



New Larval Host Records for Three Species of Leaf-Mining Weevils in the Eastern USA (Coleoptera: Curculionidae: Curculioninae), with a Review of Hosts and Larval Habits for the Genus *Tachygonus* Schönherr

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NOTE

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As reviewed by Eiseman (2022a, 2022b), about 30 weevil species in North America north of Mexico are known to mine in living leaves, and 21 of these are in the subfamily Curculioninae (Curculionidae). *Odontopus calceatus* (Say) is the sole representative of the tribe Camarotini, and the rest of the curculionines are in Rhamphini, which is divided into two subtribes: Rhamphina, with five species of *Isochnus* Thomson, seven of *Orchestes* Illiger, and three of *Tachyerges* Schönherr (Sweeney et al. 2012); and Tachygonina, with five species of *Tachygonus* Schönherr (Hespenheide 1992). Here we present new observations and rearing records for three of these species: *Odontopus calceatus*, *Orchestes pallicornis* Say, and *Tachygonus fulvipes* LeConte. All weevil specimens are deposited in the Canadian Museum of Nature, Ottawa; parasitoids are deposited in the Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa. Records annotated with “BG” can be found online by adding the accompanying number to the end of this URL: <https://bugguide.net/node/view/>; for those annotated with “iNat”, the number is added to the end of <https://www.inaturalist.org/observations/>.

Odontopus calceatus.—This species, commonly known as the “yellow poplar weevil,” occurs from Massachusetts to Florida, west to Michigan, Missouri, and Louisiana (Burns and Gibson 1968). Its previously reported hosts are in Magnoliaceae (*Liriodendron tulipifera* L.,

Magnolia grandiflora L., *M. virginiana* L.) and Lauraceae (*Sassafras albidum* (Nutt.) Nees) (Burns and Gibson 1968; “yellow poplar” is a name for *L. tulipifera*, more commonly referred to as tuliptree, and is not a reference to *Populus* spp. (Salicaceae)). On 26 May 2022 at Poor Ridge north of Kittyhawk, Dare Co., North Carolina, TSF collected a mined leaf of swamp bay (Lauraceae: *Persea palustris* (Raf.) Sarg.) (Fig. 1), and an adult of *O. calceatus* emerged from it on 5 June (Fig. 2). In addition to this new host genus, we add mountain magnolia (*M. fraseri* Walter) to the host list on the basis of a mine TSF found containing a larva in Boone, Watauga Co., North Carolina on 29 May 2021 (Fig. 3), as well as mines photographed in Monroe Co., Tennessee on 7 May 2024 (iNat 214728500). Also, a photograph taken in Geauga Co., Ohio on 5 June 2023 shows five *O. calceatus* larvae mining together in a leaf of cucumber tree (*M. acuminata* (L.) L.) (iNat 165758033). Mines of *O. calceatus* are unique among North American leaf-miners of Lauraceae and Magnoliaceae in beginning at a scar in the midrib, from which the larvae initially form a broadly linear mine; this later widens to a blotch that is partially filled with characteristic dark, stringy excrement (Eiseman 2022b). The midrib often breaks at the oviposition site, as has occurred in Fig. 3, causing the distal portion of the leaf to fall off.

Orchestes pallicornis.—Eiseman (2022a) reviewed the known hosts of this species, the widespread “apple flea weevil,” which

are all in Rosaceae: *Amelanchier* Medik., *Aronia* Medik., *Crataegus* L., *Cydonia* Mill., *Malus* Mill., *Prunus* L., and *Sorbus* L. The larval mine is similar to that of *Odontopus calceatus* in originating from a hole chewed by the female in the underside of the midrib and beginning as a full-depth, linear track that abruptly widens to a small blotch at the edge of the leaf. These characteristics distinguish *O. pallicornis* mines from those of all other North American Rosaceae-feeding leafminers, and although other Rhamphina spp. form essentially identical mines, their host plants are in Betulaceae, Fagaceae, Salicaceae, and Ulmaceae, so mines of this type on Rosaceae can be assumed to represent *O. pallicornis* (Eiseman 2022a, 2022b). The only record of hawthorn as a

host for *O. pallicornis* is that of *Crataegus mollis* (Torr. & A.Gray) Scheele reported by Anderson (1989). On 12 June 2022, CSE found a larva of *O. pallicornis* mining a leaf of medlar in his yard in Northfield, Franklin Co., Massachusetts (Fig. 4). Medlar has long been known as *Mespilus germanica* L. (a name still accepted by Bánki et al. (2024)) but is now treated by some (e.g. POWO (2024)) as *Crataegus germanica* (L.) Kuntze. This larva failed to pupate and a female of the *Chrysocharis pentheus* species group (Eulophidae) emerged on 1 July. The following additional new larval hosts have been documented by an anonymous plant propagator and nursery technician photographing leaf mines near Cleveland, Ohio in June 2023 and May 2024:



Figs. 1–4. Leaf-mining weevils. 1, Mine of *Odontopus calceatus* on swamp bay (*Persea palustris*). 2, Adult of *O. calceatus* reared from swamp bay. 3, Mine of *O. calceatus* on mountain magnolia (*Magnolia fraseri*). 4, Mine of *Orchestes pallicornis* on medlar (*Crataegus/Mespilus germanica*).

Amelanchier × *lamarckii* F. G. Schroed. (iNat 218479238), *A.* × *spicata* (Lam.) K. Koch (iNat 215934060), *A. utahensis* Koehne (iNat 215934671), *Prunus* × *cistena* N. E. Hansen ex Koehne (iNat 218479649; adult found inside mine), a hybrid between the intergeneric hybrids × *Sorbaronia* C. K. Schneid. and × *Sorbocotoneaster* Pojark. (iNat 167760541, 215935153), and a *Sorbus* hybrid tentatively identified as *S. aucuparia* ssp. *pohuashanensis* (Hance) McAll. × *S. discolor* (Maxim.) Maxim. (iNat 168882576). Beyond these records, mines were found on saskatoon (*Amelanchier alnifolia* (Nutt.) Nutt. ex M. Roem.) in Calgary, Alberta on 7 June 2023 (iNat 176672002); on purple chokeberry (*Aronia* × *prunifolia* (Marshall) Rehder) in Shelburne Co., Nova Scotia on 7 July 2023 (iNat 171759605); on apricot (*Prunus armeniaca* L.) in Kings Co., Prince Edward Island on 18 July 2023 (iNat 173911707); and on an ornamental cherry believed to be “*Prunus pendula*” in Crawford Co., Pennsylvania on 27 May 2024 (iNat 218729437); all of these are likewise new larval hosts, although the first two were previously reported as adult hosts by Anderson (1989).

Tachygonus fulvipes.—Hespenheide (1992) reported that adults of this species had been collected from Alabama supplejack (Rhamnaceae: *Berchemia scandens* (Hill) K. Koch), but no further biological information was available. The type specimen was collected in Illinois, and otherwise all known specimens are from Alabama, Florida, Louisiana, and Texas. Eiseman (2022b) speculated that *T. fulvipes* might be responsible for a leaf mine on *B. scandens* photographed by T. DeSantis on 21 November 2012 at Dismal Swamp State Park, Camden Co., North Carolina (BG 733761). The mine was elongate and irregularly lobed, consisting of two primary branches extending from

a central, dark, circular chamber, where apparently all of the frass was deposited. CSE reviewed well over 60,000 observations of leaf mines on BugGuide and iNaturalist over the course of a decade and did not see another example of this mine until September 2022. On 16 September, A. Lindqvist photographed a *B. scandens* leaf with two of these mines at Caddo National Grasslands, Fannin Co., Texas (iNat 135591601).

Then, on 21 September, FK found numerous mines in Collinsville, Etowah Co., Alabama (Figs. 5, 7). After opening one on 23 September and confirming that a larva was still present (Fig. 6), she collected many mined leaves on 27 September. The mines were full-depth and typically had two branches extending in opposite directions from the circular chamber (which was 3–4 mm in diameter), but occasionally the mine extended in just one direction or there were three branches. Frass formed a blackish coating on the ceiling and floor of the chamber, and a stripe of dark staining generally extended for some distance into each branch. As the larvae continued to feed, whitish lobes extended from the branches of the mines, and sometimes directly from the central chamber; these lacked the dark staining but contained scattered, more or less elongate fecal particles (Fig. 9). (Similar mines made by hispine chrysomelid larvae in Costa Rica were referred to by Hespenheide and Dang (1999) as “lobulate blotch mines”.) Some leaves had as many as four mines, which were confluent but each with its own circular chamber (Fig. 8). Clusters of small, circular window-feeding spots were present on the leaves (Fig. 9), and these were likely made by *T. fulvipes* adults; many photos on BugGuide and iNaturalist show adults of *T. lecontei* Gyllenhal producing similar feeding patterns on oak leaves

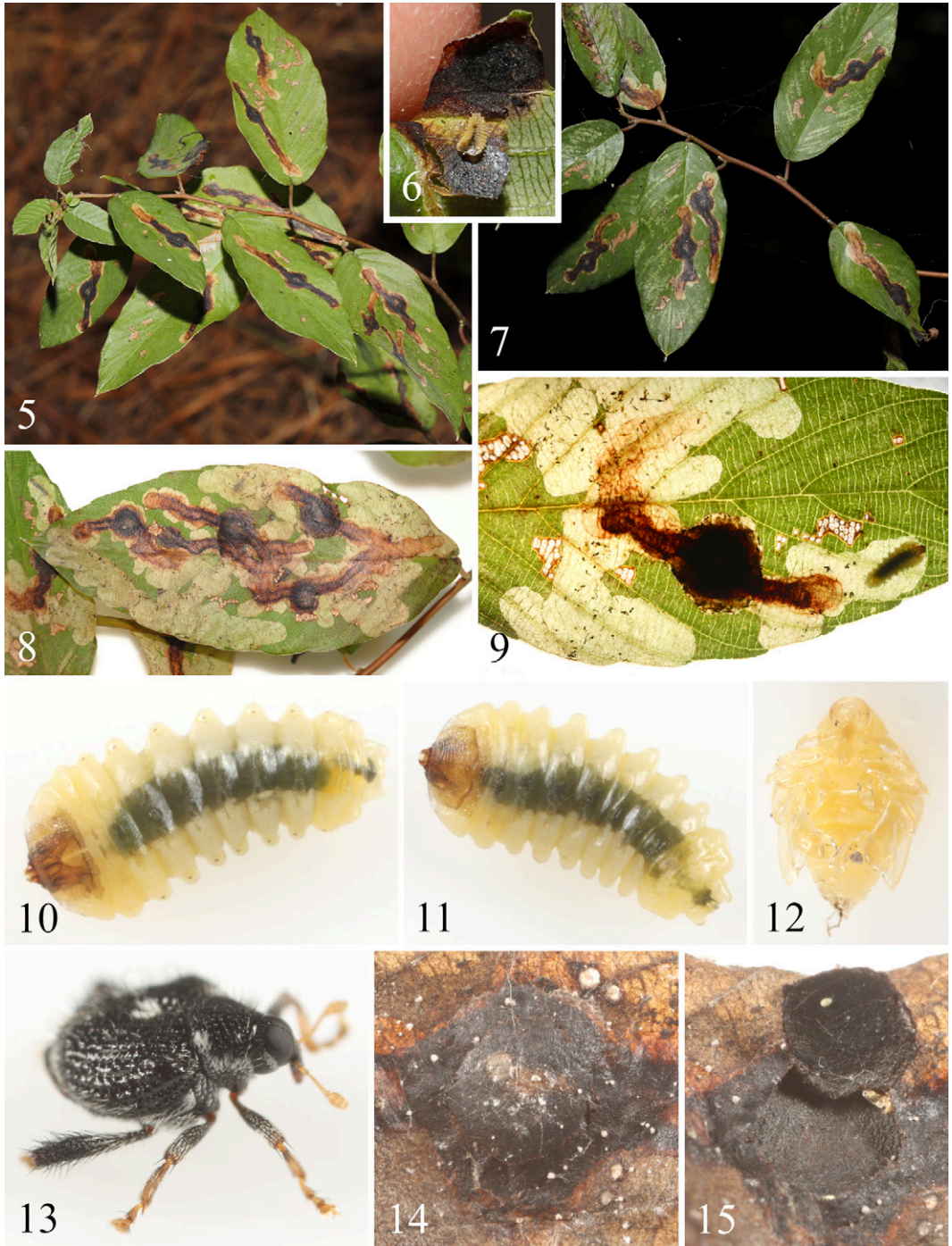
(e.g. BG 464201, 532178, 567853, 576363, 584507, 585802, 711368; iNat 96431288, 116423911).

Twelve *Pnigalio* Schrank adults (Eulophidae) emerged from aborted mines between 8 and 17 October. One of the leaf-mining larvae exited its mine on 5 October (when other larvae were still actively feeding), and another four on 9 October (Figs. 10, 11). These were placed in a jar of soil, into which they apparently burrowed, and this jar was placed in a refrigerator at 1–2°C from 15 October to 21 February 2023. The remaining leaves were placed in a refrigerator at 2–3°C from 11 November to 20 February. Four adults of *T. fulvipes* emerged from the leaves on 13 and 14 April (Fig. 13); none ever emerged from the soil. A vacated mine was recognized by the presence of a neat, circular incision cut around the perimeter of its central chamber, inside of which there was no cocoon, only the pupal exuviae at one edge (Figs. 14, 15). One loose pupa was also found in the jar of leaves at this time. On 17 April, another loose pupa (Fig. 12) was noted at the bottom of the jar, and several of the circular chambers were dissected, revealing dried, shriveled larvae in several cases, but one chamber contained a recently dead larva (not dried out, and only slightly moldy), and another contained an actively wriggling pupa. Evidently the normal habit of this species is to overwinter as a larva within the circular chamber in the leaf mine, but some individuals may exit as larvae before or after overwintering, successfully pupating at least in the latter case. A third loose pupa was found on 28 April, but no adults emerged from any of the loose pupae. Seven more adults emerged from mines between 4 and 9 May, another two on 20 and 25 May, and a final adult was found dead on 18 June.

Hespenheide (1992) did not provide collection dates for the specimens he

examined, but H. Hespenheide (in litt. to CSE, April 2023) reported that he has seen field-collected adults of *T. fulvipes* from Florida (Pinellas Co.) dated 3, 9, and 19 April 1923; from Texas (Anderson Co.) dated 22 April 1962; from Louisiana (Grant Parish) dated 21 May 1983; and from Alabama (Elmore Co.) dated 4, 9, and 14 June 1989. Thus, all available data are consistent with a univoltine life cycle, with adults active in spring and larvae active in late summer and autumn. It would appear from the gap in observations between June and September that either the egg is in diapause over the summer or the early instar develops very slowly such that mines are not conspicuous until September, but further investigation is needed to clarify this.

The leaf mines have not been described, nor have the overwintering habits been reported, for any other North American *Tachygonus*, but as far as is known all other leaf-mining Curculioninae in this region are univoltine and pupate in their mines, emerging as adults without diapause, and overwintering as adults (Eiseman 2022a, 2022b). Faeth et al. (1981) reported that in north Florida, *T. lecontei* has 2–3 generations per year, with mining stages lasting 30–60 days and with pupation in the mine, but they kept no record of the mine characteristics (S. Faeth in litt. to CSE, February 2015). In New Jersey, near the northern end of this species' range, adults of *T. lecontei* have been photographed in every month from April through November except for July (<https://bugguide.net/node/view/344217/data>). Faeth et al. (1981) recorded *Quercus falcata* Michx., *Q. hemisphaerica* W. Bartram ex Willd., and *Q. nigra* L. (Fagaceae) as larval hosts of *T. lecontei* in Florida, where an adult has also been found on turkey oak (*Q. laevis* Walter) (iNat 139061198). In New Jersey, adults have been found mostly on white oak



Figs. 5–15. *Tachygonus fulvipes* on Alabama supplejack (*Berchemia scandens*). 5, Leaf mines on 21 September. 6, Larva in opened central chamber on 23 September. 7, Leaf mines on 23 September. 8, Leaf with four mines on 5 October. 9, Backlit mine on 5 October, with larva feeding at lower right. 10, Larva on 5 October, dorsal view. 11, Same larva, ventral view. 12, Pupa. 13, Reared adult. 14, Central chamber with circular exit slit made by emerging adult. 15, Same chamber with “lid” opened; pupal exuviae visible inside at upper right.

(*Q. alba* L.) and occasionally on black oak (*Q. velutina* Lam.) (BG 845382) and willow oak (*Q. phellos* L.) (iNat 80479425); they have been found on leaves of pin oak (*Q. palustris* Münchh.) in West Virginia (iNat 116737035) and of red oak (*Q. rubra* L.) in Virginia (iNat 96431288, 96431296), and in Arizona one was collected from flowers of Mexican blue oak (*Q. oblongifolia* Torr.) (BG 633309). In addition to West Virginia, online records add Kansas (BG 1036548) and Missouri (BG 1134945, 1732342; iNat 147578241) to the distribution for *T. lecontei* given by Hesperheide (1992).

None of the remaining three *Tachygonus* species occurring north of Mexico have been reared. *Tachygonus centralis* LeConte has so far only been associated with *Robinia neomexicana* A. Gray (Fabaceae) (Hesperheide 1992; BG 172229, 287666; iNat 51192986, 52183945), but presumably it occurs on other *Robinia* spp. since its range extends to Nebraska and Illinois, well outside the range of this plant. *Tachygonus rhombus* Casey has been collected from *Coursetia glandulosa* A. Gray (Fabaceae) (Hesperheide 1992, as *C. microphylla* Gray). *Tachygonus tardipes* LeConte, reported by Hesperheide (1992) from *Ulmus americana* L. (Ulmaceae), has recently been collected from *U. alata* Michx. in Texas (BG 1969615).

South American *Tachygonus* mines, like those of *T. fulvipes*, have been described as full-depth with internal pupation, but other characteristics are variable. According to Kogan (1963), the Brazilian *T. minians* Kogan, which feeds on an undetermined dicot, inserts its egg beneath the lower leaf epidermis in a vein axil; the larva forms an irregular blotch mine, forming no cocoon or pupal chamber, and the adult emerges through a semicircular, more or less irregular slit in the lower surface. Another Brazilian species, *T. erythroxyli*

Hesperheide (host = Erythroxylaceae: *Erythroxylum subsessile* (Mart.) O.E.Schulz), lays its egg on the upper leaf surface, and the mine looks like a series of three successively larger bubbles, each produced by a different instar; the adult emerges on the upper surface approximately one month after larval eclosion (Monteiro et al. 2012). Henry Hesperheide (in litt. to CSE, June 2024) has unpublished rearing records for dozens of Neotropical *Tachygonus* species; all of these pupate within their mines, and most remain teneral for a few days after emergence before attaining final adult coloration.

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