

Investigation and Analysis of the Soil Invertebrate Community of the Biocore Restoration Prairie

By Nicholas Dahl



Curtis Prairie in late summer (*Curtis* 2003)

Goals of My Research

- ∞ To characterize the soil invertebrate community of the Biocore Restoration Prairie
- ∞ Analyze data for any indications of soil quality or prairie health
- ∞ Compare with the invertebrate population of Curtis Prairie to see if years of agriculture/plowing have reduced the invertebrate population in the Biocore Prairie

What Is A Prairie?

- ∞ Open, low-growing area dominated by grasses with less than one mature tree per acre
- ∞ Plant community also includes non-grassy flowering species called “forbs”.
- ∞ There may also be several woody species within the prairie, as well as some immature trees
- ∞ What’s left of the original prairies of Wisconsin are restricted to scattered prairie remnants throughout southern Wisconsin

QuickTime™ and a Photo - JPEG decompressor are needed to see this picture.

Flowers in the demo garden of Area II in the Biocore Restoration Prairie (photo courtesy of Seth McGee)

Biocore & Curtis Prairies

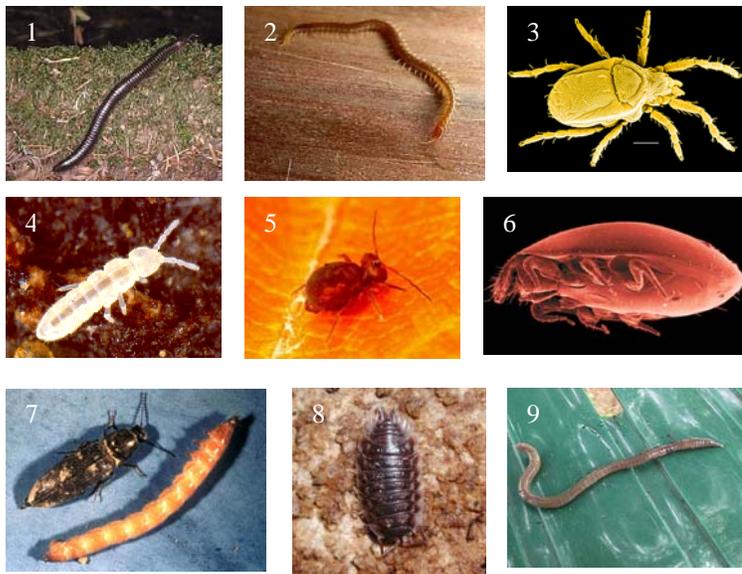
- ∞ The Biocore Restoration Prairie was begun in 1997, attempting to recreate a native tallgrass prairie
- ∞ Located on a piece of old agricultural field near the Eagle Heights gardens on Picnic Point
- ∞ Currently divided into three different areas, each receiving a different management/treatment strategy
- ∞ Curtis Prairie is part of the UW Arboretum, and is the largest restored prairie in the world
- ∞ Curtis Prairie totals 73 acres and was started in 1935
- ∞ Composed of many different types of prairies

QuickTime™ and a Photo - JPEG decompressor are needed to see this picture.

Biocore 301 students sampling the vegetation of Curtis Prairie in the fall of 2001 (photo courtesy of Seth McGee)

What Are Soil Invertebrates?

- ☞ The phrase “soil invertebrates” includes organisms from the smallest bacteria and protozoa to the relatively large earthworms and insects. My research is mainly focused on the organisms of the larger end of the spectrum
- ☞ The most numerous of the larger invertebrates are the arthropods, which include insects, crustaceans, myriapods, and arachnids
- ☞ Most of the soil invertebrates are found within the first few inches of the soil surface, and many will also dwell in the leaf litter immediately above the soil
- ☞ 3 main variables to the soil invertebrate habitat: *light*, *heat*, and *moisture*. Invertebrates like dark, cool, moist



1: Millipede, part of the myriapods 2: Centipede, part of the myriapods 3 & 6: Two different types of mites, members of the arachnids 4 & 5: Two types of springtails, members of the insects 7: Mature and immature forms of a beetle, members of the insects 8: Woodlouse, a.k.a. pillbug or sowbug, member of the crustaceans 9: Earthworm, member of the annelids

Methods of My Research

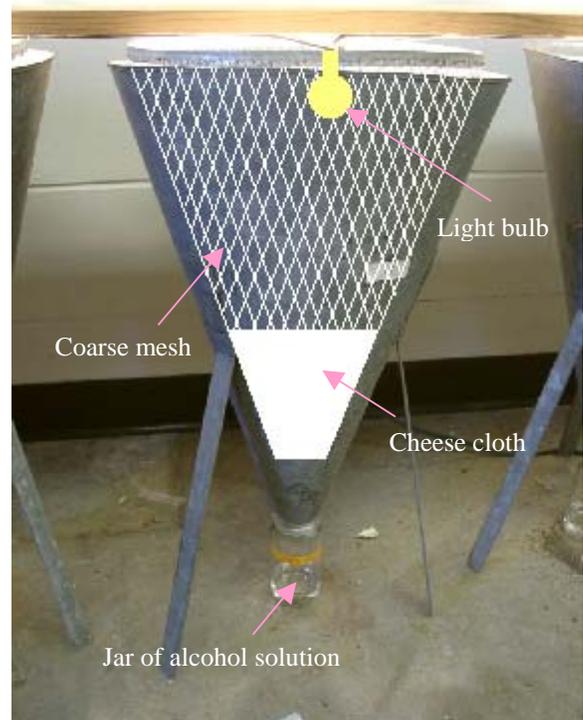
- ☞ Three areas are being sampled: Areas I & II of the Biocore Prairie, and a dry-mesic portion of Curtis Prairie
- ☞ Each sample is composed of two parts, an invertebrate sample, and a soil core sample
- ☞ The invertebrate sample is put through a Burlese funnel, pictured at right. The Burlese funnel exposes the soil sample to light and heat from an incandescent light bulb, which also dries out the soil. Any invertebrates in the sample will move away from the light and down through the funnel, eventually falling into a jar of alcohol solution, which preserves them
- ☞ The soil core sample is analyzed for soil moisture, bulk density, and amount of organic matter

	Soil Fauna	Body Length Ranges (mm)
Microfauna	nematode worms	0.15 - 1.5
	protozoa	0.02 - 0.15
	rotifers	0.1 - 1.0
Mesofauna	tardigrades	0.2 - 5
	mites	0.2 - 3
	springtails	0.2 - 6
	enchytraeid worms	1.3 - 50
Macrofauna	ants	1.3 - 10
	centipedes	3.0 - 50
	millipedes	1.4 - 21
	earthworm	1.0 - 150
	sitona larvae	1.0 - 6
	leatherjackets	5.0 - 35
	slug ground beetle	2.0 - 20
	ground beetles	5.0 - 80

Sizes of some soil invertebrates (Murray 2001)

Why Are Soil Invertebrates Important?

- ☞ Integral part of the decomposition and nutrient cycling processes
- ☞ Aerate and mix soil as they move and feed
- ☞ Movement of macroinvertebrates changes the physical properties such as porosity and bulk density
- ☞ A healthy ecosystem will have a large, diverse invertebrate population



The components and setup of a Burlese funnel. The soil sample is placed within the cheesecloth-lined coarse mesh, and illuminated for 3-5 days. The jar of alcohol solution is then sorted through for invertebrates (photo courtesy of Seth McGee)

Preliminary Results

- ☞ I'm still in the data collection/analysis phase of my research
- ☞ The most prevalent organisms so far are the springtails and mites
- ☞ There seem to be fewer macroinvertebrates in the samples from Curtis than in the samples from Biocore
- ☞ I'm working with Phil Pellitteri and Devin Biggs

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