

A NOTE ON *PLISTOPHORA* (PROTISTA: SPORAZOA) A PARASITE OF ROTIFERA IN POOL 19, MISSISSIPPI RIVER

D.A. Pillard
Institute of Applied Sciences
Box 13078
North Texas State University
Denton, TX 76205

R.V. Anderson
Department of Biological Sciences
Western Illinois University
Macomb, IL 61455

ABSTRACT

A study of the zooplankton populations in Pool 19, Upper Mississippi River, revealed several specimens parasitized by the sporozoan *Plistophora*. Only one species of rotifer, *Brachionus calyciflorus*, was infected, in contrast to other reports which found the sporozoan infecting other rotifer taxa.

INTRODUCTION

Plankton populations in freshwater systems are influenced by both environmental factors, such as temperature, and biological factors. A biological factor, parasitism, has been shown to affect both phytoplankton and zooplankton populations. Canter and Lund (1951) reported that autumn diatom populations of *Asterionella formosa* were nearly destroyed by the fungus *Rhizophidium planktonicum*. The calanoid copepod *Boeckella hamata* was found to be severely infected with dinoflagellate parasites (Burns,) important parasites on both invertebrate and vertebrate hosts.

Most studies of *Plistophora* have dealt with effects on insects, although some have included parasitism in fish and decapods. *Plistophora* is an important parasite of representatives in the phylum Rotifera as documented by Kofoed (1908) in an extensive study of the Illinois River. Beach (1960) found that *Polyarthra euryptera* was frequently infected with *Plistophora*, and *Synchaeta* spp. were also occasionally infected. A wide variety of rotifers including *Brachionus calyciflorus*, *B. caqudatus*, *Platytia patulus*, *Polyarthra* sp., *Synchaeta pectinata*, *S. stylata*, and *Filinia*

longiseta were found to be infected with *Plistophora* by Hodgkinson (1970). This infection can become severe, as shown in populations of the rotifera *Conochilus unicornis* which were considerably reduced by *Plistophora* (Ruttner, 1953). This paper reports *Plistophora* parasitism as noted on zooplankton of Pool 19, Upper Mississippi River (Pillard, 1983).

MATERIALS AND METHODS

The Upper Mississippi River exhibits, as a result of Locks and Dams, a series of pools. This study emphasized Pool 19 which extends 74.5 km (46.3 river miles) from Lock and Dam 19. Zooplankton were collected approximately monthly, May 1982 to January 1983. Samples were taken with paired Wisconsin-style plankton nets (No. 20) at 36 stations located on 8 transects from just above Lock and Dam 19 to below Lock and Dam 18. To prevent contraction of the animals, chloral hydrate crystals were added to samples in the field. Samples were preserved with 10% buffered formalin. Subsamples were examined under a compound microscope after being stained with Biebrich Scarlet/Eosin B.

RESULTS AND DISCUSSION

In Pool 19 *Plistophora* appears to be parasitic only upon the rotifer component of the zooplankton community. No evidence indicates parasitism on the other major zooplankton groups, Copepoda and Cladocera, even though *Plistophora* has been found to be a parasite in other crustaceans (Sprague, 1966). *Plistophora* infection of rotifers is probably most common in riverine systems where rotifers are usually the dominant zooplankton group and crustaceans are typically found at lower densities (Hynes, 1970).

Lack of *Plistophora* host specificity has been found in some insects (Diptera: Chironomidae) (Coste-Mathiez and Tuzet, 1977). Non-specificity also appears to apply to rotifers. Although several rotifers have been found to be infected by the protozoan (Table 1), nevertheless, some species appear to be more vulnerable than others. Beach (1960) noted parasitism only in *Polyarthra* and *Synchaeta* and Winner (1975) suggested these rotifers were more susceptible than other species. Of the 21 species of rotifers collected in this study (Table 2), only *Brachionus calyciflorus* was infected. *Polyarthra* and *Synchaeta* were present but occurred infrequently and in low densities. Similarly in the Ocqueoc River system studied by Beach (1960), *B. calyciflorus* was rarely found and not infected. Seemingly *Plistophora* more often infects rotifer taxa present in the greatest densities. This may occur because the protozoan is more likely to encounter the more abundant rotifer taxa. There is an exception, as Beach (1960) reported that *K. cochlearis* was nearly as abundant as *Polyarthra* and more abundant than *Synchaeta*. The later two were infected while *K. cochlearis* was not. Similarly, *K. cochlearis* appeared often in this study but was never infected. Because *Keratella cochlearis* is a small rotifer, size may allow it to escape parasitism.

If negative effects exist, of the parasitism documented they are probably minor and play an insignificant role compared to other factors. In the Mississippi River the absence of the parasites in zooplankton may be due to the abrasiveness of the heavy silt load in the river column. Slightly higher frequencies of occurrence of the parasite

on *Brachionus calyciflorus* were observed during the late summer when water clarity was greater. However, winter samples showed no increase in frequency in spite of increased water clarity, but low temperatures may have suppressed parasite activity during the winter.

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Table 1. List of rotifers reported infected by *Plistophora* (Protista: Sporozoa)

Rotifer	Source
<i>Brachionus calyciflorus</i>	Hodgkinson, 1970 Pillard, 1983
<i>B. caudatus</i>	Hodgkinson, 1970
<i>Conochilus unicornus</i>	Ruttner, 1963
<i>Filinia longiseta</i>	Hodgkinson, 1970
<i>Platylabus patulus</i>	Hodgkinson, 1970
<i>Polyarthra euryptera</i>	Beach, 1960
<i>Polyarthra</i> sp.	Hodgkinson, 1970
<i>Synchaeta pectinata</i>	Hodgkinson, 1970
<i>S. stylata</i>	Hodgkinson, 1970
<i>Synchaeta</i> spp.	Beach, 1960

Table 2. Rotifer taxa collected from Pool 19, Mississippi River between May 1982 and January 1983.

<i>Asplanchna</i> spp.	<i>Lecane</i> spp.
<i>Brachionus angularis</i>	<i>Mniobia</i> spp.
<i>B. calyciflorus</i>	<i>Notholca striata</i>
<i>B. caudatus</i>	<i>Platylabus patulus</i>
<i>B. quadridentata</i>	<i>P. quadricornis</i>
<i>Conochiloides</i> spp.	<i>Pyarthra</i> spp.
<i>Euchlanis</i> spp.	<i>Synchaeta</i> spp.
<i>Filia longiseta</i>	<i>Testudinella</i> spp.
<i>Kellicottia longispina</i>	<i>Trichocerca</i> spp.
<i>Keratella cochlearis</i>	<i>Trichotria</i> spp.
<i>K. quadrata</i>	