first from Australia, and later from New Zealand as well. Hence, it is possible that this ambrosia beetle was introduced into Brazil via wood packaging material at that time, especially considering that detection of infested wood packaging is

difficult at ports of entry (Brockerhoff *et al.* 2006a). For example, despite the vigilance of New Zealand port inspectors, *A. truncata* was not intercepted at New Zealand ports from 1950–2000 (Brockerhoff *et al.* 2006a). Considering the above, we estimate that *A. truncata* was introduced into Brazil around or after 1996 and that this species is now established in Brazil. Thus, despite a history of port inspections and the recent adoption of phytosanitary measures by many countries, including Brazil, Australia, and New Zealand (IPPC 2009), to minimize the movement of pests, pests continue to escape detection during the inspection of wood packing material.

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