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PREDATORY INSECTS AND SPIDERS FROM SUBURBAN LAWNS IN LEXINGTON, KENTUCKY[1]

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ABSTRACT

Predatory arthropods were caught in pitfall traps in suburban lawns in Lexington, Kentucky. The relative abundance of species of Lycosidae, Carabidae, and Staphylinidae was compared in Kentucky bluegrass and tall fescue turf. Nine species of Lycosidae were collected from both the bluegrass and tall fescue lawns. More species or phena of Carabidae were collected from bluegrass than from tall fescue turf. More than 40 species or phena of staphylinids were collected from each grass habitat. Both Kentucky bluegrass and tall fescue are inhabited by an abundant and diverse array of predatory arthropods.

Predatory arthropods, particularly carabids, staphylinids and spiders occurring in turf have been mentioned by several authors (e.g. Bohart 1947, Johnson and Cameron 1969, Klein 1982, Mailloux and Streu 1981, Reinert 1978, Streu and Cruz 1972) but no comprehensive lists have been published for any locality in North America. In the course of other studies on predatory arthropod communities in turfgrass (Cockfield and Potter 1983, Cockfield 1983), we compiled a list of predatory insects and spiders captured in suburban lawns in Lexington, Kentucky.

MATERIALS AND METHODS

Predatory arthropods were sampled from 22 March to 18 October 1982 on eight institutional landscape lawns in Lexington, Kentucky. Four of the sites consisted of predominantly Kentucky bluegrass (*Poa pratensis* L.) and the other four were predominantly tall fescue (*Festuca arundinacea* Schreb.). All lawns were mowed regularly, but had not received fertilizer or pesticide applications for at least four years prior to arthropod sampling.

Four pitfall traps (Morrill 1975) were placed in each lawn at least 4 m apart in full sun. Traps were provided with an ethylene glycol killing solution and emptied each week. Trap samples from each site were pooled and all weekly collections were combined to obtain relative abundance values based on the entire sampling period. Pitfall traps are especially suited to sampling Carabidae (Baars 1979) and wandering spiders (Uetz and Unzicker 1976), and we believe they are an effective sampling method for other ground-dwelling, mobile arthropods in turf. So that comparisons could be made between bluegrass and tall fescue lawns, all rove beetles (Staphylinidae), ground beetles (Carabidae) and wolf spiders (Lycosidae) were identified to species or to phenotypically distinct groups (phena).

In this paper we considered arthropods to be predaceous if they belonged to a family in which most members are predaceous. It should be noted, however, that the feeding habits of most of the insect species in turfgrass are unknown, and that at least some of those listed herein may in fact be omnivores or scavengers.

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RESULTS AND DISCUSSION

The pitfall traps yielded a seasonal total of several thousand arthropods per site (Table 1). More predators were caught in Kentucky bluegrass than in tall fescue, but the relative abundances of families were generally similar for both habitats. For each turfgrass habitat, Insecta and Araneida were approximately equally represented in the samples, with Chilopoda composing a small portion.

Ants were by far the most abundant predatory insects in the weekly pitfall samples, often numbering in the thousands for one site. The actual number of ants captured was not tabulated, but the species positively identified are listed in Table 2. Other than Formicidae, Staphylinidae were the most abundant predatory insects, followed by Carabidae.

Forty-one species or phena of Staphylinidae other than unidentified Aleocharinae were collected in the season-long pitfall traps in bluegrass and tall fescue sites (Table 3). Three of the staphylinid species were found only in the bluegrass sites and three were found only in the tall fescue sites. Many of the less common phena of Staphylinidae were not identified to genus or species. There were 17 such phena excluding those in the subfamily Aleocharinae. Except for *Meronera venustula* (Erichson), none of the Aleocharinae was sorted to phenon because of the taxonomic difficulty of this subfamily. Staphylinids have been frequently overlooked as predators in turfgrass, but Mailloux and Streu (1981) did mention *Meronera venustula* as a common species in New Jersey, along with the genera *Philonthus* and *Tachyporus*.

Carabids were represented by 30 distinct species or phena in the season-long pitfall trap collections from bluegrass and tall fescue (Table 4). Eleven carabid species were collected only from the bluegrass sites whereas four species were collected only in the tall fescue sites. More species or phena (27) were collected from bluegrass than from tall fescue (17). A number of the genera we collected have been reported from turfgrass in other states. Mailloux and Streu (1981) collected the genera *Amara, Bradycellus*, and *Anisodactylus* in

Table 1. Relative abundance of predatory arthropods in two turfgrass habitats. Lexington, KY 1982.

Taxon	Mean % of Total[a]		Mean no. per site	
	B[b]	F	B	F
Araneida	40.1	51.2	1294.3	690.1
Erigonidae	79.9	71.8	1034.8	495.5
Linyphiidae	14.9	7.3	192.8	50.5
Lycosidae	2.9	13.1	38.8	90.5
Theredíidae	0.5	4.0	6.8	28.0
Thomisidae	0.4	1.4	5.8	9.8
Tetragnathidae	0.2	1.1	3.0	8.0
Salticidae	0.3	0.1	2.0	1.1
All others	0.8	1.0	10.3	6.8
Insecta	47.3	48.1	1264.5	647.8
Staphylinidae	82.0	82.0	1025.8	532.8
Carabidae	11.1	10.1	137.9	65.2
Histeridae	2.3	2.1	28.3	13.8
Nabidae	<0.1	0.3	1.0	2.0
All others	4.3	5.2	53.5	34.0
Chilopoda	3.5	0.7	93.5	9.5
Total			2634.3	1347.4

[a]Values for Araneida, Insecta and Chilopoda are expressed as percent of total collection. families are expressed as percent of class or subclass.
[b]B is bluegrass, F is tall fescue.

Table 2. Ants collected from Kentucky bluegrass and tall fescue lawns.

Aphaenogaster carolinensis Wheeler
Lasius neoniger Emery
Myrmica brevinodis Emery
Pheidole tysoni Forel
Pheidole bicarinata vinelandica Forel
Ponera pennsylvanica Buckley
Solenopsis molesta (Say)
Solenopsis texana Emery
Tetramorium caespitum L.

Table 3. Relative abundances of staphylinid species in two turfgrass habitats, Lexington, KY 1982.

Species	Habitat type[a]	
	B[b]	F
Aleocharinae, assorted spp.	16.8	48.9
Meronera venustula (Erichson)	43.9	8.0
Tachyporus jocusus Say	19.2	22.4
Bryoporus rufescens Leconte	3.8	5.5
Apocellus sp.	3.2	4.5
Philonthus sp. A	3.9	0.9
Tachyporus nitidulus (Fabricius)	2.5	0.3
Coproporus nr. *ventriculus* (Say)	0.8	1.9
Neohypnus nr. *fuscipes* (LeConte)	0.6	1.0
Mycetoporus splendidus Gravenhorst	0.4	0.4
Neohypnus obscurus (Erichson)	0.6	0.1
Philonthus sp. B	0.6	0.1
Quedius sp.	0	<0.1
Homeotarsus sp.	<0.1	0.4
Philonthus sp. C	0.3	0.1
Neohypnus emmesus (Gravenhorst)	0	0.2
Paederus sp.	<0.1	<0.1
Platydrachus cinnamopterus complex	0.1	0.1
Mycetoporus flavicollis LeConte	<0.1	<0.1
Platydrachus mysticus Erichson	<0.1	0
Bolitobius cingulatus Mannerheim	<0.1	0
Philonthus sp. D	<0.1	0
Staphylinus ater Gravenhorst	0	0.1
Tachyporus pulchrus Blatchley	<0.1	<0.1
17 unidentified phena	3.0	3.9

[a]B is Kentucky bluegrass. F is tall fescue.
[b]Mean percent of total capture in each grass type.

Table 4. Relative abundances of carabid species in two turfgrass habitats, Lexington, KY 1982.

Species	Habitat type[a]	
	B	F
Harpalus (Pseudophonus) spp.	41.4	55.8
Amara cupreolata Putzeys	23.0	4.3
Agonum punctiformum (Say)	2.0	20.7
Amara familiaris Duftschmidt	11.2	1.2
Scarites subterraneus Fabricius	2.4	5.3
Evarthrus sodalis LeConte	3.1	4.2
Calathus opaculus LeConte	3.1	0
Stenolophus rotundata LeConte	3.1	0
Pterostichus lucablandus (Say)	2.7	0
Anisodactylus rusticus Say	1.6	0.7
Harpalus sp. A	0.6	0.7
Amphasia sp.	0.7	0.4
Chlaenius sp. B	1.1	0
Agonoderus sp. A	0.4	0.4
Chlaenius sp A	0.2	0.5
Dicaelus sp. A	0	0.7
Harpalus sp. B	0	0.7
Progaleritina sp.	0	0.7
Bradycellus sp. B	0.2	0.4
Pterostichus chalcites Say	0.6	0
Anisodactylus sp.	0.4	0
Bradycellus sp. A	0.4	0
Harpalus caliginosus (Fabricius)	0	0.4
Amara avida Say	0.2	0
Badister	0.2	0
Dyschirius sp.	0.2	0
Harpalus sp. C	0.2	0
Stenolophus sp.	0.2	0
Tachyuris	0.2	0
Agonoderus sp. B	0.2	0

[a]See footnotes to Table 3.

New Jersey turfgrass, and Johnson and Cameron (1969) collected 14 species of carabids, including *Anisodactylus rusticus* Say, *Amara familiaris* Duftschmidt, and *Harpalus caliginosus* (Fabricius), from a golf course in New York. Bohart (1947) collected an *Agonoderus* species in California turf. Many of the same genera and common species of carabids found in turfgrass also occur in soybeans (House and All 1981), alfalfa (Los and Allen 1983), and corn (Esau and Peters 1975).

The dominant spider families were Erigonidae, Linyphiidae, and Lycosidae (Table 1). Erigonidae and Linyphiidae are difficult to identify without dissection of the male genitalia so no specimens were sorted to phena. Nevertheless, the species positively identified are reported in Table 5. Lycosidae captured per site during the sampling period are presented in Table 6. All species of wolf spiders captured in bluegrass lawns were also captured in tall fescue lawns. *Grammonota inornata* Emerton, the most abundant erigonid spider we collected, and an *Erigone* species were also reported to inhabit turfgrass in New Jersey (Mailloux and Streu 1981). Many of the same species of spiders found in turf are also known from alfalfa and soybeans in Kentucky (Culin and Yeargan 1983).

Table 5. Erigonid and linyphiid spiders identified from Kentucky bluegrass and tall fescue lawns.

Erigonidae
Ceratinopsis laticeps Emerton
Grammonota inornata Emerton
Eperigone banksi Ivie and Barrows
Eperigone serrata Ivie and Barrows
Eridantes erigonoides (Emerton)
Erigone autumnalis Emerton
Erigone blaesa Crosby and Bishop
Icelandiana flaveola (Emerton)
Oridantes sp.
Walckenaeria spiralis (Emerton)
Linyphiidae
Bathyphantes concolor (Wider)
Bathyphantes pallidus (Banks)
Meioneta dactylata Chamberlin and Ivie
Neirene sp.
Tennesseellum formicum (Emerton)

Table 6. Relative abundance of species of Lycosidae in two turfgrass habitats in Lexington, KY 1982.

Species	Habitat type[a]	
	B[b]	F
Allocosa funerea (Hentz)	42.3	18.8
Pardosa milvina (Hentz)	10.3	38.5
Lycosa frondicola Emerton	24.4	5.9
Lycosa avida Walckenaer	4.6	17.1
Schizcosa bilineata (Emerton)	5.9	11.4
Pirata insularis Emerton	7.7	3.6
Pardosa saxatilis (Hentz)	3.3	1.1
Lycosa helluo Walckenaer	0.8	3.3
Pirata montanus Emerton	0.8	0.8

[a]B is Kentucky bluegrass, F is tall fescue.
[b]Mean percent of total capture in each grass type.

In conclusion, our studies have shown that both Kentucky bluegrass and tall fescue are inhabited by an abundant and diverse array of predatory arthropods. Most of the common genera and species that occur in suburban lawns in Lexington, Kentucky also occur in agricultural habitats.

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