

## Quantitative Comparison of Insect Orders from Three Types of Vegetational Cover on Miami, Bethel and Brookston Soils in Eastern Indiana

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For a three-week period during the summer of 1960, a study was made of the insects occurring in the vegetation on three types of soil with different drainage conditions in Wayne County, Indiana. The three soil types chosen, Miami, Bethel and Brookston, are some of the most extensive soils of the county. Miami silt loam occupies the smoother slopes of stream valleys. It is an arable soil derived from glacial tills and has a fine granular structure. Surface drainage is good. The Bethel silt loam occurs on the flattest parts of main divides remote from any stream. This soil is also of glacial till origin. The surface drainage is rather poor. The Brookston silty clay loam is found on smooth, flat, low areas. The surface drainage is very poor with water sometimes standing for months after a rain unless it is drained artificially.

Nine collecting sites were chosen, three sites from each type of soil, with a different type of vegetational cover at each of the three sites. The three vegetational covers chosen were woodland, cropland and pasture. Vegetation in woods and pasture directly reflected soil type while cropland reflected it only in amount of growth. All sites are located near the Centerville-Williamsburg Road, Wayne County. The three wooded sites are located in Lewis Woods, an 80 acre classified woods that has been used by Earlham College for several years as a study area. On the Miami site the principal tree is sugar maple. There are also some sycamores and beech. The floor covering is not dense. It consists primarily of woodbine, May-apple, false Solomon's seal and maple seedlings. On the Bethel site the trees are beech and maple with maple predominating. The principal floor covering is nettle, with jewelwood, May-apple and false Solomon's seal. The Brookston site also has beech and maple with maple predominating, but the beech are not as plentiful as on the Bethel site. Some ash and elm were also found on this site. The floor covering is again primarily nettle with jewelweed and maple seedlings, but the vegetation is more dense than on the Bethel site.

The cropland sites were sowed to corn in 1960. The Miami and Brookston sites are located in the same field while the Bethel site is two miles to the south.

The pasture sites are all grazed pastures. The Miami site's cover is chiefly grasses with some chicory and clover. Vegetation of the Bethel pasture is mainly clover with some fleabane and yarrow. The Brookston pasture is not heavily grazed and vegetation is high. It includes mainly grasses, plus fleabane, curly dock, sedges, boneset, clover, alfalfa, daisies and Queen Anne's lace. A stream runs through this pasture and the area is damp.

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### Method

Three collecting trips were made, one week apart, to each of the nine sites, all sites being visited on the same day. The first trip was on July 12, 1960. Collecting was done by sweeping with a 15" diameter net. The junior author made 60 sweeps at each site, emptying the net into the killing jar after 10 sweeps. The insects were then taken to the laboratory and sorted from vegetational debris before being weighed. There appeared to be some water loss, and hence weight loss, by this method, but the ranking of orders proved to coincide with that of later trips so possibly the weight was lost evenly.

Trip two was taken on July 20. To cut down on water loss the insects from only four sites were placed in killing bottles. These four collections were weighed the same day. The other insects were placed in jars and kept alive until the following day when they were killed and weighed.

The third trip was taken on July 27. There had been rain the previous day, and the woods areas were still very damp. This appeared to cut down the number of insects collected. The same method of collection was used as on trip two.

### Results

Totals from the three collecting days are shown on Table 1. A comparison can also be made with the top four orders, for example, ranking

**Table 1. Total Numbers of Insects from Nine Collecting Sites, and Percentages According to Weight**

Orders :	Odon.	Orth.	Hemi.	Homo.	Neur.	Cole.	Meco.	Lepi.	Dipt.	Hyme.
Sites										
<b>Miami:</b>										
Wood	0	1	2	115	1	28	1	2	79	16
		0.2%	0.5%	61.7%	0.5%	9.1%	1.1%	0.5%	18.3%	8.1%
Crop	0	14	62	32	1	64	0	0	56	5
		24.2%	7.2%	12.7%	0.9%	44.6%			6.8%	3.6%
Past.	0	16	27	111	0	44	0	0	451	46
		34.8%	10.6%	23.2%		13.9%			9.0%	7.7%
<b>Bethel:</b>										
Wood	0	1	1	64	1	36	4	11	95	13
		14.7%	0.5%	35.2%	3.0%	12.9%	3.9%	4.9%	17.6%	6.9%
Crop	0	0	7	19	0	68	0	0	19	0
			5.6%	30.0%		47.2%			17.2%	
Past.	0	14	124	497	0	36	0	5	181	21
		9.9%	5.7%	70.2%		1.6%		0.2%	7.1%	5.3%
<b>Brooks.:</b>										
Wood	0	2	1	37	0	36	5	21	98	15
		17.7%	1.0%	28.6%		14.3%	3.1%	7.8%	24.9%	2.6%
Crop	0	22	69	42	1	100	0	1	52	7
		16.7%	15.7%	14.0%	0.7%	44.0%		0.8%	6.7%	1.4%
Past.	3	39	99	337	0	43	0	1	156	4
	0.5%	46.1%	6.0%	37.0%		2.5%		0.2%	6.1%	1.6%

them with most numerous, and heaviest, at the top of their respective lists. It is these four groups which probably have the greatest effect on amount of vegetation eaten and amount of fecal matter and other organic matter contributed to the soil.

#### Summary

As a result of the study of nine collecting sites located on Miami, Bethel and Brookston soils in eastern Indiana, it can be seen that the soil types have an indirect effect on the insects by influencing the density of the vegetation.

Judging by weight, Homoptera is the top ranking insect order in all woods collections. Coleoptera ranks heaviest in all cropland collections, and Orthoptera ranks first in two pastureland total collections, with Homoptera highest in the third.