



**EUROPEAN AND MEDITERRANEAN PLANT PROTECTION
ORGANIZATION
ORGANISATION EUROPEENNE ET MEDITERRANEENNE POUR LA
PROTECTION DES PLANTES**

15- 21044 (14-19659)

Report of a Pest Risk Analysis for *Aromia bungii*

This summary presents the main features of a pest risk analysis which has been conducted on the pest, according to EPPO Decision support scheme for quarantine pests (PM 5/3(5)). The full PRA record is also available (see under references)

Pest: *Aromia bungii*
PRA area: EPPO region
Assessors: Expert Working group for PRA for *Aromia bungii*
Dr Christian Cocquempot (INRA, Montpellier, France)
Dr Neil Giltrap, Food and Environment Research Agency, York (United Kingdom)
Dr Raffaele Griffo, Plant Protection Service Regione Campania, Napoli, Italy
Dr Matteo Maspero (Fondazione Minoprio, Vertemate con Minoprio, Italy).
Dr Francesco Nugnes, Department of Agriculture, University of Naples Federico II (*observer*)
Dr Gritta Schrader, Julius Kühn Institut, Braunschweig, Germany (*core member*)
Dr Eduardo Ucciero, Plant Protection Service Regione Campania, Napoli, Italy
Dr Dirkjan van der Gaag, Plant Protection Service, Wageningen, Netherlands (*core member*)

EPPO Secretariat
Ms Muriel Suffert

Date: 2013-11-11/15. Core members (Mr Guitian Castrillon, Mr Kapitola, Mr MacLeod, Ms Petter, Mr Pfeilstetter, Mr Sletten, Ms Ustun) reviewed the draft PRA between January and February 2014. The risk management part was reviewed by the Panel on Phytosanitary Measures on 2014-03-06. The PRA report was reviewed by Working Party on Phytosanitary Regulations on 2014-06-18.

STAGE 1: INITIATION

Reason for doing PRA: In 2011, the presence of *Aromia bungii* was recorded for the first time in one location in Bavaria, Germany. In 2012, its presence was also reported in Campania, Italy and in 2013 in Lombardia, Italy. In both countries, eradication measures have been taken. In addition, *A. bungii* has been intercepted in containers or in wood packaging material. As a result, 3 express PRAs have been prepared by Germany, The Netherlands and the UK and they all concluded that *A. bungii* may pose a threat for the stone fruit production in the EPPO region. In 2013, the Working Party on Phytosanitary Measures decided that an EPPO PRA should be prepared.

Taxonomic position of pest:



Insecta: Coleoptera: Cerambycidae
Genus: *Aromia*
Species: *bungii* (Faldermann 1835)

Courtesy: R. Griffo - Plant Health Service of Campania Region, Napoli (IT)

STAGE 2: PEST RISK ASSESSMENT

PROBABILITY OF INTRODUCTION

Entry

Geographical distribution:

(see PRA record for references)

EPPO region: Germany: one outbreak in Bavaria (under eradication); Italy: two outbreaks (under eradication) in Campania and Lombardia
Asia: China (Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hong Kong, Hubei, Hunan, Inner Mongolia, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang); North Korea; South Korea, Mongolia; Vietnam; Japan (recently introduced).

Major host plants or habitats:

(see PRA record for references)

Aromia bungii is an oligophagous species. Its host range may be limited to *Prunus* spp. (*P. armeniaca* –apricot, *P. domestica domestica* – plum, *P. persica* – peach). However, a number of other host plants in other families are reported mostly without any supporting evidence.

It should be noted that it has already extended its host range to new *Prunus* species in the outbreaks in Italy and Japan (e.g. *Prunus avium* – cherry)

Which pathway(s) is the pest likely to be introduced on:

- **Wood and wood products of host plants from where *A. bungii* occurs**

Any wood or wooden products of *Prunus* species which are large enough to sustain the life cycle of the pest to adult emergence and which has not undergone treatment to kill the pest represent a risk. Eggs may be present on or in the bark. Larvae and pupae may be present in the wood. They can also survive in cut wood and in wood packaging material.

This pathway includes Wood (round or sawn, with or without bark), Wood packaging material, Furniture and objects made from wood of host plants, Wood waste, Wood chips and particle wood.

- **Plants for planting of host plants (except seed) from where *A. bungii* occurs**

Eggs may be present in the bark, larvae and pupae in stems or branches. This pathway covers also the rootstock. Most hosts of *A. bungii* may also be used as bonsais. The probability is considered moderately likely with a high uncertainty. It is unlikely for the EU (because of the import prohibition of plants for planting of *Prunus* spp.): in principle the probability of entry is zero but there is uncertainty on the existence of indirect import from countries where the pest occurs.

- **Hitch-hiking**

There are indications that adults may be hitch-hikers as some beetles were found in premises where goods have been imported but no signs of infestation were found in the associated wood packaging material still present.

Other pathways identified but considered unlikely:

- **Movement of individuals, shipping of live beetles, e.g. traded by collectors.** Cerambycidae are widely collected and *A. bungii* may circulate between hobbyist entomologists but are most likely to be sent dead.

- **Cut branches.** Eggs and larvae may be present on and in cut foliage but there is no indication that the host species considered are used for branches, nor that there is a trade to the PRA area. In addition, cut branches would be too small for the larvae to complete their development and transfer to a host where the pest could complete its life cycle would be improbable.

- **Pathways not supporting the entry of *A. bungii*:** Bark of host plants,

fruit, seeds of host plants, soil.

Establishment

Plants at risk in the PRA area:

Most of the main host species occur in the PRA area. They are grown mainly for fruit production (apricot, peach, plum, cherry), for ornamental purposes in private or public gardens, cities, industrial or commercial parks and also occur naturally in woods or forests (e.g. wild cherry tree).

Prunus species may only be absent in the most Northern part of Scandinavia and of the Russian Federation, as well as Siberia and Far East.

It is considered that *A. bungii* could increase its host range to other *Prunus* species if it was introduced in the PRA area, in particular to almond (*P. amygdalus*), sour cherry (*P. cerasus*) or cherry laurel (*P. laurocerasus*)

Climatic similarity of present distribution with PRA area (or parts thereof):

In China and Mongolia, the pest is present in areas where the annual number of accumulated degree-days (base 10°C) is above 500. Based on the current distribution, it is assessed that the northern limit of the potential distribution is the southern part of Scandinavia. As the pest is present in warm areas such as Southern China (e.g. Guangdong, Guangxi), it is assessed that the climate in the southern part of the PRA area will not be a limiting factor.

Characteristics (other than climatic) of the PRA area that would favour establishment:

Areas with high densities of host plants are more favourable for establishment than areas of low density. For example, it is expected that higher populations will occur in areas with high concentration of peach and apricot orchards. It may therefore be expected that the Mediterranean area would be more suitable.

Which part of the PRA area is the area of potential establishment:

A. bungii is likely to establish in the entire PRA area, except the most northern and eastern areas (northern parts of Scandinavia, Siberia and the Far East of the Russian Federation).

POTENTIAL ECONOMIC CONSEQUENCES

How much economic impact does the pest have in its present distribution:



Dead plant (killed by *A. bungii*).
Courtesy: Raffaele Griffò - Plant Health Service of Campania Region, Napoli (IT)

The economic importance of *A. bungii* is mainly known in China on cultivated apricot, peach and plum trees in orchards. It is considered to be very destructive on peach and apricot but it also causes considerable damage to plums and can be a serious pest of cherry. *A. bungii* is also considered as a pest for forest *Prunus*.

The main damage is caused by the larvae, which bore into the wood soon after hatching, producing tunnels in the branches and the trunk. Galleries are in the cambium zone, stop the circulation of the sap, killing the associated tissues, weakening the tree and reducing the fruit production. Extensive infestations result in tree death.

In China, many authors report that *A. bungii* attacks mainly old, stressed or decayed trees, but always living trees. The observations in Italy show that the pest can also affect young and healthy trees.

Quantitative information about the damage and economic impact is generally lacking.

Describe damage to potential hosts in PRA area:

The impact on stone fruit trees is expected to be similar to the one currently observed in the outbreak area in Campania or in China. In Campania only *Prunus* trees have so far reported to be attacked but some new host species were reported (e.g. *P. avium*)

How much economic impact would the pest have in the PRA area:

The whole area of potential establishment is at risk of economic impact. *A. bungii* is likely to have major economic impact for peach, apricot, cherry and plum trees in the whole area of production but especially in countries around the Mediterranean and Black Sea. The impact is expected to be higher in the southern part than in the northern part of the PRA area.

However, there is some uncertainty as to the total area that may be endangered and the complete range of host plants that may be affected. Economic impact on ornamental *Prunus* species is considered to be lower. The pest is likely to have a moderate environmental impact throughout the PRA area. Social impact is likely to be major at local scale and minor at the scale of the PRA area.

CONCLUSIONS OF PEST RISK ASSESSMENT

Summarize the major factors that influence the acceptability of the risk from this pest: *A. bungii* is a pest of important fruit and ornamental trees grown in the PRA area. It may attack and kill healthy trees. *A. bungii* has already been introduced into the PRA area on 3 different occasions. Eradication or containment are moderately likely in the case of an early detection, but early detection is difficult because of the hidden life stages of the pest and the fact that it might not be detected before it has already established and caused damage.

Estimate the probability of entry: The probability of entry is considered **likely**. This is based on the fact that 3 outbreaks (2 in Italy and 1 in Germany) of the pest have already been detected in the EPPO region. The fact that *A. bungii* was also introduced recently in Japan supports the idea that the pest is moving internationally. In countries where import of *Prunus* plants for planting is not forbidden, this pathway is very likely to support entry if trade occurs from areas where the pest is present. In theory, entry should be unlikely as the import of *Prunus* plants into many EPPO countries is prohibited, wood packaging material treated according to ISPM 15 does not support the entry of the pest, and the import of wood is minimal. Therefore there is a medium uncertainty associated with this assessment and a high uncertainty on how the pest has been introduced into Europe. As wood packaging material non-compliant with ISPM 15 is regularly intercepted in Europe, the EWG considered that it may be the pathway for the recent introduction of *A. bungii* into Europe.

Estimate the probability of establishment: The probability of establishment is **high (with a low uncertainty)**. The climatic conditions are favourable as is the presence and distribution of host plants. There is some uncertainty on the limits of the area of potential establishment, and the host range.

Estimate the probability of spread: The overall rate of natural spread is moderate (with moderate uncertainty as there is no direct data) and the spread by human means is high. Satellite populations may be established in multiple locations through human spread, but natural spread from these outbreaks will be relatively slow. The overall rate of spread is rated as **high with a medium uncertainty**.

Estimate the potential economic impact: The potential economic impact is considered as **major with medium uncertainty**. Control measures in commercial orchards would be difficult. The whole area of potential establishment is at risk of an economic impact. The southern part of the PRA area where more *Prunus* trees are grown will have the highest economic damage.

Degree of uncertainty The main uncertainties are as follows:

- biology of the pest (temperature threshold, length of life cycle, distance of spread by natural means, size of plants attacked)
- pathways with which the pest was introduced into the EPPO region and Japan
- host range: ornamental and wild *Prunus*, non *Prunus* species (this will affect the assessment of entry, but also of the economic consequences and the likelihood of eradication)

- efficacy of chemical treatments currently applied in orchards in controlling the pest
- use of traps (why does it work in some areas and not other)

OVERALL CONCLUSIONS

A. bungii has already been introduced into the PRA area on 3 different occasions. The widespread presence of host plants would help both establishment and spread. Once established, the pest would have a major economic impact, both commercially and in gardens. It may also have a social impact which may be major at a local scale, and an environmental impact if it infests *Prunus* species in forests and other natural environments.

STAGE 3: PEST RISK MANAGEMENT

IDENTIFICATION OF THE PATHWAYS

Pathways studied in the pest risk management

- **Host plants for planting (except seeds) of *A. bungii***

There are some uncertainties on the host range of *A. bungii*. Most data is available for *Prunus* species. However, a number of other host plants in other families are reported mostly without supporting evidence. The Panel on Phytosanitary Measures preferred to be conservative and considered that measures should be recommended in any case for all *Prunus* plants as well as other host plants identified in the literature during the PRA.

- **Wood commodities: wood (round or sawn, with or without bark) of host plants of *A. bungii*, waste wood and particle wood**

Measures for wooden furniture and objects made of wood are based on those for the wood.

IDENTIFICATION OF POSSIBLE MEASURES

Possible measures for pathways

- **Host plants for planting (except seeds) of *A. bungii***

Measures related to the crop or to places of production:

- Visual inspection is not sufficient as a standalone measure to detect all life stages of the pest.
- Treatment of the plants will reduce infestation levels but cannot guarantee pest freedom. No resistant cultivars exist.
- Pest-free area: Designation of a PFA is possible in theory, but there is uncertainty as to whether there are areas free of the pest in the countries where *A. bungii* originates. In countries where the pest is established, the following requirements are recommended to establish and maintain a PFA for *A. bungii*: a minimum distance of at least 20 km between the PFA and the closest known area where the pest is known to be present; detailed surveys and monitoring in the area in the two years prior to establishment of the PFA and continued every year. Specific surveys should also be carried out in the zone between the PFA and known infestation to demonstrate pest freedom. The surveys should focus on visual examination of *Prunus* trees but also include trapping.
- Pest-free place of production/production site: The plants should be under complete physical isolation throughout their life. They should be inspected during the growing season at least twice a year and also prior to export. Facilities should be officially authorized.

Measures related to consignments:

- Visual inspection is not sufficient as a standalone measure to detect all life stages of the pest.
- Treatment: no specific data is available. Fumigation with methyl bromide may be effective against borers in deciduous woody dormant plants but this measure is not recommended because methyl bromide will be phased out in 2015 and its use is not favoured in many EPP countries because of its environmental consequences.
- Post-entry quarantine: This requires keeping the plants in post-entry quarantine for a sufficient time to detect the symptoms of larval activity (ejection holes and frass). A period of 4 months above 20°C is appropriate. This is applicable only to small consignments in the framework of a bilateral agreement.

Systems approach

No measures could be combined to achieve a sufficient level of protection.

- **Wood commodities: wood (round or sawn, with or without bark) of host plants of *A. bungii*, waste wood and particle wood**

Measures related to the crop or to places of production:

- Visual inspection is not sufficient as a standalone measure to detect all life stages of the pest.
- Pest-free area (see above)

Measures related to consignments:

- Visual inspection is not sufficient as a standalone measure to detect all life stages of the pest.
- Treatment:
 - For wood: heat treatment (at least 56 °C for at least 30 min) or irradiation (1kGy) would in principle be effective but data are needed to define the exact schedule for the heat treatment and it may not be cost-effective for low value wood such as firewood
 - For particle wood and wood waste: heat treatment (at least 56 °C for at least 30 min) or chipped to pieces less than 2.5 cm in any dimension or to 1.5 cm in 2 dimensions

- Wood for processing (e.g. pulpmills and fuel wood for energy production), particle wood and wood waste could be imported during periods of the year outside of the flight period of *A. bungii*, and be processed before the next flight period of the pest, provided that conditions in storage and transport do not allow emergence of the pest (e.g. temperatures below 5°C, although there is some uncertainty about the exact threshold for this species). It should be stressed that this measure would be difficult to implement and control in practice. It should be as part of a specific agreement between the importing and exporting countries outlining specific requirements.

EVALUATION OF THE MEASURES IDENTIFIED IN RELATION TO THE RISKS PRESENTED BY THE PATHWAYS

The measures identified (pest-free place/site of production under complete physical protection and post-entry quarantine) will have a limited impact on trade because there is already a prohibition of import of *Prunus* species for many EPPO countries and import volumes of other plant species and wood commodities are very low.

Degree of uncertainty

Uncertainties in the management part are:

- the host range of the pest (should measures be applied only for *Prunus* species or all plants reported in literature?)
- the concrete requirements for establishing a PFA in a country where the pest is widespread
- heat treatment (exact schedule to kill the pest)
- minimum temperature threshold (to allow import on infested material at certain periods of the year)

IDENTIFICATION OF POSSIBLE MEASURES

PC= Phytosanitary certificate

Host ¹ plants for planting (excluding seeds)	PC <ul style="list-style-type: none"> • Pest-free area (see requirements above) or • Pest-free place of production/production site under complete physical isolation+ regular inspections of the crop + inspection of plants prior to export or • Post-entry quarantine for 4 months at minimum 20°C in the framework of a bilateral agreement
Wood of host ¹ species (round or sawn, with or without bark, firewood)	PC and <ul style="list-style-type: none"> • Pest-free area (see requirements above) or • Treatment (heat, irradiation) or • Import for processing at specific time of the year (only in the framework of a bilateral agreement)
Hardwood particle wood and wood waste	PC and <ul style="list-style-type: none"> • Pest-free area (see requirements above) or • Treatment (chipped to pieces of less than 2.5 cm in any dimension or to 1.5 cm in 2 dimensions) or • Heat treatment (56°C for 30 min) or • Import for processing at specific time of the year (only in the framework of a bilateral agreement)
Wood packaging material (including dunnage) containing host wood	• Treated according to ISPM 15
Wooden furniture and objects made of wood	• Heat treatment

References

See PRA Record 15-21043 Available at http://www.eppo.int/QUARANTINE/Pest_Risk_Analysis/PRA_intro.htm

¹ *Prunus* spp; *Diospyros kaki*, *Diospyros lotus*, *Diospyros virginiana*; *Castanea mollissima*; *Quercus* spp.; *Juglans regia*; *Pterocarya stenoptera*; *Azadirachta indica*; *Olea europaea*; *Bambusa textilis*; *Punica granatum*; *Pyrus bretschneideri*; *Zanthoxylum bungeanum*; *Citrus* spp; *Populus alba*, *Populus tomentosa*, *Populus* spp; *Salix* spp.; *Schima superba*