

Review of the biology, host plants and immature stages of the Australian *Cerambycidae* (Coleoptera) Part 1. *Parandrinae* and *Prioninae*

by

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Abstract - The general biology and host plants of about 20 species of Australian *Prioninae* (*Cerambycidae*) from the genera *Agrianome*, *Analophus*, *Brephilydia*, *Cacodacnus*, *Cnemoplites*, *Enneaphyllus*, *Eurynassa*, *Paroplites*, *Phaolus*, *Rhipidocerus*, *Sceleocantha* and *Toxotes* are reviewed from the available literature. The host-plant relationships of the various taxa are discussed. Some species (and genera) appear to be host-specific (i.e. monophagous) while several others exhibit polyphagy on a wide range of non-related plants. Overall, the presently available data are rather scanty and much more taxonomic and biological researches need to be undertaken before an adequate understanding of these beetles is reached.

Riassunto - Vengono riviste, sulla base della letteratura, biologia generale e piante ospiti di circa 20 specie di *Prioninae* (*Cerambycidae*) australiani appartenenti ai generi *Agrianome*, *Analophus*, *Brephilydia*, *Cacodacnus*, *Cnemoplites*, *Enneaphyllus*, *Eurynassa*, *Paroplites*, *Phaolus*, *Rhipidocerus*, *Sceleocantha* e *Toxotes*. Alcune specie (e generi) sembrano essere monofagi, mentre altri esibiscono polifagia su un'ampia gamma di piante non imparentate tra loro. I dati disponibili sono tuttavia piuttosto scarsi ed un maggior numero di ricerche biologiche e tassonomiche dovranno essere intraprese prima di poter pervenire ad un'adeguata conoscenza di questi coleotteri.

INTRODUCTION

The *Cerambycidae* of Australia number over 1100 described species (FROGGATT, 1907; TILLYARD, 1926; McKEOWN, 1942, 1947) and represent one of the most diverse assemblages of longicorn beetles of any continent. However, the biology of most species is poorly known or totally unknown. DUFFY (1963) provided the first major review of the biology and immature stages of Australian *Cerambycidae* and this work is a most useful starting point for further studies. However, it has become evident during my present studies, that some of the taxonomy of both the insects and their food plants listed by DUFFY (1963) are outdated and therefore facilitate a revised account. In addition, DUFFY (1963) has made errors in the citations of certain references and has overlooked others. Since DUFFY (1963) there have been only a few additional lists of host plants and only a small number of papers dealing with the biology/ecology of particular species. However, very recently, four papers have appeared, viz. WILLIAMS (1985), WEBB (1987), HOCKEY & DE BAAR (1988) and WEBB, WILLIAMS, DEKEYSER (1988), which have provided extensive data on larval host plants. Unfortunately, none of these authors have adopted an integrative approach in presentation of data, so that in all four works, larval hosts have been listed without reference to the work of other authors and so duplication has occurred with the records of certain species. It is with the above points in mind, that I have decided to present an up-to-date review of the biology and life-stages of Australian *Cerambycidae* and to provide as much illustrative material as possible. During my present studies I have consulted all the available references published in Australia which deal wholly or in part with *Cerambycidae* as well as other literature published in Europe which has been difficult or impossible to obtain in Australia. Due to the size of this work, it has been decided to publish this review in several

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parts, the first and present part dealing with the subfamilies *Parandrinae* and *Prioninae*, while others will deal with the *Cerambycinae* and the *Lamiinae*. In the present review, an asterisk placed against a plant name indicates that it is a non-native, introduced plant. A question mark against a name or record indicates that it is very doubtful.

SUBFAMILY PARANDRINAE

TRIBE PARANDRINI

Parandra frenchi Blackburn

Distribution - Australia (Queensland, New South Wales, Norfolk Island).

Host plants - *Araucaria cunninghamii* Ait. ex D. Don (*Araucariaceae*) (ILLIDGE, 1924; WEBB, 1987); *Araucaria heterophylla* (Salisb.) Franco (= *A. excelsa*) (*Araucariaceae*) (WEBB, 1987).

Biology - ILLIDGE (1924) provided an account of his collecting experiences with this beetle: "Whilst collecting, in company with Mr. H. Tryon, in the Lamington National Park, MacPherson Range, Queensland we came upon some larvae and pupae of a beetle, longicorn in character, which was quite new to us. These I undertook to breed out to the perfect insect, and hence we collected a large number of both larvae and pupae for that purpose. The larvae in the last instar only, as it is useless taking them earlier, unless with huge and cumbersome sections of the logs. I was much handicapped for want of proper receptacles for breeding purposes, as it is difficult to carry sufficient material to such places as the National Park, where pack-horses are the only means of transit. However, by means of small tin cans, tobacco boxes, etc., we managed to obtain over a hundred pupae and a smaller number of larvae. With these, heavy losses were encountered through the attacks of a small black fly, which deposited its eggs in both larvae and pupae collected, the maggots from which killed them wholesale, as also the jolting on the pack-horses, so that of the perfect insects not more than a dozen arrived at maturity." ILLIDGE (1924) later continues: "The chief interest outside this insect's aberrant place amongst the Prionidae (sic) in the Longicornia, is the enormous destruction amongst the hoop-pines *Araucaria Cunninghamii* when wounded or felled for timber and left lying in the damp scrub. One large piece of squared timber, about 12 in. [30 cm], and, say 12 ft. [3.8 m] long, was perforated as in that herewith exhibited, and which was cut from it. The main part of the tree on the ground was in a similar state, except that this, being covered by the bark, the beetles had found it more difficult to get at, and therefore had pierced it through cracks and crannies, and the larvae had committed their depredations therefrom as a nucleus or base, thus leaving parts free of attack." ILLIDGE (1924) finally noted that the pupal duration was about 15 days. It should be noted that DUFFY (1963) erroneously placed ILLIDGE's host record under the name *Archetypus frenchi* (Blackburn) which is a different species. Hence the name *Archetypus frenchi* (Blackburn) should be replaced by *Parandra frenchi* Blackburn in DUFFY's (1963) account. Also because of this gross error, DUFFY's (1963) statements that there are no biological data available on Australian members of the *Parandrinae* are also erroneous. The data provided by ILLIDGE (1924) and the supporting host data of WEBB (1987) leave me with no doubt that Illidge found *Parandra* in the MacPherson Range and not *Archetypus* as inferred by DUFFY (1963). As far as I am aware there are no published biological notes on *A. frenchi*, a species, which in Australia, is confined to north Queensland (McKEOWN, 1947).

Life-stages - Egg, larva and pupa have not been described.

Published collection records with biological data - Sydney, New South Wales, 1923, W. W. Froggatt, from hoop pine (*Araucaria cunninghamii* Ait. ex D. Don) (WEBB, 1987); Brookiana, New South Wales, 1923, W. W. Froggatt, from hoop pine (*A. cunninghamii*) (WEBB, 1987); Norfolk Island, 1980, R. Paton, from *Araucaria heterophylla* (Salisb.) Franco (listed as *A. excelsa*) (WEBB, 1987).

SUBFAMILY PRIONINAE

TRIBE MACROTOMINI

Agrianome spinicollis (Macleay) Figures 1e, 3

Distribution - Australia (Queensland, New South Wales, Lord Howe Island).

Host plants - *Howea forsteriana* (C. Moore & F. Muell.) H. Wendl. & Drude (*Arecaceae*), * *Citrus grandis* (L.) Osbeck (*Rutaceae*) and *Ficus* sp. (*Moraceae*) (LEA, 1916); *Flindersia schottiana* F. Muell. (*Flindersiaceae*) (WILSON, 1921); * *Schinus areira* L. (= *S. molle* L.) (*Anacardiaceae*) (DUFFY, 1963; WEBB, 1987); * *Delonix regia* (Boj. ex Hook.) Raf. (*Caesalpinaceae*) (DUFFY, 1963); * *Bauhinia forficata* Link (*Caesalpinaceae*) (HOCKEY & DE BAAR, 1988); *Grevillea robusta* A. Cunn. ex R. Br. (*Proteaceae*) (DUFFY, 1963; WEBB, 1987); *Angophora floribunda* (Sm.) Sweet, *Eucalyptus acmenioides* Schau. and *E. saligna* Sm. (*Myrtaceae*) (DUFFY, 1963); *Casuarina* sp. (*Casuarinaceae*) (WEBB, 1987); * *Salix* sp. (*Salicaceae*) (WEBB, 1987); *Acacia* sp. (*Mimosaceae*) (WEBB, 1987); *Brachychiton populneus* (Schott & Endl.) R. Br. (*Sterculiaceae*) (WEBB, 1987); * *Malus pumila* Miller (*Rosaceae*) (WEBB, 1987); *Ficus macrophylla* Desf. ex Pers. (*Moraceae*) (WEBB, 1987); *Ficus watkinsiana* F. M. Bail. (*Moraceae*) (HOCKEY & DE BAAR, 1988); * *Populus deltoides* Marsh (*Salicaceae*) (WEBB, 1987; WEBB, WILLIAMS, DEKEYSER, 1988); * *Populus nigra* Miller and * *Populus* sp. (WEBB, 1987); * *Solanum mauritanium* Scop. (*Solanaceae*) (HOCKEY & DE BAAR, 1988) (See also HAWKESWOOD & DAUBER, 1991).

Biology - The biology and host plants of this uncommon but widespread species have been recently reviewed by HAWKESWOOD & DAUBER (1991) but for completeness of the present paper, most of the data in the former paper are reproduced here as follows: LEA (1916) provided the first published observations on the species. According to LEA (1916), the species was relatively common on Lord Howe Island, east of New South Wales (present status is unknown), where numerous adults were collected at night on the trunks of various trees. The larvae were reported to construct large galleries and to eject large quantities of frass. LEA (1916) also reported that the galleries eventually became exposed through the action of other insects and fungi, and that the large hollows so formed were often found to be occupied by a large phasmid, *Karabidion australe* Montrouzier. A large orange tree [*Citrus sinensis* (L.) Osbeck, *Rutaceae*] was almost destroyed by the larvae (LEA, 1916). LEA (1916, plate XV) illustrated the damage done by the beetle and finally noted that very old and rotten logs of many kinds of trees (including banyan, *Ficus* sp., *Moraceae*) appeared to have been attacked as well as the living trees (except for *Ficus* sp., which did not appear to be attacked in the living state). The larvae of *A. spinicollis* are known as "witchetty grubs" since they were often extracted from rotten logs by the islander aborigines to be eaten or used as fish bait (LEA, 1916; DUFFY, 1963).

K. M. Moore in DUFFY (1963) provided the following data on the biology of *A. spinicollis*. Apparently growing trees only are attacked by this species, though larvae may continue to develop in logs. The life-cycle occupies at least two years, possibly three or four years. The vertical larval galleries occur close together, deep in the timber in the centre of the tree. Injured areas on bases of trunks are susceptible to attack. A cross-section of a tree trunk may show various holes varying in size, filled with either loose or firmly packed excreta. Larvae of various instars may be found together in the same area of the tree. Larvae work in subcontiguous galleries, usually along the grain of the wood, but occasionally across the grain for a short distance. Owing to their habit of tunnelling deep into a tree, larvae can survive intense bush-fires, even though the log or tree has been considerably affected by the fire. Larvae taken by Moore from *Eucalyptus saligna* Sm. (*Myrtaceae*) were found to be predominantly pink in colour, while those from *Eucalyptus acmenioides* Schau. were pale brown, while from *Angophora floribunda* (Sm.) Sweet (listed as *A. intermedia*), the larvae were cream in colour, apparently as a

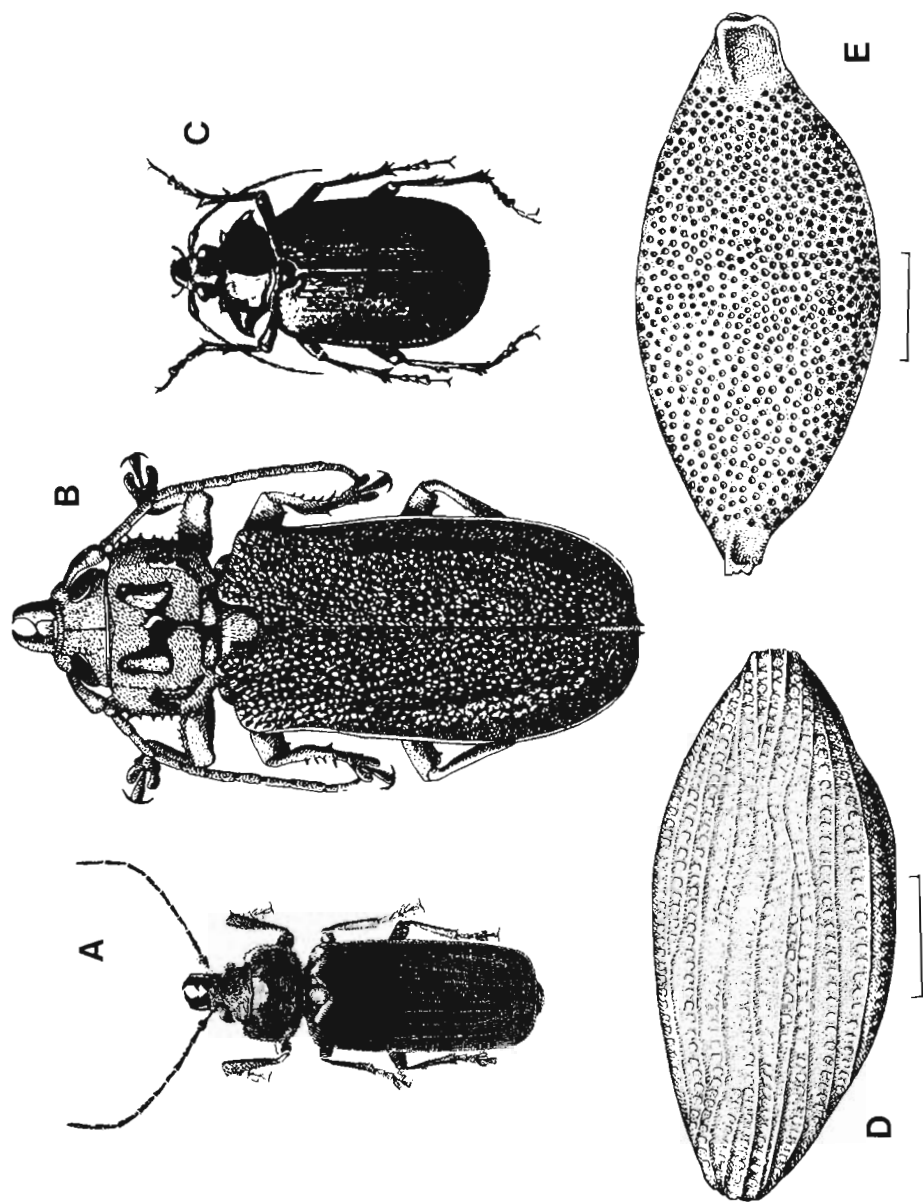


Fig. 1. A: *Euryanassa odewahni* (Pascoe), from FROGGATT (1901), *Agr. Gazette of N. S. W.*, 12: 1203-1212, and FROGGATT (1907), *Australian Insects*; B: *Euryanassa australis* (Boisduval), from DUFFY (1963, fig. 24); C: *Scelocantha gigas* Carter (female) from TILLYARD (1926, plate 19, fig. 4); D: Egg of *Paroplietes australis* (Erichson), from DUFFY (1963, fig. 19); E: Egg of *Agrianome spinicollis* (Macleay), from DUFFY (1963, fig. 21) (Note: In D and E, scale line = 1 mm).

response to the colour and chemical composition of the various timbers (Moore in DUFFY, 1963). Pupation occurs in cells surrounded by coarse strips of wood which are finer than those in the cells of *Eurynassa australis* (Boisduval) (DUFFY, 1963) (For an account of this species, see page 213). Adults emerged from reared specimens during summer (December) but others have been collected during mid- to late summer (January to February) (DUFFY, 1963).

HAWKESWOOD & DAUBER (1991) noted that on 16 Dec. 1983, one female (fig. 3) of *A. spinicollis* was collected at lights at night at Mt. Glorious, about 20 km west of Brisbane, Queensland, at the interface of wet sclerophyll forest and sub-tropical rainforest. The beetle stridulated loudly and attempted to bite fiercely when handled; later, in the laboratory, the female laid a total of 18 eggs over a three-day period and managed to live for 2 weeks (HAWKESWOOD & DAUBER, 1991). HAWKESWOOD & DAUBER (1991) provided the following discussion on the biology, behaviour and conservation of *A. spinicollis*: "*Agrianome spinicollis* is an active, nocturnal cerambycid beetle which is polyphagous in the larval stages for a wide variety of hardwood trees. Throughout its range in New South Wales, Queensland and Lord Howe Island, it appears to be uncommon and sporadic, possibly as a consequence of its 2-4 year life-cycle, i.e. in some seasons, few or no adults may be present. Most adult specimens lodged in Australian museums have been collected at night, being attracted to lamps or lights in houses, sheds, etc., during the summer months of December to February. *Agrianome spinicollis* has a coastal and inland distribution in mainland Australia (it appears to be absent from Victoria and Tasmania) and is well adapted for breeding in the living timber of such introduced trees as *Schinus* (*Anacardiaceae*), *Bauhinia* (*Caesalpinia*), *Malus* (*Rosaceae*) and *Populus* (*Salicaceae*). In many areas where the beetle frequents, e.g. Lisarow and Sydney (New South Wales) and Warwick (Queensland), there have been marked changes to the natural vegetation which have been brought about by farming, housing developments and/or industry. The survival of *A. spinicollis* in these areas appears to be maintained by the beetles shifting their feeding preferences to these introduced plants. While some of the host records reviewed in this paper require further verification, e.g. *Acacia* (*Mimosaceae*) (WEBB, 1987), *Bauhinia* (*Caesalpinia*) (HOCKEY & DE BAAR, 1988), *Casuarina* (*Casuarinaceae*) (WEBB, 1987), *Citrus* (*Rutaceae*) (LEA, 1916), *Delonix* (*Caesalpinia*) (DUFFY, 1963) and *Howea* (*Arecaceae*) (LEA, 1916), the host data show clearly that *A. spinicollis* is one of the most polyphagous species of Australian *Cerambycidae* (Hawkeswood, unpub. data). It occurs in coastal and inland eastern Australia in wet and dry sclerophyll forests, rainforests and woodlands. No doubt further collections of this beetle, especially from the more inland regions of its range, will produce further host records and other biological data. Of particular interest would be observations on its survival in coastal areas (presently) undergoing rapid environmental change through habitat destruction."

In a reference which was overlooked by all previous reviewers, i.e. DUFFY (1963), McKEOWN (1947), HAWKESWOOD & DAUBER (1991), WILSON (1921) noted that from a "cudgerie log" (*Flindersia schottiana* F. Muell., *Flindersiaceae*) which was split open, larvae and pupae of this species were collected from southern Queensland.

Life-stages - The egg (figure 1e) has been described and illustrated by DUFFY (1963) and illustrated by HAWKESWOOD & DAUBER (1991). The egg is fusiform, with one end more bluntly tapering than the other, both ends subtruncate and carinate apically. The chorion is dark brown and somewhat densely covered with large, round, deep, regularly-spaced punctures. Length 4.0-4.2 mm, width 1.6-1.7 mm (DUFFY, 1963; HAWKESWOOD & DAUBER, 1991, fig. 1). The larva is figured by LEA (1916), AURIVILLIUS (1917), BRIMBLECOMBE (1956) and HAWKESWOOD (1987) and is described in some detail by DUFFY (1963). The pupa is figured by BRIMBLECOMBE (1956) and is described in some detail by DUFFY (1963). A colour photograph of the adult is provided by HAWKESWOOD (1987), while LEA (1916) illustrates the male and female beetles.

Published collection records with biological data - Lisarow, New South Wales, 1911, collector unknown, from apple tree, *Malus pumila* Müller (WEBB, 1987); Brisbane, Queensland, 11 Nov. 1940, A. R. Brimblecombe, from *Grevillea robusta* A. Cunn. ex R. Br. (DUFFY, 1963); Warwick, Queensland, 1946, P. Miller, from *Acacia* sp. (WEBB, 1987); Boggabri, New South Wales, 1953, L. Penrose, from pepper tree, *Schinus areira* L. (WEBB, 1987); Dorrigo National Park, New South Wales, 1955, collector unknown, from Moreton Bay fig, *Ficus macrophylla* Desf. ex Pers. (WEBB, 1987); Lisarow, New South Wales (?), 16 June 1956, K. M. Moore, from *Angophora floribunda* (Sm.) Sweet (DUFFY, 1963); Ourimbah, New South Wales, 19 Nov. 1959, K. M. Moore, from *Eucalyptus acmenioides* Schau. (DUFFY, 1963); Lisarow, New South Wales, 30 March 1957, K. M. Moore, from *E. acmenioides* (DUFFY, 1963); Sydney, New South Wales, 1957, A. D. L. Mercer, from peppercorn tree, *Schinus areira* L. (WEBB, 1987); Dungog, New South Wales, 1965, P. J. Henry, from *Populus nigra* Miller (WEBB, 1987); Dubbo, New South Wales, 1970, J. Brennan, from *Grevillea robusta* (WEBB, 1987); Tumut, New South Wales, 1977, collector unknown, from *Populus* sp. (WEBB, 1987); Brisbane, Queensland, 13 Nov. 1979, M. J. Hockey, from the trunk of a dying *Bauhinia forficata* Link (?) (HOCKEY & DE BAAR, 1988); Mt. Glorious, Queensland, 29 Dec. 1979, M. J. Hockey, from log of *Ficus watkinsiana* F. M. Bail. (HOCKEY & DE BAAR, 1988); St. Georges Basin, New South Wales, 1981, E. Johns, from *Casuarina* sp. (WEBB, 1987); Long Pocket, Brisbane, Queensland, 7 Jan. 1981, M. J. Hockey, from decayed wood of *Solanum mauritianum* Scop. (HOCKEY & DE BAAR, 1988); Cobar, New South Wales, 1982, R. M. McQueen, from kurrajong, *Brachychiton populneus* (Schott. & Endl.) R. Br. (WEBB, 1987); Upper Colo, New South Wales, 1983, E. E. Taylor, from *Populus deltoides* Marsh (WEBB, 1987); Newport, Sydney, New South Wales, 1984, E. E. Taylor, from *Salix* sp. (WEBB, 1987); Upper Colo, New South Wales, 11 Jan. 1984, E. E. Taylor, from *Populus deltoides* (WEBB, WILLIAMS, DEKEYSER, 1988); Kempsey, New South Wales, 14 Jan. 1985, E. E. Taylor, from *P. deltoides* (WEBB, WILLIAMS, DEKEYSER, 1988).

***Analphus parallelus* Waterhouse**

Distribution - Australia (Queensland).

Host plant - *Aleurites moluccana* (L.) Willd. (*Euphorbiaceae*) (WEBB, 1987).

Biology - Unrecorded.

Life-stages - Egg, larva and pupa have not been described.

Published collection records with biological data - Atherton, Queensland, 1930, R. N. Doggrell, from *Aleurites moluccana* (L.) Willd. (WEBB, 1987).

***Brephilydia jejuna* (Pascoe)**

Distribution - Australia (Queensland, New South Wales).

Host plants - * *Pinus radiata* D. Don (*Pinaceae*), *Heritiera* sp. (*Sterculiaceae*) (WEBB, 1987).

Biology - Unrecorded.

Life-stages - Egg, larva and pupa have not been described.

Published collection records with biological data - Urbenville, New South Wales, 1945, K. L. Taylor, from *Heritiera* sp. (as *Tarrieria*) (WEBB, 1987); Cootamundra, New South Wales, 1983, B. Boxsell, from *Pinus radiata* D. Don (WEBB, 1987). WEBB (1987) also records the questionable record of "Ironwood" as a host plant of specimens collected from Grafton, New South Wales in 1920 and 1926, by W. W. Froggatt. WEBB (1987) regards *Austromyrtus acmenioides* (F. Muell.) Burret or *Backhousia citriodora* F. Muell. (both *Myrtaceae*) as the most likely hosts for this record, but the vague reference of "Ironwood" may also refer to Ironbarks, *Eucalyptus* spp. (also *Myrtaceae*). Thus Froggatt's records need further verification.

***Cnemoplites cephalotes* (Pascoe)**

Distribution - Australia (Queensland).

Host plant - *Eucalyptus maculata* Hook. (*Myrtaceae*) (HOCKEY & DE BAAR, 1988).

Biology - Unrecorded.

Life-stages - Egg, larva and pupa have not been described.

Published collection records with biological data - Southern Cross Mine, Ipswich, Queensland, 4-10 Nov. 1977, M. J. Hockey, from *Eucalyptus maculata* Hook. (HOCKEY & DE BAAR, 1988).

***Cnemoplites edulis* Newman**

Distribution - Australia (Victoria, South Australia).

Host plants - *Eucalyptus* spp. (*Myrtaceae*) (TEPPER, 1887).

Biology - TEPPER (1887) recorded this species breeding in *Eucalyptus* spp. (*Myrtaceae*) in South Australia. NEWMAN (1842) in his original description of the species, noted that it was an aboriginal food which was alluded to in the scientific name *edulis*. TEPPER (1887) and DUFFY (1953, 1963) briefly noted that the larvae were consumed by the Australian aborigines and that they tasted (when cooked) like fresh almonds.

Life-stages - The egg, larva and pupa have not been described.

Published collection records with biological data - None available.

***Cnemoplites impar* (Newman)**

Distribution - Australia (South Australia, Victoria).

Host plants - *Eucalyptus bicolor* A. Cunn. and other *Eucalyptus* species (*Myrtaceae*) (GODDIE, 1925).

Biology - GODDIE (1925) noted that this species bred in the roots and lower trunks of *Eucalyptus* species (*Myrtaceae*) in the mallee heathlands of north-western Victoria and that larvae were eagerly sought after by the Australian aborigines for food, while fishermen used them as bait. The GODDIE reference was overlooked by both DUFFY (1963) and McKEOWN (1947).

Life-stages - The egg, larva and pupa have not been described.

Published collection records with biological data - None available.

***Cnemoplites princeps* Gahan**

Distribution - Australia (Queensland).

Host plants - None recorded.

Biology - Unrecorded.

Life-stages - Egg described by Duffy (1963). Larva and pupa have not been described.

Published collection records with biological data - None available.

***Cnemoplites* sp.**

Distribution - Australia (New South Wales).

Host plant - *Acacia pendula* A. Cunn. ex G. Don (*Mimosaceae*) (WEBB, 1987).

Biology - Unrecorded.

Life-stages - Egg, larva and pupa have not been described.

Published collection records with biological data - Carathool, New South Wales, 1938, T. G. Campbell, from booree tree, *Acacia pendula* A. Cunn. ex G. Don (WEBB, 1987).

***Eurynassa australis* (Boisduval) Figure 1b**

Distribution - Australia (New South Wales, Queensland, South Australia, Western Australia, Tasmania).

Host plants - *Casuarina glauca* Sieb. ex Spreng. (*Casuarinaceae*) (Cox, 1906); *Eucalyptus punctata* DC. and *E. squamosa* Deane et Maiden (*Myrtaceae*) (Cox, 1906; DUFFY, 1963); *Acacia decurrens* (Wendl.) Willd. (*Mimosaceae*) (DUFFY, 1963; WEBB, 1987); *Eucalyptus acmenioides* Schau. (*Myrtaceae*) (WEBB, 1987).

Biology - LUMHOLTZ (1889) appears to have been the first to provide biological data on *E. australis*, although his notes are more ethnozoological than biological. LUMHOLTZ noted that the Aus-

tralian aborigines used to collect the larvae by cutting them from certain tree-trunks. Sometimes the larvae were eaten alive but more usually they were placed on red-hot ashes where they were rapidly cooked to become crisp and brown. LUMHOLTZ (1889) writes: "... the fat [of the larvae] bubbled in them while they were being thus prepared. If a larva is broken into two, it will be found to consist of a yellow and tolerably compact mass rather like an omelette. In taste it resembles an egg, but it seemed to me that the best kind (i.e. *Eurynassa*), which have the flavour of nuts, tasted better than a European omelette. The natives always consumed the entire larva, while I usually bit off the head and threw aside the skin, but my men always consumed my leavings with great gusto. They also ate the [adult] beetles as greedily as the larvae, swiftly removing the hard wings before roasting them". Cox (1906) noted that *E. australis* (cited as *E. figurata* Pascoe) was common in the Sydney district, New South Wales, at the turn of the century, being found abundantly under the loose bark of *Eucalyptus punctata* DC. (*Myrtaceae*). Cox (1906) also collected one larva during April 1902, from the main trunk of a *Eucalyptus squamosa* Deane et Maiden from Port Hacking, New South Wales; the larva pupated in October 1904 and became an adult in November 1904; growth in this case may have been retarded through the drying out of the infested wood (Cox, 1906), although another two larvae collected from the Hawkesbury River, New South Wales, from dry wood of *Casuarina glauca* Sieb. ex Spreng. in June 1905, took 5 and 6 months respectively, to reach the adult stage (viz. 3 Dec. and Jan. 1906 respectively). K. M. Moore in DUFFY (1963) collected larvae and pupae from the dead and rotting bases of *Acacia decurrens* (Wendl.) Willd. (*Mimosaceae*) and noted the following: all of the infested *Acacia* plants were large, mature and about 6-8 years old, some having fallen and were in contact with moist soil; some larvae were extracted from roots below ground level; adults emerged during December to February; the larval stage is at least 2 years duration and mostly 4 years; the pupal stage lasts about 2 months; galleries formed during the last instar stage are filled with coarse excreta; pupation occurs in or near the roots of standing trees, the cells being lined with coarse strips of wood. HAWKESWOOD (1987) provided a summary on the biology of *E. australis* from the data provided by LUMHOLTZ (1889) and DUFFY (1963).

Life-stages - The egg has not been described. The larva has been figured by LUMHOLTZ (1889) and McKEOWN (1942) and briefly described by DUFFY (1963). According to DUFFY (1963) the larva is very similar to that of *Paroplites australis* (Erichson). The pupa has been briefly described by DUFFY (1963) who stated that it resembled the pupa of *Agrianome spinicollis* (Macleay). The adult has been figured by LUMHOLTZ (1889), McKEOWN (1942) and DUFFY (1963). HAWKESWOOD (1987) provided the first published coloured photograph of the adult.

Published collection records with biological data - 1 larva, Port Hacking, New South Wales, 10 April 1902, H. W. Cox, from *Eucalyptus squamosa* Deane et Maiden, specimen pupated Oct. 1904, adult emerged Nov. 1904 (Cox, 1906); 2 larvae, Hawkesbury River, New South Wales, 25 June 1905, H. W. Cox, from *Casuarina glauca* Sieb. ex Spreng., adults emerged 3 Dec. 1905 and Jan. 1906 (Cox, 1906); Lisarow, New South Wales, 17 Oct. 1956, K. M. Moore, from *Acacia decurrens* (Wendl.) Willd. (DUFFY, 1963; WEBB, 1987); Lisarow, New South Wales, 1958, K. M. Moore, from *Eucalyptus acmenioides* Schau. (WEBB, 1987).

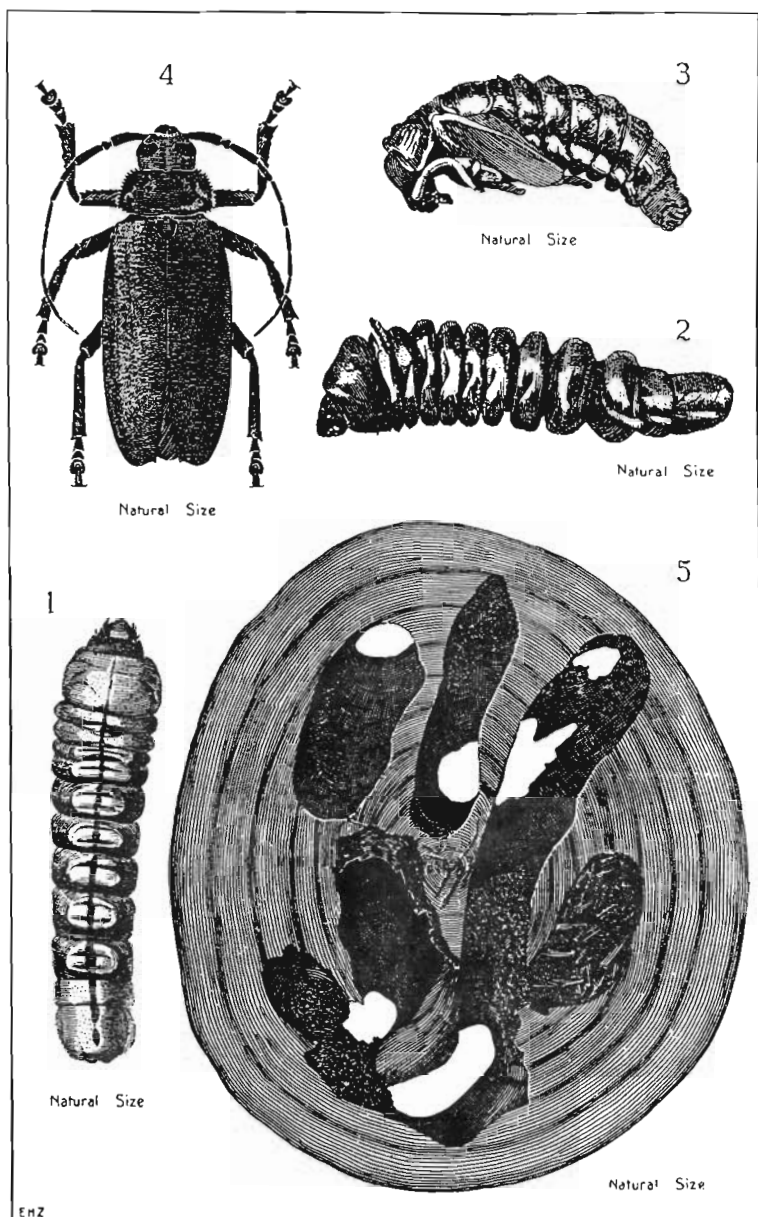
***Eurynassa odewahni* (Pascoe) Figure 1a**

Distribution - Australia (New South Wales, South Australia, Western Australia).

Host plants - *Eucalyptus* spp. (*Myrtaceae*) (TEPPER, 1887; TILLYARD, 1926; McKEOWN, 1942).

Biology - TEPPER (1887), TILLYARD (1926) and McKEOWN (1942) noted that this species was often common and usually found on or in the trunks of *Eucalyptus* species (*Myrtaceae*). McKEOWN (1942) further noted that when handled, the adult beetles emitted a strong, musky odour.

Life-stages - The egg, larva and pupa have not been described. The adult is figured by FROGGATT (1901, 1907).



Life History of the Honeysuckle Longhorn (*Paroplites australis*, Erich.).

1. Larva of beetle.
2. Side view of larva.
3. Pupa.
4. Adult beetle.
5. Cross section of stem showing damage caused by larva.

Published collection records with biological data - None available.

Eurynassa sp.

Distribution - Australia (Northern Territory).

Host plant - *Eucalyptus* sp. (Myrtaceae) (WEBB, 1987).

Biology - Unrecorded.

Life-stages - Egg, larva and pupa have not been described.

Published collection records with biological data - Barrow Creek, Northern Territory, 1980, M. S. Harvey, from *Eucalyptus* sp. (WEBB, 1987).

Paroplitus australis (Erichson) [= *P. servilis* (Pascoe)] (Banksia Longicorn) Figures 1d, 2

Distribution - Australia (Queensland, New South Wales, Victoria, Tasmania).

Host plants - *Banksia integrifolia* L. f. (Proteaceae) (FROGGATT, 1893; WEBB, 1987); *Banksia serrata* L. f. (Proteaceae) (FROGGATT, 1907, 1923); * *Quercus* sp. (Betulaceae), * *Ulmus* sp. (Ulmaceae) and * *Salix* sp. (Salicaceae) (FROGGATT, 1923); *Casuarina* sp. (Casuarinaceae) (DUFFY, 1963); *Banksia marginata* Cav. (Proteaceae) (WEBB, 1987; FEARN, 1989); *Angophora floribunda* (Sm.) Sweet (= *A. intermedia* DC.) (Myrtaceae) (WEBB, 1987); *Eucalyptus saligna* Sm. and *E. longifolia* Link (Myrtaceae) (WEBB, 1987); *Casuarina stricta* Ait. (Casuarinaceae) (FEARN, 1989).

Biology - FROGGATT (1893) was the first to record biological notes on this species (cited as *Macrotoma servilis* Pascoe). FROGGATT (1893) noted that the larvae of *P. australis* fed on the stems of *Banksia integrifolia* L. f. (Proteaceae) along the New South Wales coast and that they mined large cavities in the wood of both living and dead trees; the larval chambers were described as large and irregular in form and the larva pupated in a large, oval chamber. FROGGATT (1893) further noted that although an enormous number of *B. integrifolia* plants in the Sydney district were found to be riddled with larval holes, the adult was rarely found because of its cryptic habits in crevices of rough bark of the *Banksia* trunks. FROGGATT (1907) briefly noted that larvae of *P. australis* were common in the trunks of native honeysuckle, *Banksia serrata* L. f. (Proteaceae) along the south-west coast of New South Wales, Victoria and Tasmania. FROGGATT (1923) later provided more details on its biology as well as fine illustrations of the life-stages (except the egg). FROGGATT (1923) noted the following: "This is the commonest species in our coastal districts; and it is responsible for the final destruction of a great number of the honeysuckle trees, particularly *Banksia serrata*. All the old trees are tunnelled through the trunk and main branches; and in heavy wind storms the fallen stems show how they are honey-combed by the large white larvae. Nearly all the older trees are infested with the larvae; and a honeysuckle tree trunk obtained from the Sydney Botanic Gardens yielded over thirty specimens of the perfect beetles the following summer. At times these beetles turn their attention to cultivated shade trees. We have had specimens from cork [*Quercus* sp.], elms [*Ulmus* sp.], and willow trees [*Salix* sp.]. At Bathurst [New South Wales] some years ago a large number of street trees, particularly willows [*Salix* sp.], were badly damaged through infestation by these beetles. The destruction of all fallen and dying trees would soon reduce the numbers of these beetles.". FROGGATT (1923) and McKEOWN (1942) noted that larvae tunnel in the stems of the host plant, packing the gallery behind them with wood fragments, and pupate at the end of the gallery, usually near the bark. Although a wide range of hosts are now known, this beetle is particularly responsible for the final destruction of *Banksia* trees (FROGGATT, 1923; DUFFY, 1963; FEARN, 1989). FEARN (1989) has recently provided an account of the biology of *P. australis* from Tasmania where it breeds in *Banksia marginata* Cav. and *Casuarina stricta* Ait. (FEARN claims the first host is new but it was previously listed by WEBB, 1987). FEARN (1989) studied this beetle in a dry woodland habitat near Longford (40 km from Launceston), Tasmania during January 1982-1986; the site was on a sheep grazing property

with *Eucalyptus pauciflora* Sieb. ex Spreng. (Myrtaceae), *Crataegus monogyna* Jacq. (Rosaceae) and *Acacia mearnsii* De Wild (Mimosaceae) as dominant plants. The site was first visited on 23 Jan. 1982. Over 3 days from this date, a total of 49 beetles (41 males and 8 females) were collected. Fifteen of the males were taken from pupal chambers and the remaining 26 from tree trunks at night. All but one of the females were taken from pupal chambers. Adult beetles were found to chew away the bark over their emergence holes before emerging when environmental conditions were favourable, i.e. warm nights which are overcast and calm. During favourable nights, the beetles emerge, climb 4 metres or more up a *Banksia* tree and then fly away to unaffected trees for mating and egg-laying purposes. FEARN (1989) noted a marked decline in the numbers of *B. marginata* over the several years of observations. His summary is provided here: "When the area was first visited in January, 1982 there were 15 living specimens of *Banksia marginata* and one that had recently died as well as 35 banksia stumps and logs that had died before 1982. All the old stumps and logs were riddled with pupal chambers and emergence holes. In 1983 several of the trees had suffered wind damage, revealing severe infestation. One tree in particular showed no external damage but a break revealed larval infestation. By 1985 only 7 trees remained alive, of which 3 were young trees (trunk diameter < 30 cm) that showed no external signs of infestation while the remainder were large and had emergence holes. When visited in 1986, another large tree had died and those that died earlier had blown over revealing interiors mainly of frass. The conclusion is that larvae of *P. australis* are a major contributing factor to the rapid death of large adult banksias (especially trees with a trunk diameter of 1 m or more (?)) by consuming the wood and thus making the tree very susceptible to wind damage. Emergence holes let in moisture and other borers, promoting further decay ... The rapid decline of *Banksia marginata* coupled with no regrowth due to grazing by sheep may mean both the beetle and its host vanish from this area in a short time. Each year the number of trees diminishes as does the number and size of the beetles. All beetles taken from dead banksias were considerably underdeveloped compared to those from living trees. In other areas of Tasmania the decline of large adult banksias due to damage by *P. australis* is counteracted by sapling growth. The largest specimens of *Banksia marginata* occur in areas where *P. australis* is absent."

Life-stages - The egg is described by DUFFY (1963). The larva is illustrated by FROGGATT (1923), DUMBLETON (1957) and by DUFFY (1963, in part). The larva is briefly described by FROGGATT (1893, 1923) and in more detail by DUFFY (1963). The pupa is figured by FROGGATT (1923), but has not been described in detail. The adult is illustrated by FROGGATT (1923).

Published collection records with biological data - Nine Mile Beach, Gerringong, New South Wales, 1892, W. W. Froggatt, from *Banksia integrifolia* L. f. (FROGGATT, 1893); Sydney, New South Wales, undated, W. W. Froggatt, from *Banksia serrata* L. f. (FROGGATT, 1907, 1923; DUFFY, 1963); Sydney, New South Wales, 1904, W. W. Froggatt, from *Banksia integrifolia* L. f. (WEBB, 1987); Moruya, New South Wales, 1924, W. W. Froggatt, from *Eucalyptus longifolia* Link (WEBB, 1987); Lisarow, New South Wales, 1956, K. M. Moore, from *Angophora floribunda* (Sm.) Sweet (cited as *A. intermedia* DC.) (WEBB, 1987); Lisarow, New South Wales, 1983, E. E. Taylor, from *Eucalyptus saligna* Sm. (WEBB, 1987); Menicumbene Creek, New South Wales (17 miles south-east of Araluen), undated, P. B. Carne, from trunk of living *Casuarina* sp. (DUFFY, 1963); Beechford, Tasmania, 1982, S. Fearn (WEBB, 1987); Longford, 40 km from Launceston, Tasmania, 1982-1986, S. Fearn, from dead trunks and branches of *Banksia marginata* Cav. (FEARN, 1989). WEBB (1987) also recorded the very questionable record of "Ironwood" as a larval host plant for *P. australis* from a specimen collected at Grafton, New South Wales, by W. W. Froggatt in 1926. WEBB (1987) lists *Austromyrtus acmenoides* (F. Muell.) Burdet or *Bachousia citriodora* F. Muell. (both Myrtaceae) as the possible hosts for this record but the vague reference of "Ironwood" may also refer to "Ironbark" (*Eucalyptus* spp., Myrtaceae). Since there is some doubt, the record needs further investigations and verification.

TRIBE MEGAPODINI

Cacodacnus planicollis (Blackburn)

Distribution - Australia (Queensland, Victoria, South Australia).

Host plants - * *Pinus radiata* D. Don (*Pinaceae*) (DUFFY, 1963); *Polyscias elegans* (C. Moore et F. Muell.) Harms (= *Panax elegans* C. Moore et F. Muell.) (*Araliaceae*) (WEBB, 1987).

Biology - Unrecorded.

Life-stages - Larva briefly described by DUFFY (1963). Egg and pupa have not been described.

Published collection records with biological data - Aldgate, South Australia, 16 Feb. 1961, F. D. Morgan, from *Pinus radiata* D. Don (DUFFY, 1963); Mareeba, Queensland, 1969, R. Parrott, from *Polyscias elegans* (C. Moore et F. Muell.) Harms (as *Panax elegans*) (WEBB, 1987).

Toxotes pascoei Lameere

Distribution - Australia (Queensland, New South Wales).

Host plant - *Eucalyptus* sp. (*Myrtaceae*) (WEBB, 1987).

Biology - HAWKESWOOD (1987) noted that the species occurs in rainforests and wet sclerophyll forests in Queensland and that adults are nocturnal and may be attracted to lights at night during summer. Females are usually larger than males.

Life-stages - The egg, larva and pupa have not been described. The adult is illustrated in colour by HAWKESWOOD (1987).

Published collection records with biological data - Clyde Mountain, New South Wales, 1975, D. Royooka, from "Mahogany" (*Eucalyptus* sp.) (WEBB, 1987).

TRIBE ANACOLINI

Enneaphyllus aeneipennis Waterhouse

Distribution - Australia (Victoria, Tasmania).

Host plants - *Eucalyptus longifolia* Link and *E. pauciflora* Sieb. ex Spreng. (*Myrtaceae*) (BEST, 1920); *Xanthorrhoea* sp. (*Xanthorrhoeaceae*) (?) (WEBB, 1987).

Biology - BEST (1920) noted that he collected several adults of this rare species (cited as *Enneaphyllus rossi* Blackburn) from under the loose bark of *Eucalyptus longifolia* Link (incorrectly cited as *E. longifolium*) and also noted that the adults were nocturnal and that the larvae fed in the living roots of the snow gum, *Eucalyptus pauciflora* Sieb. ex Spreng. as well as in fallen logs from this tree, especially those which had been burnt. BEST (1920) also speculated that the adults feed on the flowers of *E. longifolia* but did not actually observe this behaviour. This record of BEST (1920) was overlooked by McKEOWN (1947) and the reference was listed by DUFFY (1963) but not referred to or discussed by him in his text which is rather peculiar.

Life-stages - The egg, larva and pupa have not been described.

Published collection records with biological data - Bicheno, Tasmania, 1980, R. Bashford, from *Xanthorrhoea* sp. (WEBB, 1987).

Phaolus metallicus (Newman) (Metallic Violet Longicorn)

Distribution - Australia (New South Wales, Queensland, Victoria, South Australia, Tasmania).

Host plants - *Acacia decurrens* (Wendl.) Willd. (*Mimosaceae*) (?) (FROGGATT, 1902); *Araucaria cunninghamii* Ait. ex D. Don (*Araucariaceae*) (WEBB, 1987); * *Pinus radiata* D. Don. (*Pinaceae*) (WEBB, WILLIAMS, DEKEYSER, 1988).

Biology - FROGGATT (1902) noted that this colourful species (listed as *Iotherium metallicum* Newman) had been collected from *Acacia decurrens* (Wendl.) Willd. and grass stalks at Bathurst, Port Macquarie and Maitland, eastern New South Wales, and noted that there was sexual dimorphism in body size, but provided no other details on the species' biology. FROGGATT (1907) fur-

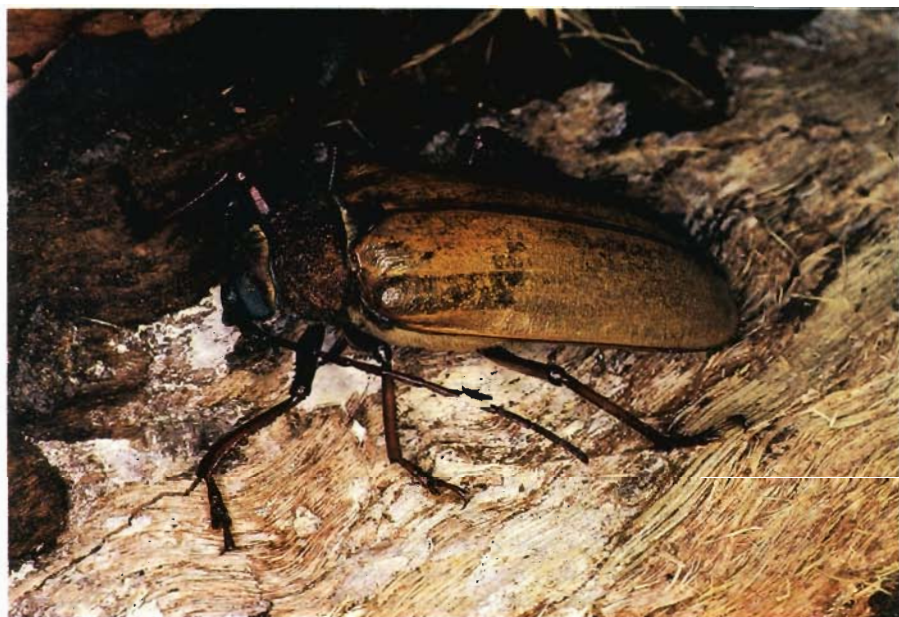


Fig. 3. Adult female of *Agrianome spinicollis* (Macleay) from Mt. Glorious, Queensland. Length of beetle is about 45 mm (Photo: T. J. Hawkeswood).

ther noted that the male was smaller than the female and that beetles were "usually taken on grass stalks in open forest country". It should be noted that the record of *Acacia decurrens* as a larval host needs further verification since FROGGATT (1902) only noted that adults were taken "upon" *Acacia decurrens*; there is no mention of adults being extracted or bred from the actual wood.

Life-stages - The egg, larva and pupa have not been described.

Published collection records with biological data - Brooklana, New South Wales, 1925, W. W. Froggatt, from hoop pine, *Araucaria cunninghamii* Ait. ex D. Don (WEBB, 1987); West Pennant Hills, New South Wales, 5 Dec. 1986, G. A. Webb, from *Pinus radiata* D. Don (WEBB, WILLIAMS, DEKEYSER, 1988).

***Rhipidocerus australasiae* Westwood**

Distribution - Australia (Queensland, New South Wales).

Host plants - *Araucaria cunninghamii* Ait. ex D. Don (*Araucariaceae*), *Nothofagus moorei* (F. Muell.) Krasser (= *Fagus moorei* F. Muell.) (*Fagaceae*) (ILLIDGE, 1924); *Toona australis* (F. Muell.) Harms (*Meliaceae*) (WEBB, 1987); * *Pinus radiata* D. Don (*Pinaceae*) (HOCKEY & DE BAAR, 1988).

Biology - ILLIDGE (1924) noted that this beetle bred in Hoop Pine (*Araucaria cunninghamii* Ait. ex D. Don) and Antarctic Beech [*Nothofagus moorei* (F. Muell.) Krasser] (cited as *Fagus moorei*) and other softwoods in the Lamington National Park, MacPherson Range, Queensland (rainforest community). The pupal stage lasted 10-12 days (ILLIDGE, 1924).

Life-stages - The egg and pupa have not been described. The larva is figured and briefly described by AURIVILLIUS (1917).

Published collection records with biological data - Gillies Highway (?), Queensland, 1969, J. G. Brooks,

from Red Cedar [*Toona australis* (F. Muell.) Harms] (WEBB, 1987); Gambubal, Queensland, 24 Sept. 1980 - 17 Feb. 1981, M. J. Hockey, from dead trunk of *Pinus radiata* D. Don (HOCKEY & DE BAAR, 1988). WEBB (1987) also includes the questionable record of "Tallowood" as a larval host for this beetle from a specimen collected from Brooklana, New South Wales in 1925 by W. W. Froggatt. Further research is needed to clarify this record since a number of native trees have been loosely called Tallowood, including *Eucalyptus microcorys* F. Muell. (*Myrtaceae*).

Sceleocantha gigas Carter Figure 1c

Distribution - Australia (New South Wales).

Host plants - None recorded.

Biology - Little has been recorded on the biology of this species. TILLYARD (1926) noted that the males of this species have the palpi enlarged into open-ribbed, packet-like organs and fly swiftly, like cockchafers (*Scarabaeidae*), over dew-covered grasslands.

Life-stages - The egg, larva and pupa have not been described.

Published collection records with biological data - None available.

Sceleocantha glabricollis Newman

Distribution - Australia (Queensland, New South Wales, Victoria, Tasmania).

Host plants - *Acacia* sp. (listed as *A. cunninghamii* Hook.) (*Mimosaceae*) (ILLIDGE, 1922; FROGGATT, 1923); *Cunninghamia lanceolata* (Lamb.) Hook. (*Pinaceae*) (HOCKEY & DE BAAR, 1988).

Biology - ILLIDGE (1922) provided the first biological notes on this species; he noted that the beetle was rare in the Brisbane district of south-eastern Queensland and that he had cut two larvae from the dense, hard, trunk wood (near the base) of *Acacia* sp. [listed as *A. cunninghamii* Hook., but this name is no longer botanically valid; the most likely *Acacia* species for this record are *A. leiocalyx* (Domin) Pedley or *A. concurrens* Pedley, but the record needs further investigation and confirmation]. FROGGATT (1923) repeated the data of ILLIDGE (1922) without adding any further information.

Life-stages - The egg, larva and pupa have not been described.

Published collection records with biological data - Imbil, Queensland, 30 Aug. 1981 - 4 Jan. 1982, M. J. Hockey, from decayed trunk of *Cunninghamia lanceolata* (Lamb.) Hook. (HOCKEY & DE BAAR, 1988).

EXCLUDED SPECIES RECORDS

1. *Agrianome fairmairei* (Montrouzier)

DUFFY (1953, 1963) erroneously recorded this species as being found in Australia (Queensland) but it is not listed in the checklist of Australian species by McKEOWN (1947). Although I have not been able to check the original description of the species at short notice, it appears that *A. fairmairei* is a species endemic to New Caledonia. DUFFY (1963) listed DISTANT (1904) as a biological reference for *A. fairmairei* but did not include it in his bibliography at the back of that book, but it was included in his 1953 work on the British *Cerambycidae*! The reference, as quoted by DUFFY (1953) is (without title) as follows: "DISTANT, W. L. 1904. *Insecta Transvaalensis* 1(5): 103-104." I have not been able to obtain a copy of this publication. It seems probable that this paper was published in a journal that became short-lived or was a private publication, not available to later workers. Also, the title suggests that it was published in South Africa. The reference was also not listed in MUSGRAVE's (1932) *Bibliography of Australian Entomology*. According to DUFFY (1953, 1963) the above reference of Distant mainly noted that the aborigines of Queensland devoured *A. fairmairei* "in all stages". LUCAS (1880) recorded *Clusia pedicellata* Forst. f. (*Clusiaceae*) as a host for *A. fairmairei* (DUFFY, 1963). However, this species is a tree which is endemic to New Caledonia and there are no records of this plant having been introduced to or cultivated in Queensland (based on records and other data at the Queensland Herbarium, Brisbane). This host record further suggests that *A. fairmairei* is a New Caledonian beetle.

Table 1. The genera and tribes of *Prioninae* in Australia with the number of species in each genus occurring in Australia (A), the number of species with recorded host data (B) and the percentage of the total number of Australian species for which larval host plants are known (C) (Modified from McKEOWN, 1947).

Tribe	Genus	A	B	C
<i>Macrotomini</i>	<i>Agrianome</i>	1	1	100
"	<i>Analphus</i>	1	1	100
"	<i>Archetypus</i>	2	0	0
"	<i>Brephilydia</i>	1	1	100
"	<i>Cnemoplites</i>	13	5	38
"	<i>Eurynassa</i>	4	3	75
"	<i>Macrotoma</i>	1	0	0
"	<i>Olethrius</i>	1	0	0
"	<i>Paroplites</i>	2	1	50
"	<i>Teispes</i>	1	0	0
"	<i>Uira</i>	1	0	0
"	<i>Xixuthrus</i>	1	0	0
<i>Megapodini</i>	<i>Cacodacnus</i>	2	1	50
"	<i>Toxentes</i>	3	1	33
<i>Anacolini</i>	<i>Aesa</i>	1	0	0
"	<i>Eboraphyllus</i>	1	0	0
"	<i>Elaptus</i>	5	0	0
"	<i>Enneaphyllus</i>	1	1	100
"	<i>Howea</i>	1	0	0
"	<i>Phaolus</i>	1	1	100
"	<i>Rhipidocerus</i>	1	1	100
"	<i>Sceleocantha</i>	6	1	17
Totals		51	18 (35%)	-

2. *Olethrius tyrannicus* J. Thomson

DUFFY (1963) listed this species from Fiji, New Caledonia, New Hebrides, Solomon Islands, Woodlark Island and Papua New Guinea as well as Australia. However, most, if not all, the biological data pertaining to this species refer to extra-Australian material (for references see DUFFY, 1963). FROGGATT's (1911) record of *Cocos nucifera* L. (*Arecaceae*) as a host came from the Solomon Islands, while RISBEC's (1937) record of *Theobroma cacao* L. (*Sterculiaceae*) came from the New Hebrides. There appear to be no references on the biology, behaviour etc. of the species in Australia. All life-stages are illustrated by RISBEC (1937).

3. *Xixuthrus microcerus* (White)

DUFFY (1963) recorded this species from Sumatra, Java, Celebes, the Moluccas, Papua New Guinea and the Solomon Islands as well as Australia. However, there appear to be no host-plants recorded for this beetle from any region. The larva and pupa are figured by HELLER (1904) but are not based on Australian material.

DISCUSSION

The data provided here indicate that there is very little information on general biology and host plants for most species and that many of the records require further confirmation. Table 1 indicates that for 10 genera out of the 22 (i.e. 45%) genera listed by McKEOWN (1947) as occurring in Australia, there have not been any biological details recorded for them. Only *Agrianome*, *Eurynassa*, *Phaolus* and *Rhipidocerus* of the *Prioninae* and *Parandra* of the *Parandrinae*, have adequate details recorded, at least with regards to host plants. The best known species biologically is *Agrianome spinicollis* (Macleay) (HAWKESWOOD & DAUBER, 1991).

Although the data are old, LILIDGE's (1924) observations on *Parandra frenchi* Blackburn ha-

ve been invaluable and have not been added to in almost 70 years. The host plants, *Araucaria* spp. (*Araucariaceae*), are primitive conifers (*Gymnospermae*) inhabiting the rainforests of eastern Australia and Papua New Guinea. Since *Parandra* is a primitive beetle with affinities also with the *Cucujoidea* (*Cucujidae*) (the genus was transferred to the *Cerambycidae* by CROWSON, 1955), it is not surprising that it is associated with a primitive plant like *Araucaria*. This plant genus, like other conifers, possesses large resin ducts in the stems and branches and it is probable that the dried sap in the dead plant tissue provides nutrition for the developing beetle larvae as they feed and grow in the fallen logs on the ground. This relationship with *Araucaria* is probably ancient and co-evolutionary. Therefore, *Parandra* appears to be monophagous at the plant genus and family levels.

Agrianome spinicollis (Macleay) is the only species of the genus found in Australia according to McKEOWN (1947) and is the most studied of all Australian *Prioninae*. The data presently available for this beetle clearly indicates that, although the species is generally uncommon, it is widely distributed and polyphagous in the larval stages on a wide variety of non-related plant genera and families. The beetle has adapted to a number of introduced (non-native) plants, i.e. *Malus*, *Schinus*, *Populus*, *Bauhinia*, *Solanum* and *Salix*. With further research, the host range of this species will no doubt be found to be much wider.

The poorly known genus *Analophus* is represented by only one species (monotypic) in Australia according to McKEOWN (1947). There is only one published host record, that of the large, tropical rainforest tree, *Aleurites moluccana* (*Euphorbiaceae*); however, this is an old record (1930) which needs confirmation. *Aleurites moluccana* is highly susceptible to various fungi but is generally resistant to borer attacks (WHITE, 1962) so this record is of some interest. Further field observations on this species are badly needed.

Brephilydia is another monotypic genus restricted to Australia, according to McKEOWN (1947). *Brephilydia jejuna* (Pascoe) has been recorded from at least two different plant families (2 genera) (with another undetermined), which indicates that it may be polyphagous in the larval stage. The record of introduced *Pinus* as host is of interest, since its normal (natural) host may be a species of rainforest conifer such as *Araucaria* (like that of the more primitive *Parandra*), but more field observations are needed before its host relationships can be clearly defined.

Several species of *Cnemoplites* show an apparent monophagy at the plant genus level on *Eucalyptus* but one record for an unidentified species indicates that *Acacia* is an additional host. However, it is not really clear whether this was definitely a *Cnemoplites* species, but since *Cnemoplites* is a genus mainly found in the semi-arid to more arid areas of Australia, it is likely that *Acacia* and *Eucalyptus* are the preferred hosts of *Cnemoplites* through ecological selection. This is another poorly known genus both taxonomically and biologically and further observations would add significantly to the present knowledge on them.

Eurynassa is a genus with at least two species endemic to Australia (McKEOWN, 1947). One species, *E. australis* (Boisduval), is relatively well known biologically and the host plant data suggest that the species is polyphagous on hardwood trees such as *Eucalyptus* and *Acacia*. *Eucalyptus* is recorded as a larval host for two other *Eurynassa* species (one of which is unidentified), which suggests that like for *Cnemoplites*, *Eucalyptus* is the preferred and normal host for *Eurynassa*. Overall, this is another poorly known genus which requires modern taxonomic and biological studies.

Paroplites is represented in Australia by at least two species (McKEOWN, 1947) but only one is well known biologically. Data for *P. australis* (Erichson) indicate that it is polyphagous in the larval stage but that *Banksia* spp. (*Proteaceae*) are perhaps the preferred hosts.

Cacodacnus is represented by at least two species in Australia (McKEOWN, 1947) but biological data exist only for *C. planicollis* (Blackburn). The data suggest that in the tropical rainforests of north Queensland, the species breeds in the large forest tree, *Polyscias elegans* (*Ara-*

liaceae), an interesting record since few *Cerambycidae* and other *Coleoptera* have been found to breed in this plant. The record from introduced *Pinus* is interesting but needs confirmation.

The genus *Toxotes* comprises at least three species from Australia (McKEOWN, 1947) but biological data exist for only one, *T. pascoei* Lameere. Like for *Cnemoplites* and *Eurynassa*, the genus *Eucalyptus* appears to be the preferred host for *T. pascoei* but more records are needed.

Enneaphyllus is another monotypic genus endemic to Australia (McKEOWN, 1947). The host data recorded for *E. aeneipennis* Waterhouse indicate that *Eucalyptus* is the preferred host but it is not clear whether *Xanthorrhoea* (grass trees) are real larval hosts or whether the beetle was merely collected from the foliage or the stems. Therefore, this record (WEBB, 1987) needs confirmation.

Phaulus is another monotypic genus endemic to Australia (McKEOWN, 1947). A few host records exist for *P. metallicus* (Newman), which suggest that the species prefers rainforest conifers such as *Araucaria* as larval hosts and is able to adapt to introduced conifers such as *Pinus*. As noted in the text, FROGGATT's (1902) record of *Acacia decurrens* as a host needs further verification.

Rhipidocerus is yet another monotypic genus of *Prioninae* restricted to Australia (McKEOWN, 1947). A number of larval host records have been published for *R. australasiae* Westwood, which indicate that, like *Parandra* and *Phaulus*, conifers (*Araucaria* and *Pinus*) are the preferred hosts. The beetle is also known to breed in primitive rainforest trees such as *Nothofagus* (*Fagaceae*) and *Toona* (*Meliaceae*), which indicates an ancient and co-evolutionary relationship and that the species is polyphagous and may have a wider host range.

According to McKEOWN (1947), there are 6 species in the endemic Australian genus *Sceleocantha*, but only host records and some biological data have been published for only one species, *S. glabricollis* Newman. It has been recorded from the native pine tree, *Cunninghamia* (*Pinaceae*) as well as hardwood *Acacia* (*Mimosaceae*), which may indicate that the species is polyphagous on a number of native trees.

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