

Unfortunately the damage to myocardium incurred from peroxidation is cumulative and irreversible. Therefore the accumulation of lipofuscin with age can be considered as a strong evidence for the occurrence of lipid peroxidation process in cells *in vivo*.

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### COMPARATIVE EVALUATION OF METHYL PARATHION TOXICITY TO SOME SELECTED FRESHWATER ORGANISMS

R. NAGARATNAMMA AND R. RAMAMURTHI

Department of Zoology, Sri Venkateswara University  
Tirupati 517 502, India

METHYL parathion is one of the organophosphate pesticides extensively used in agricultural operations. The present study concerns a comparative evaluation

of methyl parathion toxicity to different test species of aquatic ecosystem. Since an extensive research programme has been undertaken on the fish, *Cyprinus carpio* the effect of body weight of the fish on the toxicity of pesticide has also been studied.

The test animals except the leeches were fed daily and acclimatised to laboratory conditions for one week before exposure to pesticide. Lethal concentrations (LC 50/24 hrs and LC 50/8 hr) of methyl parathion [Technical grade, 95% W/V, Bayer (India) Ltd.] were computed by static bioassay using the probit method<sup>1</sup>, for the freshwater organisms such as the teleost *Cyprinus carpio*, the leech *Poecilobdella granulosa*, the pond snail *Pila globosa*, the freshwater mussel *Lamellidens marginalis* and the freshwater field crab *Oziotelphusa senex senex*. The animals were not fed during the exposure period. A stock solution of 100 mg/ml of methyl parathion was prepared in organic solvent, 2-methoxy ethanol and appropriate amounts were taken from the stock solution to prepare various concentrations of the chemical in water. Variables such as dissolved oxygen content (6.8-7.2 ml/l), pH (7.1-7.3) and temperature (28-30°C) have been controlled. Five replicates were maintained with 10 animals per treatment.

It is evident from Table I that crab and leech showed least tolerance to methyl parathion. Fish showed a fairly good resistance while the molluscs exhibited very good tolerance. In the case of molluscs, it was observed that immediately after the exposure to pesticide, they have completely withdrawn into the shell. The tight closing of the shell for 10-12 hours restricted the free flow of pesticide medium over the soft parts during that period. Copious secretion of

TABLE I

Comparative evaluation of methyl parathion toxicity to some representative freshwater organisms

Species	Weight range (g)	LC <sub>50</sub> /24 hr mg/l	LC <sub>50</sub> /48 hr mg/l
Leech :			
<i>Poecilobdella granulosa</i>	1-3	5	4
Crab :			
<i>Oziotelphusa senex senex</i>	25-30	3	1
Fresh water mussel :			
<i>Lamellidens marginalis</i>	35-40	50	40
Apple snail :			
<i>Pila globosa</i>	15-20	40	30
Common carp :			
<i>Cyprinus carpio</i>	30-40	15	12

TABLE II  
Methyl parathion toxicity to *Cyprinus carpio* in relation to body weight

Body weight	L <sub>50</sub> /24 hr mg/l	LC <sub>50</sub> /48 hr mg/l
100 mg	4	3
500 mg	6	4
30-40 gm	15	12

the mucous observed during the exposure may have a bearing on their exceedingly high tolerance.

Variations in response to pesticide exposure in relation to age and body length in fish have been reported<sup>2-6</sup>. Results in Table II reveal that the body weight exerts a profound effect on the animals ability to withstand exposure to toxicant. The fingerlings of *Cyprinus carpio* having the body weight ranging from 100-500 mgs were more susceptible. A gradual increase in resistance was observed with the increase in body weight. Widely varying LC 50/48 hr values of methyl parathion toxicity to *C. carpio* reported from Japan<sup>7</sup> and USA<sup>8</sup> may be due to differences in environmental conditions and other factors such as age and body size.

The wide variation in sensitivity and resistance of different species to different pesticides is dependent on so many variables like route of administration of pesticide, age of the test species and the presence or absence of enzyme system that can degrade the pesticide, etc. So a further investigation on physiological and biochemical responses of organism is in progress which may give a clear picture about the susceptibility and resistance of organisms to pesticides.

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## STUDIES ON THE FECUNDITY OF *BARBUS STIGMA* (CUV. AND VAL.)

SALIM SULTAN AND S. MAHMOOD KHAN

Section of Ichthyology and Fisheries  
Department of Zoology, Aligarh Muslim University  
Aligarh 202 001, India

*Barbus stigma* constitutes a major part of fresh water forage fishes. Qayyum and Qasim<sup>3</sup> studied the length frequency distribution, feeding and breeding habits of *B. stigma*. The present note deals with the fecundity of *B. stigma* as the fecundity of female has a considerable bearing on reproductive potential of the population<sup>1</sup>.

The total number of eggs were counted in the ovaries of 22 females of *B. stigma* (ranging from 79 to 114 mm in length and 11.2 to 28.8 g in weight). The fishes were collected during June-July, 1980 from fresh water pond. The ovaries were then dissected and fixed in Simpson's fluid<sup>5</sup> for hardening of ova. The eggs in samples of known weight are counted and total number of eggs was estimated.

The average fecundity of 22 fishes was 21878 ranging from 13345 to 37337 in number. The average egg production was found to be the lowest in small fishes. The number of eggs per gm of the fish ranged from 968 to 1660 eggs. The number of eggs varied without following any pattern. The average egg weight as percentage of body weight can be expressed as (1)  $\log F = 4.227 + 0.258 \log BW$ . (2)  $\log F = 3.911 + 0.215 \log BL$  (where *BW* and *BL* are body weight and body length respectively) with 0.9916 and 0.829 as value of correlation coefficient.

The total number of eggs is found to increase with an increase in the length of the fish as seen in *Channa punctatus*<sup>4</sup>. The irregular variation found in the number of eggs per gram of body weight may be due to the different collection dates responsible for the maturation of the ovaries<sup>3</sup>. However, the higher value of the coefficient of correlation between fecundity and body weight as compared to fecundity and body length shows that the relation between the former two parameters is more reliable.

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