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Pitfall Trapping Coleoptera in Anderson Prairie

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by David Nance

Purpose

It was the intent of the author to collect beetles that are attracted to dung and carion from Anderson Prairie, an area that can be described as a remnant tallgrass prairie. The primary goal was to collect quantitative and qualitative data with respect to beetle populations in this natural area. A second goal of the project was to develop a prelimary assessment of the seasonal spectrum of population densities. A third goal of the project was to compare the productivity of the two different baits, dung and carrion, in each of the four areas trapped. The fourth goal of the project was to compare four areas of this railroad prairie to see if differences in these areas would show differences in the type and number of beetles.

Description of the Study Area

Anderson Prairie is a one-mile stretch of property that was, until 1983, a two hundred-foot wide railroad right-of-way. The land was purchased from Illinois Central-Gulf Chicago and leased to Pana High School to be managed as a protected natural area. The lease became effective in August of 1986. The railbed now serves as a convenient longitudinally-bisecting trail through the park. Anderson Prairie has some areas or "patches" where high-quality tallgrass prairie exists. At this writing, 225 species of grasses, sedges, forbs, and woody plants have been cataloged from the area.

One factor of concern in the study was the relative narrowness of

the prairie continuum, which is characteristic of a railroad right-of-way. A rural road (2375 E) borders the prairie on the west for its entire length while the eastern perimeter is an example of typical disturbed areas, including agricultural fields, a landfill, and mowed lawns. These boundaries serve to isolate the prairie from any other ecologically significant areas and, at the same time, may exert an influence of their own on beetle populations. Bordering the west side of road 2375 E is an area of woodland, degraded prairie, and a shallow lake of about 100 acres. These ecosystems are within 100 meters of Anderson Prairie and the areas that were trapped. Refer to the attached map of Anderson Prairie (figure 1) to get a visualization of this setting.

Included at the end of this paper (Appendix A) is a floral inventory of plants indigenous to Anderson Prairie. This inventory is offered as an aid in estimating the quality of the prairie since true prairie can be evaluated on the basis of the presence of indicator species. Plants which are considered indicators have been checked on this list. The presence of these plants documents a prairie in good condition (Voight and Mohlenbrock, 1985). It should be pointed out that the mere presence of these plant species does not measure the total quality or stability of this ecosystem since no population studies have been conducted to measure population densities. However, beetles trapped in Anderson Prairie, for the most part, can be described as beetles of the prairie.

Methods of Trapping

Trapping was conducted from July 19, 1987 to September 18, 1987. Figure 2 illustrates materials used to trap and collect the insects in the prairie. These materials include: a) collecting bottles for spec-

imens, b) antifreeze for killing and preserving insects, c) plastic bowl traps, d) plastic 1 ounce medicine cups which hold bait, e) aluminum wire loop for positioning the baited cup above the trap, f) coffee can with lid for human dung bait, g) plastic bag with carrion (mouse) bait, h) garden trowel for digging small holes to place the traps, and i) plastic spoons to transfer the dung from the coffee can to the plastic medicine cups.

Figure 3 shows the wooden stakes of uniform length, painted white at the top, to aid in location of traps. The stakes were placed in the ground about 1-2 feet from each trap.

Figures 4 and 5 document the manner in which a trap was set up. A small hole was dug in the selected location just big enough for the plastic trap to fit so that the top rim of the bowl was flush with ground level. The china bowl trap was placed in the hole and dirt was filled in around any sunken areas that bordered the rim of the bowl. This insured that crawling beetles or other insects would be able to reach the trap from any direction on the ground. Undiluted Antifreeze was added to the bowl to uniform depth in every trap. A wire loop was placed in the ground centered above the trap about 4 to 6 centimeters. The wire loop was fashioned to receive a plastic one ounce medicine cup. The bait was placed in the cup. Figure 4 shows a carrion trap holding a mouse and figure 5 shows a dung trap with human dung bait.

Methods of Site Selection

Anderson Prairie has been divided artificially into twelve sections. Each section has been assigned a letter, A through L. The railbed acts as a bisecting line dividing the prairie into paired sections lying adjacent to one another for the entire length of each

section. The accompanying map of Anderson Prairie (figure 1) indicates the boundary of each section. The sections were determined by natural or man-made landforms such as streams and roads that transect the vegetation. The sections were used to aid in describing the location of each set of traps. They also proved useful in assigning a lettering system to each collecting jar to save time in labelling. A trap placed in section C and baited with dung that was the first run of traps in the area was assigned the code C-D 1. A carrion trap of the same run and section was labelled C-C 1, and so on for each section, bait, and run. The information for each labelled group of specimens was carefully recorded in a notebook until time permitted the making of permanent labels.

The trapping sites selected were located in sections C, E, I, and J. These sites were selected based on the type of prairie conditions existing in the area. Sections C and J could be described as mesic prairie. Section I could be described as wet prairie. Section E could be described as transitional from mesic prairie on the north to savannah on the south. It is not easy to define savannah since this ecotone exists more in theory than as an actual environment in Illinois. Section E, nevertheless, had a quality that resembles the description authorities believe must have been present in presettlement savannah (Madson, 1983). This is an area of succession, along a north-south gradient, where stands of sassafras (Sassafras albidum) and staghorn sumac (Rhus typhina) are replaced by American elm (Ulmus americana) and blackberry briars (Rubus allegheniensis). The transition continues to the south as one can observe wild apple (Malus sp.) and wild black cherry (Prunus serotina) interspersed with shingle oak (Quercus imbricaria). Traps in Section E were placed on a

finger of mesic prairie which extends into this successional gradient (See figure 6).

The wet prairie in section I stays moist all year, even in drought conditions, due to an iron spring that emerges here (figure 7). The mesic prairie of section C is a characteristic tallgrass prairie with good stands of big bluestem (Andropogon gerardii) and Indian grass (Sorghastrum nutans). (See figure 8.) Section J has a good population of prairie blazing-star (Liatris pycnostachia) and little bluestem (Schizachyrium scoparium). (See figures 9 and 10.)

It was decided that the four sites would represent four prairie situations with two test stations at each site. Care was taken to select a station where there was enough open space above the trap to allow flying insects access to the bait. It was also significant in this project to place the traps toward the center of the right-of-way to be more certain of collecting beetles from the prairie and not adjacent areas. There was also a need to minimize disturbances from vehicle traffic on either side of the station.

Methods of Sampling

A two-week trapping period consisting of two 5-day runs were conducted for July and August. Only one run was conducted in September. The double-run method allowed the baits to be switched at the two sites as a control of any possible variances in site character. Simultaneously, a double sample was obtained from a slightly larger sampling area.

Methods of Sample Treatment

At the end of the five-day run, specimens in each trap were transferred to a prelabelled jar for transport to the lab. In the lab, the specimens were rinsed with 40% isopropyl alcohol to remove

the antifreeze. Specimens were then placed in a solution of 40% isopropyl alcohol. Later, they were rinsed a second time with alcohol and placed in a fresh alcohol solution.

The beetles were separated from the other insects in each sample. A dozen representatives of each species collected from each station of each run were mounted and labelled. In some cases, less than a dozen specimens of a particular species were trapped so they were all mounted. Beetles collected were identified to family. The members of Scarabeidae were identified to genus.

Results and Discussion- Bait Attractiveness

The data collected from the field has been organized into six tables which follow the results section of this paper. The first five tables present the data for each of the five trapping periods. Table six shows combined dung and carrion totals for the five trappings and lists a grand total of the beetles trapped in dung and carrion. In this section, I shall deal with the three facets of this study which are the quantitative and qualitative results of: 1. bait attractive-ness, 2. seasonal influences, and 3. habitat influences.

Some members of beetle families collected from pitfall traps are clearly incidentals. These beetles usually occur in traps inconsistently and in small numbers. They cannot be dealt with difinitively concerning bait attraction. However, beetles which occur in traps consistently and in significant numbers obviously show bait affinity.

The data from the tables shows some interesting general results from the five trapping periods. There were a total of 20 families of beetles represented in the traps. This includes 75 species and 5134 specimens. This data is interesting from the aspect of biotic productivity of a prairie situation. It can be useful in assessing the condition of a natural community. Follow-up studies for the student could include a comparative study of prairie and woodland or prairie and "other habitat" which may be a disturbed area of some type. Another interesting project would be a comparative study of different known prairie remnants.

I have attempted to approach the topic of bait preference by comparing the number of specimens taken from undisturbed traps. Thus, the number of beetles of a specific taxa collected per dung trap was based on 15 undisturbed traps and for carrion it was 7 traps. An

average number of beetles per trap was then calculated to determine bait frequency. Table 7 shows the results of these averages ranked in order of greatest to least frequent for each bait.

From the totals at the bottom of Table 7, it can be observed that dung traps yielded, on the average, nearly 30 (29.9) more beetles per trap than did carrion traps. This indicates that dung has an overall greater attractiveness to beetles than carrion. Although dung appears to pull in greater numbers of beetles, the relative difference in diversity of beetles showing up in dung and carrion traps is insignificant. There were representatives from 19 families in dung traps while representatives from 20 families were collected from carrion traps.

The scarabs were collected most frequently from both dung and carrion traps. Particularly, the genus Onthophagus was prevalent, making up 70 percent of the scarabs taken in dung and 99.8 percent of scarabs in carrion. Onthophagus occurred more frequently in carrion than in dung. An average of 22.8 more specimens was collected from carrion than from dung. Since there were large numbers- 2333- of Onthophagus to deal with, this seems to indicate a preference for carrion.

The staphylinids were more common in dung traps averaging 30.5 to 18.1 beetles in dung and carrion. There was virtually no difference in diversity. Sixteen species were collected from both baits. A total of twenty species of staphylinids were taken from traps. The staphylinids are indeed a diverse group in prairie settings.

The histerids were nearly equally attracted to both dung and carrion. An average of 24.4 occurred in dung and 26.9 in carrion. The same four species were attracted to both traps.

The hydrophyllids were primarily attracted to dung, which is in keeping with their feeding habits (Dillon and Dillon, 1961). Only 3 specimens were collected from carrion traps while 67 were found in dung traps.

The silphids were collected most numerously from carrion traps. Two specimens appeared in dung while 29 were taken from carrion. This result was expected. The number of silphids taken, however, was small and their frequency was sporadic leaving some question about the population in the area trapped and their relationships to prairie.

The chrysomelids feed primarily on the roots, stems, and leaves of plants (Dillon and Dillon, 1961). The likelihood that the specimens taken in dung were attracted to it is not great. Although 50 specimens fell in the dung traps, it is very possible this resulted from the numerousness of species b in Anderson Prairie. Species b accounted for the majority of the specimens taken in both dung and carrion traps.

All other beetles trapped, representing 13 families, were collected in small numbers and therefore showed little bait attraction. Table 7 lists the families which average less than 2 beetles per trap.

Results and Discussion- Seasonal Influences

Table 8 is an arrangement of data to show the number of specimens taken in both baits across a seasonal spectrum. Numbers pertain to the family level. Beetles of the various families which occurred in insignificant numbers in traps have been excluded. An average number of beetles per undisturbed trap was calculated. However, the actual counts were included in the table to draw attention to the taxa where small and large numbers of beetles were taken.

The ability to measure seasonal influences on beetle populations is greatly hindered by trap disturbance. A total of 4 traps were set for each bait per run, but disturbance of the traps reduces the data collected. The number of undisturbed traps for dung and carrion respectively for each run were as follows: run #1- 4/3, run #2- 3/1, run #3- 4/2, run #4- 3/0, run #5- 2/2. Averages based on undisturbed traps can be misleading especially when dealing with small numbers of beetles and few traps where adding 10 or 20 specimens to a trap could exponentially change the results. Nevertheless, despite the variables which are inherent in such a project, a certain degree of understanding about beetle populations can be measured by looking at these averages.

The data from table 8 was translated into 4 graphs. The graphs illustrate the fluctuations in beetles trapped chronologically for the five runs. As these graphs are studied, it becomes apparent that a relatively short-term single collection of seasonal data strongly measures weather conditions during the trapping period. At least, this is certainly suspected. During hot dry weather, the dung dries up rapidly and becomes less attractive to beetles. Carrion-baited traps are less susceptible to this drying. The cryptic nature of many beetles makes assessing their frequency to traps in various gradations of environmental conditions difficult. Of course there is the issue of trap location to consider also. Some traps were deliberated shaded while others were placed in open areas. Exposure to sun and wind influences the condition of the bait and its attractiveness to beetles. Measuring seasonal data over a designated period of weeks produces a graph of widely fluctuating numbers. Certainly more work must be

done with control or measurement of these variables before any definite conclusions can be stated. However, there does seem to be some peeking of scarab populations during late-July in both dung and carrion. The staphylinids seem to reach their highest peeks late in the summer during September again in both baits. The histerids peeked in mid-August in dung and late-August in carrion. The hydrophyllids peeked in late-July in dung and carrion. The silphids were not frequent enough to be counted in dung and they peeked in the September run in carrion.

Results and Discussion- Influences of Habitat

Table 9 represents the totals of beetles trapped in the three habitat types described under "Methods of Site Selection" on pages 4 and 5. Averages of beetles per trap were used again to equalize disturbance among areas. From the data in Table 9, a series of six three-dimensional bar graphs were generated. Each graph represents the data collected for a family of beetles with the genus Onthophagus included as a significant taxa in the Scarabeidae.

It should be noted that as with the influences of season there are many factors at work influencing the beetles that may be present in a particular area. However, a graph of the average number of beetles in an area may give us some data to begin looking at a trend. There may be some subtle or not so subtle differences, for example, such as light intensity or moisture levels in wet prairie versus a savannah. Studies that correlate these factors to beetle populations are in order.

The staphylinids, namely Onthophagus, were trapped most numerously in the wet prairie of section I. There were over twice as many beetles per trap occurring here than in either mesic prairie or savannah. Section E savannah yielded the smallest average per trap.

beetles per trap occurring here than in either mesic prairie or savannah. Section E savannah yielded the smallest average per trap. This result leads to some pondering about the influence of trees on Onthophagus. It also leads to speculation about the fondness of Onthophagus for uninterrupted prairie and its role as a prairie indicator.

The staphylinids were nearly equal in frequency in mesic and wet prairie. The number of specimens taken in savannah was substantially reduced on the order of fifteen beetles per trap. This is near to a fifty percent reduction in beetles from mesic and wet prairie to savannah. It is possible that the staphylinids are showing less preference for wooded areas. Perhaps data from more highly wooded areas would bare this out.

The histerids showed an interesting reversal of frequency to traps. The savannah yielded the greatest number of beetles per trap with 49.6 while mesic prairie yielded a distant second with 27.4. Only 8 beetles were trapped on the average from wet prairie. Perhaps the histerids are showing a gradient in population from the successional stages of marsh to grassland to woodland. Taking this hypothesis one step further it may be reasoned that the histerids are perhaps displaying a greater adaptability to woodland habitat or mixed grassland and woodland. Some members may be a good example of an "edge" group which prefer to pander about between the prairie and woodland.

The hydrophilids did not vary significantly from one area to another in Anderson Prairie. They were not collected with abundance at any single trapping. The data collected therefore must be interpreted mindful of that factor. The wet and mesic prairie seem to

yield slightly better numbers of hydrophilids than savannah where a total of only six specimens were trapped during the entire project.

The silphidae were trapped with abundance in just one of the five runs. Only one specimen was trapped in the savannah area while the wet and mesic prairie areas provided better yields of silphids. Since the yields were small, it is difficult to conclude much about this group concerning habitat influence.

Table 1. Number of species and specimens of Coleoptera taken in pitfall traps in Anderson Prairie, Christian Co., Il July 19-24, 1987 (Run #1).

Family	Section C		Section E		Section I		Section J		Totals	
	dung	carr.	dung	carr.	dung	carr. ✕	dung	carr. ✕	dung	carr.
Carabidae										
species c	--	--	--	--	--	--	--	1	--	1
Hydrophilidae										
species a	2	--	3	--	5	--	6	--	16	--
Staphylinidae										
species a	6	2	--	--	--	--	--	--	6	2
b	4	--	--	--	--	--	--	--	4	--
c	1	--	--	--	--	--	--	--	1	--
d	1	--	--	--	--	--	--	--	1	--
e	21	--	4	--	2	--	1	--	28	--
f	8	--	--	1	--	--	--	--	8	1
i	1	--	--	--	1	--	--	--	2	--
k	1	--	5	--	--	--	--	--	6	--
l	--	--	--	--	1	--	--	--	1	--
n	--	--	--	--	1	--	--	--	1	--
t	--	--	--	--	1	--	--	--	1	--
Histeridae										
species a	2	--	1	4	3	--	--	--	6	4
b	30	1	39	9	1	--	3	1	73	11
c	5	5	1	4	5	--	3	--	14	9
d	--	--	--	--	2	--	--	--	2	--
Scarabeidae										
Onthophagus a	54	1	70	32	49	--	11	3	184	36
b	33	--	6	2	40	--	6	--	85	2
Elateridae										
species a	--	--	--	3	--	--	--	--	--	3
b	--	--	--	--	--	--	--	1	--	1
Dermestidae										
species a	--	--	--	1	--	--	--	--	--	1
b	1	--	--	--	--	--	--	--	1	--
Anobiidae sp.	--	--	--	--	1	--	--	--	1	--
Mordellidae										
species a	--	--	--	--	--	--	1	--	1	--
b	--	--	--	1	--	--	--	--	--	1

Table 1 continued

Family	Section C		Section E		Section I		Section J		totals	
	dung	carr.	dung	carr.	dung	carr. ⁂	dung	carr. ⁂	dung	carr.
Chrysomelidae										
species a	1	--	--	--	--	--	--	--	1	--
Curculionidae										
species a	--	--	--	--	--	--	--	1	--	1

⁂ Indicates traps which were disturbed.

Table 2. Number of species and specimens of Coleoptera taken in pitfall traps in Anderson Prairie, Christian Co., Il July 26-31, 1987 (Run #2).

Family	Section C		Section E ¥		Section I ¥		Section J ¥		Totals	
	dung	carr.	dung	carr.	dung	carr.	dung	carr.	dung	carr.
Hydrophilidae										
species a	10	--	10	--	8	--	21	--	48	--
Staphylinidae										
species a	--	1	--	--	--	--	--	--	--	1
b	1	3	5	--	2	--	3	--	11	3
c	1	1	--	2	2	--	--	--	3	3
d	--	--	1	--	--	--	--	--	1	--
e	6	--	7	--	6	--	21	--	40	--
f	1	1	--	--	4	--	--	--	5	1
i	4	1	--	3	--	--	4	--	8	4
n	--	--	--	1	--	--	--	--	--	1
p	--	1	--	--	--	--	--	--	--	1
q	1	--	--	--	--	--	--	--	1	--
r	--	--	--	1	--	--	--	--	--	1
Silphidae										
species b	1	1	--	--	--	--	--	--	1	1
c	1	--	--	--	--	--	--	--	1	--
Histeridae										
species a	1	2	5	3	1	--	3	--	10	5
b	30	147	14	51	10	--	32	1	86	199
c	3	10	4	12	2	--	10	1	19	23
d	--	1	--	--	--	--	--	--	--	1
Scarabeidae										
Onthophagus a	85	195	112	145	240	--	368	11	805	351
b	140	57	141	9	231	--	257	--	909	66
Aphodius b	1	--	3	--	--	--	--	--	4	--
Ataenius a	--	1	--	--	--	--	1	--	1	1
Phanaeus sp.	1	--	--	--	--	--	--	--	1	--
Geotrupes sp.	1	--	--	--	--	--	--	--	1	--
Dermestidae										
species a	--	3	--	--	--	--	--	--	--	3
Nitidulidae										
species a	1	--	--	--	--	--	--	--	1	--
Curculioniidae										
species a	--	--	--	--	--	--	1	--	1	--

¥ Indicates traps which were disturbed.

Table 3. Number of species and specimens of Coleoptera taken in pitfall traps in Anderson Prairie, Christian Co., Il Aug. 16-21, 1987 (Run #3).

Family	Section C		Section E		Section I		Section J		Totals	
	dung	carr.	dung	carr.	dung ¥	carr. ¥	dung	carr. ¥	dung	carr.
Hydrophilidae										
species a	2	--	3	--	--	--	4	--	9	--
Staphylinidae										
species a	8	5	6	3	--	--	--	1	14	9
b	--	--	3	--	--	--	4	--	7	--
c	--	--	1	1	--	--	4	--	5	1
d	--	--	--	--	--	--	3	--	3	--
e	1	--	8	--	--	--	21	--	30	--
f	--	--	3	3	--	--	1	--	4	3
h	--	--	1	1	--	--	--	--	1	1
i	--	--	1	3	--	--	--	--	1	3
j	--	--	2	--	--	--	2	--	4	--
k	--	--	2	--	--	--	1	--	3	--
l	--	--	--	--	--	--	--	1	--	1
n	--	--	--	--	--	--	1	--	1	--
Silphidae										
species b	--	--	--	1	--	--	--	--	--	1
Histeridae										
species a	1	--	6	7	--	--	--	--	7	7
b	15	1	58	70	--	--	38	--	111	71
c	1	2	6	23	--	--	8	--	15	25
Scarabeidae										
Onthophagus a	20	6	107	183	--	--	46	4	173	193
b	5	--	31	2	--	--	11	--	47	2
Aphodius a	--	--	--	1	--	--	--	--	--	1
Elateridae										
species b	--	--	1	1	--	--	--	--	1	1
Cantharidae sp.	--	--	--	--	--	--	2	--	2	--
Dermestidae										
species a	1	--	--	--	--	--	--	--	1	--
c	--	1	--	--	--	--	--	--	--	1
Chrysomelidae										
species a	--	--	1	--	--	--	--	--	1	--
b	2	--	18	1	--	--	17	3	37	4
c	1	--	--	--	--	--	2	--	3	--
d	1	--	--	--	--	--	--	--	1	--

¥ Indicates traps which were disturbed.

Table 4. Number of species and specimens of Coleoptera taken in pitfall traps in Anderson Prairie, Christian Co., Il Aug. 23-28, 1987 (Run #4).

Family	Section C dung	Section C carr. ¥	Section E dung	Section E carr. ¥	Section I dung ¥	Section I carr. ¥	Section J dung	Section J carr. ¥	Totals dung	Totals carr.
Cicindelidae sp.	--	--	--	--	--	--	1	1	1	1
Staphylinidae										
species a	5	1	2	--	2	--	--	--	7	1
b	4	--	--	--	--	--	1	--	1	--
c	1	--	3	--	--	--	1	--	5	--
d	--	--	8	--	--	--	1	--	9	--
e	1	4	15	--	--	--	28	--	44	4
f	8	--	--	1	--	--	10	--	10	--
i	1	--	--	--	1	--	1	--	1	--
n	--	1	1	--	--	--	--	--	1	1
p	--	--	--	--	--	--	1	--	1	--
Histeridae										
species a	--	--	1	--	--	--	2	--	3	--
b	3	--	16	--	--	--	18	--	37	--
c	--	--	3	1	--	--	--	--	3	1
Scarabeidae										
Onthophagus a	9	--	23	1	--	--	47	--	79	1
b	3	--	13	--	--	--	18	--	34	--
Ataenius a	1	--	--	--	--	--	--	--	1	--
Elateridae										
species b	--	--	--	--	--	--	1	--	1	--
c	--	--	--	--	--	--	1	--	1	--
Cantharidae sp.	1	1	1	--	--	--	--	8	2	9
Mordellidae										
species b	--	1	--	--	--	--	--	--	--	1
Chrysomelidae										
species b	--	--	2	--	--	--	1	--	3	--
c	--	--	--	--	--	--	1	--	1	--
g	--	--	2	--	--	--	--	--	2	--
Curculionidae										
species b	--	--	--	1	--	--	--	--	--	1

¥ Indicates traps which were disturbed.

Table 5. Number of species and specimens of Coleoptera taken in pitfall traps in Anderson Prairie, Christian Co., Il Sept. 13-18, 1987 (Run #5).

Family	Section C		Section E		Section I		Section J		Totals	
	dung	carr.	dung ¥	carr. ¥	dung ¥	carr.	dung	carr. ¥	dung	carr.
Carabidae										
species a	--	13	--	--	--	--	--	--	--	13
b	1	--	--	--	--	--	--	--	1	--
d	--	--	--	--	2	--	--	--	2	--
e	--	--	--	--	--	1	--	--	--	1
f	--	--	1	--	--	--	--	--	1	--
Hydrophilidae										
species a	1	--	1	--	2	--	--	--	4	--
b	--	--	--	--	--	--	1	--	1	--
Staphylinidae										
species a	7	6	7	3	--	--	--	--	14	9
b	--	--	1	--	--	--	--	--	1	--
c	1	--	1	--	--	3	1	--	3	3
d	8	1	1	--	--	--	3	--	12	1
e	27	4	15	--	2	15	61	--	105	19
f	10	13	20	--	1	16	10	--	41	19
g	--	--	--	--	--	1	--	--	--	1
h	1	--	1	--	--	--	--	--	2	--
i	--	1	11	--	--	4	2	--	13	5
j	--	--	3	--	--	--	--	--	3	--
m	--	1	--	--	--	--	--	--	--	1
n	3	1	1	--	4	22	22	2	30	25
o	--	7	--	--	--	1	7	--	7	8
p	--	2	7	--	--	1	13	--	20	3
s	--	--	--	--	--	1	--	--	--	1
Silphidae										
species a	--	13	--	--	--	14	--	--	--	27
b	--	--	--	1	--	--	--	--	--	1
Leptinidae sp.	--	--	--	--	--	1	--	--	--	1
Scydmaenidae sp.	--	--	--	--	--	--	1	--	1	--
Histeridae										
species a	2	--	--	--	--	--	--	--	2	--
b	--	2	4	1	--	--	1	--	5	3
c	--	--	1	--	--	--	1	--	2	--
Scarabeidae										
Onthophagus a	27	128	96	106	54	244	31	2	208	480
b	7	1	12	5	--	--	4	--	23	6
c	1	--	--	--	--	--	--	--	1	--
Ataenius b	--	--	1	--	--	--	--	--	1	--

Table 5 continued.

Family	Section C dung	Section C carr.	Section E dung ¥	Section E carr. ¥	Section I dung ¥	Section I carr.	Section J dung	Section J carr. ¥	Totals dung	Totals carr.
Elateridae										
species c	--	--	1	--	1	--	12	--	14	--
Cantharidae sp.	--	--	--	--	--	--	2	--	2	--
Meloidae sp.	--	1	--	--	--	--	--	--	--	1
Nitidulidae										
species a	1	2	--	1	9	5	--	--	10	8
b	1	--	--	--	--	--	--	--	1	--
c	--	--	--	--	1	1	--	--	1	1
d	--	--	--	--	1	--	--	--	1	--
e	--	--	--	--	1	--	--	--	1	--
f	--	--	--	--	1	--	--	--	1	--
Chrysomelidae										
species a	1	--	--	--	--	--	1	--	2	--
b	8	6	5	3	2	1	14	1	29	11
c	--	1	--	--	--	--	6	--	6	1
e	1	--	--	--	--	--	--	--	1	--
f	--	--	--	--	--	1	--	--	--	1
h	--	1	--	--	--	--	--	--	--	1
Curculionidae										
species a	--	--	1	--	--	--	--	--	1	--
Scolytidae sp.	--	1	--	--	--	--	--	--	--	1

¥ Indicates traps which were disturbed.

Table 6. Number of species and specimens of Coleoptera taken in pitfall traps in Anderson Prairie, Christian Co., Il July 19-Sept. 18, 1987 (Runs 1-5 combined).

Family	Section C		Section E		Section I		Section J		Totals	
	dung x	carr. x	dung xx	carr. xxx	dung xxx	carr. xxxx	dung	carr. xxxxx	dung	carr.
Cicindelidae sp.	--	--	--	--	--	--	1	1	1	1
Carabidae										
species a	--	13	--	--	--	--	--	--	--	13
b	1	--	--	--	--	--	--	--	1	--
c	--	--	--	--	--	--	--	1	--	1
d	--	--	--	--	2	--	--	--	2	--
e	--	--	--	--	--	1	--	--	--	1
f	--	--	1	--	--	--	--	--	1	--
Hydrophilidae										
species a	15	--	17	--	10	--	31	--	73	--
b	--	--	--	--	--	--	1	--	1	--
Limnebiidae sp.	1	--	--	--	--	--	--	--	1	--
Staphylinidae										
species a	26	15	15	6	--	--	--	1	41	22
b	5	3	9	--	2	--	8	--	24	3
c	4	1	5	3	2	3	6	--	17	7
d	9	1	10	--	--	--	6	--	25	1
e	56	8	49	--	10	15	132	--	247	8
f	19	14	23	4	5	16	21	--	68	34
g	--	--	--	--	--	1	--	--	--	1
h	1	--	2	1	--	--	--	--	3	1
i	5	2	12	6	1	4	3	--	21	12
j	--	--	5	--	--	--	2	--	7	--
k	1	--	7	--	--	--	1	--	9	--
l	--	--	--	--	1	--	--	1	1	1
m	--	1	--	--	--	--	--	--	--	1
n	3	2	2	1	5	22	23	2	30	27
o	--	7	--	--	--	1	7	--	7	8
p	--	3	7	--	--	1	14	--	21	4
q	1	--	--	--	--	--	--	--	1	--
r	--	--	--	1	--	--	--	--	--	1
s	--	--	--	--	--	1	--	--	--	1
t	--	--	--	--	1	--	--	--	1	--
Silphidae										
species a	--	13	--	--	--	14	--	--	--	27
b	1	1	--	2	--	--	--	--	1	3
c	1	--	--	--	--	--	--	--	1	--
Leptinidae sp.	--	--	--	--	--	1	--	--	--	1
Scydmaenidae sp.	--	--	--	--	--	--	1	--	1	--

Table 6 continued

Family	Section C dung	Section C carr. *	Section E dung **	Section E carr. ***	Section I dung ***	Section I carr. ****	Section J dung	Section J carr. *****	Totals dung	Totals carr.
Histeridae										
species a	6	2	13	14	4	--	5	--	28	16
b	78	151	131	131	11	--	92	2	312	284
c	9	17	15	40	7	--	22	1	53	58
d	--	1	--	--	2	--	--	--	2	1
Scarabeidae										
Onthophagus a	195	330	408	467	343	244	676	53	1622	1094
b	188	58	203	18	271	--	296	2	958	78
c	1	--	--	--	--	--	--	--	1	--
Aphodius a	--	--	--	1	--	--	--	--	1	--
b	1	--	3	--	--	--	--	--	4	--
Ataenius a	1	1	--	--	--	--	1	--	2	1
b	--	--	1	--	--	--	--	--	1	--
Phanaeus sp.	1	--	--	--	--	--	--	--	1	--
Geotrupes sp.	1	--	--	--	--	--	--	--	1	--
Elateridae										
species a	--	--	--	3	--	--	--	--	--	3
b	--	--	1	1	--	--	1	1	2	2
c	--	--	2	--	--	--	1	--	3	--
Cantharidae sp.	1	1	1	--	--	--	4	8	6	9
Dermestidae										
species a	1	4	--	--	--	--	--	--	1	4
b	1	--	--	--	--	--	--	--	1	--
c	--	1	--	--	--	--	--	--	--	1
Anobiidae sp.	--	--	--	--	1	--	--	--	1	--
Meloidae sp.	--	1	--	--	--	--	--	--	--	1
Mordellidae										
species a	--	--	--	--	--	--	1	--	1	--
b	--	1	--	1	--	--	--	--	--	2
Nitidulidae										
species a	2	2	--	1	9	5	--	--	11	8
b	1	--	--	--	--	--	--	--	1	--
c	--	--	--	--	1	1	--	--	1	1
d	--	--	--	--	1	--	--	--	1	--
e	--	--	--	--	1	--	--	--	1	--
f	--	--	--	--	1	--	--	--	1	--

Table 6 continued

Family	Section C dung	Section C carr. ¥	Section E dung ¥¥	Section E carr. ¥¥¥	Section I dung ¥¥¥	Section I carr. ¥¥¥¥	Section J dung	Section J carr. ¥¥¥¥¥	totals dung	totals carr.
Chrysomelidae										
species a	2	--	1	--	--	--	1	--	4	--
b	10	6	25	4	2	1	32	4	69	15
c	--	2	--	--	--	--	9	--	9	2
d	1	--	--	--	--	--	--	--	1	--
e	1	--	--	--	--	--	--	--	1	--
f	--	--	--	--	1	--	--	--	1	--
g	--	--	2	--	--	--	--	--	2	--
h	--	1	--	--	--	--	--	--	--	1
Curculioniidae										
species a	--	--	1	--	--	--	1	1	2	1
b	--	--	--	1	--	--	--	--	--	1
Scolytidae sp.	--	1	--	--	--	--	--	--	--	1

¥ Indicates traps which were disturbed.

Table 7. Ranking of frequency of beetle families to undisturbed dung and carrion pitfall traps in Anderson Prairie, Christian Co., Il., July 19-Sep. 18, 1987.¥

Family	DUNG		CARRION	
	Total Beetles (15 Traps)	Ave./Trap	Total Beetles (7 Traps)	Ave./Trap
1. Scarabeidae sp.	2109	140.6	853	121.9 (1)
Onthophagus sp.	1482	98.8	851	121.6 (1)
2. Staphylinidae sp.	457	30.5	127	18.1 (3)
3. Histeridae sp.	367	24.4	188	26.9 (2)
4. Hydrophilidae sp.	67	4.5	3	.43 (9)
5. Chrysomelidae sp.	50	3.3	11	1.6 (5)
6. Elateridae sp.	15	1.0	1	.14(10)
7. Cantharidae sp.	6	.4	10	1.4 (6)
8. Nitidulidae sp.	3	.2	8	1.1 (7)
9. Silphidae sp.	2	.13	29	4.1 (4)
10. Dermestidae sp.	1	.07	5	.71(8)
10. Anobiidae sp.	1	.07	0	0 (17)
10. Mordellidae sp.	1	.07	1	.14(10)
10. Curculionidae sp.	1	.07	1	.14(10)
10. Cicindelidae sp.	1	.07	0	0 (17)
10. Limnebidae sp.	1	.07	0	0 (17)
10. Scydmaenidae sp.	1	.07	0	0 (17)
17. Leptinidae sp.	0	0	1	.14(10)
17. Meloidae sp.	0	0	1	.14(10)
17. Scolytidae sp.	0	0	1	.14(10)
Totals	3143	209.5	1257	179.6

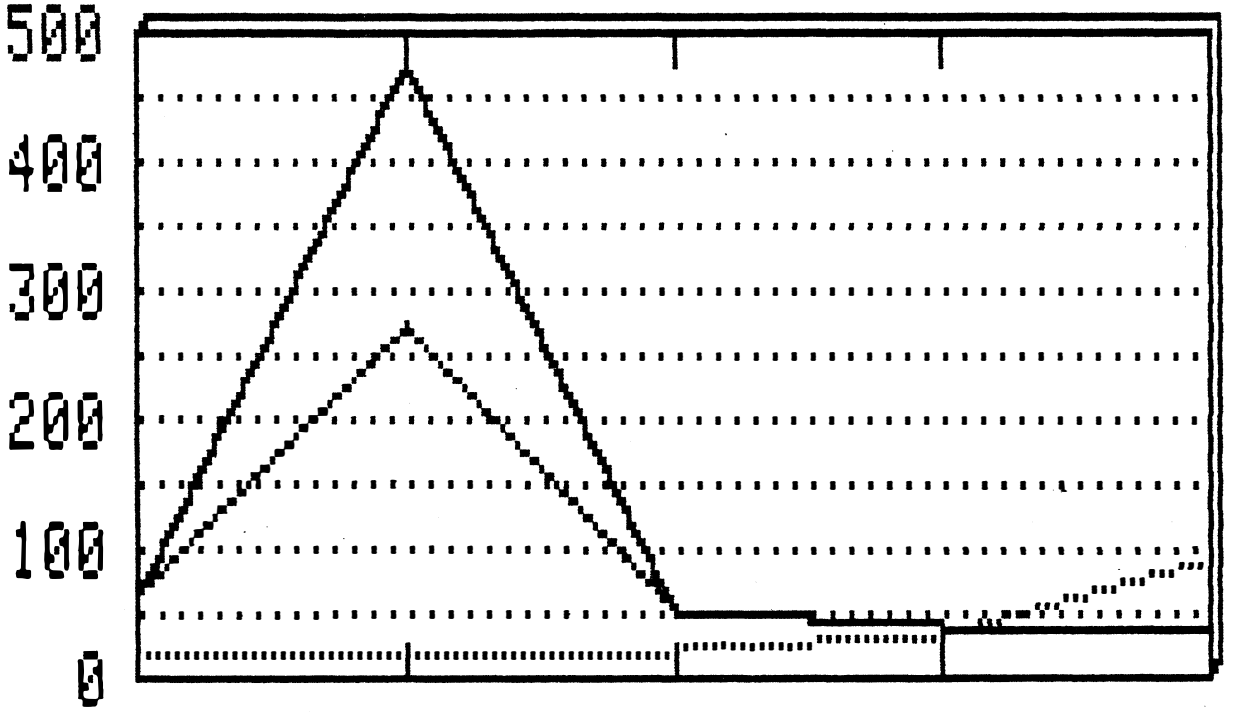
¥ Note that beetle families are ranked in order of frequency to dung bait and that the ranking of carrion frequency is the number in parenthesis following the average per trap.

Table 8. Number of specimens of Coleoptera taken in pitfall traps per run in Anderson Prairie, Christian Co., Il, July 19-Sep. 18, 1987.

Family	Run #1 July 19-24		Run #2 July 26-31		Run #3 Aug. 16-21		Run #4 Aug. 23-28		Run #5 Sep. 13-18	
	dung	carr.	dung	carr.	dung	carr.	dung	carr.	dung	carr.
Scarabeidae	269	35	1436	253	220	192	114	0	70	373
Av./Trap	67.3	11.7	479.7	253	55	96	38	0	35	186.5
Onthophagus	269	35	809	252	220	191	114	0	70	373
Av./Trap	67.3	35	269.7	252	55	95.5	38	0	35	186.5
Staphylinidae	59	3	56	8	73	16	93	0	176	100
Av./Trap	14.8	3	18.7	8	18.3	8	31	0	88	50
Histeridae	95	23	92	160	133	103	43	0	4	2
Av./Trap	23.8	7.7	30.7	160	33.3	25.8	10.8	0	2	1
Hydrophilidae	16	0	39	0	9	0	0	0	3	0
Av./Trap	4	0	13	0	2.3	0	0	0	1.5	0
Silphidae	0	0	2	1	0	1	0	0	0	27
av./Trap	0	0	.7	1	0	.5	0	0	0	13.5

GRAPH OF SEASONAL INFLUENCES

AV. BEETLES PER TRAP (DUNG)



RUN #1 RUN #2 RUN #3 RUN #4 RUN #5

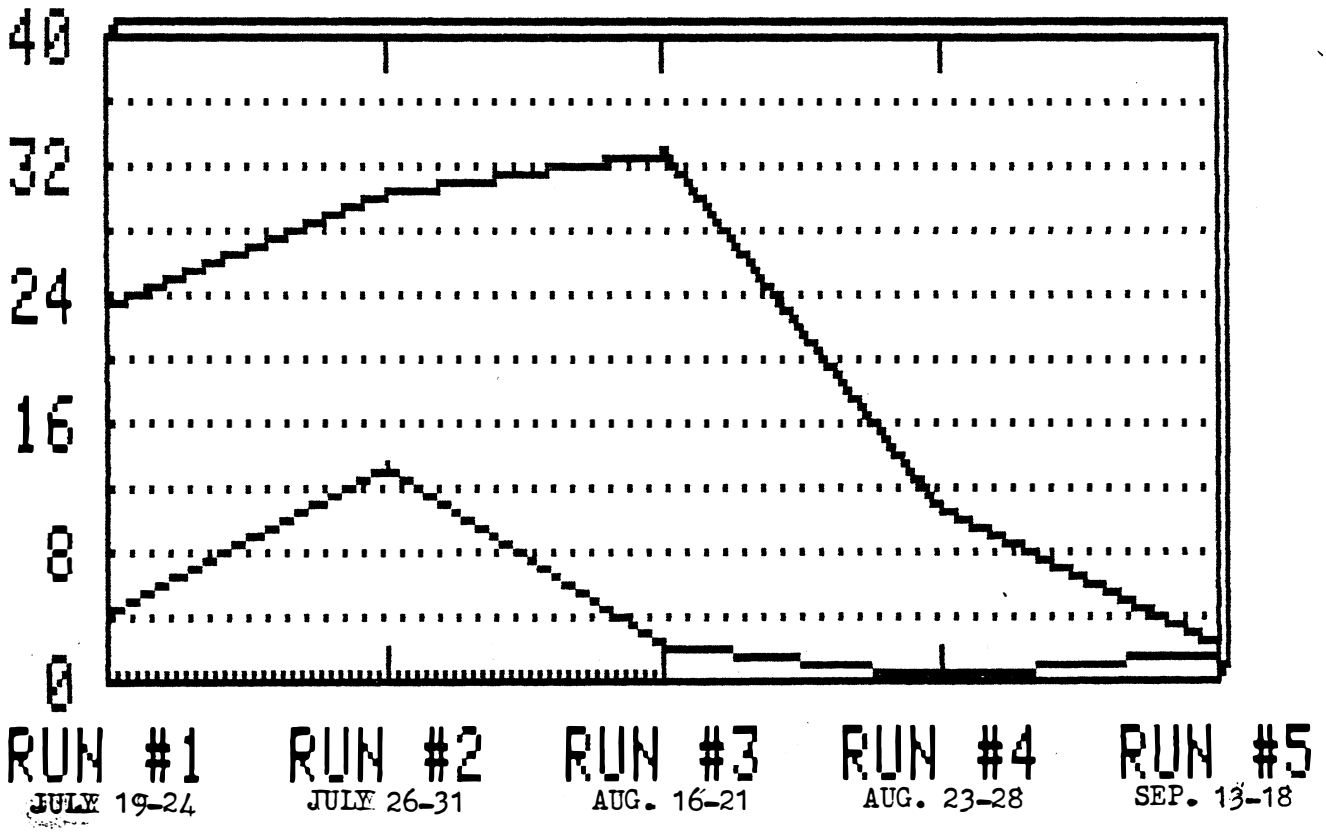
JULY 19–24 JULY 26–31 AUG. 16–21 AUG. 23–28 SEP. 13–18

TRAPPING DATES, 1987

▬ SCARAB. ▁ ONTHO. ..... STAPHYL.

GRAPH OF SEASONAL INFLUENCES

AV. BEETLES PER TRAP (DUNG)

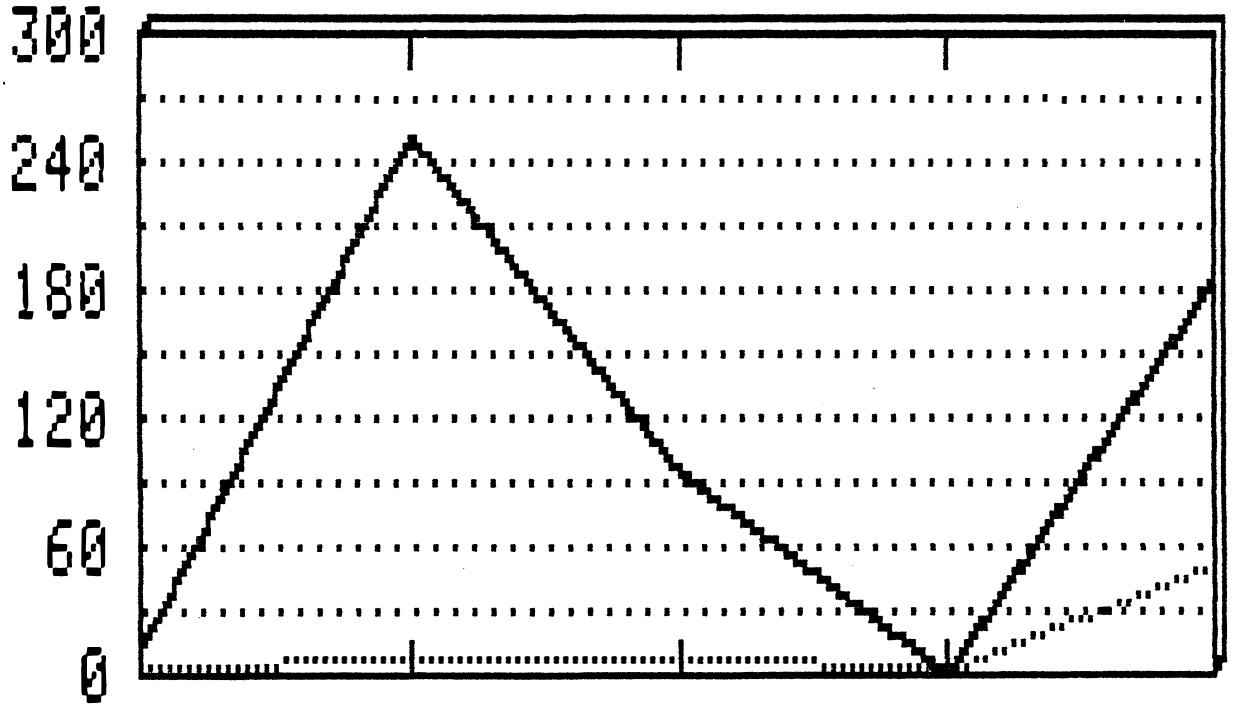


TRAPPING DATES, 1987

▬ HISTER. ▬ HYDROPH. ..... SILPH.

GRAPH OF SEASONAL INFLUENCES

AV. BEETLES PER TRAP (CARRION)

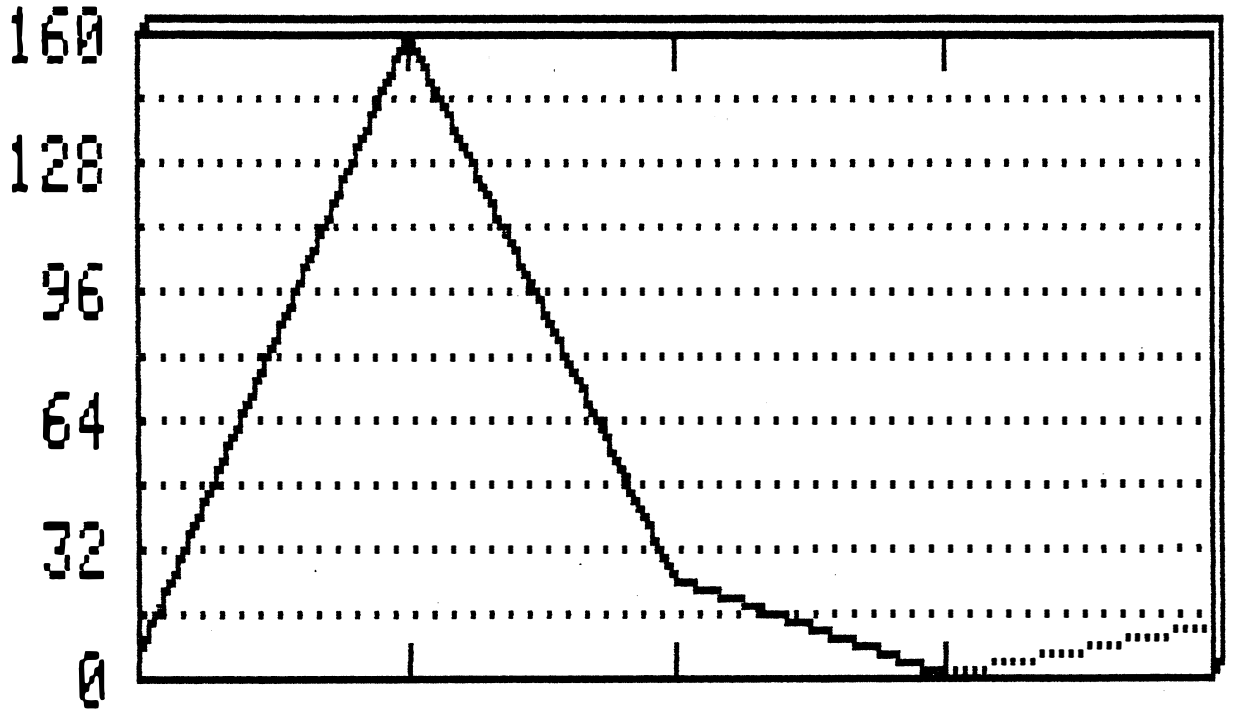


TRAPPING DATES, 1987

▬ SCARAB. ▬ ONTHOPH. ..... STAPHYL.

GRAPH OF SEASONAL INFLUENCES

AV. BEETLES PER TRAP (CARRION)



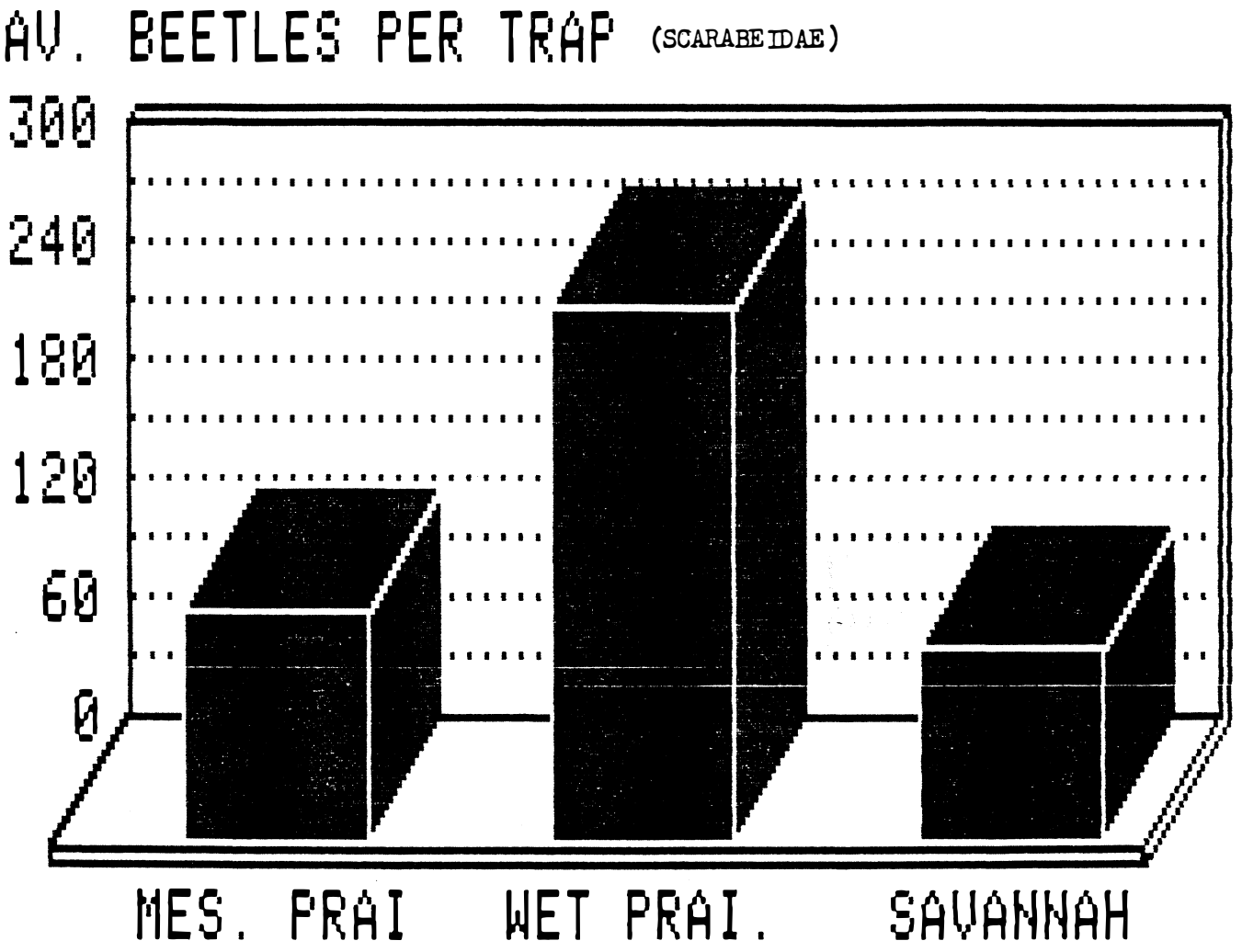
TRAPPING DATES, 1987

▬ HISTER. ▬ HYDROPH. ..... SILPH.

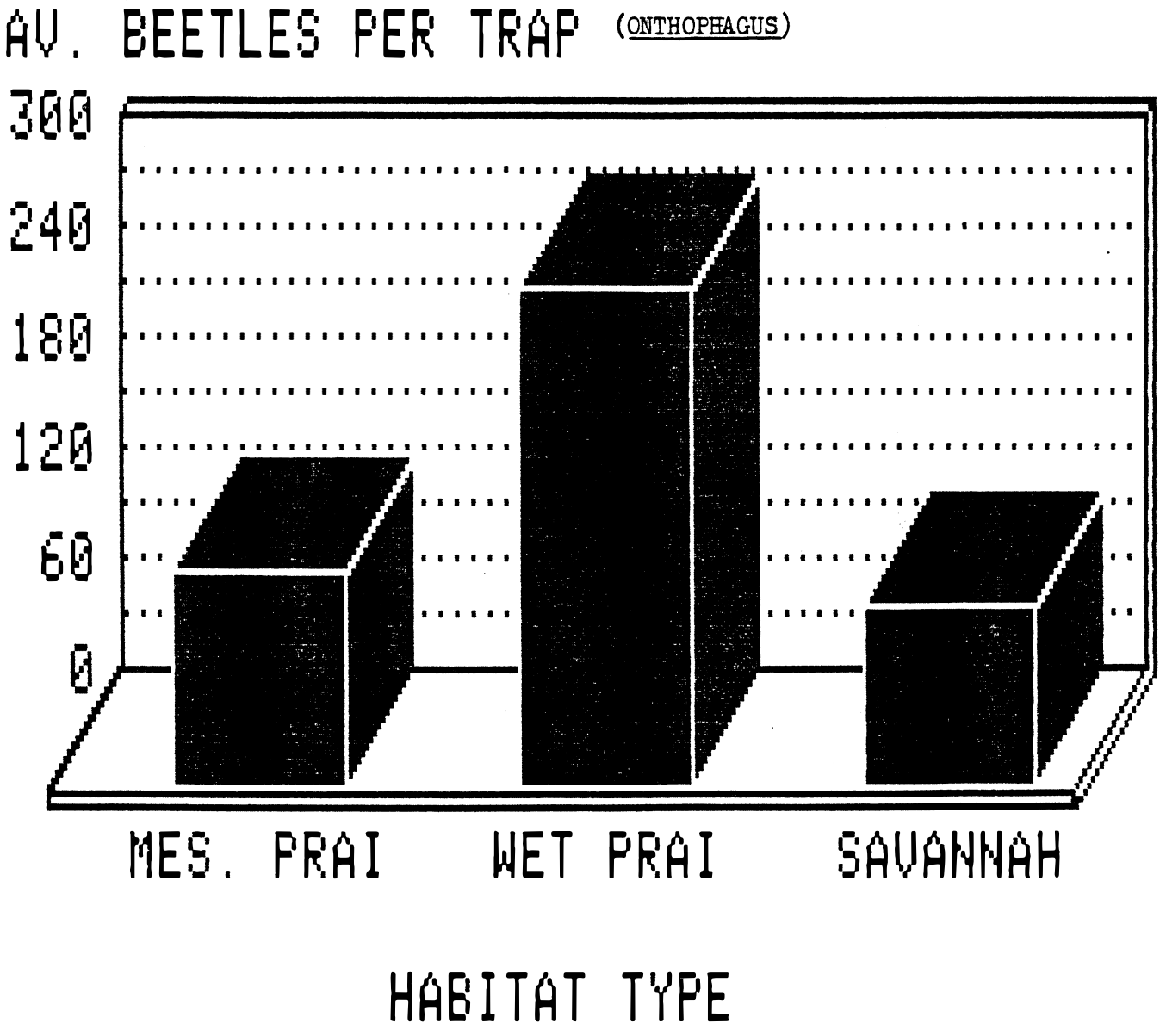
Table 9. Number of specimens of Coleoptera taken in pitfall traps per habitat in Anderson Prairie, Christian Co., Il, July 19-Sep. 18, 1987.

Family	Mesic Prairie Sections C,J	Wet Prairie Section I	Savannah Section E
Scarabeidae	1577	804	470
Av./Trap	112.6	268	94
Onthophagus	1571	804	469
Av./Trap	112.2	268	93.8
Staphylinidae	422	84	77
Av./Trap	30.1	28	15.4
Histeridae	383	24	248
Av./Trap	27.4	8	49.6
Hydrophilidae	47	13	6
Av./Trap	3.4	4.3	1.2
Silphidae	16	14	1
Av./Trap	1.14	4.7	.2

GRAPH OF HABITAT INFLUENCES



GRAPH OF HABITAT INFLUENCES



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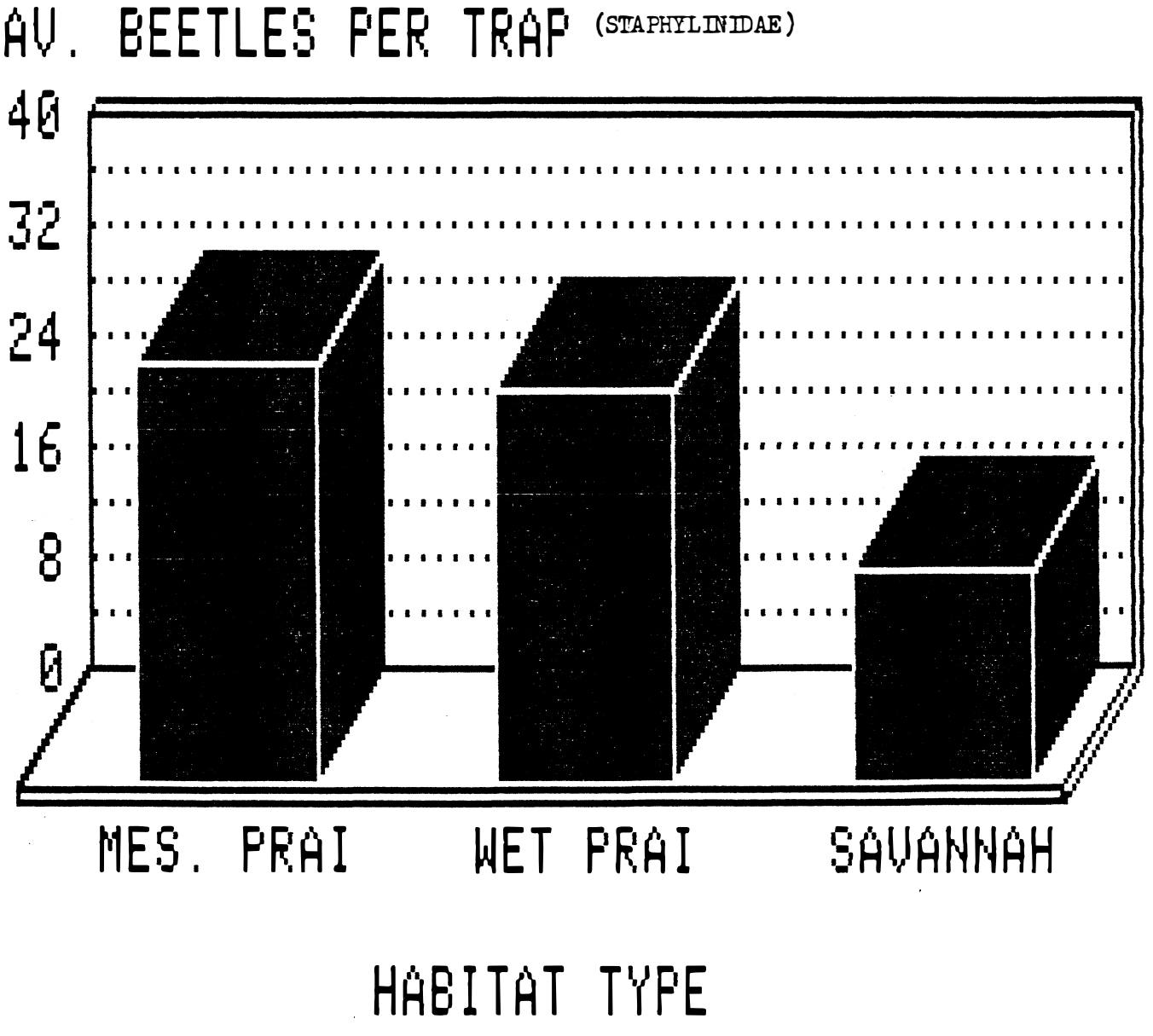

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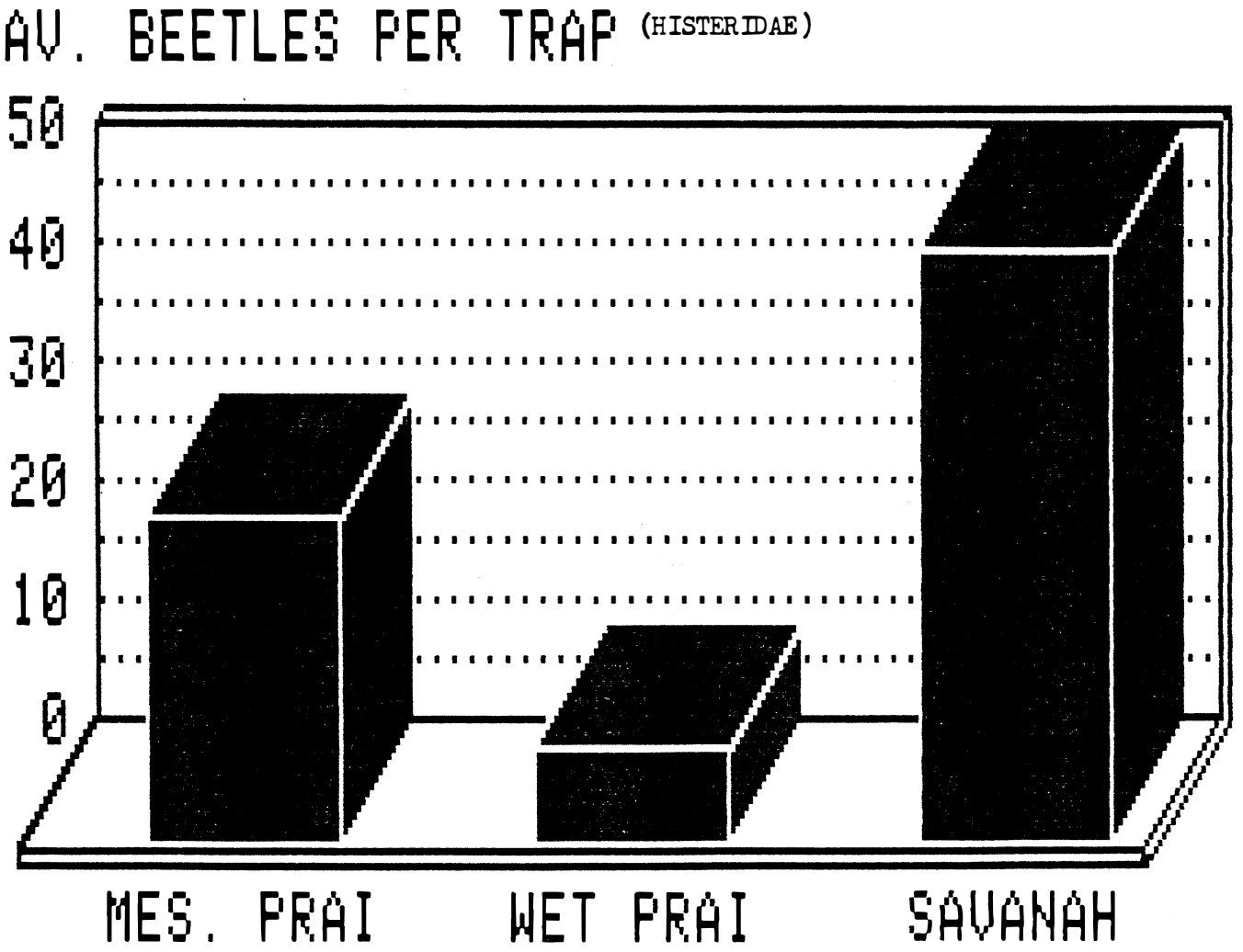
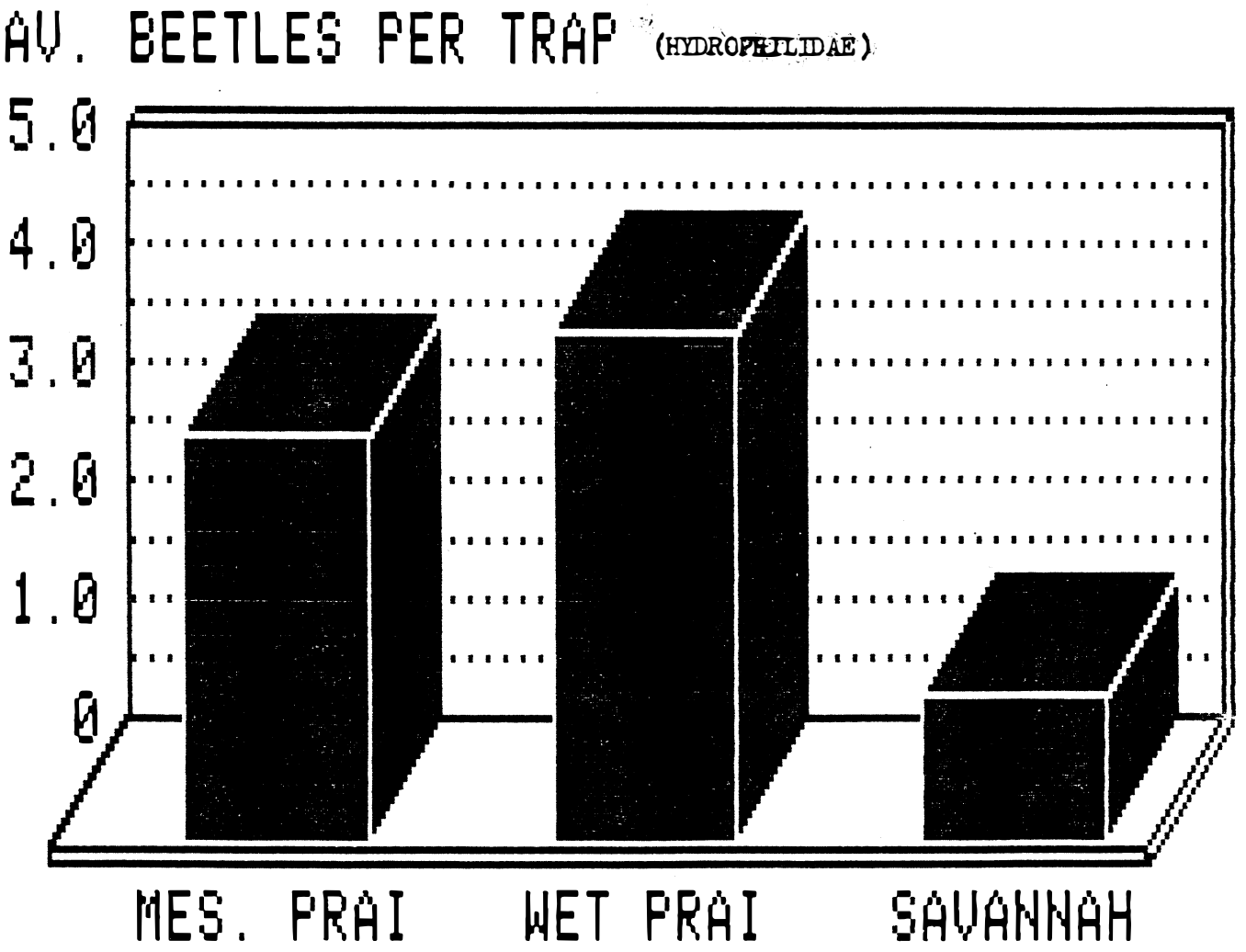
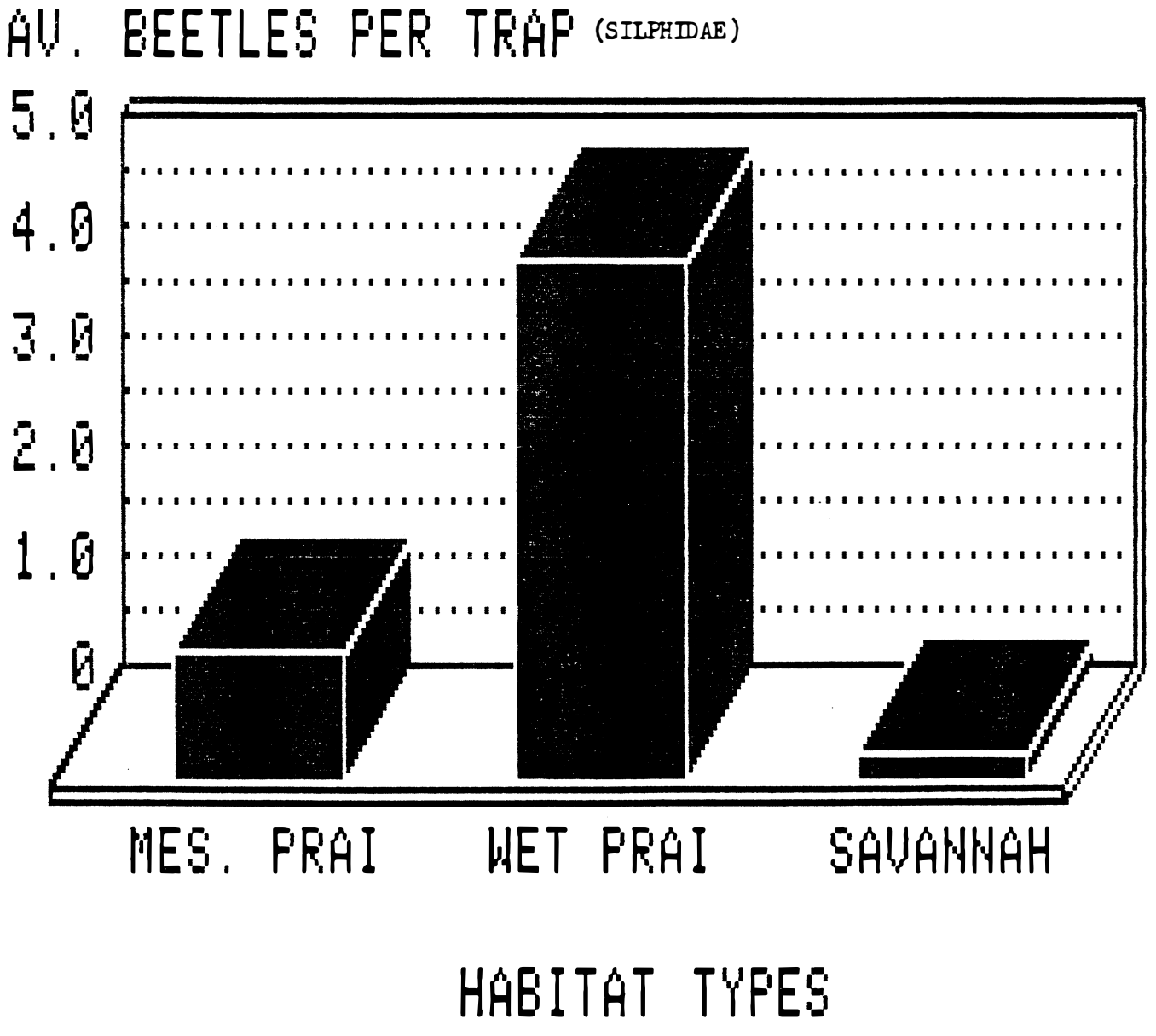


GRAPH OF HABITAT INFLUENCES



GRAPH OF HABITAT INFLUENCES



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Appendix A

Floral Inventory for Anderson Prairie, Pana, Illinois

Equisetaceae- Horsetail Family

1. Equisetum arvense- Common Horsetail

Typhaceae- Cat-tail Family

2. Typha latifolia- Common Cat-tail

Poaceae- Grass Family

3. Elymus hystrix- Bottlebrush Grass
4. Elymus canadensis- Nodding Wild Rye
5. Panicum capillare- Witch Grass
6. Panicum virgatum- Switch Grass
7. Sorghastrum nutans- Indian Grass
8. Andropogon gerardi - Big Bluestem
9. Schizachyrium scoparium- Little Bluestem
10. Tridens flavus- Purple-top
11. Sporobolus heterolepsis- Prairie Dropseed
12. Cynodon dactylon- Bermuda Grass (New Christian County Record)
13. Spartina pectinata- Cord Grass
14. Aristada oligantha- Common Three Awn

Cyperaceae- Sedge Family

15. Scirpus atrovirens-
16. Scirpus pendulus-
17. Carex vulpinoidea-
18. Carex annectens-
19. Carex cristatella-
20. Carex bicknellii-
21. Carex meadii- Mead's Sedge
22. Carex bushii-
23. Carex atherodes- (ENDANGERED)

Commelinaceae- Spiderwort Family

24. Tradescantia ohiensis- Spiderwort
25. Tradescantia virginiana- Prairie Spiderwort

Juncaceae- Rush Family

26. Juncus dudleyi-

Liliaceae- Lily Family

27. Allium canadense- Wild Onion
28. Allium cernuum- Nodding Wild Onion
29. Lilium michiganense- Turk's-cap Lily
30. Polygonatum commutatum- Solomon's Seal
31. Asparagus officinalis- Asparagus

Liliaceae continued

32. Smilacina racemosa or stellata- False Solomon's Seal
33. Ornithogalum umbellatum- Star-of-Bethelehem
34. Camassia scilloides- Wild Hyacinth
35. Camassia angusta- Wild Hyacinth (ENDANGERED)
36. Hypoxis hirsuta- Yellow Star Grass

Iridaceae- Iris Family

37. Iris shrevei- Wild Blue Iris
38. Iris pseudacorus- Yellow Iris
39. Sisyrinchium angustifolium- Blue-eyed Grass
40. Sisyrinchium albidum- Blue-eyed Grass (White Form)

Orchidaceae- Orchid Family

41. Spiranthes cernua- Nodding Ladies' Tresses Orchid
42. Spiranthes magnicamporum-

Salicaceae- Willow Family

43. Salix nigra- Black Willow
44. Salix humilis - Prairie Willow
45. Populus deltoides- Cottonwood

Juglandaceae- Walnut Family

46. Juglans nigra- Black Walnut

Betulaceae- Birch Family

47. Alnus serrulata- Smooth Alder

Corylaceae- Hazelnut Family

48. Corylus americana- Hazelnut

Fagaceae- Beech Family

49. Quercus imbricaria- Shingle Oak

Ulmaceae- Elm Family

50. Ulmus americana- American Elm
    Ulmus pumila- Siberian Elm
51. Celtis occidentalis- Hackberry

Moraceae- Mulberry

52. Morus rubra- Red Mulberry
53. Maclura pomifera- Osage Orange
54. Humulus lupulus- Common Hop

Santalaceae- Sandalwood Family

55.Comandra umbellata - False Toadflax

Aristolochiaceae- Birthwort Family

56. Asarum canadense var. reflexum- Wild ginger

Polygonaceae- Buckwheat Family

57. Rumex crispus- Curly Dock
58. Rumex altissimus- Pale Dock
59. Rumex verticillatus- Swamp Dock

Amaranthaceae- Pigweed Family

60. Froelichia floridana or gracilis- Cottonweed

Nyctaginaceae- Four-O'Clock Family

61. Mirabilis nyctaginea

Phytolaccaceae- Pokeweed Family

62. Phytolacca americana- Pokeweed

Portulacaceae- Purslane Family

63. Claytonia virginica- Spring Beauty

Caryophyllaceae- Pink Family

64. Silene stellata- Starry Campion
65. Saponaria officinalis- Bouncing Bet

Ranunculaceae- Buttercup Family

66. Delphinium tricorne- Dwarf Larkspur
67. Thalictrum thalictroides- Rue Anemone
68. Thalictrum revolutum- Waxy Meadow Rue
69. Anemone virginiana- Tall Anemone

Lauraceae- Laurel Family

70. Sassafras albidum- Sassafras

Papaveraceae- Poppy Family

71. Corydalis micrantha- Slender Corydalis

Brassicaceae- Mustard Family

72. Capsella bursa-pastoris- Shepherd's-purse
73. Thlaspi arvense- Field Pennycress
74. Barbarea vulgaris- Winter Cress

Grossulariaceae- Gooseberry Family

75. Ribes sp.-Gooseberry

Saxifragaceae- Saxifrage Family

76. Penthorum sedoides- Ditch Stonecrop
77. Heuchera richardsonii- Prairie Alumroot

Rosaceae- Rose Family

78. Prunus americana- Wild Plum
79. Prunus serotina- Wild Black Cherry
80. Malus sp.- Wild Apple
81. Rubus occidentalis- Black Raspberry
82. Rubus flagellaris- Dewberry
83. Rubus allegheniensis- Common Blackberry
84. Rosa carolina- Carolina rose
85. Rosa sp.
86. Potentilla simplex- Common Cinquefoil
87. Potentilla recta- Rough-fruited or Sulfur Cinquefoil
88. Fragaria virginiana- Wild Strawberry

Caesalpiniaceae- Caesalpinia Family

89. Cassia fasciculata- Partridge Pea
90. Cercis canadensis- Redbud
91. Gleditsia triacanthos- Honey Locust

Fabaceae- Pea Family

92. Amorpha fruticosa- Water Locust
93. Amorpha canescens - Leadplant
94. Robinia pseudoacacia- Black Locust
95. Crotalaria sagittalis- Rattlebox
96. Apios americana- Groundnut
97. Dalea candida- White Prairie Clover
98. Dalea purpurea- Purple Prairie Clover
99. Tephrosia virginiana- Goat's-rue
100. Melilotus alba- White Sweet Clover
101. Melilotus officinalis- Yellow Sweet Clover
102. Trifolium campestre- Low Hop Clover
103. Trifolium pratense- Red Clover
104. Baptisia lactea- White Wild Indigo
105. Baptisia leucophaea- Cream Wild Indigo
106. Lespedeza capitata- Round-headed Bush Clover
107. Desmodium sessilifolium- Sessile-leaved Tick Trefoil
108. Desmodium illinoiense- Tick Trefoil
109. Desmodium canescens- Hoary Tick Trefoil
110. Desmodium ciliare- Hairy Tick Trefoil (New Christian Co. Record)

Linaceae- Flax Family

111. Linum medium var. texanum- Wild Flax

Oxalidaceae- Oxalis Family

112. Oxalis violacea- Purple Wood Sorrel
113. Oxalis stricta- Yellow Wood Sorrel

Polygalaceae- Milkwort Family

114. Polygala sanguinea -Purple Milkwort

Euphorbiaceae- Spurge Family

115. Acalypha rhomboidea- Three-sided Mercury
116. Euphorbia corollata - Flowering Spurge

Anacardiaceae- Cashew Family

117. Toxicodendron radicans- Poison Ivy
118. Rhus typhina- Staghorn Sumac

Aceraceae- Maple Family

119. Acer negundo- Box Elder
120. Acer saccharum- Sugar Maple
121. Acer saccharinum- Silver Maple

Balsaminaceae- Balsam Family

122. Impatiens capensis- Spotted Touch-me-not

Rhamnaceae- Buckthorn Family

123. Ceanothus americanus- New Jersey Tea

Vitaceae- Grape Family

124. Parthenocissus quinquefolia- Virginia Creeper
125. Vitis sp.- Wild Grape

Cistaceae- Rockrose Family

126. Helianthemum canadense- Frostweed

Violaceae- Violet Family

127. Viola sororia- Blue Violet
128. Viola sagittata- Arrow-leaved Violet
129. Viola refinesquii- Johnny-jump-up or Field Pansy

Lythraceae- Loosestrife Family

130. Lythrum alatum- Winged Loosestrife

Onagraceae- Evening Primrose Family

131. Ludwigia alternifolia- Seedbox
132. Oenothera pilosella- Prairie Sundrops (New Christian Co. Record)
133. Oenothera biennis- Evening Primrose

Apiaceae- Carrot Family

134. Eryngium yuccifolium- Rattlesnake Master
135. Thaspium trifoliatum var. flavum- Yellow Meadow Parsnip
136. Torilis japonica- Hedge Parsley
137. Daucus carota- Wild Carrot
138. Oxypolis rigidior- Cowbane
139. Zizia aurea- Golden Alexanders
140. Pastinaca sativa- Parsnip
141. Osmorhiza longistylis- Anise-root
142. Polytaenia nuttallii- Prairie Parsley
143. Cicuta maculata- Water Hemlock
144. Conium maculatum- Poison Hemlock

Cornaceae- Dogwood Family

145. Cornus sp.- Dogwood

Primulaceae- Primrose Family

146. Lysimachia ciliata- Fringed Loosestrife

Oleaceae- Ash Family

147. Fraxinus sp.- Ash
148. Lilac vulgaris- Common Lilac

Gentianaceae- Gentian Family

149. Gentiana puberulenta- Downy Gentian
150. Gentiana andrewsii- Closed Gentian

Apocynaceae- Dogbane Family

151. Apocynum cannabinum- Indian Hemp

Asclepiadaceae- Milkweed Family

152. Asclepias tuberosa ssp. interior- Butterfly Weed
153. Asclepias viridiflora- Green Milkweed
154. Asclepias syriaca- Common Milkweed
155. Asclepias incarnata- Swamp Milkweed

Convolvulaceae- Morning-glory Family

156. Ipomoea pandurata- Wild Sweet Potato Vine

Polemoniaceae- Phlox Family

157. Phlox pilosa- Prairie Phlox

Boraginaceae- Borage Family

158. Lithospermum canescens- Hoary Puccoon

Verbenaceae- Verbena Family

159. Verbena stricta- Hoary Vervain
160. Verbena hastata- Blue Vervain

Lamiaceae- Mint Family

161. Lycopus americanus- Common Water Horehound
162. Teucrium canadense var. virginicum- American Germander
163. Monarda fistulosa- Wild Bergamot
164. Pycnanthemum tenuifolium- Slender Mountain Mint
165. Leonurus cardiaca- Motherwort
166. Perilla frutescens- beefsteak Plant
167. Physostegia virginiana- False Dragonhead
168. Prunella vulgaris- Self-heal

Scrophulariaceae- Figwort Family

169. Veronicastrum virginicum- Culver's-root
170. Penstemon digitalis- Foxglove Beardtongue
171. Verbascum blattaria- Moth Mullein

Bignoniaceae- Bignonia Family

172. Campsis radicans- Trumpet Creeper
173. Catalpa sp.- Catalpa

Acanthaceae- Acanthus Family

174. Ruellia humilis- Wild Petunia

Plantaginaceae- Plantain Family

175. Plantago aristata- Bracted Plantain
176. Plantago lanceolata- Buckhorn

Rubiaceae- Madder Family

177. Galium triflorum- Sweet-scented Bedstraw
178. Galium aparine- Goosegrass
179. Galium obtusum- Wild Madder
180. Hedyotis longifolia- Long-leaved Bluets

Caprifoliaceae- Honeysuckle Family

181. Sambucus canadensis- Elderberry
182. Lonicera japonica- Japanese Honeysuckle
183. Triosteum aurantiacum- Horse Gentian

Campanulaceae- Bellflower Family

184. Triodanis perfoliata- Venus' Looking-glass
185. Campanula americana- American Bellflower
186. Lobelia spicata- Spiked Lobelia

Asteraceae- Aster Family

187. Solidago rigida- Rigid Goldenrod
188. Solidago canadensis- Tall goldenrod
189. Solidago nemoralis- Gray Goldenrod
190. Euthamia graminifolia- Grass-leaved Goldenrod
191. Aster novae-angliae- New England Aster
192. Aster laevis- Smooth Aster
193. Aster ericoides- Heath Aster
194. Erigeron sp.- Daisy Fleabane
195. Verbesina alternifolia- Yellow Ironweed
196. Bidens coronata- Tickseed Sunflower
197. Coreopsis palmata- Prairie Coreopsis
198. Coreopsis tripteris- Tall Coreopsis
199. Silphium perfoliatum- Cup-plant (New Christian Co. Record)
200. Silphium laciniatum - Compassplant
201. Silphium terebinthinaceum - Prairie Dock
202. Silphium laciniatum X terebinthinaceum (hybrid in Sections C and L)
203. Silphium integrifolium - Rosin Weed
204. Heliopsis helianthoides- False Sunflower
205. Ratibida pinnata- Drooping Coneflower
206. Rudbeckia triloba ?- Brown-eyed Susan
207. Rudbeckia hirta- Black-eyed Susan
208. Parthenium integrifolium- Wild Quinine
209. Achillea millefolium- Common Yarrow
210. Echinacea purpurea- Purple Coneflower
211. Cirsium discolor- Field Thistle
212. Cirsium sp.- Thistle
213. Centaurea maculosa- Spotted Knapweed
214. Liatris pycnostachia- Prairie Blazing-star
215. Liatris aspera- Rough Blazing-star
216. Liatris ligulistylis- Blazing-star
217. Vernonia missurica- Missouri Ironweed
218. Antennaria neglecta- Pussytoes
219. Ambrosia sp.- Ragweed
220. Tragopogon pratensis- Goat's-beard
221. Prenanthes aspera- Rough White Lettuce
222. Hieracium scabrum- Hairy Hawkweed
223. Taraxacum officinale- Common Dandelion
224. Cichorium intybus- Chicory