A Survey of Arthropods along the Marcy-South Power Line at Greenwoods Conservancy, summer 2002

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INTRODUCTION

The purpose of this research was to survey species richness of terrestrial arthropods within a section of the Marcy-South right-of-way (ROW) in an attempt to gain insight into how maintenance practices by the New York Power Authority (NYPA) affect this community. This work follows arthropod surveys collected in 1999 (Scott, 2000) and 2000 (Brodie, 2001).

The Marcy-South power line was constructed in the mid 1980's. It runs across central New York State and through Greenwoods Conservancy which is located in Burlington, NY. NYPA uses mechanical and chemical means to manage vegetation near the ROW to reduce interference and to allow access (Fickbohm, 2001). NYPA avoids any disturbance of woody plants that will not grow high enough to interfere with the ROW.

Two transects running across the ROW, originally established by Austin (2000) were used for the collection of data (Figure 1). Belt transect A has a relatively stable shrub community and undergoes periodic selective tree cutting. Belt transect B was cleared of all vegetation in fall 1998 and currently represents an open, immature shrub community (Fickbohm, 2001).

METHODS

Arthropods were sampled on 14 and 16 June 2002 from the perimeters of transects A and B (Figure 1) using various methodologies. Sweeping nets were used by brushing them along the bordering shrubs. Samples were also taken using a Malaise trap, which was set (without bait) overnight at the center of the ROW between the two transects on the Beaver Dam Trail (Figure 1). The rationale was that insects using the trail as a flyway would encounter the net and would be directed up into the collecting chamber. Nocturnal aerial insects were collected using light traps set overnight at the center of each transect. Insects attracted to the light were drawn into the trap by an impellor.

Soil arthropods were taken by using four pitfall traps, two being placed along the borders of each transect. Canine feces and alewife (*Alosa pseudoharengus)* carcasses placed on the end of a wire that hung over the center of a coffee can served as bait.

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Arthropods attracted by the bait fell into a can which contained laundry detergent (which prevented the specimens from escaping).

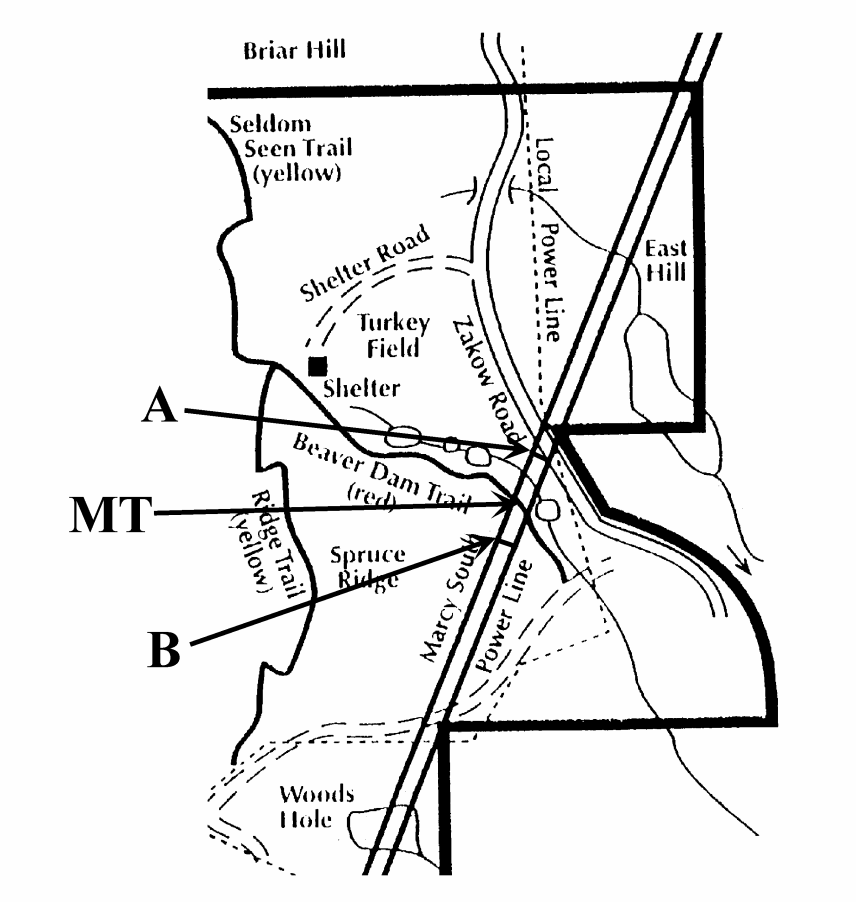

Figure 1. Belt transects A and B and the location of the Malaise trap set used for arthropod collections at Greenwoods Conservancy, summer 2002.

Collected arthropods were brought back to the BFS where they were killed by freezing and were preserved in 70% ethanol or pinned, depending on body type. Identification was made at least to family following Borror *et al.* (1989), Arnett (1993), Kaston (1971), Milne and Milne (1998), Opler (1998) and White (1983).

RESULTS AND DISCUSSION

Tables 1-4 provide a summary of the arthropods collected along each transect at Greenwoods Conservancy. Included are taxonomic overviews, common names and numbers of individuals collected by using sweeping nets, pitfall traps, light traps and a malaise trap. Note that the malaise trap was set mid-way between the transects.

Despite the differences in the characteristics of the plant communities (Brodie. 2002), the two sites were quite similar in diversity and richness at the family level. There were, however, differences in the taxa involved between the transects. It can also be noted in Figure 2 that the numbers of orders and families varied little over the three years. When surveying an area such as this for three years in the exact same location, one would expect to find similar taxa (Butts, 2002).

In the past, soil arthropods were taken by collecting substrate, primarily decomposing organic material, using a series of 10cm X 10cm X 10cm quadrats across each transect. The organisms were separated from the material using Berlese funnels (Brodie, 2001). As few specimens were captured using this technique, it was replaced by pitfall traps. It was found that while the pitfall trap yielded larger numbers of specimens then the Berlese funnel, only 3 families of insects were represented.

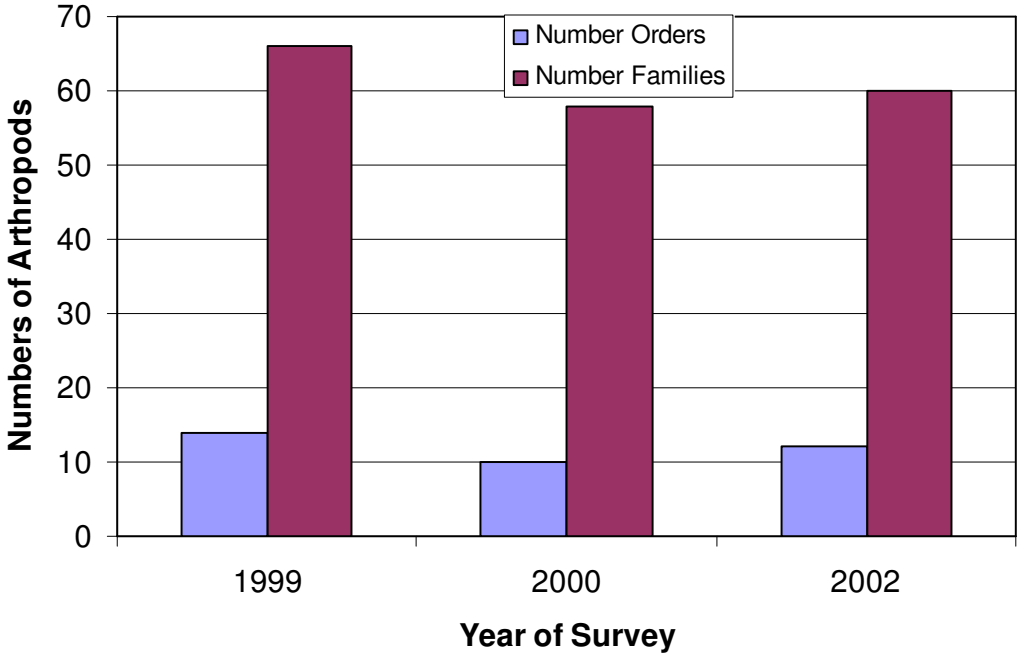

Figure 2. Comparison of the number of orders and families found along the right-of-way in 1999 (Scott, 2000), 2000 (Brodie, 2001) and 2002.

Sweeping Net: Transect A						
Class	**Order**	**Family**	**Subfamily**	**Genus**	**Common Name**	**Quantity**
Insecta	Coleoptera	Elateridae			Click beetle	1
Insecta	Coleoptera	Silphidae			Carrion beetle	1
Insecta	Diptera	Culicidae			Mosquito	1
Insecta	Diptera	Scathophagidae			Dung fly	3
Insecta	Diptera	Muscidae			House fly	2
Insecta	Diptera	Calliphoridae			Blow fly	5
Insecta	Diptera	Tachinidae			Tachnid fly	1
Insecta	Diptera	Dilichopodidae			Long-legged fly	6
Insecta	Hemimpera	Miridae			Leaf bug	3
Insecta	Homoptera	Aphididae			Aphid	2
Insecta	Homoptera	Cercopidae			Frog hopper	3
Insecta	Homoptera	Cicadellidae			Leaf hopper	5
Insecta	Lepidoptera	Pterophoridae			Plume moth	1
Insecta	Lepidoptera	Hesperiidae			Skippers	1
Insecta	Mecoptera	Panorpidae			Common scorpionfly	2
Insecta	Odonata	Coenagrionidae			Narrow-winged damselfly	5
Insecta	Orthoptera	Gryllidae			Wingless long-horned grasshopper	6

Sweeping Net: Transect B						
Class	**Order**	**Family**	**Subfamily**	**Genus**	**Common Name**	**Quantity**
Insecta	Coleoptera	Curculionidae			Weevil	1
Insecta	Coleoptera	Mordellidae			Tumbling flower beetle	1
Insecta	Coleoptera	Lampyridae			Firefly	2
Insecta	Diptera	Sepsidae			Black scavenger fly	1
Insecta	Diptera	Lauxanidae				1
Insecta	Diptera	Dilichopodidae			Long-legged fly	1
Insecta	Diptera	Muscidae			House fly	1
Insecta	Diptera	Sarcophagidae			Flesh fly	2
Insecta	Diptera	Calliphoridae			Blow fly	1
Insecta	Diptera	Sciomyzidae			Marsh fly	1

Table 1. Arthropods collected using sweeping nets, transects A and B.

Sweeping Net: Transect B						
Class	**Order**	**Family**	**Subfamily**	**Genus**	**Common Name**	**Quantity**
Insecta	Diptera	Syrphidae			Flower fly	4
Insecta	Diptera	Tabanidae	Chrysops		Deer fly	2
Insecta	Diptera	Otitidae			Picture winged	1
Insecta	Hemiptera	Coreidae			Leaf-footed bugs	1
Insecta	Hemiptera	Pentomatidae		Podisus	Spined soldier bug	1
Insecta	Hemiptera	Miridae			Leaf bug	25
Insecta	Homoptera	Cercopidae			Frog hopper	6
Insecta	Homoptera	Membracidae			Tree hopper	2
Insecta	Homoptera	Cicadellidae			Leaf hopper	4
Insecta	Homoptera	Aphididae			Aphid	1
Insecta	Homoptera	Psyllidae			Jumping plantlice	26
Insecta	Hymenopter:	Formicidae			Ant	3
Insecta	Hymenopter:	Tethredinidae			Common sawfly	1
Insecta	Lepidoptera	Hesperiidae			Skipper	2
Insecta	Mecoptera	Panorpidae			Common scorpianfly	1
Insecta	Neuroptera	Panorpidae			Common lacewing	1
Insecta	Odonata	Coenagrionidae			Narrow-winged damselfly	4
Insecta	Orthoptera	Tettigoniidae			Kadydid	1
Insecta	Orthoptera	Gryllacrididae		Camptonotus	Wingless long-horned	4

Table 1 (cont.). Arthopods collected using sweeping nets, transects A and B.

Pitfall Trap with Alwive bt: Transect A						
Class	**Order**	**Family**	**Subfamily**	**Genus**	**Common Name**	**Quantity**
Insecta	Coleoptera	Silphidae			Carrion beetle	10
Insecta	Coleoptera	Staphylinidae			Rove beetle	2
Insecta	Coleoptera	Scarabaeidae		Cloeotus	Scarab beetle	1
Insecta	Diptera	Calliphoridae			Blow fly	1
Insecta	Diptera	Muscidae			House fly	2

Pitfall Trap with feces ba: Transect A
Yielded no results

Table 2. Arthropods collected using pitfall traps, transects A and B.

Pitfall Trap with Alwive bait: Transect B						
Class	**Order**	**Family**	**Subfamily**	**Genus**	**Common Name**	**Quantity**
Insecta	Coleoptera	Silphidae			Carrion beetle	2
Insecta	Coleoptera	Staphylinidae			Rove beetle	1
Insecta	Diptera	Calliphoridae			Blow fly	6
Insecta	Diptera	Sarcophagidae			Flesh fly	1
Insecta	Diptera	Scathophagidae			Dung fly	1

Pitfall Trap with feces bait: Transect B						
Class	**Order**	**Family**	**Subfamily**	**Genus**	**Common Name**	**Quantity**
Insecta	Coleoptera	Carabidae			Ground beetle	1

Table 2 (cont.). Arthropods collected using pitfall traps, transects A and B.

Light Trap: Transect A						
Class	**Order**	**Family**	**Subfamily**	**Genus**	**Common Name**	
Insecta	Lepidoptera	Unknown				3
Insecta	Diptera	Chironomidae			Midge	4
Insecta	Homoptera	Cicadelidae			Leaf hopper	4
Insecta	Hemiptera	Nabidae			Damsel bugs	1
Insecta	Lepidoptera	Geometridae			Measuring worm	1
Insecta	Diptera	Culicidae			Mosquito	2
Insecta	Lepidoptera	Pterophoridae			Plume moth	2
Arachnida		Lycosidae			Wolf spider	1

Light Trap: Transect B						
Class	**Order**	**Family**	**Subfamily**	**Genus**	**Common Name**	**Quantity**
Insecta	Coleoptera	Coccinellidae			Ladybird beetle	1

Table 3. Arthropods collected using light traps, transects A and B.

	Malaise Trap					
Class	**Order**	**Family**	**Subfamily**	**Genus**	**Common Name**	**Quantity**
Arachnida	Opiliones				Harvestmen	3
Insecta	Coleoptera	Lamyridae			Firefly	1
Insecta	Coleoptera	Coccinellidae			Ladybird beetle	1
Insecta	Coleoptera	Chrysomelidae			Leaf beetle	1
Insecta	Diptera	Tabanidae		Tabanus	Deer fly	10
Insecta	Diptera	Tabanidae	Chrysops		Deer fly	4
Insecta	Diptera	Sarcophagidae			Flesh fly	32
Insecta	Diptera	Syrphidae			Flower fly	14
Insecta	Diptera	Calliphoridae			Blow fly	1
Insecta	Diptera	Pipunculidae			Big headed fly	5
Insecta	Diptera	Conopidae			Thick headed fly	2
Insecta	Diptera	Tachninidae			Tachnid fly	4
Insecta	Diptera	Dilichopodidae			Long-legged fly	30
Insecta	Diptera	Tipulidae			Crane fly	1
Insecta	Diptera	Muscidae			House fly	20
Insecta	Diptera	Chironomidae			Midge	2
Insecta	Ephemeroptera	Unknown			Mayfly	1
Insecta	Hymenoptera	Icheumonidae			Ichneumen wasp	3
Insecta	Hymenoptera	Anthophoridae			Carpenter bee	2
Insecta	Hymenoptera	Apidae			Honey Bee	2
Insecta	Hymenoptera	Vespidae			Yellow jacket	3
Insecta	Lepidoptera				Skipper Moth	2
Insecta	Lepidoptera	Geometridae			Measuring worm	1
Insecta	Lepidoptera	Lilellulidae			Common skimmer	1
Insecta	Odonata	Coenagrionidae			Narrow-winged damsel fly	4

Table 4. Arthropods collected using malaise traps, mid-way between transects A and B.

In the future, collections should be made in the forest canopy rather than just along the ROW. This would provide insight into what the arthropod community likely was prior to the establishment of the ROW (Butts, 2002), and thus how management activities affected it.

Given the expense and potential environmental implications of using herbicides and physical means of controlling pestiferous plants, it is important for research to be carried out to find effective and affordable alternatives. Negative impacts can also be reduced by using multiple control tactics, instead of relying on a single method (U.S. Water News, 2000). NYPA and the Biological Field station are researching the possibility of managing the ROW while limiting the amount of pesticide used by encouraging the growth of small shrubs and bushes (Fickbohm, 2000; Brodie, 2002; Tedesco, 2003). This would block light from the understory, keeping nuisance species which would ultimately interfere with the power line from becoming established. Hopefully, this tactic will benefit the arthropod community as well.

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