



# **CRINIA TSCHUDI (ANURA: LEPTODACTYLIDAE) FROM THE CAINOZOIC OF QUEENSLAND, WITH THE DESCRIPTION OF A NEW SPECIES**

by MICHAEL J. TYLER\*

## **Summary**

TYLER, M. J. (1991) *Crinia* Tschudi (Anura: Leptodactylidae) from the Cainozoic of Queensland, with the description of a new species. *Trans. R. Soc. S. Aust.* 115(2), 99-101, 31 May 1991.

The leptodactylid frog *Crinia presignifera* sp. nov. is described from a series of Oligo-Miocene sites at Riversleigh Station in northwest Queensland. This finding represents the first record of the genus *Crinia* from the Tertiary and the first record of fossil material of *Crinia* from Queensland. *Crinia remota* Tyler & Parker is reported from a Quaternary cave deposit at Riversleigh Station.

KEY WORDS: *Crinia*, ilia, Leptodactylidae, Cainozoic, Queensland, Australia

## **Introduction**

The genus *Crinia* Tschudi, including frogs referred to *Ranidella* Girard (according to Heyer *et al.* 1982), is a group of 12 small, ground-dwelling species that live close to water. It is represented in all but the arid, central portion of Australia, and the central coastal area of Western Australia. One species (*C. remota* (Tyler & Parker)) occurs in northern Australia and southern New Guinea.

The genus *Crinia* has been the subject of diverse studies, particularly in the fields of polymorphism and of pre-mating isolating mechanisms. Consequently, published data on this genus are more substantial than those available for any other genus in Australia.

The phylogenetic relationships and the origin of *Crinia* are unclear. Morphological evidence (Heyer & Liem 1976; Davies 1989) suggests a close relationship with *Pseudophryne* Fitzinger and *Uperoleia* Gray.

The current fossil record of *Crinia* consists of the extant species of *C. signifera* Girard, from Pleistocene deposits at Henschke's Cave and Victoria Cave, in the southeast of South Australia (Tyler 1977), and the extant species *C. georgiana* Tschudi from Pleistocene deposits at Skull Cave and Devil's Lair in the extreme southwest of Western Australia (Tyler 1985).

Here I report the first Tertiary record of *Crinia*, and the first Quaternary record of *Crinia* from Queensland. The genus *Crinia* occurs at several Cainozoic sites at Riversleigh Station in northwest Queensland. Previously, two other leptodactylid genera have been reported from that area: *Lechriodus* Boulenger (Tyler 1989) and *Limnodynastes* Fitzinger (Tyler 1990).

## **Material and Methods**

The material is deposited in the Queensland Museum, Brisbane (QM) and the South Australian Museum, Adelaide (SAM). Letters following the abbreviations are departmental identifications.

Comparative studies were based on the osteological collections at the Department of Zoology, University of Adelaide.

Osteological nomenclature and methods of measurement follow Tyler (1976, 1989).

## **Systematics**

Family: Leptodactylidae Werner, 1896

Sub-family: Myobatrachinae Schlegel, 1850

Genus: *Crinia* Tschudi, 1838

At the time of the preparation of a description of the ilial characteristics of Australian frogs by Tyler (1976), *Crinia* was considered a monotypic genus, and *Ranidella* distinct from it. The principal morphological features distinguishing *C. georgiana* from the species of *Ranidella* examined (*R. parinsignifera* and *R. signifera*) were considered to be the extent of the dorsal protuberance, and the presence of a very slight longitudinal indentation upon the lateral surface of the ilial shaft of *Crinia* that was absent from the *Ranidella* species (Tyler 1976).

Examination of these particular features in additional species formerly referred to *Ranidella*: *bilingua*, *deserticola*, *glauerti*, *insignifera*, *pseudinsignifera*, *remota* and *riparia* indicates that the generic differences proposed by Tyler (1976) cannot be sustained. Nevertheless, and perhaps more significantly, despite its larger adult size, it is evident that *C. georgiana* has a more robust ilium than the species of *Ranidella* so far examined, in which the ilial shaft proportionately is deeper and more substantial than in those species that are now its congeners.

\* Dept of Zoology, University of Adelaide, Box 498, G.P.O., Adelaide, S. Aust. 5001.

Diagnostic generic features of *Crinia* are the curved and medio-laterally flattened shaft, lacking a dorsal crest and possessing a very slight medial indentation; large acetabular fossa with a broad peripheral rim; slight development of the ventral acetabular expansion and a subacetabular zone that does not protrude anteriorly. The dorsal acetabular expansion is poorly developed. The dorsal prominence is low and the dorsal protuberance slightly developed.

*Crinia presignifera* sp. nov.  
FIG. 1A

**Holotype:** QM F17630. A left ilium collected at Wayne's Wok Site, Riversleigh Station, northern Queensland.

**Description of holotype:** Iliac shaft slender and slightly curved. Lacks dorsal crest but with moderately deep, slight lateral concavity along proximal one-third of shaft. Distal end of iliac shaft incomplete inferiorly.

Acetabular fossa large and deep, with prominent, elevated rim. Dorsal margin of acetabular fossa superior to inferior margin of iliac shaft. Pre-acetabular zone evenly rounded, expanding inferiorly into protruding rounded flare of sub-acetabular expansion. Inferior margin of sub-acetabular expansion lacking.

Dorsal acetabular expansion raised slightly.

Dorsal prominence poorly developed. Dorsal protuberance narrowly oval, prominent, projecting laterally.

Length of ilium: 6.3 mm.

**Paratypes:** There are 18 paratypes - Outasite Site: QM F17634-36, 18155, SAM P31230-33; Quentin's Quarry Site: AM F17631; Neville's Garden Site: QM F18156-58, SAM P31234-35; Two Trees Site: QM F17632, SAM P31228; Camel Sputum Site: QM F17633, SAM P31229.

The largest of the specimens in which the iliac shaft is complete measures 7.1 mm. A paratype is shown in Fig. 1.

Throughout the series the dorsal prominence and dorsal protuberance are conspicuous, and the dorsal acetabular expansion is elevated only slightly. The acetabular fossa is consistently large, but the breadth of the adjacent pre-acetabular zone varies from extremely narrow (at its closest proximity to the fossa) to moderately wide. The ventral acetabular expansion is incomplete in most specimens.

**Comparison with other species:** The overall similarity in external morphology of species of *Crinia* (excluding *C. georgiana*) is accompanied by an extreme conservatism in the form of the ilium. Most of the specific characters are slight, when

A



B



Fig. 1. A. *Crinia presignifera* sp. nov. paratype: QM F17630; B. *Crinia remota* SAM P31236.

compared with those distinguishing members of other genera e.g. *Limnodynastes* and *Litoria*. Nevertheless one feature distinguishing *C. presignifera* from congeners is the narrow pre-acetabular zone clearly demonstrated by comparison with *C. remota* in Fig. 1. Amongst extant species the one with the narrowest pre-acetabular zone is *C. signifera* but even in that species it is far more substantial than in the new species.

**Stratigraphy and lithology:** In the Riversleigh Station area Archer, *et al.* (1989) recognised a minimum of five types of Oligo-Miocene carbonates that are rich in bones. The sites bearing *C. presignifera* comprise two sequences of lacustrine carbonates that contain principally non-aquatic local faunas. These collectively are referred to by them as "System B" and "System C".

**Etymology:** In adding pre- (*L. prae*) as a prefix to *signifera* I am alluding to the ancestral nature of the fossil species relative to extant species.

*Crinia remota* (Tyler & Parker)  
Fig. 1B

**Material:** A single right ilium, SAM P31236 from Carrington Cave, Riversleigh Station, Queensland.

**Descriptive notes:** The iliac shaft is cylindrical and the terminal portion is missing. Existing length 4.6 mm. The superior portion of the dorsal acetabular expansion is missing. The ventral acetabular expansion is broadly expanded.

**Comments:** *Crinia remota* (Tyler & Parker 1974) was described from southern Papua and is now known to occur also in northern Queensland and the Northern Territory including Melville Island and Groote Eylandt (Tyler *et al.* 1985, in press). The present specimen does not differ from specimens examined and is the first fossil record of the species.

Carrington Cave is situated in a hill adjacent to the Gregory River. The specimen was found near the surface of a vast mound of fragmented bones derived from the excreta of the ghost bat *Macroderma gigas*, and is located approximately 100 m from the entrance to the cave.

The age of the deposit is unknown but it is presumed to be Holocene or Late Pleistocene.

### Acknowledgments

I am extremely grateful to Professor Michael Archer, Dr Suzanne Hand and Mr Henk Godthelp of the University of New South Wales, for their continued aid and support throughout my study of the fossil frog fauna at Riversleigh Station.

Laboratory studies have been funded by a grant from the Australian Research Council. Miss Leanne Seller sorted and documented the material, and

prepared the illustration. Research facilities were provided by the University of Adelaide. The assistance of Parke Davis Pty Ltd is gratefully acknowledged.

The materials upon which this study was based were obtained through the support of the following funding bodies and organisations to M. Archer, S. Hand and H. Godthelp: Australian Research Grants Scheme; Department of Arts, Sport, the Environment, Tourism and Territories; National Estate Programme Grant Scheme; Wang Computers Pty Ltd; Australian Geographic Pty Ltd; Mount Isa Mines Pty Ltd; the Queensland Museum; the Australian Museum; the Royal Zoological Society of N.S.W.; the Linnean Society of N.S.W.; Ansett/Wridgways Pty Ltd; Mount Isa Shire Council; the Riversleigh Society and the Friends of Riversleigh.

### References

- ARCHER, M., GODTHELP, H., HAND, S. & MEGIRIAN, D. (1989) Fossil mammals of Riversleigh, northwest Queensland: preliminary overview of biostratigraphy, correlation and environmental change. *Aust. Zool.* 25(2), 29–65.
- DAVIES, M. (1989) Ontogeny of bone and the role of heterochrony in the myobatrachine genera *Uperoleia*, *Crinia* and *Pseudophryne* (Anura: Leptodactylidae: Myobatrachinae). *J. Morphol.* 200, 269–300.
- HEYER, W. R. & LIEM, D. S. (1976) Analysis of the intergeneric relationships of the Australian frog family Myobatrachidae. *Smithson. Contrib. Zool.* 233, 1–29.
- \_\_\_\_\_, DAUGHERTY, C. H. & MAXSON, L. R. (1982) Systematic resolution of the genera of the *Crinia* complex (Amphibia: Anura: Myobatrachidae). *Proc. biol. Soc. Wash.* 95, 423–427.
- TYLER, M. J. (1976) Comparative osteology of the pelvic girdle of Australian frogs and description of a new fossil genus. *Trans. R. Soc. S. Aust.* 100, 3–14.
- \_\_\_\_\_. (1977) Pleistocene frogs from caves at Naracoorte, South Australia. *Ibid.* 101, 85–89.
- \_\_\_\_\_. (1985) Quaternary fossil frogs from Skull Cave and Devil's Lair in the extreme south-west of Western Australia. *Rec. W. Aust. Mus.* 12, 233–240.
- \_\_\_\_\_. (1989) A new species of *Lechriodus* (Anura: Leptodactylidae) from the Tertiary of Queensland, with a redefinition of the ilial characteristics of the genus. *Trans. R. Soc. S. Aust.* 113, 15–21.
- \_\_\_\_\_. (1990) *Limnodynastes* Fitzinger (Anura: Leptodactylidae) from the Cainozoic of Queensland. *Mem. Qld Mus.* 28(2), 779–784.
- \_\_\_\_\_, DAVIES, M. & WATSON, G. F. (1986) The frog fauna of Groote Eylandt, Northern Territory, Australia. *Zool. J. Linn. Soc.* 88, 91–101.
- \_\_\_\_\_, \_\_\_\_\_, & \_\_\_\_\_ (in press) The frog fauna of Melville Island, Northern Territory. *Beagle*.
- \_\_\_\_\_, & PARKER, F. (1974) New species of hylid and leptodactylid frogs from southern New Guinea. *Trans. R. Soc. S. Aust.* 98, 71–78.