

A further note on *Branchinecta gaini* (Daday, 1910)  
population from the region of the "H. Arctowski" Station  
(King George Island, South Shetland Islands)

## Introduction

There are several groups of invertebrates occurring in freshwater bodies on King George Island. Crustacea are represented there by Copepoda and Branchiopoda (Heywood 1970).

*Branchinecta gaini* (Branchiopoda, Anostraca) occurs in the Antarctica on Signy Island (Heywood 1970), South Georgia (Linder 1941) and King George Island (Campos, Arenas and Steffen 1978). This branchiopod is a detritivorous filtrator, feeding close to the bottom (Šramek-Hušek, Straškraba and Brtek 1962). Completion of its life cycle takes from November to May, through the following stages: nauplii, metanauplii, juvenes and adult males and females (Jurasz, Kittel and Presler 1983). Ten years after the first data on the distribution and the life cycle of *B. gaini* occurring in the region of the "Arctowski" Station had been collected (Jurasz, Kittel and Presler 1983), observations on its population abundance and structure have been repeated.

## Material and methods

Nine ponds situated in the neighbourhood of the "Arctowski" Station (Fig. 1) have been studied; they were of the following types:

- 1) Large, permanent ponds, probably fed with water from melting snow and glacier (ponds No. I, II, VIII).
- 2) Permanent, small water bodies situated on the side moraine of Ecology Glacier (V, VII, IX).
- 3) Ephemeral, small, shallow water bodies (III, IV, VI).

The same classifications and symbols have been used as in the study by Jurasz, Kittel and Presler (1983).

Throughout the study period (January 1988) almost no precipitation has been observed and the water bodies were intensely drying. The maximum depth in water bodies No. I, II, V, VI, VII, IX was about 1.5 m, and the average depth of water bodies No. III and IV was about 0.2–0.3 m. Temperature ranged from 2.1 to 7.7°C in large ponds (class 1), and from 5.4 to 11.2°C in small ones (classes 2 and 3).

Samples were collected three times in 1988: on January 7, January 20 and January 27 with a classical plankton net, mesh size 100 µm. Samples contained from 17 to 213 individuals.

Animals were measured with measurement accuracy of 0.1 mm, stage of development and sex were determined. Samples were preserved in 4% formalin.

## Results

*Branchinecta gaini* was present in only 3 water bodies: No. I, VII and IX (Fig. 1). In pond I, in the direct neighbourhood of the station, its abundance was low; in pond IX the density of *B. gaini* was higher and the highest was in pond VII.

Body length of *B. gaini* did not change significantly\* in January, with no significant differences between particular collecting sites and was in average:  $12.0 \pm 1.2$  mm for males,  $11.9 \pm 1.6$  mm for females,  $12.1 \pm 2.1$  mm for egg-bearing females, and  $6.7 \pm 1.3$  mm for juvenes (Tab. 1).

Sex ratio  $\frac{\sigma}{\phi}$  in pond VII changed significantly in time from 1.05 to 3.12. In pond IX there were no significant changes in sex ratio and it ranged between 0.87 and 1.39 (Tab. 1). In pond I abundance was too low for determination of sex ratio and population structure.

In the study period the population structure in pond VII was different than in pond IX; in pond IX juvenes occurred and there were almost no egg-bearing females, whereas in pond VII almost no juvenile forms could be found and egg-bearing females accounted to 30.8–34.5% of all females (Fig. 2).

## Discussion

Comparing the data from 1978 (Jurasz, Kittel and Presler 1983) and from 1988 concerning the distribution of *B. gaini* in the region of "Arctowski" Station, abundance of this species seems to have decreased in the direct

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\* Significance of differences was tested with t-Student test at significance level  $\alpha = 0.05$ .

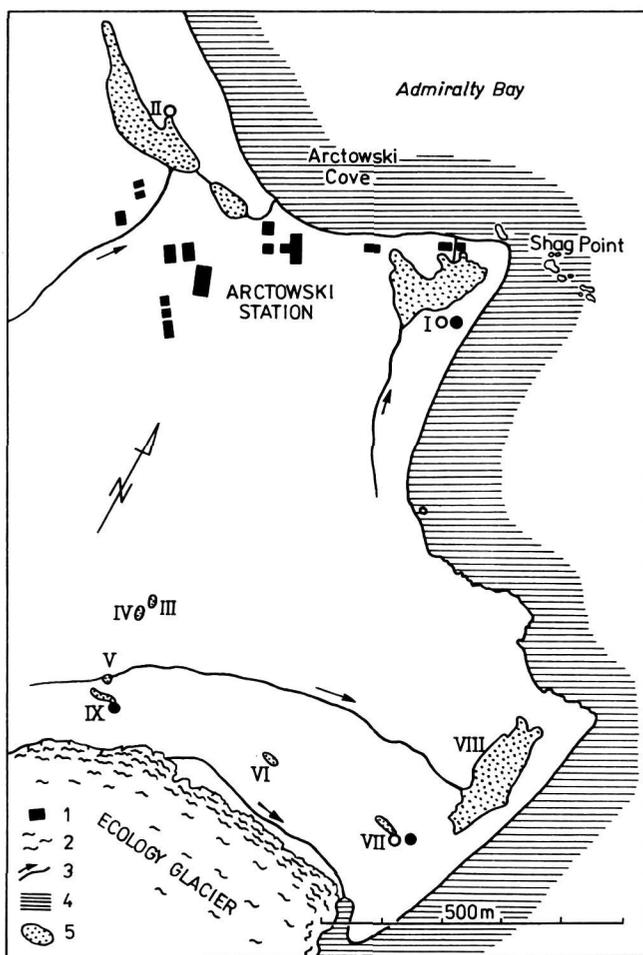


Fig. 1. Investigated area;

I—IX — freshwater bodies under investigation, 1 — station buildings, 2 — glacier, 3 — streams, 4 — sea, 5 — freshwater bodies (from Jurasz, Kittel and Presler 1983), o — ponds with *B. gaini* in 1978, ● — ponds with *B. gaini* in 1988

Table 1  
Average body length and changes in sex ratio in *Branchinecta gaini* population in 1988

Pond No.	Body length (mm)				Sex ratio $\frac{\delta}{\text{♀}}$		
	males	females	ovigerous females	juvenes	7 Jan.	20 Jan.	27 Jan.
VII	12.1	12.0	11.9	—			
	±1.0	±1.5	+1.7		1.1	1.6	3.1
IX	11.7	11.5	14.3	6.7			
	±2.0	±1.6	±4.3	±1.3	1.0	0.9	1.4

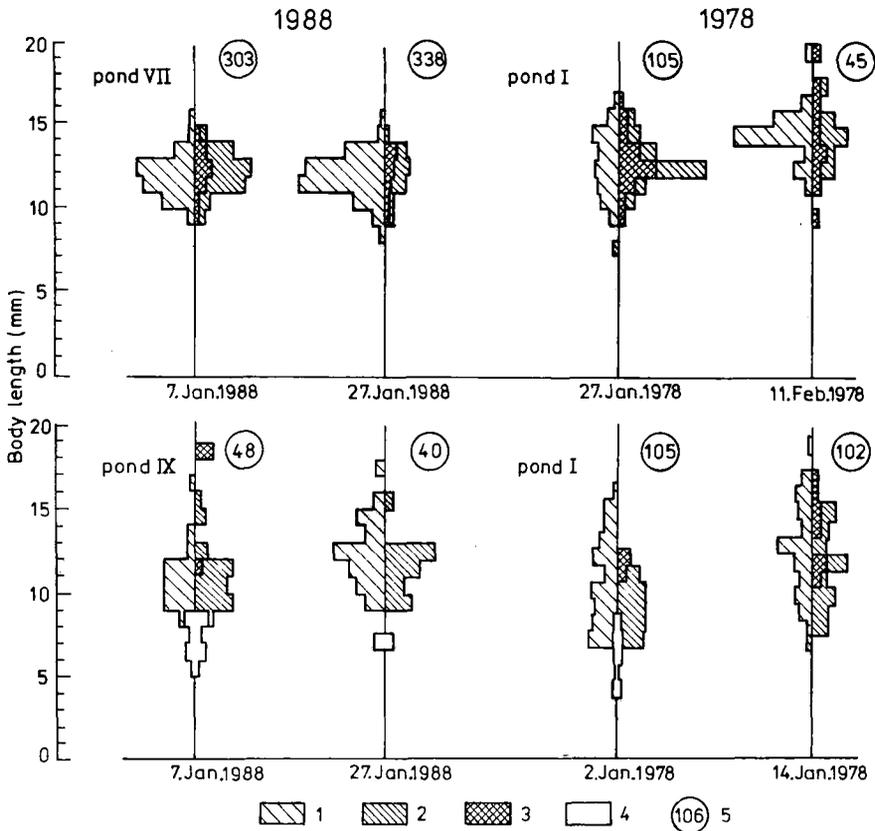


Fig. 2. *B. gaini* population structure in the study period of 1988 in comparison with the data from similar period in 1978 (data after Jurasz, Kittel and Presler 1983); 1 — adult males, 2 — adult females, 3 — adult females with egg-sacs filled with eggs, 4 — juvenes, 5 — number of checked specimens

neighbourhood of the station. In pond II *B. gaini* was not observed. In pond I, in comparison with 1978, the abundance of this branchiopod has dropped. But *B. gaini* is still abundant in pond VII, where it was noted also in 1978 (Fig. 1), and entered a new water body, No. IX, where it did not occur 10 years earlier. Both ponds (VII and IX) are situated some 800 m from the station.

Distribution of *B. gaini* in 1988 may suggest that the decrease in its abundance in the direct neighbourhood of the station may be caused by the inflow of some sewage to ponds I and II. Changes in the distribution, due to the ability of eggs to survive overdrying and freezing, can result also in the sudden and abundant appearance of this crustacean in water bodies, where it did not occur for several years (Stańczykowska 1986).

Duration of the life cycle of *B. gaini* is 4–6 months, similarly as in other species from this genus (Šrámek-Hušek, Straškraba and Brtek 1962). Comparing *B. gaini* population structure in 1978 (Jurasz, Kittel and Presler 1983)

and in 1988, the part of its life cycle observed in January was similar. However, a shift (acceleration in pond VII and a delay in pond IX) in the life cycle is possible, as compared to 1978 (Fig. 2).

Sex ratio  $\frac{\sigma}{\phi}$  which oscillated around 1 in 1978, increased to 3 at the end of the 1988 study period. It could be the consequence of higher mortality of females after egg-laying.

During the observations in 1988 the large form of *B. gaini*, which occurred in 1978 in pond VII, has not been found.

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