NATURAL HISTORY AND OBSERVATIONS

First Canadian records for two invasive seed-feeding bugs, *Arocatus melanocephalus* (Fabricius, 1798) and *Raglius alboacuminatus* (Goeze, 1778), and a range extension for a third species, *Rhyparochromus vulgaris* (Schilling, 1829) (Hemiptera: Heteroptera)

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New invasive insect species affect agriculture, the environment, landscapes, and homeowners. Invasive species are difficult and challenging to manage due to limited availability of direct control products or other management strategies. Nuisance insect outbreaks can have negative impacts on homeowners and businesses; if they reach high densities, they can cause anxiety and discomfort and additional management costs. We report here the first records from Canada for two new invasive pests, *Arocatus melanocephalus* and *Raglius alboacuminatus,* and provide a range extension for *Rhyparochromus vulgaris* (Schilling), reported as new to British Columbia by Scudder (in press, this volume).

The elm seed bug, *Arocatus melanocephalus* Fabricius (Hemiptera: Heteroptera: Lygaeidae), is native to Europe and widely distributed in central and southern Europe (Ferracini and Alma 2008); it was reported in China in 2013 (Gao *et al.* 2013). *Arocatus melanocephalus* was first detected in the United States, in Idaho, in 2009 and is present in Oregon, Washington, and Utah (Collman and Bush 2016). An infestation of *A. melanocephalus* was reported by a homeowner in the Rutland area of Kelowna, British Columbia, in June 2016. There were large numbers of adults in and around the home and on Chinese elm wood piles in the yard. Three homeowners in the area also reported *A. melanocephalus* outbreaks.

Adults are 6.5–7 mm long, strongly punctate, with conspicuously contrasting dark-red and black coloration—black on head, posterior lobe of pronotum, scutellum, and posterior half of corium, and rusty red on anterior lobe of pronotum, outer portion of clavus, and anterior portion of corium (Gao *et al.* 2013; figures 1a and 1b).

The life cycle of *A. melanocephalus* in Canada has not been determined. In Europe and the United States, there is one generation per year (Maistrello *et al.* 2006; Idaho State Department of Agriculture 2013). They overwinter as adults and emerge in the spring to lay eggs on elm. Nymphs feed on elm seeds from May to June and develop into adults in the summer (Idaho State Department of Agriculture 2013). *Arocatus melanocephalus*

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feed primarily on elm seeds (*Ulmus* spp.), but have been collected from oak (*Quercus)* and linden (*Tilia)* (Bechinski *et al.* 2012).

Figure 1a. Dorsal view of adult *Arocatus melanocephalus*. Photograph by W. B. Strong

Figure 1b. Lateral view of adult *Arocatus melanocephalus*. Photograph by W. B. Strong

An outbreak of *Raglius alboacuminatus* (Hemiptera: Heteroptera: Rhyparochromidae) was reported by an orchardist in Kelowna, British Columbia, in August 2016. The source of the infestation appeared to be a cut hayfield next to the

property. There were large numbers of *R. alboacuminatus* at the grower's fruit shop, apple bins, and in and around the home and other buildings and structures on the property.

Raglius alboacuminatus is native to Europe and the Mediterranean. It was first detected in North America, in Utah, in 1999, and it is present in California, Oregon, and Washington (Henry 2004; Bechinski and Merickel 2007). Adults are about 5–6 mm long, with dark-brown to black coloration, white markings on the posterior pronotal lobe, anterior half of the corium, and three conspicuous white spots—one on the apex of each corium, and one on the apex of hemelytral membrane (figures 2a and 2b).

Figure 2a. Dorsal view of *Raglius alboacuminatus*. Photograph by W. B. Strong

Figure 2b. Lateral view of *Raglius alboacuminatus*. Photograph by W. B. Strong

The life cycle of *R. alboacuminatus* in Canada has not been determined. There is one generation per year in the United States (Bechinski and Merickel 2007), but there are two in England and three in Russia (Henry 2004; Southwood and Leston 1959). *Raglius alboacuminatus* overwinters as adult. Overwintered adults lay eggs in the soil or ground litter in early spring. Nymphs feed on developing seeds of plants in the mint family (Lamiaceae). The preferred host in the U.K. is black horehound, *Ballota nigra (*Bantock and Botting 2013*)*.

In addition to the two species new to British Columbia, we also report the occurrence of a third species of the exotic seed bug, *Rhyparochromus vulgaris* (Schilling) (Hemiptera: Heteroptera: Rhyparochromidae), from two locations in Kelowna. It was collected in conjunction with *A. melanocephalus* in September 2016 and as by-catch in surveillance traps for invasive alien species from the Kelowna landfill (49.948597º N, 119.424989º W) in June 2016. The initial discovery of *R. vulgaris* in British Columbia is reported by Scudder (in press). All three species are the first representatives of these genera in Canada.

Although *A. melanocephalus* and *R. alboacuminatus* are not known as agricultural pests, the presence of large numbers could be problematic for homeowners and farmers. Elm is a common landscape tree in Interior British Columbia, which may lead to more reports of infestations by *A. melanocephalus*. Years with high summer temperatures may see particularly large numbers, as was found in Italy (Maistrello *et al.* 2006). The large numbers of *R. alboacuminatus* were a nuisance for the affected orchardist, who was worried about the negative impact on his business. The spread of *R. alboacuminatus* via farm equipment, vehicles, and transportation of farm produce is likely; we had to remove *R. alboacuminatus* hitchhikers from our vehicle before leaving the infested property. Vouchers of the three species have been deposited at the Canadian National Insect Collection, and Spencer and Royal BC museums. A *R. vulgaris* voucher from the invasive alien species landfill traps has been deposited in the Canadian Forest Service, Pacific Forestry Centre reference collection, Victoria, British Columbia. Photographs are of specimens collected at the sites.

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