THE MEMBRACIDAE OF THE UNIVERSITY OF WISCONSIN ARBORETUM[1]

CLIFFORD J. DENNIS AND ROBERT J. DICKE

During the summer of 1950, a survey of the adult Membracidae was made at the University of Wisconsin Arboretum. Certain species of the Membracidae or "tree-hoppers" are of importance as pests of agricultural crops, although the family is a large one comprising many "non-economic" forms. The purpose of this study was to determine the seasonal incidences and habitats of the Membracids in a restricted but diversified area such as in the Arboretum. A record was also taken of the plants on which Membracids were collected. No attempt was made to determine the reason for the insect's presence on a particular plant.

Procedure. Weekly collections were made from May 12 to November 16 in selected ecological areas. These areas are indicated in Fig. 1, and were as follows:

GENERAL DESCRIPTION	AREAS
Abandoned apple orchard	A
Sand prairie	B
Oak openings	C,D
Horticultural area	E
Black locust	F,G,H
High prairie	I
Low prairie	J
Marsh	K,L
Aspen	M
Cottonwood–aspen swamp	N
Oak–hickory	O,P
Willows	Q

Collections were made by means of a sweeping net. The sampling procedure was not designed to demonstrate numbers of the particular species.

Results and Discussion. Fifty species of Membracids were collected during the summer of 1950. These species and the plants on which they were collected are listed in Table 1. The preference of Membracids for oaks was apparent. On white oak, 26 species were collected, while 29 species were taken from black oak and bur oak. Of the 50 species collected, 36 belong to the tribes Telamonini and Smiliini which in general are tree-inhabit-

[1] The co-operation of the University of Wisconsin Arboretum Committee is acknowledged for their encouragement of this study and the use of their facilities, and for permission to reproduce the map used in Fig. 1.

ing, preferring oak. The relatively large numbers of species which were collected in the Horticultural and Cottonwood—aspen swamp areas reflect the presence of oak trees.

A number of species were collected from economically important crop plants. For example, eight species occurred on sweet clover and three on apple. A knowledge of collection records from wild hosts for economically important species is often an important factor in control. *Stictocephala bubalus,* for example, is an important pest of orchard crops. In addition to apple, this species was found on sweet clover, haw, American elm, goldenrod, nettle, and wild plum.

The seasonal incidences of the Membracids are summarized in Table 2. These data indicate that certain groups are variable in their occurrence. The Smiliini, for example, were the first adults to appear and uniformly occurred only during the spring and early summer. Seasonal incidence may indicate the overwintering habits of some species. Adults of *Entylia bactriana* and *Pubilia concava,* for example, appeared briefly early in spring although their principal occurrence was during late fall. Overwintering in the adult stage was indicated for these species. Generally, males of all species appeared earlier than females but did not persist as long.

The numbers of Membracid species collected in each of the habitats studied are indicated below.

Habitat	Number of Species
Abandoned apple orchard	4
Sand prairie	0
Oak openings	35
Horticultural area	28
Black locust	8
High prairie	3
Low prairie	1
Marsh	9
Aspen	0
Cottonwood–aspen swamp	13
Oak–hickory	35
Willows	0

Summary

1. A survey of the Membracidae was made at the University of Wisconsin Arboretum during the summer of 1950 to determine the number of species present, their seasonal incidences, habitats and plants on which they may be collected.

2. Fifty species of Membracids were collected. These were principally taken from oak, although many other plants harbored

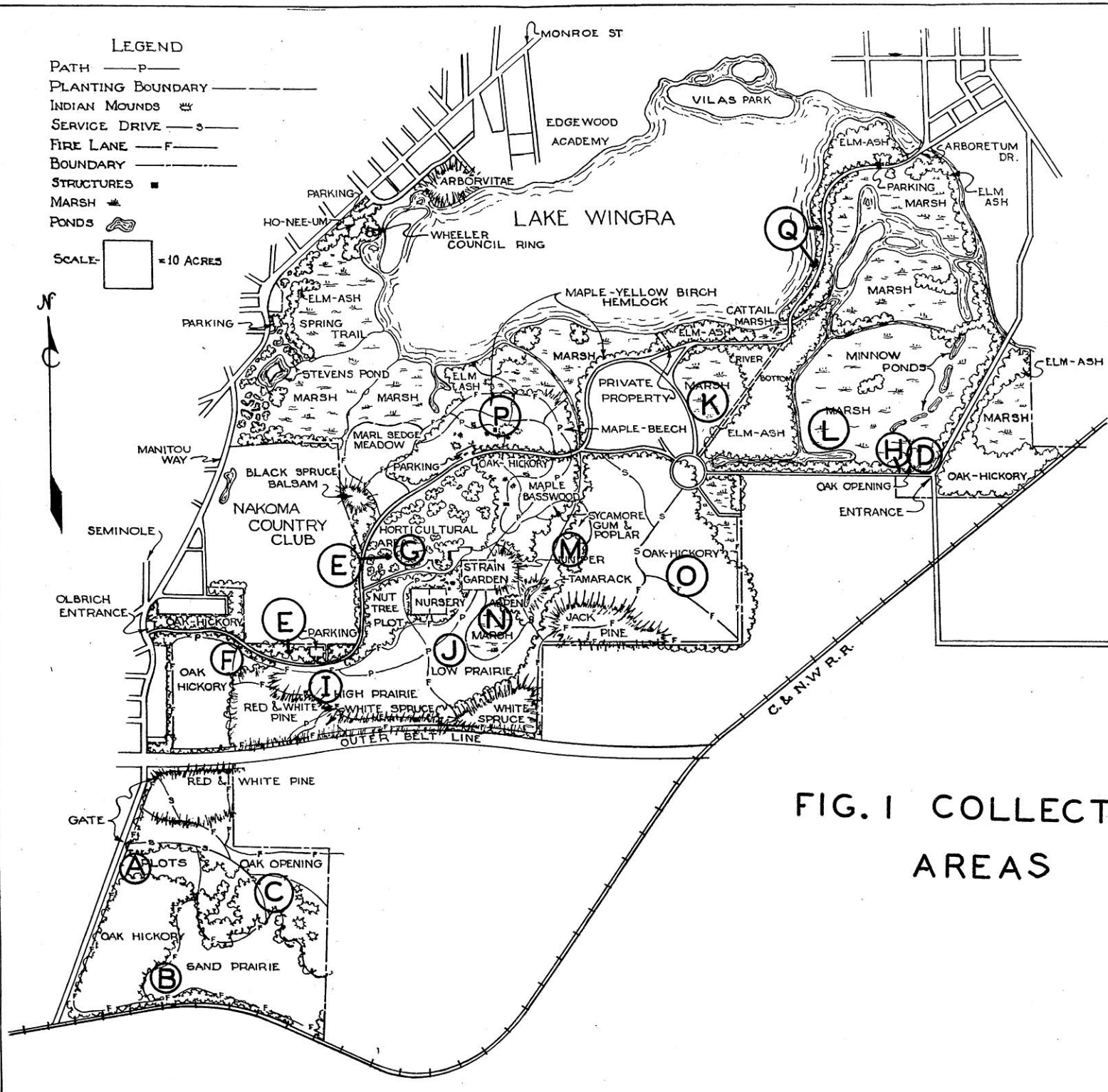

FIG. 1 COLLECTING AREAS

them. Studies on seasonal incidences have indicated the probable overwintering habits of two species.

3. Relatively few of the species studied were of economic importance as pests of agronomic crops. However, all species may be considered of potential importance to the agriculturist, and fundamental information on their biology and habits should be known. Of the economically important species such as the Buffalo Treehopper *(Stictocephala bubalus)* information was gained in respect to habits and plants harboring the species under uncultivated conditions.

TABLE 1

MEMBRACID SPECIES AND PLANTS ON WHICH THEY WERE COLLECTED

Subfamily Membracinae

Campylenchia latipes (Say)
Sweet clover, goldenrod, wild sunflower, red clover, giant ragweed, small ragweed, black oak, nettle, alfala

Enchenopa binotata (Say)
Black locust, sweet clover, black oak

Subfamily Smiliinae

Tribe Polyglyptini

Entylia bactriana Germar
Giant ragweed, goldenrod

Pubilia concava (Say)
Giant ragweed, wild sunflower, nettle, white oak, bur oak, sweet clover, compass plant

Vanduzea arquata (Say)
Black locust

Tribe Smiliini

Cyrtolobus arcuatus (Emmons)
Black oak, bur oak, white oak

Cyrtolobus discoidalis (Emmons)
White oak, bur oak, black oak, shagbark hickory

Cyrtolobus fenestratus (Fitch)
Black oak, bur oak

Cyrtolobus fuliginosus (Emmons)
Bur oak, white oak, black oak, shagbark hickory, hazel, black locust

Cyrtolobus fuscipennis Van Duzee
Bur oak, white oak, black oak

Cyrtolobus griseus Van Duzee
Bur oak, white oak, black oak

Cyrtolobus helena Woodruff
Bur oak, white oak, black oak, swamp white oak, chinquapan oak

Cyrtolobus inermis (Emmons)
Bur oak, white oak, black oak

Cyrtolobus maculifrontis (Emmons)
Bur oak, white oak, black oak, swamp white oak

Cyrtolobus pallidifrontis (Emmons)
White oak, bur oak, shagbark hickory

TABLE 1—*(Continued)*

MEMBRACID SPECIES AND PLANTS ON WHICH THEY WERE COLLECTED

Cyrtolobus pulchellus Woodruff
Black oak, bur oak, white oak
Cyrtolobus querci (Fitch)
White oak, bur oak, black oak
Cyrtolobus tuberosus (Fairmaire)
White oak, bur oak
Cyrtolobus vau (Say)
White oak, bur oak, black oak
Ophiderma definita Woodruff
White oak, bur oak, black oak
Ophiderma evelyna Woodruff
Black oak, white oak, bur oak, shagbark hickory
Ophiderma flava Goding
Black oak, white oak
Ophiderma grisea Woodruff
White oak, black oak, gray dogwood
Ophiderma pubescens (Emmons)
Black oak, white oak, bur oak
Ophiderma salamandra Fairmaire
White oak, bur oak, black oak, shagbark hickory, smooth sumac
Xantholobus intermedius (Emmons)
Black oak
Xantholobus lateralis Van Duzee
White oak, bur oak
Xantholobus muticus (Fabricius)
Black oak, white oak, bur oak
Smilia camelus (Fabricius)
Black oak, bur oak

Tribe Telamonini
Archasia belfragei Stal
Bur oak
Archasia galeata (Fabricius)
Black oak
Carynota mera (Say)
Shagbark hickory
Glossonotus crataegi (Fitch)
Haw
Telamona decorata Ball
Bur oak, white oak, black oak
Telamona maculata Van Duzee
Bur oak
Telamona monticola (Fabricius)
Bur oak, black oak
Telamona spreta Goding
Bur oak, black oak
Telamona tiliae Ball
Bur oak, white oak, black oak, haw, hackberry
Telamona tristis Fitch
Hazel

TABLE 1—*(Continued)*

MEMBRACID SPECIES AND PLANTS ON WHICH THEY WERE COLLECTED

Telamona westcotti Goding
White oak
Thelia bimaculata (Fabricius)
Black locust

Tribe Ceresini

Acutalis tartarea (Say)
Goldenrod, giant ragweed
Spissistilus borealis (Fairmaire)
Sweet clover, apple, nettle, black locust, goosefoot, black cherry
Stictocephala albescens (Van Duzee)
Hazel, choke cherry
Stictocephala bubalus (Fabricius)
Sweet clover, apple, haw, American elm, goldenrod, nettle, wild plum
Stictocephala constans (Walker)
Goldenrod, sweet clover
Stictocephala diceros (Say)
Nettle, black raspberry
Stictocephala lutea (Walker)
Sweet clover, wild sunflower, shagbark hickory, bur oak, black oak, white oak
Stictocephala taurina (Fitch)
Sweet clover, giant ragweed, small ragweed, apple, nettle, wild sunflower, wild plum, wild grape, goosefoot, black locust
Tortistilus inermis (Say)
Sweet clover, wild sunflower, giant ragweed, small ragweed, red clover

TABLE 2

SEASONAL INCIDENCE OF MEMBRACIDAE COLLECTED IN THE UNIVERSITY OF WISCONSIN ARBORETUM[1]

SPECIES	WEEK OF																							
	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 30	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Oct. 1	Oct. 8	Oct. 15	Oct. 22	Oct. 29
Campylenchia latipes (Say)	...	...	...	...	x	x	x	x	x	x	x	x	x	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	o	o	o	o	o	o	o	o	o	o	o	o	o	o	...	...	...	...	...
Enchenopa binotata (Say)	...	...	...	...	...	...	...	...	x	...	...	x	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	o	...	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Entylia bactriana Germar	...	...	...	...	...	...	...	...	...	...	...	...	x	...	...	x	...	...	x	...	...	...	...	...
	...	o	...	...	...	...	...	...	...	...	...	...	...	...	o	o	...	...	o	...	...	...	...	...
Pubilia concava (Say)	x	...	x	...	...	...	...	...	...	...	...	...	x	x	x	x	x	x	x	x	...	...	...	...
	o	...	...	...	...	...	...	...	...	...	...	o	o	o	o	o	o	o	o	o	...	...	...	...
Vanduzea arquata (Say)	...	...	...	...	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	...	...
	...	...	...	...	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Cyrtolobus arcuatus (Emmons)	...	...	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	o	...	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cyrtolobus discoidalis (Emmons)	...	x	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cyrtolobus fenestratus (Fitch)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cyrtolobus fuliginosus (Emmons)	...	x	x	x	x	x	...	...	...	...	x	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	o	o	o	o	...	...	...	...	o	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE 2—*(Continued)*

SEASONAL INCIDENCE OF MEMBRACIDAE COLLECTED IN THE UNIVERSITY OF WISCONSIN ARBORETUM[1]

SPECIES	WEEK OF																							
	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 30	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Oct. 1	Oct. 8	Oct. 15	Oct. 22	Oct. 29
Cyrtolobus fuscipennis Van Duzee	...	x	x	x	x	x	...	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	o	o	o	...	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cyrtolobus griseus Van Duzee	...	...	x	x	x	x	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	o	o	o	o	o	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...
Cyrtolobus helena Woodruff	...	...	x	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	o	o	o	o	o	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...
Cyrtolobus inermis (Emmons)	...	...	...	...	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cyrtolobus maculifrontis (Emmons)	...	...	x	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	o	o	o	o	o	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...
Cyrtolobus pallidifrontis (Emmons)	...	x	x	x	x	...	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	o	...	o	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cyrtolobus pulchellus Woodruff	...	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	o	o	o	o	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cyrtolobus querci (Fitch)	...	x	x	x	...	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	o	o	o	o	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cyrtolobus tuberosus (Fairmaire)	...	x	...	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	...	...	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE 2—*(Continued)*

SEASONAL INCIDENCE OF MEMBRACIDAE COLLECTED IN THE UNIVERSITY OF WISCONSIN ARBORETUM[1]

SPECIES	WEEK OF																							
	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 30	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Oct. 1	Oct. 8	Oct. 15	Oct. 22	Oct. 29
Cyrtolobus vau (Say)	...	x	x	x	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	o	o	o	o	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ophiderma definita Woodruff	...	x	x	...	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	o	o	o	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ophiderma evelyna Woodruff	...	x	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	o	o	o	o	o	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...
Ophiderma flava Goding	...	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	o	o	...	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ophiderma grisea Woodruff	...	...	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	o	o	o	...	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ophiderma pubescens (Emmons)	...	x	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	o	o	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ophiderma salamandra Fairmaire	...	x	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	o	o	o	...	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Xantholobus intermedius (Emmons)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Xantholobus lateralis Van Duzee	...	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	...	...	...	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE 2—*(Continued)*

SEASONAL INCIDENCE OF MEMBRACIDAE COLLECTED IN THE UNIVERSITY OF WISCONSIN ARBORETUM[1]

SPECIES	WEEK OF																						
	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 30	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Oct. 1	Oct. 8	Oct. 15	Oct. 22	Oct. 29
Xantholobus muticus (Fabricius)	...	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	o	o	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Smilia camelus (Fabricius)	...	x	x	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Archasia belfragei Stal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Archasia galeata (Fabricius)	...	...	...	...	...	...	...	...	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...
Carynota mera (Say)	...	...	...	...	...	...	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Glossonotus crataegi (Fitch)	...	...	...	...	...	...	...	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Telamona decorata Ball	...	...	...	...	..	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Telamona maculata Van Duzee	...	...	...	...	...	...	...	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Telamona monticola (Fabricious)	...	...	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	o	...	...	...	o	...	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Telamona spreta Goding	...	...	...	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE 2—*(Continued)*

SEASONAL INCIDENCE OF MEMBRACIDAE COLLECTED IN THE UNIVERSITY OF WISCONSIN ARBORETUM[1]

SPECIES	WEEK OF																							
	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 30	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Oct. 1	Oct. 8	Oct. 15	Oct. 22	Oct. 29
Telamona tiliae Ball	...	...	x	x	...	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	o	...	...	o	o	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...
Telamona tristis Fitch	...	...	...	...	...	...	...	...	...	...	...	...	o	...	...	...	...	...	...	...	...	...	...
Telamona westcotti Goding	...	...	...	...	...	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Thelia bimaculata (Fabricius)	...	...	...	...	...	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	...	...	...
	...	...	...	...	...	...	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Acutalis tartarea (Say)	...	...	...	...	...	...	...	...	x	x	...	x	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	o	...	o	o	o	...	...	...	...	...	...	...	...	...	...
Spissistilus borealis (Fairmaire)	...	...	...	...	...	...	...	x	...	x	x	...	x	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	o	o	o	...	o	o	o	o	o	o	...	...	...	...	...
Stictocephala albescens Van Duzee	...	...	...	...	...	...	...	...	...	x	...	...	...	x	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	o	...	...	o	o	o	o	o	o	o	...	...	...	...
Stictocephala bubalus (Fabricius)	...	...	...	...	...	...	...	...	x	x	x	x	x	x	...	x	...	x	x	x	...	...	...
	...	...	...	...	...	...	...	...	...	o	o	...	o	o	o	o	o	...	o	o	o	o	...
Stictocephala constans (Walker)	...	...	...	...	...	...	...	...	...	...	...	o	...	...	...	o	...	...	...	...	...	...	...
Stictocephala diceros (Say)	...	...	...	...	...	...	...	...	...	x	x	...	...	x	x	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	o	...	o	o	o	o	o	...	...	...	...	...	...	...	...

TABLE 2—*(Continued)*

SEASONAL INCIDENCE OF MEMBRACIDAE COLLECTED IN THE UNIVERSITY OF WISCONSIN ARBORETUM[1]

SPECIES	WEEK OF																							
	May 28	June 4	June 11	June 18	June 25	July 2	July 9	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 30	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Oct. 1	Oct. 8	Oct. 15	Oct. 22	Oct. 29
Stictocephala lutea (Walker)	...	x	x	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	o	o	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Stictocephala taurina (Fitch)	...	...	...	...	...	...	x	x	...	x	x	...	x	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	o	...	o	o	o	o	o	o	o	...	...	...	o	...	...	...
Tortistilus inermis (Say)	...	...	...	...	...	x	x	x	x	...	x	x	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	o	o	o	o	o	o	o	o	...	o	...	...	...	...	...	...	...	...

1 x = male specimens collected
o = female specimens collected