# Preparedness in biological control of priority biosecurity threats

## Red necked longicorn, *Aromia bungii* (Faldermann)

## Introduction

The red necked longicorn (RNL), *Aromia bungii* (Coleoptera: Cerambycidae) originates from eastern Asia. It has been accidentally introduced into Japan in 2012, and in Germany, where outbreaks were reported in 2011 and 2016, and Italy in 2012 and 2016 (EPPO 2022). Outbreaks are either under eradication or else containment measures are in place (EPPO 2022). Red necked longicorn is predominantly a pest of stone fruit trees (*Prunus* spp.) although unconfirmed records of other host species exist (CABI 2022). In China, it is a very destructive pest of peach and apricot and can also cause significant damage to plum and cherry both in terms of reducing fruit production and killing the tree (EPPO 2022). It is also considered a pest of forest *Prunus* and wild cherry (*P.avium*) where it impacts on wood production (EPPO 2022). The larvae are xylophagous and tunnel within the cambium layer within the trunk and branches of their host tree. The larval galleries stop the circulation of sap, resulting in a weakening of the tree, and may cause its death at high levels of infestation (EPPO 2022).

Red necked longicorn is considered a quarantine species in Europe. It is highly adaptable to different environments (CABI 2022) and is likely to establish within a large area of the EPPO region, up to the southern part of Scandinavia and as far east as the eastern part of the Russian Federation (EPPO 2022). The eggs, larvae and pupae of RNL can be accidentally spread with wood, wood products, wood packaging and plants for planting (EPPO 2014). However, the most likely routes of entry are considered wood packaging and plants for planting (CABI 2022).

## History of classical biological control against *Aromia bungii*

There is no history of classical biological control against red necked longicorn.

## Most promising natural enemies

Information on predators and parasitoids of red necked longicorn is scarce. The parasitoids *Sclerodermus guani* (Hymenoptera: Bethylidae) and *Sclerodermus harmandi* (Hymenoptera: Bethylidae) are listed as natural enemies of RNL (CABI 2022). However, these are generalist parasitoids and not specific to RNL (CABI, 2022). Note, references to *S. harmandi* in Chinese papers may be referring to *S. guani* as they were once considered synonymous (Men *et al.* 2019).

*Sclerodermus guani* Xiao et Wu (Hymenoptera: Bethylidae) is an ectoparasitoid of wood-boring larvae, native to China. Li *et al.* (2015) indicates a very broad host range of more than 50 species across 22 families in three Insect Orders. Hosts include Coleoptera (Buprestidae, Cerambycidae, Curculionidae, Tenebrionidae), Lepidoptera (Crambidae, Gelechiidae, Psychidae, Pyralidae, Sesiidae) and Hymenoptera (Aphidae, Pamphiliidae) (Men *et al.* 2019). It has been used in its native China for the biological control of forest pests (e.g. the cerambycid pine sawyer *Monochamus alternatus*). Rates of 81% parasitism of *M. alternatus* have been reported in release years (Li *et al.* 2019). A laboratory study by Men *et al.* (2019) reports a parasitism rate for *S. guani* on RNL of 43%, with 15 offspring recorded per parasitized host, and a RNL mortality rate of 55%. A short report referenced by Yang *et al.* (2014) apparently indicates that rates of parasitism of up to 31% were achieved when *S. guani* was investigated for biological control of RNL.

*Sclerodermus harmandi* (Hymenoptera: Bethylidae) is an ectoparasitoid of wood-boring larvae. Forty-six host species from the families of Coleoptera, Lepidoptera and Hymenoptera have been reported as hosts in China. The species has been mass-reared and used in augmentative biological control of agricultural and forest pests in China for over 20 years; parasitization rates can be very high (Liu *et al.* 2017). However, non-target effects have been suspected, and demonstrated, due to its low host specificity (Liu *et al.* 2017).

## Other natural enemies

Some generalist parasitoids and predators in the invaded range could probably attack the different immature stages of *A. bungii* (EPPO 2022), These potentially include species of Braconidae (e.g *Spathius erythrocephalus*), Ichneumonidae, Bethylidae and Coleoptera (e.g. Cleridae)(EPPO 2014) . Ants have been reported to prey on *A. bungii* in Japan (Sunamura et al. 2020). The beetle *Dastarcus helophoroides* (Coleoptera: Bothrideridae) has been recorded parasitizing *A. bungii* (Men et al. 2017).

In China, the beetle *D. helophoroides* and the parasitoid *S. guani* have been deployed in combination with entomopathogenic nematodes in the biological control of RNL with apparently positive results (CABI 2022).

*Dastarcus helophoroides* is a coleopteran parasitoid of several wood boring beetles in Asia (Yang *et al.* 2014) and has been investigated, as part of an Integrated Pest Management technique for the control of longhorn beetles (e.g. *Monochamus alternatus* and *Massicus raddei*) in Chinese forests.

## References


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