FIRST PLIOCENE RECORD OF THE MADTSOIID SNAKE GENUS *YURLUNGGUR* SCANLON, 1992 FROM QUEENSLAND

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A single, large snake vertebra was recovered from a quarry in Chinchilla, southwestern Queensland. Its description is consistent with *Yurlunggur* and confirms that this genus persisted beyond the Miocene in Australia. ❐ *Yurlunggur, Matsoiidae, Pliocene.*

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Four species of madtsoiid have been reported from the Cainozoic fossil record of Australia; *Wonambi naracoortensis* Smith,1976 (Pleistocene), *Yurlunggur camfieldensis* Scanlon, 1992 (Miocene), *Patagoniophis* sp. cf. *P. parvus* Albino, 1986 and *Alamitophis* sp. cf. *A. argentinus* Albino, 1986 (Scanlon 1993, Eocene). The last mentioned is the oldest known snake from Australia. Madtsoiids are closely related to South American specimens from the Late Cretaceous (Scanlon 1993). Outside Australia, madtsoiids did not survive beyond the Eocene (Rage, 1987). In Australia, Pleistocene to Pliocene records of madtsoiids have been referred mostly to *Wonambi naracoortensis* or cf. *W. naracoortensis* (see Merrilees, 1979; Flannery, 1989; Barrie, 1990; McNamara, 1990; Pledge, 1992). Scanlon (1995) reported *W. naracoortensis* from an additional Pleistocene locality (Wellington Caves, New South Wales), but also suggested that species of *Yurlunggur* may have been present in either or both the Curramulka Local Fauna (probably early Pliocene, S South Australia, Pledge, 1992) and the Wyandotte Local Fauna (NE Queensland, McNamara, 1990). The specimen described here confirms the interpretation that *Yurlunggur* persisted beyond the Miocene.

A single large snake vertebra was recovered during quarrying operations at the Rifle Range at Chinchilla, SW Queensland. The fossil comes from a sandy sequence of fluviatile deposits known as the Chinchilla Sand (sensu Woods, 1960), interpreted as middle Pliocene age based on biocorrelation with the Bluff Downs Local Fauna (Archer, 1976). A number of other large snake vertebrae have been reported from the Bluff Downs (Mackness, 1995) and also the Spring Park Local Faunas (Mackness et al., 1993) but these are all pythonines. This paper reports the first ophidian fossil from the Chinchilla Local Fauna as well as the first record of the Madtsoiidae from the Pliocene of Queensland.

Terminology for the vertebra follows Auffenberg (1963), Hoffstetter & Gasc (1969) and LaDuke (1991). A cast of the vertebra is registered in the Queensland Museum (QMF30560).

SYSTEMATICS

Family Madtsoiidae Hoffstetter, 1961

Yurlunggur sp. Scanlon, 1992
(Fig. 1)

The vertebra is referred to the Madtsoiidae because it has the following combination of characters: prezygapophyseal processes absent, zygapophyses inclined well above horizontal, paradiapophyses extend laterally beyond prezygapophyses, paracotylar and parazygantral foramina present. It is referred to *Yurlunggur* because of a moderate slope of the zygapophyses (<22° above horizontal) and strong overall resemblance to vertebrae of *Y. camfieldensis* Scanlon, 1992.

DESCRIPTION. The specimen is a large trunk vertebra, lacking any of the specialised processes that characterise other regions of the column. The anteroposteriorly short centrum and single hypapophysis indicate a position in the anterior portion of the trunk. It is complete except for the distal part of the neural spine and slight damage to the postzygapophyses.

The centrum is broadly triangular in ventral view, the ventral face strongly defined by subcentral ridges converging posteriorly towards the condyle at nearly 90° from each other. A narrow

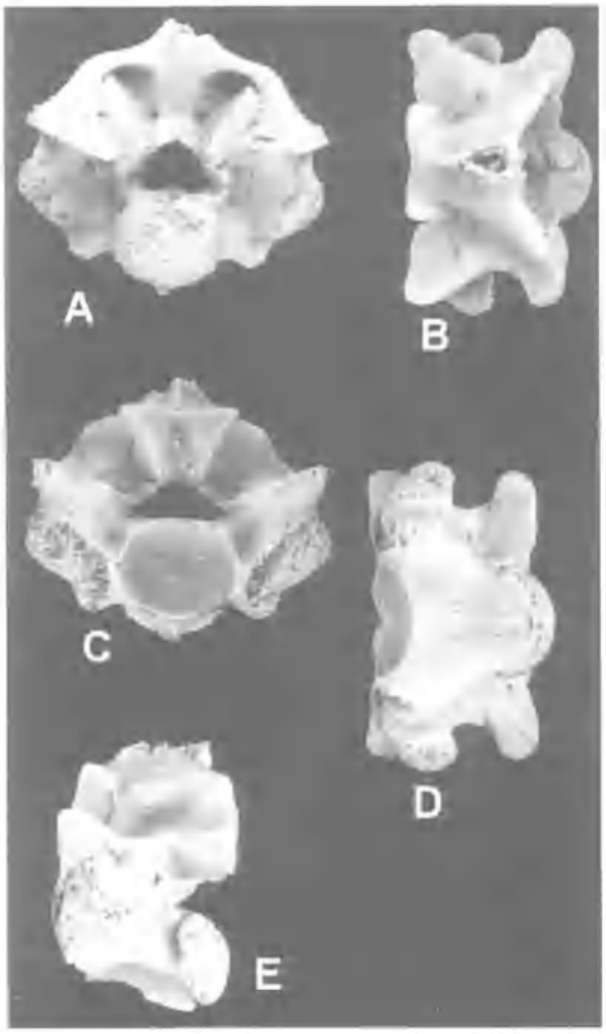

FIG 1. Vertebra of *Yurlunggur* sp. in A, posterior; B, dorsal; C, anterior; D, ventral and E, lateral views. Actual size.

but not very prominent hypapophysis is present on the posterior half of the centrum, with only a low ridge (between shallow ventrolateral concavities) extending to the cotylar rim. In lateral view, the hypapophysis is defined by a very distinct 'step' anteriorly and is nearly horizontal ventrally. It is sharp and narrow anteriorly, but thickened posteriorly by lateral ridges (incipient paired hypapophyses). Hypapophyses of similar form occur in the posterior precardiac region (transition to 'mid-trunk') of *Yurlunggur* spp. (*Y. camfieldensis*, Scanlon, 1992, fig. 1B,C), but are not known in *Wonambi*.

Zygapophyses are inclined at about 20° above the horizontal, their planes intersecting at the base of the neural canal. Zygapophyseal facets are obovate but slightly pear-shaped, distal parts slightly distinguished by anteroposterior constrictions and prominent growth rings which are likely to reflect individual variation (perhaps an interruption of growth due to seasonal variation or injury). Long axes of the prezygapophyses are transverse, postzygapophyses extending slightly posteriad. Interzygapophyseal ridges are smoothly concave laterally.

Zygosphene about the same width as cotyle, and about as deep as wide. Zygosphenal facets slightly concave laterally, diverge dorsally at about 30° from vertical, and their tangental planes intersect between the centre and base of the neural canal. Neural canal weakly trifoliate, slightly wider than high. Zygosphene roof arcuate in anterior view, neural spine extending as a low, dorsally concave crest almost to the anterior edge. This differs from *Wonambi* where the spine rises steeply from the middle of the zygosphene roof, and from most *Yurlunggur* where it is almost entirely posterior to the zygosphene. Spine is broken, so that its original height is unknown, but was steeper and probably higher than in *Y. camfieldensis*.

Paradiapophyses extend slightly beyond the prezygapophyses laterally. In lateral view, they are kidney-shaped, slightly indented posteriorly, but without the strong dorsal concavities of *Wonambi* (Scanlon 1995). Paracotylar, parazygantral, zygantral, and upper and lower lateral foramina present: two or three small subcentral foramina on each side rather than the usual large pair.

The specimen is somewhat smaller than the most similar vertebrae in *Yurlunggur camfieldensis* holotype, and thus represents a smaller individual; centrum relatively shorter and condyle more depressed and oblique, consistent with size differences being ontogenetic (with the usual allometry) rather than difference in adult size. Apart from slight proportional differences, the greatest difference from *Y. camfieldensis* (Scanlon, 1992, fig. 1B) is the more elevated neural arch, in posterior view sloping gradually up to the neural spine rather than forming a horizontal roof over the zygantrum.

Measurements (mm) of *Yurlunggur* sp. vertebra: zygosphene width 13.5; zygosphene height 8.2; neural canal height 4.5; zygantrum width 15.6; paradiapophysis width 34.7; paradiapophysis internal width 19.7; condyle width 12.3; prezygapophysis width 32.9; pre/postzygapophysis length 19.5; centrum midline length 14.0.

This specimen further extends the known geographic and temporal range of *Yurlunggur* in

Australia. Although originally described from the Middle Miocene of the Northern Territory, the genus has also been reported from the Late Oligocene to Middle Miocene of Riversleigh, NW Queensland (Scanlon, 1992), and apparently persisted in northern Queensland until the Late Pleistocene (Scanlon, 1995).

Remains of large pythons and large madtsoiids have been found together but with different frequencies in deposits at Riversleigh and Bullock Creek (Smith & Plane, 1985; Scanlon, 1992) suggesting ecological differences (Scanlon, unpubl. data). Very large pythonine snakes are also known from the Pliocene of N Queensland (Archer, 1976; Mackness et al., 1993; Scanlon & Mackness, unpubl. data) but so far there is no evidence of sympatry between madtsoiids and pythons later than the Miocene (Scanlon, 1995). Whether the extinction of madtsoiids can be attributed to direct competition from pythons is thus doubtful.

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