Journal of the Arkansas Academy of Science

Volume 65 Article 29

2011

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Occurrence of Two Rare Prairie Insects, *Tetraloniella albata (*Cresson*)* and *Microstylum morosum* (Loew), at Terre Noire Natural Area, Clark County, Arkansas

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In southwestern Arkansas, remnant prairies occur in a few scattered patches. The "blackland" prairie is a region of calcareous clay soils that lie mostly in the West Gulf Coastal Plain in the southwestern portion of the state (Foti 1974). Although the English geologist George Featherstonhaugh (1844) superficially described these prairies, detailed studies of the distribution, geology, and vegetation of the remnants were not conducted for about another 150 years (Foti 1989). A detailed study of one prairie (Saratoga Landing Blackland Prairie in Hempstead and Howard Counties) revealed characteristics of disturbance that are typical of the remnants – eroded gullies and invasion by woody plants – therefore the use of prescribed fire was suggested as an effective technique for prairie restoration (Foti 1990).

The Arkansas Natural Heritage Commission (ANHC) and The Nature Conservancy (TNC) own remnant prairie patches in Clark County, known and managed as Terre Noire Natural Area (TNNA, Fig. 1).

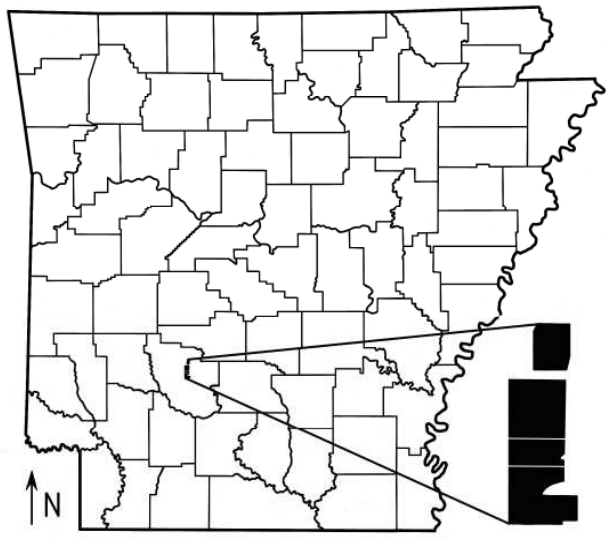

Figure 1. Location of Terre Noire Natural Area, Clark County, AR. Enlargement indicates the 4 units of the TNNA.

The TNNA is one of the highest quality blackland prairies remaining in Arkansas (http://www.naturalheritage.com/natural-area/terre-noire). Located in north-central Clark County, TNNA was established in 1991 and has grown by land acquisition to include 200 hectares (493 acres). The ANHC has been adding to the protected Natural Area as lands have become available, and presently there are 4 units under management (controlled burns and removal of eastern red cedar, *Juniperus virginiana* L.) to maintain or restore prairie conditions. The more northern 2 units are comprised of restored remnant prairie with interspersed patches of trees, and the southern 2 units currently are undergoing extensive restorative treatment due to overgrowth of red cedar.

The TNNA is home to several species of plants and animals considered to be "species of special concern" in Arkansas. The present study was conducted to determine the presence of 2 rare insect species of concern. The long-horned bee *Tetraloniella albata* (Cresson), a member of the family Apidae (subfamily Eucerinae – see Laberge, 2001), is associated with prairies, and has been reported in the southeastern U.S. (in Mississippi) only once (MacGown and Schiefer 1992), although it has been collected previously at TNNA (Warriner, *in litt.*). This bee is characterized as a small, fuzzy, white bee with long antennae present in males (Figure 2). It is oligolectic (from Greek words, meaning "few selected") and specifically uses purple prairie clover (*Dalea purpurea* Vent.) at TNNA (8 species of *Dalea* occur in Arkansas but only 2, including *D. purpurea*, are not considered to be species of special concern (Arkansas Vascular Flora Committee 2006). This plant-specific trait allowed the survey strategy to be focused on the presence and blooming chronology of the flowers.

Microstylum morosum (Loew), the giant prairie robberfly, is another rare insect of special concern, which is also associated with prairies and previously found at TNNA (Warriner 2004). *Microstylum morosum* (Figure 2) is the largest member of the Asilidae (Back 1909) reaching a length of 50 mm (Bromley 1934). Males are shiny black and have brown to black wings. Females are larger than males,

but are most easily distinguished by their reddish legs. Both have distinctive emerald-green eyes.

The species was believed to be endemic to Texas (Martin 1960) until Beckemeyer and Charlton (2000) documented it in Kansas, Oklahoma, Arizona, New Mexico, and Colorado. More recently, *M. morosum* was documented at TNNA – about 320 km distant from the nearest eastern occurrence then known in Texas. This first documented Arkansas record was discovered on 19 July and a voucher specimen was collected 20 July (Warriner 2004). In Texas, the species has been collected between 28 June and 26 August (Bromley 1934).

Figure 2. Images of males of *Tetraloniella albata* (top) and *Microstylum morosum* (bottom) taken at Terre Noire Natural Area (TNNA) during 2010.

Tetraloniella albata

To search for *Tetraloniella albata* during the summer of 2010, we visited TNNA and conducted random walks to survey each of the 4 units for the presence of these bees. Twelve sites were selected for examination, representing the range from high-quality prairie to degraded prairie encroached by dense stands of cedar. Because the presence of *T. albata* is associated with the onset of flowering of purple prairie clover, we monitored floral development and began our surveys after the plants were in bloom. During peak activity periods between 10:00 – 14:00 hrs (M. Warriner, *in litt*.), we meandered among patches of purple prairie clover and recorded the number of *T. albata* seen during the visit to each site (chance observations at other times also were recorded). Besides the distinctive appearance of this white bee serving to "catch the eye", location of individuals was further enhanced by hearing the unusual high-pitched buzz of the bee in flight. The site being a protected natural area owned by state agencies, we collected only one voucher specimen (deposited in the collections at Henderson State University), and numerous "voucher" photographs were taken of other individuals.

In Arkansas, *T. albata* has been collected from 20 May to 25 June (M. Warriner, *in litt*.). During our study, *Dalea purpurea* was coming into bloom on 21 May 2010, but *T. albata* was not found until 25 May 2010. On that date, at 13:06 hr, about 10 individuals were seen foraging among prairie clover on the northern-most part of TNNA, but only 1 individual was seen on each of the next 2 units southward during that day. We made 6 additional trips to TNNA between 27 May and 9 June 2010 to search for *T. albata* on other parts of the Natural Area. Visual qualitative assessments of the 4 units at TNNA revealed that the abundance of purple prairie clover decreased from the most northern (best prairie) to the most southern (most overgrown with cedar) unit, and the abundance of *T. albata* was functionally consistent with the observed abundance of *D. purpurea*.

The earliest observation of *T. albata* was at 8:45 h and the latest was at 13:30 h (the bees likely were active well after that time, but surveys had been terminated due to the heat). A maximum of 26 bees was found during a survey of the northern-most unit on 7 June, resulting in an average of 1 bee per 2 minutes of the survey. Twelve bees were seen at each of 2 other sites, 1 at a separate location on the north unit (8 June) and 1 on the second unit south (2 June), resulting in an average of 1 bee per 5 minutes of the survey. On the third unit south, 8 *T. albata* were found on 9 June, averaging 1 bee per 10 minutes of survey. Only 1 *T. albata* was encountered on the heavily treated fourth unit south (where there are few and scattered *D. purpurea*) at 13:11 h on 27 May.

It appears that this rare bee is well established in the northern 2 units of TNNA. Management to restore prairie habitat in the southern 2 units should allow further re-establishment of already-present *D. purpurea* and lead to increase in populations of *T. albata* throughout TNNA.

Microstylum morosum

Although the first documented record of *M. morosum* from Arkansas was collected in Clark County during 2002 (Warriner 2004), apparently the first specimen from Arkansas was collected in 1994 from Howard County (Barnes et al. 2007). Several recent photographic records, listed here, were compiled by Hershel Raney on his Arkansas Robberfly website

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DOI: 10.54119/jaas.2011.6524

(http:www.hr-rna.com/RNA/Robber%20main%20page.htm). On 5 August 2005 at 9:05 h, Charles Mills photographed a male *M. morosum* in Howard County at Okay levee near Millwood Lake, and on 7 September 2007 Greg Lasley photographed a female within a mile of Mills' location at the levee (images available at http://www.greglasley.net/nonBirds/microstylummorosum.html). This specimen (43 mm total length) was collected and preserved in the collection of Mike Thomas in Connecticut. Dan Scheiman photographed a female on 1 July 2006 in Hempstead County at Grandview Prairie Wildlife Management Area, and Norm and Cheryl Lavers later imaged a female also at Grandview Prairie, on 19 July 2008.

All of these records were from southwestern Arkansas, but more recently Norm Lavers deposited a specimen in the University of Arkansas Arthropod Museum, collected in Baxter County, AR, near the Missouri border. *Microstylum morosum* also has been collected recently (2009) near the Arkansas border in the White River Hills of extreme southwestern Missouri (detailed in Ted McRae's website, http://beetlesinthebush.wordpress.com/2009/09/17/north-americas-largest-robber-fly).

Based on all previous dates of observations and collection, it was clear that the species does not appear until summer. We had watched for *M. morosum* during the earlier surveys targeting *T. albata* but did not encounter any individuals until 29 June 2010 (about 3 weeks earlier than the initial discovery at TNNA on 19 July (Warriner 2004).

We initially attempted to make counts of this robberfly during timed random walks, but its relative rarity made the timed approach uninformative. Instead, we selected prairie patches and conducted non-timed random walks merely to locate and document the presence of the species.

Four of our 5 observations of *M. morosum* occurred on the best prairie, i.e., the most northern unit. On 29 June 2010, we located a male *M. morosum* at 11:00 h at the ecotone of the prairie on the west-central edge of the northern-most unit. Within a few minutes, a female joined the male on woody vegetation at the edge of the grassy prairie. Near the northern side of the unit, and close to the location of Warriner's (2004) observation, we found another female *M. morosum* near the forest edge at 11:45 h. More centrally in the unit, a female was located on 21 July 2010 at 11:32 h. On 28 July, at 11:22 h, a female was found at the southern edge of the unit.

All other units were searched for *M. morosum* on 1, 15, 16, 19, 26, and 30 July, and 21 and 26 August, with findings only on 30 July, when a female was observed at 11:53 h on the second unit south. She perched on grasses near woody vegetation near the northern border of that unit. Prairie edges that appeared to be appropriate habitat were present in the third unit south, but repeated searches did not reveal the species in that unit. Further prairie restoration increasing connectivity between the units likely will result in the occurrence of *M. morosum* farther into TNNA.

Other large robberflies encountered and photographed during the search for *M. morosum* included *Efferia aestuans* (L.), *E. nemoralis (*Hine*)*, *Promachus hinei* (Bromley), *P. bastardii* (Macquart), and *Triorla interrupta* (Macquart). None of these are easily confused with *M. morosum*.

Acknowledgments

This project and the preparation of this report were funded in part by the State Wildlife Grants Program (Grant # T-30-R) from the U.S. Fish and Wildlife Service through an Agreement with the Arkansas Game and Fish Commission (AGFC). We thank the Arkansas Natural Heritage Commission (an agency of the Department of Arkansas Heritage) for access to the study site, Jennifer Akin (ANHC) for logistic support, AGFC for a general collecting permit, Cindy Osborne (ANHC) for a collecting permit specifically for study on TNNA, and Tobin Fulmer for field assistance. Norm Lavers, Charles Mills, Greg Lasley, Mike Thomas, and Dan Scheiman provided information about *M. morosum*.

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DOI: 10.54119/jaas.2011.6524