APPS

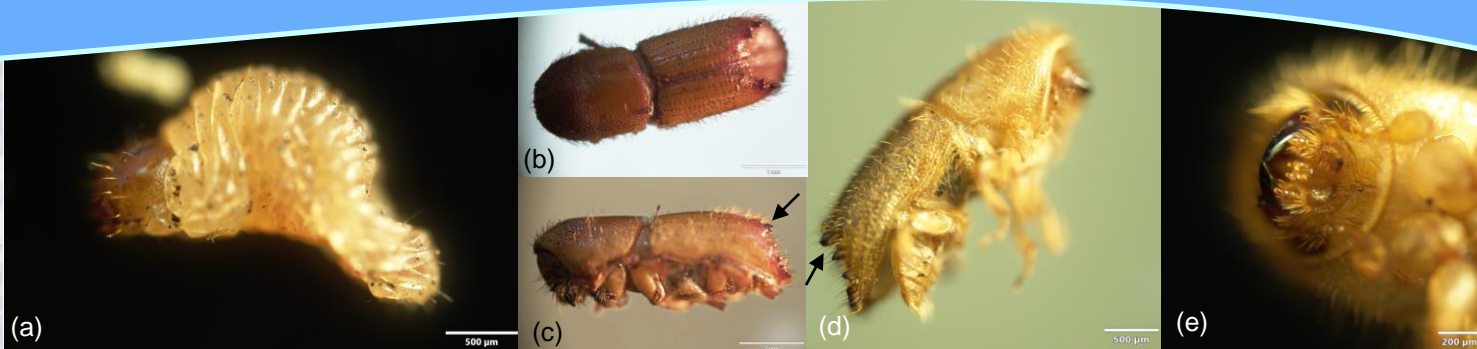*Ips grandicollis (Eichhoff)*

Fig. 1. (a) Larval stage; (b) Dorsal view; (c) and (d) Lateral view of *I. grandilcollis* adult highlighting the five projections on the posterior margin of each elytron (black arrows); (e) Close-up of the mandible. Images were acquired under light microscopy with an Olympus CMOS DP74 camera. Beetles were kindly provided by Z. Mahony and Prof. D. Guest (The University of Sydney).

Common Name: Five–spined bark beetle; Five–spined engraver
Classification: K: Animalia   P: Arthropoda   C: Insecta   O: Coleoptera   F: Curculionidae

Accidently introduced in Australia through transportation in wood packaging, *Ips grandicollis* is found throughout the *Pinus radiata* growing areas in Australia except Tasmania. Factors such as drought and fire contribute to tree stress which make such trees susceptible to *I. grandicollis* attack.

Biology and Ecology:
Adult *I. grandicollis* are 3-5 mm in length and light to dark reddish-brown in colour, depending on age, maturity and light exposure. Beetles hibernate mainly in the bark of dead trees and logs. Dispersal is mainly by flight and via transport of timber and logs containing the insect within the bark. In South Australia, two types of attack have been shown in trees: (a) breeding attack initiated by males i.e. where they infest the inner bark forming star-shaped nuptial chambers from which females construct longitudinal egg galleries, often with a characteristic tuning fork appearance. From here, larval galleries radiate into the phloem where feeding takes place; (b) feeding attack where both males and females cause damage to the phloem, cambium and outer sapwood. Adult beetles attack stressed or dying trees, freshly cut wood from harvesting and thinning operations, and occasionally healthy trees. Outbreaks have been associated with drought and trees damaged from storms and fires. Beetles also carry blue stain fungi, which can result in significant timber degrade.

Impact:
According to the Australian Plantation Statistics 2019[1], The total area of softwood plantations in 2017–18 was 1,037,000 hectares and accounted for more than 53 per cent of total commercial plantation area.

Distribution:
Ips grandicollis is native to eastern North America. In Australia, it is found in major pine growing regions in New South Wales, Victoria, South Australia, southern Queensland and Western Australia. It is also found in pine growing regions in Canada, Cuba, Honduras, Jamaica, Mexico and in the US.

Host Range:
It targets a wide range of *Pinus* species. In Australia, *P. elliotii*, *P. pinaster*, *P. radiata*, *P. taeda*, *P. caribaea* var. *hondurensis*, *P. elliottii* x *P. caribaea* hybrids and *P. patula*.

Management options:
Maintaining good tree health is key to managing the impacts of *I. grandicollis*. Optimum silviculture to promote tree vigour and good plantation hygiene to reduce population build-ups are essential parts of management for this pest. Two biological control agents (the wasp parasitoids *Roptrocerus xylophagorum* and *Dendrosoter sulcatus*) were introduced into Australia in the 1980s and are now established throughout the distribution of *I. grandicollis* in Australia, where they assist in suppressing population levels.

Further Reading: All JN and Anderson RF (1972) Ann. ent. Soc. Am. 65: 1293–1296; Garraway, E. (1986) The Canadian Entomologist, 118(2), 113-121. doi:10.4039/Ent118113-2; Gitau et al (2013) For. Ecol. Manag. 310: 865-874; Morgan FD (1967) Austr. For. 31:2, 137-155, DOI: 10.1080/00049158.1967.10675435; Yousuf et al (2014) Austral Enomology 53: 298-316;
[1]Australian plantationstatistics 2019 update,Research by the Australian Bureau of Agricultural and Resource Economics and Sciences, Technical report 19.2 May 2019 (https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/abares/publications/AustPlantationStats_2019_v.1.0.0.pdf)

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