

**EVALUATION OF THE EFFECTS OF THREE COMMONLY USED PESTICIDES ON BRAIN ACETYLCHOLINESTERASE ACTIVITY OF *Rasbora caverii*, A FERAL FISH FOUND IN PADDY FIELD ASSOCIATED WATER BODIES IN SRI LANKA**

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There is a growing concern worldwide over the indiscriminate use of pesticides resulting in environmental pollution and toxicity to non target aquatic organisms. The present study was carried out to evaluate the effects of three commonly used pesticides in agriculture viz. paraquat, fenthion and phenthoate on brain acetylcholinesterase (AChE) activity and condition factor of *Rasbora caverii*, a feral fish inhabiting paddy field associated water bodies in Sri Lanka. Fish samples were collected from March to August 2004 in Maha cultivation season from five sites in the Kaduwela area (Akuragoda Wewa, the reference site; a main canal running through the abandoned paddy fields; a feeder canal running through the cultivated paddy fields; the main canal running through the cultivated paddy fields and vegetable fields; the location where the main canal joins the Kelani river), at four sampling stages (before application of any pesticide in the area; after application of paraquat; after application of a mixture of fenthion and phenthoate; at the end of the culture cycle of paddy). The brain AChE activity and condition factor of the fish collected from each of these sampling sites at each sampling stage were determined. In addition, *R. caverii* collected from the reference site were exposed separately to  $2 \mu\text{g l}^{-1}$  paraquat,  $3 \mu\text{g l}^{-1}$  fenthion and  $5 \mu\text{g l}^{-1}$  phenthoate for 2 days with and without pre-exposure to paraquat ( $2 \mu\text{g l}^{-1}$ , 7 days) to examine the response of the fish brain AChE to pesticide exposure under laboratory conditions.

The results of the present study revealed that brain AChE activity of *R. caverii* collected from all the sampling sites prior to application of any pesticide or after application of paraquat to the area were not significantly different from each other. However, the brain AChE activities of the fish collected from the pesticide applied sites after application of a mixture of fenthion and phenthoate to the paddy fields and at the end of the culture cycle were significantly lower than that of the fish collected from the reference site. In the laboratory study, the brain AChE activities of the fish exposed to fenthion or phenthoate or a mixture of fenthion and phenthoate were significantly lower than those of the respective controls. Pre-exposure to paraquat had no significant effect on the extent of brain AChE inhibition when exposed to phenthoate subsequently. However, prior exposure of the fish to paraquat caused significantly greater inhibition of the brain AChE activity when the fish were subsequently exposed to fenthion or a mixture of fenthion and phenthoate. There were no significant differences among sampling sites or stages in the condition factor of *R. caverii*. These results suggest that the inhibition of brain AChE activity of *R. caverii* can be used as a promising biomarker to detect the exposure of non-target feral fish populations inhabiting paddy field associated water bodies to anti-cholinesterase pesticides contaminating the aquatic environments.