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NOTE

Lebia vittata (Coleoptera: Carabidae) and its associated host *Disonycha alternata* (Coleoptera: Chrysomelidae) in New Brunswick

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It is estimated that more than 1000 species of beetles remain undetected or undescribed in Canada (Burke et al. 2019). Even for those species previously reported, distributional data is often scant. Furthermore, biogeography is often dynamic, due to changing climate, habit alteration, and the spread of non-native species. *Lebia vittata* Fabricus, 1776 (Coleoptera: Carabidae), the Striped Harp Ground Beetle, is widespread across North America south to Mexico (Lindroth 1969), as is its associate *Disonycha alternata* (IIIiger, 1807) (Coleoptera: Chrysomelidae), the Striped Willow Leaf Beetle. In eastern Canada *L. vittata* has been reported from Ontario, Quebec and Nova Scotia (Bousquet et al. 2013) and in eastern Maine as far north as Mount Desert (Dearborn et al. 2014). However, in spite of fairly intensive study of the coleopteran fauna of New Brunswick over the past several decades (Webster et al. 2016), *L. vittata* has previously been unreported in the province (Webster 2016). Although *D. alternata* has long been known to be present, the few New Brunswick specimens in the New Brunswick Museum (NBM) insect collection (6 specimens dating from the early 1900s and 2002 in Saint John and Kings Counties) previous to those reported here suggest the species is not common or widespread in the province.

Mimicry is apparently rare among carabids (Thiele 1977), with the *Lebia - Disonycha* system being one of the more striking examples (Balbaugh 1967). Lindroth (1971) suggests this may be a case of Batesian mimicry, proposing that the jumping habit of *D. alternata* may be an effective means of avoiding predation by certain birds and that this is the likely basis for mimicry by *L. vittata*. Adult *L. vittata* may also prey on different life stages of *D. alternata* (Lindroth 1969), while the larvae of *L. vitatta* are reported to be ectoparasitic on the pupae of *D. alternata* (Lindroth 1969, 1971).

On 16 August 2024 DFM found *D. alternata* abundant on Bebb's Willow (*Salix bebbiana* Sarg.: Salicacae) at an abandoned gravel pit in the Loch Alva Protected Natural Area (PNA) (N45°.2019- 66°.3851 W). Among 80 specimens of *D. alternata* collected by beating the vegetation, a single specimen of *L. vittata* was present. At the same site, on 18 August 2024 DD collected a second specimen of *L. vittata* on the flowerhead of an isolated Downey Goldenrod (*Solidago puberula* Nutt.: Asteraceae). On 21 August 2024 DFM and RPW spent 2 person hours beating willows at the site, collecting two specimens of *L. vittata* (Figure 1). Although GB identified 5 species of willows at the Loch Alva PNA site (*Salix eriocephala* Michx., *S. bebbiana, S. discolor* Muhl., *S. lucida* Muhl., *S. pyrifolia* Andersson) we found that *D. alternata,* and by association *L. vittata,* were restricted to *S. bebbiana.* On 15 July 2025 DFM and GB revisited the Loch Alva site. Adult *D. alternata* were present in small numbers, again confined to *S. bebbiana*. Larval *D. alternata* were also common, feeding on *S. bebbiana*. A single adult *L. vittata* was observed. Reference specimens of both *L. vittata* and *D. alternata*, as well as samples of each *Salix* spp., have been deposited in the insect and vascular plant collections respectively of the NBM (Figure 2 A-B; NBM-IN-70716, 70717).

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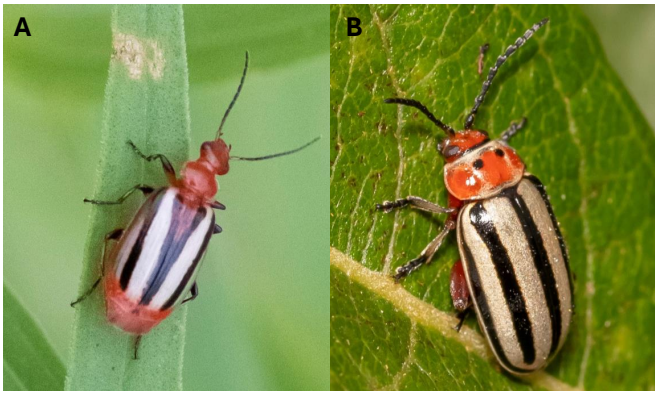
Figure 1. Reginald Webster beating a clump of Bebb's Willow (*Salix bebbiana*) in an abandoned gravel pit in the Loch Alva Protected Natural Area, habitat for the Striped Harp Ground Beetle, *Lebia vittata* (photo credit: DF McAlpine).

Figure 2 A). Striped Harp Ground Beetle, *Lebia vittata*, B). Striped Willow Leaf Beetle, *Disonycha alternata,* both photographed in the Loch Alva Protected Natural Area in August 2024 (photo credit: D. Doucet).



Larochelle and Lariviére (2003) report that *L. vittata* occurs in association with *D. alternata* along the borders of pools and ponds in sand pits (as well as abandoned and cultivated fields, meadows and gardens) and is active in the sunshine on the foliage of bushes (i.e., *Salix*) and flowers (i.e., *Solidago*). This aptly describes the habitat from which *L. vittata* was collected in the Loch Alva PNA. Although Thiele (1977) notes that *L. vittata* does not occur at high population densities, Lindroth (1969) reported *L. vittata* as "numerous" 15-16 June 1956 at New Sarum, east of St. Thomas, Ontario.

Willows (Salicaceae) are reported to be the primary host for *D. alternata*, including *Salix bebbiana*, *S. exigua* Nutt. (reported as syn. *S. interior* Rowlee), *S.* x *fragilis* L., *S. humilis* Marshall, *S. sessilifolia* Nutt. (reported as syn. *S. longifolia* Muhlenberg) and *Populus deltoides* Bartr. Ex Marsh (reported as syn. *P. sargentii* Dode) (Clark et al. 2004). However, Clarke et al. (2004) and Rhodes and Chaboo (2009) also report host plants (likely accidental) across a variety of plant families, including, Apiaceae, Asteraceae, Caprifoliaceae, Fabaceae, Malvaceae, Rosacea, and Solanaceae. Rank et al. (1996) found that food-finding in Salicaceae-feeding chrysomelid beetles is partially chemically mediated. Concentrations of salicyl-glucosoides in host plants vary among willow species, but can be an important resource for chrysomelids (Rank et al. 1996). Deswarte and Balsbaugh (1973) found *D. alternata* was host-specific on *S. interior* (= *S. exigua*) at a site in South Dakota. New Brunswick and South Dakota evidence suggests that *D. alternata* may develop local host-plant specificity across its wide range. The evolutionary and ecological processes leading to such specialization are likely complex, but data from a wider range of sites may help to support this hypothesis.

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