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POPULATION FLUCTUATIONS OF *LYMNAEA ACUMINATA* LAMARCK WITH NOTES ON ITS BIOLOGY

H. P. AGRAWAL

Zoological Survey of India, Calcutta

ABSTRACT

Fluctuations in the natural population and breeding behaviour of *Lymnaea acuminata* Lamarck were studied in 1978-1979. High incidence of the species in October-January denotes its preference to low temperature. The species has no definite breeding season.

INTRODUCTION

Pillai and Koshy (1970) studied the population build-up of *Macrochlamys indica* ; Agrawal (1976) and Raut (1979) made observations on *Bensonia monticola, Achatina fulica* and *Macrochlamys indica* respectively. Nothing is on record on freshwater gastropods except some preliminary observations on the breeding habits of *Lymnaea acuminata* (Agrawal, 1972). It appears that in the absence of density dependent factors, density independent factors such as vegetation, rainfall, temperature etc. might exert a control on snail population. In the present paper attempts have been made to gain knowledge on the factors influencing population density and also the breeding behaviour of *Lymnaea acuminata*.

MATERIAL AND METHODS

The snails were collected from Budagarh lake, Jabalpur (situated on Jabalpur-Katni road, 23° 20'N lat., 83°E long.) fortnightly in the years 1978-1979. In the lake five sites were selected at random. From each site, snails and egg-masses present in half a square metre area were collected and counted. The mean of such five readings was considered as the actual snails and egg-masses present in the area. Only living snails above 5.4 mm were counted and measured with vernier callipers reading to 0.1 mm.

OBSERVATIONS

Hydrological conditions

The pH ranged from 7.1 to 7.8. The pH values were less in July-September period when the lake was flooded with rain water.

The water temperature of the lake ranged from 16.5°C to 29°C, with a minimum in December, 1978 and maximum in May, 1978. The minimum and maximum temperature values concides with the seasonal changes.

Population trends

Lymnaea acuminata is found in the lake throughout the year, the population density

varied from place to place. The highest population density was 21 to 26 with an average 25 snails in the size-group 7.5-12.0 was recorded in November at a temperature about 21°C (Fig. 1). The minimum was 3 to 7 with an average five snails in the size-group 6.1-8.2 was recorded in June at about 28°C temperature (Fig. 1).

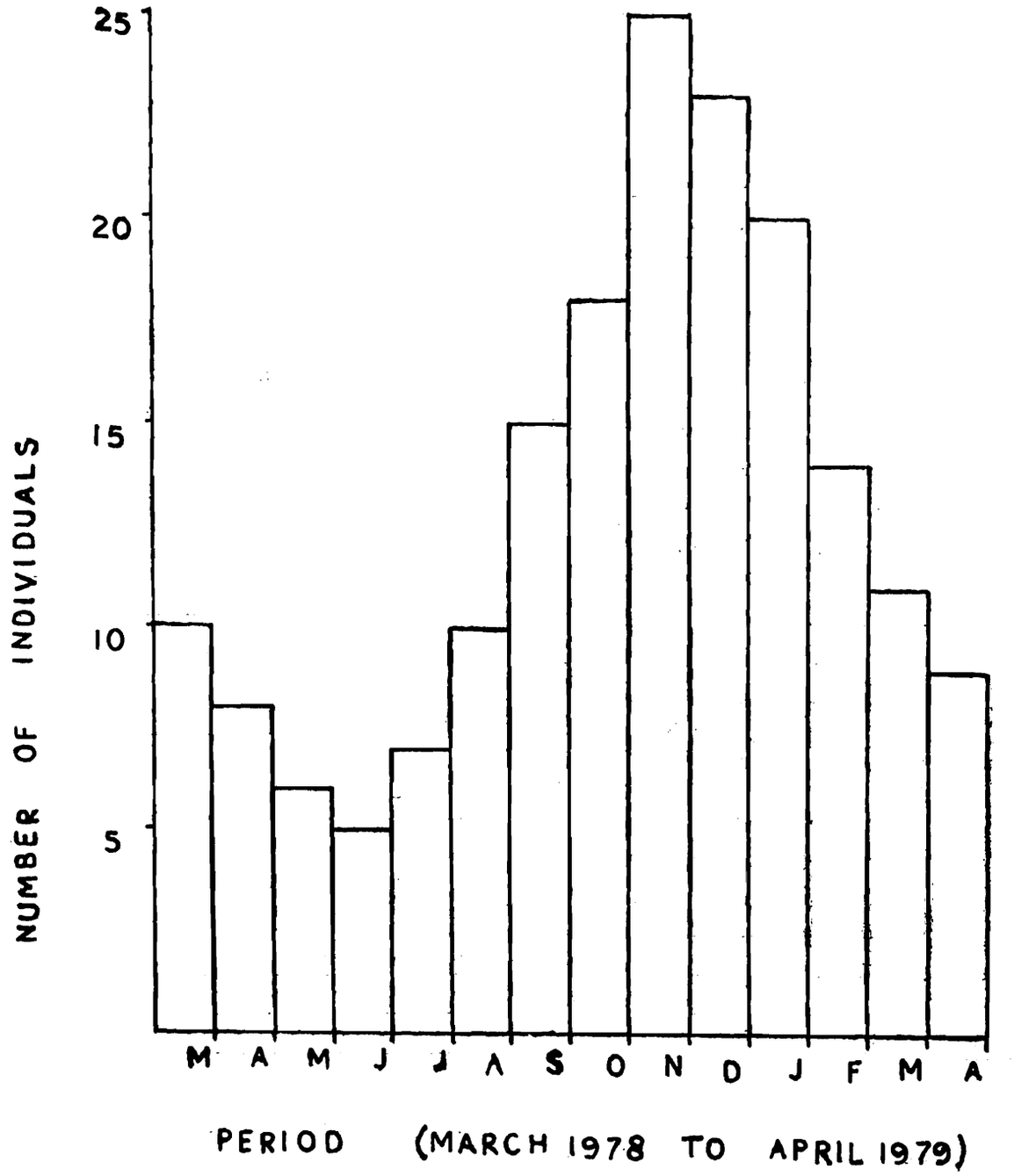

FIG 1

Fig. 1. Population fluctuations of *Lymnaea acuminata* from March, 1978 to April, 1979.

The numbers were low in other months. The higher incidence during October 1978 to January 1979 suggests their preference to low temperature (Fig. 2).

slowly. It takes about half an hour to lay a mass of about 120 eggs. The eggs could be collected round the year (Fig. 3) as different sets of individuals attain sexual maturity at

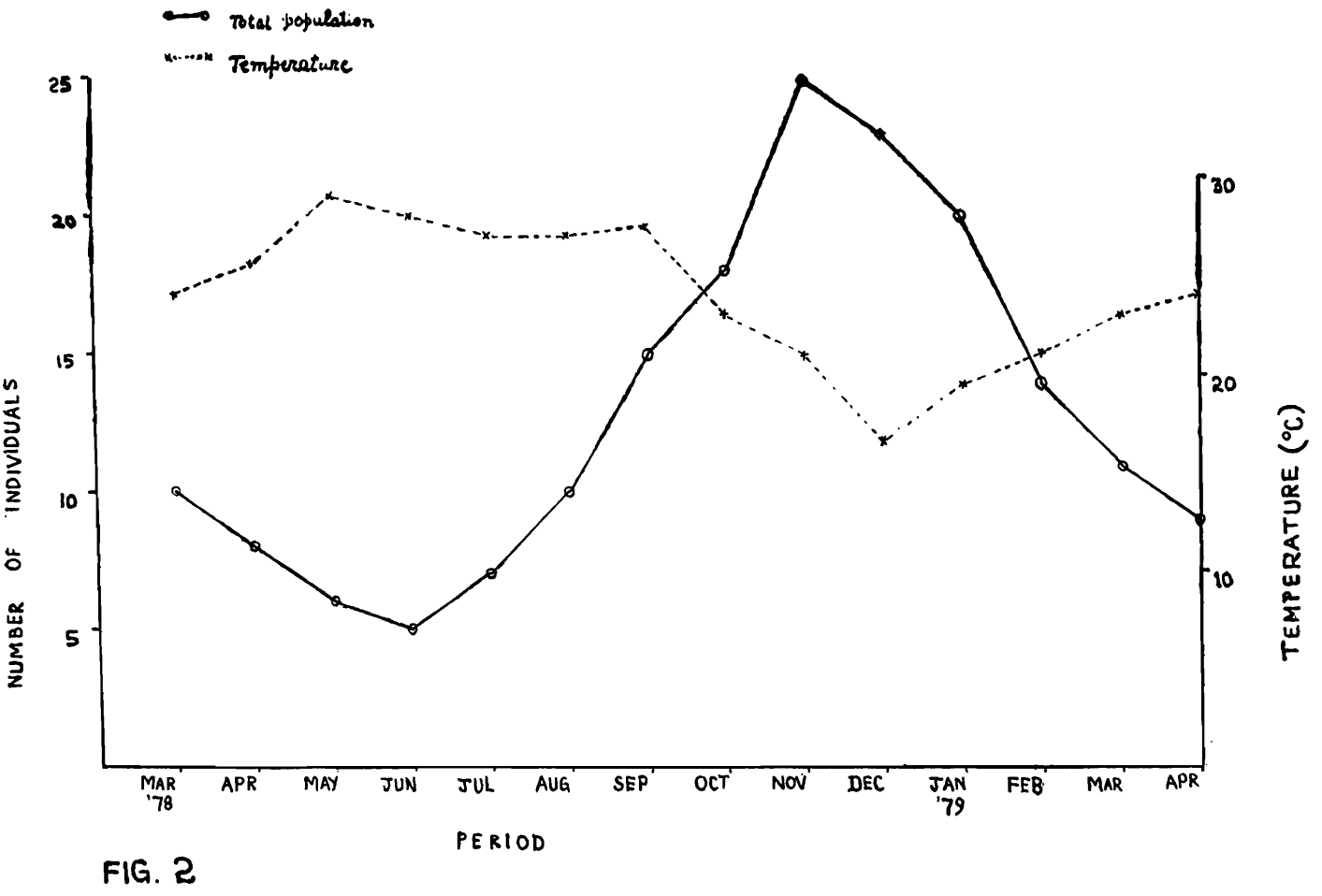

Fig. 2. Graph showing the effect of temperature on the population of *Lymnaea acuminata*.

Biology

Lymnaea acuminata is hermaphrodite and oviparous. The copulation lasts for about fortyfive minutes and is not reciprocal. The individuals come to the surface for mating. The eggs are laid within two days. The individuals about to lay eggs, attaches itself by its foot to a leaf or to the walls of the aquarium in the laboratory. The eggs embeded in a jelly-like substance are laid on the support and the animal recedes very slowly. It takes about half an hour to lay a mass of about 120 eggs. The eggs could be collected round the year (Fig. 3) as different sets of individuals attain sexual maturity at different periods of the year. There seems to be no definite breeding season for the species.

An examination of the egg-mass under the microscope revealed that all the eggs were in the same stage of development. The number of the eggs laid in different egg-masses varies and the average number of eggs tends to fall with higher number of egg-masses laid by an individual.

The number of egg-masses laid by an individual varies from 1 to 28. The peak was

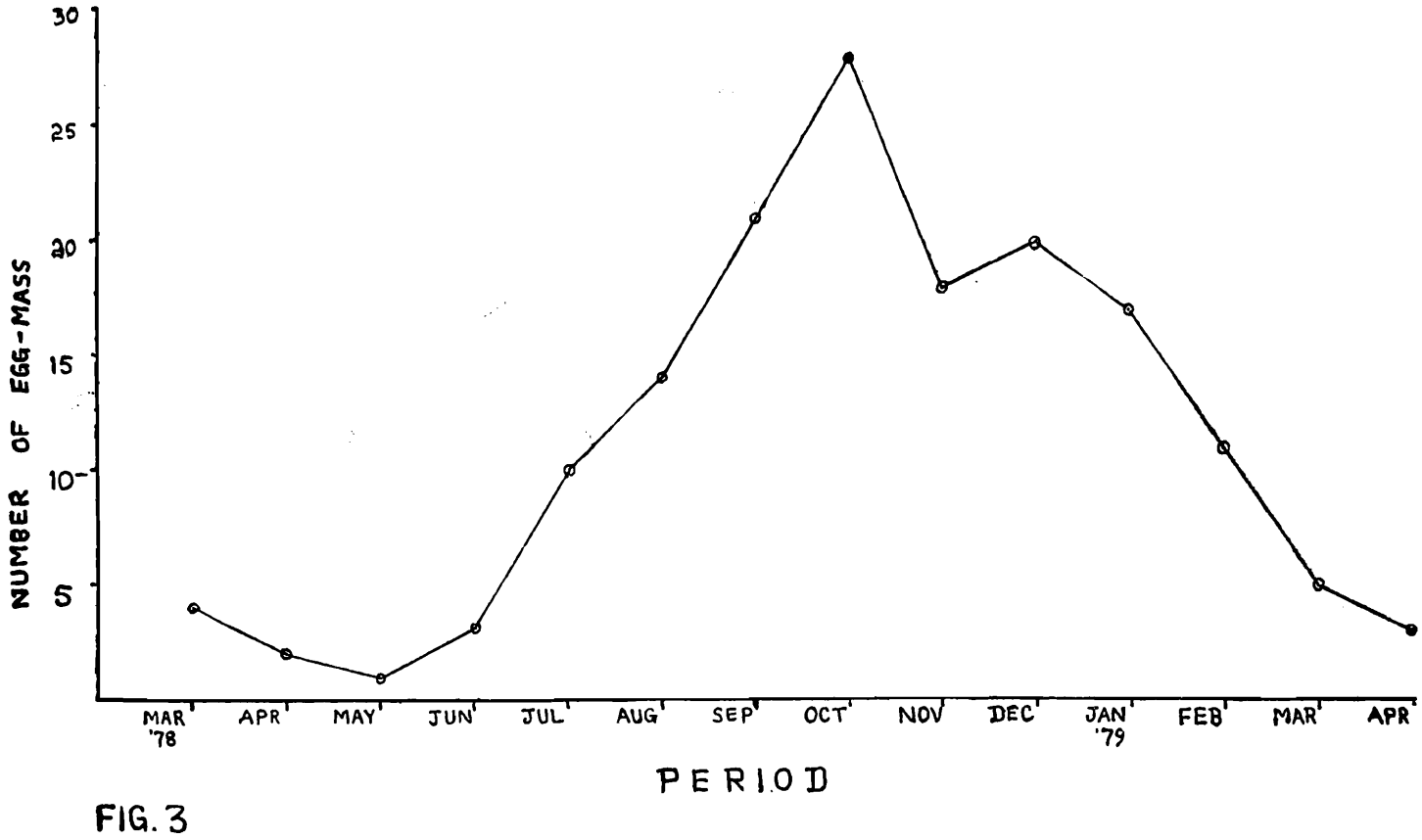

Fig. 3. Fluctuations in the number of egg-masses of *Lymnaea acuminata*.

recorded in October during the period of investigation. The values were low in other months (Fig. 3).

Discussion

Population density exhibits variations from place to place in the same lake. Biotic and abiotic factors of the lake were considered to ascertain their role on the survival and multiplication of the snails.

The vegetation is a significant factor in the multiplication of snails. Since the population was maximum from September to January, it appears that trapa vegetation (which is being cultivated during this period) is one of the vital factor for the propagation of this species.

Temperature plays an important role on the snails population. It is inversely proportional to the temperature.

It appears that pH has no impact on the snail population. This supports the view of Raut (1979).

Predators like birds (*Anastomus oscitans*) and trematode parasites have been recorded which affect the snail population.

Individuals of different size-groups were found throughout the year, probably due to the addition of new populations.

Definite breeding period could not be ascertained in *L. acuminata*. Ramanan (1900) has said that in case of *L. luteola* spawn was laid once in a fortnight. Thompson (1926), speaking of *L. stagnalis*, said that the eggs are laid through the summer. Annandale and

Rao (1925) stated that certain species of *Lymnaea* are functionally protandrous and pair when the male organs are ripe. The fecundity of *L. acuminata* seems to be susceptible to environmental influences.

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