SOLPUGIDS OF THE NATIONAL REACTOR TESTING STATION, IDAHO[1]

Dorald M. Allred[2] and Martin H. Muma[3]

Little has been published concerning the ecology of the arachnid order Solpugida in the United States. Most North-American species are known to be nocturnally active, diurnally burrowing, rapidly running, cursorial predatory arachnids (Muma, 1966, 1966a, 1966b, 1966c, and 1967); but information on their ecological requirements, habitat preferences, population dynamics, and seasonal abundance has been recorded only twice (Muma, 1963 and 1966d). In Nevada over a two-year period (1960-1962), approximately 1,000 specimens representing 28 species, 9 of them new, were collected in unbaited, dry, can pit-traps (Muma, 1963). The same technique used over a 15-month period (1966-1967) in Idaho yielded 71 specimens and 6 species, 2 of them undescribed. Although these latter data are not voluminous, they provide, for the first time, an opportunity to compare ecological relationships of North-American solpugids.

The National Reactor Testing Station is situated in southeastern Idaho, and its southeastern boundary is approximately 30 miles west of Idaho Falls. The station is situated on a level plain with an average elevation of 4,865 feet. This is part of the Snake River Plain section of the Columbia Plateau Province. The central and southern parts of the station are typified by basalt flows which are exposed or covered by only a few feet of soil. The northern section is primarily lake and eolian deposits, and near-surface basalt flows are less common. Annual precipitation averages less than 10 inches. The average annual temperature is 42 F, with extremes of 102 and minus 43. The vegetation is characteristic of the cool, northern desert shrub biome. The most conspicuous plant over most of the area is sagebrush, *Artemisia tridentata.* Other predominant plants are rabbitbrush, *Chrysothamnus* spp., and grasses. For other details referable to the station, study sites, vegetational complex, and techniques, refer to Allred (1968) and Atwood (1970).

Species Recorded

Eremobates septentrionis Muma, 1970.—Eight males, nine females, and two immature specimens were taken from eight study areas (1, 2, 3, 6, 7, 10, 11, 12) in June, July, and August. Most were collected in July. Members of this species occurred among several different plant communities but were most commonly found with *Chrysothamnus* and *Artemisia.*

This species is known from California, Colorado, Idaho, Nevada, Oregon, Utah, Washington, and Canada (Muma, 1970).

[1]BYU-AEC Report No. COO-1559-8.
[2]Department of Zoology, Brigham Young University, Provo, Utah 84601.
[3]Box 1554, Silver City, New Mexico 88061.

Eremobates ctenidiellus Muma, 1951.—One female was taken in July from area 7, predominated by *Chrysothamnus* and *Artemisia* vegetation.

Occurrence of this species in Idaho was expected on the basis of records from California, Colorado, Nevada, Oregon, Utah, Washington, and Mexico (Muma, 1951, 1962, 1963, 1970).

Eremobates sp.—One female and an immature specimen were taken from areas 1 and 7 in September and August, respectively.

Hemerotrecha denticulata Muma, 1951.—Nine males, six females, and four immatures were taken from eight study areas (1, 2, 3, 6, 7, 10, 12) in April, May, September, and October; most were collected in September. Members of this species were most commonly found where *Chrysothamnus* and *Artemisia* were the predominant plants.

Muma (1951, 1963, 1970) listed records of this species from Colorado, Idaho, Nevada, and Utah, and (Muma, 1963) indicated that in southern Nevada it was most commonly collected from *Salsola* and *Grayia-Lycium* plant communities, and overwintered as adults.

Hemerotrecha n. sp. "a."—One male was taken in September from area 12, where the predominant plants were *Juniperus*, mixed shrubs, and grasses.

Eremochelis bidepressus (Muma), 1951.—Two males were taken in June and July from areas 6 and 7, typified by *Chrysothamnus*, *Artemisia*, and *Tetradymia*.

Muma (1951, 1962) recorded this species from northern and southern Nevada. In the latter area 55% of the collections were from the *Grayia-Lycium* plant association. This is a new record for Idaho.

Eremochelis n. sp. "i."—One male was taken in July from area 7, predominated by *Chrysothamnus* and *Artemisia*.

Eremochelis sp.—Five immatures were taken in July and August from area 7.

Unidentified.—Twenty-two juveniles were taken in June, July, August, and September from seven areas (1, 2, 6, 7, 8, 10, 11); most were taken in August.

Discussion

The occurrence of 6 species at the National Reactor Testing Station is not as spectacular as that of the 28 species reported by Muma (1963) for the Nevada Test Site. However, the geographic study area in Idaho was smaller (900 sq. mi. as compared to the Nevada site, 1300 sq. mi.), and its more northern location with correspondingly lower average temperatures might not be as favorable for solpugid reproduction and population development as the more southern, warmer regions. The vegetation complex and soil types were also different.

Solpugids were collected in the Idaho study area from April through October, with the largest populations in July, August, and September (Table 1). The greatest number of species was collected during July. Immature specimens were most abundant in July and August; adults, in July and September.

Eremobates septentrionis and *Hemerotrecha denticulata* were the most numerous and widespread of the solpugids collected at the Idaho site. Preferred habitats of these arachnids were in plant associations of *Chrysothamnus* and *Artemisia.* Fewer numbers were found when only one of these plants occurred in association with other types.

In plant communities where both *Chrysothamnus* and *Artemisia* were absent, essentially no solpugids were found. No apparent correlation was evident between total plant cover and species or individual numbers of solpugids (Table 2).

A comparison of these data with those previously published reveals the following facts. In southern Nevada, solpugids were collected the year around and attained peak populations in May, June, and July (Muma, 1963). On the other hand, *Eremobates durangonus* Roewer was most abundant during August and September in southeastern Arizona (Muma, 1966d). Since the Idaho populations attained peak levels at or nearly concurrently with these more southern populations, it would appear that the effects of lower temperatures may be offset by inherent biotic factors of the species involved.

Similar deductions are afforded by previously published plant community-solpugid data and those presented here. In southern Nevada, a closely related species to *E. septentrionis*, *Eremobates zinni* Muma, was associated almost exclusively with *Salsola* in the *Grayia-Lycium* community, and *H. denticulata* was common in either *Salsola* or *Grayia-Lycium* communities (Muma, 1963). Since the Idaho populations of these species occurred in either *Chrysothamnus*, *Artemisia*, or combined communities, it would seem that plant associations may not be critical to solpugid abundance but that the plants themselves may be ecological replacements in the different deserts.

Further studies of solpugid populations should be made to test the above conclusions and to investigate the effects of other ecological

TABLE 1. Seasonal occurrence of solpugids at the National Reactor Testing Station, Idaho.

Item	Month						
	Apr	May	Jun	Jul	Aug	Sep	Oct
No. species collected	1	1	2	4	2	3	1
Total no. individuals collected	3	2	4	27	18	14	3
Immatures			1	11	16	6	
Adults	3	2	3	16	2	8	3

TABLE 2. Predominant vegetation based on percentage ground cover, and number of species and individuals of solpugids found in each of 12 study areas at the National Reactor Testing Station, Idaho.

	Study area and percentage of total ground cover*	No. of solpugid	
		Species	Individuals
1	*Chrysothamnus* 38%, *Artemisia* 24%, grasses 15% (bare ground 5%)	2	12
2	*Artemisia* 50%, *Chrysothamnus* 15%, grasses 15%, *Eurotia* 10% (bare ground 3%)	2	7
3	*Elymus* 50%, grasses and forbs 35% (bare ground 15%)	2	2
4	Grasses 90% (bare ground nil)	0	0
5	*Juniperus* 40% (bare ground 59%)	0	0
6	*Chrysothamnus* 30%, *Tetradymia* 30%, *Artemisia* 20% (bare ground 10%)	3	10
7	*Chrysothamnus* 41%, *Artemisia* 30% (bare ground 16%)	4	21
8	*Artemisia* 30%, *Atriplex* 26% (bare ground 38%)	1	6
9	*Chenopodium* 40%, *Eurotia* 35% (bare ground 20%)	0	0
10	*Artemisia* 68% (bare ground 13%)	2	3
11	*Chrysothamnus* 30%, grasses 26%, *Tetradymia* 22% (bare ground 5%)	2	6
12	*Juniperus* 30%, *Chrysothamnus* 15%, *Eurotia* 15%, *Artemisia* 13%, grasses 10% (bare ground 10%)	3	5

*Only those plants constituting 10% or more of the total plant cover are listed.

factors such as prey density, humidity, and soil structure on solpugid abundance.

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