

## SYDNEY'S SNAKES, PART I

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### ABOUT SYDNEY

Sydney is Australia's oldest and largest city. It is the state capital of New South Wales, the most populous state in the country. It has a population of between 3.5 and 4.5 million people, the exact number depending on which outer suburbs and nearby satellite cities are included in the count. At the time of writing, 1990, the population of Sydney is increasing by about 80-100 thousand people a year as a result of natural increase and immigration elsewhere (mainly other countries).

Sydney is about 900 km (by road) to the north-north east of Melbourne, Australia's second largest city, with a population of about 600,000 less than Sydney's. A paper on Melbourne's snakes was published in two parts in this journal (Vol. 10 (2), Vol. 10 (3), 1990). The snakes covered in that paper are included in this paper, with the exception of one species, the Little-whip snake *Unechis flagellum*, which is not included due to the fact that it is not found anywhere close to Sydney. The descriptions of species of snake in this paper also include distribution information strictly relevant to the Sydney district as well as other 'locally' relevant material as necessary. The two species of Worm or Blind Snakes known to occur within the Sydney region are described together due to their great similarity in appearance and known habits.

According to the 1982 YEAR BOOK AUSTRALIA, Sydney was on average 42 metres above sea level. The climate is by Australian standards relatively cool, and due to the coastal location of most of Sydney it is also very mild, being spared most of the extreme summer heat and mid-winter overnight cold experienced in many other parts of Australia.

Rainfall is by Australian standards high, averaging 1,215 mm annually, with a range between 2,196 and 585 mm. Although rainfall in Sydney is nearly double that of Melbourne's in terms of mm's, Sydney's rainfall tends to be heavier, in terms of amount of rain over a given period and hence Sydney enjoys an average of more daily sunshine than Melbourne also.

Rainfall occurs throughout the year with a bias towards more rainfall in the summer months. The year round average maximum temperature is 21.4°C, with an average minimum of 13.6°C. The highest maximum on record is 45.3°C (Sydney city), and the lowest is 2.1°C (city). It should be noted here that the 'western suburbs' which are further away from the moderating influences of the coast have recorded higher and lower temperature extremes, while the higher parts of the Blue Mountains (90-120 km west of the Sydney GPO) which exceed 1000 meters in elevation have recorded substantially colder extremes and are consistently cooler than other parts of the Sydney metropolitan area on a regular basis.

Sydney is located in the 'Sydney basin' which is flat in the centre and hilly around the edges. The basin is centred to the south of the Sydney GPO, somewhere to the south of Port Jackson, but north of Botany Bay. Hills to the north and south of the city exceed 300 meters, while



Foto 1: Three Sisters,  $\pm$  100 km west of Sydney in the Blue Mountains, Katoomba. Copperheads and White-lipped snakes are found here. Koperkoppen en witlip slangen komen hier voor; foto R.T. Hoser.



Foto 2: Kurringai Chase habitat, Terrey Hills,  $\pm$  25 km north of Sydney. The rocky sandstone habitat with crevices and exfoliations provides optimal habitat for many types of reptiles including snakes. Het rotsachtige zandsteen gebied met zijn spleten en geërodeerde rotsen vormt een optimaal biotoop voor veel reptielen soorten, inclusief slangen; foto R.T. Hoser.

ranges about 100 kms west of the city (the Blue Mountains), rise in a dissected plateau to over 1000 meters.

Virtually all of the Sydney area is based on sandstone rock formation, although some shales and clays are also found in pockets in sandstone areas. At the centre of the Sydney basin and on the Cumberland plain which occupies most of the (now settled) western suburbs, clays and shales predominate (see photo 1). The Pacific Ocean to the east of the city and the Blue Mountains to the west of the city major climate influencing factors. Rainfall is highest in the coastal suburbs, particularly the upper 'north shore' area, decreasing westwards, so that in outer western suburbs such as Liverpool, the average annual rainfall is approximately half that of the coastal suburbs. Rainfall increases again as one journeys into the higher elevations of the Blue Mountains.

Sandstone areas not urbanised tend to remain as natural bushland, with relatively invasion by introduced grasses and other weeds. Much of this natural area is included in National Parks, such as Kurrungai Chase, and Brisbane Water to the north, Wollemi to the north-west, Blue Mountains to the west, Royal and Heathcote to the south, along with a number of smaller reserves and parks. The soils in these areas are well drained and sandy and characterised by large amounts of sandstone rock outcrops which provide optimal cover and habitat for most reptile species (see photo 2).

The clay and shale based habitats, particularly those of the Cumberland plain are relatively depauperate in reptile species, even in areas where the habitat is relatively undisturbed (these areas are now rare).

Due to the fact that the Sydney area acts as a convergence of subtropical and more temperate zones, the reptile fauna is relatively rich. The sandstone habitat also seems to enhance the potential richness of reptile species diversity found within the area.

Some 21 species of snake are covered in this paper, as species known to occur within 80 kms of the Sydney GPO. If one were to extend this coverage to within 100 kms of the GPO another species would be added. In this paper descriptive information about each snake species is not as detailed as in the paper 'Melbourne's Snakes'. References are not cited in the text, although a bibliography is given at the end of this paper. Some of the material cited at the end of this paper was also cited in the paper 'Melbourne's Snakes'.

## IDENTIFICATION OF SYDNEY'S SNAKES

Sydney's snakes can be identified by many means. One familiar with snakes can usually identify a given species at a glance. Characteristics used for identification include colour, morphology and scalation. Snake's colouration varies greatly, so the latter two characteristics are more commonly used for positive identification. Colour and morphology are easily explained to most people. For those not familiar to basic snake scalation patterns an outline is given.

Snakes have characteristic scale arrangements, such as ventral or belly scales, etc. Different species have different characteristic scale counts and arrangements, particularly on the head, although bodily scale counts are more widely used for identification purposes. Bodily scale counts most commonly used are; mid-body rows, or rows scales around the middle of the snake's body, ventrals or scales on the belly prior to the anal plate, and subcaudals or belly/tail scales past the anal plate and their condition.

When counting mid-body rows, the ventrals are excluded from the count, (the number should always be odd). When counting the ventrals the anal plate is excluded from the count. When counting subcaudals divided ones are counted as one paired or divided subcaudal.

THE SNAKES OF SYDNEY

Of the roughly 140 species of snake known to occur in Australia about one seventh are found in the Sydney region (within 80 kms of the city centre, within the Sydney sandstone basin).

The snakes of the Sydney region belong to the following five groups or families; The blind snakes (Family *Typhlopidae*), 2 species; Pythons (*Boidae*), 1 species; Colubrid snakes (*Colubridae*), 2 species; Elapid snakes (*Elapidae*), 15 species; Sea snakes (*Hydrophiidae*), 1 species.

Blind or worm snakes (*Typhlopidae*), as they are commonly called are wormlike, harmless snakes. Except on nights (usually) above 18°C they spend most of their life underground. They are Australia's only insectivorous snakes.

Pythons (*Boidae*) are thickset non-venomous snakes which kill their prey by constriction. They have distinct heads and necks and include the worlds largest serpent.

Colubrid snakes (*Colubridae*), are the dominant family of snakes in all parts of the world except Australia. They comprise fangless and rear fanged tree snakes in Sydney. No Australian colubrid is dangerous.

The Elapid or front fanged venomous land snakes (*Elapidae*) are the dominant group of snakes in Australia. All are venomous and some species are deadly. This family has the deadliest snakes on earth and a worldwide distribution. Its' members include the Death Adder, Taipan, Tiger Snake, Mamba and Cobra.

The sea snakes (*Hydrophiidae*) are a marine group with keel shaped bellies and oar shaped tails, well adapted for swimming. They are all allied to the elapids. All are venomous. These snakes are usually found on land when cast up in storms or sick. They find movement on land difficult, but can still bite an aggressor.

Two types of legless lizard (Family *Pygopodidae*), are found in the Sydney region. Both the Scalyfoot *Pygopus lepidopodus* and the Burton's Legless Lizard *Lialis burtonis* are abundant and are commonly mistaken for snakes. They may be distinguished by their external ears, thick fleshy tongues and long tails which may be separated from the body. Tail autotomy (shedding) is practised by both species.

KEY TO THE SNAKES OF THE SYDNEY REGION

This key enables rapid identification of all of Sydney's snakes, and legless lizards. The latter were included so as to avoid any misidentification that might arise by their omission. This key will only apply to snakes from the Sydney region (within 80 kms of the City centre), and will not work if applied to Australian snakes from other areas.

KEY TO IDENTIFICATION OF SYDNEY'S SNAKES (AND LEGLESS LIZARDS)

- 1A. Tongue not forked, external ear openings present ..... (Family *Pygopodidae*, legless lizards) 2
- 1B. Tongue forked, no external ear openings ..... 3
- 2A. Highly distinctive pointed snout, head covered with small irregular shields ..... *Lialis burtonis*, Burton's legless lizard
- 2B. Head covered with ordered shields ..... *Pygopus lepidopodus*, Common Scalyfoot
- 3A. Eyes present as black spots only .... (Family *Typhlopidae*, Worm or Blind snakes) 4
- 3B. Eyes well developed ..... 5



Foto 3: *Typhlina nigrescens* (Gray, 1854), blind snake, blinde slang, Cottage Point, NSW; foto R.T. Hoser.



Foto 4: *Typhlina proximus* (Waite, 1893), blind snake, blinde slang, Terrey Hills, NSW; foto R.T. Hoser.



Foto 5: *Morelia spilotes* (Lacepede, 1804), diamond python, 18 month old male, 18 maanden oude man, Kenthurst, NSW; foto R.T. Hoser.



Foto 6: *Boiga irregularis* (Merrem, 1802), brown tree snake, + 1.2 m, bruine boomslang, West Head NSW; foto R.T. Hoser.

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- 4A. 20 Mid body rows ..... *Typhlina proximus*, Worm snake  
 4B. 22 Mid body rows ..... *Typhlina nigrescens*, Worm snake
- 5A. Tail more or less cylindrical, not flattened and paddle shaped ..... 6  
 5B. Tail strongly vertically compressed and paddle shaped .....  
 ..... (Family *Hydrophidae*, Sea snakes), *Pelamis platurus*, Yellow-bellied sea snake
- 6A. Fewer than 30 mid body rows ..... 7  
 6B. More than 30 midbody rows ..... (Family *Boidae*), *Morelia spilota*, Diamond python
- 7A. One or more loreal scales present, or if absent, 23 or more mid body scale rows and a divided anal plate ..... (Family *Colubridae*, harmless or back fanged snakes) 8  
 7B. No loreal scales, anal single if mid body scales in 23 or more rows .....  
 ..... (Family *Elapidae*, front fanged venomous land snakes) 9
- 8A. Ventrals fewer than 225 and 13 midbody scale rows .....  
 ..... *Dendrelaphis punctulatus*, Green tree snake  
 8B. Ventrals more than 225 and 19 to 23 mid body scale rows .....  
 ..... *Boiga irregularis*, Brown tree snake
- 9A. No suboculars; no specialised curved soft spine on tip of tail ..... 10  
 9B. Suboculars; has a curved, soft spine on the tip of the tail .....  
 ..... *Acanthophis antarcticus*, Death adder
- 10A. All subcaudals normally undivided ..... 11  
 10B. At least some subcaudals divided ..... 17
- 11A. Anal normally single ..... 12  
 11B. Anal normally divided ..... *Hemiaspis signata*, Swamp or Marsh snake
- 12A. Frontal shield longer than broad; where frontal is only slightly longer than broad, lower anterior temporal shield is shorter than frontal ..... 13  
 12B. Frontal shield not or scarcely longer than broad; lower anterior temporal about as long or longer than frontal ..... *Notechis scutatus*, Eastern tiger snake
- 13A. Scales in 15-21 mid body rows, ventrals not keeled or notched; if 19 or more, ventrals fewer than 190 ..... 14  
 13B. Scales in 19-21 mid body rows; ventrals keeled or notched and over 190 .....  
 ..... (Genus *Hoplocephalus*) 23
- 14A. Frontal less than one and a half times as broad as the supraocular .....  
 ..... *Cryptophis nigrescens*, Small-eyed snake  
 14B. Frontal more than one and a half times as broad as the supraocular ..... 15
- 15A. Lateral scales adjoining ventrals not noticeably enlarged .....  
 ..... (Genus *Drysdalia*) 16  
 15B. Lateral scales adjoining ventrals noticeably enlarged .....  
 ..... *Austrelaps ramsayi*, Highland copperhead

- 16A. No band across the nape . . . . . *Drysdalia coronoides*, **White-lipped snake**  
 16B. A pale yellowish band across the nape . . . . .  
 . . . . . *Drysdalia rhodogaster*, **Eastern masters snake**
- 17A. Usually all subcaudals divided . . . . . 18  
 17B. Usually some anterior subcaudals single, remainder divided . . . . .  
 . . . . . *Pseudechis porphyriacus*, **Red-bellied black snake**
- 18A. Subcaudals 35 or more . . . . . 19  
 18B. Subcaudals fewer than 35 . . . . . 22
- 19A. Nasal and preocular scales in contact . . . . . 20  
 19B. Nasal and preocular scales widely separated . . . . . *Furina diadema*, **Red-naped snake**
- 20A. 15 Mid body rows . . . . . 21  
 20B. 17 or more mid body rows . . . . . *Pseudonaja textilis*, **Eastern brown snake**
- 21A. Diameter of eye markedly greater than its distance from the mouth . . . . .  
 . . . . . *Demansia psammophis*, **Yellow-faced whip snake**  
 21B. Diameter of eye about equal to or less than its distance from the mouth . . . . .  
 . . . . . (Genus *Cacophis*) 25
- 22A. Colour pattern not consisting of alternate black and white bands . . . . .  
 . . . . . (Genus *Cacophis*) 25  
 22B. Colour pattern consisting of alternate black and white bands from head to tail . . . . .  
 . . . . . *Vermicella annulata*, **Bandy Bandy**
- 23A. Body spotted or banded . . . . . 24  
 23B. Body without spots or bands . . . . . *Hoplocephalus bitorquatus*, **Pale-headed snake**
- 24A. Body banded with yellow and black, the yellow usually two or more scales in width; black bands often extending to sides of ventral scales . . . . .  
 . . . . . *Hoplocephalus stephensi*, **Stephen's banded snake**  
 24B. Body black with numerous scattered yellow or white scales; the latter often form irregular crossbands which rarely exceed one scale in width; sides of ventral scales are yellow or white . . . . . *Hoplocephalus bungaroides*, **Broad-headed snake**
- 25A. A complete white, cream or yellow head band, belly not reddish . . . . .  
 . . . . . *Cacophis krefftii*, **Krefft's dwarf snake**  
 25B. Paler golden lateral head marking not forming a complete head band; reddish belly . . . . .  
 . . . . . *Cacophis squamulosus*, **Golden-crowned snake**

NOTES ON DESCRIPTIONS OF SYDNEY'S SNAKES

All snake species known to occur within an 80 km straight line radius of Sydney City, and the adjoining sandstone basin have been included. Along with each description, photographs of typical representatives from the Sydney district have been included to aid identification. All lengths of snakes quoted are total lengths; that is snout-vent length plus tail length.

Excluding the worm snakes, the families of snakes and their species have been described in alphabetical order (of scientific names). The family *Elapidae* has been split into two parts;



the innocuous and the deadly. The innocuous snakes have been placed first. The last six species of snakes described are Sydney's only deadly species, namely the Death adder (*Acanthophis antarcticus*), Copperhead (*Austrelaps superbus*), Tiger snake (*Notechis scutatus*), Red-bellied black snake (*Pseudechis porphyriacus*), Eastern brown snake (*Pseudonaja textilis*) and the Yellow-bellied sea snake (*Pelamis platurus*).

## TYPHLOPIDAE

Blind or Worm snakes, *Typhlina nigrescens* (Gray, 1845), and *Typhlina proximus* (Waite, 1893). Photos 3 and 4.

### Description

Their eyes are reduced to small dark spots under the scales of the head, which act as light sensors only. The small curved mouth is well behind the snout tip making it shark like. The cylindrical body of uniform thickness has a short tail which terminates in a downward pointing spine. Worm snakes have smooth pink to brown shiny scales which are similar in size around the body (i.e. there are no broad belly shields). They may occasionally exceed 60 cm in length.

### Distribution.

Worm snakes (both species) are commonly found in all parts of Sydney including the inner north shore and eastern suburbs.



Foto 7: *Dendrelaphis punctulatus* (Gray, 1826), green tree snake, groene boomslang, St. Ives, NSW; foto R.T. Hoser.

### General

Worm snakes are non-venomous and occur in all habitats. The diet of worm snakes is believed to be ants and termites. They have been recorded as eating large bull ants. When freshly caught they emit a strong and objectionable smell from well developed anal glands. They often tie themselves into tight knots. Worm snakes are nocturnally active burrowers, and are usually only found on the ground surface in warm or wet weather, especially after rain. Most worm snakes are found during the day when dug from the ground or uncovered by moving rocks and logs. Winter hibernation aggregations and more commonly summer breeding aggregations are known to occur. The largest recorded to date was a summer aggregation found in St.-Ives consisting of about thirty five specimens under one rock. Worm snakes are oviparous (egg laying), producing about 4 to 5 eggs in late summer.

### BOIDAE

Diamond python, *Morelia spilota* (Lacépède, 1804). Photo 5.

### Description

The heavily built Diamond python is the coastal New South Wales variation of the widespread carpet python, being the nominate subspecies. It has a large head, distinct from the relatively thin neck and thick set body. It is typically glossy olive black above, with cream or yellow spots on many of the individual scales, forming the characteristic series of diamond shaped patterns. The lips are cream barred with black. The ventral surface is cream to yellow, becoming increasingly variegated with dark grey towards the posterior end of the body. The scalation is smooth, with 45-51 mid body rows, 251-304 ventrals, 63-92 paired subcaudals and the anal may be either single or divided. The snake may exceed 3 m in length, but 2 m is usually the maximum length attained. Diamond pythons are easily the largest snake species in the Sydney area.

### Distribution

Diamond pythons are frequently found in all outer suburbs of Sydney, being most common in hilly and rocky areas. General: Diamond pythons are active at day or night and when not active may be found concealed in hollow tree limbs, rock crevices, beneath large rocks or simply amongst vegetation. Food of Diamond pythons is mainly warm blooded in the form of rodents and birds, and for this reason many farmers introduce them into grain warehouses to control vermin. Smaller specimens have a greater tendency to eat cold blooded food. Breeding and hibernation aggregations of this species occur. An unusual aspect of this species is the much greater proportion of males to females that seem to be caught. No reason for this has yet been found.

Mating usually occurs in early spring with eggs being laid around December, although this species has been known to lay eggs at all times of year. The average clutch size is 15 en when laid the female coils herself around the eggs to protect them from predators and incubate them. By rapid muscular contractions female Diamond pythons may become endothermic (warm blooded) (to some degree).

The incubation period is usually about three months and hatchlings usually measure about 30 cm in length. Young Diamond pythons tend to be considerably brighter in colour than older specimens. With the possible exception of some juveniles, most Diamond pythons have a docile temperament, even if freshly caught.

Recent radio-telemetry work on these species by Drs. Shine and Slip (see bibliography), has revealed much detail about the biology of the species. It is considerably more arboreal and

tree-dwelling than had been previously thought. Many specimens were found to shelter in excess of 6 m in well concealed tree hollows and other well hidden places in trees.

Unlike some other pythons, which may be accurately sexed by the relative size of the pelvic spurs, there appears to be little difference in the actual size of the pelvic spurs in either sex of this snake, with individual variation being great enough to overlap any possible average sexual difference. Probing these snakes in order to determine sex is also apparently more difficult than for most other snakes. Snakes sexed as males by experienced snake probers are later discovered to be female, although there still appears to be substantially more males in captivity than females after allowing for the sexing errors indicated.

## COLUBRIDAE

Brown tree snake, *Boiga irregularis* (Merrem, 1802). Photo 6.

### Description

This thin snake is brown to bright reddish brown dorsally with numerous irregular indistinct dark crossbands. The ventral surface is a salmon colour (in the Sydney area). Brown tree snakes have a large distinct head, followed by a long thin tapering body and tail. The scales are smooth with 19 mid body rows, 236-259 ventrals, 87-104 paired subcaudals and a single anal. This snake averages 1.5 m when fully grown, but may exceed 2 m.

### Distribution

This species is by far most common in the sandstone country to the north and north west of Sydney. It does not occur in large southern areas such as the Cumberland plain and Royal National Park. It is not common in the Blue Mountains.

### General

This wholly nocturnal snake is a climbing species which lives either in trees, or more commonly in the Sydney region is associated with rock outcrops. During the day this species is usually found in rock crevices or the honeycomb formations in sandstone caves, in the ceilings. Studies show that these snakes move away from their day-time retreats to seek food from the adjacent bushland at night. The diet of this species is varied and includes frogs, small lizards, mammals and birds. Although Brown tree snakes are rear fanged and venomous, they are considered no threat to humans, due to the weakness of their venom. In killing its prey this species relies more upon constriction of its prey than the effects of its venom. This snake is aggressive when caught and throws the forepart of its body into a series of S-shaped curves from which it strikes with mouth agape.

This snake mates in winter and spring and minor breeding aggregations are found during these months. Eggs are produced in early summer with roughly 10-12 per clutch. These take roughly three months to hatch and the young measure between 25 and 30 cm in length at birth.

The snakes from the Indonesian archipelago known as *Boiga fusca* are sometimes treated as being of the same species being essentially similar in most respects but often obtain a larger adult size. Captive adults are easily maintained on a diet of mice.

Green tree snake, *Dendrelaphis punctulatus* (Gray, 1826). Photo 7.

### Description

This slender harmless snake has a head which is slightly distinct from the neck and a long whiplike tail. Dorsally the colour is green, with yellow or blue spots between the scales, which are only occasionally visible. Ventrally the snake is yellow. The scalation is smooth with 13 mid

body rows, 180-220 ventrals, 90-139 paired subcaudals, and a divided anal. This snake averages 1.5 m in length but may exceed 2m.

#### Distribution

Green tree snakes are found throughout the Sydney area being most prevalent in hilly, rocky areas.

#### General

This diurnal (day active) species is largely arboreal in habits. In rocky areas this species is commonly found in rock crevices and under rocks, particularly in winter. This snake commonly aggregates, with a number of specimens occupying the same site.

The diet of this species consists of all suitably sized vertebrates, though frogs are mostly eaten. This dietary preference leads to the presence of unsightly external skin worms (a type of tape worm) on many specimens. These worms have no adverse effects on the snake.

Though non-venomous this species is often nervous by nature and will frequently bite when freshly caught. The small needle-like teeth usually draw blood, though little pain. When preparing to bite this snake will often dilate neck and body and hiss loudly. Green tree snakes carry a stronger scent or odour than most other snakes.

Mating occurs in early spring and between 3 and 12 eggs are produced around december. The eggs usually take about 12 weeks to hatch and the young measure roughly 20 cm in length upon hatching.