24 THE VERTICAL DISTRIBUTION OF ROTIFERS IN A COASTAL MEROMICTIC LAKE OF PAPUA NEW GUINEA (LAKE NAGADA, MADANG PROVINCE).

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Lake Nagada is a coastal meromictic lake in NE Papua New Guinea (1). As part of a field study on the limnology of this lake, we studied the day- and nighttime vertical distribution of the rotifer *Brachionus* cf. *plicatilis* ("S-type") (2) in relation to the stratification of abiotic factors (temperature, conductivity, redox potential, pH, dissolved oxygen, total sulfides, and light transmission) as well as of phytoplankton and photosynthetic bacteria. At the end of May 1992, the thermocline was situated at 2.00 m depth, whereas the chemocline was at 4.75 m depth. A phytoplankton peak concentration was observed at the thermocline (1.5 - 2 m), whereas a dense bacterial plate occurred at the chemocline. Light intensity dropped sharply to less than 0.1 % at the depth of the bacterial plate. The day- and nighttime vertical distribution of *Brachionus* cf. *plicatilis* was sampled at 0.5 m intervals. During the day, a bimodal distribution was observed, with a peak of more than 900 ind. l^{-1} at 1-1.5 m depth, and a smaller peak of about 400 ind. l^{-1} at 4.5 m. A small number of individuals was found below the chemocline (up to 6.5 m depth). At night, there was a clearcut unimodal distribution, with a peak concentration of 1040 ind. l^{-1} at 1.5 m. Our results indicate two subpopulations of *B.* cf. *plicatilis* in Lake Nagada, with the animals residing near the chemocline during the day migrating to the phytoplankton maximum during the night.

(1) W. VYVERMAN (1991). *Biol. Jb. Dodonaea* 59:100-108.
(2) Y. FU, K. HIRAYAMA and Y. NATSUKARI (1991). *J. exp. mar. biol. Ecol.* 151:29-41.

25 ROOSTS OF BLACK-HEADED GULLS : KEY OF A SELF-ORGANIZED DISPERSAL SYSTEM.

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Self organizing principle suggests that very simple interactions between numerous agents lead to very sophisticated adaptive behaviours on the hole system of these interacting agents. Self-organization has been evidenced as the leading principle of several adaptive mass behaviour in social animals, mostly social insects. Here we construct a model based on field observations and experiments on the social behaviours of wintering black-headed gulls, particularly roosting behaviour. This model leads from the simple rules structuring flocks of gulls till the complex adaptive system regulating the daily distribution of lens of thousands of them over wide