



## ***Otiorhynchus porcatus* (Coleoptera: Curculionidae): a European root weevil newly discovered in the Canadian Maritime Provinces**

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### **ABSTRACT**

*Otiorhynchus porcatus* (Herbst), a Palearctic root weevil previously known in North America from collections in Newfoundland, Québec, and Ontario, is reported for the first time in the Maritime Provinces of Canada from Halifax, Nova Scotia. The distribution and biology of the species in Europe are briefly summarized, as are observations on its possible hosts in North America. It is unlikely to have been introduced in historic ballast shipments; more probably in association with agricultural or horticultural products.

### **RÉSUMÉ**

L'*Otiorhynchus porcatus* (Herbst), une espèce paléarctique de charançon des racines autrefois présente en Amérique du Nord et dont des spécimens se retrouvent dans des collections de Terre-Neuve, du Québec et de l'Ontario, a été signalé pour la première fois dans les provinces Maritimes du Canada, plus précisément à Halifax, en Nouvelle-Écosse. On présente un bref résumé de la répartition et de la biologie de l'espèce en Europe ainsi que des observations sur ses hôtes éventuels en Amérique du Nord. Il est peu probable que l'espèce ait été autrefois introduite dans l'eau de ballast de navires marchands et plus plausible qu'elle ait été associée à des produits agricoles ou horticoles.

### **INTRODUCTION**

The genus *Otiorhynchus* Germar 1812 is a hyper-diverse genus of Palearctic root weevils (Curculionidae: Entiminae). Some 157 species are known in Europe, 14 of which have been introduced to North America, and 11 have been recorded in Canada (Frieser 1981; Bright and Bouchard 2008). Majka et al. (2007) reported eight of those species from the Maritime Provinces of Canada (New Brunswick, Nova Scotia, and Prince Edward Island), including *Otiorhynchus ligneus* (Olivier, 1807), *Otiorhynchus ovatus* (Linnaeus, 1758), *Otiorhynchus raucus* (Fabricius, 1777), *Otiorhynchus rugifrons* (Gyllenhal, 1813), *Otiorhynchus rugostriatus* (Goeze, 1777), *Otiorhynchus scaber* (Linnaeus, 1758), *Otiorhynchus singularis* (Linnaeus, 1767), and *Otiorhynchus sulcatus* (Fabricius, 1775). Adults are flightless and the larvae feed underground; most are polyphagous and many are significant pests of a variety of cultivated plants. Although, in Europe, males of all species are known, in North America most (except for *Otiorhynchus ligneus*, *Otiorhynchus meridionalis* Gyllenhal, 1834, and *Otiorhynchus porcatus* (Herbst, 1795)) consist of female-only populations that reproduce by parthenogenesis (Bright and Bouchard 2008).

*Otiorhynchus porcatus* (Herbst, 1795) is a central and northern European weevil recorded from Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Ireland, Italy, Luxembourg, Netherlands,

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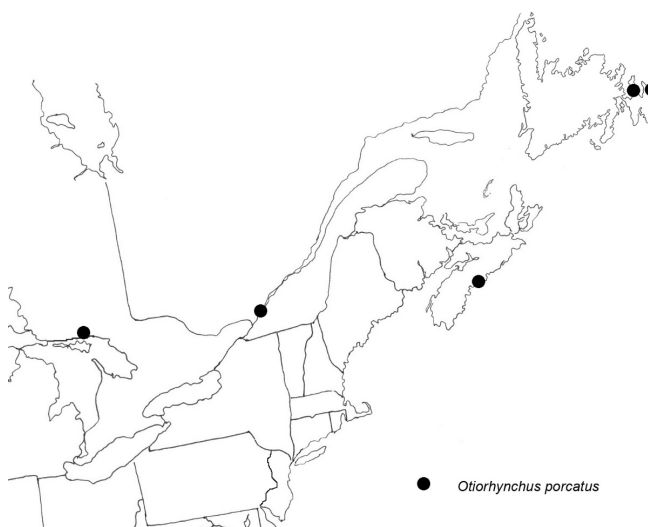
Norway, Poland, Slovakia, Sweden, and Switzerland (Alonso-Zarazaga 2007). *Otiorhynchus porcatus* was first reported in North America by Brown (1940) from a single specimen collected in Montréal, Québec (25 April 1937, J. Ouellet, CNC (Canadian National Collection)). It was subsequently reported from St. John's, Newfoundland by Brown (1967) (23 June 1965, W.J. Brown, CNC), and from Killarney, Ontario (22 January 1932, 2 specimens, CNC) by Bright and Bouchard (2008). David Langor (Canadian Forest Service-Northern Forestry Center (CFS-NFC), personal communication) has records of specimens collected in St. John's in 1989 and 1992; Hicks (2007) collected two specimens in Tilton on the western coast of Conception Bay, Newfoundland in 2003; and Mardon Erbland photographed a specimen (Fig. 1) in Logy Bay, Newfoundland, 16 May 2009, indicating that the species has a wider distribution on the Avalon Peninsula. The Canadian distribution is shown in Fig. 2.

**Fig. 1.** Adult *Otiorhynchus porcatus* photographed 16 May 2009, Logy Bay, NL in moss at the edge of a peat bog. Mardon Erbland.



In Europe it has been recorded as feeding on *Saxifraga umbrosa* L. (Saxifragaceae), *Primula* spp. (Primulaceae), *Solidago altissima* L. (Asteraceae), and *Prunus serotina* (Ehrh.) (Rosaceae) (Kevan 1943, 1944; Fjeldalen 1963; Jobin et al. 1996; Nowakowska and Halarewicz 2006); in North America it has been recorded from *Syringa* sp. (Oleaceae) and *Viburnum* sp. (Caprifoliaceae) (Campbell et al. 1989). Holecova (2001) referred to *Otiorhynchus porcatus* as a nocturnally active, polyphagous species. Germann et al. (2008) considered it a polyphagous species, ubiquitous in xero-thermophilous and grassland sites in Switzerland. It was abundant in similar areas (median

**Fig. 2.** Distribution of *Otiorhynchus porcatus* in North America.



strips of highways) in Finland (Koivula et al. 2005). It is one of the few North American *Otiorhynchus* species in which males are known (Bright and Bouchard 2008). Adults can readily be distinguished from other species in the genus by their elevated and tuberculate alternate elytral interstriae, and their strongly tuberculate pronotum (Bright and Bouchard 2008) (Fig. 1). In Europe, *Otiorhynchus porcatus* is placed in the *Otiorhynchus* s. str. *lolatismus* Reitter species group, however, in North America these groups and subgeneric categories have not been employed (Frieser 1981; Bright and Bouchard 2008). The present study newly reports *Otiorhynchus porcatus* from Nova Scotia, Canada.

## RESULTS

On 17 June and 28 October 2009, in the course of research on the insect fauna of green roofs and adjacent areas in Halifax, Nova Scotia, the second author collected 22 specimens of *Otiorhynchus porcatus* specimens in pitfall traps in a green roof area of the Life Sciences Building of Dalhousie University (Fig. 3). On 9 September 2009, the first author visited the site to determine the extent of its distribution. Examination of the main grassy portion of the site by sweep netting and checking under stones and at the base of plants yielded no specimens. However, there is a large elevated bed of vegetation enclosed by a concrete retaining wall at this site. It was readily possible to search among the bases of the plants and a number of Coleoptera specimens (living and dead) were collected including three additional specimens of *Otiorhynchus porcatus* as well as specimens of *Otiorhynchus ovatus* and *Otiorhynchus sulcatus*. The vegetation of this bed consists of the following plants:

**Fig. 3.** Life Sciences Building, Dalhousie University, Halifax, NS site where adult *Otiorhynchus porcatus* were collected. C. Majka, NS Museum.



**Abundant:** scotch lovage, (*Ligusticum scothicum* L. (Apiaceae)); calico aster (*Aster lateriflorus* (L.) Britt. (Asteraceae)); fly honeysuckle (*Lonicera canadensis* Bartr. (Caprifoliaceae)); tufted vetch (*Vicia cracca* L.) (Fabaceae)); lily-of-the-valley (*Convallaria majalis* L. (Liliaceae)); and, Kentucky bluegrass (*Poa pratensis* L. (Poaceae)).

**Common:** New York aster (*Aster novi-belgii* L.) and Canada goldenrod (*Solidago canadensis* L.) (Asteraceae); black medick (*Medicago lupina* L. (Fabaceae)); Solomon's seal (*Polygonatum pubescens* (Willd.) Pursh (Liliaceae)); and, common speedwell (*Veronica officinalis* L. (Scrophulariaceae)).

**Scarce:** Shasta daisy (*Leucanthemum x superbum* (Bergmans ex J.W. Ingram) D.H. Kent) and rough goldenrod (*Solidago rugosa* Ait. (Asteraceae)); snow-in-summer (*Cerastium tomentosum* L. (Caryophyllaceae)); red osier dogwood (*Cornus sericea* L. (Cornaceae)); spinulose wood fern (*Dryopteris carthusiana* (Vill.) Fuchs (Dryopteridaceae)); *Iris* sp. (Iridaceae); poverty rush (*Juncus tenuis* Willd. (Juncaceae)); couch-grass (*Elymus repens* Gould (Poaceae)); and fringed loosestrife (*Lysimachia punctata* L. (Primulaceae)).

On 28 October 2009, two additional specimens of *Otiorhynchus porcatus* were collected in a pitfall trap at a site adjacent to a small marsh and pond, also located on the campus of Dalhousie University, 0.15 km from the green roof site. Fifty-three species of vascular plants were found at this site including: *Solidago puberula* Nutt., and *Aster novae-belgii* L., *Achillea millefolium* L., *Centaurea nigra* L., *Chrysanthemum* sp. (ornamental), *Erigeron* sp., *Hieracium kalmii* L.,

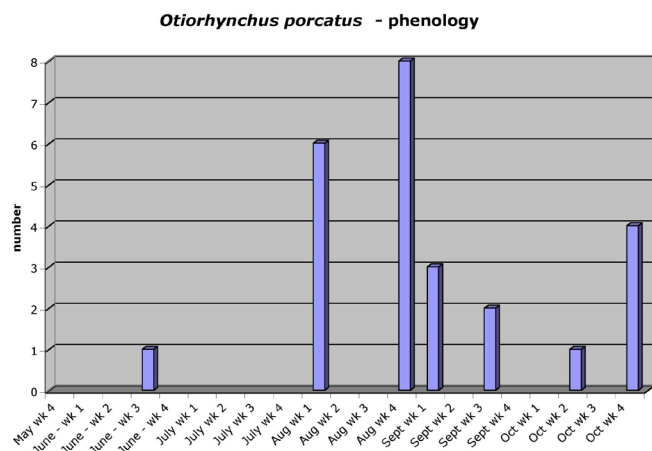
*Leontodon autumnalis* L., *Senecio vulgaris* L., and *Sonchus arvensis* L. (Asteraceae); *Fragaria virginiana* Duchesne, *Rubus "fruticosus"*, *Rubus hispidus* L., *Sorbus americana* Marsh., and *Spirea x vanhoutei* (Briot) Zabel (Rosaceae); and, *Astilbe biternata* (Vent.) Britt. (Saxifragaceae).

## DISCUSSION

Potential host plants of the *Otiorhynchus porcatus* at the green roof site in Halifax would appear to be: *Solidago canadensis* and *S. rugosa*, given that *Otiorhynchus porcatus* has adapted to feed on *Solidago altissima*, an adventive plant introduced to Europe from North America (Jobin et al. 1996); *Lonicera canadensis*, closely related to the genus *Viburnum* in the Caprifoliaceae, a host recorded in Canada by Campbell et al. (1989); and, *Lysimachia punctata*, closely related to the genus *Primula* in the Primulaceae, a known host plant in Europe (Fjelddalen 1963). No plants in the Saxifragaceae, Rosaceae, or Oleaceae were found at this site, although there were three other species in the Asteraceae in the genera *Aster* and *Leucanthemum*. At the marsh and pond site *Solidago puberula* is present, as are 15 other species in the Asteraceae, Rosaceae, and Saxifragaceae known to be associated with *Otiorhynchus porcatus*. As *Otiorhynchus porcatus* is known to be polyphagous on plants of several families in both Europe and Canada, further investigation on their hosts in Nova Scotia would be worthwhile given the observation that, "No serious damage has been recorded from Canada, but the species could become a serious pest under the proper conditions" (Bright and Bouchard 2008, 123).

The phenology of living adults collected is shown in Fig. 4. Specimens were collected between 17 June and 28 of October. This limited data (n = 25) would appear to indicate a peak in numbers during the month of August. In Europe adults have been collected between 24 April–17 October (Holecova 2001); 17 July–1 October (Koivula et al. 2005); and 13 June–3 August (German et al. 2008). Although univoltine, it may be the case that *Otiorhynchus porcatus*, like other *Otiorhynchus* species (i.e., *Otiorhynchus ovatus*, *Otiorhynchus singularis*, and *Otiorhynchus sulcatus*) that have been more extensively studied in Canada (Campbell et al. 1989), overwinters as both adults and late instar larvae. Overwintering adults appear early in the spring, feed for two weeks and then look for oviposition sites. Overwintering larvae feed until early summer, pupate with adult eclosion occurring in late summer followed shortly thereafter by oviposition (Campbell et al. 1989). In Québec, Levesque and Levesque (1994) found active *Otiorhynchus ovatus* adults from early June until the end of October.

**Fig. 4.** The phenology of *Otiorhynchus porcatus* collected in Halifax, NS.



Given that *Otiorhynchus porcatus* is a flightless species, and the considerable distances between areas where it has been historically collected (600–900 km.), it is apparent that records in Canada must represent several separate introduction events. Although several species of *Otiorhynchus* (*Otiorhynchus ligneus*, *Otiorhynchus ovatus*, *Otiorhynchus rugostriatus*, *Otiorhynchus sulcatus*) are associated with ballast sites in Great Britain, and are thought to have been introduced to North America via the historic trans-Atlantic lumber trade, this seems unlikely in the case of *Otiorhynchus porcatus*. It was not found by Lindroth (1957) at sites in southwestern England where dry ballast originated, and the host plants with which it is associated are not coastal species. The mechanism of its introduction to North America is unknown. It may perhaps have been introduced in association with agricultural or horticultural products. Further fieldwork to determine the extent its distribution in Halifax would be worthwhile.

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