

Department of Zoology, for help with radioactivity determinations.

Laboratory of Algal Physiology. ARUNA GARG.  
Department of Botany, S. N. TRIPATHI.  
Banaras Hindu University, E. R. S. TALPASAYI.  
Varanasi 221 005.

1. Watanabe, A. and Kiyohara, T., In "Studies on Microalgae and Photo-synthetic Bacteria," *Plant and Cell Physiol.* (Special Issue), 1963, p. 189.
2. Allen, M. B. and Arnon, D. I., *Plant Physiol.*, 1955, 30, 366.
3. Hatch, M. D. and Slack, C. R., *Arch. Biochem. Biophys.*, 1967, 120, 224.
4. Morris, I. and Facell, K., *Physiol. Plant.*, 1971, 25, 372.
5. Talling, J. F. and Driver, D., In *Proceedings, Conference of Primary Productivity Measurement, Marine and Freshwater*, Hawaii, 1961, U.S. Atomic Energy, Comm. TID-7633, 1963, p. 142.
6. Lowry, O. H., Rosenbrouge, N. J., Farr, A. L. and Randall, R. J., *J. Biol. Chem.*, 1951, 193, 265.
7. Fogg, G. E., Stewart, W. D. P., Fay, P. and Walsby, A. E., *The Blue-Green Algae*, Acad. Press, London and New York, 1973.
8. Codd, G. A. and Stewart, W. D. P., *Planta*, 1976, 130, 323.
9. — and —, *Arch. Mikrobiol.*, 1973, 94, 11.

**MASS MIGRATION AND MORTALITY OF  
AMYNTHAS (= PHERETIMA) ALEXANDRI  
(BEDDARD) (MEGASCOLECIDAE:  
OLIGOCHAETA)**

Mass migration is an occasional phenomenon seen in earthworms<sup>1</sup>. This phenomenon was recorded in *Perionyx* sp. in Burma<sup>2,3</sup>, and in *Eisenia foetida* in Holland<sup>4</sup>. However, only one such report existed till today in India, in which little was mentioned regarding the location, and species of the earthworm<sup>3</sup>. During 1979, the mass migration leading to mortality, of a geophagous earthworm, *Amyntus* (= *Pheretima*) *alexandri* (Beddard) was recorded at Medziphema (lat. 25° 45' N; long. 93° 53' E; and ca altitudinal range 420–450 m MSL), in Kohima District, Nagaland, which experienced a tropical climate with heavy rainfall. The uncultivated fields of the place were covered with thick undergrowth consisting of grasses, *Imperata cylindrica*, and *Thysanolaena maxima*; and herbs, *Mikania scadens*, and *Eupatorium odoratum*. This

report is a brief account of the observations of the above mentioned phenomenon.

The mass migration was observed during September–October, 1979, the post monsoon and early winter season of the place, most probably when the soil was hardened. During this period the worms were recorded crawling on the surface aimlessly in the early mornings (0500–0700 hrs) in huge numbers, almost covering the earthen roads, tracks, paths and other open places. The direction of their migration was downward the hill slopes. About 5,000 migratory worms were collected and preserved in 5% formalin. It was estimated that about 99.99% of them were matured. Gates<sup>2,3</sup> also reported similar types of migratory movements, and assumed that these worms were moving downwards in search of water and food. Madge<sup>5</sup> stated that the mass migration was in response to the raiding activity of the predatory ants. In contrast, the mass migration of earthworms in India as reported by Gates<sup>3</sup> was during the early part of the monsoon, and worms were moving upward. This upward movement was probably in search of suitable habitat.

During the day time, in the forenoon when the temperature of the atmosphere, and soil was increased gradually, the locomotion of the worms were stopped. Then, they dried up and died secreting a whitish yellow body fluid and rolling in the surrounding soil. Small predatory ants, black in colour were observed attacking these worms and they were quickly killed and eaten<sup>5</sup>. During the afternoon, these worms were not found except a few fresh carcasses in certain places. In some other places the worm carcasses were seen in hundreds lying near each other on the surface. Similar type of mass mortality which was described by Gates<sup>2,3</sup> as "Mortal wandering", has been recorded in species belonging to the genus *Eutyphoeus*, *Desmogaster* or *Pheretima* in western hills of Burma.

The author likes to thank Dr. J. M. Julka, who kindly identified the earthworm.

North-Eastern Hill University, M. VIKRAM REDDY.  
College of Agriculture,  
Medziphema 797 106,  
Nagaland, May 9, 1980.

1. Edwards, C. A. and Lofty, J. R., *Biology of Earthworms*, Chapman and Hall Ltd., London, 1972, 282 pp.
2. Gates, G. E., *Am. Midl. Nat.*, 1961, 66, 61.
3. —, *Trans. Amer. Phil. Soc.*, 1972, 62, 1.
4. Doeksen, J., *Meded. Inst. biol. Scheik. Ouderz. LandbGewass.*, 1970, 353, 199.
5. Madge, D. S., *Pedobiologia*, 1969, 9, 188.