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Notes on three braconid wasps (Hymenoptera: Braconidae, Doryctinae) parasitizing oak long-horned beetle, *Massicus raddei* (Coleoptera: Cerambycidae), a severe pest of *Quercus* spp. in China, together with the description of a new species

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Abstract

Three species of Doryctinae (Hymenoptera: Braconidae) parasitize larvae of oak longhorn beetle *Massicus raddei* Blessig (Coleoptera: Cerambycidae), a serious wood borer pest in North China. *Rhoptrocentrus quercusi* **sp. nov.**, is described as a new species and *Doryctes petiolatus* Shestakov, as well as *Zombrus bicolor* (Enderlein). The three species are idiobiont ectoparasitoids, and may have potential for biological control of oak longhorn beetle.

Key words: Braconidae, *Rhoptrocentrus*, new species, parasitism, *Massicus raddei* Blessig

Introduction

Massicus raddei Blessig (Cerambycidae: Cerambycinae) is a wood borer distributed in more than 20 provinces of China as well as in Japan, Korean Peninsula, and Russia. In Liaoning and Jilin provinces of northeastern China, it has caused great damage to oak trees, mainly *Quercus liaotungensis* and *Q. mongolica*. The young larvae feed on phloem and cambium under bark (Fig. 5), and mature larval tunneling penetrates into the heartwood of the host tree. Mostly a tree can be injured by many the borers (Fig. 6), that causes trunk to have many tunnels (Fig. 4). When the adults exit from the trunk, many exit holes can be seen on the trunk bark (Fig. 3). Tree vigor is weakened and many trees get exsiccated and wind-breakage occurs (Figs 1, 2). The amount of damaged forest has reached 160, 000 ha (Tang *et al.* 2010), which threatens the ecological security of natural forests in Northeast Asia.

A general surveying for natural enemies of *M. raddei* to search for potential biocontrol agents was carried out during 2008 to 2011. Several parasitoids were found, and three species of Doryctinae, including one new species, are reported.

Material and methods

This study is based on specimens kept in the Entomological Museum of Chinese Academy of Forestry. Natural enemies' surveys of *M. raddei* were conducted in Liaoning Province, Kuandian County during 2008 to 2011. Trunk bark of stressed trees, mainly *Q. liaotungensis* and *Q. mongolica*, was peeled off to search for *M. raddei* larvae and associated parasitoids. The larvae and possible parasitoid cocoons were placed singly in vials (12 mm in diameter and 75 mm in length), each containing a piece of filter paper dipped in distilled water for moisture. The vials were plugged tightly with sterilized cotton and maintained at 22–25 ℃ in the rearing room. Parasitoid cocoons were successively reared to adults. Specimens were examined with an SZH 1500 stereomicroscope (Nikon, Tokyo, Japan). Photographs of the new species and other related species were taken with a CX31 microscope (Olympus,

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