A RE-EVALUATION OF THE SKELETAL ABNORMALITIES IN FROGS IN THE ADELAIDE HILLS REGION

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Section Two – Toxicological Research

Abstract

This study has shown that abnormal frogs representing ten species can be found in a range of habitats in the Mt Lofty Ranges, Flinders Ranges and the South East of South Australia. There was no significant difference in the incidence of abnormality between the Flinders Ranges, which has little or no pollution, and the Mt Lofty Ranges. However incidence of abnormality in frogs is associated with land use in the Mt Lofty Ranges.

The incidence of injury in frogs was much higher than has generally been reported but was similar to the study of Brooks (1979). Incidence of injury did not vary significantly between different land use areas or geographic regions.

Most sites within the Adelaide Hills and surrounds had low levels of abnormality but an exception was high levels in two species at a pond in an industrial area. Further investigation found that the levels of various heavy metals in the sediment were above those considered desirable in freshwater systems.

Eggs that were laid by frogs collected from the polluted site and reared under laboratory conditions produced very low levels of abnormal frogs, well within allowable limits. This observation suggests that pollutants are not accumulated and transferred to successive generations. Abnormal frogs collected from the same location did not successfully reproduce.

There was a reduction in the survival of tadpoles reared in sediment collected from the polluted site, but no difference in survival was detected when tadpoles were reared in artificial sediment that had similar heavy metal levels. There was however an increase in developmental problems with increasing metal concentration:

- *Crinia signifera* took longer to reach metamorphosis.
- *Litoria ewingi* also took longer to metamorphose and furthermore attained a larger size at metamorphosis.

Although no statistical analyses could be undertaken there appeared to be an increase in the incidence of abnormality in the polluted aquaria, but the rate of abnormality was lower than that recorded in the wild. Therefore, despite the fact that these metals can have a significant effect on growth and development, they are not solely responsible for the high incidence of abnormality in the field.

Declaration

This work contains no material that has been accepted for the award of any other degree or diploma in any university or other tertiary institution. To the best of my knowledge no material previously published or written by another person has been included, except where due reference has been made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying.

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