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NOTE

# The Sphindidae (Coleoptera) of Nova Scotia, Canada

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As their common name suggests, Sphindidae (cryptic slime mold beetles) are myxomycophagous beetles, with all life stages occurring on or in slime mold sporocarps where they feed on spores and related supporting structures (McHugh 2002). In North America, the family is represented by four genera (*Odontosphindus* LeConte, *Eurysphindus* LeConte, *Carinisphindus* McHugh, and *Sphindus* Megerle) and nine species, five of which have been recorded in Canada (Campbell 1991; McHugh 2002). No species were recorded in Atlantic Canada by Campbell (1991).

Although there have been several scattered reports of sphindids in Nova Scotia forest beetles studies (Lafontaine et al. 1987; Dollin et al. 2008; Bishop et al. 2009), there has been no overview of the fauna in the province. The present study surveys the Sphindidae of Nova Scotia and provides observations from New Brunswick and Prince Edward Island to present a regional context for the family. Two species are newly recorded in New Brunswick.

During the author's biodiversity research on the Coleoptera of the Maritime Provinces of Canada, 50 specimens of Sphindidae (47 from Nova Scotia, three from New Brunswick, and none from Prince Edward Island) were examined and identified. The specimens included *Odontosphindus denticollis* LeConte, 1878 (5 specimens), *Sphindus americanus* LeConte, 1866 (35 specimens), and *Eurysphindus hirtus* LeConte, 1878 (10 specimens). Of these 34% were collected with flight intercept traps, 18% with a car net, 12% with funnel traps, and 10% with other techniques (at light, sweeping, pitfall traps). The other 26% had no information on collection techniques. The distribution of specimens is depicted in Figure 1.

The key to genera provided in McHugh (2002) allows for species identification of Nova Scotia Sphindidae:

1. Antennae 11-segmented, pronotal margin with 6-7 acute teeth, length 2.8–3.5 mm ..... *Odontosphindus*
– Antennae 10-segmented, pronotal margin smooth to crenulate, length 1.5–2.3 mm ..... 2

2(1). Body elongate oval, parallel sided, dorsal head punctures fused to form three or more longitudinal grooves over eye, pygidium with a pair of large, densely setulose impunctate binding patches..... *Sphindus*
– Body broadly oval, convex, head with a single dorsal groove adjacent to eye, pygidium evenly punctate and setose, lacking binding patches ..... *Eurysphindus*

Within the genus *Sphindus*, only *Sphindus americanus* has been found in the Maritime Provinces. However, a second species, *Sphindus trinifer* Casey, 1898 has been recorded in Québec and Maine. The two species can be differentiated according to the following key from Downie and Arnett (1996):

1. Length 1.5–2.5 mm, piceous black with elytra often brownish ..... *Sphindus americanus*
– Length < 1.7 mm, more or less shiny black with appendages pale testaceous ... *Sphindus trinifer*

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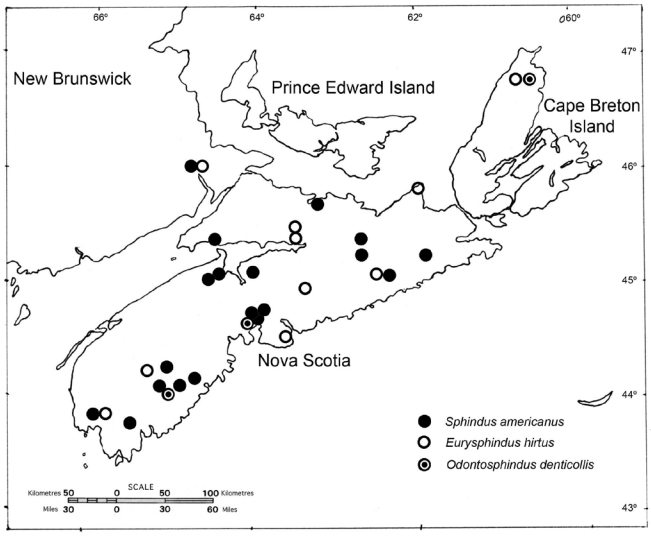
**Figure 1. Distribution of Sphindidae species in Nova Scotia.**




### *Odontosphindus denticollis* LeConte, 1878

*Odontosphindus denticollis* (Figure 2a) was reported from Nova Scotia by Lafontaine et al. (1987), Dollin et al. (2008), and Bishop et al. (2009). Unfortunately Campbell (1991) failed to note the record of the former in his distributional checklist of Canadian species. This species appears to be the least common sphindid in the province and the reports cited above are the only records from Nova Scotia. However, records indicate that the species occurs from northern Cape Breton to southwestern Nova Scotia, thus, throughout the province (Figure 1). Lawrence and Newton (1980) reported an association of *Odontosphindus denticollis* with *Fuligo septica* (L.) Wigg. (scrambled-egg slime) [Physarales: Physaraceae], a very common and widespread slime mold found on various substrates in Nova Scotia and New Brunswick (Wehmeyer 1950). In Nova Scotia, three of the four specimens were found in old growth red spruce (*Picea rubens* Sarg.) forests; one in a mixed white pine (*Pinus strobus* L.) red spruce forest.

### *Sphindus americanus* LeConte, 1866

*Sphindus americanus* (Figure 2b) was reported from Nova Scotia by Dollin et al. (2008). The record of *Sphindus trinifer* reported by Bishop et al. (2009) is a misidentification and actually refers to *Sphindus americanus*. *Sphindus americanus* is a common and widely distributed species in Nova Scotia, although no specimens have been reported from Cape Breton Island. The species is herein newly recorded from New Brunswick [Westmorland County: Moncton, 29 June 1987, P. Maltais, Université de Moncton, 1 specimen]. The single specimen, while identical with other specimens of *Sphindus americanus* with which it was compared, is broken making the identification provisional. Further specimens of this species should be sought in the province to confirm this record.

Lawrence and Newton (1980) and Stephenson et al. (1994) reported associations of *Sphindus americanus* with *Comatricha subcaespitosa* Peck, *Comatricha longa* Peck [Stemonitales: Stemonitaceae], *Fuligo septica*, *Fuligo megaspora* Sturgis (scrambled-egg slime), *Stemonitis axifera* (Bull.) T. Macbr., *Stemonitis fusca* Roth (chocolate tube slimes) [Stemonitales: Stemonitaceae], *Tubifera ferruginosa* (Batsch.) Gmel. (red raspberry slime) [Liceales: Reticulariaceae], and *Arcyria incarnata* (Pers. ex J.F. Gmel.) Pers., and *Arcyria nutans* (Bull.) Grev. (carnival candy slime) [Trichiales: Trichiaceae]. *Comatrichia subcaespitosa* has been reported (on decaying wood) in Nova Scotia (*Comatrichia longa* has not been reported in the region); *Stemonitis axifera* (on conifer wood) and *Stemonitis fusca* (on pine and beech) are both common in Nova Scotia; and *Tubifera ferruginosa* (on decayed logs, including hemlock), *Arcyria incarnata* (on decaying poplar and beech), and *Arcyria nutans* (on decaying wood) have all been reported from various localities in Nova Scotia (Wehmeyer 1950).

In Nova Scotia, *Sphindus americanus* has been collected in red spruce, mixed red spruce/white pine, and red spruce/eastern hemlock (*Tsuga canadensis* (L.) Carr.) forests of various ages (40–120 years old), as well as in young deciduous and mixed forests

### *Eurysphindus hirtus* LeConte, 1878

*Eurysphindus hirtus* (Figure 2c) was reported from Nova Scotia by Lafontaine et al. (1987) and Bishop et al. (2009). Unfortunately, Campbell (1991) failed to note the record of the former in his distributional checklist of Canadian species. The species is widely distributed throughout Nova Scotia from northern Cape Breton to the southwest mainland of the province (Fig. 1). *Eurysphindus hirtus* is herein newly reported from New Brunswick [Westmorland County: Moncton, 6 July 1987, 13 July 1987, P. Maltais, Université de Moncton, 2 specimens]. Lawrence and Newton (1980) reported associations with *Fuligo septica*, *Stemonitis axifera*, and *Tubifera ferruginosa*. See the previous account for information on these hosts.

In Nova Scotia specimens of *Eurysphindus hirtus* have been collected in red spruce, and mixed red maple (*Acer rubrum* L.)/red oak (*Quercus rubra* L.)/ yellow birch (*Betula alleghaniensis* Britt.) forests, on

**Figure 2. Dorsal habitus of *Odontosphindus denticollis* (2.7–3.0 mm)** (a); ***Sphindus americanus* (1.5–2.5 mm) (b); *Eurysphindus hirtus* (1.6 mm) (c) Photo credit: J.P. Gruber and N. Gompel.**

**(a)** **(b)** **(c)**

a coastal salt-spray barren, and along a lake shore.

As noted in the individual species accounts, the three species of Sphindidae found in Nova Scotia appear to be widely distributed in the province (perhaps in New Brunswick as well, although data is lacking), although *Sphindus americanus* has not been recorded on Cape Breton Island and *Odontosphindus denticollis* has not been recorded in New Brunswick. The lack of sphindid records from Prince Edward Island may reflect the comparative dearth of collecting activity in that province, particularly for saproxylic and forest beetles. Alternatively the highly anthropogenically modified forests of Prince Edward Island may not be suitable environments for sphindids or their host myxomycetes. Only one of the 60 species of Myxomycetes recorded in the Maritime Provinces by Wehmeyer (1950), *Cribraria rufa* (Roth) Rostaf., was recorded as occurring on Prince Edward Island, and this species has not been noted in association with Sphindidae. Alternatively, the insular position of the province, separated from the neighbouring mainland by the 13 km gap of the Northumberland Strait, may have prevented the historical dispersal of these species to the island. Further research is necessary to determine if Sphindidae are actually absent from Prince Edward Island.

Sphindidae are myxomycete feeders, a trophic group that includes members of Leiodidae (*Agathidium, Aglyptinus, Anisotoma, Gelae*), Scaphidinae (*Baeocera, Scaphisoma*), Eucinetidae (*Eucinetus*), Clambidae (*Clambus*), Latridiidae (*Enicmus*), and Cerylonidae (*Philothermus*) (Lawrence and Newton 1980; Stephenson et al. 1994; Miller and Wheeler 2004; Wheeler and Miller 2005). They appear to form a trophic guild (*sensu* Root 1967), being "a group of species that exploit the same class of environmental resources in a similar way." There is considerable interest amongst ecologists in identifying such groups since there is growing evidence that they may be fundamental ecological units with emergent properties that "will become the standard currency of ecologists in their efforts to understand community relationships of many kinds" (Terborgh and Robinson 1986).

Some beetles associated with Myxomycetes are obligate feeders on this group (Sphindidae; *Anisotoma*) while others are facultative feeders on slime molds and are also associated with certain Basidiomycetes and/or Ascomycetes. The feeding habits of sphindids appear to be relatively diverse, with species in the family feeding on members of the Physaraceae, Reticulariaceae, Stemonitaceae, and Trichiaceae, four of the seven families of Myxomycetes utilized by myxomycophagous beetles (Lawrence and Newton 1980; Stephenson et al. 1994; Wheeler and Miller 2005). Slime molds in the genera *Fuligo* and *Stemonitis* are broadly accepted as hosts by many species of Coleoptera (Lawrence and Newton 1980; Wheeler 1979; Stephenson

et al. 1994; Wheeler and Miller 2005). In general, host specificity appears rare for most myxomycophagous beetles, as evidenced by their utilization of taxonomically distantly related hosts (Stephenson et al. 1994).

Although only a small component of the saproxylic beetle fauna of the region, the Sphindidae, owing to their close relationship with Myxomycetes, may nonetheless be important in the dynamics of forest decomposition processes. For example, Wheeler and Miller (2005) discuss the potential role that myxomycophagous beetles may play in assisting the dispersal and germination of Myxomycetes. Consequently it would be worthwhile to further investigate the distribution, abundance, and ecology of this family of beetles in the Maritime Provinces.

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