This text is an integral part of the *EPPO Study on bark and ambrosia beetles associated with imported non-coniferous wood* and should be read in conjunction with the study

Pest information sheet
Ambrosia beetle

AUSTROPLATYPUS INCOMPERTUS AND *PLATYPUS SUBGRANOSUS* (COLEOPTERA: PLATYPODINAE)

horizontal borer and mountain pinhole borer

EPPO Lists: Not listed. The assessment of potential risks in this information sheet is not based on a full PRA for the EPPO region, but on an assessment of the limited information for that species used to prepare the information sheet. These two species are treated together due to similarities in their distribution, hosts and biology.

PEST OVERVIEW

Taxonomy

- *Austroplatypus incompertus* (Schedl, 1968)
- *Platypus subgranosus* Schedl, 1936

Associated fungi

- *A. incompertus.* Symbiont *Ambrosiella* sp. (Ploetz *et al.*, 2003), mentioning an 'unclear involvement of symbiont' in the degradation of wood quality.
- *P. subgranosus.* Symbiont *Leptographium lundbergii*. In addition, in Tasmania, *P. subgranosus* was found to be involved in the widespread mortality of *Nothofagus cunninghamii*, as 'inadvertent vector' of *Chalara australis. P. subgranosus* infests trees dying from the disease. Frass containing the fungus is then carried by the wind into wounds of otherwise healthy *N. cunninghamii* trees. The fungus normally spreads by root contact (Kliejunas *et al.*, 2003, citing others). Bickerstaff (2017) also mentions *Hormpascus platypodis* and *Raffaelea* sp.
  All fungi above are presumably not pathogenic except *C. australis*: Bickerstaff (2017) mention that there is no incidence of *Platypus*-mediated tree diseases within Australia (apart from *C. australis*).

Morphology and biology

A. incompertus and *P. subgranosus* are wood boring ambrosia beetles.

- *A. incompertus*. Adults measure 6 mm. The morphology of *A. incompertus* is detailed in Kent (2010). *A. incompertus* has been reported to attack live healthy and undamaged trees, such as rough-barked live eucalypts over 35 cm in diameter (Kliejunas *et al.*, 2003, citing others). Galleries of *A. incompertus* extend into the sapwood and may also be deep into the heartwood. The formation of galleries that extend deep into the heartwood of mature trees is done over is done over several offspring cohorts produced by the same foundress female during the whole lifetime of the system, and galleries are added as the colony develops. Smith *et al.* (2018) showed that the gallery systems are always inhabited by a single core family, consisting of a lifetime inseminated mother, permanently unmated daughter workers, and immatures that are always full siblings to each other and their adult caretakers. The foundress female is attracted by a male, mates on a tree, and initiates a gallery system on her own. It takes 4 years from gallery initiation until dispersal of the first adult offspring. The female may survive for over 30 years. Because of lifetime storage of sperm from the original mate, a female may produce many generations during its lifetime. While males offspring disperse, female offspring either disperse to mate and found their own colony, or assume unmated worker roles in the colony, probably surviving for many years without any reproductive potential (Smith *et al.*, 2018). Some *Eucalyptus delegatensis* in Victoria were found to have been infested for up to 36 years and still contained live insects and fungi in galleries long after the initial attack, indicating that a population had survived and reproduced during many years in the trees (Kliejunas *et al.*, 2003, citing others). Smith *et al.* (2018) note that attacks on live trees is a necessity to maintain viable colonies over many years. However, even after felling, some adults were observed to emerge for 3 years from an infested tree after felling (Kliejunas *et al.*, 2003, citing others).

- *P. subgranosus.* Adults measure 4 mm (Candy, 1990). *P. subgranosus* infests live trees and fresh logs. There is only one generation per gallery. A generation takes 10 months to 5 years depending on temperatures, with an average 2-3 years in the Central Highlands of Victoria. Long-established colonies of *P. subgranosus* in pure stands of live *Eucalyptus nitens* in eastern Victoria have been found (Kliejunas *et al.*, 2003, citing others). On *Pinus radiata,* infestations have been on damaged trees only (Kliejunas *et al.*, 2003 citing others). *P. subgranosus* attacks weakened live trees according to Bickerstaff (2017). However, in Tasmania, apparently healthy *N. cunninghamii* are attacked (Candy, 1990). In studies, densities of 420 attacks per m^2 were observed on *N. cunninghamii* inoculated with *C. australis*, and some emergence was observed from logs of diameter ca. 12 cm-40 cm (Candy, 1990).

Spread biology

Both males and females fly. For *P. subgranosus*, the flight capacity is described as 'weak and slow' (Kliejunas *et al.*, 2003, citing others). No information was found for *A. incompertus*.

Nature of the damage

P. subgranosus and *A. incompertus* tunnel into the wood, and lead to wood staining, both affecting wood quality. *P. subgranosus* has been involved in the spread of *Chalara australis* causing mortality of *N. cunninghamii* in Tasmania (Kliejunas *et al.*, 2003).

Detection and identification

- *Symptoms.* For both species, frass and holes may be observed.
- *Trapping*. Ethanol is an attractant for *P. subgranosus* (Candy, 1990, citing others).
- *Identification.* An identification of Australian pinhole borers is given in Bickerstaff (2017). A full, illustrated description of the external morphology of *A. incompertus* has been published by Kent (2010).

Distribution

- *A. incompertus*. Australia (Victoria, New South Wales) (Kent, 2008).
- *P. subgranosus*: Australia (Queensland, Tasmania, Victoria) (Kliejunas *et al.*, 2003, citing others).

Host plants

- *A. incompertus*. Only eucalypts[1] (Myrtaceae) are hosts: *Eucalyptus agglomerata, E. andrewsii, E. baxteri*, *E. botryoides*, *E. cameronii, E. consideniana*, *E. delegatensis (E. gigantea)*, *E. dives*, *E. fastigata*, *E. globoidea (E. scabra)*, *E. laevopinea*, *E. macrorhyncha*, *E. muelleriana*, *E. obliqua*, *E. pilularis*, *E. radiata*, *E. resinifera*, *E. sieberi*, *Corymbia gummifera* (Kent, 2008), *E. eugenioides* (Kliejunas *et al.*, 2003). Kent (2008) notes that the current host list is probably not exhaustive.
- *P. subgranosus***.** Most host are eucalypts[1] (Myrtaceae): *Eucalyptus delegatensis, E. goniocalyx, E. nitens, E. obliqua, E. regnans, E. saligna, Corymbia maculata*), but it has also been found on *Nothofagus cunninghamii* (Nothofagaceae or Fagaceae depending on sources) and *Pinus radiata* (Pinaceae) (Kliejunas *et al.*, 2003). On *Eucryphia lucida*, *Atherosperma moschatum, Phyllocladus aspleniifolius* and *Anodopetalum biglandulosum*, galleries are formed but brood production is not known (Candy, 1990 citing others). Wood and Bright (1992) also mention *Brachychiton acerifolius*, *B. populneus, Pterocymbium beccarii* (Malvaceae), *Scolopia brownii* (Salicaceae), but no mention of these hosts was found elsewhere. Candy (1990) notes that sawn timber and 'edgings' of *Dacrydium* (*Lagarostrobus*) *franklinii* (Podocarpaceae, conifer) can be attacked, but that attacks on freshly sawn timber does not result in successful brood production because the timber dries out relatively quickly compared to the length of the life cycle, resulting in desiccation.

A number of other *Eucalyptus* spp. native to Australia are grown in the EPPO region such as *E. globulus*, *E. camaldulensis*, *E. gunnii*, *E. viminalis* (see Spread). Some are present in Australian States where *P. subgranosus* and *A. incompertus* occur but are not reported as hosts. It is not known whether the lack of reports on these species are due to the fact that they are more resistant to the pests or are not present in the same geographic areas.

[1] In the broad sense, including the genus *Corymbia*, previously included under *Eucalyptus*.

Known impacts and control in current distribution

- *A. incompertus* can infest high-value *Eucalyptus* species, causing loss of wood value because of the presence of the beetle galleries and fungal staining (Kliejunas *et al.*, 2003, citing others). It causes visual and structural defects to the wood (Kent, 2008). Bickerstaff (2017) mentions that *A. incompertus* resides in living eucalypt trees with no adverse effects to the hosts health, which is consistent with the observation that infested trees can produce new broods during many years (see *Morphology and biology* above).
- *P. granulosus* causes wood degradation in the process of infesting trees (Kliejunas *et al.*, 2003, citing others). However, its major impact has occurred in Tasmania where it was an incidental vector of the lethal disease *Chalara australis* on *Nothofagus cunninghamii*.

Control: Kliejunas *et al.* (2003) mention that no control is available against these species.

POTENTIAL RISKS FOR THE EPPO REGION

Pathways

Entry

P. subgranosus and *A. incompertus* are associated with wood and can attack large diameter trees. All commodities of host wood may be a pathway. If log moisture remains suitable, both species can survive in this material for some time (Kliejunas *et al.*, 2003, citing authors. Adults of *A. incompertus* were observed to emerge from an infested tree 3 years after felling (see *Morphology and biology*). However, the wood would degrade and may not be able to sustain development of the pest (as seen for *P. subgranosus* on sawn timber of *Dacrydium franklinii*).The likelihood of entry on wood chips, hogwood and processing wood residues would be lower than on round wood, as likelihood of survival processing and transport is lower, as well as transfer to a suitable host. Data on the trade of eucalyptus round wood is available from Eurostat. In 2017, imports from Australia (ca. 4000 kg by 2 countries, UK and the Netherlands). Eucalyptus is also used as wood packaging material. Eucalypts are a known pathway for invasive pests (Hurley *et al.*, 2016). Once in the EPPO region, *P. subgranosus* and *A. incompertus* may be able to transfer to hosts, either live or freshly cut.

It is not known if small diameter material can be attacked, i.e. whether plants for planting or cut branches could be a pathway. The fact that trees infested by *A. incompertus* survive over several years could make plants for planting a likely pathway for this species if small diameter trees can be infested. Plants for planting are subject to a degree of control during production, during which attacked plants may be detected and discarded. Entry on cut branches is less likely as these are normally used indoors, and the pests are unlikely to be able to transfer to a suitable host (it is also not known if eucalyptus branches are traded).

Summary of pathways (uncertain pathways are marked with '?'):

Austroplatypus incompertus:

- *wood (round or sawn, with or without bark, including firewood) of hosts*
- *non-coniferous wood chips, hogwood, processing wood residues (except sawdust and shavings)*
- *wood packaging material if not treated according to ISPM 15*
- *plants for planting (except seeds) of hosts?*
- *cut branches of hosts?*

Platypus subgranosus:

- *wood (round or sawn, with or without bark) of hosts*
- *wood chips, hogwood, processing wood residues (except sawdust and shavings)*
- *wood packaging material if not treated according to ISPM 15*
- *plants for planting (except seeds) of hosts?*
- *cut branches of hosts (incl. Christmas trees)?*

In both cases, because of the known host ranges, pathways may cover, in addition to known hosts, all eucalypts (i.e. including genera previously included under Eucalyptus).

Spread (following introduction, i.e. within EPPO region)
P. subgranosus and *A. incompertus* could spread naturally and through human-assisted pathways (wood). If *P. subgranosus* or *A. incompertus* were introduced into the EPPO region, spread would depend on their hosts. It may be limited if only known hosts are attacked.

Establishment
Based on the Köppen-Geiger classification (see Annex 6 of the study), the main climate types of Australian states where the pests are present (Victoria, New South Wales and Tasmania) are Cfa and Cfb[2], which occur in the temperate part of the EPPO region, from UK to Spain in the West to Poland and the Black Sea in the East.
Eucalyptus spp. are not native to the EPPO region. They are most cultivated in temperate climates in UK, Ireland and France, as well as in the southern part of the EPPO region. Most known eucalypt hosts seem to be available as ornamentals in the EPPO region (general Internet search). In addition, *E. nitens* is planted in northern Portugal and Spain, France, United Kingdom and Ireland for pulpwood. Some other species are grown in the EPPO region, but are not known as hosts: *E. globulus* (introduced to the Iberian Peninsula and Northern Africa in the mid-19th century and planted for industrial purposes, currently mostly for pulpwood mainly in Spain, Portugal, and to a lesser extend in the southern parts of France and Italy); *E. camaldulensis* (Spain, Portugal, Italy, France, Greece, Malta, Cyprus**,** Turkey) (timber, shelterbelts, ornamental); *E. gunnii* (France, UK, Ireland) (ornamental, windbreak, wood fuel); *E. viminalis* (France, UK) (shelterbelts, ornamental). For *P. subgranosus*, *Pinus radiata* is among the most used non-native pines cultivated in Europe for timber production (EPPO, 2015), but attacks in Australia appear to have been observed only on damaged *P. radiata*. *N. cunninghamii* is available as ornamental in the EPPO region (general Internet search).
As potential host plants are present in areas of suitable climate in the EPPO region, the pests could establish.

Potential impact (including consideration of host plants)
The potential impact of *P. subgranosus* and *A. incompertus* in the EPPO region would relate mainly to reduction of wood quality of eucalyptus. It would be minor if only the known hosts are attacked, and would relate to impact on *E. nitens*. Staining may have an impact on pulp production (no information was sought). Economic impact would occur mostly if *Eucalyptus* grown for timber were attacked, where damage due to the presence of galleries and staining would impact the value of the wood. Both ambrosia beetles may also have an impact on ornamental trees, but not on biodiversity. Some eucalyptus species are considered invasive in some EPPO countries (e.g. *E. camaldulensis*); therefore, if these species affect invasive stands, this would be a positive impact. Finally, the potential for vectoring pathogenic fungi may be a concern, as happened for *P. subgranosus* in Tasmania.

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[2] **Cfa**: warm temperate climate, fully humid, hot summer; **Cfb**: warm temperate climate, fully humid, warm summer

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