



Foto 1: De Yarra rivier die vanuit de heuvels ten oosten van Melbourne door de stad stroomt. Yarra river, which flows from the hills east of Melbourne, through the city. Foto R.T. Hoser.



Foto 2: *Austrelaps superbus*, koperkop (laagland vorm), copperhead (lowland form). Foto R.T. Hoser

MELBOURNE'S SNAKES, PART 1

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Contents: About Melbourne - An overview of
snakes - Copperhead - Small-eyed snake -

ABOUT MELBOURNE.

Melbourne is the second largest Australian city, and the state capital of Victoria. It has a population of between three and four million people, the exact number depending on which outer suburbs and nearby satellite cities are included in the population count. At the time of writing (1989), the population of Melbourne is increasing by about 60,000 people a year as a result of natural increase and immigration from elsewhere (mainly other countries). Melbourne is about 900 km (by road) to the south-south west of Sydney, Australia's largest city with a population about 600,000 more than Melbourne's. According to the 1982 YEAR BOOK AUSTRALIA, Melbourne was on average 35 m above sea level. The climate is by Australian standards cool, with more overcast weather than most other parts of the country. Melbourne city's rainfall is not high in terms of mm's that fall, but this hides the fact that a large portion of the rainfall is in the form of drizzle, and not heavy downpours like what dominates the rainfall of other parts of the country. The average annual rainfall is 659 mm, with a range between 331 and 939 mm. Although rainfall is fairly evenly spread throughout the year, slightly more falls in winter months, and that which falls in warmer months has a greater tendency to be of the heavy thunderstorm variety.

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The year round average maximum temperature is 19.7°C with an average minimum of 9.9°C . The highest recorded temperature is 45.6°C whilst the lowest ever recorded is -2.8°C . The weather in Melbourne is highly erratic and changeable, not only on a seasonal basis, but also on a daily basis. The locals here have a saying 'If you don't like Melbourne's weather, wait five minutes and it will change. That's often true. Most of Melbourne is relatively flat, with few if any rugged hills in the near vicinity (within 50 km of the city centre). The Dandenong ranges some 30 km to the east of the city are easily the largest and steepest hills in the area. These hills represent the eastern edge of the urban sprawl, and are still mostly covered by dense forests, and gullies with tree ferns. As one moves, westwards towards the city and beyond, the countryside is relatively flat and undulating.

Along with a westwards decrease in rainfall, the natural vegetation gradually changes from dense forests to open grasslands with very few trees by the time one reaches the outer western suburbs about twenty km from the city. Directly south of the city is Port Phillip Bay, which opens into Bass Strait some 60 km further south. For about 10 km to the north of the city there is a general rise to open basalt plains which are found to the north and north west of the city. These plains run into the plenty river gorge in the north east and then into hillier more wooded country after that. Most native grasses have been eliminated and replaced by introduced varieties. Rainfall not only decreases in an east west direction, but also in a north-south direction to a lesser extent.

AN OVERVIEW OF THE SNAKES

Herpetologically, Melbourne is relatively devoid compared to other parts of Australia, principally due to it's relatively cool climate. Sydney has well over 20 species of snake found within 50 km of the city centre. Melbourne has only seven species found within 50 km of the city centre. All but one, the Little Whip Snake *Unechis flagellum* also occurs around Sydney. No Blind Snakes (Family: *Typhlopidae*), have been recorded within 50 km of Melbourne, but due to their cryptic nature they may occur in this area.

Some other snake species occur within 80 km of the city, typically north of the Great Divide, but they are not included in this paper. Legless lizards, (Family: *Pygopodidae*) occur around Melbourne, with *Delma* species the most common. These lizards and some small skinks with reduced limbs are sometimes killed by locals in mistake for snakes.

Conserving snakes is still regarded by most Victorians as a ridiculous idea. The seven species of snake found around Melbourne are all widespread throughout the south-eastern part Australia's and all belong to the family *Elapidae*. The seven species are:

- 1: Copperhead (lowland) *Austrelaps superbus*
- 2: Small-eyed Snake *Cryptophis nigrescens*
- 3: White-lipped Snake *Drysdalia coronoides*
- 4: Eastern Tiger Snake *Notechis scutatus*
- 5: Red-bellied Black Snake *Pseudechis porphyriacus*
- 6: Eastern Brown Snake *Pseudonaja textilis*
- 7: Little Whip Snake *Unechis flagellum*

All species are found in reasonable numbers

where habitats are suitable, although the least frequently caught species around Melbourne are the Small-eyed and Black snakes. Both of these types become more abundant in coastal areas of New South Wales.

The Copperhead, Eastern Tiger and Eastern Brown snakes are all deadly and claimed numerous lives before the advent of anti-venoms. Deaths are recorded from the bites of the Small-eyed and Red-bellied Black snakes, but in all cases have been in exceptional circumstances, (such as severe alcohol anaebriation of the victim), but should still be treated as potentially dangerous.

The other two species, though venomous, have venoms too mild to be more than a minor irritant if one is bitten.

When I quote average lengths and maximums for snakes, these figures are not based on specific museum or other specimens, and the lengths are estimated as a result of my experience with specimens (not necessarily measured) in the field, captivity and from other people's reported measurements.

COPPERHEAD, *Austrelaps superbus* (Gunther, 1858)

Colouration: see photo 3. Highly variable in dorsal colour, ranging from yellows, browns, reds, greys or black. Specimens may or may not have a different coloured nape region, (Hoser, 1989a). The nape is more common in smaller specimens (Rawlinson, 1965). Examples of four different colour variations of Copperhead are shown on page 148 of Hoser (1989a) (highland and lowland forms). Average Adult Maximum Length: 1.1



Foto 3: *Cryptophis nigrescens*. West Head (NSW).
Foto R.T. Hoser.

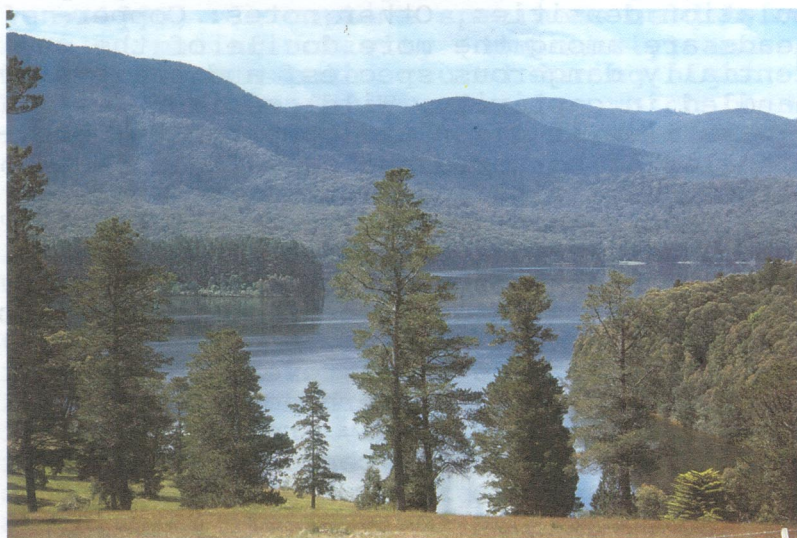


Foto 4: De heuvels ten oosten van Melbourne.
The hills east of Melbourne. Foto R.T. Hoser

m. Length of longest recorded specimens (approx. estimate) 1.9 m. Basic scalation: smooth with 15 mid body rows, 140-165 ventrals, single anal, and 40-55 single subcaudals. Distribution (lowland form only): found in Victoria (most of the southern half only), Tasmania and South-eastern South Australia. Around Melbourne, this species is absent in a line stretching north from the city and nearby western suburbs, (the lower Yarra valley). Copperheads apparently "fizzle out" to the west of Kinglake, before re-appearing further west as part of the second population. The South-North line of absence splits Victorian Copperheads into two distinct populations, probably no more than 30 km apart at the closest point. This division of populations probably pre-dates white settlement of the area. Copperheads are most common in the Dandenong ranges and nearby hills, where they are sometimes found in high population densities. Other notes: Copperheads are among the more docile of the potentially dangerous species, and are easily handled in captivity. Wild specimens will always flee if given the opportunity. Occasionally if cornered and agitated, a Copperhead will hiss and flatten the whole body before suddenly moving for cover. In some areas where there is no ground cover other than grass tussocks Copperheads will still occur in large numbers, but are often hard to locate.

Burn offs in these areas reveal huge numbers of specimens. Copperheads are most common where food (mainly frogs) are most common, and are not as common around Melbourne as they are in some of the upland farming country to the east of Victoria, where frogs are more numerous. Their cannibalistic behaviour and greater resistance

to cold than other snakes, usually leads to Copperheads eliminating most other snakes in areas where they are most common. Such areas are typically farming country with abnormally high populations of frogs. Over a period of time, the frog numbers increase as a result of the construction of small farm dams that provide drinking water for stock. The frogs breed in these dams, which are effectively new breeding sites. As the Copperhead numbers increase in line with their food supply, so they adversely effect the numbers of competing snakes. Mating occurs in early spring (I observed it in September/October in captive specimens) with an average of fourteen live young being born around January to March. The young average 18 cm at birth. Although Copperheads are mainly diurnal, they become crepuscular or nocturnal in hot weather. Male combat in the breeding season as been documented in this species, (Shine and Allen, 1980). In captive specimens held by myself, mating activity (dominantly) and birth of young both occurred during night hours. This was for two females which bred in 1975-76. Both snakes gave birth five days apart in the first week of March between midnight and 3 am (Eastern Summer Time), in identical weather conditions. Although kept in an indoor cage, the weather outside was cold and wet (post cold front), and would have been noticeable to the snakes inside. Peters (pers. comm.) a former reptile keeper at Sydney's Taronga Zoo, reported that the zoo had difficulty in keeping this species. Apparently the zoo's reptile house was "too hot" for this species, and specimens kept became emaciated before later dying. Another Sydney herpetologist, Carey (pers. com.), reported a similar problem when keeping this species.

Both Carey and Peters, held numerous other types of snake, and did not report such problems with any. The specimens kept by the author in 1974-76 were housed (thrived) in a cool room under his parent's house without artificial heating. All other species kept in this room required some form of heating, at least in the winter months. Although I never experienced cannibalism or attempted cannibalism in this species, Weigal (1988) warns about problems of captive cannibalism in Copperheads. The highly neurotoxic venom of Copperheads is neutralised by Tiger Snake (*Notechis*) anti-venom, which is administered to bite victims.

SMALL-EYED SNAKE *Cryptophis nigrescens*
(Gunther, 1862)

Colouration: see photo 4. Average adult maximum length: 50 cm. Length of longest recorded specimens (Victoria only) (approximate estimate) 75-80 cm. Basic scalation: smooth with 15 mid body rows, 165-210 ventrals, single anal and 30-45 single sub-caudals. Distribution: found along the coast, ranges and nearby slopes, from Cape York, North Queensland to the vicinity of Melbourne, Victoria. Around Melbourne, Rawlinson (1965) reports this species as being restricted to some rocky areas to the north and east of the city, and not abundant in any locality. Turner (pers. comm.) reported this species as being common (abundant) in the Plenty River Gorge to the north east of the city. Specimens had also been caught in the Churchill National Park, near suburban Dandenong, and there were also a number of unconfirmed reports of specimens being caught in some hills to the south west of the city.

Other notes: although a nocturnal species, most specimens are found during the day when resting under cover; particularly in the colder months. Like many other snakes, this species won't hesitate to utilise man made cover in the form of sheets of tin and similar. When caught this snake will usually attempt to bite and may flatten its body while doing so. On one occasion I caught a specimen inside a termite mound that I had dismantled at Mount Kurringai, near Sydney. In the same mound I caught a half paralysed Copper-tailed skink *Ctenotus taeniolatus*, that had presumably been bitten by the snake and then fled. The skink died shortly after I had caught it. Small-eyed snakes are dominantly skink feeders, but captive specimens have also taken geckoes and mall frogs of the genera *Pseudophryne* and *Crinia*. During early May 1977, I located an aggregation of 29 Small-eyed Snakes at Darkes Forest (just south of Sydney). The snakes ranged in age from juvenile to adult, with most specimens being adult. They were found in a pile of sheets of corrugated iron (Hoser, 1980). Other aggregations of this species have also been recorded by Covacevich and Limpus (1973), Gow (1976). McPhee, (1979) documents a case of 28 specimens being found knotted together presumably hibernating in winter. Aggregation in this species is presumably fairly common. Mating occurs in late autumn, winter and spring with two to eight (average five) young being produced in late summer. Young measure 10-12 cm at birth. On 30 December 1981, Webb and Chapman, found two gravid females of this species and seven gravid Golden Crowned Snakes *Cacophis squamulosus* on a six km stretch of gravel road. It was between 9.00 pm and 10.30 pm (Eastern summer time), in a NSW state forest. No

males or other specimens were found on that night, and they concluded that these snakes were "nocturnal road basking" in order to facilitate the development of their embryos or eggs, (Webb and Chapman, 1983). At 9.00 pm, the ambient air temperature had been 20 degrees celcius, presumably warm enough for males to forage for food in the forest. The two Small-eyed Snakes had no food in their stomachs, indicating that this species probably doesn't feed in the latter stages of pregnancy. In relation to the above case involving the gravid snakes, my own experiences and conclusions differ slightly. Gravid snakes of various species including Death Adders *Acranthophis* become unusually restless in the month or so preceding paturition, and by this factor alone, are more likely to be found crossing roads. In cases noted by myself, road basking was not evident; the snakes found, merely crossing the roads. Also the ground temperature of the road (as measured) did not significantly differ from open (exposed) rock outcrops, and ground in the adjacent bush, (Principal studies in West Head, area, NSW, and Pilbara W.A.). Captive specimens of this species are hardy, provided one is able to maintain an adequate supply of skinks. Although it is hard to quantify the exact number of skinks required on a weekly basis for skink feeding snakes, due to a number of variable factors, I used to operate on the principal that any given snake would need to be supplied with in excess of three skinks per week on average and assuming that a small oversupply in food stocks is maintained). Rawlinson (1965) noted that the Small-eyed snake and the Little whip Snake *Unechis flagellum* emits a sharp "ant-like" odour when freshly caught.

MELBOURNE'S SNAKES. PART 2

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Contents: White lipped snake - Eastern
tiger snake - Redbellied black snake -
Eastern brown snake - Little whip snake -
Conservation - Acknowledgement - References

WHITE-LIPPED SNAKE, *Drysdalia coronoides*
(Gunther, 1858)

Colouration: Highly variable in dorsal
colour, ranging from greys, greens, reds,
browns or even black.

Average Adult Maximum Length: 40 cm. Length
of longest recorded specimens (approx.
estimate): 70 cm.

Basic scalation: Smooth, with 15 mid body
rows, 120-160 ventrals, single anal and 35-
70 single subcaudals.

Distribution: Found in colder parts of New
South Wales, Victoria (East and West) and
all of Tasmania. Around Melbourne, this
species is absent from the drier and more
open western suburbs. It is very common in
the Dandenongs, and forested hilly parts of
the nearby Mornington Peninsula area.

Other notes: This mainly diurnal snake is
usually found sheltering under ground
litter, including well embedded rocks, when
inactive. Active specimens are found during
favourable weather conditions. Where this
snake occurs, it is not unusual to be able
to catch several specimens in a single
afternoon's hunting. A skink feeder, (Shi-
ne, 1981), it actively stalks it's prey.
About six young are produced from January
to early March and unlike most kinds of

snake, White-lipped Snakes continue to feed throughout pregnancy. Newborns measure about 10 cm. A favoured hibernation site is inside water soaked logs in water soaked areas (Bartell and Jenkins 1980).

EASTERN TIGER SNAKE, *Notechis scutatus*
(Peters, 1861)

Colouration: Highly variable in dorsal colour ranging through olives, yellows browns, reddish, greys or even black, with or without cross bands of varying intensity.

Numerous examples of variation in colouration of this species are provided by Cogger (1986), Gow (1989a), Griffiths (1987), Hoser (1989a), Mirtschin and Davis (1982). Mirtschin and Davis (1982), page 42, have a photograph of a leucystic (white) specimen from Warnambool, some two and a half hours drive west-south-west of Melbourne. Anecdotal evidence provided by Rawlinson (1965), indicates that banding (or non-banding) in Tiger Snakes is genetically dictated by simple dominant or recessive genes. Although the degree to which bands are visible on Eastern Tiger Snakes varies, Chappell Island Tiger Snakes *Notechis ater serventyi* from Bass Strait, only seem to come in two highly distinct morphs: Banded and unbanded, with no intermediates. Mertens (pers. com.) who provided specimens of both morphs of Chappell Island Tiger Snakes photographed in Hoser (1989a) stated that breeding adults produced one or both morphs in their offspring, indicating that they too have their bands or lack thereof dictated by simple dominant or recessive genes. Further investigation is required. Average adult maximum length: 1.3 metre.

Length of longest recorded specimens (approx. estimate; this form of Tiger Snake only): 2.2 metre.

Basic scalation: Smooth with 15-19 mid body rows, 146-185 ventrals, single anal and 39-65 single subcaudals.

Distribution: Throughout mainland south-eastern Australia, except for the most arid parts, which it only penetrates along the river valleys.

In parts of South-east South Australia where the Western or Black Tiger Snake *Notechis ater* occurs, the Eastern Tiger Snake *Notechis scutatus* is absent.

Although found throughout Melbourne, this snake occurs in largest numbers in the lower Yarra Valley, where it is still common (Studley Park), and the low lying swamp lands to the west and south-west of the city between Altona and Geelong.

Other notes: More white Australians have died as a result of bites from this snake than any other. This is due to it's presence in large numbers in heavily populated areas, and of course it's deadly neurotoxic venom.

Typically the Eastern Tiger Snake *Notechis scutatus* will flee if approached. When cornered it will flatten it's neck and body, lunging forward in various directions, and striking when the opportunity arises. Despite the wide range of habitats occupied by this snake, preferred habitats are those with large numbers of frogs, such as river flats, and grassy areas adjacent to beaches, including those around Port Phillip Bay.

Tiger snakes are usually diurnal, but become crepuscular or nocturnal in hot weather, particularly juveniles (Hoser, 1989a). Frogs are the dominant component of their vertebrate diet. Worrell (1970) plate 57,

shows an Eastern Tiger Snake swallowing an eel, tail first. Barnett, (pers. comm.) reports captive Tiger Snakes, Death Adders *Acranthophis* spp. and other Australian elapids readily feeding on goldfish dropped in front of them when hungry.

Tiger snakes in Queensland are rapidly disappearing as a result of the predations and poisonings of the Cane Toad *Bufo marinus*, (Hoser 1989a, Rook and Charles, (pers. comm.)). I believe that it is probable that the Melbourne environment could support permanent and viable populations of Cane Toads, and so Cane Toads pose a long term threat to Melbourne's Tiger Snakes, if the Toads continue to spread southwards along the New South Wales Coast. If the 'Greenhouse effect' takes place as predicted and Melbourne's average temperature rises by between two and four degrees celcius, then *Bufo marinus* would have an even better chance of becoming established in Melbourne. Withstanding the above, it is unlikely that *Bufo marinus* pose a threat to Melbourne's Tiger Snakes in the next fifty years. Mating of Tiger Snakes is usually in early spring (September to November), and a pair of copulating Tiger Snakes from Melbourne's outskirts is shown on page 192 of Hoser (1989a).

17-109 (average 35) young are produced in late summer (late January-April). Newborns measure about 18 cm, often having distinct bands that fade in later life.

Captive Tiger snakes are 'durable' and tend to thrive, even in conditions considered unsuitable for most other snakes, (e.g. too dirty or too moist cage). They tend to become fairly docile and this is their danger. Experienced snake handlers who keep this species fall into the trap of trusting this snake, and get bitten when it decides



Foto 1: *Drysdalia coronoides*, witlipslang, white-lipped snake. Lithgow (NSW). Foto R.T. Hoser.



Foto 2: *Notechis scutatus*, oosterlijke tijgerslang, eastern tiger snake. Lake George (NSW). Foto R.T. Hoser.

to bite it's keeper. This unpredictable streak in the Tiger Snake's nature leads to a disproportionately large number of experienced snake handlers falling victim to this snake's bite.

RED-BELLIED BLACK SNAKE, *Pseudechis porphyriacus* (Shaw, 1794)

Colouration: See photo. Changes little with age, sex or other factors. Belly colour ranges from whitish to red, and is usually most red at the edges of the ventral scales. Average adult maximum length: 1.5 m. Length of longest recorded specimens (approx. estimate): 2.5 m. Basic scalation: Smooth, with 17 mid body rows, 180-210 ventrals, divided anal, 40-65 single and divided subcaudals.

Distribution: Found in coastal areas of South-eastern Australia and wetter parts of the Queensland coast. Also found in inland areas along the Murray-Darling river system.

Around Melbourne, this species is absent from drier parts of the northern and western areas, and patchily distributed elsewhere. Near Melbourne, this species is most common along the Plenty River Gorge, an area now under threat from urban development.

Like the Small-eyed snake, the Red-bellied Black Snake becomes more common further north in New South Wales.

Other notes: Although the Red-bellied Black Snake has killed people, it's venom is not as potent as most Australians seem to think. Average venom yields kill about five hundred laboratory mice, (compared to 23,529 for a Taipan (*Oxyuranus scutella-*

tus), 833 for Copperhead (*Austrelaps superb*), 5,832 for a Tiger Snake (*Notechis scutatus*), or 2,285 for a Death Adder (*Acranthophis antarcticus*) (Worrell, 1972). This snake is not however a pleasant one to be bitten by. Typical bite symptoms are severe local pain and swelling, nausea and general sickness. The Red-bellied Black Snake is however very inoffensive and rarely bites, even if trodden on. (On one occasion I stood on a 1.2 m. specimen at Gove's Leap, NSW, and the snake tried to squirm away from me, without attempting to bite my foot).

When agitated and cornered, this snake may flatten it's neck and raise it's head in a Cobra *Naja*-like fashion. This snake is diurnal, even in warm weather, when it restricts it's activity to early mornings and dusk. Most specimens are caught in the vicinity of water, which it may frequently enter in search of food, or to hide from potential predators. Roberts (1983), documents a case where a Red-bellied Black Snake hid from a potential predator in a cool creek. The 'specific heat' of the water ensured that the snake's body temperature dropped rapidly when it entered the water. This enabled the snake's metabolic rate to slow sufficiently to allow it's breathing rate to slow down enough to let the snake remain totally submerged for extended periods.

When searching for food, this species won't hesitate to climb small trees and shrubs. Diet is varied, but frogs tend to dominate, meaning that Cane Toads are exterminating this snake in northern areas (Qld and NSW). Worrell (1970), plate 59, shows a Red-bellied Black snake consuming an eel head first. I once had a 1.3 m. captive male specimen attempt to consume a 1 m. male

Keelback *Amphiesma mairii*, who shared the same cage. The Black Snake was unable to completely swallow the Keelback, and after a period, the now dead Keelback was regurgitated.

Also on plate 59, Worrell (1970), is a photo of two male Red-bellied Black Snakes fighting. The snakes engage in these spectacular 'wrestling' displays in spring, by biting one another and twineing their bodies around each another. Rarely do the opponents hurt one another. When fighting one another the snakes become oblivious to all that may go on around them, and they may make a substantial amount of noise as they crash over dry leaves. Springtime breeding aggregations of this species do occur. At late afternoon on a mild and clear sunny day, during October 1976, when driving along a bitumen road near Macquarie Marshes, NSW, I found a pair of Red-bellied Black Snakes copulating in the middle of the road. As I approached them on foot, after alighting from the car, the two snakes broke off and fled. The two snakes measured about 1.5 m. each and the ambient air temperature at the time was about 20 degrees celcius. In summer from eight to thirty live young are produced in membranous sacs, from which they emerge minutes after birth. Newborns measure about 18 cm. Captive specimens are easy to maintain, being voracious feeders and resistant to most ailments.

EASTERN BROWN SNAKE, *Pseudonaja textilis*
(Dumeril, Bibron and Dumeril, 1854)

Colouration: Typically brown dorsally, but may range from near white, through various shades of brown to jet black. Some Black specimens result from a specific allele (type of gene), and black and non-black specimens may result from a single clutch of eggs. Juveniles from Melbourne and nearby areas have black bands on the head which fade with age (Usually within three years). Coastal NSW specimens are banded as juveniles. In some areas banded and non-banded juveniles occur, and both forms are known to have emerged from a single clutch of eggs. Obviously one variant gene is dominant over the other. However which one is dominant, hasn't been ascertained yet.

Average Adult Maximum Length: 1.5 metre.

Length of Longest Recorded Specimens (approx. estimate): 2.4 m. Basic scalation: Smooth with 17 mid body rows, 185-235 ventrals, divided anal, and 45-75 divided subcaudals.

Distribution: Found throughout the eastern half of Australia, its distribution becoming patchier as one moves westwards. To date only one specimen has been recorded from Western Australia. That specimen was caught in the South-east Kimberley, at Gordon Downs (Storr, Smith and Johnstone, 1986). Found in all areas around Melbourne, and very common everywhere except for the wetter parts of the Dandenong Ranges.

Other notes: Brown Snake venom is extremely toxic, but fortunately this snake has a relatively poorly developed biting apparatus (small fangs and venom glands). However this snake can be easily agitated, is fast moving and must be regarded as highly dan-

gerous. When aroused, the Brown Snake will hold its neck high, slightly flattened in an S-shape, and strike at it's aggressor at every opportunity. It will even chase off a person who has aroused it. This diurnal snake is found in all types of habitat, but is most common in open grassy habitats and open woodlands. It is active at relatively high temperatures, compared to other snakes.

Large numbers are found in agricultural areas. When resting Brown Snakes are commonly found under man made rubbish such as sheets of metal.

The varied diet includes introduced pest rodents. As well as relying on it's venom to kill it's prey the Brown Snake constricts and holds it's prey while it is repeatedly biting it. The coils are wrapped around the prey as soon as it bites at it. A typical Brown Snake feeding sequence is documented on page 187 of Hoser (1989a). The feeding of this snake is very rapid, with the mouse eating sequence shown by Hoser (1989a) taking only about 60 seconds. After biting it's prey towards the rear of it's body, and it dying almost immediately, the Brown Snake released it's prey and then proceeded to eat it head first, (a typical feeding pattern). Large winter aggregations are known, with Gary Webb, finding one consisting of thirty individuals in Sydney's outer western suburbs. These aggregations are maintained in spring for mating purposes.

Please, change the captions of the photographs 5 and 3 and 6 and 4 on the next 2 pages.



Foto 5: Melanistic *Pseudonaja textilis*.
Green Valley (NSW). Foto R.T. Hoser.



Foto 6: *Pseudonaja textilis*, juvenile, let op kop-
tekening, note the head markings. Foto R.T. Hoser.



Foto 3: *Pseudechis porphyriacus*, roodbuik zwarte slang, red-bellied black snake. Seaforth (NSW). Foto R.T. Hoser.



Foto 4: *Pseudonaja textilis*, oosterlijke bruine slang, eastern brown snake. Cobar (NSW). Foto R.T. Hoser.

Males, which also tend to be the larger sex, engage in combat. The ten to thirty eggs produced in early summer hatch about eighty days later. Hatchlings measure about 27 cm.

LITTLE WHIP SNAKE, *Unechis flagellum*
(McCoy, 1878)

Colouration: See photo. Little variation known.

Average adult maximum length: 40 cm.

Length of longest recorded specimens (approx. estimate): 65 cm.

Basic scalation: Smooth, with 17 (or rarely 15) mid body rows, 125-150 ventrals, single anal, 20-40 single subcaudals.

Distribution: South-eastern New South Wales, most of Victoria and far south-east South Australia, (Gow, 1989b). A near identical species, *Unechis spectabilis* is found in adjoining areas of Victoria, New South Wales (most of that state), southern South Australia and southern inland Queensland. Around Melbourne, the Little Whip Snake (*Unechis flagellum*) is most common in rocky localities to the north and west of the city, particularly on and adjacent to the basalt plains, (James, 1979; Fyfe and Booth, 1984).

Other notes: The relationship between the Little Whip Snake *Unechis flagellum* and *Unechis spectabilis* is uncertain. They may turn out to be races of the same species (sub-species) rather than differing species.

Unechis spectabilis typically has 15 mid body rows, whereas the Little Whip Snake usually has 17 mid body rows. I have inspected a number of specimens of both snake types, and on external inspection have no-

ticed little difference. Certainly their biological habits don't appear to differ either. If they turn out to be the same species, then the name used will be *Unechis flagellum*, as it was described first. The Little Whip Snake *Unechis flagellum* was the only type of snake to be originally described from Melbourne. Like a number of other *Unechis* sp. that possess black markings on their head, the Little Whip Snake *Unechis flagellum*, is often mistaken for juvenile Brown Snakes *Pseudonaja* spp. (Some *Pygopodids* also have these types of markings on their head). Believed to be nocturnal, most specimens are caught during the day hiding under cover, or in loose soil under cover. Not a very fast moving species; when discovered it adopts a defensive pose, then moves off seeking cover (Rawlinson, 1965). Turner (1984), describes three distinct categories of defence mode employed by this species.

1: The snake will attempt to frighten off the aggressor. It raises the forepart of it's body, expands it's head and neck, and thrashes it's body about in a whip-like fashion (hence the name *flagellum*). The snake may also hiss in a low but audible sound, increasing in volume when the snake moves. Lunging forward in an apparant attempt to strike is usually bluff.

2: Usually triggered by handling, this snake will emit an 'ant-like' odour from the anus (Rawlinson, 1965; Turner, 1984). The smell may be in the form of a milky liquid, or as a penetrating gas. Both are effective and rely on the sensitivity of the predator's olfactory senses. Defecation may also occur in these circumstances, and this second method of defence is often used in conjunction with the third.

3: Tight coiling, twisting or knotting of

the body is a posture assumed when *Unechis flagellum* is prodded or overturned. The ribs are expanded to assist in attaining a rigid pose and the snake superficially resembles a shallow cone (Bartell and Jenkins, 1980). The head may or may not be hidden, but by my experiences is more likely to be concealed. The snake remains motionless when in this position, feigning death, probably to appear non-edible, and minimise the risk of being eaten by a predator.

Some individuals of this species consistently utilise the same defence method while others will make use of any of the three methods on different occasions (Turner, 1984). Fyfe and Booth (1984), note that females are more likely to bite a captor than a male, although both sexes may do so.

Like some other types of elapid, there is a readily observable sexual dimorphism which may be observed, in terms of size and shape of the tail. Females have an evenly tapering tail with 20 to 29 subcaudal scales, while males have a bulging tail with 29 to 40 subcaudal scales, (Rawlinson, 1965). This dimorphism is even apparant in newborns, where males have tails 50 per cent longer than females.

The most detailed captive breeding records on this species have apparently been made by Turner, of Bundoora, Vic, although Fyfe and Booth have also kept very detailed records of captive breeding.

The breeding activity of Turner's Little Whip Snakes, was not necessarily in line with wild specimens as he apparantly manipulated cage temperatures and photoperiods, not strictly in line with outside (natural) variations. Mating in long term captives

was consistently recorded in October, and young were born in February (Turner, 1985). Fyfe and Booth (1984) had a captive mating in May with young born in September. Connection in mating was estimated to have lasted between four and six hours, (as observed - Turner, 1985); in excess of one hour with pre-copulation and breaking not observed (Fyfe and Booth, 1984).

Turner recorded two females giving birth to young 151, and 148 days after mating/copulation was observed. Fyfe (1980), reported a 108 day gestation period for a single specimen of this species, and Fyfe and Booth (1984), reported a 121 day gestation period for another specimen.

Turner (1985) attributed the time difference in gestation to temperature factors affecting the females, however I suspect that whilst temperature factors no doubt played an important role, the possibility of unrecorded matings by either Fyfe, Booth, or Turner could explain the huge variation in reported gestation period.

Turner (1985), noted that prior to giving birth the females had a distinct affinity for warmth, basking during daylight hours directly under the heat source. This behaviour continued throughout gestation, ending abruptly with the birth of the young. Feeding by females during gestation, whilst it may occur, is minimal.

Fyfe and Booth (1984), Turner, (pers. comm.), report never finding a wild specimen in the open during daylight hours in spite of their collection of a large number of specimens.

Typically 2-4 live young are produced (Fyfe and Booth, 1984), although Turner (1987) records at least one case of a fe-

male giving birth to six young. Newborns at birth measure between 12 and 14 cm in total length, 10.6-12.5 cm snout-vent (Turner, 1985). Fyfe and Booth (1984), record mating in the wild for this species as occurring in Autumn and Winter (as based on location of aggregations of mated pairs and later birth of young), and newborns were found from July to early November. An aggregation of seven specimens was found under a single large flat rock, on 12th September 1980 (Fyfe and Booth, 1984). It consisted of four newborns, a thin 'hollow' female (obviously the parent of the young), a heavy still gravid female, and a large adult male. Interestingly, during winter months, it was usual to this species in groups of two or more snakes, (average three), with both sexes usually present (Fyfe and Booth, 1984). These snakes were either found under the same rock or under nearby rocks (within 3 m). I found similar aggregations in *Unechis monachus* near Dubbo, NSW, in early september 1986. On sunny days the Little Whip Snakes found under cover weren't torpid, in fact they were quite active, so Fyfe and Booth (1984), concluded that these snakes actively mate under cover during daylight hours. The small groups of these snakes found in the wild, were maintained all year, (average of two specimens in summer). This 'pairing' behaviour probably acts to minimise the risk of snakes being ambushed by predators when in the open looking for a mate. Captive and wild specimens forage about as soon as night falls. This is in line with most other small nocturnal elapids including Small Eyed Snake *Cryptophis nigrescens* and Golden-crowned Snake *Cacophis squamulosus*.

The only record that I could find of this

species being caught at night was, Fyfe and Booth (1984), who caught four specimens at night in mid March, on a 'typical good snake night', (that included seasonally warm air temperature, falling air pressure, no moon).

Diet consists almost exclusively of skinks, (Shine, pers. comm.), including species of *Lampropholis*, *Leiolopisma*, *Hemiergis*, *Ctenotus*, *Morethia*, and *Lerista*, but in exceptional (captive) circumstances has been known to include frogs (Gow, 1976), new born mouse (Fyfe and Booth, 1984), and even a member of it's own species (Turner, 1987).

Cannibalism in wild specimens of this species is probably unknown, and definitely not a normal occurrence (Fyfe and Booth, 1984). Turner (1987), reported an unusual

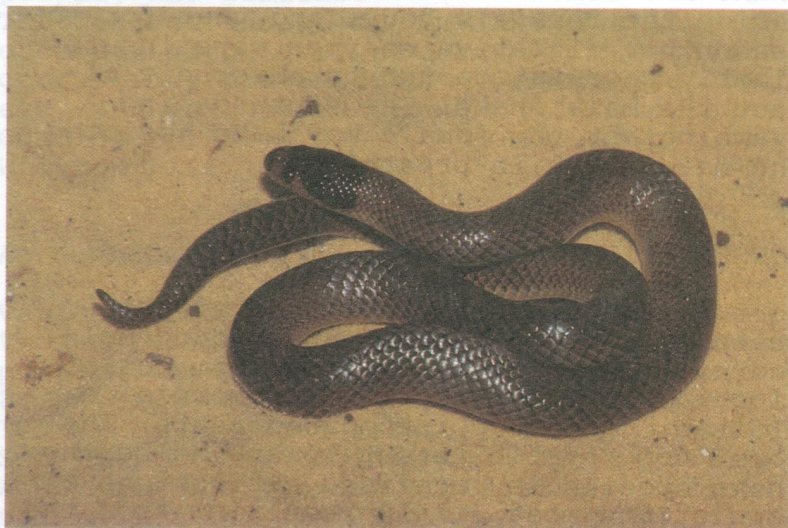


Foto 7: *Unechis flagellum*, kleine zweepslang, little whip snake. Whittlesea (Vict). Foto R.T. Hoser

case of cannibalism in this species. In March, 1983, after giving birth to six young, a captive female consumed, head first, a male cage mate some 8 cm shorter. The female was no doubt very hungry after her long gestation, during which feeding had been minimal. For the following fifty plus hours that the female had the male snake inside her, the cage temperature was maintained at 27-32 degrees to aid digestion. The female was observed to wriggle her body apparently involuntarily, and also to yawn for several minutes at a time. Three days later the male snake was regurgitated and still alive. Apart from superficial and minor damage to some scales, the snake was still in good health, (unharmd). This is the first such case known to Turner (pers. comm), myself and others of a snake managing to survive such an ordeal. Typically regurgitated snakes are dead. It was assumed that the male snake had somehow been able to breath when inside the female's body, and that for some reason her digestive enzymes were insufficiently powerful enough to adversely affect the male snake. The mouth gaping (yawning) by the female may have assisted the male snake in breathing.

CONSERVATION.

Fortunately at this stage none of the seven species of snake found around Melbourne are seriously at risk from collecting, habitat destruction, commercial exploitation or from introduced pests. The worst conceivable threat to any Melbourne snake species is localised extinctions of populations most likely resulting from the spread of Melbourne's urban sprawl.

The Victorian wildlife authorities have enacted so-called protective legislation that effectively prevents most people from being able to legally keep specimens for any reason. People are still apparently allowed to kill snakes on sight should they so desire. The 'prohibition' on keeping the seven Melbourne snakes is counterproductive to the herpetological cause, as it discourages 'new' people from taking an interest in our native wildlife. The administering of licences, central registers and similar, for most snake keepers in Victoria, represents a gross mis-direction of our 'conservation dollar', with the money being better spent elsewhere. It can be argued that the money spent by the Victorian wildlife authorities in relation to 'policing' herpetologists, should be re-directed to allow further herpetological research, in the form of grants (hand outs of money to the relevant people) and similar. The general thrust of the conservation argument, also involves removing government corruption, mis-information including lies, etc, and is covered elsewhere, including Cumming, (1981); Hoser, (1988, 1989b); Whitton (1987).

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