

AN ANNOTATED LIST OF THE MEMBRACIDAE OF INDIANA (HOMOPTERA)

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The members of the family Membracidae are commonly called treehoppers. One of their number, the buffalo treehopper (*Ceresa bubalus*), is widely known as a pest of apples. However, this species has doubtless been confused in the past with *Ceresa borealis* and *C. taurina*. *C. basalis* and *Stictocephala inermis* also injure apple trees by ovipositing in the one and two year old twigs. *Enchenopa binotata* has been observed to injure butternut in the same manner. *C. bubalus* is suspected of being a mechanical carrier of the causative organism of the Dutch elm disease.

No formal list of the species of Membracidae occurring in Indiana exists. In fact there are but few references in the literature to their occurrence in the state and none that deal with local distribution. Baldwin (1)² in 1914 recorded the buffalo treehopper in Indiana. Van Duzee (4) records two additional species from the state in his well known catalogue of the Hemiptera. Funkhouser (3), in his catalogue of the Membracidae of the world, records 23 species from the state in addition to the three mentioned above. Ball (2), in 1932, records four species from Indiana, two of which had been previously reported by Funkhouser. Thus a total of 28 species of Membracidae have been reported in the literature as occurring in Indiana. The writers in the present paper add 29 species to the list making a total of 57 species, representing four subfamilies and 21 genera which are known to occur in the state.

The material upon which this paper is based has for the most part been collected by the writers during the past four years as a part of their study of the Hemipterous and Homopterous fauna of the state. In addition to this material the writers have had access to specimens collected by other members of the entomology staff and students at Purdue. These collectors are indicated under "collection records" by their initials which are as follows: JMA—J. M. Amos, DWB—D. W. Brinson, HEB—Harry E. Brown, JJD—J. J. Davis, RRH—R. R. Heaton, DWL—D. W. LaHue, GEL—G. E. Lehker, BEM—B. E. Montgomery, LIM—L. I. Musgrave, COP—C. O. Partlow, FHT—F. H. Test, AWT—A. W. Trippel. The writers' collection records are indicated by HOD and GEG. All specimens in the Purdue Entomological Collection which do not bear a collector's label are indicated by PC.

The writers wish to express their appreciation to Dr. W. D. Funkhouser, the recognized world authority on the classification of the Membracidae, for examining most of the material upon which this paper is based.

¹ Contribution of the Department of Entomology.

² Numbers in parentheses refer to Literature Cited.

The subfamilies and genera are arranged according to the Funkhouser catalogue. The species are arranged alphabetically under each genus.

Nearly all of the specimens studied are deposited in the Purdue Entomological Collection. Species marked with an asterisk have not been reported from the state before.

Subfamily MEMBRACINAE

1. *Campylenchia latipes* (Say, 1824).

Collection records: Adams Co., June 18 (GEG); Carroll Co., July 14 (HOD); Clark Co., June 12-Aug. 1 (BEM, PC); Fayette Co., July 13 (PC); Greene Co., June 29 (W. S. Blatchley); Harrison Co., July 3-7 (DWL); Jefferson Co., July 5-Aug. 6 (DWB); Knox Co., June 14 (BEM); Kosciusko Co., June 24-Aug. 10 (GEG); Lake Co., June 28 (GEG); Lawrence Co., July 4-25 (BEM, LIM); Morgan Co., July 13 (RRH); Porter Co., July 4, Sept. 3 (BEM, PC); Pulaski Co., July 24 (GEG); St. Joseph Co., July 11-Aug. 26 (AWT); Tippecanoe Co., July 11-Oct. 6 (JJD, HOD, BEM, PC, AWT); Tipton Co., Aug. 27 (GEG).

Notes: A common herb-inhabiting species collected from asparagus, blue grass, corn, golden rod, oaks, smartweed, and roadside weeds. Extremes of collection dates of adults are June 12 and Oct. 6.

Reported from Indiana by Funkhouser (3).

2. *Enchenopa binotata* (Say, 1824).

Collection records: Carroll Co., Sept. 30 (HOD); Harrison Co., July 5 (DWL); Clark Co., June 12 (PC); Jennings Co., July 15 (PC); Knox Co., July 14 (BEM); Kosciusko Co., July 5-Aug. 7 (GEG); Lake Co., June 28 (GEG); Morgan Co., June 10-July 23 (LIM); Porter Co., July 4-Aug. 8 (HEB, JJD); Tippecanoe Co., June 24-Oct. 10 (JJD, HOD, GEG, AWT, PC); Vermillion Co., June 1 (GEG); Warren Co., June 27 (HOD).

Notes: A common tree- and shrub-inhabiting species although sometimes taken on herbaceous plants. It has been taken from apple, bittersweet, clover, hop hornbeam, maple, walnut, and willow and in miscellaneous sweeping from weeds. Extremes of collection dates of adults June 1 and Oct. 10.

Reported from Indiana by Funkhouser (3).

Subfamily HOPLOPHORINAE

3. **Platycotis quadrivittata* (Say, 1831).

Collection records: Tippecanoe Co., Nov. 12 (W. D. Miller).

Subfamily SMILIINAE

4. *Acutalis semicrema* (Say, 1830).

Collection records: Harrison Co., Sept. 1 (DWL); Kosciusko Co., July 20 (GEG); Marion Co., Oct. 15 (HOD); Morgan Co., Aug. 7 (LIM); Porter Co., July 8 (HEB).

Notes: Rather scarce, taken by sweeping grass and weeds in woods. Reported by Funkhouser (3).

5. **Acutalis tartarea* (Say, 1830).

Collection records: Clark Co., July 25, Aug. 31 (PC, JJD); Clay Co., June 21 (GEG); Harrison Co., July 1 (JJD, DWL); Jefferson Co., June 28 (DWB); Knox Co., July 11 (BEM); Kosciusko Co., July 15 (GEG); Morgan Co., June 18 (LIM); Noble Co., July 20 (HEB); Parke Co., June 28 (FHT); Porter Co., July 8 (HEB); Tippecanoe Co., Sept. 15 (PC).

Notes: More common than the above species. Taken on willow and by sweeping herbage. Extremes of collection dates of adults are June 18 and Sept. 15.

6. *Microtalis calva* (Say, 1831).

Collection records: Carroll Co., July 28-Oct. 17 (HOD, GEG); Clark Co., Aug. 31 (JJD, HOD); Crawford Co., Aug. 31 (DWL); Harrison Co., July 1-Aug. 31 (DWL); Jefferson Co., June 5 (DWB); Lawrence Co., Aug. 4 (JMA); Morgan Co., June 10-July 13 (RRH, LIM); Noble Co., Sept. 7 (HEB); Orange Co., Aug. 20 (LIM); Posey Co., Sept. 2 (HOD); St. Joseph Co., June 28 (AWT); Tippecanoe Co., June 12-Oct. 17 (JJD, HOD, GEG, LIM, AWT, PC); Wells Co., June 18 (GEG).

Notes: A very common species on honey locust. Taken from *Datura*, elm, golden rod, honey locust, iron weed, pig weed, and willow and "at light." Extremes of collection dates of adults are June 5 and Oct. 17.

Reported from Indiana by Funkhouser (3).

7. **Stictocephala festina* (Say, 1830).

Collection records: Harrison Co., Aug. 24-Sept. 4, on alfalfa and clover (DWL).

8. *Stictocephala inermis* (Fabr., 1775).

Collection records: Harrison Co., July 3 (DWL); Kosciusko Co., June 24-July 15 (GEG); Lawrence Co., June 21-Aug. 20 (JMA, HOD, LIM); Noble Co., July 20 (HEB); St. Joseph Co., July 12-Aug. 21 (AWT); Starke Co., July 24 (GEG); Tippecanoe Co., July 7-Sept. 8 (HOD, GEG, AWT, PC); Vigo Co., June 8 (JJD).

Notes: The common name of "green clover leafhopper" has been applied to this insect in the Pacific Northwest where it is an important pest of apples. It has been taken in Indiana from alfalfa, apple, asparagus, smartweed, and willow and "at light." The extremes of the collection dates of the adults are July 24 and Sept. 8.

Reported from Indiana by Funkhouser (3).

9. *Stictocephala lutea* (Walker, 1851).

Collection records: Clark Co., June 14-July 6 (BEM, PC); Crawford Co., May 16 (JJD); Harrison Co., May 13, Aug. 31 (DWL); Knox Co., May 21-Aug. 20 (GEG, BEM, PC); Kosciusko Co., May 21-June 7 (GEG); Lake Co., June 4 (GEG); LaPorte Co., May 9-Sept. 1 (GEL); Morgan Co., May 29 (LIM); Porter Co., June 9 (HEB); St. Joseph Co., June 15-17 (AWT); Starke Co., June 4 (GEG); Tippecanoe Co., May 10-Sept. 20 (GEG, RRH, PC); Warren Co., May 19 (HOD, PC).

Notes: More common in Indiana than *S. inermis*. Taken from

alfalfa, cottonwood, dewberries, red clover, sweet clover, and willow. Extremes of collection dates of adults are May 9 and Sept. 20.

Reported from Indiana by Funkhouser (3).

10. *Ceresa albescens* Van Duzee, 1908.

Reported from Indiana by Funkhouser (3).

11. *Ceresa basalis* Walker, 1851.

Collection records: Clark Co., June 12-July 26 (BEM, PC); Kosciusko Co., May 14-21 (GEG); Morgan Co., May 29 (LIM); Pulaski Co., July 24 (GEG); Tippecanoe Co., May 10 (PC); Warren Co., May 20 (BEM, PC).

Notes: Taken from oaks and grass. Extremes of collection dates of adults May 10 and July 26.

Reported from Indiana by Funkhouser (3).

12. *Ceresa borealis* Fairmaire, 1846.

Collection records: Clark Co., Aug. 31 (JJD); Harrison Co., July 4, Sept. 1 (DWL, HOD); Howard Co., Aug. 27 (GEG); Lawrence Co., July 24-Aug. 16 (JMA); Morgan Co., July 13-23 (RRH, LIM); Noble Co., July 20 (HEB); Starke Co., July 24 (GEG); Tippecanoe Co., July 19-Oct. 20 (HOD, GEG, BEM, AWT, PC).

Notes: Taken from cottonwood, goldenrod, maple, and willow and "at light." Extremes of collection dates, July 4 and Oct. 20.

Reported from Indiana by Funkhouser (3).

13. *Ceresa brevicornis* Fitch, 1856.

Reported from Indiana by Funkhouser (3).

14. **Ceresa brevitylus* Van Duzee, 1908.

Collection records: Tippecanoe Co., June 15 (JJD).

15. *Ceresa bubalus* Fabr., 1794.

Collection records: Bartholomew Co., Oct. 15 (HOD); Carroll Co., July 14-28 (HOD, GEG); Clark Co., June 28, Aug. 31 (PC, HOD); Clinton Co., Aug. 27 (GEG); Harrison Co., Sept. 4 (DWL); Jasper Co. (PC); Knox Co., Aug. 12 (BEM); Kosciusko Co., July 20-Aug. 21 (GEG); Lawrence Co., July 2-Sept. 1 (JMA, LIM); Pulaski Co., July 24 (GEG); Rush Co., Sept. 11 (RRH); Starke Co., July 24 (GEG); Tippecanoe Co., July 4-Oct. 17 (HOD, GEG, RRH, BEM, LIM, AWT, PC); Tipton Co., Aug. 27 (GEG); Wabash Co., July 11 (GEG).

Notes: This species is the well known buffalo treehopper which injures apple and elm twigs rather seriously by ovipositing in them. Taken from alfalfa, apple, corn, elm, poplar, and willow and at light. Extremes of collection dates of adults are July 2 and Oct. 17.

Reported from Indiana by Baldwin (1), Funkhouser (3) and Van Duzee (4).

16. *Ceresa constans* (Walker, 1851).

Collection records: Jefferson Co., on *Liquidambar styraciflua*, July 5 (DWB); Kosciusko Co., July 8 (GEG); Tippecanoe Co., Oct. 17 (PC).

Reported from Indiana by Funkhouser (3).

17. *Ceresa diceros* (Say, 1824).

Collection records: Fulton Co., July 6 (GEG); Harrison Co., Aug. 24 (DWL); Kosciusko Co., June 26-July 20 (GEG); Noble Co., Sept. 7 (HEB); Morgan Co., July 14 (LIM); Porter Co., July 8 (HEB); Posey Co., Sept. 2 (HOD); Tippecanoe Co., June 15-July 22 (GEG, PC); Tipton Co., July 30 (COP).

Notes: Taken on elder and clover. Extremes of collection dates of adults are June 15 and Sept. 7.

Reported from Indiana by Funkhouser (3).

18. *Ceresa illinoiensis* Golding, 1894.

Reported from Indiana by Funkhouser (3).

19. *Ceresa palmeri* Van Duzee, 1908.

Collection records: Carroll Co., July 28 (GEG); Noble Co., July 20 (HEB); Tippecanoe Co., July 4-Oct. 7 (HOD, GEG).

Reported from Indiana by Funkhouser (3).

20. *Ceresa taurina* Fitch, 1856.

Collection records: Harrison Co., July 12-14, (DWL); Kosciusko Co., July 4-Aug. 7 (GEG); Lawrence Co., Aug. 23 (JMA); Orange Co., June 25 (JMA); Rush Co., June 30 (RRH); Tippecanoe Co., June 26-Oct. 8 (JJD, GEG, AWT, PC); Tipton Co., July 4-30 (COP).

Notes: This is another species of *Ceresa* which oviposits in apple. Taken from apple and willow and "at light."

Reported from Indiana by Funkhouser (3).

21. *Carynota marmorata* (Say, 1831).

Reported from Indiana by Funkhouser (3).

22. **Carynota mera* (Say, 1831).

Collection records: Clark Co., July 15 (PC); Jefferson Co., June 16 (DWB); Lawrence Co., July 2 (JMA); Tippecanoe Co., June 12 (HOD, LIM).

23. *Thelia bimaculata* (Fabr., 1794).

Collection records: Clark Co., June 14-July 8 (PC); Morgan Co., June 18 (LIM); Noble Co., Sept. 5 (HEB); Tippecanoe Co., May 26-Sept. 28 (BEM, LIM, AWT, PC); Washington Co., July 2 (PC).

Notes: Host, black locust. Extremes of collection dates of adults, May 26 and Sept. 28.

Reported from Indiana by Funkhouser (3).

24. **Glossonotus acuminatus* (Fabr. 1775).

Collection records: Clark Co., June 26, on oak (PC).

25. *Glossonotus univittatus* (Harris, 1841).

This species is reported from Indiana by Ball (2). The specimens which he examined were collected by Baker and are deposited in the U. S. National Museum.

26. *Palonica pyramidata* (Uhler, 1877).

Reported from Indiana by Funkhouser (3).

27. **Palonica viridia* (Ball, 1903).

Collection records: Noble Co., July 20 (HEB).

28. *Telamona ampelopsidis* (Harris, 1841).
Collection records: Clark Co., June 23 (BEM); Tippecanoe Co., June 15 (JJD).
Notes: Reported from Indiana by Ball (2) and Funkhouser (3). The specimens which Ball examined are in the U. S. National Museum.
29. **Telamona collina* (Walker, 1851).
Collection records: Lawrence Co., July 2 (JMA).
30. *Telamona decorata* Ball, 1903.
Reported from Indiana by Van Duzee (4) and Funkhouser (3).
31. *Telamona extrema* Ball, 1903.
Reported from Indiana by Ball (2) from specimens taken by Gerhardt.
32. *Telamona monticola* (Fabr., 1803).
Collection records: Clark Co., June 14 (PC); Lawrence Co., June 14 (JMA); Orange Co., Sept. 10 (PC).
Reported from Indiana by Ball (Baker collection in U. S. N. M.) and Funkhouser (3).
33. **Telamona spreta* var. *agrandata* (Ball, 1932).
Collection records: Porter Co., June 21 (HEB).
34. **Telamona tiliæ* Ball, 1925.
Collection records: Lawrence Co., July 21, at light (JMA).
35. *Telamona unicolor* Fitch, 1851.
Collection records: Delaware Co., June 6 (JJD).
Reported from Indiana by Funkhouser (3).
36. **Archasia belfragei* (Stal, 1869).
Collection records: Clark Co., June 14 (BEM), July 8, on oak (PC).
37. **Archasia galeata* (Fabr., 1803).
Collection records: Harrison Co., June 20, on oak (DWL).
38. **Smilia camelus* (Fabr., 1803).
Collection records: Clark Co., July 3 (PC); Kosciusko Co., June 4 (GEG).
39. **Atymna castaneæ* (Fitch, 1851).
Collection records: Clark Co., July 14 (PC).
40. **Atymna helena* (Woodruff, 1915).
Collection records: Kosciusko Co., July 20, on oak (GEG).
41. **Atymna querci* (Fitch, 1851).
Collection records: Clark Co., July 14 (PC); Kosciusko Co., June 2-4, on oak (GEG); Tippecanoe Co., June 12 (HOD, LIM).
42. **Cyrtolobus acutus* Van Duzee, 1908.
Collection records: Kosciusko Co., June 2, on oak (GEG).
43. **Cyrtolobus arcuatus* (Emmons, 1854).
Collection records: Clark Co., June 13 (BEM); Kosciusko Co., June 4, on oak (GEG); Tippecanoe Co., July 17 (PC).

44. **Cyrtolobus fuliginosus* (Emmons, 1854).
Collection records: Kosciusko Co., June 4, on oak (GEG).
45. **Cyrtolobus fuscipennis* Van Duzee, 1908.
Collection records: Clark Co., July 14 (PC); Kosciusko Co., July 4 (GEG).
46. **Cyrtolobus graciosus* Woodruff, 1924.
Collection records: Kosciusko Co., June 2, on oak (GEG).
47. **Cyrtolobus griseus* Van Duzee, 1908.
Collection records: Clark Co., July 14 (PC).
48. **Cyrtolobus puritanus* Woodruff, 1924.
Collection records: Kosciusko Co., July 20 (GEG).
49. **Cyrtolobus vau* (Say, 1831).
Collection records: Clark Co., June 1-3 (BEM); Kosciusko Co., July 20 (GEG); Tippecanoe Co., May 22-June 12 (HOD, LIM, PC); Tip-ton Co., July 30 (COP).
50. **Ophiderma flavacephala* Goding, 1892.
Collection records: Clark Co., June 15 (PC).
51. **Ophiderma grisea* Woodruff, 1919.
Collection records: Kosciusko Co., June 4, on oak (GEG).
52. **Ophiderma pubescens* (Emmons, 1854).
Collection records: Tippecanoe Co., June 15 (JJD).
53. *Vanduzeca arquata* (Say, 1831).
Collection records: Clark Co., June 12-17 (BEM, PC); Kosciusko Co., June 17 (GEG); Noble Co., June 30 (HEB); Morgan Co., June 1 (LIM); St. Joseph Co., Aug. 22 (AWT); Tippecanoe Co., July 31-Sept. 25 (JMA, HOD, BEM, AWT).

Notes: This is a common species taken on cottonwood, honey locust, horse weed, and willow. Extremes of collection dates of adults are June 1 and Sept. 25.

Reported from Indiana by Funkhouser (3).

54. *Entylia bactriana* Germar, 1835.
Collection records: Bartholomew Co., Oct. 15 (GEG); Crawford Co., Aug. 31 (DWL); Fayette Co., July 17 (PC); Knox Co., July 11 (BEM); Kosciusko Co., May 21-Aug. 7 (GEG); Monroe Co. (JJD); Morgan Co., May 29-Oct. 21 (LIM); Parke Co., June 25-28 (FHT); Tippecanoe Co., May 6-Oct. 10 (JJD, HOD, GEG, LIM, AWT).

Notes: This is a very common herb-inhabiting species and is one of the few membracids which over-winters in the adult stage. Has been taken on asparagus, blue grass, ragweed, sunflower, willow.

Reported from Indiana by Funkhouser (3).

55. *Publia concava* (Say, 1824).

Collection records: Fulton Co., May 31 (GEG); Morgan Co., May 14-Aug. 7 (RRH, LIM); Tippecanoe Co., April 22-June 8 (GEG, PC).

Notes: This species also seems to over-winter as adults. Taken on burdock and red clover and from weeds along streams.

Reported from Indiana by Funkhouser (3).

56. **Publia reticulata* Van Duzee, 1908.

Collection records: Clark Co., June 13, July 15 (BEM); Crawford Co., Aug. 30, Sept. 1 (JJD, HOD); Johnson Co., Oct. 15 (HOD); Kosciusko Co., May 21-24 (GEG); Noble Co., June 9 (HEB); Tippecanoe Co., May 8-June 9 (GEG, PC); Warren Co., May 19 (HOD).

Notes: More common than the above species. It seems to over-winter as an adult as young nymphs were abundant in Crawford County the first of September on iron weed. Taken from burdock and iron weed and in general sweeping.

Subfamily CENTROTINAE

57. **Microcentrus perdita* (A. & S., 1843).

Collection records: Tippecanoe Co., Oct. 1 (PC).

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