Seasonal Arthropod Societies In Two Overgrazed Short-Grass Communities[1]

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The recent period of drouth (1952-57), together with the general practice of overgrazing natural grasslands, has brought about a decidedly degraded condition of the pasturelands generally in the Panhandle of Oklahoma. In many places, according to Weaver (1954), a midseral form, *Aristida longiseta,* and related species have invaded the short-grass disclimax communities of *Bouteloua gracilis, Bouteloua hirsuta,* and *Buchloe dactyloides.*

Two communities were chosen for study because of their differences in vegetation cover. Plot A had about 85% short grass, 15% *Aristida,* a few clumps of *Yucca* sp., *Opuntia* sp., and *Sporobolus asper.*

Plot B was vegetated by about 85% *Aristida* and 15% of a mixture of *Bouteloua gracilis, Bouteloua hirsuta,* and *Buchloe dactyloides.* In addition, there were about 2 plants per square meter of *Andropogon scoparius* in one small area.

The grammas and buffalo grass were 10 cm. high in both areas. The *Aristida* varied between heights of 24 and 45 cm.

Aristida occurred in clumps and small patches in plot A, but formed a continuous stand of vegetation in plot B, under which the short grasses formed a rather weak undergrowth.

Animals were collected with a sweep net, 30 cm. in diameter, that had a handle 1 meter long. One hundred sweeps constituted a unit collection, which covered about 30 square meters. Sweeps were usually made while moving in a westerly direction. Collections were taken at 6:00 p.m. during the late vernal (April), early estival (May), autumnal (September, November), and early hiemal (December) periods. During the vernal and estival periods, the time collection fell in the diurnal portion of the 24-hour day, while during the autumnal and hiemal periods, it was in the early crepuscular portion.

The sweep net method of collection limits the type of pouulation caught, so it does not give a true picture of the total population present.

The arthropod population of the two plots varied with the season and with climatic conditions. In plot A, the total number of arthropods in 12 unit-collections (1200 sweeps) was 1012. Animals in plot A exceeded in number those in plot B in two-thirds of the collections, primarily those in the estival period, but plot B had a greater total population, represented by 1504 individuals, and eleven orders, compared with 10 orders in plot A. Plot A reached a maximum population earlier than B, but the number of orders increased more slowly.

In plot A, the majority of the organisms represented two orders, Homoptera (Cicadellidae, *Cicadula* sp.), and Diptera, of numerous families. (For data of individual collection days see Table I.)

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Plot B had the greater number of orders present and over a longer period of time; the most prevalent orders and families were:

Homoptera, (Cicadellidae, and Chermidae)

Diptera, (numerous families including Muscidae, Anthomyiidae, and Trypetidae)

Coleoptera, (Carabidae, Chrysomelidae, Rhynchophora, Coccinellidae, Meloidae, and Elateridae)

Hemiptera, (Scutelleridae, Pentatomidae, Reduviidae, Miridae, Anthocoridae)

Orthoptera, (Acrididae: *Melanoplus* sp., Acridinae, Gryllidae: *Oecanthus* sp.)

Hymenoptera, (Ichneumonoidea).

Individual orders of insects seemed to react differently to the same meteorologic factors of the environment at different seasons. This may have been caused by different physiologic states of the various species with age, to different tropistic responses of various instars (Bachmetjew, 1907), and to the later vernation of *Aristida,* which delayed the development of the arthropod population in plot B.

A fourth possibility was that certain times of collecting were such that both diurnal and nocturnal components of the population were more or less active. These two groups of organisms obviously react quite differently to light, temperature, and relative humidity. A high rate of air movement, however, seemed to be inhibitory to maximum activity of both groups. Also, meteorologic factors at the beginning of the crepuscular period change rapidly in value.

The two most abundant orders, Diptera and Homoptera, apparently were affected by late vernation of *Aristida* in plot B.

High wind and dirt in the atmosphere reduced the catches in both plots on April 18, 23, and 25, but plot A still had the greater number of insects, probably because of green vegetation and greater available food.

After the *Aristida* produced new shoots in the early estival period, the Homoptera apparently migrated to plot B. Plot A still had a larger breeding population (120, April 30) but this decreased sharply in number of individuals in the next two collections (53, May 7; 14, May 9), although conditions seemed to be favorable for continued reproduction.

There was also a noticeable shift to plot B (1 to 27) by the Diptera on April 30, and the fly population continued to increase until May 9 (74), except on May 7 when high winds (30 mph.) reduced the number caught to 13.

In the autumnal period (September 28) distribution of the arthropod population reversed completely, plot B having 1169 and plot A 354 individuals. There were increases in the following orders: Coleoptera, Hymenoptera, Hemiptera, Homoptera, and Diptera. These increases were especially noted in plot B where more food, shelter, and hibernation sites were available.

In the late autumnal (November) and early hiemal (December) periods the population sharply decreased, caused probably by the death of mature insects and hibernation caused by downward trends of temperature. The population of plot B remained higher since the insulation by clumps of tall grass afforded the over-wintering species a slightly higher micro-environmental temperature.

In summary, an increase of *Aristida* in overgrazed disclimax short-grass prairie is accompanied by an increase in numbers of Homoptera and Diptera, and the increased cover produced by it affords a hibernation site for certain Coleoptera, Hymenoptera, and Hemiptera.

Table I. Distribution of Arthropods by Orders in Two Prairie Communities

Date	Diptera		Coleoptera		Lepidoptera		Hymen-optera		Thysanura		Ortho-ptera		Hemiptera		Homoptera	
(Plots)	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
4-8-57	14	15	0	1	0	2	0	0	0	0	0	0	0	0	2	3
4-10	33	9	0	2	0	1	0	0	0	0	0	0	0	0	62	1
4-15	27	1	1	0	1	1	1	0	4	0	1	1	0	0	84	5
4-18	0	7	1	0	0	0	1	1	0	0	0	0	0	1	55	3
4-23	2	1	1	0	0	0	0	0	0	0	0	0	0	0	45	7
4-25	2	1	0	0	0	0	0	1	0	1	0	0	0	2	30	7
4-30	11	27	1	1	1	0	0	1	0	1	0	0	0	2	120	3
5-7	11	13	2	3	0	0	1	0	1	0	0	0	0	2	53	19
5-9	4	74	1	2	0	0	0	0	0	5	0	0	0	3	14	20
9-28	50	113	33	173	20	23	37	249	16	27	7	23	61	206	120	300
11-11	39	22	1	6	0	1	2	6	0	0	0	0	4	11	14	2
12-16	0	1	0	1	0	0	0	0	0	0	0	0	0	2	2	3

REFERENCES

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