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ABSTRACT

Four species of marsh beetles were collected from Pine Hollow during the 1987 field season. Of these, Prionocyphon discoideus (Say) represents a new state record. In addition, specimens of an undescribed Cyphon were also recovered. During the same period, 12 scirtid species were taken at the UW-Milwaukee Field Station. Of these, new state records are reported for five species of Cyphon: fuscescens Klausnitzer, neovariabilis Klausnitzer, orphreatus Klausnitzer, perplexus Blatchley, and ruficollis (Say). Only two species, Flavohelodes thoracica (Guérin-Méneville) and Cyphon obscurus (Guérin-Méneville), were recovered from both sites. Observational notes are included for each of the species found at the two sites, along with preliminary phenologies for the adults.

INTRODUCTION

The marsh beetles (Coleoptera: Scirtidae) comprise eight genera and 100 species in North and Central America (Arnett, 1983). However, the group is in dire need of study (fide Arnett, 1960; Spangler, 1982) and a substantial number of species remain to be described. In fact, of approximately two dozen species known or expected to occur in Wisconsin (Hilsenhoff, 1981), at least six, or 25% of our fauna, are presently undescribed.

Scirtid larvae are particularly interesting due to several unique morphological and ecological attributes. They are unique among the holometabolous insect larvae in possessing long, multiarticulate antennal flagellae (Crowson, 1981; Lawrence and Newton, 1982). They are also unique among the beetles as regards their intricate mouthparts (Beier, 1952; Striganova, 1961; Hannappel and Paulus, 1987), and unique among the Eucinetoidea in being aquatic.

Although larvae of several beetle families are restricted to aquatic environments, those of Scirtidae (= Helodidae, Cyphonidae auctorum) exhibit an unusual and varied array of lentic microhabitat diversity. They have been recorded from forest ground pools, marshes (some of which contained high iron content), sphagnum bogs, and lentic microhabitats within rivers and streams (e.g., marginal pools and backwater flowages) (Kraatz, 1918; Good, 1924; Beerbower, 1943; Leech and Chandler, 1956). "Plant waters" or phytotelmata (sensu Varga, 1928), including water-filled tree holes, represent a particularly fascinating but poorly studied habitat (Osten-Sacken, 1862; Snow, 1958).

The species richness of Wisconsin's marsh beetle fauna and associated diversity of wetland microhabitats utilized by scirtid larvae for development suggest that marsh beetles may play a significant role in the community structure and population dynamics of the wetlands habitat. However, several deficiencies in our knowledge base must be addressed before relationships can be established. As Larson (1987) noted of scirtids, "Taxonomically, this is one of the most inadequately known families of water beetles."

My purpose in conducting this study was to sample scirtid populations at Pine Hollow and the UW-Milwaukee Field Station and collect baseline habitat observations to provide data for species inventories.

METHODS

Comparative ecological and morphological studies of marsh beetles are virtually nonexistent; even general, descriptive literature is limited. In North America Kraatz (1918) discussed the life history of Scirtes tibialis Guérin-Méneville. Good (1924) provided an account for Prionocyphon limbatus LeConte, and Beerbower (1943) detailed the development of Scirtes orbiculatus (Fabricius).

Assessing the ecological significance of Wisconsin scirtids can, therefore, only evolve over time. As a feasible start, I selected two sites which, collectively, offered a varied set of wetland microhabitats. The UW-Milwaukee Field Station (UWMFS) offers an abundance of diverse microhabitats, including well developed tree holes on the "Bog Islands" of Cedarburg Bog and in the old growth forest of Cedarburg Beech Woods. Pine Hollow (PH) was selected, in part, because of my familiarity with the area. In June of 1985, I collected a single male of an undescribed scirtid at PH. Since this area will serve as the type locality for the species (Young and Stribling, in preparation), discovery of additional specimens was viewed as a priority. PH also offered a very different set of wet microhabitats compared to those of the UWMFS.

Sampling techniques for adults included sweeping vegetation in, and adjacent to, microhabitats in which larvae develop. Additionally, since some species of Cyphon and Scirtes actively fly at night, light-trapping was utilized on several occasions. Some Prionocyphon and Flavohelodes develop in phytotelmata which, as already noted, are associated with old growth forests. Adults of these were sampled for by means of Malaise traps.

Larvae were sampled by use of standard aquatic nets and pans (marsh and related species) or by removal of water [siphoning] and leaf pack [extra-long forceps] in tree holes (phytotelmata associates).

RESULTS AND DISCUSSION

Field sampling during the 1987 season was highlighted by the discovery of four marsh beetle species at PH - one of which represents a **NEW STATE RECORD** and

one of which is currently being formally described as a **NEW SPECIES**. The diversity at the UWMFS was, as anticipated, much greater with 12 species recorded to date (Table 1). Of these, **NEW STATE RECORDS** are tallied for an amazing five species. Interestingly, as hypothesized the microhabitats of PH and UWMFS appear to support rather different scirtid communities: only Flavohelodes thoracica (Guérin-Méneville) and Cyphon obscurus (Guérin-Méneville) were recovered from both sites.

Table 1. Species of Scirtidae collected during 1987 at Pine Hollow (PH), and the University of Wisconsin-Milwaukee Field Station (UWMFS).

Species	PH	UWMFS
Prionocyphon discoideus (*)	+	
Flavohelodes pulchella		+
F. thoracica	+	+
Scirtes tibialis		+
Cyphon fuscescens (*)		+
C. nebulosus		+
C. neovariabilis (*)		+
C. obscurus	+	+
C. ochreatus (*)		+
C. perplexus (*)		+
C. pusillus		+
C. ruficollis (*)		+
C. variabilis		+
Cyphon sp. nov.	+	

[**NOTE**: species followed by (*) represent new state records]

BIONOMICAL REMARKS

Prionocyphon discoideus (Say) [**STATE RECORD**]

A single female was collected at a blacklight on 17 July (PH). Although I collected discoideus at several localities in Wisconsin during 1987, no previously published Wisconsin records exist for this species. As appears to be the case for species of Flavohelodes, P. discoideus is apparently restricted to water-filled tree holes for larval development.

Flavohelodes spp.

Two of the three Flavohelodes known to occur in Wisconsin were collected: F. pulchella (Guérin-Méneville) from UWMFS and, as noted in the introduction, F. thoracica (Guérin-Méneville) was seen at both sites. Specimens of pulchella

were recovered from Malaise traps set up in the Cedarburg Beech Woods; thoracica was collected from sweepnet samples taken in the woods or in a woods/marsh ecotone. Larvae of Flavohelodes were very commonly observed in water-filled tree holes at both sites and evidence from this study and elsewhere suggests that they are restricted to this microhabitat for development (Snow, 1958; Klausnitzer, 1980; Hannappel and Paulus, 1987). Larvae are commonly seen feeding on organic debris associated with the leaf pack found in the bottom of these tree holes.

Scirtes tibialis (Guérin-Méneville)

This is a very common species at UWMFS, having been collected by sweeping foliage in marshy areas surrounding the laboratory building as well as sweeping in the bog and on the "bog islands". Specimens were also recovered from a Malaise trap in the Cedarburg Beech Woods.

Cyphon fuscescens Klausnitzer [STATE RECORD]

A single female assigned to this species was collected at UWMFS during the night of 12/13 June. It was observed on a mercury vapor-lighted sheet being run in front of the lab building. The only previously published record for this species is that of the holotype; it was from New York (Klausnitzer, 1976).

Cyphon nebulosus (LeConte)

This common species was collected in a number of habitats at UWMFS. It was taken while sweeping vegetation in both marshy and bog habitats as well as along the pathway through the Cedarburg Beech Woods. It was also collected at light (mercury vapor) during the evening hours.

Cyphon neovariabilis Klausnitzer [STATE RECORD]

Although very common at the UWMFS, the only previously published account of this species is for the holotype, which was collected in New York (Klausnitzer, 1976). It was collected at the Field Station in a wide variety of habitats, ranging from the open mat of the bog to a Carex marsh, to a woods/marsh ecotone. It was also attracted to the mercury vapor light.

Cyphon obscurus (Guérin-Méneville)

This was the only species of Cyphon common to both PH and UWMFS. At the Field Station, it was fairly common in marsh areas surrounding the lab building; it was also collected in and near the edge of the Cedarburg Beech Woods. At PH, a series of 11 males was taken on 10 June while sweeping low vegetation surrounding a spring-seepage flow near the intermittent stream in the bottom of the hollow. Although this microhabitat was suspected to represent the site for

larval development, no larvae were found in spite of several attempts to locate them in decaying leaves, twigs and other decaying vegetation in the seepage.

Cyphon ochreatus Klausnitzer [STATE RECORD]

The only previously published record for ochreatus is that of the holotype; it was from New Jersey (Klausnitzer, 1976). All of my specimens were collected from the first "bog island" (UWMFS) and one adult was taken from a water-filled tree hole on 31 July.

Cyphon perplexus Blatchley [STATE RECORD]

A single male of this species was collected at UWMFS on 31 July while sweeping vegetation on the first bog island. This species was described from Florida; the only specimen I have seen from the Great Lakes region was a single male collected in East Lansing, Michigan.

Cyphon pusillus (LeConte)

Specimens of pusillus, a rather distinctive and small-sized Cyphon, were common in many UWMFS communities; they were also attracted to the mercury vapor light.

Cyphon ruficollis (Say) [STATE RECORD]

On two occasions, specimens of ruficollis were collected in (Malaise trap) or near the edge of (sweeping) the Cedarburg Beech Woods. The closest published distribution records are from specimens collected in Indiana (Blatchley, 1910).

Cyphon variabilis (Thunberg)

A very common species at UWMFS, variabilis was often collected in sweep samples. Specimens, including a single male and seven females, were also attracted to the mercury vapor-lighted sheet.

Cyphon sp. nov. [NEW SPECIES]

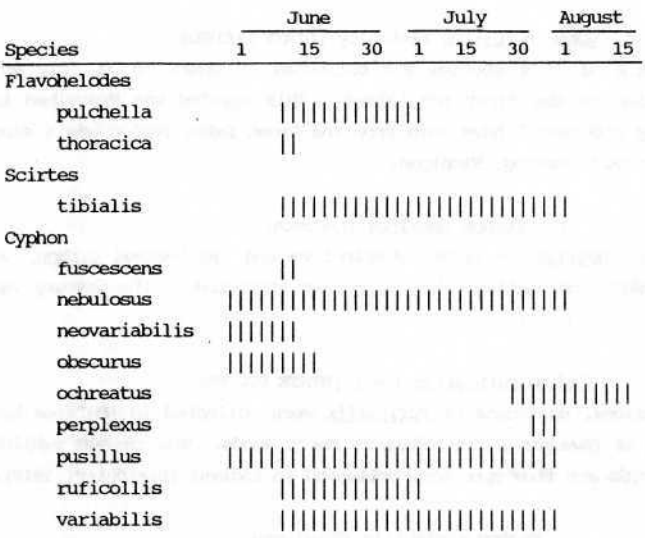
As was noted above, a single male of an undescribed Cyphon was collected at PH during the summer of 1985. A particularly rewarding goal for the study was realized when the species was rediscovered. To date, 16 additional males have been collected during various visits to PH during June and early July. All were collected by sweeping understory vegetation in the upland wooded area above the hollow. A single male was also collected at nearby Baxter's Hollow; several additional males have turned up in entomological collections examined elsewhere - including specimens from Milwaukee, Illinois and Ohio (Young and Stribling, in preparation).

PHENOLOGICAL REPORT (ADULTS)

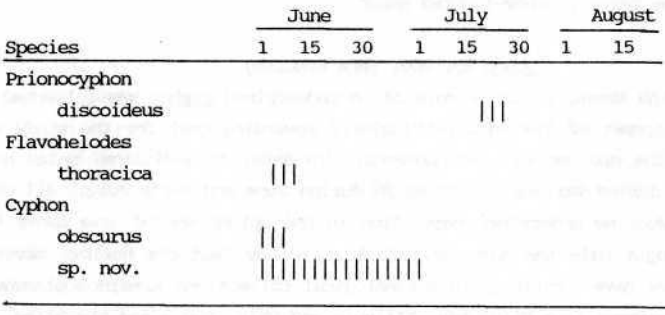
The phenology of adult Scirtidae collected during 1987 at Pine Hollow and the UWM Field Station is presented in Table 2.

Table 2. Phenology of adult Scirtidae collected in 1987.

A. University of Wisconsin - Milwaukee Field Station [UWMFS]



B. Pine Hollow [PH]



WORK STILL IN PROGRESS

The following represents a brief outline of tasks not yet completed relative to the project:

* UWMFS Samples - Nearly 100 specimens of Cyphon are yet to be critically examined from material collected during the summer of 1987. It should be pointed out that in this genus, every specimen must be dissected and genitalia must be referred to in order to evaluate species-level characters for both males and females.

* Voucher collections - Presently, dissections are in temporary storage capsules. These will be transferred to a permanent system in the near future, labelled and sorted into reference collections for the UWMFS, UW-Madison, and the collection of the investigator. The holotype of the new species of Cyphon will be deposited in the collection of the United States National Museum of Natural History in Washington, D. C.; paratypes will be distributed amongst several collections.

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