

THE EFFECT OF CHANGE ENVIRONMENTAL PARAMETRS ON BEHAVIOUR OF LAMELLIDENS MARGINALIS

* Surwase S.S. **Kulkarni D.A. ***Chati R.S.

The effect of environmental parameter is an important aspect of every animal. Measurements of physiological parameters involve the respiration metabolism, biochemical diversion, feeding, excretion and behaviour. Comparative information on closely related forms and for interspecific inter population comparisons is critical to the basic understanding of the ecological function as well as the broader concepts of the evolution of both physiological and life history of freshwater bivalves (burky,1983).

Behaviour affects the survival of aquatic invertebrates and reflects the intrgration of many biochemical and physiological processes. Therefore, behaviour is an important area to examine when investigating the effect of toxicants on aquatic invertebrates. The freshwater mussels, *Lamellidens Marginalis* found along the bank of Manjara river near Kallam. Dist. Osmanabad. In the present investigation to study some of the effects of temperature and the exposure to atmospheric air on behavior of animals. Hence, the present study it has been planned to find and the effect of environmental parameters on behaviors of *L. Marganalis*.

MATERIALS AND METHODS -The bivalve mollusca *L. Marganils* were collected from the bank of Manjara river near Kallam. Dist – Osmanabad from the year 2001 – 2003, Dec 2001 to May 2002. The behaviour pattern was done from the animals belonging to respective controls and experimental groups effect of exposure to atmospheric air and effect of rise in temperature. The freshly collected animals in December 2001 (winter), May 2002 (summer) and July 2001 (Monsoon). Every time samples were pooled from 5 different animals from each group to observed the animal behaviour in different exposure period on 2nd, 6th and 12th day. The animal exposure to temperature the three thermostats were attached to the aquarium and maintained the temperature in winter season at 28°C, in summer season 32°C and in monsoon season at 30°C. The animal behaviour pattern is observed in aquarium in control, and experimental groups.

RESULTS AND DISCUSSION -The effect of rise in temperature and effect of exposure to atmospheric air on behaviour of *Lamellidens Marginalis* are expressed in table no. 1 and physico-chemical conditions is different seasons are expressed in table no. 2 Most of the workers studied the effect of pesticides on the behavioural response of fishes. The active parathion exhibited loss of balance, erratic swimming pattern, paralysis, and banding, swelling and respiratory distress in fish, *Punctius sophora* (Bask and Konar, 1974). Gupta *et. al* (1979) studied acute toxicity of aldrin and ethylparathion to the fish, *Colisa foscatus and notopterus notopterus* at three levels of temperature. pH, dissolved oxygen and fish size. The authors further showed that effect of lethal concentrations of pesticides on the fishes prior to death are usually manifested by excitation, erratic swimming ability, difficulty in respiration, increased ventilation rate, jerky movements of body and fin fast up and downward movements, convulsions, loss of equilibrium, excess secretion of mucus by the gills and the body wall. In present study with *L. marginalis* due to rise in temperature it has been observed that in summer at 32°C the effect was more pronounced than in monsoon at 30°C and winter at 28 and 30°C. Comparing the behaviour at 30°C in monsoon and winter, it has been observed that the effect was more pronounced in monsoon than in winter. Due to atmospheric exposure effect under wet mixture of sand and mud shell valves were widely opened and feet were extended to the maximum in summer than in monsoon and winter. Due to variations in temperature and atmospheric exposure it has been observed that the mortality was more in summer than monsoon and winter. Along the banks of the Manjara river at Kallam, Dist. Osmanabad amongst the ecological parameters, temperature and atmospheric exposure are the most important for the growth and survival of *L. marginalis*.

Eisler (1970) started that the toxicity of substance when tested on an organism or when applied in the environment depends not only on the concentrations

*.***P.G. department of Zoology, Shikshan Maharshi Dnyandev Mohekar College, Kallam

*** Department of Zoology, Karmveer Mamasahab Jagdhale Mahavidyalaya, Washi

of substance, but also on the particular chemical and physical conditions under which it is tested. Reaction and survival of aquatic organisms under toxic conditions depend upon several factors such as kind, toxicity and concentration of the toxicant and the temperature, salinity, dissolved oxygen, pH, hardness of water etc. in addition to the type and time of exposure to the toxicant as well as the physiological status of animal / stage of development (Holden, 1973; McKim *et al.*, 1973, 1974; Brungs *et al.*, 1977). Brian L. Bayne (2004) concentrate on responses to the food environment rather than temperature although growth in bivalves depends on both temperature and food (see review by Gosling, 2003).

CONCLUSION -The physico-chemical characteristics of water during the stocking of the animals during different seasons showed that at the time of high temperature in summer, there was low level of oxygen content and also total carbonate of water increased at the high temperature in summer. There was no much fluctuation in the pH during different seasons. In the present study behaviour and mortality due to the exposure of *L. marginalis* to rise in temperature and exposure to atmospheric air showed differential responses, in different seasons. These changes were conditioned under different categories for the control groups as well as on the experimental groups in different seasons.

Table no. 1 Behavioural pattern of *L. marginalis* in different exposure.

| Exposure | Behavioural patterns |
|---|---|
| Control | a) The bivalve close the shell valves a) b) The bivalve began to open the shell valves two pallial edges extended out of the valves. c) Open the shell valves-extended pallial edges the gentle mechanical stimulus made the extended organ to retract in shell-valves immediately. |
| Experimental groups in rise in temperature | a) The bivalves remained with shell valves closed. b) (I) It is slightly open the shell valves and protruded the foot slightly along with the pallial edges and siphons out sides the shell valves. (II) Initially in bivalves gaped in the shell valves, widely opened the valves, extended the foot, gentle mechanical stimulus made the extended organs to retract inside the shell valves and retraction and oxygen inside the shell valves was rapid in animals exposure to rise in temperature. c) The bivalves when died. Gentle mechanical stimulus had no effect. |
| Experimental groups in atmospheric air | a) The bivalves remained with shell valves closed. b) The animal laying on the surface of the soil, open the shell valves with prostration of pallial edges and foot extended in the wet soil. c) The bivalves with shell valves opened extended foot maximum and buried in the wet soil, the siphons were at the surface of the wet - soil.i) d) The bivalve when died open the shell valves with for extended and remained on the surface of the wet - soil. |

Table no. 2 Physico – Chemical Characteristic of water.

| | Summer | Monsoon | Winer |
|--------------------------------|-----------------|-----------------|------------------|
| Temperature | 28.5°C-29.5°C | 24.5°C-25-0°C | 20°C-22°C |
| Oxygen | 5.684-6.330mg/l | 6.171-6.577mg/l | 6.2156-.6732mg/l |
| Total Carbonate content | 115-1190 PPM | 109-114 PPM | 97-100 PPM |
| pH | 7.68-7.70 | 7.79-7.81 | 7.73-7.74 |

REFERENCE

- * Bask, P.K. and Konar, S.K. (1974) : Effects of an organo-phosphorus pesticide, dimethoate on the survival behaviour, growth and reproduction of fish. *Abst No. 108, 62nd Session of Ind. Sci. Cong. Sect. Zool. and Entamol.* 170. * Brungs, W.A., McCoremic, J.H., Neiheisel, T.W., Spehar, R.A., Stephan, C.E. and Stokes, G.N. (1977) : Effects of pollution on freshwater fish. *J. Water Pollution Cont. Fed.*, Washington, D.C. 49 : 1425-1493. * Burky, R.J. (1983) : Physiology ecology of freshwater bivalves in the mollusca-ecology, vol. 6, Editor-in-chief K.M. Wilber-Editor by W.D. Russell – Hunter, Academic Press, New York and London. * Eisler, R. (1970) : Latest effect of insecticide intoxication to marine molluscs. *Hydrobiologia*. Vol. 36, (3-4) : 345-352. * Gosling, E. (2003) : Bivalves molluscs : Biology, ecology and culture, *Fishing News Books*, Oxford, U.K. * Gupta, S.P., S.R. Verma and R.C. Dalela (1979) : Studies on toxicity of a few pesticides on *Calisa fasciatus* and *Notopterus notopterus* with reference to histopathology and histochemistry Part - I : Bioassay studies, *Acta. Hydrochimi. Hydrobiol.* 7(2) : 223 – 238. * Holden, A.V. (1973) : Effects of pesticides on fish In : Environmental pollution by pesticides, (Ed. C.A. Edware) Plenum Press, 213 -253. * McKim, J.M., G.A. Christensen, J.H. Tuckery, D.A. Benoit and A.G. Levis (1973) : Effect of pollution on freshwater fish. *J. Washington DC* 45: 1370-1407. * McKim, J.M., G.A. Christensen, J.H. Tuckery, D.A. Benoit and A.G. Levis (1974) : Effect of pollution on freshwater fish, *Ibid.*, 1514-1591.