

Feeding behaviour of salp *Thalia democratica* (Thaliacea)

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Received 9 June 1994; revised 14 February 1995

The salp *Thalia democratica* was found to feed on *Chaetoceros* sp. continuously during the entire experimental period of 24 hours. The rate of consumption ($0.09\text{--}0.16\% \cdot \text{animal}^{-1} \cdot \text{h}^{-1}$), however, did not differ significantly. Faecal output also followed a similar trend ($0.073\text{--}0.098\% \cdot \text{animal}^{-1} \cdot \text{h}^{-1}$). Food concentration, thus, did not influence the grazing rate of this species.

Feeding strategies of zooplankton, particularly copepods have received considerable attention as this provides important information related to productivity and energy transfer in the marine ecosystem¹⁻⁵. However, most of the work on this line is from temperate region and no reports are available from the tropics. Therefore, an experiment has been designed to understand the grazing behaviour of the salp *Thalia democratica* which is a common member of zooplankton community along the Indian coast. Salps are selected firstly because they feed on phytoplankton extensively thereby converting plant organic matter into animal organic matter and secondly they often form large swarms and are therefore responsible for significant reduction in phytoplankton population. Sometimes they also form large aggregations at deeper layers and play an important role in the utilisation of organic matter. In this study the grazing rate of the salp on diatom *Chaetoceros* sp. and its faecal output over a 24 h period are evaluated to assess the influence of phytoplankton concentration on the feeding behaviour of this species.

This study was undertaken as part of the Joint Global Ocean Flux Studies—Indian Programme (JGOFS) during the 78th cruise of *ORV Sagar Kanya* in September 1993. Experimental animals and seawater were collected off Bombay at about 300 m isobar. Pure culture of *Chaetoceros* sp. was carried from the laboratory in 500 ml conical flasks. This culture was later grown in F/2 medium on board, under artificial light (10000 lux) after adding 25 μCi of ¹⁴C. In general, the method described by Omori and Ikeda⁶ was followed in developing the pure culture. It took 3 days for the culture to attain its peak. Required quantity of seawater was filtered through glass fibre filter pa-

per (GF/C). The incubated phytoplankton culture was later diluted in 3 litre filtered seawater. The experimental specimens were starved for 12 h before commencing the experiment.

The diluted *Chaetoceros* culture was stirred well and 80 ml aliquots were taken in 100 ml glass beakers. To each beaker, 3 salps (size 7.1 ± 0.6 nm) were introduced. Triplicates were maintained for each set including the control which did not contain salps. In all, there were 7 sets of experimental beakers. All beakers were covered with black cloth and kept in a dark room (24°C) to avoid photosynthesis. At every 4 h interval, one set of experimental beakers (3) were taken out and animals and excreta were carefully removed. They were stored in scintillation vials separately. Water was filtered through GF/C and stored in scintillation vials. Later, ¹⁴C activity in the animals, faecal matter and water were estimated in a liquid scintillation counter. The experiment lasted for 24 h. Each experimental beaker contained 0.9 ± 0.02 mg C of phytoplankton at the beginning of the experiment. No mortality occurred during the course of the experiment. Students'-*t* test was used to find significant differences in grazing rates.

Table 1 shows hourly feed consumption and faecal output at each time interval. Although the consumption showed marginal increase over the 24 h experimental period ($0.09\text{--}0.16\% \cdot \text{animal}^{-1} \cdot \text{h}^{-1}$), it was not significant ($P > 0.05$). Faecal output was also stable regardless of the time elapsed ($0.073\text{--}0.096\% \cdot \text{animal}^{-1} \cdot \text{h}^{-1}$). Thus, it can be deduced that the feeding activity or rate of consumption of *T. democratica* was not influenced by the concentration of *Chaetoceros* sp. because as the salps start grazing, the population of *Chaetoceros* is bound to reduce in abun-

Table 1—Consumption and faecal production (% of initial *Chaetoceros* concentration) by *Thalia democratica* (animal·h⁻¹)

| Time elapsed (h) | Consumption | Faecal production |
|------------------|-------------|-------------------|
| 4 | 0.09 | 0.083 |
| 8 | 0.13 | 0.098 |
| 12 | 0.13 | 0.073 |
| 16 | 0.11 | 0.087 |
| 20 | 0.14 | 0.092 |
| 24 | 0.16 | 0.094 |

dance over the 24 h experimental period and feeding continued almost at equal rates. The faecal output data was also in support of this finding.

The present work was conducted primarily to extract basic information on grazing of zooplankton in tropical waters like the Arabian Sea. Mullin⁷ while working on the same species of salp observed that grazing rate per unit weight increased with increasing size of salp. Since the size of salp

used in this study was more or less uniform, it is difficult to find any such variation.

The confined condition in beakers did not affect the grazing rate of salps as there was considerable feeding on phytoplankton and faecal production at the end of the experiment. As there was almost uniform rate of grazing throughout the experimental period it can be deduced that when food is in abundance grazing by individual salp was not in any way influenced by concentration of food.

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