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OBSERVATIONS OF HABITAT USE BY *SARINDA HENTZI* (ARANEAE, SALTICIDAE) IN NORTHEASTERN KANSAS

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ABSTRACT. During the mid-autumn of 1993 and spring through summer of 1994, I sampled tallgrass prairie in northeastern Kansas to determine habitat use, distribution and population dynamics of the ant-like jumping spider *Sarinda hentzi* (Banks). This species was not detected in any censused area of tallgrass prairie until early October 1993, when large juvenile specimens were found in a density of 0.54 individuals/m^2 on inflorescences of Indian grass (*Sorghastrum nutans* (L.) Nash.) in a biennially burned watershed. During the following spring, 0.6 adults/m^2 were found on Indian grass panicles in a four-year burned watershed and 0.4 adults/m^2 were located on Indian grass inflorescences in another biennially burned watershed. By mid-summer 1994, this species was no longer found on Indian grass and only very small juveniles were found on various *Carex* and *Juncus* species at the margins of wetlands.

Spiders which mimic ants have a large suite of morphological and behavioral adaptations (McIver & Stonedahl 1993). Many of the ant-mimicking spiders belonging to the families Clubionidae and Salticidae avoid predation by their mimicking deception (Cutler 1991). The feeding behaviors, food preferences and general biology of selected ant-like salticids have been well documented by Jackson (1982, 1986) and Wing (1983); however, there is little available information on habitat use by North American ant-like salticids (Duffy 1978; Cutler, pers. comm.).

In northeastern Kansas, the family Salticidae is most commonly represented by the genera *Metaphidippus* and *Phidippus* (Fitch 1963). Two species of ant-like salticids, *Sarinda hentzi* (Banks) and *Synomosyna formica* Hentz, may also be common (Fitch 1963; S. Johnson, pers. obs.); however, virtually nothing is known about the natural history of these species in this region (B. Cutler, pers. comm.).

The purpose of this study was to 1) investigate habitat preferences, 2) estimate population densities and 3) record seasonal population dynamics of *Sarinda hentzi* in the tallgrass prairie of northeastern Kansas because *S. hentzi* may be the most frequently encountered ant-like salticid of the tallgrass prairie in northeastern Kansas (S. Johnson, pers. obs.).

METHODS

Research was conducted at the Konza Prairie Research Natural Area (KPRNA) located approximately 10 km south of Manhattan, Kansas (39°08′N, 96°35′W). This site is a member of the Long Term Ecological Research Network established in 1981 (Callahan 1984). Fire is an important component in the maintenance of tallgrass prairie where, in the past, natural fires were common events (Pyne 1982; Abrams et al. 1986). Today, fire is a frequent management practice in tallgrass prairie (Anderson 1972; Blankespoor 1987). All prescribed fires occurred on KPRNA in mid-Spring (late March through April). In early June and mid-August through mid-October 1993, I conducted a survey to ascertain distribution and habitat preferences of *Sarinda hentzi*. Samples were collected by taking 50 sweeps while walking along parallel transects in hilltop plateau, midslope and wetland margin sectors of tallgrass prairie (Cutler 1971). Three separate samples were collected for each distinct zone by sweeping three parallel transects in each of the three distinct zones (Fig. 1). Samples were taken in three annually burned, two biennially burned, two 10-year and two 20-year burned watersheds. The number of spiders captured per sample was converted to an estimated density of spiders/m^2 by taking the number spiders/sample and divid-

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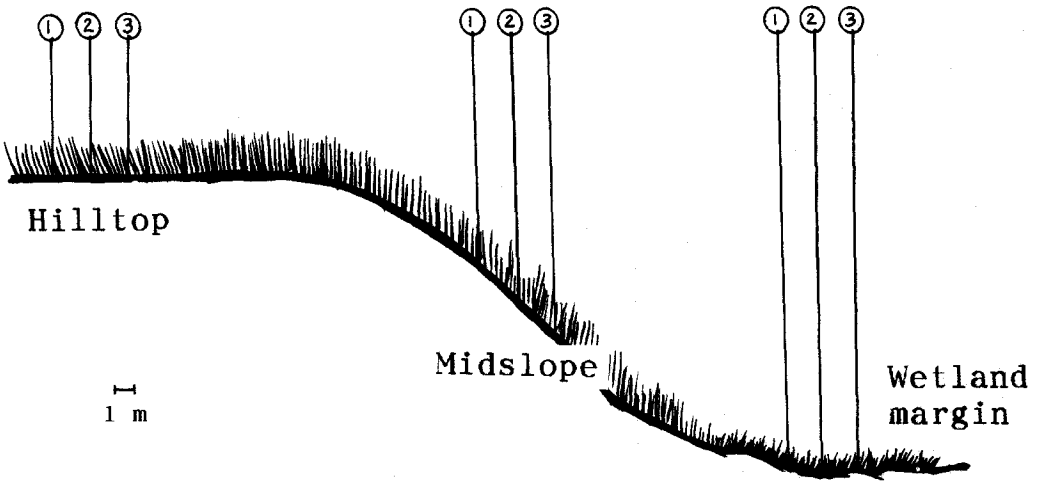

Figure 1.—Positions of sweep samples taken in hilltop, midslope and wetland margin zones of tallgrass prairie. Each replicate consisted of 50 sweeps at the inflorescence level. Duplicate samples in the hilltop and midslope zones were taken at the level of basal leaves approximately 0.3 m above the ground.

ing it by the number of inflorescences/m² in the habitat where the sample was collected. The density of Indian grass and big bluestem (*Andropogon gerardii* Vitman) culms and inflorescences was determined by taking 50 0.1 m² quadrat samples in each location where sweep samples were taken. Where *S. hentzi* was frequently encountered, sweeps of single infloresences were made to determine the spider density per individual inflorescence. This single inflorescence data was also used as an index of the estimated density of individuals/m². To determine if *S. hentzi* was present elsewhere in the habitat, separate sweep samples were taken among basal leaves of the grasses. Captured spiders were counted after each individual sweep and subsequently released back onto grass infloresences.

In 1994, sampling began in early May and continued until early August. Samples were taken in the same manner as described for 1993; however, the sampling procedure was expanded to include two additional four-year burned watersheds.

RESULTS AND DISCUSSION

In 1993, a year with rainfall amounts 33 cm above a 30-year mean (KPRNA weather data, unpubl.) no *S. hentzi* were collected in any watershed until early October. Otherwise, from June to early October, the most commonly collected spiders on inflorescences of Indian grass (*Sorghastrum nutans*) in annually and biennially burned (1992 burned) watersheds were *Marpissa pikei* (G. & E. Peckham) (Salticidae) (0.45 ± 0.18 individuals/m² in June, 0.27 ± 0.15 ind./m² in October), *Thiodina puerpura* Hentz (Salticidae) (0.32 ± 0.19 ind./m² in June, 0.18 ± 0.09 ind./m² in October) and *Tibellus duttoni* (Hentz) (Philodromidae) (O.56 ± 0.12 ind./m² in June, 0.32 ± 0.2 ind./m² in October). In these watersheds, Indian grass inflorescences occurred in an average density of 40.3 ± 8.2/m² and the total density of Indian grass culms was 59.6 ± 12.2/m². Where big bluestem was dominant, it occurred in a density of 73.6 ± 14.3 culms/m² with 68.3 ± 8.4 inflorescences/m². In adjacent 10 and 20 year burned watersheds both Indian grass and big bluestem were more patchily distributed and occurred in less dense and often mixed stands. There, Indian grass inflorescences occurred in a density of 12.5 ± 2.2/m² and big bluestem inflorescence densities were comparable. Also, broad leaved forbs were more common. In early June, *Metaphidippus galathea* (Walckenaer) and *Phidippus clarus* Keyserling were the most common species collected. In early October, inflorescences of big bluestem were being used as perches by *Phidippus audax* (Hentz) (0.3 ± 0.19 ind./m²) and *P. apacheanus* Chamberlin & Gertsch (0.12 ± 0.08 ind./m²). No *S. hentzi* were found in annually, 10- or 20-year burned watersheds.

Beginning in early October 1993, large juvenile *S. hentzi* (~10 mm in length) were collected in a density of 0.54 ± 0.12 individuals/m² on inflorescences of Indian grass in the mid-slope transects of a biennially burned watershed (Fig.

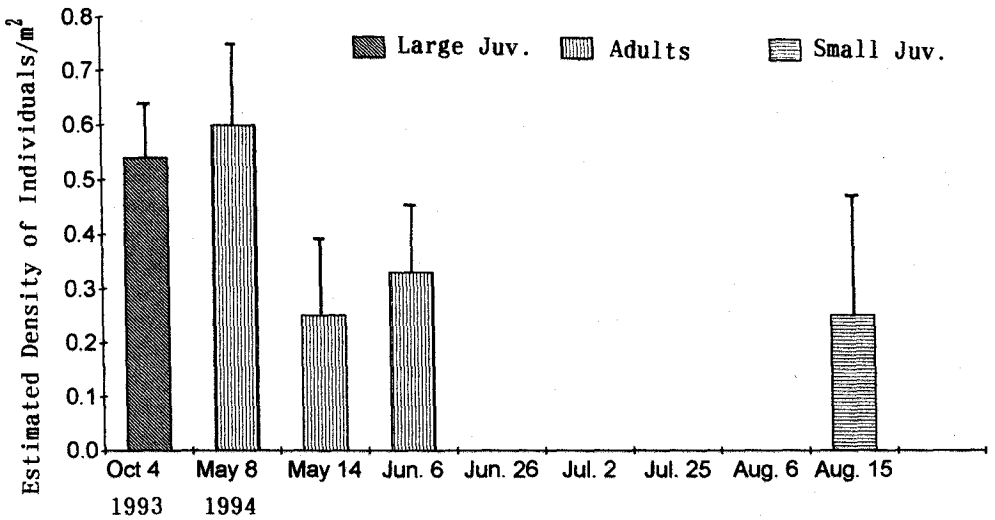

Figure 2.—The estimated density of *Sarinda hentzi* individuals/m² in early October 1993 and from 8 May through 15 August 1994. Vertical bars represent one standard error of the mean.

2). These juveniles were occasionally found in groups of two or three per inflorescence in pure stands of Indian grass. By mid-October, no *S. hentzi* juveniles were found in this area.

In early May 1994, a year with a more normal level of rainfall, *S. hentzi* adults were found in a density of 0.6 ± 0.15/m² on old inflorescences of Indian grass in a four-year burned watershed (Fig. 1). By mid-May, in the same watershed, the number of adults in Indian grass inflorescences had dropped to 0.25 ± 0.14 individuals/m² (Fig. 2). Sweeps of grass blades around these inhabited Indian grass canes failed to capture any *S. hentzi*. By the end of May, adult *S. hentzi* were no longer found on Indian grass inflorescences in this watershed.

In a biennially burned watershed located several kilometers south of the four-year burned watershed, 0.35 ± 0.19 adult *S. hentzi*/m² were found in Indian grass inflorescences on the hilltop sampling position in early June (Fig. 2). These individuals were sympatric with the same three grass-inhabiting species: *M. pikei, M. puerpura* and *T. duttoni*. Twice in the early June sampling I captured *M. pikei* being eaten by *T. duttoni*; however, I never observed *S. hentzi* being preyed upon by any of the other mentioned species.

By late June all species were in reduced densities which were concentrated farther downslope from the sites sampled in early June. By mid-July, these grass-inhabiting species were most concentrated at the margins of wetlands among *Carex annectens* Bicknell, *C. hystericina* Muhl., *Eleocharis erythropoda* Steudel and *Juncus torreyi* Coville where the combined density of plant culms was 86.8 ± 23.5/m². Here, I found the *M. pikei* and *T. duttoni* in densities of more than 0.7 individuals/m² each. Conversely, I found only one adult *S. hentzi* in 100 sweeps. By mid-August I found no adult *S. hentzi* but did capture tiny juveniles (1.5–2 mm in length) in a density of 0.25 ± 0.2 ind./m² (Fig. 2). A similar density of juvenile *S. hentzi* was found in the margin of the wetland basin of the four-year burned watershed where the high density of adults had been found during the preceding May.

From these observations, I hypothesize that *S. hentzi* is a grass inhabiting species somewhat like *Marpissa pikei* in northeastern Kansas but may be more restricted in habitat. Because *S. hentzi* was only found in intermediate burn frequencies and generally absent from annually-burned and long-term unburned areas, it may be avoiding potentially greater competition from higher density spider populations in annually-burned prairie, following the pattern of many other grass-inhabiting spiders in long-term unburned prairie (Weaver 1987; Usher 1988; S. Johnson, unpubl. data). With this habitat specificity, *S. hentzi* may also be an indicator of environmental quality (Clausen 1986). Also, it seems either to be prone to large fluctuations in population density or is sensitive in some way to sweep net sampling. Some evidence for this such sensitivity comes from population density dynamics of sympatric spiders. For example, while numbers of adult *S.*

hentzi dropped precipitously from early May to early June, numbers of *Metaphidippus galathea* and *Tibellus duttoni* in the same area remained fairly constant over the same period of time (0.27 ± 0.18 and 0.66 ± 0.21 ind./m^2 respectively, in early May; 0.21 ± 0.06 and 0.59 ± 0.20, respectively, in early June). Furthermore, while experimental manipulation and statistical analysis were not part of this descriptive study, these observations may help formulate appropriate questions to design experimental work on arthropod habitat preferences in the tallgrass prairie ecosystem.

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