

**SPHAERODERMA TESTACEUM (F.) (COLEOPTERA: CHRYSOMELIDAE), A  
PALEARCTIC FLEA BEETLE NEW TO NORTH AMERICA**

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**Abstract.**—A common Palearctic flea beetle, *Sphaeroderma testaceum* (F.) is reported for the first time from North America. Adults were collected from Canada thistle (*Cirsium arvense*) in Canada (Bible Hill, Nova Scotia) on 3 August 2001. This apparently accidentally introduced species, a specialist on pest thistles and a promising biological control agent, is redescribed and habitus photographs that facilitate its identification are provided. Its Old World distribution, host plants, and natural history are summarized.

**Key Words:** Coleoptera, Chrysomelidae, *Sphaeroderma testaceum*, *Cirsium arvense*, Canada thistle, North America, distribution, natural history, biological control, immigrant species

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Thistles include many species of composites in the subfamily Cynareae of the Asteraceae. Although most species in North America are native and beneficial to wildlife, several species that have been unintentionally introduced from Europe and North Africa have become serious weeds of crops and rangelands in North America. Invasive species that warrant control—chemical, cultural, or biological—include musk and Italian thistle [*Carduus thoermeri* (Weinmann) and *Carduus pycnocephalus* (L.)], Canada and bull thistle [*Cirsium arvense* (L.) Scopoli and *Cirsium vulgare* (Savi) Tenore], and milk thistle [*Silybum marianum* Gaertner].

The discovery and deployment of biological control agents to reduce populations of pest thistles below economic thresholds have been emphasized in North America, and several Old World insects have been released into the native landscape for thistle control or suppression. The most important of these species include three weevils

[*Rhinocyllus conicus* (Froelich), *Trichosirocalus horridus* (Panzer), and *Hadroploncus litura* (F.); Curculionidae], two leaf beetles [*Altica carduorum* Guérin-Ménéville and *Cassida rubiginosa* Muller; Chrysomelidae], and a stem-galling fly [*Urophora cardui* (L.); Tephritidae] (e.g., Harris 1984, Harris and Wilkinson 1984, Peschken 1984, McClay et al. 2002).

Canada thistle is considered one of the world's worst weeds (Holm et al. 1977, McClay et al. 2002) and the third most important weed in Europe (Schroeder et al. 1993). In Switzerland, *C. arvense* is regarded as the most troublesome weed in agricultural land and is equally problematic in adjacent fields (Bacher 1997). In North America, *C. arvense* is a noxious weed in 35 U.S. states and occurs throughout Canada, including the Atlantic Provinces (McClay et al. 2002).

On a recent collecting and survey trip to the Canadian Maritime Provinces, we observed numerous adults of *Sphaeroderma*



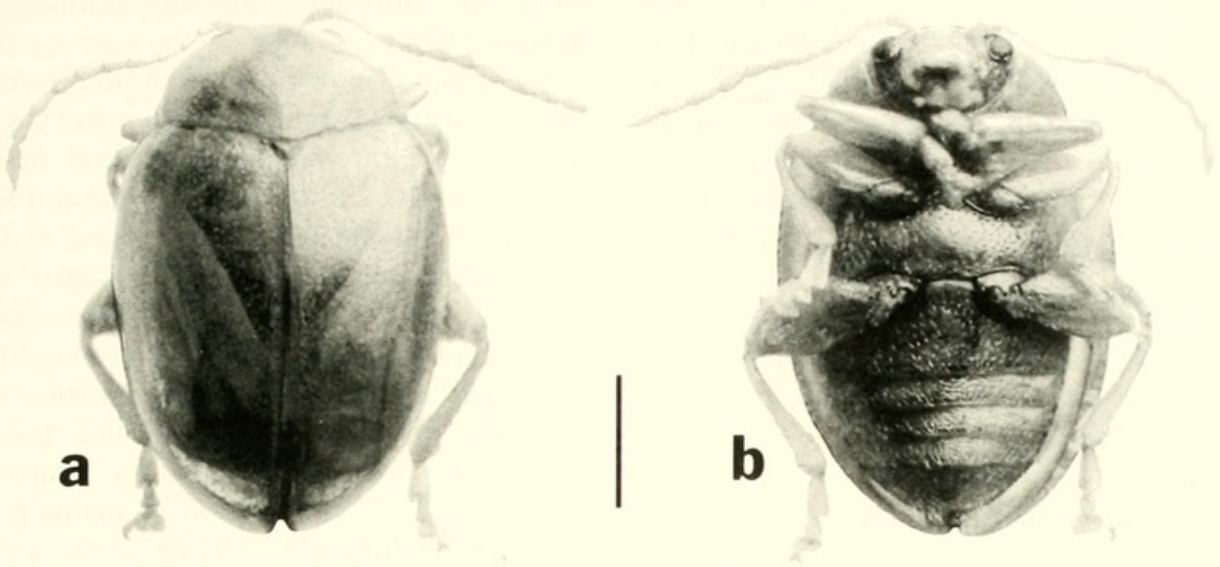


Fig. 1. *Sphaeroderma testaceum*, adult habitus. a, Dorsal aspect. b, Ventral aspect. Scale line, 1 mm.

*testaceum* (F.) at a site in Nova Scotia; on 3 August 2001, this widely distributed Palearctic flea beetle was beaten from the foliage of *C. arvense* growing (in edge areas) on the campus of the Nova Scotia Agricultural College at Bible Hill (Colchester Co.). We provide here a redescription and habitus photographs of *S. testaceum* to allow its recognition, and information on its Old World distribution, host plants, and natural history.

*Sphaeroderma testaceum* (F.)

(Fig. 1)

(synonymy after Heikertinger and Csiki 1940)

*Altica testaceum* Fabricius 1775: 114.

*Haltica cardui* Gyllenhal 1813: 551.

*Sphaeroderma testaceum*: Stephens 1831: 328.

*Sphaeroderma centaureae* Stephens 1831: 329.

Redescription (adapted from Konstantinov and Vandenberg 1996 and Savini and Furth 2001).—Body small, 3.0–4.5 mm, broadly spherical, coccinelliform, wide, strongly convex. Body, legs, and mouthparts orange yellow to reddish brown. Head with frontal sulcus horizontal from upper margin of compound eyes toward center of

head. Supraantennal calli present, separated from each other, slightly raised and slightly separated from frontal ridge, and laterally strongly delineated from vertex by deep furrows. Compound eye small. Interantennal space wider than transverse diameter of antennal socket but narrower than transverse diameter of compound eye. Antenna 11-segmented, filiform. Pronotum convex, without prebasal transverse impression; anterior angles projected anteriorly, thickened, very blunt, not beveled. Anterior coxal cavities open behind. Metasternum longer than prosternal and mesosternal process together. Metafemur not greatly thickened, narrower than width of abdomen. Metatibia dorsally rounded, without excavation on outer edge and without preapical tooth. First metatarsomere triangularly enlarged and very thick. Elytral disc with very fine and confused punctation, with tendency to form striae. Epipleura totally visible laterally, very wide in anterior half and gradually tapering apically, almost reaching elytral apex.

Remarks.—Most species of *Sphaeroderma*, a genus of more than 150 species worldwide, are found in the Oriental and Afrotropical Regions; about 14 species also occur in the Palearctic Region (Konstanti-



nov and Vandenberg 1996), with *S. rubidum* (Graells) and *S. testaceum* the most common. There are no native species of *Sphaeroderma* in the New World; two species (*optima* LeConte and *coerulea* Jacoby) previously included in the genus clearly belong to two different genera (Savini and Furth 2001). *Sphaeroderma optima*—recorded from Ohio, Maryland, North Carolina, Florida, and Texas (Wilcox 1975, Flowers et al. 1994)—belongs in the genus *Pseudodibolia* Jacoby, whereas *S. coerulea* (Panama) is now placed in the new genus *Neosphaeroderma* Savini and Furth. These genera, including *Sphaeroderma*, are diagnosed and separated in a key to genera by Savini and Furth (2001).

**Distribution.**—In the Palearctic Region, *S. testaceum* is widely distributed in Europe, ranging from Denmark and Scandinavia in the north, south to northern Spain, France, northern Italy, the Balkan states, Crimea, southern Russia, and the Caucasus (Heikertinger and Csiki 1940, Gruev and Tomov 1998).

**Material examined.**—Voucher specimens deposited in the Cornell University Insect Collection, Ithaca, NY. CANADA: NOVA SCOTIA: Colchester Co., Truro (Bible Hill) (45.24° N, 63.18° W), campus of Nova Scotia Agricultural College, 3 August 2001 (11 adults), beaten from Canada thistle (*C. arvense*).

**Host plants and natural history.**—In the field and in laboratory tests in Europe, adults of *S. testaceum* fed on the foliage of the composites *Carduus nutans* L., *C. crispus* L., *C. personatus* (L.) Jacq., *C. defloratus* L., and species of the genera *Cirsium*, *Carlina*, *Onopordum*, and *Silybum* (Batra et al. 1981). The larvae mine the leaves of their hosts, especially species of *Carduus* and *Cirsium*, feeding on the parenchyma. Their mines follow leaf edges, whereas those of *S. rubidum* follow the midrib and principal veins (Redfern 1983). In Bulgaria, *S. testaceum* is found from the seacoast up to 800 meters elevation; adults are present

from May through September (Gruev and Tomov 1998).

In England, new-generation adults of *S. testaceum* probably appear from the beginning of April through July and survive until the end of October (Cox 1976). Oviposition extends from late June until the end of October. Egg hatch begins in early August and continues until early January. From early October until late March, fully grown third-instar larvae can be found in leaf mines of *Cirsium*. Fully grown larvae (third instars) apparently enter an obligatory diapause during winter, with pupation occurring from March until July (Cox 1976).

#### DISCUSSION

Preliminary screening of the host range of *S. testaceum* in Europe suggested this chrysomelid's potential in North America as a biological control agent against invasive thistles of the genera *Carduus*, *Cirsium*, and *Silybum* (Batra et al. 1981). We were unaware of the beetle's actual release in North America, but our collection of *S. testaceum* on the campus of an agricultural college raised the possibility of an intentional introduction. This possibility seemed greater once we discovered that Glen Sampson, a faculty member at the Nova Scotia Agricultural College, is interested in weed management and has been involved with weed biocontrol projects in Nova Scotia. He is, however, unaware of any attempts to import, evaluate, and release *S. testaceum* in Canada (M.G. Sampson, personal communication). Moreover, this chrysomelid is not among insects known to have been released during 1969–1980 (Harris 1984, Peschken 1984, Harris and Wilkinson 1984) or 1981–2000 (McClay et al. 2002) to help suppress Canadian populations of *Carduus* or *Cirsium* thistles.

*Sphaeroderma testaceum* is a potentially useful biocontrol agent that apparently has been unintentionally introduced and has become established on Canada thistle in Nova Scotia. Several other Old World insects that feed on invasive thistles in North America,



such as the weevils *Cleonus piger* (Scopoli) and *Larinus planus* (F.) and the leaf beetle *Cassida rubiginosa*, also are considered to have been accidentally introduced into North America (Wheeler and Whitehead 1985). *Larinus planus* subsequently has been released against Canada thistle in British Columbia and the Canadian Prairie Provinces (McClay et al. 2002). *Sphaeroderma testaceum* might also be considered for release against pest thistles in North America.

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#### Literature Cited

- Bacher, S. 1997. Das Potential einkeimischer Insekten zur biologischen Bekämpfung der Ackerkratzdistel (*Cirsium arvense* (L.) Scop.) in Mitteleuropa. Mitteilungen der Deutschen Gesellschaft für Allgemeine Angewandte Entomologie 11: 277–280.
- Batra, S. W. T., J. R. Coulson, P. H. Dunn, and P. E. Boldt. 1981. Insects and fungi associated with *Carduus* thistles (Compositae). U.S. Department of Agriculture Technical Bulletin Number 1616, 100 pp.
- Cox, M. L. 1976. The taxonomy and biology of the British Chrysomelidae. Ph.D. Thesis, University of New Castle upon Tyne, England.
- Fabricius, J. C. 1775. Systema Entomologiae sistens Insectorum classes, ordines, genera, species, adjectis synonymis, locis, descriptionibus, observationibus. Flensburgi et Lipsiae, Korte, 832 pp.
- Flowers, R. W., D. G. Furth, and M. C. Thomas. 1994. Notice on the distribution and biology of some Florida leaf beetles (Coleoptera: Chrysomelidae). Coleopterists Bulletin 48: 70–89.
- Gruev, B. and V. Tomov. 1998. Coleoptera, Chrysomelidae. Pensoft, Sofia, 160 pp. (English translation of Catalogus Faunae Bulgaricae, 3: Coleoptera, Chrysomelidae. Academia Scientiarum Bulgarica Institutum Zoologicum, Moscow).
- Gyllenhal, L. 1813. Insecta Suecica descripta. Classis I. Coleoptera sive Eleutherata. 8. Tome I, Pars III. pp. 2–730.
- Harris, P. 1984. *Carduus nutans* L., nodding thistle and *C. acanthoides* L., plumeless thistle (Compositae), pp. 115–126. In Kelleher, J. S. and M. A. Hulme, eds., Biological Control Programmes against Insects and Weeds in Canada 1969–1980. Commonwealth Agricultural Bureaux, Farnham Royal, Slough, England.
- Harris, P. and A.T.S. Wilkinson. 1984. *Cirsium vulgare* (Savi) Ten., bull thistle (Compositae), pp. 147–153. In Kelleher, J. S. and M. A. Hulme, eds., Biological Control Programmes against Insects and Weeds in Canada 1969–1980. Commonwealth Agricultural Bureaux, Farnham Royal, Slough, England.
- Heikertinger, F. and E. Csiki. 1940. Halticinae (partes 166 & 169), pp. 1–635. In Schenkling, S., ed., Coleopterorum Catalogus, Vol. XXV. Chrysomelidae II. W. Junk, The Hague, Netherlands.
- Holm, L. G., D. L. Plucknett, J. V. Pancho, and J. P. Herberger. 1977. The World's Worst Weeds: Distribution and Biology. University of Hawaii Press, Honolulu, 609 pp.
- Konstantinov, A. S. and N. J. Vandenberg 1996. Handbook of Palearctic flea beetles (Coleoptera: Chrysomelidae: Alticinae). Contributions on Entomology, International 1: 237–439.
- McClay, A. S., R. S. Bouchier, R. A. Butts, and D. P. Peschken. 2002. *Cirsium arvense* (L.) Scopoli, Canada thistle (Asteraceae), pp. 318–330. In Mason, P. G. and J. T. Huber, eds., Biological Control Programmes in Canada, 1981–2000. CABI Publishing, Wallingford, UK.
- Peschken, D. P. 1984. *Cirsium arvense* (L.) Scop., Canada thistle (Compositae), pp. 139–146. In Kelleher, J. S. and M. A. Hulme, eds., Biological Control Programmes against Insects and Weeds in Canada 1969–1980. Commonwealth Agricultural Bureaux, Farnham Royal, Slough, England.
- Redfern, M. 1983. Naturalists' Handbooks 4. Insects and Thistles. Cambridge University Press, Cambridge, 65 pp.
- Savini, V. and D. G. Furth. 2001. The status of *Hei-*



- kertingerella*, *Monotalla*, *Pseudodibolia*, and *Sphaeroderma* (Coleoptera: Chrysomelidae: Alticinae) in the New World. Proceedings of the Entomological Society of Washington 103: 903–912.
- Schroeder, D., H. Müller-Schärer, and C. S. A. Stinson. 1993. A European weed survey in 10 major crop systems to identify targets for biological control. Weed Research 33: 449–458.
- Stephens, J. F. 1831. Illustrations of British Entomology, or a Synopsis of Indigenous Insects Containing their Generic and Specific Descriptions, with an Account of their Metamorphoses, Times of Appearance, Localities, Food and Economy, as far as Practicable, with Colored Figures (from Westwood) of the Rarer and more Interesting Species. Mandibulata (Coleoptera), Vol. 4, London. 414 pp.
- Wheeler, A. G., Jr. and D.R. Whitehead. 1985. *Larinus planus* (F.) in North America (Coleoptera: Curculionidae: Cleoninae) and comments on the biological control of Canada thistle. Proceedings of the Entomological Society of Washington 87: 751–758.
- Wilcox, J. A. 1975. Checklist of the beetles of Canada, United States, Mexico, Central America and the West Indies. The Leaf Beetles (Red Version). North American Beetle Fauna Project 1(7): 1–166.

Note added in proof.—In 2003, we recollected *S. testaceum* at Bible Hill on 29 July (13 adults) and found it at two additional localities in Nova Scotia: Antigonish Co., Antigonish, 30 July (6 adults), and Pictou Co., New Glasgow, 3 August (2 adults).



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