SEASONAL POPULATION PHENOLOGY AND HABITAT PREFERENCES OF MONTANE HARVESTMEN (ARACHNIDA: OPILIONES) FROM SOUTHWESTERN NEW MEXICO

JAMES C. COKENDOLPHER, WILLIAM P. MACKAY, AND MARTIN H. MUMA

2007 29th Street, Lubbock, TX 79411 (JCC)
Department of Biological Sciences and Laboratory for Environmental Biology,
The University of Texas, El Paso, TX 79968 (WPM, for reprints)
P.O. Box 135, Portal, AZ 85632 (MHM, deceased)

ABSTRACT—We studied seasonal changes in populations of harvestmen from three arid to semi-arid habitats in southwestern New Mexico. The following taxa were collected: Sclerobunus robustus robustus (Packard), Leibobunum tomsendi Weed, Trachyrhinus marmoratus Banks, Protolophus singularis Banks, and an undescribed species of Metopilo and another of Globipes. Harvestmen were most abundant at the lowest (1,830 m) and highest (2,440 m) elevations. Half of the species were present as juveniles in the spring, and as adults in the summer and fall. This suggests that they are univoltine and survive the winter as eggs or early instar juveniles. Three genera, Globipes, Metopilo, and Protolophus, are newly recorded from New Mexico. Metopilo is a new record for the United States.

Harvestmen (Arachnida: Opiliones) are not well known in deserts (Crawford, 1981; Cokendolpher, 1990; Hunt, 1991). Most North American species are undescribed and few data are available other than collection locality. A few museum specimens are labeled “under rocks” and “under dead cacti,” but meaningful ecological data are missing. Notable exceptions are the studies of Allred et al. (1963) and Allred (1965) from the Mojave and Great Basin deserts, Cloudsley-Thompson (1956) from arid elevations in central Tunisia, and Hunt (1991) from arid and semi-arid Australia. These authors found harvestmen to be rarely collected in arid regions. In this paper, we report on the seasonal changes of harvestmen populations. We also compare the populations from three different habitats and elevations.

MATERIALS AND METHODS—Populations were sampled at the following localities in Grant County, southwestern New Mexico: 1) Game Refuge behind old Ft. Bayard; elevation 1,829 m; soil sandy-clay with oak-leaf surface litter; vegetation consisting of oaks (Quercus arizonica and Q. gambelii). 2) Meadow Creek in Pinos Altos Mountains; elevation 2,134 m; soil sandy-clay with surface litter of leaves and rotting herbs and wood; vegetation consisting of several species of oaks, pines with mesic-xeric herbs, vines and grasses (mesic-xeric wooded valley). 3) Signal Peak in Pinos Altos Mountains; elevation 2,438 m; consisting of an alpine bog and meadow surrounded by several species of oaks and pines, open areas covered with wild iris, other mesic herbs and grasses; half of the traps were set in the bog, half in the wooded zone.

Ten pitfall traps, each with a diameter of 15.3 cm, were established in each of the study areas. Preservative (250 ml of 1:1 mixture of 70-75% isopropyl alcohol and ethylene glycol) was placed in each of the traps. Five traps were placed in a north-south transect, five in an east-west transect; traps were placed 10 m apart. Traps were installed on April 1976 and monitored at two-week intervals until December 1978. Samples were removed from the traps after each two-week interval and the liquid replenished if necessary. Samples were pooled over all traps per locality, identified and counted. Samples collected during the same time period in different years were averaged before the data were analyzed and plotted.

Pitfall traps have been criticized as a method of sampling arthropod populations (Turnbull, 1973; Southwood, 1978), although many arthropod biologists still consider them valid and comparable to other methods (e.g., Pietruszka, 1980; Marsh, 1984; Morrill et al., 1990). We believe our data allow us to compare seasonal above-ground activity and relative abundances of the species in different habitats.
RESULTS AND DISCUSSION—We found two species of harvestmen to be abundant in the arid regions of Grant Co., New Mexico. One of the poorly represented species in the present study (Trachyrhinus marmoratus) was found in dense populations in a more arid region of the Indio Mountains of the Chihuahuan Desert in Texas (unpubl. data). Wagner (1954) also found high densities of harvestmen, and he reported finding about 70,000 opiliones in a single candelabra cactus in an arid region of Jalisco, Mexico.

Harvestmen were most abundant in our collections at 1,829 m (Fig. 1), especially Leiobunum townsendi and an undescribed species of Globipes. Low numbers of all species occurred at 2,134 m. The abundances of both L. townsendi and an undescribed species of Metopilus were greatest at the highest elevation (2,438 m).

Leiobunum townsendi is a well known long-legged harvestmen from Utah, Nevada, south and east to Chihuahua, Durango, Texas and Oklahoma (Ekpa et al., 1985). This species is active at night (McAlister, 1962), and is unusual in that individuals often mass together by the thousands in daytime retreats (smaller groups in the more western parts of its range). Juveniles of L. townsendi first appeared in September. They increased in size and numbers until June when the first adults appeared (Fig. 2; 12 specimens collected on 17 March 1978 were not plotted on the figure). Numbers of juveniles decreased to nearly zero throughout July and August. The abundance of adults was low until June, increased to high levels in the summer, and declined drastically in October. Our data (Fig. 2) suggest a univoltine pop-
The undescribed species of Metopilio is known only from isolated desert mountains in southwestern New Mexico and adjoining Arizona. This is the first published report of the genus from the United States. Other congeners are from Mexico and Central America. Juveniles first appeared in our traps in June (Fig. 2), and increased in numbers throughout July and August. Adults first appeared in July and persisted in moderate numbers until the end of October. A few adults were present in December. All adults apparently died during the winter. Eggs either hatched during spring, or newly hatched juveniles remained in habitats not sampled during the fall or winter.

Our samples of Protolophus singularis are the first record of the genus from New Mexico. This species is otherwise known from southern California, Utah, and Arizona (Goodnight and Goodnight, 1942). Laboratory studies of a population from the Chiricahua Mountains, southeastern Arizona, indicate that mating and egg laying occur in late spring and summer with the adults dying shortly after mating and oviposition. Few juveniles of P. singularis were collected, but there is some evidence of increased abundance in the spring (Fig. 2). It is possible that the juveniles are not active on the soil surface. The abundance of adults was initially high, and seemed to decline at the end of May. The population disappeared from our collections by late August.

Several other species of harvestmen in the Gaurellidae are known from isolated desert mountains in surrounding states and nearby mountains of New Mexico: Dalquestia spp. (Cokendolpher,
1984; Cokendolpher and Stockwell, 1986; unpubl. data), an undescribed species of Eurybunus (unpubl. data), and Leiobanum depressum (Davis, 1934). As members of these genera have been repeatedly taken in pitfall traps elsewhere, we assume they were absent from our study sites or they occurred in very low densities. An additional gasterilid, an undescribed species of Leunonychus, is known from the Chiricahua Mountains, southeastern Arizona (unpubl. data). It, likewise, was not taken in our study and may not occur outside of the Chiricahua Mountains.

Abundances of the other two species were relatively low (Fig. 3). Trachythinus marmoratus is a widely distributed, but uncommon to rare, species occurring throughout western North America from Montana and North Dakota, south and west to Baja California Norte, Durango, and Zacatecas (Cokendolpher, 1981b). Virtually nothing is known about the biology of this wide-ranging species. Cokendolpher (1981b) stated that oviposition probably occurred during spring (based on a single preserved female). More recently, JCC has maintained adults of this species from western Texas in the laboratory, where eggs were deposited in November. Trachythinus marmoratus was never common in our study (Fig. 3) and the few collected were taken primarily in late summer and fall.

Sclerobunus robustus robustus (Triacnonychidae) is the only member of the suborder Laniatores taken during this study. The other species are in the suborder Cyphopalpatores. Published records (Briggs, 1971) of S. r. robustus are from high elevations (1,981–3,200 m) in conifer forests of isolated desert mountains in eastern Arizona and New Mexico. Elsewhere in southcentral and western New Mexico and southeastern Arizona, JCC has collected this species in great numbers beneath rocks and rotting logs in moist conifer forests. During late winter, adults occur by the hundreds under snow-covered logs. Little movement has been detected other than movement to and from winter aggregation. Although not stated, the collections of this species from Grant Co., New Mexico by JCC (Ekpa et al., 1984) were from 1.2 km northeast of Cherry Creek Campground on Highway 15 near the present study sites. This locality is in the Pinos Altos Mountains, approximately 6.4 km SW of Meadow Creek and 4.8 km SW of Signal Peak. All three localities are at approximately the same elevation (within 305 m), but only Cherry Creek and Meadow Creek have mixed oak/pine woods with surface litter and decaying logs. Sclerobunus robustus was very rare in our samples (Fig. 3) and little can be concluded from our data on this species. Pitfall trapping appears unsuitable for sampling this species.

We thank the Laboratory for Environmental Biology of The University of Texas at El Paso for supporting our research. Voucher specimens are in the collections of JCC and the Florida State Collection of Arthropods, Gainesville. G. A. Thompson helped with the pitfall trapping.

**Literature Cited**


EKPA, O., J. W. WHEELER, J. C. COKENDOLPHER, AND R. M. DUFFIELD. 1984. N,N-dimethyl-α-phenyl-ethylamine and bornyl esters from the harvestman...


