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**THE NEUROPTERA—SUBORDER PLANIPPENIA OF WISCONSIN
PART III—MANTISPIDAE, ASCALAPHIDAE,
MYRMELEONTIDAE AND CONIOPTERYGIDAE**

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This part concludes the Neuroptera—Suborder Planipennia of Wisconsin. In Parts I and II (Throne 1971a, b) no keys to the species were included because satisfactory keys were readily available. However, keys are included in Part III either because satisfactory keys are not available or because simpler keys than those available prove adequate for the few Wisconsin species. Whenever possible I have used macroscopic structural characters. In order to separate two species of Coniopterygidae I found it necessary to use male genitalic characters. I have made free use of the keys of Dr. Martin Meinander (1972) in constructing the key for the genera and species of Wisconsin dustywings.

With the exception of the Coniopterygidae which have been ably documented by Dr. Meinander, I am able to find but few recent distribution records for the species of the families here considered.

Family MANTISPIDAE

This family is represented in the Wisconsin fauna by two genera *Climaciella* and *Mantispa*. Because of their mantis-like appearance and actions they are variously called mantisflies, mantispas or false rear-horses. They are relatively rare in Wisconsin although at times, in restricted areas, they may be rather numerous.

I have 42 specimens and have examined 85 from the University of Wisconsin at Madison, and six from the Public Museum at Milwaukee. Of these 133 specimens 47% are males and 53% females. Twenty percent were collected during June, 61% in July, 15% in August and 4% in September. All of my Wisconsin specimens were taken by sweeping but I have frequently taken them in light traps in Kentucky.

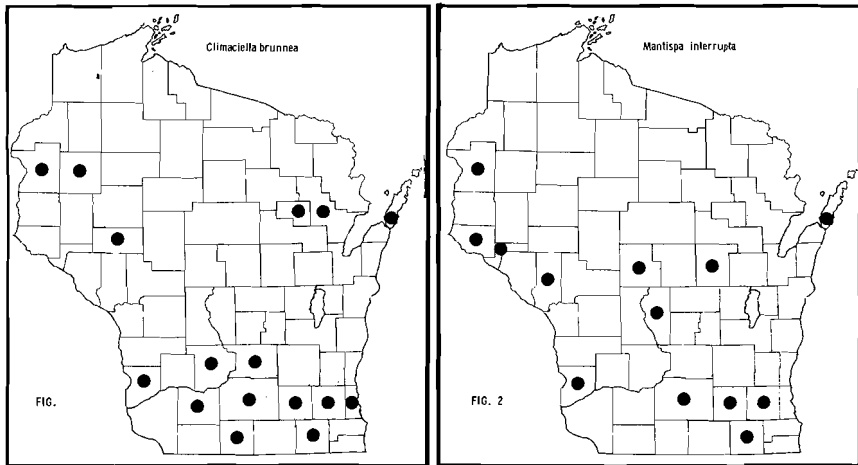
KEY TO THE SPECIES OF WISCONSIN MANTISPIDAE

1. Anterior portion of wings widely infuscated with brown or brownish-black *Climaciella brunnea*
- 1': Anterior portion of wings not widely infuscated 2
2. Color green or yellowish, wings unmarked *Mantispa viridis*
- 2': Color brown or blackish with some wing markings 3
3. Only the costal or subcostal areas of wings brown or blackish *M. uhleri*
- 3': In addition to the brown or blackish costal or subcostal areas, a brownish spot at the apex of wings and one or two below the radius *M. interrupta*

Genus CLIMACIELLA Enderlein

brunnea (Say). (Fig. 1). June 19 to August 26. This is the most abundant Wisconsin mantispid and the one most widely distributed. Hagen (1861) lists it from Florida, Georgia, Pennsylvania, Illinois, Washington, Mexico and Central America; Brimley (1938) from North Carolina; Froeschner (1947) from Missouri; Smith (1925) from Kansas; Banks (1904) from New Mexico; Montgomery and Trippel (1933) from Indiana and Wheeler (1889) from Nebraska. Banks (1911) records the species from Washington, Nevada and Colorado and Parfin (1952) from Minnesota under the designation *C. brunnea* var. *occidentis* Banks.

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I have seen 73 Wisconsin specimens most of which were taken on oak and pine in sandy areas.

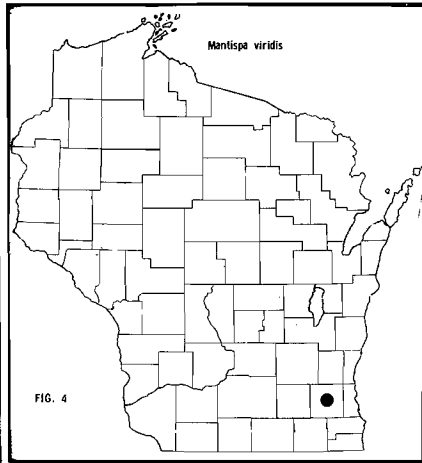
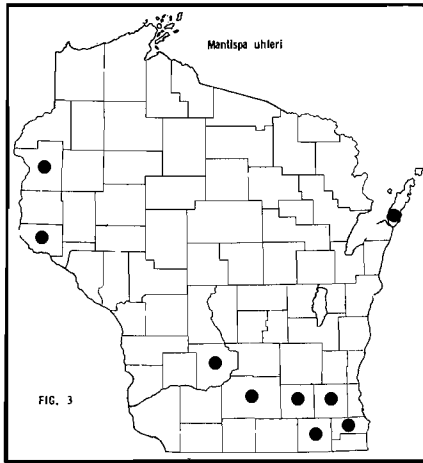
Genus MANTISPA Illiger

interrupta Say. (Fig. 2). June 13 to September 3. I have examined 46 Wisconsin specimens. *Interrupta* occurs mainly in the eastern half of the United States although it has been recorded from New Mexico (Banks, 1904). I have specimens from Texas and Arizona. Smith (1925) says it is very rare in Kansas. Bailey (1948) reports the species from as far north as Massachusetts in the east and Parfin (1952) from Minnesota in the west. Banks (1907) says it is found in the southern states. I have specimens from Florida and Kentucky.

This species has been swept from *Quercus* spp., *Juniperus virginiana* L. and *Pinus strobus* L.

About noon on June 22, 1967 I caught two females on oak in Waukesha County. One was approximately two centimeters long and the other about two-thirds as large. I put them in a jar 4 x 9 cm covered with nylon netting and both were still alive at 11:30 PM. When I looked at them about 8:00 AM the next day the abdomen and part of the thorax of the smaller one had been eaten by the larger one. I kept the remaining individual well supplied with a variety of living food. Stoneflies, mayflies and large tree-hoppers were completely disregarded and attempts to capture small beetles failed because she could not hold on to them. A gall wasp from a large oak leaf gall was repeatedly caught but the hard smooth body always slipped from her grasp. Several small moths were seized but the only individual she was able to eat was a soft bodied one that had just emerged from the pupa. Her favorite foods were spiders and Diptera of which she relished house flies, blue-bottle flies and a species of small Syrphidae. In all cases with the Diptera, the head was eaten first, then the thorax and lastly the abdomen; the legs and wings being discarded. With the spiders she bit into the abdomen and ate the inside contents rejecting all the rest. She lived nearly a month after being caught, dying July 20 without laying any eggs.

uhleri Banks. (Fig. 3). July 13 to September 10. The only records I can find of this species are from Pennsylvania, Illinois and Wisconsin cited by Banks (1943). I have examined 13 specimens from nine Wisconsin counties. I am inclined to believe that some of the specimens collected in the more northern states and recorded as *M. sayi* Banks will upon closer examination prove to be *uhleri*.



viridis Walker. (Fig. 4). July. This is a southern species. Banks (1907) lists it from Texas and Parfin (1958) from Virginia. I have specimens taken in Florida. Dr. Ludwig Pauly, Professor of Zoology at the University of Wisconsin, Milwaukee caught a male *viridis* in Waukesha County in July 1967. Although it is an easily identified species, I sent it to Dr. Oliver S. Flint, Jr. of the Smithsonian Institution for conformation and he verified my identification. Whether it is indigenous to Wisconsin and very rare or an accidental introduction I do not know.

Family ASCALAPHIDAE

The ascalaphids, or owlflies as they are sometimes called because of the nocturnal habits of some species, are largely found in the southern and southwestern states. They are conspicuous insects and readily come to lights. To my knowledge only three specimens have ever been collected in Wisconsin so they may not be indigenous to the state. The specimens are in the collection of the University of Wisconsin at Madison. The labels bear no collector's name. Years ago in conversation with Professor Charles Fluke at the University, he told me he had caught several ascalaphids in the apple orchards at Gays Mills, Crawford County. Thus I assume that the Wisconsin specimens are those collected by Professor Fluke.

KEY TO THE WISCONSIN SPECIES OF ASCALAPHIDAE

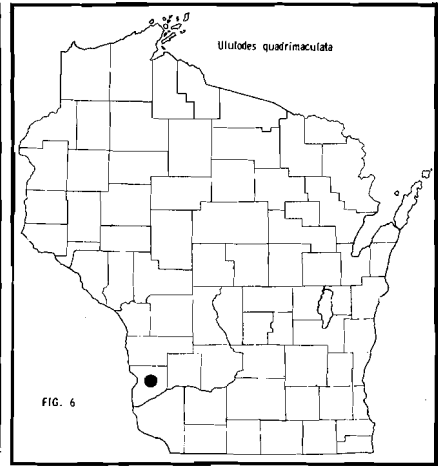
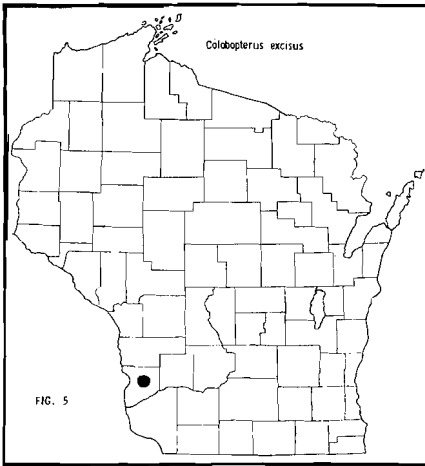
- 1. Posterior margin of hind wing sharply and deeply emarginate at the base *Colobopterus excisus*
- 1'. Posterior margin of hind wing not sharply and deeply emarginate but gently sloping to the base *Ululodes quadrimaculata*

Genus COLOBOPTERUS Rambur

excisus Hagen. (Fig. 5). Two specimens both caught at Gays Mills, Crawford County, one in 1939 and the other in 1940.

Genus ULULODES Currie

quadrimaculata (Say). (Fig. 6). One specimen taken at Gays Mills, Crawford County in 1939.



The published records indicate that the states nearest Wisconsin from which these two species have been reported are Indiana (Montgomery and Trippel, 1933) and Missouri (Froeschner, 1947).

Family MYRMELEONTIDAE

The so-called ant-lions or doodle-bugs of Wisconsin are represented by four genera: *Cryptoleon*, *Dendroleon*, *Hesperoleon* and *Myrmeleon*. The larvae of all species catch their prey in pits which they dig, generally in sand. In Ozark County, Missouri, May 14, 1971, I found numerous pits of *Myrmeleon immaculatus* in dry sawdust used as a mulch for a rose hedge. In Wisconsin the pits are usually found in sand protected from rain by overhanging sandstone ledges, buildings or dense pine cover. All species come to light traps but they also may be collected by sweeping vegetation in areas containing pits. The best time to sweep is at early dusk when they are easily disturbed and can be seen when they fly.

I have 114 Wisconsin specimens and have examined 48 from the University of Wisconsin at Madison and 25 from the Public Museum at Milwaukee, a total of 187 specimens. Of these specimens 62% are males and 38% females. Six percent were collected in May, 13% in June, 45% in July, 34% in August and 2% in September.

KEY TO THE WISCONSIN SPECIES OF MYRMELEONTIDAE

- 1. Both wings with conspicuous black or brownish-black circular spots or bars *Dendroleon obsoletum*
- 1: No conspicuous black or brownish-black spots or bars in wings 2
- 2. Tibial spurs not present 3
- 2: Tibial spurs present 4
- 3. Numerous costal cross-veins connected; sides of pronotum predominately black *Cryptoleon nebulosum*
- 3: Few if any costal cross-veins connected; sides of pronotum predominately yellow. *C. signatum*
- 4. Tibial spurs slightly curved, equal in length to 2 to 2-1/2 basal segments of tarsus; pronotum with one pair of dorso-lateral brown bands, rest of pronotum yellowish *Hesperoleon abdominalis*
- 4: Tibial spurs nearly straight, equal in length to the basal segment of tarsus; pronotum without definite stripes or bands, uniformly grayish with a pair of indefinite, yellowish spots anteriorly *Myrmeleon immaculatus*

Genus MYRMELEON Linnaeus

immaculatus DeGeer. (Fig. 7). May 12 to September 16. This is the most widely distributed species of ant-lion in Wisconsin and also in North America. It has been recorded from New Hampshire to Florida in the east, Washington to California in the west, and from many states in between as well as in British Columbia (Banks, 1927). Banks (1901) reports it from Mexico and Green (1955) from Ontario.

Genus HESPEROLEON Banks

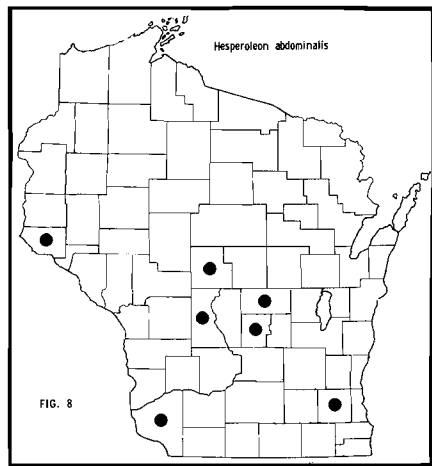
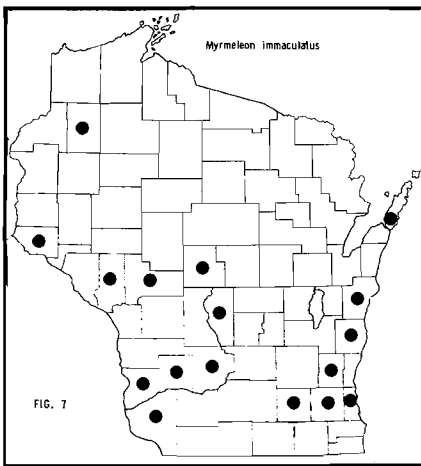
abdominalis (Say). (Fig. 8). June 23 to August 9. This species occurs all over the United States in favorable habitats for it has been reported by numerous authors from Massachusetts to Florida to California and Washington and many interior states. Banks (1927) records it from Manitoba and Ontario.

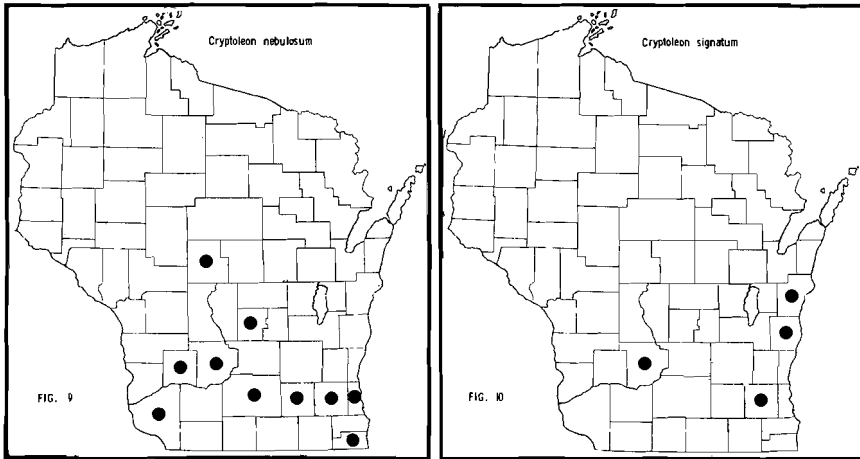
Genus CRYPTOLEON Banks

nebulosum (Olivier). (Fig. 9). May 31 to September 2. Wisconsin collections indicate that of the two species of *Cryptoleon* found in the state, *nebulosum* has a wider distribution in Wisconsin than *signatum*, as is also true for their distribution in the United States. Banks (1927) lists it from New Jersey, North Carolina, Georgia, Florida, Ohio, Michigan, Wisconsin and Ontario; Hagen (1861) records it as *Myrmeleon nebulosum* from New York; Smith (1934) from Kansas and Parfin (1952) from Minnesota.

signatum (Hagen). (Fig. 10). June 26 to August 21. This species apparently has a rather restricted distribution. Banks (1927) records it from Michigan, Illinois, Ohio, New York and Rhode Island; Smith (1925) from Kansas and Parfin (1952) from Minnesota.

While collecting at night in the sand dunes of Sheboygan and Manitowoc Counties using a gasoline lantern, I noted that specimens of *signatum* would come to the light for only a few minutes after I placed the light in a particular area. If I moved the light a hundred or so feet, again they came but for only a few minutes. I repeated the procedure several times with the same result. I concluded that the ant-lions were attracted to the light of the lantern from only a short distance. Thus it was profitable to keep moving the light from place to place throughout the dune area.





Genus DENDROLEON Brauer

obsoletum Say. (Fig. 11). May 12 to September 16. This is undoubtedly the rarest species of ant-lion in Wisconsin. I have collected only four specimens, all in one location, and there are only three specimens at the University at Madison and none at the Milwaukee Public Museum. It is distributed throughout the eastern portion of the United States. Banks (1927) lists it from New Hampshire, Massachusetts, Connecticut, New York, Maryland, Virginia, North Carolina, Florida, Illinois and Michigan. Smith (1925) says it is quite plentiful in Kansas. Froeschner (1947) records it from Missouri; Montgomery and Trippel (1933) from Indiana; and Hagen (1861) from Alabama. I have collected it commonly in Kentucky.

This is Wisconsin's most conspicuously marked ant-lion with the large black wing spots. However, if one is caught which has very recently emerged from the pupa the black spots, though present, are very faint and will not darken if the specimen is killed while in the light condition.

Family CONIOPTERYGIDAE

The dustywings are covered with a whitish, powdery, waxy secretion which gives them both their common and family names. They are the smallest of all the Neuroptera averaging 3 mm long with a wingspread of from 4 to 6 mm. I have found few Wisconsin specimens in the collections I examined. There are three at the University of Wisconsin at Madison. I have 256 specimens. Of these 259 specimens 6% were collected in May, 16% in June, 44% in July, 29% in August and 5% in September. Four genera are found in the state: *Coniopteryx*, *Conwentzia*, *Helicoconis* and *Semidalis*. I have collected dustywings on *Acer rubrum* L., *A. saccharum* Marsh., *Carya ovata* (Mill.) K. Koch, *Fraxinus* sp., *Juniperus virginiana* L., *Picea glauca* (Moench) Voss, *Pinus* spp. and *Quercus* spp. Sex and collecting data are given in Table 1.

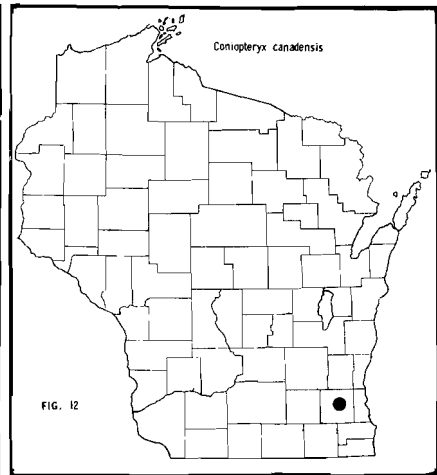
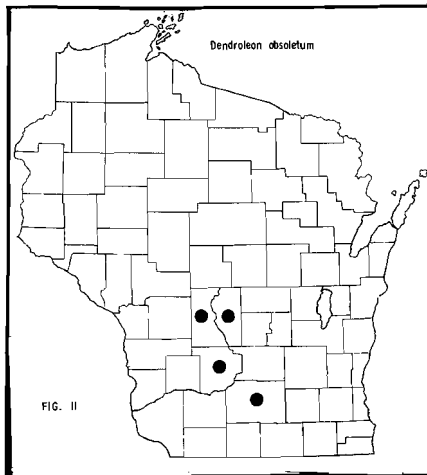
Dr. Martin Meinander of the Zoological Museum, the University of Helsinki has recently published a revision of the family Coniopterygidae which is the most complete study ever made of the family and contains a lengthy bibliography. Dr. Meinander has very graciously identified and sexed all of my specimens collected before 1972. With the aid of his excellent keys I have identified my 1972 specimens. The North American and world distributions which I give for the Wisconsin species have all been taken from Meinander (1972).

Table 1. Collecting data for Wisconsin Coniopterygidae.

Species	Males	Females	Light Trap	Sweeping	Number of Specimens
<i>Coniopteryx canadensis</i>	2	0	2	0	2
<i>Coniopteryx westwoodi</i>	16	11	4	23	27
<i>Conwentzia pineticola</i>	47	22	61	8	69
<i>Helicoconis walshi</i>	2	1	0	3	3
<i>Semidalis inconspicua</i>	53	95	128	20	148
<i>Semidalis vicina</i>	2	8	0	10	10
Total numbers	122	137	195	64	259
Percentages	47%	53%	75%	25%	

KEY TO THE WISCONSIN SPECIES OF CONIOPTERYGIDAE

- 1. Two radio-medial cross-veins in middle of fore wing *Helicoconis walshi*
- 1': One radio-medial cross-vein in middle of fore wing 2
- 2. Media of hind wing unforked 3
- 2': Media of hind wing forked 4
- 3. Head yellowish-gray; antennae 28-34 segmented; thorax without distinct shoulder spots *Coniopteryx canadensis*
- 3': Head brown; antennae 22-26 segmented; thorax with blackish shoulder spots *C. westwoodi*



- 4. Cross-vein M-Cu₁, at least in the fore wing, striking longitudinal veins at right angles and always the stem of M; hind wing reduced in size *Conwentzia pineticola*
- 4'. Cross-vein M-Cu₁ of both wings oblique, generally striking the posterior branch of M; hind wing not reduced in size5
- 5. Uncini serrate and fused below parameres *Semidalis vicina*
- 5'. Uncini not fused, long and slender, apically bent downward, basally apparently connected by membrane to parameres *S. inconspicua*

Genus CONIOPTERYX Curtis

canadensis Meinander. (Fig. 12). July 16 to August 29. I have but two specimens, both males collected in a light trap at two localities in Waukesha County, 16-VII-1968 and 29-VIII-1972. This is a rare species for only five other specimens have been collected by various persons, all in Saskatchewan, Canada.

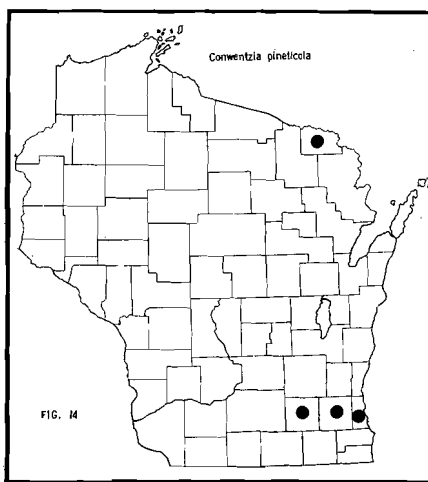
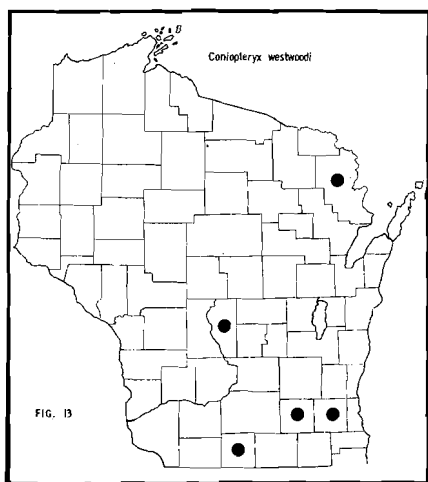
westwoodi (Fitch). (Fig. 13). May 25 to September 8. I have collected 26 specimens in the state. There is one specimen in the collection at the University at Madison taken by J. T. Medler in Green County. It has also been recorded from Michigan, Tennessee, New Jersey, Virginia, Florida and Texas.

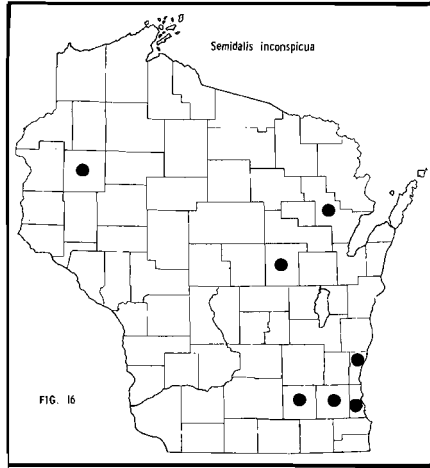
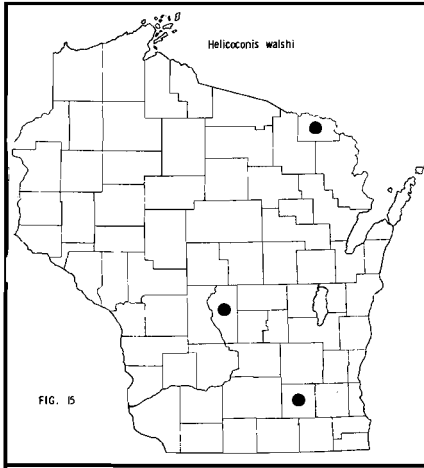
Genus CONWENTZIA Enderlein

pineticola Enderlein. (Fig. 14). June 27 to September 20. This holarctic species is common throughout Europe, Siberia, Mongolia, and North Africa. In North America it is found in Newfoundland, Nova Scotia, Ontario, Maine, New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Maryland, Virginia, North Carolina, Florida, Ohio, Michigan, Wisconsin and I have specimens from Arkansas not previously reported.

Genus HELICOCONIS Enderlein

walshi (Banks). (Fig. 15). July 8 to July 25. Only three specimens have been collected in Wisconsin: a male, July 21, 1958 in Florence County by J. Kapler; a female, July 25, 1958 in Adams County and a male, July 8, 1959 in Jefferson County both by Throne. It has been captured in Maine and Michigan. Females, probably of this species, were collected in Newfoundland and Ontario.





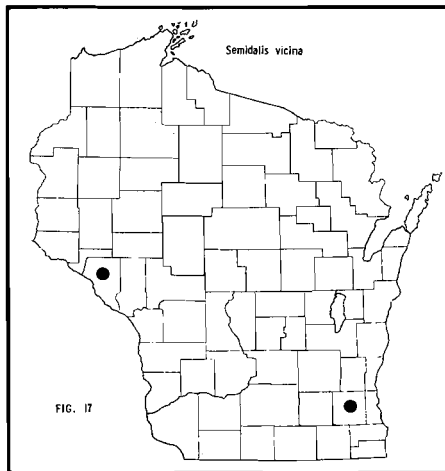
Genus SEMIDALIS Enderlein

inconspicua Meinander. (Fig. 16). June 14 to September 8. This nearctic species is the most abundant species in Wisconsin. It has been collected in Maryland, Virginia, Wisconsin, Oklahoma, Texas, Arizona and California.

vicina (Hagen). (Fig. 17). June 14 to August 6. This species occurs in France, Spain, Portugal, Yugoslavia, Morocco and Quebec. A female which appears to be *vicina* was collected in Alberta. In the United States it has been taken in 17 states east of the Mississippi River from Maine to Florida and Wisconsin to Mississippi. Two specimens are recorded from Douglas County, Kansas. I have ten specimens from Wisconsin.

ACKNOWLEDGEMENTS

In addition to the persons listed in Parts I and II of this paper Throne (1971a, b), I wish to thank Dr. Ludwig Pauly, University of Wisconsin, Milwaukee for giving me several



mantispid and particularly for the only specimen of *Mantispa viridis* collected in Wisconsin and Mr. Philip A. Holzbauer of Palmyra, Wisconsin for aiding me on numerous collecting trips. I especially wish to thank Dr. Martin Meinander of the Zoological Museum of the University of Helsinki for identifying my specimens of Coniopterygidae.

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