



**FROGS AS PREDATORS OF ORGANISMS OF AQUATIC
ORIGIN IN THE MAGELA CREEK SYSTEM,
NORTHERN TERRITORY.**

by

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Master of Science
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DECLARATION

I certify that this thesis contains no material which has been accepted for the award of any other degree or diploma in any university and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference is made in the text.

Michael Cappel.

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SUMMARY

The patterns of distribution and diets of the anuran fauna of the Magela Creek system of the Northern Territory have been examined. Frogs may be potentially important in the transfer of contaminants away from aquatic ecosystems to terrestrial ecosystems through food webs by virtue of their role as prey and predator, their life histories and their colonisation of local mining sites.

The aim of this study was to predict which species of frogs are most important in this transfer through ingestion of prey with wholly or partially aquatic life histories. The 16 study species comprised six genera. Seven faunal groupings were recognised: aquatic frogs (Litoria dahlii); arboreal frogs (L. rothii, L. bicolor, L. rubella); ground hylids (sensu Moore, 1961) (L. pallida, L. inermis, L. nasuta, L. tornieri, L. wotjulumensis); wide-mouthed burrowing frogs (Cyclorana australis, C. longipes, Limnodynastes ornatus, L. convexiusculus); narrow-mouthed burrowing frogs (Notaden melanoscaphus); toadlets (Uperoleia inundata); and froglets (Ranidella bilingua).

The patterns of spatial distribution of this fauna were surveyed to determine which species forage in aquatic macrohabitats, these species being considered most likely to encounter prey of aquatic origin. Stomach contents were classified to the lowest level necessary to determine the nature of their origin and quantified to compare the relative occurrence of prey of aquatic origin.

Macrohabitats in close vicinity to waterbodies were found to be important as foraging areas for only the aquatic frogs Litoria dahlia, the arboreal frogs L. rothii and L. bicolor, the ground hylids and froglets. However, all species may encounter prey of aquatic origin during at least two stages of their post-metamorphic ontogeny, as juvenile frogs leaving the larval habitat and as adults visiting waterbodies for breeding purposes.

Biases in sampling techniques enforced inclusion in stomach content analyses of species which forage in terrestrial macrohabitats. The occurrence of prey of aquatic origin was not significant in the stomachs of these frogs. An index of food consumption (stomach distention) was significantly influenced by breeding activity of frogs collected at waterbodies and it is proposed that breeding activities are placed at a premium over foraging activities by adults at breeding sites. Juveniles of most species were collected rarely at waterbodies.

The frequency of occurrence of aquatic prey orders in stomachs containing food was low; less than 12% for 12 species, and less than 50% for aquatic and arboreal species examined in stomach content analyses. It is concluded that the aquatic frog, Litoria dahlia, ingests the greatest amounts of prey of aquatic origin in terms of frequency of occurrence, number of items and biovolume. Larval and adult forms of the Odonata, Zygoptera, Trichoptera, and aquatic Coleoptera and Hemiptera, were common in stomachs of this species, which forages within waterbodies and their littoral zones. The arboreal species, Litoria rothii and L. bicolor,

consumed alate prey predominately, and are considered of secondary importance in predation upon organisms with wholly or partially aquatic life histories.

The levels of consumption of these prey types by Litoria dahlii were shown to vary widely with seasonal, micro-temporal and spatial factors in the Magela Creek system.