

Research Note

COLLEMBOLA ASSOCIATED WITH GRASSES IN THE GROUNDS OF THE UNIVERSITY OF PUERTO RICO AT MAYAGÜEZ^{1,2}

Springtails are generally regarded as being restricted to wet or moist protected habitats such as soil, leaf litter and crevices under rocks. However, a number of species of the families Entomobryidae and Sminthuridae frequently climb vegetation and spend most or all of their life there. The present investigation had the purpose of surveying the fauna of springtails associated with grasses in the Mayagüez area, particularly on the campus of the University of Puerto Rico.

Fifty samples were taken in various locations within or close to the University campus. Since the grounds around the central area of the campus are generally kept free of weeds and grasses, most sampling was done near the Entomological Research Laboratory, at the university farm and along the road to the state zoological gardens. Specimens were collected by beating vegetation over a white enameled pan measuring 45 × 30 cm. An aspirator was used to transfer the springtails to vials filled with 95% ethyl alcohol.

Since I did not intend to make quantitative studies, I made no effort to standardize the number of beatings made at each location or to collect all the specimens seen on the surface of the pan. I did try to collect each species roughly in proportion to its observed abundance.

At each locality the temperature inside the grass stand was recorded and specimens of grasses were collected. The condition of the stand was classified as cool and moist (temperature below 30°C, some water condensed on the leaves), or warm and dry (temperature above 30°C, leaves completely dry). These conditions depend on the location of the stand (e.g., out in the open vs. shaded by trees) and the hour when the sample was taken. Sampling was done between 8:00 a.m. and 4:00 p.m., with most samples taken between 8:30-9:30 a.m. and 1:30-2:30 p.m. Collections were made from February 1 to May 10, 1984. Collection data from my general collection of springtails was used as reference to help determine whether the species are regular inhabitants of grasses and other vegetation or primarily inhabit leaf litter.

Table I presents a list of the species of springtails, total number of specimens collected, percentage of the samples in which each species was

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² The author thanks Dr. A. González Mas for advice on the identification of the grasses collected during this study. Mr. Samuel Pérez Ruiz counted and separated most of the specimens.

found, and the number of specimens collected on stands classified as cool and moist or warm and dry.

Salina tristani Denis was found in 90% of the samples. This species is very common in all habitats from the rain forest to the seashore. It has occasionally been found in leaf litter but is much more abundant on vegetation, especially on grasses. The species is also known from Costa Rica and Venezuela.

Entomobrya cubensis Folsom was the second most frequently collected species (76% of the samples). Most of the specimens were collected on

TABLE 1.—Species of Collembola, total number of specimens collected, percent of samples with each species of springtail, number of specimens in cool and moist, dry and wet samples, and host plants for each species of Collembola. Grass species as follows: 1 = *Panicum maximum* (yerba guinea), 2 = *Paspalum paniculatum* (yerba peluda), 3 = *Paspalum millegrana* (cortadora), 4 = *Eriochloa polystachia* (malajillo), 5 = *Pennisetum purpureum* (yerba elefante)

Species of Collembola	Total number of specimens collected	% of samples with this species	Specimens in cool & moist samples (30)	Specimens in warm and dry samples (20)	Species of grass
Entomobryidae					
<i>Salina tristani</i>	1846	90	1001	845	1, 2, 3, 4, 5
<i>Entomobrya cubensis</i>	1127	76	312	815	1, 2, 5
<i>Seira subannulata</i>	268	56	100	168	1, 2, 4
<i>Lepidocyrtus nigrosetosus</i>	132	32	121	11	1, 2, 3, 4
<i>Lepidocyrtus biphasis</i>	81	28	60	21	1, 4
<i>Lepidocyrtus griseolus</i>	84	28	54	30	1, 2, 5
<i>Lepidocyrtus vireticulus</i>	5	6	5	0	1, 3, 4
<i>Campylothorax sabanus</i>	9	6	9	0	1
Isotomidae					
<i>Cryptopygus thermophilus</i>	8	4	1	7	1, 2
Sminthuridae					
<i>Dicyrtomina</i> sp.	21	18	19	2	1, 2, 5
<i>Bourletiella</i> sp.	3	4	3	0	1

warm and dry stands. This and the preceding species were by far the most abundant when temperatures exceeded 33° C. At least in Puerto Rico, *E. cubensis* is apparently strictly epigeic, perhaps restricted to grasses. This species is also known from Cuba, Panamá and the Lesser Antilles.

Seira subannulata (Denis) was found in 56% of the samples. This is the only other species frequently found in stands with temperatures exceeding 33° C, although the species was most abundant between 25 and 30° C. This species has been collected on sugarcane and other grasses and is only rarely found in leaf litter samples. It is also known from Costa Rica, Brazil and Cuba.

Lepidocyrtus nigrosetosus Folsom is a common and widely distributed species in Puerto Rico. It is collected frequently in wet or dry leaf litter including that of sugarcane fields. In the present study it was collected in 32% of the samples, with most specimens found on cool and moist grass stands. The species has also been reported from Jamaica.

Lepidocyrtus biphasis Mari Mutt and *L. griseolus* Mari Mutt were collected in 28% of the localities. Both are widely distributed in Puerto Rico and are found frequently in moist leaf litter. *L. vireticulus* Mari Mutt was found only in three samples with a total of five specimens collected. The species is uncommon, but it has been collected in abundance near the Entomological Research Laboratory on moist refuse of mowed lawns. A few specimens have also been collected in pitfall traps at the Isabela Agricultural Experiment Station. These three species of *Lepidocyrtus* are, up to now, endemic to Puerto Rico.

Campylothorax sabanus (Wray) is an endemic species, very common in the leaf litter of moist forests. The three grass stands in which it was collected were low, moist, and shaded by tall trees during most of the day. All the specimens were collected around 8:30 a.m., when much water was still condensed on the grass leaves.

Cryptopygus thermophilus (Axelson) is a cosmopolitan species common in leaf litter throughout the island. It has been collected in the leaf axils of banana plants over 1.5 m tall. During this study it was found in two localities. In one the grass was moist (9:41 a.m., 29° C), and in the other it was dry (10:53 a.m., 32° C). In both locations the grass stand was less than 0.7 m tall.

The unidentified species of *Dicyrtomina* is widely distributed in Puerto Rico. It was found in 18% of the samples and exhibited a clear preference for low, cool and moist stands. The species is seldom found in leaf litter.

Only three specimens of the unidentified species of *Bourletiella* were collected. This species has been collected on soybean plants at the Isabela Agricultural Experiment Station and a dimorphic species of the genus is common on dry grass growing close to the seashore along the south coast of the island.

Table I also indicates on which species of grass each species of Collembola was found. *Panicum maximum*, imported from Tropical Africa, is by far the most abundant grass around campus and was present in 44 of the 50 localities. At 29 of these localities it was the only species present. All the species of springtails were collected at one or more of these 29 localities except *Lepidocyrtus griseolus*, and *L. vireticulus*, which were collected in stands of *P. maximum* mixed with other species of grass. Since *P. maximum* occurred at 88% of the localities, we found few pure stands of the other species. Among the latter, there was little faunal difference in comparison with pure stands of *P. maximum*. Apparently,

there is no host specificity and the species of springtail will climb various species of grasses as long as temperature and humidity are favorable.

In summary, of the eleven species collected on grasses during this study, four are regular residents of this habitat and are found in it throughout the island: *Salina tristani*, *Entomobrya cubensis*, *Seira subannulata* and *Dicyrtomia* sp. The other species live primarily in leaf litter but climb grasses when ecological conditions are favorable.

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