The Great Lakes Entomologist

Volume 32
Number 1 & 2 - Spring/Summer 1999 *Number 1 & 2 - Spring/Summer 1999*
Article 2

April 1999

A New *Flexamia* (Homoptera: Cicadellidae: Deltocephalinae) From Southern Michigan

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A NEW *FLEXAMIA* (HOMOPTERA: CICADELLIDAE: DELTOCEPHALINAE) FROM SOUTHERN MICHIGAN

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ABSTRACT

A new species, *Flexamia huroni*, is described from a prairie fen in southeastern Michigan. This leafhopper is closely related to the western *F. serrata* B & T, a specialist on mat muhly (*Muhlenbergia richardsonis*). Like its sister species, *F. huroni* was found only in close association with mat muhly, a grass listed as a threatened species in Michigan and Wisconsin. The regional rarity of mat muhly, its association with a globally imperiled plant community (prairie fen) and the absence of *F. huroni* from several fens known to contain this grass, make this new *Flexamia* a strong candidate for listing as endangered in Michigan.

The leafhopper genus *Flexamia* DeLong is one of the largest genera of grassland inhabiting Deltocephalinae (Hamilton and Ross 1975) with 44 described species (Young and Beirne 1958, Ross and Cooley 1969, Hamilton and Ross 1975, Whitcomb and Hicks 1988, Lowry and Blocker 1989). The members of this genus occur almost exclusively in remnants of native grasslands, with a center of diversity in the eastern Great Plains (Whitcomb et al. 1986a, Whitcomb and Hicks 1988, Panzer et al. 1995).

Although *Flexamia* species are grassland specialists, few have been associated with more hydric communities. In western North America, *F. serrata* is known only from mat muhly stands in alkaline wet meadows and along stream corridors. In the east, *F. pyrops*, a specialist on three-awn grasses (*Aristida* spp.), has been found in wet-mesic sand prairies containing an abundance of these grasses (Bess pers. obs.). *Flexamia prairiana* DeLong feeds on big bluestem (*Andropogon gerardi*) and has been collected from this grass in wet prairie and prairie fen communities (Panzer et al. 1995, Bess and Hamilton pers. obs.). *Flexamia inflata* (Osborn and Ball) is usually found in moist or saline areas, feeding on *Juncus dudleyi* in the east and *Muhlenbergia asperifolia* in the west. Whitcomb et al. (1986b) also report this leafhopper from lovegrass (*Eragrostis* sp.) and sometimes even fescue (*Festuca arundinacea*), bluegrasses (*Poa* spp.) and other turf species (e.g. *Zoysia*). *Flexamia beameri* Whitcomb and Hicks was described from a series collected in 1946 at a Canadian Zone lakeside in upstate New York. This leafhopper has not been seen since the original series was collected and its foodplant(s) remain unknown.

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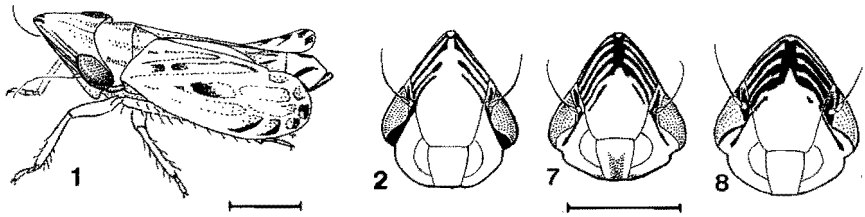


Figures 1–2, 7–8. *Flexamia huroni*, adult habitus (1) and ventral aspect of head (2). Ventral aspect of head of *Flexamia stylata* (Ball) (7) and of *Flexamia decora* Beamer and Tuthill (8). Scale line = 1 mm.

Flexamia huroni Bess and Hamilton, new species

Male. Base color ivory white, vertex strongly produced, as wide as width before eyes, unmarked, except for pair of small black spots at tip and stramineous longitudinal carina; frons and genae pale stramineous with 5–6 interocular blackish lines interrupted medially by ivory white (Figures 1–2). Pronotum with three pairs of faint longitudinal stripes, median pair pale stramineous, extending faintly onto base of head, lateral pairs thin, black, indistinct. Forewings subbrachypterous, apically bent upwards, rarely exceeding tip of abdomen; base color ivory white, veins chalk white, black patches in claval and discal cells, apical cells and reflexed veinlets of forewings with markings stramineous and dark brown. Hindwings normal for genus. Pygofer (Fig. 3a) with posterior lobe rounded distally, broad v-shaped central notch extending one-third length of plates, each plate with black central dot and indistinct, stramineous median line; aedeagus (Figs. 3b–c) straight, symmetrical, shaft slender, laterally compressed, with two pairs of apicolateral processes curved dorsally; caudoventral region of aedeagus with broad, unpaired median process; gonopore oval, caudoventral, at base of unpaired median process. Venter and legs whitish with few dark markings.

Female. Habitus as in male, vertex more strongly produced, slightly exceeding width before eyes; markings as in male but more distinct. Forewings reaching only to ninth abdominal tergite, tips not upturned. Abdomen very large and distended, relative to male, often extending well lateral and distal of tegmina. Pregenital sternite with posterior margin produced medially and having a slight apical notch, median projection also bearing distinct lateral teeth; ovipositor with base of first valvulae (Fig. 4) produced as two anterior lobes having a distinct medial notch extending the length of the lobes, lobes not recurved dorsally or laterally, heavily sclerotized, black.

Length. Male 3.7–4.2 mm; female 3.8–4.5 mm.

Types. Holotype male: Michigan, Oakland County, T5N R8E, Brandt Road Fen, August, 1991. Allotype female, same data as holotype male. Paratopotypes: 1 male, 3 females, same data as holotype; 1 male, 5 July 1989, same location as holotype. Holotype, Allotype and 135 paratypes No. 21453 in Canadian National Collection, Ottawa, Ont; 1 paratype in Michigan State University and four paratypes in the collection of the senior author.

Etymology. The epithet *huroni* refers to the Huron River (a tributary of the Great Lakes) which has its headwaters a few miles south of the type locality.

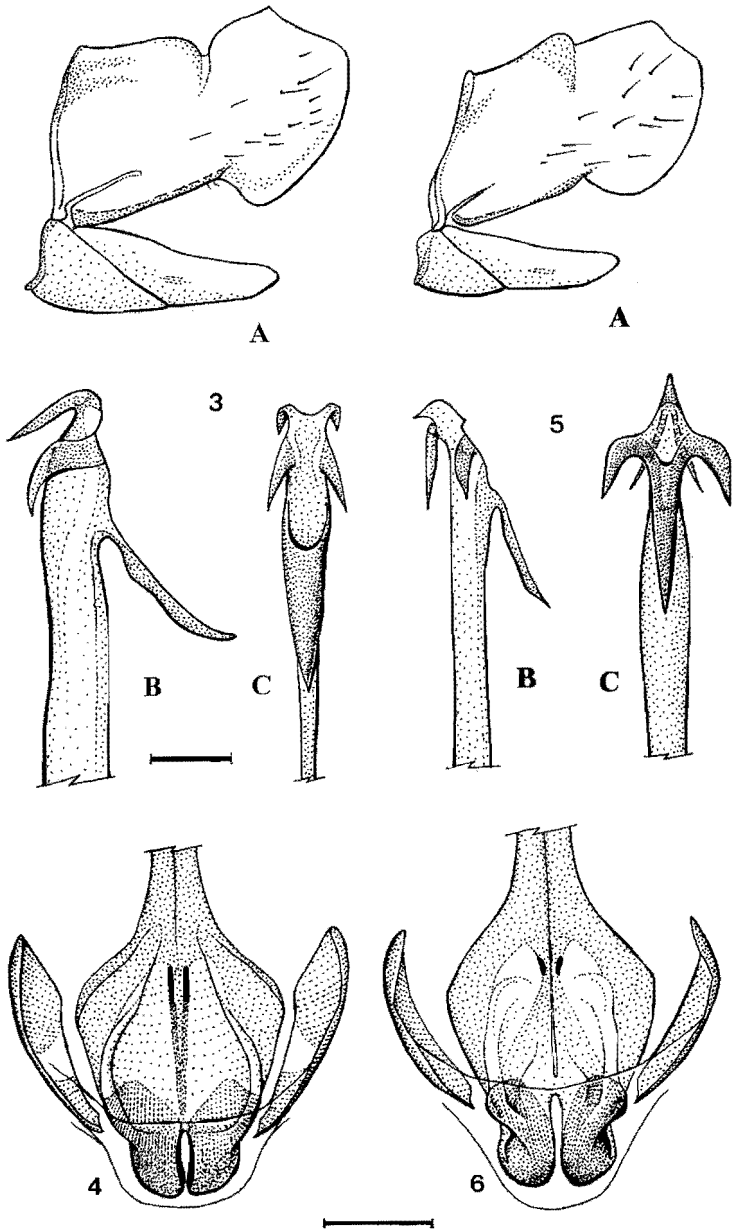
Diagnosis. *Flexamia huroni* resembles *F. serrata*, to which it keys to couplet six in Whitcomb and Hicks revision of the genus *Flexamia* (1988). It

appears to be closely related to *F. serrata*, sharing with it the distinctive ivory white dorsal coloration, a well produced vertex with frons having medially interrupted dark lines just below the coronal margin, an aedeagus possessing paired lateral terminal processes (Figs. 3b–c, 5b–c) and the sole foodplant (*Muhlenbergia richardsonis*). The two differ principally in that the aedeagus of *F. huroni* has the unpaired terminal process (prominent in *F. serrata*, Figs. 5b–c) reduced to a state where only the two pairs of lateral terminal processes are evident (Figs. 3b–c). *Flexamia huroni* also has the caudoventral median process much enlarged, as is the gonopore. In *F. huroni* the gonopore is oval, not round as in *F. serrata*. The plates are similar but longer in *F. huroni* and the cleft seperating the apical lobe of the pygofer is more pronounced than in *F. serrata* (Figs. 3a,5a). The female genitalia are also very similar, the heavily sclerotized apical lobes of the first valvulae being distinctive within *Flexamia*. In *F. huroni* females, the apical lobes are straight (Fig. 4), not recurved as in *serrata* (Fig. 6). The facial markings, with the inter-ocular bands interrupted medially, is also distinctive among the "stripe-faced" *Flexamia* (see Figs. 2, 7–8).

Ecology: *Flexamia huroni* has been collected only from *Muhlenbergia richardsonis*, a threatened species in two Midwestern states (MI, WI). This grass is extremely rare in eastern North America (Fig. 9), where it is typically associated with prairie fens or similar alkaline wetland types (Hitchcock 1935, Penskar pers. comm., Voss 1981). It is known from 13 extant colonies in Michigan (Penskar pers. comm.). Prairie fens are locally distributed from central Ohio west to southern Minnesota and northern Iowa (Kohring 1982, Chapman 1986, Kron 1989) and are considered a globally imperiled plant community type by The Nature Conservancy and the U. S. Fish and Wildlife Service. Examples of this plant community type often contain a rich flora and are known to be the sole habitat for a number of highly localized and globally imperiled insect species (Shuey 1985, U. S. Fish and Wildlife Service 1991, Panzer et al. 1995).

This is the first *Flexamia* species to be associated exclusively with prairie fens. Four additional fens containing mat muhly (three in Michigan and one in Wisconsin) have also been sampled for this leafhopper, with no success. The Brandt Road site is highly unusual in that mat muhly forms extensive colonies ("mats"), co-dominating large portions of the fen along with big bluestem (*Andropogon gerardi*), smooth blue aster (*Aster laevis*), fen star sedge (*Carex sterilis*), fringed gentian (*Gentiana crinita*), blazing star (*Liatris spicata*), Kalm's lobelia (*Lobelia kalmii*) shrubby cinquefoil (*Potentilla fruticosa*) and Riddell's goldenrod (*Solidago riddellii*). No other Michigan prairie fen has mat muhly at this density. In all other fens sampled for this leafhopper, mat muhly was much more patchily distributed, usually as small clumps on sedge tussocks or old ant hills. The patchy distribution of its foodplant in the region may partially explain the highly limited distribution of *Flexamia huroni*.

Conservation status: *Flexamia huroni* is a candidate for listing as an endangered species in Michigan under guidelines B.1 and secondary condition 2 in the "Technical Advisory Committee Guidelines for listing endangered, threatened, probably extirpated and special concern species in Michigan" (Michigan Department of Natural Resources, 1986). Given its localized occurrence in a globally imperiled plant community, the threatened status of its foodplant, its absence from several other sites known to contain mat muhly, female morphology and associated dispersal capabilities, *F. huroni* is likely sensitive to alterations of its habitat. Additional surveys are planned at the remaining Michigan *M. richardsonis* sites to determine the distribution of *F. huroni* in Michigan. The type locality is owned and protected by the



Figures 3–6. Comparison of genitalia of *Flexamia huroni* (3 = male, 4 = female) and *Flexamia serrata* (5 = male, 6 = female). a = pygofer, b = aedeagus, lateral aspect; c = aedeagus, dorsal aspect. Female genitalia show base of ovipositor, dorsal aspect. Scale line = 0.1 mm.

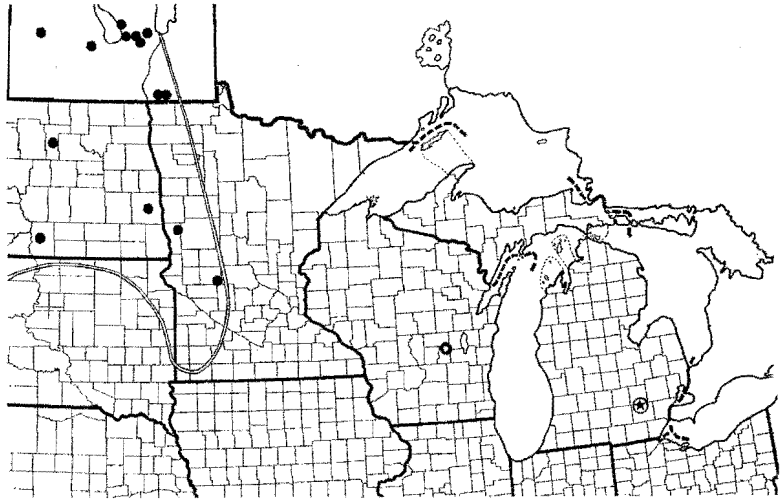


Figure 9. Map showing the distribution of *Muhlenbergia richardsonis* (line), *Flexamia huroni* (star), *Flexamia serrata* (solid circles), and the Wisconsin fen containing *M. richardsonis* but not *F. huroni* (open circle).

Michigan Department of Natural Resources and they have been made aware of the presence of this new species.

ACKNOWLEDGMENTS

We thank Michael Penskar (botanist for the Michigan Natural Features Inventory), who collected five of the specimens used in this manuscript and provided information on the vegetative composition of the Brandt Road site and other Michigan prairie fens. Thanks also to the Michigan DNR and The Nature Conservancy for providing funding for a major portion of this research. June Dobberpuhl and Bill Smith of the Wisconsin DNR provided information on *Muhlenbergia richardsonis* and prairie fens in Wisconsin. The manuscript was reviewed by Matthew Lavin, Richard Miller, Kevin M. O'Neill, Michael Penskar, Ron Panzer and two anonymous reviewers.

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