The frogs in the exhibit were obtained from the Museum of Victoria as captive bred animals. They are fed live crickets that are bred in the school Cricket Breeding Facility. The Torquay Primary School Indigenous Nursery grows the plants required for the enclosure.

Students are heavily involved in all aspects of plant propagation, cricket breeding and general frog husbandry as well as the construction of the Web site "**Frogs On the Move**" which is linked to the Torquay Primary Home Page (torquayp.vic.ed.au)

It is hoped this exhibit will raise the profile of the Growling Grass Frog and promote the adoption of various frog friendly practices to ensure the long-term survival of this endangered local species.

Students searching for the endangered Growling Grass Frog on private property in Moriac.

A NEW SPECIES OF ELAPID (SERPENTES: ELAPIDAE) FROM WESTERN NEW SOUTH WALES

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ABSTRACT

The genus *Pseudonaja* has been the subject of taxonomic debate and relative uncertainty for many years. However almost without exception, it is accepted that the species *Pseudonaja textilis* as recognized in most herpetological texts comprises at least number of distinct regional subspecies and perhaps even more than one species. Wells (2002) even went so far as to place the *textilis* group outside the traditional genus *Pseudonaja* and instead place it in the genus *Euprepiosoma* Fitzinger 1860.

In recent years, two variants of *Pseudonaja textilis* as broadly recognised have been formally named. These are *Pseudonaja ohnoi* Wells and Wellington 1985 from central Australia (herein recognised at the subspecies level only) and another from the island of New Guinea. This paper formally describes and names a new taxa, most closely related to *Pseudonaja textilis* from western New South Wales. It is regarded as being sufficiently different from *Pseudonaja textilis* to warrant recognition as a separate species.

PREAMBLE

Most publishing authors recognize just one form of the Eastern Brown Snake (*Pseudonaja textilis*). However within this ambit, it is generally conceded by Australian herpetologists that more than one taxa are involved; at least at the subspecies level (see Wells 2002). The most recent relevant recent papers include an in press description of the New Guinea subspecies and Wells (2002). In spite of this, a number of regional variants have been named and recognised as such for some time.

Broadly following on from Hoser (2002), the known regional variants from within Australia are therefore classified thus:

> ***Pseudonaja textilis textilis* (Dumeril, Bibron and Dumeril, 1858) the type species from Eastern NSW and nearby areas.**
>
> ***Pseudonaja textilis bicucullata* (McCoy, 1879) from Victoria - a slightly smaller variant than the nominate subspecies.**
>
> ***Pseudonaja textilis ohnoi* Wells and Wellington, 1985 from Central Australia. Believed to be restricted to the McDonnell Ranges of Central Australia, (other as yet unnamed taxa as identified by Gillam (1979) occur north of here).**

Following on from Wells (2002), I now tentatively consider *Pseudonaja inframacula* (Waite 1925) from the Eyre Peninsula, SA and along coastal SA across to WA to be sufficiently differentiated from *Pseudonaja textilis* to warrant recognition as a separate taxa at the species level.

For most *Pseudonaja textilis* and others in the species group as identified above, they all tend to share the following characteristics.

In dorsal colour, they may range from light tan, through dark brown, russet and orange to almost black, or any shade in between the preceding. The belly is usually cream or yellowish-orange with scattered darker blotches. Hatchlings vary between localities. However most have a black head and/or black markings on the head and nape. The juvenile pattern usually fades at about two years of age. In some specimens of the insular subspecies of *P. affinis tanneri* and *P. a. exilis* the colour change is reversed, light as juveniles and darkening with age. (Maryan and Bush 1996).

In coastal areas of NSW and nearby places, young specimens are usually banded (black bands) all along the body. In some areas, young may be born with or without bands, even from the same clutch of eggs.

The species (as identified here) is known from all Aus-

tralian States, however in the NT, it is only known from the McDonnell Ranges and adjacent areas to the north, including the Barkly Tableland, while a single specimen is known from WA (Gordon Downs, in the Kimberley District). In the other (Eastern) states the species is most common in wetter regions, although within these areas, they prefer open woodland and grassland type habitats, where they are sometimes extremely common. The species does not occur in Tasmania.

Scales are smooth with 17 mid-body rows, 185-235 ventrals, a divided anal and 45-76 paired subcaudals. Occasionally the first (anterior) subcaudals may be single.

In most areas adults average about 1.5 metres, but in Coastal Queensland adults over 2 metres are common.

This swift-moving diurnal species will usually flee if aroused, but if cornered will stand it's ground raise it's head and become highly aggressive which is as described in (Gillam 1979).

It is a highly dangerous species.

The venom is toxic and the species is one of the most common causes of snakebite deaths within Australia.

This reflects the fact that the species is tolerant of human habitation and in many areas has actually increased in numbers, particularly around the edges of the capital cities of Sydney, Melbourne, Adelaide and Brisbane.

In Melbourne I am a licenced snake removalist and about one in three removals are for this species. Most of these snakes come from the north-west suburbs in an arc stretching from Thomastown to Sunshine.

The species feeds on vertebrates, including introduced mice (*Mus musculus*). 10-35 eggs are usually laid.

Other *Pseudonaja* are separated from this species by a suite of characters including scalation, and the colour of the buccal cavity.

The most closely related to *Pseudonaja textilis* are *Pseudonaja affinis* Gunther 1872 and *Pseudonaja tanneri* (Worrell 1961), both of which are separated from *Pseudonaja textilis* by having 19, instead of 17 mid-body rows, (Wilson and Knowles 1988).

Other genera of similar looking elapid snakes (e.g. *Pailsus, Oxyuranus* and *Cannia*) are separated by colouration, build, scalation and other physical characteristics.

Refer to Cogger (2000) and Hoser (1998) for further information about separating these similar genera.

Photos of *Pseudonaja textilis* in life are provided by Ehmann (1992), Gow (1986), Hoser (1989), and Mirtschin and Davis (1992), Storr, Smith and Johnstone (1986), Worrell (1970) and other authors.

WILCANNIA *PSEUDONAJA*

For many years and at least since the late 1970's it has been known by many Sydney-based herpetologists that at least some "*Pseudonaja textilis*" from the Wilcannia area of western New South Wales are "different" to those from other areas.

For more than twenty years, I have been looking at these alleged differences, but had been hampered by a number of factors, including a general lack of specimens from this general area and the fact that some specimens did appear to be different and yet others looked much the same as those from elsewhere.

Thus is it was concluded tentatively that the variation was explained by either a cline or that if the differences did warrant recognition at some level, it was most likely at the subspecies level.

Assuming for a moment that these snakes from the Wilcannia region were in fact different subspecies, the question then became whether or not they had in fact been named at some time in the past.

A check of previously named taxa, as listed by Cogger et. al. (1983) and Wells and Wellington (1985) indicated that the only likely name that could be assigned to these snakes was *Pseudonaja textilis bicucullata* (McCoy, 1879).

Recently I was able to check the holotype of this snake in the National Museum of Victoria and found it to be a juvenile *Pseudonaja textilis*. Regarding the Victorian *Pseudonaja textilis* as being slightly different to the Sydney animals, I therefore recognize this name as applying to most or all of the Victorian *Pseudonaja textilis*, as well as specimens found slightly north of here in areas such as the Riverina area in New South Wales. Also see Annable (1985) for more on Riverina *Pseudonaja textilis*.

This still left the possibility of there being an unnamed taxa, at least at the subspecies level inhabiting parts of western New South Wales.

In the period 2000-2002 I was able to examine a number of dead and live so-called "*Pseudonaja textilis*" from the Wilcannia area and adjacent parts of Western New South Wales.

To my surprise I found that there were two radically different and apparently sympatric taxa involved.

Using keys in the major books such as Cogger (2000) both taxa key out as *Pseudonaja textilis*. However in spite of this similarity, the two taxa can be readily differentiated by a suite of characteristics including the relative sizes of the eye, eye-ridge prominence at the supraocular level, other scalation characteristics and general (usual) dorsal and ventral colouration (see the description below).

As part of this study, I looked at a vast number of live

captive snakes and specimens in the field, as well as a sample of specimens from diverse and materially relevant localities at the Australian and National Museums (Sydney and Melbourne).

Just prior to publication of this description (in June 2002) I became aware of the commencement of a study into *Pseudonaja* by Adam Skinner and Mark Hutchinson at the South Australian Museum and so contact was made with him on my behalf by Scott Eipper, who provided invaluable assistance's in this and other research projects. The fact that their study was (in terms of the "*textilis*" group) at it's earliest stages was indicated by Skinner's apparent lack of knowledge of the Wilcannia taxa at the time contact was first made with him. He also indicated that he was most interested in the "*nuchalis*" group of snakes (Skinner 2002).

However as a result of this contact, myself and Scott Eipper agreed to supply him with our data, including tissue samples from a specimen of the species described below for DNA analysis and to defer naming other subspecies of *Pseudonaja textilis*, including those unnamed forms from northern Australia pending the final publication of Skinner's own study.

***PSEUDONAJA ELLIOTTI* SP. NOV.**

HOLOTYPE

An adult female specimen in the Australian Museum in Sydney, New South Wales, R132991 from about 30 km north of Wilcannia, New South Wales, on White Cliffs Road, Lat. 31°23' S, Long 143°10' E. It was collected on 10 February 1991.

The specimen's key measurements are as follows: 32 mm head length (to back of skull) (straight line down middle of head), 103.8 cm snout-vent, 122.5 cm total length.

The dorsal colouration is generally a darkish brown, however within this ambit, there is a lighter anterior from the rear of the head to about 27 cm down the body where the body gradually becomes darker. This lighter colouration, includes an orangeish tinge at the posterior tips of the relevant scales. The head shields are lighter, particularly on the sides, but usually have dark etching on the scales.

The ventral surface is whitish at the anterior end with black edges (broken) on the posterior edges of most scales. However as one moves down the ventral surface towards the rear of the body, this whitish colouration remains dominant (in contrast to what is seen in the paratype (see below). However, in common with the paratype, the dark etching on the posterior of each scale remains for the entire length of the snake's body and onto the tail. From about the thirtieth to the sixtieth subcaudal there was a long darkish blotch running down the centre of the belly, which ran across the width (longitudinally) of each scale. There are no yellow or orange blotches or faded blotches on the ventralia as is typical for most *Pseudonaja textilis*. Some of the specimen's scales were flaking off (not slough).

The snake's scalation is as follows:

2 parietals, 2 postoculars, 2 prefrontals, 2 internasals, six supralabials, six infralabials, 17 mid body rows, anal divided, 60 all divided subcaudals, 215 ventrals.

PARATYPE

An adult female specimen in the National Museum of Victoria at Melbourne, Victoria D71085 lodged there on 6 August 2002 and previously collected live on 20 December 1999 from the general area of Wilcannia rubbish tip. Lat. 31° 34' S, Long. 143° 22' E.

The dorsal colouration is generally a darkish brown, however within this ambit, there is a lighter anterior from the rear of the head to about a quarter of the way down the body where the body gradually becomes darker. This lighter colouration, includes an orangeish tinge at the posterior tips of the relevant scales. The head shields are lighter, particularly on the sides, but usually have dark etching on the scales.

The ventral surface is whitish at the anterior end with black edges (broken) on the posterior edges of most scales. As one moves down the snake's body and beyond the neck region, the ventral colouration becomes yellowish, but the dark etching on the posterior of each scale remains for the entire length of the snake's body and onto the tail. There are no yellow or orange blotches or faded blotches on the ventralia as is typical for most *Pseudonaja textilis*.

The snake's scalation is as follows:

2 parietals, 2 postoculars, 2 prefrontals, 2 internasals, six supralabials, six infralabials, 17 mid body rows, anal divided, 45 all divided subcaudals, 232 ventrals.

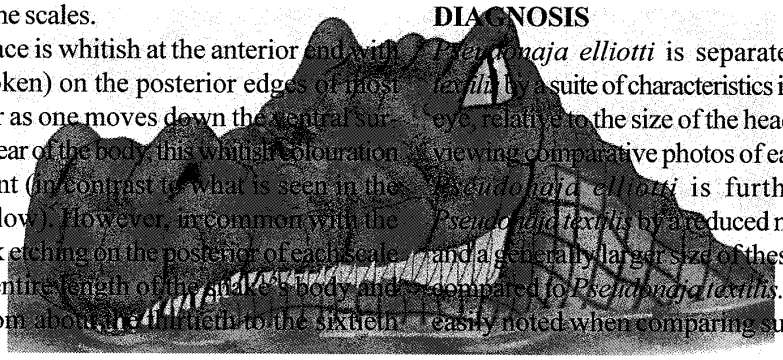
The paratype had been held as a captive in a private collection as a live snake for some time prior to being lodged in the National Museum of Victoria.

It died on 5 July 2002 of unknown causes.

DIAGNOSIS

Pseudonaja elliotti is separated from *Pseudonaja textilis* by a suite of characteristics including a much larger eye, relative to the size of the head. This is best seen by viewing comparative photos of each species.

Pseudonaja elliotti is further separated from *Pseudonaja textilis* by a reduced number of head shields and a generally larger size of these remaining scales as compared to *Pseudonaja textilis*. This is perhaps most easily noted when comparing supralabials, which are



much larger in *Pseudonaja elliotti.*

No *Pseudonaja elliotti* are known to have seven supralabials, although this appears to be fairly common in *Pseudonaja textilis* from Western New South Wales, (e.g. R150329 from the Australian Museum in Sydney, from Mootwingee National Park). This is another diagnostic difference between the two taxa.

Pseudonaja elliotti is also readily separated by the dark reddish brown etching of each scale on the sides of the head. This is not seen in *Pseudonaja textilis.*

The eye-brow ridges are not as pronounced in *Pseudonaja elliotti* as in *Pseuondaja textilis.*

Based on the limited number of specimens known, *Pseudonaja elliotti*'s ventral counts tend to be higher than for *Pseudonaja textilis.*

Pseudonaja elliotti may be separated from other *Pseudonaja* in western NSW, by it's flesh coloured buccal cavity. *Pseudonaja nuchalis* and *Pseudonaja modesta* both have a blackish buccal cavity.

Pseudonaja elliotti is separated from the Inland Taipan (*Oxyuranus microlepidota*) which may occur in the same general region, by having 17 mid body rows (versus 23 in *Oxyuranus microlepidota*). Snakes from the genera *Cannia* and *Pseudechis* are separated from *Pseudonaja* and *Oxyuranus* by the fact that they have high numbers of single subcaudals (usually in excess of 10), which the latter genera do not have.

Like *Pseudonaja textilis*, this species is often highly strung and won't hesitate to rear up and attack and aggressor if cornered.

Pseudonaja elliotti is presently known definitively from just two specimens lodged in two State Museums, however it is almost certain that others have been collected in the past. Both are known from the immediate vicinity of the town of Wilcannia, New South Wales.

This may indicate a very restricted distribution for the species.

Further study in the field is required to resolve the extent of the distribution of this taxa.

CAPTIVITY

The captive husbandry requirements for this species appears to be essentially the same as for *Pseudonaja textilis*.

Captives readily take mice.

There are no breeding records known.

Due to the highly-strung nature of specimens, this species is not recommended for novice snake keepers or those with limited expertise in terms of handling highly venomous snakes.

Based on the limited experience with small numbers of this species, it appears that as a rule specimens do not settle down, even after some time in captivity. Specimens remain highly strung and in the captive circumstance of a small wooden glass fronted cage seem to remain intent on striking at the keeper when the opportunity arises.

Finally, since publication of Hoser (1998), a number of cross-

The paratype had some ticks on it when captured and in captivity it was never observed to soak itself in it's water bowl.

CONSERVATION:

There are no known or foreseen threats, however the restricted range of the species (as presently known) is a cause for some concern, and it is suggested that self-sustaining populations be maintained in captivity in the event of unforeseen disaster in the wild populations. Given the fact that the species is not highly sought after by either the pet trade or zoos, we see no reason to restrict the relatively minor trade in live specimens of this species.

ETYMOLOGY

Named after Melbourne-based reptile keeper Adam Elliott in recognition of his contribution to herpetoculture (reptile-keeping) among Victorian and other herpetologists as well as his other wildlife conservation related activities.

PHOTOGRAPH NOTES

Immediately following publication of this paper, good quality colour photographs of the following:

- The holoytpe of *Pseudonaja elliotti*
- The paratype of *Pseudonaja elliotti*
- "Normal" western New South Wales *Pseudonaja textilis*
- Comparative photos of both *Pseudonaja ellioti* and *Pseudonaja textilis*
- The holotype of *Pseudonaja ("Furina") bicucullata*

can be found on the internet website http://www.smuggled.com/psetex2.htm and/or links from that site. All photos are by this author.

MUSEUM SPECIMENS OF *PSEUDONAJA TEXTILIS* EXAMINED FOR WHICH DATA WAS TAKEN:

National Museum of Victoria:

D01882 (Holotype of "*Furina bicucullata*") from: Nth Victoria, D09726 (Renmark, SA), D09747 (No locality data) D09748 (No locality data), D10374 (Wyndham Station via Wentworth, NSW), D12815 (No locality data), D12816 (No locality data).

Australian Museum in New South Wales:

R150329 from: Mootwingee National Park, Lat 31 deg 23 min S, Long 142 deg 15 min E., R151570 :

Sandy Creek Crossing, (1 km south of here), 200 km south of Tiboburra, NSW, on the Silver City Highway, Lat 30 Deg 58 min south Long 142 deg 15 min East., R152806 (Collection data not known).

Non Museum Specimens and Museum specimens for which no data was recorded are not listed

Note: The Holotype and Paratype of *Pseudonaja elliotti* are not listed in the above summary.

ACKNOWLEDGMENTS

Numerous people provided assistance's in this and related projects and for space reasons are not named here. This was mainly in the form of providing literature or providing of study specimens in their care (including museum specimens).

Included here are the relevant museum curators, Dianne Bray at the National Museum of Victoria (Victoria) and Ross Sadlier and Allen Greer at the Australian Museum (New South Wales).

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