85-9

The Rich South High School Prairie-Woodland Nature Preserve

Insect Habitat Improvement:

A Summary Report

August, 1985

Prepared under Contract
with
Illinois Department of Conservation

Funded
through
Nongame Conservation Checkoff Fund

Prepared by
Tallgrass Associates
Orland Park, Illinois

SUMMARY

Rich South High School Prairie-Woodland Preserve represents a tallgrass prairie reconstruction on clay-fill soils. The current insect population of the prairie represents immigrations from nearby lawns, fields, and possibly a railroad prairie remnant. The enhancement of these insect populations with species either common or specific to the original prairie might be accomplished through the establishment of additional native prairie grasses and forbs which can serve as both host and habitat for such species. During the summer of 1985, a plan was developed to augment the plant species in an effort to provide habitat and hosts for more desirable insect species. A reference sample of insects were collected. This site had a coefficient of community (Jaccard Coefficient) of 25% when compared to the species found in a similarly sized site in Bridgeview. This sampling suggests that only common old field and a few wet-soil species currently inhabit the site. Selected plant species are recommended for planting both in the prairie itself and in special plots adjoining the prairie.

PROJECT STATEMENT

The goals of this project were:

1. to develop a plan for improving prairie insect habitat quality while serving educational and restoration goals

2. to increase the probability of occurrence of prairie insect species through the introduction of additional host or habitat plants.

3. to plan for the development of special plots adjoining the prairie containing a concentration of host and/or habitat species for insect conservation education.

METHODS

Planning Stages:

A series of meetings were held with selected biology faculty (Jan Weslund & Betty Eertmoed) the then division chairperson (Lou Schmitt), and a consultant (Lou Mulé, Tallgrass Associates) to plan improvements to the Prairie-Woodland Preserve,a prairie reconstructed several years earlier. These meetings resulted in the design of special plots to aid the restoration effort. These meetings were held prior to and after the insect study.

Equipment was ordered and paperwork issued for necessary materials.

Insect Sampling:

Insect samples, using sweep nets, were collected and later pinned and mounted for taxonomic identification. The prairie was divided into four zones paralleling existing slope gradients. Insects were non-randomly collected from each zone and placed in killing jars. Both the top and mid-sections of the vegetation were swept. Contract time and funding constraints precluded a more scientific sampling of insects. Nevertheless it is consistent with methods other studies have used (DeMauro 1984). Generally the ground surface areas were not sampled. The dates of the field samples were:

08 July 1985
15 July 1985
23 July 1985
09 August 1985

Due to time constraints and extreme difficulty of identifying insects to species only preliminary identification to family was possible for this reference set.

RESULTS

These activities resulted in the following major accomplishments:

1. Completion of a design for development of special garden plots adjacent to the prairie area.
2. Selection of desired plant species to provide habitat and host plants for improvement of insect habitat.
3. Development of a relative comparison of insect families present at the site.
4. Acquisition of the materials needed for completing the construction of the special plots and general habitat management.

Following the completion of the plans for the special plots and insect study, equipment was ordered, sources of landscape timbers and prairie seed were obtained, and an insect collecting schedule was initiated. In addition, arrangements were made to compare, in a general way, how the insect samples from Rich South agreed with a concurrent insect study at Bridgeview Park District's Illiniwek Nature Area. A study of the Penn Central railroad prairie insects nearby was not attempted due to time and funding constraints. The Bridgeview study provides an acceptable substitute for referencing diversity in the collections.

Although limited in their usefulness, coefficients of community may be calculated for the Rich South site and the Bridgeview site (Brower & Zar, 1977). Using the Jaccard coefficient, there is a .25 coefficient between the two sites. Using the Sorensen coefficient, that value is .40. Although the species numbers are similar between the sites, the Rich South demonstrates a greater representation of "wet" species (dragonflies and certain marsh flies). The lower end of the prairie virtually grades into a man-made cattail marsh/pond. The Bridgeview site is not near any significant body of water. However, in nearly every other family, the Bridgeview site demonstrated a greater number of species.

DISCUSSION[1]

A brief analysis of the insect family list (Table 1) quickly indicated that the following families are not well-represented at Rich South:

Spread-wing damselflies
Narrow-wing damselflies
Pygmy grasshoppers
Assassin bugs
Seed bugs
Leafhoppers
Acanaloniid planthoppers
Ladybird beetles
Chrysomedlid beetles
Long-horned beetles
Blister beetles
Most butterflies
Most moths
Robber flies
Picture-winged flies
Megachilids

No doubt many species in these groups were missed in our sampling. However, relative to other similarly-sized prairies in the area, the Rich South lacks many of the species attracted to showy forbs, especially the butterflies and moths.

A review of Table 2 indicates that the Rich South site shares no more than 41% in common with species found at a Bridgeview prairie of similar size. Yet the number of species collected were nearly identical at both sites. Butterflies and moths are noticeably absent from here, one's common experience might suggest that such species may be, in part, "quality indicators."* This suggests that desirable prairie insect species here are

[1]For purposes of discussion, a familiarity with the IDOC proposal elements and rationale is assumed here.

more depauperate than established prairies and that the "mere" existence of a reconstruction does not imply a fully functioning insect community (whatever that might be!). The Rich South site may be too far from the Penn Central tracks for more prairie species to colonize; again, it may just be a lack of suitable hosts or habitat.

Other species are previously known from the site, such as blister beetles, but were not collected on any of the field days. It seems likely that leaf and planthoppers should be present, but perhaps the sparseness of the grasses in some areas significantly reduces the population sizes. In natural prairies, many forbs are clumped, possibly providing a minimum critical "attracting size." What forbs that are present here are usually singletons or few in number. A special plot with showy forbs should help increase the species richness. Additional plantings out in the prairie should help as well. A list of targeted species is outlined in Tables 4 and 5.

*Table 3 indicates that the species common to both Romeoville and Lockport prairies is not appreciably higher than found between Rich South and Bridgeview (no statistical test, however, was performed). The differences or similarities may lie in the sampling techniques. The data might be expected to converge if sampling continued throughout the whole season.

REFERENCES

Borror, Donald & Richard White. 1970. A Field Guide to the Insects of America North of Mexico. Boston: Houghton Mifflin Co.

Brower, James & Jerrold Zar. 1977. Field and laboratory methods for general ecology. Dubuque: Wm. C. Brown Co.

DeMauro, Marcella. 1984. "A Vegetational and Plant Community Survey of Lockport Prairie Nature Preserve and the Romeoville Prairie." Report to the Forest Preserve District of Will County. June, 1984.

TABLES

Table 1. List of insect families noted at selected prairie study sites.

Table 2. A summary comparison of insects found at small prairie study sites.

Table 3. A summary comparison of insects found at two larger prairies.

Table 4. Recommend plant species for special plots.

Table 5. Recommended grass and forb seed mixtures.

Table 6. Prairie species list, Rich South High School Prairie-Woodland Preserve

CONTRACT INVOICE

Original enclosed with cover letter.

Table 1. List of insect families noted at selected prairie study sites. Data for the first two sites (Lockport Prairie LP and Romeoville Prairie RV) are derived from R. Panzer in DeMauro (1984). The last two sites (Rich South RS and Illiniwek Nature Area BP) represents data from the study described in the report. See endnote [1].

Order/Family	Site LP	RV	RS	BP	RS/BP DIFF
ODONATA (Anisoptera -- Dragonflies)					
Libellulidae (Common Skimmers)	7	5	5	2	
Aeshnidae (Darners)	2	1	0	1	
Sub-Total	9	6	5	3	2
ODONATA (Zygoptera -- Damselflies)					
Coenagrionidae (Narrow-winged Damselflies)	2	2	2	1	
Lestidae (Spread-winged Damselflies)	2	0	0	0	
Calopterygidae (Broad-winged Damselflies)	2	0	0	0	
Sub-Total	6	2	2	1	1
ORTHOPTERA (Ensifera -- Long-horned Grasshoppers)					
Tettigoniidae	5	4	1	1	
Sub-Total	5	4	1	1	0
ORTHOPTERA (Caelifera -- Short-horned Grasshoppers)					
Acrididae (Short-horned)	8	8	1	4	
Tetridgidae (Pygmy)	1	2	0	0	
Gryllidae (Crickets)	1	1	1	1	
Sub-Total	10	11	2	5	-3
PHASMATODEA (Walkingsticks)					
Phasmidae	0	0	1	0	
Sub-Total	0	0	1	0	1
HEMIPTERA (True Bugs)					
Reduviidae (Assassin)	0	0	0	1	
Tingidae (Lace)	0	0	1	1	
Cydnidae (Burrower)	0	0	1	0	
Miridae (Plant Bugs)	4	3	3	1	
Phymatidae (Ambush)	1	1	1	1	
Thyreocoridae (Negro)	1	0	0	0	
Nabidae (Damsel)	1	2	0	0	
Pentatomidae (Stink)	1	2	1	2	
Alydidae (Broad-headed)	0	1	0	0	
Lygaeidae (Seed)	0	1	0	1	
Sub-Total	8	10	7	7	0

Table 1. (Continued)

HOMOPTERA (Hoppers)					
Cicadellidae (Leafhoppers)	6	3	0	0	
Acanaloniidae (Acanaloniid Planthoppers)	1	1	0	0	
Membracidae (Treehoppers)	2	2	2	1	
Cercopidae (Spittlebugs)	2	1	4	4	
Cicadidae (Cicadas)	1	0	0	0	
Aphididae (Aphids)	1	0	1	1	
Fulgoridae (Large Planthoppers)	0	0	1	3	
Sub-Total	13	7	8	9	-1
NEUROPTERA (LACEWINGS)					
Chrysopidae (Green Lacewings)	0	1	1	1	
Hemerobiidae (Brown Lacewings)	0	0	0	1	
Sub-Total	0	1	1	2	-1
COLEOPTERA (Beetles)					
Chrysomelidae (Leaf)	6	5	3	8	
Cicindelidae (Tiger)	0	1	0	0	
Coccinellidae (Ladybird)	3	4	0	3	
Cerambycidae (Long-horned)	1	1	1	0	
Cantharidae (Soldier)	0	1	0	1	
Meloidae (Blister)	0	1	0	1	
Melandryidae (False Darkling)	0	0	1	0	
Dermestidae (Dermestids)	0	0	1	1	
Scarabaeidae (Dung)	0	0	1	0	
Curculionidae (Snout)	0	0	1	1	
Sub-Total	10	13	8	15	-7
LEPIDOPTERA (Rhopalocera -- Butterflies)					
Danaidae (Monarchs/Milkweed)	0	0	1	1	
Hesperidae (Skippers)	8	8	0	2	
Papilionidae (Swallowtails)	1	1	0	1	
Satyridae (Nymphs & Satyrs)	2	0	0	1	
Pieridae (Sulfurs & Whites)	3	3	1	2	
Lycaenidae (Blues & Hairstreaks)	4	3	0	0	
Nymphalidae (Brush-footed)	9	6	0	0	
Sub-Total	27	21	2	7	-5
LEPIDOPTERA (Heterocera -- Moths)					
Ctenuchiadae (Ctenuchidae)	1	2	0	0	
Noctuidae (Noctuid)	9	6	0	0	
Pyralidae (Pyralid)	2	2	2	1	
Arctiidae (Tiger)	2	2	1	0	
Agaristidae (Forester)	1	0	0	0	
Geometridae (Measuringworm)	2	2	1	0	
Sphingidae (Sphinx)	3	1	0	0	
Zygaenidae (Smoky)	1	0	0	0	
Lasiocampidae (Tent Caterpiller)	1	1	0	0	
Sesiidae (Clear-winged)	1	1	0	0	
Sub-Total	23	17	4	1	3

Table 1. (continued)

DIPTERA (Flies)						
Dolichopodidae (Long-legged Flies)		0	0	1	0	
Chloropidae (Frit Flies)		0	0	1	0	
Chironomidae (Midges)		0	0	1	0	
Asilidae (Robber)		2	1	0	1	
Bombyliidae (Bee Flies)		1	1	0	0	
Otitidae (Picture-winged)		1	1	0	0	
Syrphidae (Hover Flies)		1	1	4	2	
Tephritidae (Fruit Flies)		0	0	1	2	
Tachinidae (Tachinid)		1	1	1	3	
Sarcophagidae (Flesh)		0	0	1	0	
Stratiomyidae (Soldier Flies)		0	0	2	0	
Tabanidae (Deer)		1	1	0	0	
Trupaneidae (Fruit)		1	1	0	0	
Sciomyzidae (Marsh Flies)		1	1	0	0	
	Sub-Total	9	8	12	8	4
HYMNEOPTERA (Bees, Wasps, & Ants)						
Siricidae (Horntails)		1	0	0	0	
Vespidae (Vespids)		2	2	1	1	
Sphecidae (Sphecids)		0	2	1	3	
Ichneumonidae (Ichneumons)		1	1	1	1	
Megachilidae (Megachilids)		0	0	0	1	
Apidae (Apid)		2	5	2	2	
Formicidae (Ants)		0	0	2	1	
Colletidae (Yellow-Faced Bees)		0	0	0	1	
Halictidae (Halictid/Sweat Bees)		0	0	1	0	
Andrenidae (Andrenid Bees)		0	0	1	0	
	Sub-Total	6	10	9	10	-1
	TOTAL	136	123	70	84	-14

1. Data used to construct these tables represent a superset of the data used to prepare the following tables. Hence totals do not agree. Panzer lists several species within a number of families where he simply lists them without any indication as to which prairie they were found. In preparing this table, these species were omitted from these calculations unless there was corollary evidence to suggest they were present at both sites.

Table 2. A summary comparison of insect species found at Illiniwek Nature Area BP (a prairie remnant) and Rich South Prairie-Woodland Preserve RS (a reconstruction) during July-August, 1985. This summary excludes a few common species included in Table 1.

		RS	BP
Acreage (apprx.)		2.5	1.5
Total Species Found Both Sites*	100		
Total Species Identified Each Site*		62	63
Species Common to Both Sites	25	40.3%	39.7%
Species Unique to Each Site	75	37 (59.6%)	38 (60.3%)

*approx. 95% collected sample

Table 3. A summary comparison of insect species found at Lockport Prairie LP (a prairie remnant) and Romeoville Prairie RV (also a remnant) during June-August, 1983 (from R. Panzer in DeMauro 1984).

		LP	RV
Acreage		249	200
Total Species Found Both Sites	175		
Total Species Identified Each Site		126	108
Species Common to Both Sites	61	48.4%	56.4%
Species Unique to Each Site	114	65 (51.5%)	47 (43.5%)

Table 4. Recommended Plant Species for Special Plots

The following species are recommended for starter plants in the special plots:

1. Showy Forbs & Grasses (useful for insect conservation education)
   - Hoary Puccoon
   - Prairie Phlox
   - Shooting Star
   - Yellow Star Grass
   - Alumroot (Heuchera richardsonii)
   - Blue-Eyed Grass
   - Prairie Violet (Viola pedatifida)
   - False White Indigo
   - Golden Alexanders
   - Common Spiderwort
   - Violet Wood Sorrel
   - Pasture Rose (Rosa carolina)
   - Nodding Wild Onion
   - Butterfly Weed
   - Flowering Spurge
   - Purple Coneflower
   - Sneezeweed
   - Western Sunflower (Helianthus occidentalis)
   - Marsh Blazing Star
   - Button Blazing Star
   - False Dragon Head (Physostegia virginiana)
   - Wild Bergamot
   - Kalm Chess Grass (Bromus kalmii)
   - Purple Prairie Clover
   - Mountin Mint
   - Yellow Coneflower
   - Ironweed
   - Stiff Aster (Aster ptarmicoides)

2. Edible, Medicinal & Pioneer Plants

Not all plants are prairie species.

   - Alumroot
   - American Ginseng
   - Cinquefoil
   - Common Mayapple
   - Fever Root
   - Indian Jack-in-the-Pulpit
   - Horsetail
   - Jerusalem Artichoke
   - Marsh Marigold
   - New Jersey Tea
   - Opuntia Cactus
   - Stinging Nettle
   - Wild Rose
   - Wild Onion
   - Wild Geranium
   - Wild Strawberry

3. Wet Prairie Plants

Special soil structure changes may be necessary to establish this special plot. Not all plants listed are prairie plants. Some plants may require shady cover for proper growth.

Blue-flag Iris (Iris virginica)
Skunk Cabbage (Symplocarpus foetidus)*
Snapweed (Impatiens capensis)
Cardinal Flower (Lobelia cardinalis)
Green Dragon (Arisaema dracontium)
Swamp Milkweed (Asclepias incarnata)
Virginia bluebells (Mertensia virginica)
Joe-Pye-Weed (Eupatorium perfoliatum)
Jacob's Ladder (Polemonium reptrans)
Smooth Phlox (Phlox glaberrima)
Lance-leaf Goldenrod (Solidago graminifolia)
Royal Fern (Osmunda regalis)*

*These plants are good candidates for placement into the bottom of the gully area just south of the pond.

Table 5. Recommended grass and forb seed mixtures.

The following grass seed is recommended for broadcast or plug transplant in the prairie:

Big Blue Stem (Andropogon gerardi) - all areas
Little Blue Stem (A. scoparius) - up slope areas
Indian Grass (Sorghastrum nutans) - all areas but mostly mid- and lower areas
Prairie Dropseed (Sporobolus heterolepis) - all areas
Prairie Cord Grass (Spartina pectinata) - lower wet areas

The following forb seed is recommended for direct planting or plug transplants into the prairie:

Tall Anemone (Anemone cylindrica) - lower open areas
Smooth Blue Aster (Aster laevis) - borders
Sky-Blue Aster (A. azureus) - drier up slope areas
New England Aster (A. novae-angliae) - borders and edges
Prairie Coreopsis (Coreopsis palmata) - open spots
Tall Coreopsis (C. tripteris) - borders and open spots
Purple Coneflower (Echinacea pallida) - all upland areas
Rattlesnake Master (Eryngium yuccifolium) - mid to lower areas
Marsh Blazing Star (Liatris spicata) - lower moist areas
Button Blazing Star (L. aspera) - upslope drier areas
Wild Quinine (Parthenium integrifolium) - all areas
Purple Prairie Clover (Petalostemum purpureum) - all drier areas
Yellow Coneflower (Ratibida pinnata) - all borders
Rosinweed (Silphium integrifolium) - open areas and borders
Prairie Dock (S. terebinthenaceum) - open areas
Compass Plant (S. laciniatum) - open areas near borders

Table 6. Prairie Species List, Rich South High School Prairie-Woodland Preserve area (Rich Township, Cook County) - August, 1985.

The following native (non-native but common prairie species are *) species were observed in the prairie during the course of this project. Nomenclature generally follows that of Swink & Wilhelm (1979).

Allium cernuum
Andropogon gerardi
A. scoparius
Asceplias syrica
A. verticillata
Aster pilosa (possibly ericoides)
A. novae-angliae
Chrysanthemum leucanthemum pinnatifidum*
Echinacea pallida
Elymus canadensis
Eryngium yuccifolium
Helianthus grosseserratus
H. laetiflorus rigidus
Liatris aspera
Monarda fistulosa
Panicum virgatum
Parthenium integrifolium
Petalostemum purpureum
Ratibida pinnata
Rosa carolina
Rudbeckia hirta*
Silphium integrifolium
S. laciniatum
S. terebinthenaceum
Solidago canadensis
S. rigida
Sorghastrum nutans
Typha augustifolia
Veronicastrum virginicum

CONTRACTUAL SERVICES INVOICE
RICH SOUTH HIGH SCHOOL
31 August 1985

Rich South High School assumed all costs beyond the goods and services itemized in the proposal.

Contractual Services

Rich South High School retained the services of Tallgrass Associates to supervise the field work and prepare the final report for submission under the contract.

Tallgrass Associates, Environmental Consultants:
Orland Park, Illinois

Field Biologist - 10 hours @ $40.00	$400.00
(includes field and lab time, including submission of final field report)	
Insect Taxonomist/Ecologist - 3 hours @ $20.00	$ 60.00
(preliminary taxonomic identification of specimens collected)	
Sub-Total	$ 460.00

Personel/Staff

Teacher Field Assistant - 20 hours @ $15.00/hr	$ 300.00
(Managed field activities per proposal)	
Sub-Total	$ 300.00

Equipment/Supplies

Rich South High School assumed all the costs of equipment and supplies needed for the project beyond those itemized below.

Collecting Supplies	
Seed/Seedlings	
Field References	$ 240.00
Sub-Total	$ 240.00

TOTAL FUNDS DUE $1000.00

85-9

Rich Township High Schools

Robert C. Rubenow, Superintendent
DuWayne D. Carnes, Associate Superintendent
Craig A. Schilling, Assistant Superintendent

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September 8, 1985

Carl N. Becker
Natural Heritage Section Manager
Forest Resources & Natural Heritage
Illinois Department of Conservation
Lincoln Tower Plaza
524 South Second Street
Springfield, Illinois 62701-1787

Dear Mr. Becker:

We are pleased to submit to you our final report pursuant to our nongame conservation contract dated May 24, 1985, and entitled "Insect Habitat Improvement: Prairie-Woodland Preserve."

In addition, we enclosed a bill for the services we rendered per the terms of the contract and our proposal for same dated April 23, 1985.

Should you have any questions about the bill or the final report, please direct them to my attention immediately. We thank you for the opportunity to work with the Illinois Department of Conservation.

Sincerely,

Dennis Walery

Dennis Walery
Division Chairman
Math and Science Department

Donald H. Trimble

Donald H. Trimble
Principal

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Enclosure