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Scope of Study: This paper presents a list of the aquatic invertebrate organisms inhabiting a small fertile pond located on the Oklahoma State University campus. A comparison has been made with a previous study on the same pond.

Findings and Conclusions: Twenty-seven genera of zooplankton and eleven genera of benthic invertebrates were found in this survey. Protozoans, copepods, and rotifers were the most abundant. Populations of other organisms were quite small. The small numbers were attributed to the draining and dredging of the pond.

ADVISER'S APPROVAL

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A SURVEY OF THE AQUATIC INVERTEBRATES
OF A SMALL FERTILE POND IN
CENTRAL OKLAHOMA

By

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INTRODUCTION

This investigation was undertaken to provide a list of aquatic invertebrate organisms inhabiting Theta Pond, a small fertile pond located on the south edge of the Oklahoma State University campus. The results are compared with those of a previous study by Wallen (1946).

The pond was drained and dredged to its present capacity (surface area 0.8 acre, 14 feet maximum depth) in late summer and early fall of 1943. The pond was drained and dredged again in early spring of 1964 to remove sediments. Theta Pond was selected because of its accessibility, and abundant organic material which arises from runoff and from food given the ducks that inhabit the pond.

The investigations of Copeland, Butler and Shelton (1961) show Theta Pond to be heterotrophic. Utilization, rearrangement, and decomposition of complex materials predominate in a heterotrophic environment as opposed to fixation of light energy, use of simple inorganic substances and buildup of complex substances in the autotrophic environment (Odum, 1959).

METHODS

Weekly samples were collected from September 28, 1964, to January 11, 1965, and preserved in 10% formalin. Samples were taken from the vegetation, bottom and at various depths of the water.

Qualitative methods:

Plankton samples were taken with a size 20 plankton net. Bottom samples were collected with an Ekman dredge. Samples from vegetation were collected by removing smaller vegetation and examining it. Samples were taken from the surface of large plants with a pipette.

Quantitative methods:

Plankton samples were taken with a Kemmerer bottle. The Sedgewick-Rafter counting chamber was used to determine the numbers of individuals. Many of the organisms occurred sporadically during the sampling period and were not counted.

Organisms were identified to genus and when possible to species (Ward and Whipple, 1959; and Pennak, 1953).

RESULTS AND DISCUSSION

Twenty-seven genera of zooplankton and eleven genera of benthic invertebrates were collected and identified during the study. A comparison of the two surveys yielded the following results:

	1964	1946	
Protozoa (1)			
<u>Arcella</u>	x	x	(1) 1250 per liter
<u>Carchesium</u>		x	
<u>Centropyxis</u>		x	
<u>Ceratium hirundinella</u>	x		
<u>Chlamydomonas</u>	x		
<u>Codonella</u>		x	
<u>Coleps</u>		x	
<u>Colpoda</u>	x		
<u>Condylostoma</u>		x	
<u>Didinium</u>		x	
<u>Diffugia</u>		x	
<u>Euglena</u>	x		
<u>Euglypha tuberculata</u>	x		
<u>Gonium</u>	x		
<u>Halteria</u>		x	
<u>Paramecium</u>		x	
<u>Pyxidium</u>		x	
<u>Rhabdostyla</u>		x	
<u>Spirostomum</u>		x	
<u>Stentor</u>	x	x	
<u>Stylonychia</u>		x	
<u>Tintinnopsis</u>		x	
<u>Trachelius</u>		x	
<u>Trachelomonas hispida</u>	x		
<u>Trichodina</u>		x	

<u>Vaginicola</u>		x	
<u>Vorticella</u>		x	
telotroch		x	
Coelenterata			
<u>Hydra americana</u>	x		
Gastrotricha			
<u>Chaetonotus</u>	x		
Rotatoria			
<u>Anuraeopsis (Anuraea)</u>		x	
<u>Asplanchna</u>		x	
<u>Brachionus</u>		x	
<u>Brachionus angularis</u> (2)	x		(2) 60 per liter
<u>Cephalodella (Furcularia)</u>	x	x	
<u>Colurella (Colurus)</u>		x	
<u>Euchlanis</u>	x		
<u>Kertella cochlearis</u>	x		
<u>Lecane (Cathypna)</u>		x	
<u>Lecane luna</u>	x		
<u>Lepadella</u>	x		
<u>Monostyla</u>	x		
<u>Philodina</u> (3)	x		(3) 80 per liter
<u>Platyias (Noteus)</u>		x	
<u>Platyias patulus</u> (4)	x		(4) 60 per liter
<u>Platyias quadricornis</u> (4)	x		
<u>Polyarthra</u> (5)	x	x	(5) 90 per liter
<u>Ptygura</u>	x		
<u>Rotaria (Rotifer)</u>	x	x	
<u>Synchaeta</u>		x	
<u>Testudinella</u>	x		
<u>Trichocerca (Rattulus)</u>		x	
Platyhelminthes			
<u>Dalyellia</u>		x	
Bryozoa			
<u>Plumatella repens</u>	x		
<u>Plumatella</u>		x	
Annelida			
Oligochaeta			
<u>Chaetogaster</u>	x		
<u>Naidium osborni</u>	x		

<u>Nais</u>		x	
Hirudinea			
<u>Erpobdella punctata</u>	x		
<u>Glossiphonia heteroclita</u>	x		
<u>Helobdella stagnalis</u>	x		
Arthropoda			
Cladocera			
<u>Alona</u>		x	
<u>Bosmina</u>		x	
<u>Bosmina coregoni</u>	x		
<u>Chydorus</u>		x	
<u>Daphnia</u>	x	x	
<u>Ilyocryptus</u>		x	
<u>Leydigia</u>		x	
<u>Pleuroxus</u>		x	
Copepoda (6)			(6) 800 per liter
<u>Cyclops</u>	x	x	
<u>Diaptomus</u>	x	x	
nauplius (larval form)	x	x	
Collembola		x	
Diptera			
<u>Psychoda</u> (pupa)	x		
larvae		x	
Neuroptera			
naiad		x	
Mollusca			
Gastropoda			
<u>Helisoma trivolvis</u>	x		
<u>Physa halei</u>	x		
Pelecypoda			
<u>Musculium</u>	x		

Few genera comprised Protozoa which was numerically the most abundant phylum. Ceratium hirundinella was the predominant

protozoan. Other genera of protozoa were sporadic in occurrence with only a few individuals present for short periods.

Hydra americana has often been collected from the pond in large numbers for use in biology classes, but was encountered only twice. In no instance were more than five individuals per square foot found.

A single individual of the gastrotrich, Chaetonotus sp., was taken from bottom vegetation. Polyarthra sp., Philodina sp., Brachionus angularis, Platytias patulus, and Platytias quadricornis were the most numerous of the Rotatoria. Nine other genera were present but seldom collected. Six genera were found in common with the two surveys.

The bryozoan, Plumatella repens, was collected in the adult stage. Wallen (1946) found only the statoblast of Plumatella sp.

Most of the benthic invertebrates were annelids. Two genera of Oligochaeta, Chaetogaster and Naidium osborni, were collected and at no time did their number exceed five per square foot. Three species of leeches, Erpobdella punctata, Glossiphonia heteroclita, Helobdella stagnalis were collected. Glossiphonia heteroclita was the most common form. A single individual for each of the other genera was collected.

Cladocerans and copepods were the principal arthropods. Only one genus of Insecta was found during the survey. A few dipteran

pupae, Psychoda sp., were collected on one occasion.

Most of the zooplankton biomass was composed of copepods, Cyclops sp. and Diaptomus sp. The cladocerans, Bosmina coregoni and Daphnia sp., contributed little to the biomass because of small numbers.

Molluscs present in the pond were two species of snails, Helisoma trivolvis and Physa halei, and one species of clam, Musculium sp. Both species of snails were abundant and the small, thin-shelled clam was commonly found.

Considerable differences between the two studies were found. The pond had undergone changes during the time between the two surveys. The dredging in the spring, 1964, must have had a drastic effect.

The environment becomes more favorable for zooplankters in the spring and results in a rapid increase in many forms (Pejler, 1962). Different populations often increase simultaneously, indicating that competition is not especially great at this time, presumably because of a superabundance of food. The dredging operation during this productive period removed or killed many organisms and reduced the food supply for the survivors. Possibly sufficient time had not elapsed after the dredging for the populations to be present in great numbers during the sampling period.

All forms of aquatic life do not coincide concerning the periods of maximum population. Temperature, reproductive rate, and food supply are important factors in population dynamics (Pejler, 1962).

The sampling period for this survey was relatively short and many organisms may have been missed because of their seasonal fluctuations.

SUMMARY

1. This investigation provides a list of the aquatic invertebrate organisms inhabiting a small fertile pond. The results are compared with those of a previous study on the same pond.
2. Weekly samples were taken and thirty-eight genera of organisms were identified.
3. The most abundant organisms were protozoans, copepods and rotifers. The other organisms occurred sporadically and in small numbers. Much of the zooplankton biomass was composed of copepods.
4. Differences between the two studies might be attributed to changes in the ecosystem over the span of years. Evidently the draining and dredging had a drastic effect on the ecosystem in reducing the number of organisms. Seasonal fluctuation may have also played a role.

LITERATURE CITED

- Copeland, B. J., J. L. Butler and W. L. Shelton. 1961. Photosynthetic Productivity in A Small Pond. Okla. Acad. Sci. 42:22-26.
- Odum, E. P. 1959. Fundamentals of Ecology. W. B. Saunders Company: Philadelphia.
- Pejler, B. 1962. The Zooplankton of Ösbysjön, Djursholm II. Further Ecological Aspects. Oikos 13 (Part 2):216-231.
- Pennak, R. W. 1953. Fresh Water Invertebrates of the United States. The Ronald Press Company: New York.
- Wallen, I. E. 1946. The Plankton Population of A Small Fertile Pond in Central Oklahoma. M. S. Thesis, Okla. State Univ., Stillwater, Okla.
- Ward, H. B. and G. C. Whipple. 1959. Fresh Water Biology. John Wiley and Sons, Inc.: New York.

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