

Some Crustacean Zooplankton of the Noatak River Area, Northern Alaska

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ABSTRACT. Twenty-six species of Cladocera and 13 species of Copepoda were collected from lakes and pools in the Noatak River area of Northern Alaska. The lakes had an average of 14.50 species per lake and the pools 8.12 species per pool. Nine species were restricted to lakes and 13 to pools. Nineteen species occurred in both lakes and pools.

RÉSUMÉ. *Le zooplankton crustacé de la région de la Noatak, dans le Nord de l'Alaska.* Dans des lacs et des mares de la région de la Noatak, dans le Nord de l'Alaska, on a recueilli vingt-six espèces de cladocères et 13 espèces de copépodes. Il y a en moyenne 14,50 espèces dans un lac et 8,12 espèces dans une mare. Neuf espèces ne se trouvent que dans les lacs et 13 dans les mares. Dix-neuf espèces se trouvent à la fois dans les lacs et les mares.

РЕЗЮМЕ. *Ракообразные в зоопланктоне водоемов в районе реки Ноатак (Северная Аляска).* При исследовании водоемов в районе реки Ноатак в Северной Аляске было собрано 26 видов отряда Cladocera и 13 видов подкласса Copepoda. Дается описание местообитаний различных видов исследованных ракообразных.

INTRODUCTION

Information on the occurrence, distribution, and general ecology of some zooplankton in Northern Alaska has been presented by Johnson (1961), Reed (1962), Hilliard and Tash (1966), Watson *et al.* (1966), Wilson and Tash (1966), and Tash and Armitage (1967). Despite these studies and several earlier ones, relatively little is known about the zooplankton in this vast northern area.

The present paper is a contribution to the knowledge of the occurrence of some zooplankton in various aquatic habitats in the Noatak River area of Northern Alaska.

STUDY AREA

The location of the study area is about 58 miles inland from the Chukchi Sea, near the junction of the Kelly and Noatak Rivers, about 67°58'N., 162°20'W. (Wilson and Tash 1966). All lakes and pools studied are on the delta between the Noatak and Kelly Rivers. Hilliard and Asmund (1963) give a brief description of the flora in the area and summarize a few chemical parameters taken in one pool.

Reed (1962) characterized the pools, ponds, and lakes that he sampled in the Colville River area of Northern Alaska. The various aquatic habitats that were

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sampled during the present study in the Noatak River area that are herein called pools and lakes correspond in general to the characterizations Reed (1962) made for his lakes and pools.

METHODS

Twenty-six samples of zooplankton were collected during 27 August and 2 September 1960 and during 23, 28, and 29 July 1961 from 4 different lakes and 8 different pools. Qualitative samples of zooplankton were taken with a Wisconsin plankton net of #12 mesh. Horizontal tows were made either along the shorelines of the lakes or by throwing the net out from the shore into the lake and pulling it back with an attached cord. Pools were sampled by towing the net through all parts of the area. Samples were also taken by stripping vegetation into the net. Concentrated samples were fixed in a 10 per cent formalin solution and transferred to 80 per cent alcohol. Identification of zooplankton was made from preserved specimens using published keys and figures (Brooks 1957, 1959; Lang 1948; Pennak 1953; Rylov 1935; Sars 1895; Wilson 1959; Wilson and Yeatman 1959; Yeatman 1944, 1959).

ZOOPLANKTON ANALYSIS

Twenty-six species of Cladocera and 13 species of Copepoda were identified from preserved samples. Table 1 shows the occurrence of each species in the various lakes and pools sampled. Information on the occurrence of males, females, ovigerous females and juvenile forms of each species is available at the Library of the Arctic Institute of North America.

The lakes supported an average of 14.50 species per lake whereas the pools only supported an average of 8.12 species per pool. This variation is probably accounted for by the more diverse habitats of the lakes which provide more niches for different species.

Nine species were restricted to lakes, 13 to pools and 19 occurred in both habitats (Table 1). Reed (1962) indicates that *Cyclops magnus* showed habitat preference for pools and *Diaptomus gracilis* and *Cyclops scutifer* for lakes in the Colville area. In the Noatak River area, these species showed the same habitat preferences as those in the Colville area.

Tash and Armitage (1967) indicated that *Cyclops vernalis* and *Chydorus sphaericus* were ubiquitous in the various habitats sampled in the Cape Thompson area and that *Daphnia pulex* had a habitat preference for inland pools and *Holopedium gibberum* for lakes. In this study *Cyclops vernalis*, *Holopedium gibberum*, *Daphnia pulex*, and *Chydorus sphaericus* seemed ubiquitous to both pools and lakes.

Brooks (1959) stated that *Eurycercus glacialis* is the species that occurs in northern Alaska and Canada. However, Reed (1962) has identified *E. lamellatus* from samples taken along the Colville River area of northern Alaska and did not collect *E. glacialis* in this area. Both *E. lamellatus* and *E. glacialis* were found in samples taken in the Noatak River area. In one case, the two species co-occurred

TABLE 1. The occurrence of different species of Copepoda and Cladocera in lakes and pools in the Noatak River Area.

Species	Lakes				Noatak-Kelly Area Pools								No. of occurrences of each species in habitats
	1	2	3	4	1	2	3	4	5	6	7	8	
<i>Eurytemora yukonensis</i>	X	X	X	X									4
<i>Diaptomus gracillis</i>	X	X	X	X									4
<i>Eucyclops agilis</i>			X	X						X			3
<i>Cyclops scutifer</i>		X											1
<i>Cyclops magnus</i>								X	X				2
<i>Cyclops vernalis</i>	X		X		X	X	X	X	X			X	8
<i>Cyclops capillatus</i>	X			X	X	X							4
<i>Cyclops venustoides</i>											X		1
<i>Cyclops languidoides</i>							X						1
<i>Cyclops bicolor</i>										X			1
<i>Moraria duthief</i>	X									X			2
<i>Moraria mrazeki</i>		X											1
<i>Canthocamptus staphylinoides</i>								X			X		2
<i>Bryocamptus tikchikensis</i>						X							1
<i>Polyphemus pediculus</i>	X	X	X	X	X	X	X		X		X		9
<i>Sida crystallina</i>	X		X	X									3
<i>Holopedium gibberum</i>		X		X									2
<i>Daphnia pulex</i>	X			X	X	X	X	X	X		X		8
<i>Daphnia longiremis</i>	X	X	X	X									4
<i>Daphnia rosea</i>	X	X				X							3
<i>Simocephalus vetulus</i>					X								1
<i>Simocephalus serrulatus</i>				X						X		X	3
<i>Scapholeberis kingi</i>			X	X		X	X		X				5
<i>Ceriodaphnia reticulata</i>			X									X	2
<i>Bosmina coregoni</i>	X	X	X	X						X			5
<i>Lathonura rectirostris</i>					X								1
<i>Eurycercus lamellatus</i>	X				X	X							3
<i>Eurycercus glacialis</i>					X	X				X			3
<i>Camptocercus rectirostris</i>						X				X			2
<i>Acroperus harpae</i>	X					X				X		X	4
<i>Alona guttata</i>										X			1
<i>Alona affinis</i>	X	X	X							X			4
<i>Alona costata</i>	X		X	X		X			X	X		X	7
<i>Alona rectangula</i>	X				X								2
<i>Alona intermedia</i>	X												1
<i>Alona excisa</i>	X				X								2
<i>Chydorus gibbus</i>			X										1
<i>Chydorus latus</i>				X						X			2
<i>Chydorus ovalis</i>				X									1
<i>Chydorus sphaericus</i>	X	X			X	X	X		X	X	X	X	9
Total no. of species in each habitat	19	11	13	15	11	13	6	4	9	11	5	6	

in a small pool. Such co-occurrence is not without precedent as the author has observed this phenomenon in the Cape Thompson area of northern Alaska where the two species co-occurred in a small lake.

Reed (1962) found only 22 species of cladocerans and 7 of cyclopoids in samples taken from 200 aquatic habitats along the Colville River. In the Noatak area, 26 species of cladocerans and 6 of cyclopoids were collected from only 4 lakes and 8 pools. Perhaps the sampling technique of stripping and squeezing aquatic vegetation into the net (which Reed did not list as having done) resulted in this increase in the total number of cladoceran and cyclopoid species collected. Many

of the smaller species of cladocerans and cyclopoids show habitat preferences for densely vegetated aquatic areas and they would more likely be captured by stripping vegetation. Conversely, only 4 species of calanoida copepods were captured in the Noatak area compared to 10 species from the Colville area. Relatively few calanoids show habitat preferences for small-pool weedy areas, thus sampling by stripping vegetation would not capture more species.

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REFERENCES

- BROOKS, J. L. 1957. The systematics of North American *Daphnia*. *Memoirs of the Connecticut Academy of Arts and Sciences*, 13: 1-180.
- . 1959. Cladocera. In: W. T. Edmondson ed. *Fresh-water Biology*. New York: John Wiley and Sons, Incorporated. pp. 587-656.
- HILLIARD, D. K. and B. ASMUND. 1963. Studies on Chrysophyceae from some Ponds and Lakes in Alaska. II. Notes on the General *Dinobryon*, *Hyalobryon* and *Epipyxis* with descriptions of new species. *Hydrobiologica*, 22: 331-97.
- HILLIARD, D. K. and J. C. TASH. 1966. Notes on the fresh-water algae and zooplankton. In: *Environment of the Cape Thompson region, Alaska*. United States Atomic Energy Commission. pp. 363-413.
- JOHNSON, W. 1961. The zooplankton of some arctic coastal lagoons of northwestern Alaska with description of a new species of *Eurytemora*. *Pacific Science*, 15: 311-23.
- LANG, K. 1948. *Monographie der Harpacticiden*. Vol. 1, 2. Stockholm: H. Ohlsson Lund. 1683 pp.
- PENNAK, R. W. 1953. *Freshwater invertebrates of the United States*. New York: The Ronald Press Company. 769 pp.
- REED, E. B. 1962. Freshwater plankton crustacea of the Colville River Area, Northern Alaska. *Arctic*, 15: 27-50.
- RYLOV, W. M. 1935. Das Zooplankton der Binnengewasser. In: A. Thiemann, ed. *Die Binnengewasser*. E. Schweizerbart'sche Verlagsbuchhandlung Stuttgart; Erwin Hagele. Band 15. 272 pp.
- SARS, G. O. 1895. *An account of the Crustacea of Norway*. Vol. 4, Copepoda, Calanoida; Vol. 4, Copepoda, Harpacticoida; Vol. 6, Copepoda, Cyclopoida Alb. Copenhagen: Cammermeyers Forlag.
- TASH, J. C. and K. B. ARMITAGE. 1967. Ecology of zooplankton of the Cape Thompson Area, Alaska. *Ecology*, 48: 129-39.
- WATSON, D. G., W. C. HANSON, J. J. DAVIS, and C. E. CUSHING. 1966. Limmology of tundra ponds and Ogotoruk Creek. In: *Environment of the Cape Thompson region, Alaska*. United States Atomic Energy Commission. pp. 415-35.
- WILSON, M. S. 1959. Free-living Copepoda: Calanoida. In: W. T. Edmondson ed. *Fresh-water Biology*. New York: John Wiley and Sons, Incorporated. pp. 738-94.

- WILSON, M. S. and J. C. TASH. 1966. The Euryhaline copepod genus *Eurytemora* in fresh and brackish waters of the Cape Thompson Region, Chukchi Sea, Alaska. *Proceedings of the United States National Museum, Smithsonian Institution*, 118: 553-76.
- WILSON, M. S. and H. C. YEATMAN. 1959. Free-living Copepoda: Harpacticoida. In: W. T. Edmondson ed. *Fresh-water Biology*. New York: John Wiley and Sons, Incorporated. pp. 815-61.
- YEATMAN, H. C. 1944. American cyclopoid copepods of the *viridis-vernalis* group. (Including a description of *Cyclops carolinianus* n. sp.) *American Midland Naturalist*, 32: 1-90.
- . 1959. Free-living Copepoda. In: W. T. Edmondson ed. *Fresh-water Biology*. New York: John Wiley and Sons, Incorporated. pp. 795-815.