



FAUNA *of* AUSTRALIA



10. FAMILY RANIDAE

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Pl. 1.1. *Rana daemeli* (Ranidae): the only member of the Ranidae in Australia; Cape York and Arnhem Land. [J. Wombey]

DEFINITION AND GENERAL DESCRIPTION

Australian Ranidae, or ‘True frogs’, are ground-dwelling frogs characterised by the following features. The pectoral girdle is firmisternal, with the sternum fused to the pectoral arch and the epicoracoidal cartilages fused (Fig. 1.5B; Duellman & Trueb 1986). The phalangeal formula is normal in that there are no intercalary cartilages, the toes and fingers have grooved, dilated tips and the toes are webbed. There is a dorso-lateral skin fold from behind the eye to the hindlimb (Pl. 1.1). Maxillary teeth are present. The sacral diapophyses are cylindrical and the sacrum has a bicondylar articulation with the coccyx. The ilial shaft bears a large, tapering, fin-like, dorsal crest (Tyler 1976c). The tadpole has an emarginated oral disc with a fringe of elongated papillae along the posterior margin of the disc (Fig. 10.1; Richards 1992).

The family is cosmopolitan, though very poorly represented in southern South America and Australia (Frost 1985). In Australia only one species, *Rana daemeli*, is recorded from northern Queensland and north-east Northern Territory. It also occurs in New Guinea.

HISTORY OF DISCOVERY

The presence of ranid frogs in Australia was first noted by Günther (1867), British Museum. He examined two female specimens (see Boulenger 1882), found by Edward Dämel on Cape York in the latter half of 1866. However, he identified them as *Hylorana erythraea*, a South-East Asian species. Dämel was a collector for the Godeffroy Museum, Hamburg (Musgrave 1932; Monteith 1987). Steindachner (1868) of Vienna, described a further nine of Dämel’s specimens and correctly assigned them to a new species, *Hylorana daemeli* (Boulenger 1920). The species was to be ‘discovered’ twice again at Cape York. Macleay (1877) of Sydney, named a species *Hylarana nebulosa* from a specimen collected during the *Chevert* cruise and de Vis (1884b), Queensland Museum, Brisbane, named *Hyla nobilis* from specimens collected by Kendall Broadbent.

MORPHOLOGY AND PHYSIOLOGY

Little has been published on the morphology and physiology of the Australian *Rana*. However, the Ranidae has been much studied in Europe and America (see Noble 1931; Porter 1972; Duellman & Trueb 1986 and references therein). A pair of lateral vocal sacs can be inflated externally as separate pouches (Fig. 10.2A; Tyler 1989a).

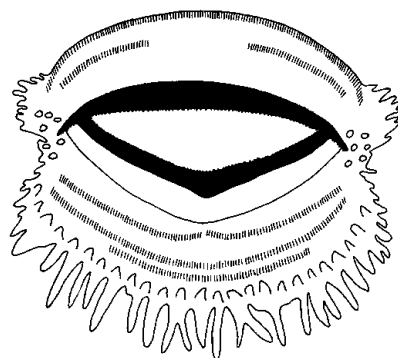


Figure 10.1 Mouth disc of *Rana daemeli* tadpole. (After Richards 1992)
[T. Wright]

REPRODUCTION AND DEVELOPMENT

The species of Australian and Papuan ranids that have been karyotyped have a diploid chromosome number of 26 and are similar in chromosome morphology (Menzies 1987). According to Richards (1992), tadpoles belong to the Benthic (Type 2: Profundal) ecomorphological guild of Altig & Johnston (1989). The length of time from egg to metamorphosis is unknown.

NATURAL HISTORY

Like most frogs, the Australian ranid lives on land and returns to water to breed. The males call from beside water, usually in late spring, summer and early autumn. Amplexus is axillary. Eggs are deposited in water and float in large, loosely attached clumps at the surface.

Rana daemeli occurs mostly along streams, rivers and swamps, in a variety of vegetation types from open woodland through to monsoon forest and rainforest.

Spiders, a shrimp, cockroaches, grasshoppers, a beetle, a moth, one *Litoria pallida* and the legs of two unidentified frogs were found in stomach contents examined by Cameron & Cogger (1992) at Weipa, Cape York.

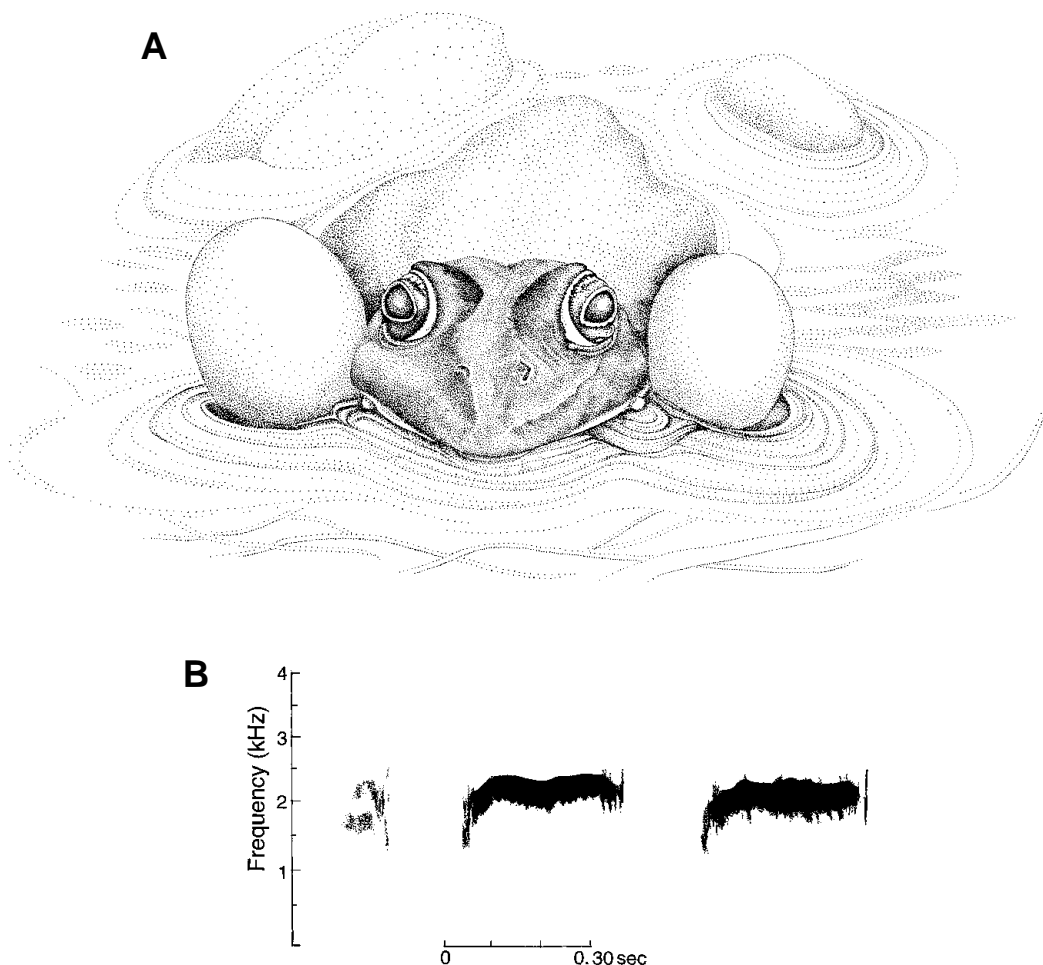


Figure 10.2 Vocalisation in *Rana*. **A**, calling male of a European species, *Rana esculenta*, showing the distended pair of vocal sacs characteristic of Ranidae; **B**, sound spectrogram for a New Guinean population of *Rana daemeli*. (A, after Cochran 1961; B, after Menzies 1987)

[A, T. Wright; B, W. Mumford]

Rana daemeli has been the subject of several investigations for internal parasites. Delvinquier & Jones (1988) recorded the gut flagellate *Trichomitus batrachorum* and Delvinquier (1988) recorded an undetermined gut ciliate of the family Sicutophoridae. Several species of nematode are also parasites of *R. daemeli*. Sprent (1985) recorded the gut ascaridoid *Seuratascaris numidica*, Owen & Moorhouse (1980) recorded the gut physalopterid *Pseudorictularia disparilis* and Moravec (1990) recorded the lung parasite *Rhabdias australiensis*. Cameron & Cogger (1992) noted acanthocephalans and species from three orders of nematodes in the intestine of *R. daemeli*.

Heatwole and Shine (1976) recorded female mosquitoes *Uranotaenia argyrotarsis* biting the head of *R. daemeli* at night, especially on the eyelids. Numerous simultaneous bites resulted in raised whitish swellings. No mosquitoes were seen biting the body or legs. Marks (1980) recorded one female *U. novaguinensis* and six *Culex* (*Lophoceraomyia*) spp. (representing two or three species) biting a *R. daemeli*.

Sources of mortality and behaviour of Australian ranids are largely unknown. Although species of *Rana* are the major source of frog legs for the food and restaurant market, the Australian species has not been considered for farming, apparently because its small legs would be uneconomical (Maclean 1975).

BIOGEOGRAPHY AND PHYLOGENY

Distribution

Australian *Rana daemeli* occurs on Cape York Peninsula, Queensland, south to Kowanyama (15° 19'S) in the west and near Townsville (19° 16'S) in the east (Ingram & Raven 1991; Fig. 6.1), and has been recorded recently in eastern Arnhem Land, Northern Territory (N. Gambold pers. comm.).

Ranidae are regarded as very recent colonisers of Australia, probably during the Pleistocene (Kikkawa, Monteith & Ingram 1981; Savage 1973).

Affinities within the Taxon

Boulenger (1920) reviewed the subgenera and species of *Rana* in southern Asian, New Guinea, Melanesia and Australia. He allocated the Australian species to the subgenus *Hylarana*. Savage (1973) placed the Australian and New Guinean ranid species in the subfamily Platymantinae. However, the contributors to Frost (1985) preferred to be conservative and only recognised Raninae (including Platymantinae). Menzies (1987) revised the species of *Rana* in Papua and Australia and placed *R. daemeli* in the *R. papua* group.

Australian and Papuan species of ranids are very conservative in their morphology. However, they differ in their advertising call and habitats. Even so, it is difficult to gather this information. Donnellan, Adams & Aplin (1989) found that it was easier to identify genetic groups by biochemical analysis.

Fossil Record

No fossil ranids have been recorded from Australia (Tyler 1991e).