

A translocated population of the mainland Australian Cockroach *Drymaplaneta semivitta* Walker, 1868 (Blattidae: Polyzosteriinae) in Launceston, Tasmania

Simon Fearn and Judy Rainbird

*Natural Sciences, Queen Victoria Museum and Art Gallery,
PO Box 403, Launceston, Tasmania 7250,
Simon.Fearn@launceston.tas.gov.au
Judy.Rainbird@launceston.tas.gov.au*

Introduction

Amongst the global environmental challenges of the 21st century is the geographic rearrangement of the world's biota and the consequences arising from it (Simberloff & Rejmanek, 2011). Many translocated or introduced species can seriously affect agriculture, forestry, fisheries, ecosystem function, human amenity, as well as animal and plant health. Such impacts are often more pronounced in island ecosystems and in Australia alone >3500 invertebrates (terrestrial and marine), vertebrates and plants have become established through anthropogenic action since European contact (Low, 2011). Invertebrates are among the most successful invaders as they are often small and hence easily overlooked, fast reproducing and short lived (*r*-selected) as well as having a suite of ecological and behavioural adaptations (e.g. resistant dormant

stages) that readily facilitate unwitting anthropogenic transport (Bufford & Daehler, 2011).

Blattodeans (cockroaches) are notorious invaders, but only a relatively small number of the world's approximately 4500 species have cosmopolitan distributions due to unintended anthropogenic transport (Rentz, 2014). The most important economic species are in the Families Blattinae (*Periplaneta* and *Blatta* spp.) and Ectobiidae (*Blattella*) and all are closely linked in biology to anthropogenic habitats. These species are detrimental to human health through release of allergenic chemicals into the air in dwellings, spreading a wide range of medically important pathogens, spreading food-borne parasites as well as spoiling human food with up to 13 species of fungi (Evangelista *et. al.* 2013). Nine of these cockroach species (*Periplaneta australasiae*, *P. fuliginosa*, *P. brunnea*, *P. americana*, *Blatta orientalis*,

Neostylopyga rhombifolia, *Blattella germanica* and *Supella longipalpa*) are well established over much of Australia but are largely confined to urban habitats (Rentz, 2014). Many of the above species are intercepted on a regular basis in a wide variety of goods entering Tasmania (L. Hill, Biosecurity Tasmania pers. comm.) but only *Blatta orientalis* (oriental cockroach) and *Blattella germanica* (German cockroach) are established in some urban centres. It is very likely that Tasmania's cool climate has prevented the establishment of the large and essentially tropical *Periplaneta* spp. Australian mainland native cockroaches of little or no economic consequence are also detected at biosecurity barriers as well as being delivered to the Queen Victoria Museum and Art Gallery (QVMAG) by members of the public who find specimens in their homes and places of work.

One such genus is *Drymaplaneta* (wood runners) which comprises six named species, the majority of which occur naturally in Western Australia (*D. lobipennes*, *D. heydeniana*, *D. semivitta*, *D. shelfordi* and *D. variegata*). *Drymaplaneta communis* is widespread in south eastern Australia (Rentz, 2014). Populations of *D. semivitta* (Plates 1 and 2) in Victoria and the ACT are presumably unintended translocations (ALA-bie. ala.org.au/.../urn:lsid:biodiversity.org.au:afd.taxon:4084ab92-7a98-420a-a1da-fb; S. Fearn unpublished data) and this species has been established in New Zealand for many years (Somerfield, 1977). Apart from *D. shelfordi* which has a uniform black colouration, the other

members of the genus are all superficially similar 'two toned' blattodeans of reddish to very dark brown body colours with distinctive white to yellowish bands around the outer edge of the body (Rentz 2014; Plate 1). Only *D. communis* and *D. semivitta* are known to overlap in distribution in eastern Australia and while both are a similar size (18- 30mm), the latter displays notably thickened hind tibiae in males (Plate 2). Live specimens of *Drymaplaneta* have been detected entering Tasmania (L. Hill, Biosecurity Tasmania pers. comm.) and specimens of *D. communis* have been delivered to QVMAG for identification by members of the public.

There is only one native and apparently endemic Tasmanian cockroach that could be confused with *D. semivitta*. *Temnellytra* sp. nov. was identified as an undescribed species by Australia's leading cockroach taxonomist Dr David Rentz from specimens collected in the senior author's suburban yard in Riverside, Launceston and held in the collections of QVMAG (Plate 3). This species is also a 'two toned' blattodean up to 20mm in length but is more colourful, typically orange/red with cream/yellow borders extending the whole length of the insect as well as being more gracile in overall shape. Rentz (2014) provides keys to the genera of Australian cockroaches.

In this work we report what appears to be an established, translocated population of the mainland cockroach *Drymaplaneta semivitta* in central Launceston.



Plate 1. Adult female *Drymaplaneta semivitta* (QVM:2017:12:1454) from Alice Place, Launceston, Tasmania. Note distinctive white/cream edging. Photograph: S. Fearn.

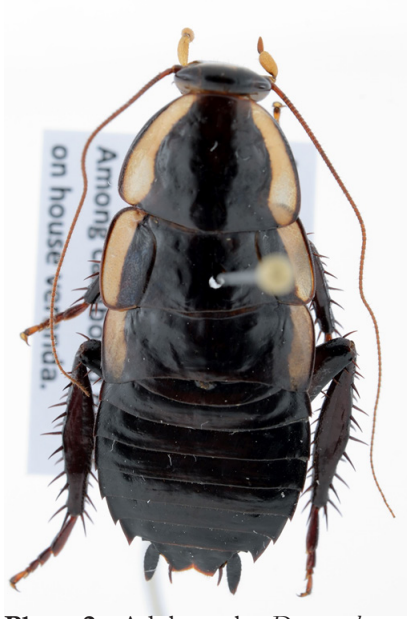


Plate 2. Adult male *Drymaplaneta semivitta* from Canberra, ACT (QVM:2017:12:1436). Note expanded central portion of hind tibia. Photograph: D. Maynard.



Plate 3. *Temnehytra* sp. nov. Riverside, Launceston, Tasmania. Photograph: D. Maynard.

Field observations

In February 2017 the second author collected a large female cockroach with a fully formed ootheca protruding from the abdomen at her residence in Alice Place, central Launceston and gave it to the senior author for identification. Having previously encountered *Drymaplaneta* species on the mainland the senior author recognised the genus immediately. Consultation of Rentz (2014) and examination of specimens held in the QVMAG entomology collection confirmed the specimen conformed to *Drymaplaneta*. Since the collection of the initial specimen (QVM: 2017:12:1452), two further specimens from the Alice Place residence (QVM: 2017:12:1453-1454) were added to the collection in March and May 2017. Specimen 1453 was collected from a trampoline moved from the yard of a neighbouring residence. When initially moved, approximately six specimens of *D. semivitta* were disturbed from their shelter under the plastic covering on the outer steel ring of the trampoline surface. Not being aware of the significance of the cockroaches, the owners of the trampoline did not collect any at the time. In addition to the specimens collected from the second author's residence other specimens have been observed sheltering under welding gloves in a shed. The very first *Drymaplaneta* specimen observed at the second author's residence was ca. 2005 and was an adult female with attached ootheca, concealed among papers in a folder left on the floor. It is possible therefore that *D. semivitta* has been

established in the area for at least 12 years.

All the Launceston *Drymaplaneta* specimens available for examination up to June 2017 were female so the authors were not confident in assigning a species to them. That was until June 17, 2017 when another QVMAG staff member photographed a large cockroach on an external door at her residence in Eardley St, South Launceston, 1.1km from the location of the original specimens in Alice Place (C. Todd, pers. comm.) The photo appeared to be an adult male *D. semivitta* as indicated by its prominent expanded hind tibia. Two days later three more adult *Drymaplaneta* were collected at the Alice Place property (QVM: 2017:12:1455-1457) including two males which also conformed to *D. semivitta*. On the evening of 19 June 2017 an adult female specimen of *D. semivitta* was secured at the Eardley St residence under a plant pot on a wooden deck and delivered to the senior author (QVM:2017:12: 1458).

Discussion

The translocation and establishment of both exotic and mainland Australian blattodeans to Tasmania is inevitable given the many invasion pathways open to these invertebrates. Modern human transport technology as well as the rapid increase in human travel and trade across perceived barriers such as oceans is increasingly facilitating the spread of organisms (McDowell 2011; Rentz 2014.). Blattodeans, in particular, are well suited to surviving relatively long periods in transit (especially in the

oothecal stage) and avoiding detection. Many blattodeans, especially those in genera with an invasion history, display considerable behavioural and trophic flexibility which may make subsequent survival and colonisation more likely in novel habitats (Rentz 2014; McDowell 2011). *Drymaplaneta* species may be emerging as one such example. Both *D. communis* and *D. semivitta* are commensal, sometimes becoming a minor nuisance in homes, and they can be present in high densities in urban habitats (Rentz 2014; S. Fearn unpublished data). At one residence in urban Canberra, *D. semivitta* had never been observed in a house but was common nocturnally in the garden and house exterior. Large congregations of adults and nymphs were observed among large sheets of cardboard packing leaning against an external wall as well as in a recycling bin full of cardboard and paper. Other specimens were observed on well weathered paling fences (S. Fearn unpublished data). The trophic ecology of this species apparently includes wood fibre and an association with paper and cardboard which would facilitate unwitting translocation in all manner of freight as well as enhancing survival prospects in transit. The size and range of the *D. semivitta* population in Launceston is unknown but it appears to have left the incipient stage to become established and reproductive. Once established, even if in a relatively confined geographical area, *Drymaplaneta* could be expected to have a very high likelihood of both relatively long and short-distance dispersal mechanisms (stratified dispersal) within Tasmania through the movement of people and

their belongings and goods. During the editing of this paper a female specimen of *D. semivitta* was confirmed from Sandy Bay, Hobart after it was delivered to TMAG (S. Grove pers. comm. 26 June, 2017).

The cockroach fauna of Tasmania is virtually unknown. For example, three entirely new and currently unnamed species (*Temnehytra*, *Ellipsidion* and *Balta*) have been identified from the senior author's suburban garden in Launceston. At least five other apparently undescribed species in three genera have been collected by QVMAG in various Tasmanian habitats over the last three years. However, there would appear to be little doubt that *D. semivitta* is a recent introduction as it is a large and conspicuous commensal species with no collection history in the state. All previous known specimens are singletons arising from border inspections or specimens brought in to QVMAG by members of the public associated with freight (L. Hill, Biosecurity Tasmania pers. comm. S. Fearn, unpublished data). The Tasmanian Museum and Art Gallery (TMAG) had no specimens of *Drymaplaneta* prior to 2017 (S. Grove pers. comm.). With the rapid rise of global travel and trade, coupled with a steady decline in entomological expertise, new species will arrive and remain undetected until the opportunity for control has passed (Rentz, 2014). We urge all interested Tasmanians to be alert to the possibility of novel species and to collect specimens and take them to either of the state's museums or to Biosecurity Tasmania.

Acknowledgements

The authors would like to thank Mr Lionel Hill of Biosecurity Tasmania for his association with QVMAG over many years as well as reviewing the manuscript. Thanks also to David Maynard and Alastair Richardson for their editing skills as well as the former's excellent photographs. Special thanks to Claire Todd for taking an interest in this project and capturing cockroaches at her residence.

References

- Bufford, J. L. and Daehler, C. C. (2011). Life History Strategies. Pp. 437-441 in Simberloff, D. and Rejmanek, M. (Eds.). (2011). *Encyclopedia of biological invasions*. University of California Press. Berkely and Los Angeles. California.
- Evangelista, D., Buss, L. and Ware, J. L. (2013). Using DNA barcodes to confirm the presence of a new invasive cockroach pest in New York City. *Journal of Economic Entomology* 106(6): 2275-2279.
- Low, T. (2011). Australia: Invasions. Pp. 36-42 in Simberloff, D. and Rejmanek, M. (Eds.). (2011). *Encyclopedia of biological invasions*. University of California Press. Berkely and Los Angeles. California.
- McDowall, R. M. (2011). Dispersal ability: Animal. Pp. 154-159 in Simberloff, D. and Rejmanek, M. (Eds.). (2011). *Encyclopedia of biological invasions*. University of California Press. Berkely and Los Angeles. California.
- Rentz, D. (2014). *A guide to the cockroaches of Australia*. CSIRO Publishing. Collingwood. Victoria.
- Simberloff, D. and Rejmanek, M. (Eds.). (2011). *Encyclopedia of biological invasions*. University of California Press. Berkely and Los Angeles. California.
- Somerfield, K. G. (1977). Insects of economic significance recently recorded in New Zealand. *New Zealand Journal of Agricultural Research* 20: 421-428.