FIRST NORTH AMERICAN RECORDS FOR THE PALEARCTIC
ORIUS MAJUSCUS (REUTER)
(HEMIPTERA: HETEROPTERA: ANTHOCORIDAE)

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Abstract.—Orius majuscus (Reuter), a widespread Palearctic species, is reported in North America for the first time based on specimens collected in Ontario, Canada. A diagnosis, description, photographs of the adult, photomicrographs of selected structures, and illustrations of male genitalia are presented to help distinguish O. majuscus from other North America species of the genus.

Key Words: Heteroptera, Anthocoridae, Orius, majuscus, non-indigenous, Canada, description, new records

In 2005, specimens of an anthocorid were submitted to me for identification by the late Courtney Finch, a graduate student of Drs. Jan Barber and Peter Bernhardt at Saint Louis University, St. Louis, MO. This material was taken during her cooperative work in Ontario, Canada, near Guelph, with Dr. Peter Kevin (University of Guelph) and his graduate student Victoria MacPhail, as part of a pollination study on yellow marsh marigold, Caltha palustris L. [Ranunculaceae]. The specimens subsequently proved to be the Palearctic Orius majuscus (Reuter), a species not previously recorded from North America.

Prior to this report, only seven species of Orius Wolff were known from the Nearctic (Henry 1988), including the adventive O. minatus (Linnaeus), a species probably introduced with exotic plant material from the Palearctic (Kelton 1978, Lattin et al. 1989). Kelton (1963, 1978) reviewed the four species known to occur in Canada and Herring (1966) treated 21 species in his revision of the genus for the Western Hemisphere, including descriptions of 12 new species.

More than 70 species of Orius are known in the world (Péricart 1972). Twenty-five species are known from the Palearctic and at least 38 species have been documented from the Afro tropical Region (Hernández and Stonedahl 1999). Péricart (1972) monographed the western Palearctic species and provided keys and information on their distribution and ecology; Hernández and Stonedahl (1999) reviewed the East African species of economic importance, including one new species; Yasunaga and Miyamoto (1993) established the subgenus Panaorius for O. tantillus (Motschulsky); Cassis and Gross (1995) cataloged the Australian species; and, more recently, Bu and Zheng (2001) revised the 13 species known from China, including descriptions of two new species.
In this paper, I give the first report of *O. majusculus* in North America and provide a diagnosis, description, dorsal and lateral adult digital photographs, scanning electron photomicrographs of selected structures, and illustrations of male genitalia to help distinguish it from other New World species of the genus.

This paper is dedicated to my long-time friend and colleague, Dr. John D. ("Jack") Lattin in recognition of his many contributions to our knowledge of the North America Anthocoridae, and for all the inspiration and support he has given me over the years. Congratulations to you Jack on the occasion of your 80th birthday (July 2007). All the best wishes for many more years of productive research.

Materials and methods. The color images of *O. majusculus* were obtained using an EntoVision Imaging Suite that included a JVC KY-75 3CCD digital camera mounted to a Leica M16 zoom lens via a Leica z-step microscope stand. Multiple focal planes were merged using Cartograph 5.6.0 (Microvision Instruments, France) software. Photomicrographs were captured using an AMRAY 1810 electron microscope set at 10 kv.

Abbreviations for institutions cited in this paper are as follows: UG (University of Guelph, Guelph, Ontario); USNM (National Museum of Natural History, Washington, DC).

*Orius majusculus* (Reuter)  
(Figs. 1–11)

*Triphleps majusculus* Reuter 1879: 15  
(Orig. descr.); Ribaut 1923: 530  

*Orius majusculus*: Wagner 1952: 42  
(descr., paramere, n. subg.); Sands 1957: 301  
(descr. egg, nymphs); Southwood and Leston 1959: 181  
(biol., key, paramere); Péricart 1972: 183  
(descr., key, paramere, distr., ecol.), 1996: 124 (cat.).

Diagnosis.—*Orius majusculus* keys to *O. minutus* in Kelton (1963, 1978) and Herring (1966) based on the elongate-oval shape (Figs. 1–4), large size, and relatively dense hemelytral pubescence. It can be distinguished from *O. minutus* and all other North American species by the large size alone. Males range from 2.5–2.7 mm and females, from 2.6–3.0 mm, whereas the adventive *O. ininus* (the next largest Nearctic species) ranges from 2.2–2.3 mm in males and from 2.2–2.4 mm (Herring 1966, Kelton 1978) to 2.2–2.5 mm (Péricart 1972) in females. In addition to size, *O. majusculus* is distinguished by the proportionately longer antennal segment II that is 1.9 times longer than the vertex in males and 1.5 times in females versus 1.7 times in males and 1.3 times in female for *O. minutus* (Southwood and Leston 1959), and the robust male paramere (Fig. 11) that has the flagellum extending only slightly beyond the main trunk versus a less robust trunk and proportionately longer flagellum in *O. minutus* (Fig. 12).

Study of the paramere of the one Canadian male and measurements of the antennal segment II length to width of vertex ratios in both sexes were used to confirm the identification of the North American specimens, in addition to comparison with identified European material in the USNM collection.

Description (n = 1).—Male: Elongate oval, length 2.55 mm, width 1.07 mm.  
*Head*: Length 0.40 mm, width across eyes 0.42 mm, width of vertex 0.19 mm; shiny dark brown to black, frons and vertex finely rugose; eyes reddish black, ocelli reddish, set near inner hind margin of eye by distance less than half diameter of an ocellus.  
*Labium*: Length 0.59 mm, extending to bases of front coxae.  
*Antenna*: Segment I length 0.13 mm, II 0.38 mm, III 0.27 mm, IV 0.26 mm;
Figs. 1–4. *Orius majuscule*. 1, 2, adult male. 1, dorsal aspect. 2, lateral aspect. 3, 4, adult female. 3, dorsal aspect. 4, lateral aspect.
overall coloration yellowish brown, segment I sometimes darker brown, segment IV and apical half of segment III dark brown or fuscous. **Pronotum**: Length 0.35 mm, basal width 0.90 mm; shiny black, trapeziform, lateral margin finely carinate, anterior two thirds narrowly explanate; posterior margin weakly concave; finely punctate except for contiguous impunctate calli; relatively densely set with semierect, simple, pale yellowish brown setae. Mesoscutum black, broadly exposed; scutellum black, slightly broader at base than long. **Hemelytron**: Subparallel, yellowish brown with cuneus brown to dark brown; clothed with relatively dense, semierect, simple, pale yellowish-brown setae; membrane entire, translucent pale brown. **Ventral surface** (Figs. 2, 4, 5, 7, 10): Shiny black; ostiolar auricle and evaporative area (Fig. 9) black. **Legs**: Uniformly pale yellowish
brown, hind femur and middle and hind coxae often darker brown. Male paramere (Fig. 11) broadly rounded, flagellum proportionately short, extending only slightly beyond rounded main trunk.

Female (n = 4): Length 2.60–2.85 mm, width 1.17–1.18 mm. **Head:** Length 0.43 mm, width across eyes 0.42–0.45 mm, vertex 0.21–0.22 mm. **Labium:** 0.64–0.66 mm, extending to bases of front coxae. **Antenna:** Segment I length 0.13 mm, II 0.32–0.34 mm, III 0.22–0.26 mm, IV 0.24–0.26 mm. **Pronotum:** Length 0.40 mm, basal width 0.99–1.01 mm. Similar to male in overall coloration, but more broadly oval, slightly longer, and with a proportionately shorter antennal segment II length to width of vertex ratio.

**Distribution.**—In the Palearctic, this species ranges throughout Europe, east to Mongolia and Far-Eastern Russia, south to Syria and Turkey, and to Morocco in northern Africa (Péricart 1996). Specimens from three counties (Halton, Waterloo, and Wellington) in southern Ontario, Canada, listed below represent the first Western Hemisphere records for *M. majusculus.*


Palearctic specimens examined.—**FRANCE:** 3 ♀, Carssonne (no other data) (USNM); 1 ♂, 1 ♀, Lille (no other data) (USNM). **GERMANY:** 1 ♀, Enkheim (no other data) (USNM); 3 ♀, Nordstedt, 27 Apr. 1993, Rade (USNM); 1 ♀, Pinneberg, 19 Sept. 1993, Ranzel (USNM). **NETHERLANDS:** 1 ♂, 1 ♀, Amsterdam, 23 Aug. 1951, Hakan Linberg (USNM); 1 ♀, Gavenzande, 28 Jul. 1950, J. J. Meurer (USNM); 2 ♀, Hoek, 13 Sept. 1944, J. J. Meurer (USNM). **ROMANIA:** 1 ♀, Macin, Dobroudja (no other data) (USNM); 6
Discussion.—Herring (1966) noted that the New World species do not satisfactorily fit into Wagner's (1952) subgeneric classification. That all New World species lack setae at the corners of the pronotum and the calli are impunctate loosely place them in the subgenus *Heterorius* Wagner, which includes *O. majusculus* and *O. minutus*.

*Orius majusculus* is an effective predator in various crop systems. Wagner (1952) and Péricart (1972) described the adult and illustrated the male paramere and Sands (1957) described the egg and nymphal instars. Members of the genus *Orius* are well-known predators shown to be important in biological control programs in both the New and Old World where they feed on aphids, leafhoppers, psyllids, scale insects, springtails, thrips, beetle and lepidopteran eggs and larvae, and other soft-bodied arthropods (Kelton 1978, Lattin et al. 1989). The North American *Orius insidiosus* (Say) has been subject of many studies in agroecosystems (Ryerson and Stone 1979, Lattin 1999), where it is known to prey on aphids, leafhoppers, mites, thrips, and eggs and larvae of Lepidoptera, including the corn earworm. Hernandez and Stonedahl (1999) noted that certain species of *Orius*, including *O. majusculus*, can maintain populations of *Frankliniella occidentalis* (Pergande) and *Thrips tabaci* Lindeman (Thysanoptera) below economic thresholds. Other research has documented that *O. majusculus* is an important predator of *Aphis pomi* De Geer on apple trees in the Czech Republic (e.g., Kabicek and Hejzlar 1996) and of *Frankliniella occidentalis* and *Tetranychus urticae* Koch (Acari: Tetranychidae) under greenhouse conditions in Germany (e.g., Blaeser et al. 2005).

It is difficult to speculate when *O. majusculus* may have become established in North America. The earliest records cited in this paper go back only five years to 2002. However, given that Kelton conducted extensive surveys in Canada during the 1960s and 70s, studied the Canadian species of *Orius* (Kelton 1963), and monographed the Canadian and Alaskan Anthocoridae (Kelton 1978), it is unlikely that this adventive species was present before the 1980s. Clearly, additional survey work is needed to more fully determine the distribution of this newly detected anthocorid in North America.

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**LITERATURE CITED**


