

Mini data sheet on *Massicus raddei* (Coleoptera: Cerambycidae - oak longhorn beetle)

Massicus raddei was added to the EPPO A1 List in 2018. A full datasheet will be prepared, in the meantime you can view here the data which was previously available from the EPPO Alert List (added to the EPPO Alert List in 2015 - deleted in 2018).

Why: the addition of *Massicus raddei* (Coleoptera: Cerambycidae) to the EPPO Alert List was suggested by the NPPO of the United Kingdom. *M. raddei* was identified during the horizon scanning of literature which has been carried out for the UK Pest Risk Register, as a serious pest of oak trees in China.

Where: *M. raddei* occurs only in Asia.

EPPO region: Russia (Far East).

Asia: China (Anhui, Fujian, Guizhou, Hebei, Heilongjiang, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Neimenggu, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang), Japan (Honshu, Shikoku), Korea (Dem. People's Republic of), Korea (Republic of), Russia (Far East), Taiwan, Vietnam.

On which plants: *M. raddei* mainly attacks oaks (*Quercus* spp.) and chestnuts (*Castanea* spp.). In the literature, the following species are recorded as host plants: *Castanea crenata*, *C. mollissima*, *Castanea sativa*, *Quercus acuta*, *Q. acutissima*, *Q. aliena*, *Q. dentata*, *Q. liaotungensis*, *Q. mongolica*, *Q. serrata*, *Q. variabilis*. Other tree species such as *Castanopsis cuspidata*, *Castanopsis cuspidata* var. *sieboldii*, *Morus* sp. and *Paulownia* sp. are also mentioned.

Damage: *M. raddei* is a wood borer. Damage is essentially caused by its larvae which make galleries inside tree trunks. Studies conducted in China have showed that adults of *M. raddei* can feed on sap oozing from the wounds they themselves have inflicted to trunks of *Q. mongolica*. According to the literature, infested trees show crown dieback but it is unclear whether tree mortality has been observed or not. Nevertheless, it is stated that during the last decades, outbreaks of *M. raddei* have been observed in Northeastern China (in particular in Jilin, Inner Mongolia (Neimenggu, Liaoning) on *Q. mongolica* and *Q. liaotungensis* causing ecological and economic losses. In these infested oak forests, it is estimated that 45% of the trees were attacked. Studies on the distribution pattern of *M. raddei* in the trunk of *Q. liaotungensis* have showed that larvae were rarely found in trees with a trunk diameter of less than 9 cm (and with a bark thickness < 0.5 cm), therefore suggesting that young trees are not attractive to the beetle. In the Chinese province of Liaoning, field studies concluded that 3 years were necessary for *M. raddei* to complete one generation. Six larval instars were observed with a total duration of more than 1021 days. During the first year, larvae overwinter as 2nd and 3rd larval stages, in the second year as 4th and 5th instars, and during the third winter all larvae enter the 6th instar (fully grown larvae). The life cycle appears to be synchronous with mass adult emergence every 3 years.

Adults are large brownish longhorn beetles (approximately 35 to 52 mm long) with whitish larvae (fully grown larvae are approximately 65 mm long). Pictures can be viewed on the Internet:

<http://www.zin.ru/ANIMALIA/COLEOPTERA/rus/neoradzi.htm>

<http://homepage3.nifty.com/kaa44/hibikoutyuunikki2014.htm>

Dissemination: there is no data on the natural spread of the insect but adults can fly. Over long distances, as is the case for other wood borers, *M. raddei* can be transported on wood and wood products, including wood packaging material.

Pathway: Plants for planting (trees above a certain size?), wood, wood products, packaging wood material, hitchhiking?

Possible risks: Oak and chestnut trees are widely planted in the EPPO region for forestry, and amenity purposes, as well as for fruit production in the case of *C. sativa*. In China, *M. raddei* is considered to be a pest of oaks, mainly *Q. liaotungensis* and *Q. mongolicus*. However, there is no data on the susceptibility of oak species (e.g. *Q. ilex*, *Q. petraea*, *Q. robur*, *Q. suber*) present in the Euro-Mediterranean region to this pest. Data is also generally lacking on the severity of damage caused by *M. raddei* (i.e. tree mortality) and its economic impact. As for other wood borers, control is rendered difficult by the hidden mode of life of the larval and pupal stages. In China, research is being carried out on the possible use of biocontrol agents (e.g. *Dastarcus helophoroides* (Coleoptera: Bothrideridae), *Sclerodermus pupariae* (Hymenoptera: Bethyridae) or *Cerchysiella raddei* (Hymenoptera: Encyrtidae)). Although there are many uncertainties on the biology, host range, and economic impact of *M. raddei*, the recent experience with the introductions of wood borers (e.g. *Anoplophora* spp., *Aromia bungii*) from Asia into the EPPO region advocates for a precautionary approach. It can be noted that although *M. raddei* does not occur in the USA, it has been included in early detection programmes for alien forestry pests at least in some states.

Sources

- Cho YH, Kim YJ, Han YG, Cha JY, Jeong JC, Seo JK, Nam SH (2010) A faunistic study of insects on Mt. Juwang National Park. *Journal of National Park Research* 1(3), 225-254.
- INTERNET
- Catalogue of Palearctic Cerambycoidea by ML Danilevsky (updated 2015-03-08). <http://www.cerambycidae.net/catalog.pdf>
- Kim ST, Jung MP, Kim HS, Shin JH, Lim JH, Kim TW, Lee JH (2006) Insect fauna of adjacent areas of DMZ in Korea. *Journal of Ecology and Field Biology* 29(2), 125-141.
- Lim J, Jung SY, Lim JS, Jang J, Kim KM, Lee YM, Lee BW (2014) A review of host plants of Cerambycidae (Coleoptera: Chrysomeloidea) with new host records for fourteen cerambycids, including the Asian longhorn beetle (*Anoplophora glabripennis* Motschulsky), in Korea. *Korean Journal of Applied Entomology* 53(2), 111-133.
- Tang YL, Yang ZQ, Jiang J, Wang XY, Gao C (2011) Distribution pattern of larvae and pupae of *Massicus raddei* in the trunk of *Quercus liaotungensis*. *Scientia Silvae Sinicae* 47(3), 117-123 (abst.).
- Tang YL, Yang ZQ, Wang XY, Tang H, Jiang J, Wei K, Lu J (2012) [Biocontrol of oak longhorn beetle, *Massicus raddei* by releasing parasitoid *Dastarcus helophoroides* (Coleoptera: Bothrideridae) adults and eggs]. *Scientia Silvae Sinicae* 48(7), 186-191 (in Chinese).
- Wang XY, Yang ZQ, Tang YL, Jiang J, Yang YL, Gao C (2012) [Determination of larval instar number and duration in the oak longhorn beetle, *Massicus raddei* (Coleoptera: Cerambycidae)]. *Acta Entomologica Sinica* 55(5), 575-584 (in Chinese).
- Wei JR, Gao C, Gao JC, Dong LJ (2013) Roles of vision and antennae in the short-distance mate searching behavior of male adults of *Massicus raddei* (Coleoptera: Cerambycidae). *Acta Entomologica Sinica* 56(7), 824-830 (abst.).
- Wei JR, Yang ZQ, Du ZQ, Hao HL (2007) Studies on *Dastarcus helophoroides* (Fairmaire), a natural enemy of longhorned beetles. Abstract of a paper presented at the International Workshop on Biological Control of Invasive Species of Forests (Beijing, CN, 2007-09-20/25), 54-55.
- Yang ZQ, Tang H, Wang XY, Wei JR, Zhao HB (2013) A new species of *Cerchysiella* (Hymenoptera: Encyrtidae) parasitic in larva of chestnut trunk borer (Coleoptera: Cerambycidae) from China with notes on its biology. *Journal of Natural History* 47(3/4), 129-138 (abst.).
- Yang ZQ, Wang XY, Cao LM, Tang YL, Tang H (2013) *Cerchysiella mesosae* Yang sp. nov. (Hymenoptera: Encyrtidae), a parasitoid of *Mesosa myops* (Dalman) (Coleoptera: Cerambycidae) larvae in China. *Zootaxa* 3619(2), 154-160.
- Yang ZQ, Wang XY, Zhang YN (2014) Recent advances in biological control of important native and invasive forest pests in China. *Biological Control* 68, 117-128 (abst.).
- Zheng Y, Tang YL, Yang ZQ, Tang H (2014) [Characteristics of supplementary nutrition feeding of *Massicus raddei* (Coleoptera: Cerambycidae) adults and the main components of the fed-sap of host tree *Quercus mongolica*]. *Scientia Silvae Sinicae* 50(12), 156-160 (in Chinese).