

ABSTRACT

Toxicology of Pesticides on the Larvae of Two Tropical Amphibians,
Physalaemus pustulosus and *Bufo marinus*.

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The optimal rearing conditions in the laboratory for *Physalaemus pustulosus* and *Bufo marinus* were determined through investigation of several parameters of which the following were found to have a pronounced effect. These included amount of feed, absence and presence of soil, frequency of water change and crowding levels. Tadpoles were found to thrive best when fed as much as they could consume, with soil as a substrate, water changes every three days and with no more than ten (10) tadpoles per liter of water. This finding was further confirmed in the density experiments which revealed the mitigation of the crowding effect at densities of 20 – 30 tadpoles per liter of water when soil substrate was utilized. The finding of these two experiments were crucial to the toxicity experiments as they revealed the ideal conditions in which *P. pustulosus* tadpoles could be maintained and a suitable method for the laboratory rearing of *P. pustulosus* tadpoles for possible use in ecotoxicology studies.

Pesticides can cause significant mortalities in non-target organisms such as amphibians. The toxicity of three insecticides (Fenobucarb, Revelo 350CS, Evisect) and three herbicides (Karmex, Roundup and Gramoxone) were examined in *P. pustulosus* and *B. marinus* species in water alone (single phase) and with the presence of soil (dual phase). The Spearman-Kärber 96-hr median lethal concentration [LC50] values were determined for each pesticide, with and without the presence of soil per species. The LC50 average values at 96 h for *P. pustulosus* in the single phase were Fenobucarb 2.1 mg L⁻¹, Revelo 350CS 563.0 mg L⁻¹, Evisect 3.3 mg L⁻¹, Karmex 0.3 mg L⁻¹, Roundup 7.9 mg L⁻¹, and Gramoxone 1.0 mg L⁻¹ and in the dual phase were Fenobucarb 3.0 mg L⁻¹, Revelo 350CS 237.2 mg L⁻¹, Evisect 0.8 mg L⁻¹, Karmex 0.3 mg L⁻¹, Roundup 4.6 mg L⁻¹, and Gramoxone 1.1 mg L⁻¹. The LC50 average values at 96 h for *B. marinus* in the single phase were Fenobucarb 29.5 mg L⁻¹, Revelo 350CS 187 mg L⁻¹, Evisect 0.8 mg L⁻¹, Karmex 1.4 mg L⁻¹, Roundup 9.6 mg L⁻¹, and Gramoxone 278.8 mg L⁻¹ and in the dual phase were Fenobucarb 26.5 mg L⁻¹, Revelo 350CS 621.5 mg L⁻¹, Evisect 2.4 mg L⁻¹, Karmex 1.4 mg L⁻¹, Roundup 60.1 mg L⁻¹, and Gramoxone 461.7 mg L⁻¹.

The results revealed upon comparison of the LC50 values that the feeding behavior of *P. pustulosus* (benthic feeder) significantly enhanced its sensitivity to the dual phase toxicity runs while the presence of soil decreased the overall toxicity to *B. marinus* (primarily a surface feeder). *P. pustulosus* was found to be the more sensitive to the pesticides even in the single phase when compared to *B. marinus*. This finding is important as it reveals a shortfall in the typical acute toxicity tests which do not include the use of natural substrate as a factor in the evaluation of toxicity.

Keywords: Pesticides, *Physalaemus pustulosus*, *Bufo marinus*, Median Lethal Concentration [LC50].