

REPORT TO APPALACHIAN HIGHLANDS SCIENCE LEARNING CENTER

Title: Survey of Isotomid Springtails in the Southern Appalachian Highlands

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Introduction

This project was proposed to initiate Collembola (springtail) surveys, with emphasis on Isotomidae, along Obed Wild and Scenic River and Big South Fork National River Recreation Area (BSF), and to continue surveys of Collembola in Great Smoky Mountains National Park (GRSM) and Blue Ridge Parkway (BRP). For GRSM and BRP, emphasis was placed on sampling areas that had not previously been intensively surveyed. As BSF would not issue a collecting permit, that unit was excluded from this study. The attached spreadsheet lists the sites from which collections were made in Obed, GRSM, and BRP.

More specific objectives were to determine the biodiversity of Isotomidae in the southern Appalachian region, provide a base for inventory of Collembola in units other than GRSM, continue the process of describing the many new species that appear to exist in this region, and add to web resources for the region being developed at GRSM and the University of Tennessee.

My collaborator in this study was, and continues to be, Dr. Arne Fjellberg, a Norwegian who is generally considered one of the top world authorities on springtails. The funds generously provided by AHSLC were used to support Dr. Fjellberg's travel and activities in this collection effort.

Materials and Methods

The active field portion of this study ran from 24 May to 7 June 2007. Collembola were collected mostly by means of Tullgren funnels. Litter/soil samples were collected in the field, returned to the laboratory, and placed in Tullgren funnels for extraction of arthropods into 95% or 100% ethanol. This preservative was used so that specimens could later be used in molecular studies. Other means for collecting Collembola also were used, including pan sweeps and beating in vegetation, and aspiration of specimens from exposed surfaces (rocks, logs). When we traveled together on collecting trips, we each collected samples from the same sites to simplify the process of collaboration on taxonomic work.

Results

In the two weeks of field work, 219 samples, of which 56 were from BRP, 86 from GRSM, and 31 from Obed. The remaining 46 samples were collected in related or adjacent habitats and will provide additional biogeographic information on southern Appalachian Collembola. At present, 15 GRSM samples, 5 BRP samples, and 12 Obed samples have been completely characterized, with a total of at least 128 species in 11 families. The spreadsheet lists do not include samples that are partially characterized or those from which selected specimens were taken for more study. The species figure undoubtedly is grossly understated. Taxa listed in the spreadsheet as “spp.” consist of more than one unidentified species. Some of these unidentified forms will prove to be previously described forms, but a significant number are undescribed species. We have recognized at least 10 probable new taxa in the collections we have examined so far, and the number may eventually be double that. Our current emphasis in this project is to identify *Agrenia* spp. and characterize several new southern Appalachian species. The springtails in this genus are closely associated with streams and were collected from all three units; specimens were selectively removed from many samples that were not completely characterized and so do not appear on the spreadsheets.

Spreadsheet Content

The attached spreadsheet contains the following:

- Collection Events page that identifies all sites from which samples were collected;
- Taxonomy page that provides the hierarchical classification for each taxon identified;
- For each unit (BRP, GRSM, Obed) a Collection Page that duplicates the entries on the main Collection Events page, and a records list identifying all the taxa of springtails so far identified from the unit.

Each Records page has columns that indicate the how the specimens are being maintained (slide-mounted, preservative), and whether the specimens have been digitally imaged (this information not yet available for BRP). A few taxa from GRSM have been set aside for DNA analysis and are so indicated. The Comments column on each records page consists of short notes we have made to ourselves to help keep straight the great complexity of the collections. “Remainder” indicates that all specimens of current interest have been removed from a sample and the rest are being stored *en masse*.