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**SPIDERS FROM HEADING BLUEGRASS (*POA PRATENSIS* L.)
IN ROSEAU COUNTY, MINNESOTA**

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Northwestern Minnesota is one of the principal producers of Kentucky bluegrass (*Poa pratensis* L.) seed in the United States. Extensive areas of cropland in Roseau County are devoted to this seed production. The natural vegetation of Roseau County is in itself interesting, since the county straddles the ecotone between boreo-nemoral forest and prairie. The types of plant cover include the following: prairie, jack pine forest, black spruce-larch bog, aspen woods, spruce-fir forest, and river flood plain forest. The soil types are consequently, quite complex. Generally, bluegrass is grown on burnt and drained peatland, or former prairie sites. The topography of the bluegrass growing areas is flat, and spring flooding is extensive. The climate is typically continental, with severe winters and a three month, frost free growing season.

During the early summer of 1966, I carried on a survey of the spiders in four fields in northern Roseau County. These fields were surveyed from June 14 to July 7. The Foss field was sampled five times during this period, the three other fields, four times. Samples were taken by taking 20 sweeps while walking in the middle of each field. The same net was used for all samples. All individual sets of 20 sweeps were non-overlapping. At no time were the sweeps less than ten meters from an edge. During the first visits to the fields, two to six sets of 20 sweeps per field were taken; after the first week eight sets of 20 sweeps were taken per visit to each field. Table 1 shows the distribution of specimens per sample and species per sample of 20 sweeps.

The fields are designated by the names of the farmers who owned them at the time. The Foss field was located seven miles north of Badger in Township 163 N., Range 42 W., Section 36. It was the only field bordering on woodland, or shelter belts, and had trees on three sides. The Roadfeldt field was located one mile south of Badger in Township 161 N., Range 42 W., Section 24. The field was turned over to cattle just before the last visit, but the grazing seemed to have little effect on the spider population. The Baumgartner field was located five miles northeast of Roseau in Township 163 N., Range 39 W., Section 33. The field was on burnt and drained peatland and was bordered on one side by a drainage ditch. The Hipsher field was located three miles south of Roseau in Township 162 N., Range 40 W., Section 36. The native vegetation of these fields based on McMiller *et al.* (1942) was:

Foss—prairie over glacial till

Roadfeldt—mixed forest-grass, aspen groves over loose sandy material

Baumgartner—spruce-tamarack bog, some white cedar over peat

Hipsher—prairie, scattered trees over Glacial Lake Agassiz deposits.

Collections were made during daylight hours from 10:30 AM to 7:30 PM. Weather conditions at time of sampling were variable. Skies were clear to partly cloudy, temperatures from 13°C to 32°C, winds from nearly all compass directions were from 0 to 20 miles per hour, five feet above the ground.

It has been noted by those who have worked with bluegrass insects in Minnesota (personal observations of Dr. A. G. Peterson, and Dr. K. C. Kim) that the fauna is varied for a pure stand crop. This is borne out for the spider fauna also, as can be seen in Table 2. The presumed explanation for this richness is the close resemblance of the bluegrass stands to the original prairie biome. At least 41 species are present in the bluegrass stands (Table 2), compared to Raatikainen and Huhta's (1968) 65 species on oats, and Lowrie's (1968) 63 species from a variety of herbaceous habitats in a montane area.

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Table 1. Frequency of number of specimens and species of spiders per 20 sweep samples.

Specimens per 20 sweep samples	Number of samples	Species per 20 sweep samples	Number of samples
0	20	0	20
1	20	1	25
2	29	2	36
3	18	3	19
4	6	4	11
5	8	5	4
6	5	6	1
7	3	7	0
8	1	8	0
9	4	9	1
10	1	10	0
11	1	11	0

Table 2 has been drawn so that it may be readily compared with Table 2 of Raatikainen and Huhta (1968). Spiders were sampled in the Finnish oat fields by sweeping three spots in the field no less than five meters from an edge, and taking 20 sweeps at each spot. The time of year almost exactly coincides with the time in this study. They collected from June 26 to July 15.

Table 2. Numbers of specimens of the different species of spiders caught in bluegrass fields.

Spiders	Fields				Total
	B*	F	H	R	
Araneidae					
<i>Araneus</i> sp.	19	4	10	6	39
<i>Mangora placida</i> (Hentz)	1	0	0	0	1
<i>Neoscona arabesca</i> (Walckenaer)	0	0	1	2	3
<i>Singa variabilis</i> Emerton	1	3	0	0	4
Dictynidae					
<i>Dictyna coloradensis</i> Chamberlin	1	0	0	0	1
<i>Dictyna manitoba</i> Ivie	0	0	1	0	1
<i>Dictyna minuta</i> Emerton	1	1	0	0	2
<i>Dictyna phylax</i> Gertsch and Ivie	1	0	0	2	3
<i>Dictyna sancta</i> Gertsch	0	0	4	1	5
<i>Dictyna</i> sp.	0	2	1	0	3
Linyphiidae					
Erigoninae					
<i>Catbrithorax plumosus</i> (Emerton)	0	6	4	0	10
<i>Ceraticelus laetus</i> (O.P.—Cambridge)	0	0	2	3	5
<i>Ceratinops inflatus</i> (Emerton)	0	0	0	1	1
<i>Eperigone contorta</i> (Emerton)	0	0	2	1	3
<i>Erigone atra</i> Blackwall	0	2	3	0	5
<i>Minyrioloides trifrons</i> (O.P.—Cambridge)	9	3	0	2	14
<i>Minyriolus arenarius</i> (Emerton)	0	2	0	0	2
<i>Oedotheorax trilobatus</i> (Banks)	1	0	1	0	2
<i>Tmeticus ornatus</i> (Emerton)	0	1	0	0	1
<i>Erigoninae</i> sp.	3	12	45	16	76

Table 2. (Continued)

Spiders	Fields				
	B*	F	H	R	Total
Linyphiinae					
<i>Bathyphantes canadensis</i> (Emerton)	1	0	0	0	1
<i>Bathyphantes gracilis</i> (Blackwall)	0	0	1	0	1
<i>Bathyphantes pullatus</i> (O.P.—Cambridge)	0	1	0	2	3
<i>Meioneta fabra</i> (Keyserling)	0	0	0	1	1
<i>Tennesseellum</i> n. sp.	0	0	1	0	1
Lycosidae					
<i>Pardosa</i> sp.	0	0	0	1	1
<i>Pirata insularis</i> Emerton	0	2	0	0	2
<i>Pirata maculatus</i> Emerton	0	0	0	1	1
<i>Pirata</i> sp.	0	7	2	2	11
Salticidae					
<i>Marpissa grata</i> (Gertsch)	0	0	1	0	1
<i>Sitticus palustris</i> (Peckham)	0	1	0	0	1
<i>Sitticus striatus</i> Emerton	0	2	0	0	2
Tetragnathidae					
<i>Tetragnatha candata</i> Emerton	2	2	2	0	6
<i>Tetragnatha laboriosa</i> (Hentz)					
male	1	3	3	0	7
female	4	11	11	6	32
immature	6	11	16	1	34
Theridiidae					
<i>Achearanea globosa</i> (Hentz)	0	0	2	0	2
<i>Theridion unimaculatum</i> Emerton	0	0	1	0	1
<i>Theridiidae</i> sp.	0	2	0	0	2
Thomisidae					
<i>Philodromus</i> sp.	0	2	1	2	5
<i>Tiballus maritimus</i> (Menge)	3	3	1	4	11
<i>Xysticus discursans</i> Keyserling	0	1	1	0	2
<i>Xysticus</i> sp.	1	1	3	1	6
Total	55	85	119	56	315
Male	10	16	24	12	62
Female	15	33	39	18	105
Immature	30	36	56	26	148

* Abbreviations for the fields are: B=Baumgartner, F=Foss, H=Hipsher, R=Roadfeldt.

Table 3 shows comparisons for selected groups of spiders from my Table 2, and Raatikainen and Huhta's (1968) Table 2. The percentage of linyphiids is the major difference being almost three times higher in Minnesota. Thomisids and theridiids are relatively more abundant in the Finnish material, *Dictyna* spp. more abundant in Minnesota material. It is noteworthy that in both localities a species of *Tetragnatha* is the dominant spider.

Lowrie (1967, 1968) comments on the ecology of *Tetragnatha laboriosa* and notes that it is the most abundant spider species in drier meadow situations and wood clearings. It was by far the most abundant species in the bluegrass stands of this study. Even with almost one-quarter of the total number of spiders collected, it was surpassed by *T. extensa* in the Finnish oat fields, comprising almost one-third of the specimens collected.

Table 3. Comparison of families and genera between Finnish oat fields, and Minnesota bluegrass fields in June and July. Finnish data from Raatikainen and Huhta (1968), percentages computed by B. Cutler.

Percentage of total spider fauna (specimens) from Finnish oats	Taxon	Percentage of total spider fauna (specimens) from Minnesota bluegrass
34.0	All <i>Tetragnatha</i> spp.	25.1
10.3	All <i>Araneus</i> spp.	12.4
2.5	All <i>Dictyna</i> spp.	4.8
0.7	Clubionidae	0
14.5	Linyphiidae	38.1
4.3	Lycosidae	4.4
0.1	Salticidae	1.3
7.1	Theridiidae	1.6
19.3	Thomisidae	7.3

In that study, 63.2% of the specimens collected were adult. Similarly I found 53% of spiders collected in bluegrass to be adults. On the other hand Lowrie (1968) notes that 76% of the spiders he collected were immature. Since Lowrie collected from June through August, it would be expected that his data would show a higher percentage of immatures. In north temperate regions, summer is the period of maturation.

Table 4 shows the number of spiders per 20 sweeps of several workers. Lowrie's figures (1968) were originally in terms of 50 sweeps, but were converted by me to specimens per 20 sweeps. The variability between fields is high, and I have no explanation for this variability. The average for all fields is almost the same as that reported for the Finnish oat fields. It is somewhat higher than Lowrie's (1968) figure for dry meadows, and considerably lower than his figures for wet meadows.

Table 4. Average number of specimens per 20 sweeps. Lowrie's data was converted by me from 50 sweep samples.

Baumgartner bluegrass	1.96
Foss bluegrass	2.66
Hipsher bluegrass	4.10
Roadfeldt bluegrass	2.00
All four bluegrass fields pooled	2.68
Finnish oat fields (Raatikainen and Huhta, 1968)	2.8
Dry mountain meadow, Grand Tetons (Lowrie, 1968)	1.7
Moist peat meadow, Illinois (Lowrie, 1968)	6.8
Moist mountain meadow, Grand Tetons (Lowrie, 1968)	4.8

In summary, the resemblances between my study and that of Raatikainen and Huhta (1968) are strong, and suggestive of more than coincidence. Both dominant species belong to the genus *Tetragnatha*, both show a rich species composition, and both appear to have a similar density of spiders. The last is perhaps, the least defensible, since net sizes, strides, and arm lengths were surely different. Nevertheless, the similarities are compelling, and are worthy of notice, if only to serve as a goad to future workers.

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