

Effect of five pesticides on juvenile terrestrial stages of the common hourglass tree frog, *Polypedates cruciger*

N.B. Karunarathna^{1,3}, M. Meegaskumbura² and R.S. Rajakaruna^{3*}

¹*Postgraduate Institute of Science, University of Peradeniya, Sri Lanka,*

²*Department of Molecular Biology and Biotechnology, Faculty of Science, University of Peradeniya, Sri Lanka,* ³*Department of Zoology, Faculty of Science, University of Peradeniya, Sri Lanka*

**rupikar@pdn.ac.lk*

Numerous studies provide evidence of lethal and sub-lethal effects of pesticides on aquatic stages of amphibians. However, effects of pesticides on terrestrial stages are largely neglected. Agricultural lands often receive pesticides at high concentrations and amphibians with their permeable, moist skin should be highly vulnerable to pesticides. This study examined the acute toxicity of five commonly used pesticides on terrestrial stage of juveniles of *Polypedates cruciger*. A total of 130 healthy, laboratory-reared juveniles (<7 days post-metamorphic) of *P. cruciger*, which were never exposed to pesticides were used for the experimental exposure. Commercially available, formulated products of five chemicals were used: an insecticide (Carbosulfan), two fungicides (Tebuconazole and Chlorothalonil), and two herbicides (Azimsulfuron and Fenoxaprop-p-ethyl). Two concentrations (maximum recommended concentration for field application and 5×recommended concentration) of each pesticide were selected for the experiment to stimulate a real field application and a worst-case scenario. Maximum recommended concentrations of Carbosulfan, Tebuconazole, Chlorothalonil, Azimsulfuron and Fenoxaprop-p-ethyl were 800, 150, 1500, 78 and 82.5 mg/L, respectively. A hand-held spray bottle was used to spray the calculated volume of each pesticide (2, 2, 4.5, 2 and 1.5 ml respectively) evenly into the tanks (surface area 450 cm²) containing five juveniles. After seven days, mortalities ranged from 0–50% and 0–80% for recommended and 5× recommended concentration respectively; no mortality occurred in the controls. At recommended concentration, Carbosulfan and Tebuconazole caused relatively high mortality (50% and 20% respectively). The two herbicides (Azimsulfuron and Fenoxaprop-p-ethyl) and fungicide Chlorothalonil caused no mortality at recommended concentration, and less than 10% mortality was observed at 5× recommended concentration. Our results indicate that direct overspray of certain pesticides even at the recommended concentrations for field application could be highly lethal to juveniles of *P. cruciger* and presumably many other amphibians. Except for fungicide chlorothalonil, which is used mainly in vegetable cultivation, all the other pesticides used in the study are used for paddy cultivation. Agricultural lands, particularly paddy fields, support a considerable diversity of amphibians. Therefore terrestrial stages face the risk of direct exposure of these chemicals. This study generates baseline information required for establishing a pesticide risk assessment procedure that would incorporate the terrestrial amphibian toxicity information as well. Currently such assessments do not consider amphibians before a new pesticide is released to the market.

Financial assistance given by the National Science Foundation Sri Lanka (RG/2014/EB/02) is acknowledged.