

Observations on the biology and host plants of the Australian longicorn beetle, *Ceresium seminigrum* Aurivillius (Coleoptera: Cerambycidae)

by

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Abstract - New observations on the biology and host plants of the Australian longicorn beetle, *Ceresium seminigrum* Aurivillius (Coleoptera: Cerambycidae: Callidiopini) are provided. The known larval host plants in Queensland are *Acacia penninervis* Sieb. ex DC. and *A. leiocalyx* (Domin) Pedley (Mimosaceae). A comparison of the host plants of *C. seminigrum* is made with those of the related Australian and New Guinean *Ceresium* species. The wasp *Xanthocryptus* sp. (Hymenoptera: Ichneumonidae) is recorded here for the first time as a parasite of *C. seminigrum* larvae.

Riassunto - Nuove osservazioni su biologia e piante ospiti [note per il Queensland *Acacia penninervis* e *A. leiocalyx* (Mimosaceae)] del cerambicida (Col., Cerambycidae, Callidiopini) australiano *Ceresium seminigrum*. Una tabella confronta le piante ospiti di *C. seminigrum* con quelle delle specie affini presenti in Australia, Nuova Guinea o comunque in Oceania. Una specie di *Xanthocryptus* (Hymenoptera: Ichneumonidae) parassita la larva di questo xilofago.

INTRODUCTION

The genus *Ceresium* is distributed throughout the South-East Asian region, and is represented in the New Guinea area by at least 10 species (GRESSITT, 1959), as in Australia, following McKEOWN (1947), but there are actually 11 species known from Australia, *C. illidgei* Blackburn having been accidentally omitted by that author (see HAWKESWOOD, 1993). They are mainly red-brown to dark brown, medium-sized longicorn beetles measuring mostly 10-25 mm in total body length. The host plants and biology of the various species from New Guinea and Australia are poorly known. During July and October 1988, the author made collections of one species, *Ceresium seminigrum* Aurivillius, from two sites in south-eastern Queensland. The results of this research are recorded here for the first time.

MATERIALS AND METHODS

During 1-2 July 1988, the author collected a considerable amount of dead, dry branches and main stems of *Acacia penninervis* Sieb. ex DC. (Mimosaceae) from semi-cleared, dry sclerophyll forest / open woodland, situated about 20 km north-west of Goombungee, west of Toowoomba, Queensland (c. 27°10'S, 151°48'E). This wood material was carefully dissected over the next six days using a screwdriver and hammer. Although most of the timber had been infested with termites (*Isoptera*), especially the lower branches and main stems, a few species of wood-boring Coleoptera were obtained from the wood. Observations are provided here on the most common of these beetles, *Ceresium seminigrum* Aurivillius (fig. 1). Another specimen of this species was collected on 22 October 1988 from dry sclerophyll forest at Brisbane, south-eastern Queensland (c. 27°31'S, 153°04'E) from *Acacia leiocalyx* (Domin) Pedley (Mimosaceae).

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RESULTS

The dead, dry stems (20-25 mm in diameter) and branches (10-20 mm in diameter) of still standing but dead *Acacia penninervis* Sieb. ex DC. were dissected. The wood material was obtained from *A. penninervis* plants that had died prematurely as a result of fire and/or drought stress. Evidence of other wood borers from the families *Cerambycidae* (longicorn beetles) and *Buprestidae* (jewel beetles) was present but most of the feeding damage appeared to have been caused by *C. seminigrum*.

Three last instar larvae were collected from *A. penninervis* in addition to the adult and pupal material recorded below. All larvae were active in the centre of the branches. After exposure of their tunnels to the outside environment, the larvae, within a few days, had covered the exposed area with a dense covering of chewed wood fragments, wood powder and faecal pellets. Four live adults and a dead one were obtained and measured (table 2). Males were easily distinguished from females on external morphology in having longer antennae with slightly wider and more prominently serrate antennal segments. Although only a few specimens of *C. seminigrum* were available for examination, a general trend was noted for dimorphic size differences between the sexes; the males were smaller (15.0-16.5 mm total body length) than the females (18.5-18.7 total body length) (table 2). Adults of both sexes stridulated when handled but individuals did not attempt to bite; they settled down quickly once they were placed in a large container with host wood upon which they rested. The adults lived for 2-3 weeks in captivity without feeding before dying.

The eggs of *C. seminigrum* are probably laid singly in the crevices in the tough but thin (0.2-0.3 mm) bark of *A. penninervis* near the base of the plants or at branch nodes further up the main stems (trunks) of the saplings. The larvae appeared to have fed on the phloem and cambial tissues under the bark before boring (chewing) into the sapwood (primary xylem) and the heartwood (secondary xylem). Most of the tunnels bored by the larvae were situated parallel with the grain of the wood. Most larvae appear to restrict their tunnelling activities within an area of 10-15 cm in any section of the timber. The pupal chambers were mostly situated in the heartwood of the stems and branches and varied from 3 to 8 mm in width, 4 to 12 mm in height and 47 to 75 mm in length (table 1). The wood in which the pupal chambers were situated varied from 15 to 26 mm in diameter (table 1). Two of the pupal chambers were found to contain the pupa of a parasitic wasp (table 1, figure 2). The adult wasps emerged about 2 months later during September 1988 and they were identified as *Xanthocryptus* sp. (*Ichneumonidae*) (fig. 3).

On 22 October 1988, one fully sclerotized adult of *C. seminigrum* was extracted (it was ready to emerge) from the dead stem of a small plant of *Acacia leiocalyx* (Domin) Pedley (*Mimosaceae*) growing in skeletal soil in an exposed situation on the top of a rise near the Griffith University campus, Brisbane, Queensland. The plant was examined closely but no further material of *C. seminigrum* or any other beetles were observed.

DISCUSSION

The two host plants recorded in the present paper are the first to be published and recorded for *C. seminigrum* Aurivillius. AURIVILLIUS (1917), in his description of the species, did not provide any biological data. The data presented here indicate that in south-eastern Queensland, *Acacia* is probably the preferred host plant genus of *C. seminigrum*. The known larval host plants of various *Ceresium* species from the Pacific region are summarized in table 3. These data indicate that most *Ceresium* species are polyphagous, although *C. illidgei* Blackburn may exhibit monophagy at the generic (or even species) level upon *Callitris* spp. (*Cupressaceae*) (HAWKESWOOD, 1993), although at present, only one *Callitris* species has been recorded as a larval host (table 3). Previously, the only published record of *Acacia* as a larval host for a species of *Ceresium* was that of DUFFY (1953) for *Ceresium unicolor* (Fabricius) (table 3).

Table 1. Size measurements and contents of the pupal chambers of *Ceresium seminigrum* Aurivillius in the dead branches and stems of *Acacia penninervis* Sieb. ex DC. (Mimosaceae) from near Toowoomba, south-eastern Queensland, Australia.

Pupal chamber number	Pupal chamber dimensions			Wood thickness (mm)	Contents of pupal chamber
	Width (mm)	Height (mm)	Length (mm)		
1	6-8	6-12	72	24-26	Adult (live)
2	3-4	8-9	48	20	Adult (live)
3	4-6	6-7	54	22-25	Adult (live)
4	4-6	6-7	56	22-25	Adult (live)
5	5-6	5-7	75	17-18	Adult (dead)
6	5-7	5-6	68	20-22	Pupa
7	4-5	4-5	58	18-19	Parasitic wasp pupa
8	5	5	48	15-18	Parasitic wasp pupa
9	5-6	6-8	47	15-16	Empty

Table 2. Size measurements of the five adults of *Ceresium seminigrum* Aurivillius collected from *Acacia penninervis* Sieb. ex DC. (Mimosaceae) from near Toowoomba, south-eastern Queensland, Australia.

Specimen	Thorax width (mm)	Thorax length (mm)	Elytral length (mm)	Total body length (mm)
Male	2.0	3.0	10.4	15.2
Male	2.3	3.1	11.2	16.5
Male	1.8	2.8	10.5	15.0
Female	2.5	3.2	13.6	18.5
Female	2.5	3.1	13.5	18.7

Table 3. Summary of larval host plants and references for some *Ceresium* species from Oceania (chiefly Papua New Guinea and Australia). * Introduced plant species.

Cerambycid species	Host plant	Plant family	Reference
<i>Ceresium australe</i> Carter	<i>Pultenaea stipularis</i> Sm.	Fabaceae	DUFFY (1963)
	* <i>Lantana camara</i> L.	Verbenaceae	WILLIAMS (1985), WILLIAMS, WEBB, DEKEYSER (1988)
<i>Ceresium flavipes</i> (Fabricius)	<i>Artocarpus</i> sp. *	Moraceae	FAIRMAIRE (1850)
	<i>Casuarina equisetifolia</i> Forst.	Casuarinaceae	BEESON & BHATIA (1939)
	* <i>Citrus</i> sp.	Rutaceae	DUFFY (1963)
	<i>Avicennia marina</i> (Forsk.) Vierh.	Avicenniaceae	HOCKEY & DE BAAR (1988)
<i>Ceresium illidgei</i> Blackburn	<i>Excoecaria dgallocha</i> L.	Euphorbiaceae	HOCKEY & DE BAAR (1988)
	<i>Callitris glaucophylla</i> Thomson & Johnson	Cupressaceae	DUFFY (1963)
<i>Ceresium pachymerum</i> (Pasc.)	* <i>Hevea brasiliensis</i> (Willd. ex A. Juss.) Muell. Arg.	Euphorbiaceae	HAWKESWOOD & DAUBER (1990)
	* <i>Mangifera minor</i> Blanco	Anacardiaceae	HAWKESWOOD & DAUBER (1990)
<i>Ceresium unicolor</i> (Fabricius)	<i>Hibiscus tiliaceus</i> L.	Mulvaceae	FAIRMAIRE (1850)
	<i>Acacia</i> sp.	Mimosaceae	DUFFY (1953)
	<i>Pipturus</i> sp.	Urticaceae	DUFFY (1953)
	<i>Artocarpus</i> sp.	Moraceae	GRESSITT (1956)
	<i>Casuarina</i> sp.	Casuarinaceae	GRESSITT (1956)
	<i>Cordia</i> sp.	Boraginaceae	GRESSITT (1956)
	<i>Sapindus</i> sp.	Sapindaceae	GRESSITT (1956)
<i>Heritiera littoralis</i> Aiton	Sterculiaceae	DUFFY (1957)	



Fig. 1. *Ceresium seminigrum* Aurivillius Dorsal view of adult female collected on 2 July 1988 west of Toowoomba, Queensland from the dead wood of *Acacia penninervis* Sieb. ex DC. (Mimosaceae) Total body length (i.e. excluding antennae) is 18.5 mm (Photo T. J. Hawkeswood).

The observations on larval behaviour, including tunnelling, and pupation of *C. seminigrum*, agree reasonably well with those made on *C. pachymerum* (Pascoe) (as recorded by HAWKESWOOD & DAUBER, 1990). The biology and behaviour of adult *C. seminigrum* are unknown, but like *C. pachymerum* (HAWKESWOOD & DAUBER, 1990), the beetle may be nocturnal, becoming active at dusk. In all of the literature that I have examined to the end of 1992, there are no records of any Australian or New Guinean species of *Ceresium* feeding on flowers or leaves. The genus is poorly represented in museum collections in Australia and this may be the result of most species being rare or localized in distribution.

The emergence of one specimen of the parasite *Xanthocryptus* sp. is of interest since data on parasites of Australian *Cerambycidae* are very scant. As far as I am aware, *Xanthocryptus* has not been recorded previously as a parasite of the larvae of Australian *Cerambycidae*. It is interesting to note that both FROGGATT (1923) and MOORE (1963) failed to record any *Ichneumonidae* as primary parasites of Australian *Cerambycidae*. Primary parasitic *Ichneumonidae* may be important regulators of populations of longicorn beetles as well as other *Coleoptera*.

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Fig. 2 *Xanthocryptus* sp. (Ichneumonidae) Pupa of parasitic wasp (at right) in a larval/pupal chamber of *Ceresium seminigrum* Aurivillius in a dead stem of *Acacia penninervis* Sieb. ex DC (Mimosaceae). Remains of the parasitized *Ceresium* larva and larval cuticle of the wasp are situated on the left. Length of the wasp pupal cell is 24.5 mm. (Photo: T. J. Hawkeswood)



Fig. 3 *Xanthocryptus* sp. (Ichneumonidae) Adult specimen measuring about 25 mm total body length (i.e. excluding antennae and ovipositor) from pupal chamber shown in fig. 2 of this paper. (Photo: T. J. Hawkeswood).

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