

**INTRODUCED LEAF BEETLES OF THE MARITIME PROVINCES, 3: THE
VIBURNUM LEAF BEETLE, *PYRRHALTA VIBURNI* (PAYKULL)
(COLEOPTERA: CHRYSOMELIDAE)**

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Abstract.—*Pyrrhalta viburni* (Paykull), the viburnum leaf beetle, is an introduced Palearctic leaf beetle established in northeastern and northwestern North America. It was first reported in Ontario in 1947 but did not create problems until 1978 when destruction of European varieties of viburnums was observed. It has subsequently been found in a number of Canadian provinces and northeastern United States. It is herein newly reported from Prince Edward Island and Newfoundland. In Nova Scotia, several localities are reported for the first time, while specimens collected in Annapolis Royal, in 1924, establish a new timeline for its occurrence on the continent. Two possible scenarios with respect to the origin and dispersal of *P. viburni* in the Maritimes are proposed and discussed. The systematic history of the genus is briefly recounted and the diagnostics of the genus and species are given. The occurrence of *P. viburni* on native and exotic species in the plant genus *Viburnum* is examined, and concerns are expressed with respect to its impact on native and cultivated varieties.

Key Words: Coleoptera, Chrysomelidae, Galerucinae, *Pyrrhalta viburni*, viburnum leaf beetle, Canada, Maritime Provinces, introduced species

Pyrrhalta viburni (Paykull) is an accidentally introduced Palearctic leaf beetle, which is now established in northeastern and northwestern North America. In the Old World, it is found throughout much of Europe (including Ireland and Great Britain) north to Fennoscandia and east across Russian Karelia to the Urals, Orenburg, and Kazan. The southern limit of its distribution ranges from the Pyrenees east through Liguria and the southern Carpathians to the Black Sea, Crimea, Georgia, and Dagestan in the Caucasus (Warchalowski 1994, Borowiec 2005)

Pyrrhalta viburni was first reported on the North American continent from specimens collected in Fonthill in the Niagara Peninsula of Ontario in 1947 (Sheppard 1955). In 1978, Becker (1979) found the species established on the southern side of the Ottawa River in Ottawa (Ontario), and on the northern side in Hull (Québec). Old scars on twigs of infested bushes indicated that the beetle had been present for several years before the infestations were noticed. In 1993, it was reported in Halifax and Dartmouth, Nova Scotia (Wheeler and Hoebeke 1994), and in 1994 it was found

in Maine (Weston and Hoebeke 2003). It was recorded in New York (1996), Vermont (2000), Pennsylvania (2000), and Ohio (2002) by Weston and Hoebeke (2003). In 2001, it was recorded in British Columbia (Gillespie 2001). More recently it has been reported in Connecticut (2004), Massachusetts (2004), New Hampshire (2005) and Vermont (2004) (Anonymous 2005). Weston and Diaz (2005) predicted that “given its broad distribution in Europe, it seems likely that this pest will become widely distributed in the United States, given the abundance of suitable native host plants such as *Viburnum dentatum* and *V. opulus* variety *americanum* throughout the eastern and northern halves, respectively, of the United States.”

Pyrrhalta viburni has been recorded from a large variety of hosts whose susceptibility to the beetle varies considerably. Based on field observations, Weston and Desurmont (2002) reported that *V. trilobum* Marshall, *V. opulus* L., *V. sargentii* Koehne, *V. rafinesquianum* Schultes, *V. recognitum* Fernald, and *V. dentatum* L. were the most susceptible hosts. In laboratory trials, they found *V. trilobum*, *V. sargentii*, and *V. prunifolium* L. susceptible in varying degrees to larval feeding, while *V. wrightii* Miq., *V. plicatum* (Thunb.), *V. rhytidophylloides* J. Sur., *V. carlesii* Hemsl., and *V. sieboldii* Miq were resistant. Adults additionally fed to a substantial degree on *V. wrightii*, *V. rhytidophylloides*, and *V. carlesii*. Clark et al. (2004) additionally record *P. viburni* from *V. acerifolium* L., *V. dilatatum* Thunb., *V. lantana* L., *V. lentago* L., *V. x pragense* Decker, and *V. tinus* L., although they did not specify susceptibility nor larval versus adult consumption for these species. Concern has been expressed by a number of authors about the potential impact of *P. viburni* on populations of *Viburnum* in North America (Weston and Desurmont 2002, Weston et al. 2002, Weston and

Hoebeke 2003, Weston and Diaz 2005). Small and Catling (2005: 50) wrote that, “Biologists have speculated that certain species of *Viburnum* may become extirpated over parts of their range. The situation has been described as verging on ecological disaster.”

In this context, we examined the published records of this species from the Maritime Provinces of Canada. We also studied recent and historical specimens housed in various collections (see below). Our survey reveals that *P. viburni* is more broadly distributed in this region than hitherto known, and it has been present for a significantly longer period than previously reported.

SYSTEMATICS

Pyrrhalta has a complicated taxonomic history. De Joannis (1866) originally created it as a subgenus of *Galeruca* Geoffroy, 1792. In the first edition of the *Coleopterorum Catalogus*, Weise (1924) considered *Pyrrhalta* as monotypic, including only *P. viburni*. Wilcox (1965) enlarged the genus considerably by including the subgenera *Galerucella* Crotch, *Neogalerucella* Chûjô, *Xanthogaleruca* Laboissière, and *Tricholochmaea* Laboissière. He maintained roughly the same conception in the second edition of the *Coleopterorum Catalogus* (Wilcox 1971). Ten years later, however, he included in *Pyrrhalta* only the Palearctic species and elevated to generic level the subgenera of his first contribution (Seeno and Wilcox 1982). LeSage (1991) adopted these changes but Downie and Arnett (1996) continued to use the broad conception of *Pyrrhalta*.

Recently Riley et al. (2002) largely followed the generic arrangement of Seeo and Wilcox (1982), with only slight modifications regarding *Galerucella* Crotch and *Neogalerucella* Chûjô. This new classification which was adopted for the *Catalog of Leaf Beetles*

of *America North of Mexico* (Riley et al. 2003) reaches a broad consensus among those interested in leaf beetles in North America.

IDENTIFICATION

The genus *Pyrrhalta* can be identified using a combination of external characters: antennomere 4 longer than 2, the front coxae closed and not separated by the prosternum, tibial spurs present on hind tibiae in both sexes, the inner margin of epipleuron is distinct to apex, elytra without distinct vittae, and elytral punctuation fine.

At a specific level, *P. viburni* is distinguished by a golden pubescence on the head, pronotum, and elytra. Species in the genus *Tricholochmaea* Laboissière are also pubescent, but the hairs are never golden. On the pronotum of *P. viburni*, the pair of dark markings reach the lateral margins, but not in *Tricholochmaea*. In addition, the pronotum is twice as wide as long in *Pyrrhalta*, whereas it is only 1.5 as wide as long in *Tricholochmaea*. The elytral punctures are coarse in *Tricholochmaea* but fine in *Pyrrhalta*. There are no vittae on the elytra as in most specimens of *Ophraella* Wilcox, although the shoulders are often darkened (Fig. 1).

CONVENTIONS

Abbreviations of collections referred to in the text are:

ACNS	Agriculture and Agri-Food Canada, Kentville, Nova Scotia	DHWC	David H. Webster Collection, Kentville, Nova Scotia
ACPE	Agriculture and Agri-Food Canada, Charlottetown, Prince Edward Island	GSC	Gary Selig Collection, Bridgewater, Nova Scotia
CGMC	Christopher G. Majka Collection, Halifax, Nova Scotia	NSAC	Nova Scotia Agricultural College, Bible Hill, Nova Scotia
CNC	Canadian National Collection, Ottawa, Ontario	NSMC	Nova Scotia Museum Collection, Halifax, Nova Scotia
CUIC	Cornell University Insect Collection, Ithaca, New York	NSNR	Nova Scotia Department of Natural Resources, Shubenacadie, Nova Scotia

LOCALITY RECORDS

Pyrrhalta viburni has now been found in the four Maritime Provinces: New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland (Fig. 2). In total, 76 specimens were examined. Unless otherwise indicated, specimens are adults. In addition to the locality records obtained from the specimens examined by the authors, the list below includes localities reported in the literature.

NEW BRUNSWICK: *Charlotte Co.*: St. Stephen, 1995–2001, R.E. Hoebeke and A.G. Wheeler, (Hoebeke and Wheeler 2003); *Saint John Co.*: Saint John, 1995–2001, R.E. Hoebeke and A.G. Wheeler, (Hoebeke and Wheeler 2003); *York Co.*: Fredericton, 1995–2001, R.E. Hoebeke and A.G. Wheeler, (Hoebeke and Wheeler 2003). NEWFOUNDLAND: St. John's, Long Pond, IX–X.2001, D.J. Larson (4, CNC); St. John's, 2002, D.J. Larson (2, CNC). NOVA SCOTIA: *Annapolis Co.*: Annapolis Royal, 19.IX.1924, J.P. Spittal (1, ACNS); 1.X.1924, J.P. Spittal (4, ACNS); *Halifax Co.*: Halifax, 26.VI.1993, R.E. Hoebeke & A.G. Wheeler, (on) *Viburnum opulus* (1, CUIC); Dartmouth, 26.VI.1993, R.E. Hoebeke & A.G. Wheeler, (on) *Viburnum opulus*, (1, CUIC); Point Pleasant Park: 9.IX.2001, C.G. Majka, swamp, low vegetation (1, CNC); *ibid.*, 23.IX.1993, Barry Wright, (on) *Viburnum nudum* (9, NSMC); *ibid.*, 25.IX.1993, Barry Wright, (on) *Viburnum*



K. G. S. S. S.

Fig. 1. Habitus photograph of *Pyrrhalta viburni*.

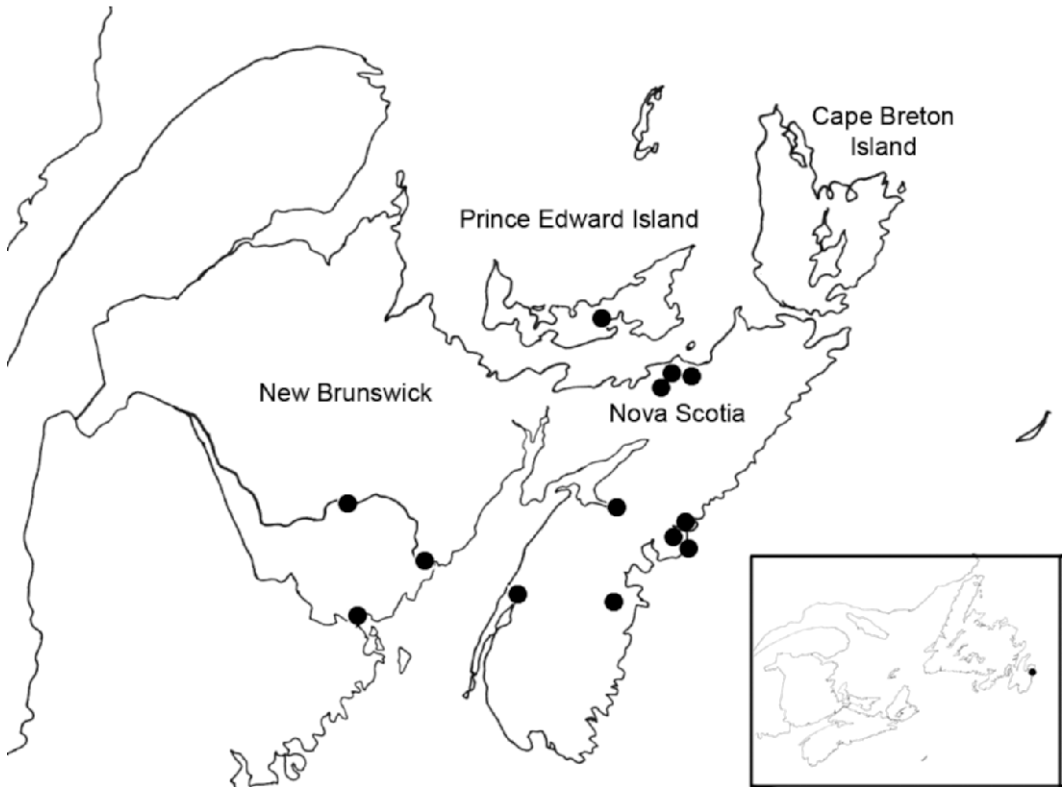


Fig. 2. Distribution of *Pyrrhalta viburni* in the Maritime Provinces. Closed circles indicate collection localities. Inset map: collection locality in Newfoundland.

nudum (3, NSMC); *ibid.*, 1.IX.2000, C.G. Majka, C.G. Majka, (on) *Viburnum nudum* (1, CGMC); *ibid.*, 10.VIII.2001, C.G. Majka, (on) *Viburnum nudum* (2, CGMC); *ibid.*, 9.IX.2001, C.G. Majka, boggy area, deciduous vegetation (3, CGMC); *ibid.*, 21.IX.2001, C.G. Majka, deciduous forest (3, CGMC); Herring Cove: 29.IX.2002, C.G. Majka, coastal barrens (2, CGMC); *Hants Co.*: Windsor, 28.VII.1999, J. Ogden (2, NSNR); *Pictou Co.*: New Glasgow, 22.VIII.2002, S. Wallis (8, NSNR); Lyons Brook, 30.VIII.2002, E. Georgeson (1, NSNR); Salt Springs, 16.VIII.2006, C.G. Majka, defoliating *Viburnum opulus* (20, CGMC); *Lunenburg Co.*: Bridgewater, 23.IX.2002, G.D. Selig, defoliating *Viburnum opulus* (2, GSC). PRINCE EDWARD ISLAND: *Queens Co.*: Charlottetown, 6.VIII.1997, M.E.M. Smith, on *Viburnum*

(2, ACPE); Charlottetown, 1995–2001, R.E. Hoebeke and A.G. Wheeler, (Hoebeke and Wheeler 2003); Cornwall, 28.VI.2005, defoliating snowballs, M.E. Smith (36 larvae, CNC).

DISCUSSION

An examination of Fig. 2 reveals that *P. viburni* has now been recorded from a number of widely distributed localities in the southern portions of the Maritime Provinces and in Newfoundland. On the mainland, it has not been recorded in northern New Brunswick (although collecting effort in this area has been slight) nor on Cape Breton Island. Of particular note and interest are specimens collected by J.P. Spittal (a researcher with the Dominion Entomological Station [1911–52] in Annapolis Royal) in Annapolis Royal, NS in 1924. These specimens

extend by 23 years the known timeline of this species in North America. The question thus arises as to the possible origin of this population. In this context two possibilities present themselves.

1) Annapolis Royal is the site of one of the earliest European settlements in North America, established by French settlers in 1605. It was the military and administrative center of Acadia during parts of 17th century, and between 1710 and 1749 (until the establishment of Halifax) was the capital of Nova Scotia (which then included much of the Maritime Provinces). During this period, there was an extensive trans-Atlantic commerce between Annapolis Royal and (particularly) French seaports (Calnek 1897). Indirect evidence indicates that this commerce had an effect on the fauna of the area. Of 161 species of beetles which have been collected in the Annapolis Royal area (ACNS, CNC, CGMC, DHWC, NSAC, NSMC), 47 species (29.2%) are introduced, Palearctic species, double the 14.8% overall ratio of introduced species in Nova Scotia (C. Majka, unpublished data). Many of these are synanthropic species or those associated with agriculture and/or horticulture. In many instances these specimens represent some of the earliest known records of these species in the province (Table 1), indicating an early and extensive history of introductions to the area. Thus, it is possible that *P. viburni* may have been imported to the Annapolis Royal area sometime during this early history of settlement.

2) Annapolis Royal was also the site (from 1885 to ~ 1945) of the Annapolis Royal Nurseries, the largest and most comprehensive horticultural nursery in eastern Canada (Clarke 1927). This nursery imported horticultural stock from throughout the world, propagated it, and sold plants throughout the Maritime Provinces (A. Wilson, pers.

Table 1. Early records (date first recorded) of adventive Coleoptera from Annapolis Royal, NS.

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Anobiidae		
	<i>Lasioderma serricorne</i> Fabricius	1929
	<i>Ptinus fur</i> Linné	1912
Bostrichidae		
	<i>Lyctus linearis</i> (Goeze)	1932
Cantharidae		
	<i>Cantharis rufa</i> Linné	1930
Carabidae		
	<i>Agonum muelleri</i> Herbst	1909
	<i>Amara familiaris</i> Duftschmid	1909
	<i>Pterostichus melanrius</i> (Illiger)	1909
	<i>Clivina fossor</i> (Linné)	1935
Cerambycidae		
	<i>Callidium violaceum</i> Linné	1929
Chrysomelidae		
	<i>Longitarsus luridus</i> (Scopoli)	1924
	<i>Pyrrhalta viburni</i> (Paykull)	1924
Cryptophagidae		
	<i>Cryptophagus subfumatus</i> Kraatz	1941
Curculionidae		
	<i>Sitophilus granarius</i> (Linné)	1910
	<i>Otiorhynchus ovatus</i> (Linné)	1932
	<i>Otiorhynchus sulcatus</i> (Fabricius)	1928
	<i>Sitona flavescens</i> Gyllenhal	1928
	<i>Sitona hispidulus</i> (Fabricius)	1928
	<i>Sciaphilus asperatus</i> (Bonsdorff)	1910
	<i>Strophosoma melanogrammum</i> (Forster)	1924
	<i>Trachyphloeus asperatus</i> (Beck)	1924
	<i>Hypera zoilus</i> (Scopoli)	1924
Dermestidae		
	<i>Attagenus pellio</i> Linné	1930
	<i>Dermestes lardarius</i> Linné	1909
Latridiidae		
	<i>Corticaria saginata</i> Mannerheim	1924
	<i>Corticaria gibbosa</i> (Herbst)	1928
Melyridae		
	<i>Malachius aeneus</i> Linné	1928
Oedemeridae		
	<i>Nacerdes melanura</i> (Linné)	1935
Scarabaeidae		
	<i>Aphodius prodromus</i> (Brahm)	1915
Staphylinidae		
	<i>Tasgius ater</i> (Gravenhorst)	1938
Tenebrionidae		
	<i>Tenebrio molitor</i> Linné	1913
<hr/>		

comm.). In the nursey's catalogue (Clarke 1927) three exotic Palearctic species of *Viburnum* were offered for sale (*V. opulus* L., *V. tomentosum* Shasta, and *V. plicatum* Thunb.), suggesting the possibility that *P. viburni* could have been imported in association with nursery stock of one of these species. Whether this early introduction to Annapolis Royal was responsible for the subsequent occurrence of *P. viburni* at other locations in the Maritime Provinces is uncertain.

Pyrrhalta viburni is one of a substantial number of introduced leaf beetles known in the Maritime Provinces. In Nova Scotia, 25 of the 178 species of Chrysomelidae (14%) recorded in the province are introduced species, similar to the 14.8% of the overall beetle fauna which is introduced (C. Majka, unpublished data). *Chrysolina staphylea* L. (Evans 1899), *Cassida rubiginosa* Müller (Brown 1940), *Longitarsus luridus* (Goeze) (Brown 1967, LeSage 1988), *L. ferrugineus* (Foudras) (LeSage 1988), *L. pratensis* (Panzer) (LeSage 1988), *Sphaeroderma testaceum* (Fabricius) (Hoebeke and Wheeler 2003, Majka and LeSage 2006) and *Oulema melanopus* (Linné) (LeSage et al. 2007) are all introduced Palearctic chrysomelids whose presence in the region has been discussed in publications. The impact of this substantial number of introduced species on the native fauna and the environment in general has been rather little investigated. Species such as *Lilioceris lili* (Scopoli), *Crioceris duodecimpunctata* (L.), *C. asparagi* (L.), and *Oulema melanopus* are all potentially serious pests.

In the Maritime Provinces, the native *Viburnum alnifolium* Marsh., *V. edule* (Michx.) Raf., and *V. nudum* L. are common, generally distributed species. *Viburnum acerifolium*, *V. lentago*, and *V. recognitum* have been found in New Brunswick. Exotic species such as *V. dentatum*, *V. lanata*, and *V. opulus* grow

as naturalized shrubs, and other species of *Viburnum* are grown in horticultural contexts (Roland 1998, Hinds 1986). In the Maritime Provinces *P. viburni* has been recorded on *V. opulus* and *V. nudum*, and *V. acerifolium*, *V. dentatum*, *V. lanata*, *V. lentago*, and *V. recognitum* are recorded hosts (Clark et al. 2004), indicating that a substantial proportion of species in this region could be affected by this beetle.

Thus far, the impact of *P. viburni* in this region has not been noted to be significant, although occasional significant defoliation of shrubs has been reported (G. Selig pers. comm.). Weston and Desurmont (2002) wrote that, "Viburnum leaf beetle has the potential to become a major landscape pest because of its ability to kill susceptible viburnums if allowed to defoliate shrubs for several years in succession." Young (2004) wrote that, "Heavy infestations ... could defoliate shrubs, cause dieback, and eventually kill plants. Costs to homeowners, parks, arboretums, municipalities, and nurseries to manage heavy infestations ... and to replace killed plants could be high. Quarantines imposed ... would represent an economic burden to the many growers who export nursery stock" Given such concerns, ongoing monitoring of populations of *P. viburni* in the region would not be imprudent.

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