

# Walking with snakes

**Steve Davidson** treads carefully through the latest intelligence on brown snakes, and how to avoid them.

**I**n most regions of Australia, snakes are the only vertebrate animals that are dangerous to humans and our continent is the only one in which most of the snake species are venomous. This may account for our generally strong, sometimes paranoid, aversion to them.

Most peoples' interest in snakes, especially in rural areas, is limited to the

question of how to avoid them. Advice on this is freely available in any country pub, but it may not be very reliable, sober or polite.

However, herpetologists at the University of Sydney have taken a more scientific approach to the subject of encounters between humans and snakes. Dr Pat Whitaker and Professor Rick Shine



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Although highly venomous, the brown snake is an elegant animal that has protected status throughout Australia.

point out that such encounters are potentially dangerous for both parties. Humans can suffer snake bite, while snakes, like other potentially dangerous animals worldwide, are often killed on sight, despite their protected status.

To help avoid risky confrontations with snakes, and to benefit snake conservation, the researchers set out to identify factors

influencing their behaviour. For three years, they regularly walked transects on a property near Leeton in New South Wales, mostly on an ungrazed canal bank covered with weeds, tussock grasses and some eucalypts, and on surrounding farmland. Along the way, they recorded both the number and rate of snake-human encounters, and the proportion of snakes,

## Snake safety

ARMED with their research results, Pat Whitaker and Rick Shine have come up with a number of recommendations for avoiding brown-snake bite.

- If venturing into snake country, walk slowly, wear dark shades of clothing, and don't wave your hands around at ground level. Although walking slowly means you are more likely to meet a snake up close, it is much less likely to take offence than if you rush towards it. Snakes are more likely to notice dark clothes and hence move away; it has nothing to do with a reptilian preference for sartorial elegance.
- On cool spring days, avoid undisturbed areas, for example uncultivated or ungrazed grassland or bushland on farms, which are good mating areas for snakes. Spring is the breeding season, and courting snakes are more likely to be preoccupied and so startled by a close approach. Furthermore, cool snakes are less likely to flee.
- Be cautious on very windy days, especially if it is also cool and cloudy, because you are less likely to be noticed by a snake and so more likely to take it by surprise. Closely encountered snakes are also more likely to remain stationary on a cloudy day and less likely to retreat.
- Avoid tall tussock grasses with small open areas in-between (often used as mating areas) and wear protective thick trousers and footwear when walking in vegetated areas, especially during drought when snakes tend to be more offensive.
- If possible, avoid walking in brown-snake habitat between late morning and mid-afternoon, especially during spring. More snakes are likely to advance in spring and the risk of brown-snake offence seems to be highest during the early afternoon.
- Beware the snake you do not see! Although people are more likely to notice a moving snake than a stationary one, most encounters are with stationary snakes. The snakes most often seen are those least likely to advance and are more likely to continue on their way than unseen immobile snakes. To be specific, the greatest risk is from a brown snake that does not retreat and that is approached suddenly and touched immediately, while not under cover, on a spring day.



Brown snakes encountered on open ground with little cover are more likely to act offensively.

## The only good snake . . .

NO DOUBT, humans kill many more snakes than vice versa, but Australia's venomous snakes have taken their toll over the years. Back in 1929, the Medical Journal of Australia reported that in the 17 years before 1926, more than 11 people a year, on average, died of snake bite. Since then, with snake antivenoms becoming available, the incidence of death from snake bite has fallen and subsequently remained fairly constant despite an increasing human population.

A more recent analysis, by Dr Struan Sutherland of CSL Limited, showed that 18 deaths due to snake bite were reported to CSL over the 10 years from 1981 to 1991. For comparison with the earlier rate, this is an average, over the decade, of less than two reported fatalities a year. Of the 18 fatalities, 11 were attributed to brown snakes: the venom, on occasion, causing rapid unexpected collapse and death, despite medical treatment.

The case histories make grim reading. In one case, a Queensland man mistook a large brown-snake for a harmless species and, when he picked it up, was bitten eight times on his hands. Despite medical attention, he was declared dead 48 hours after envenomation. Another man died after foolishly grabbing a swimming brown-snake from behind, in an act of bravado, in the Murray River.

The relatively low incidence of fatal snake bites since about 1980 – usually one or two deaths a year – is probably due to a combination of factors. In addition to the availability of snake antivenoms, improved first-aid measures, venom-detection kits, and better training for medical students and paramedics have improved the odds of survival for the snake bitten. Most bites, even from venomous species, are not fatal. Also, snake numbers seem to have declined in some areas due to urban expansion.

What about the reverse side of the coin? How many snakes do people kill? And why?

The Sydney University researchers found that causes of mortality in both brown snakes and black snakes in the Murrumbidgee Irrigation Area included attack by humans, feral cats, birds of prey, monitor lizards and larger snakes. Of 138 town and country people responding to a questionnaire, about half approached snakes they saw.

More than one-in-three said they had attacked the snakes and virtually all of these snakes were killed. Women were more likely to kill snakes than were men. Reasons given for slaughtering snakes included fear, hate, and concern for the safety of children or pets. Many respondents gave no reason. The view that 'the only good snake is a dead snake' is still commonly held.

It is ironic that people see snakes as aggressive considering how we and the snakes behave. Whereas just 0.38% of black and brown snakes that encountered people actually attacked, some 38% of people encountering a snake say they attacked it. On these figures, people are 100 times more likely to assault a snake than a snake a person! This is not good news for the snake fauna and puts the humans who attempt to kill a snake at serious risk of retaliation.

'If you see a snake, it is usually safer to stand still or to retreat than to move towards it or try and destroy it,' say the herpetologists. 'People overestimate the aggression of snakes because they don't even see the vast majority of snakes that simply freeze and hide when approached by a person. In fact, the low incidence of fatal snake bites in Australia suggests that, on the whole, our venomous snakes may be less willing to attack people than those elsewhere in the world.'

known to be 'out-and-about', that were visible. They also studied how the snakes responded to humans. Under what circumstances do they hide, attack or flee?

The study concentrated on the common or eastern brown snake which inhabits the eastern third of Australia (the most populated part). Studies with mice have shown it has the second most toxic venom, after the inland taipan, of all snake species so far tested worldwide.

Slender, fast, agile and reaching up to two metres in length, the brown has a reputation as an assertive snake that will defend itself if antagonised. It can strike at speeds of up to two metres per second. Anecdotal reports of unprovoked attacks by brown snakes are frequent, although mice, not humans, are their main prey in agricultural areas.

It is easy to interpret the vigorous lunging defensive behaviour of brown snakes as downright aggression and there is a thin line between this and full-blooded offensive behaviour. Certainly, brown snakes are responsible for most fatal snake bites that are reported.

### Elusive browns

After 510 hours of walking transects and analysis of hundreds of close (less than 5 m) encounters with brown-snakes, the researchers came to a number of conclusions. They were especially surprised to find that, despite their expertise in snake spotting and the great abundance of brown snakes, few were actually encountered. What's more, the experienced observers saw less than one in four of those snakes known to be active in the 10 m wide transects. (The snakes' movements were monitored via the telemetry signal from tiny radio transmitters implanted in some 40 adult snakes in the area.)

On most days, brown snakes stay in underground retreats and few of those above ground are seen because they either flee or lie low and rely on their cryptic colouration to escape detection. It is perhaps disconcerting to think that we can encounter snakes without even knowing it, but reassuring to hear that, contrary to their reputation, they are rarely aggressive.

Right: Humans are more aggressive towards snakes than snakes are to humans. Most brown snakes fled rather than attacked, even when prodded.

Indeed, about half the snakes encountered responded by retreating while most of the remainder remained stationary. Only 12 snakes (3%) moved towards the human intruders and just three of these behaved in an offensive life-threatening manner: two of these only after being inadvertently touched or stepped on! One of these stepped-on snakes bit a boot, but this was the only successful bite recorded in the three-year study.

The snakes often allowed the human investigators to approach to within less than a metre and, even when prodded after a 10-second pause, most fled rather than attacked.

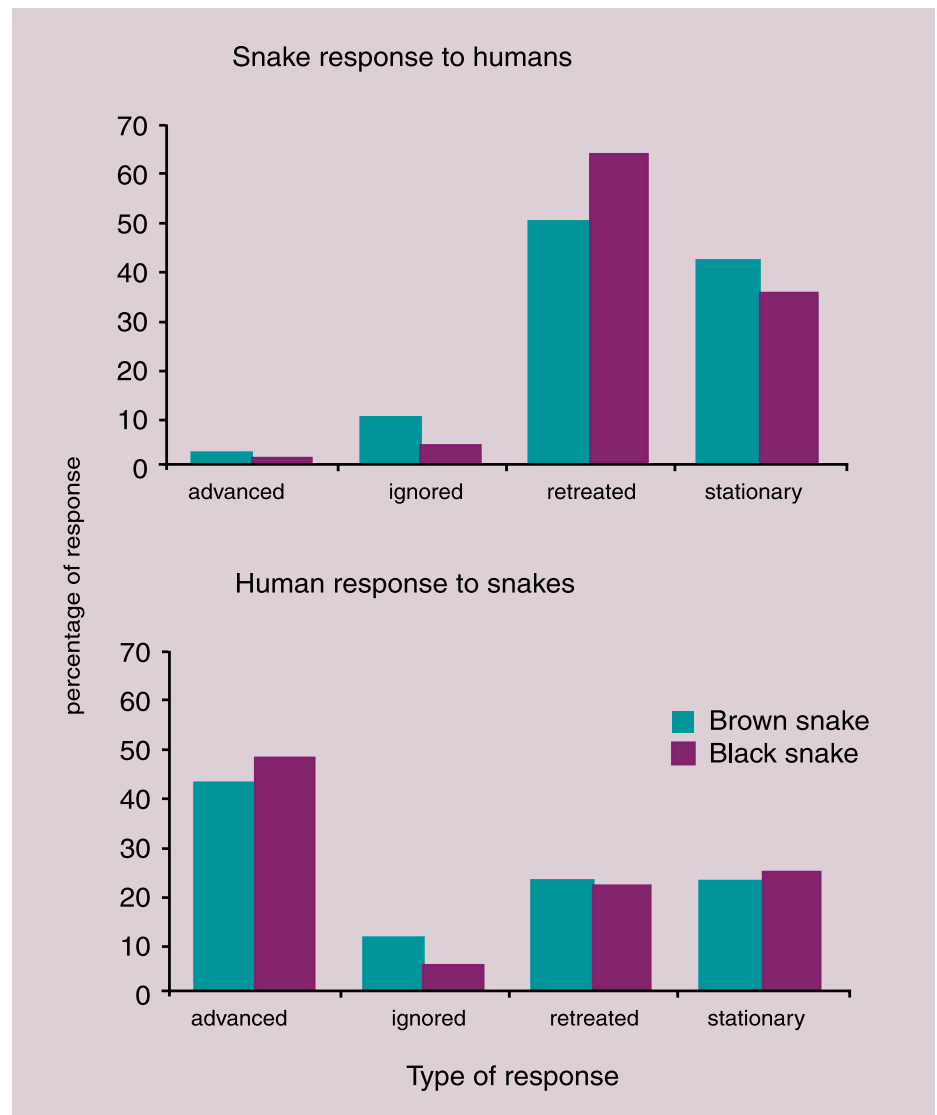
So it takes a lot to provoke even this infamous species and the herpetologists maintain that humans are therefore unlikely to be the victims of unprovoked attacks from any Australian snake species. The consequence of willingly interfering with browns is another matter and, in the

worst case scenario, they may pursue a tormentor!

The data show that the likelihood of meeting a brown-snake varies with time of day, season, habitat, weather, shade, sex and size of the snake, and even the person's clothing.

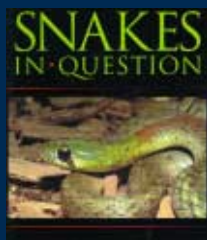
For example, for various reasons, spring is the prime season for encountering brown-snakes (67% of encounters), followed by summer (13.8%), autumn (12.6%) and winter (6.6%). On summer days, many snakes are underground seeking their temperature comfort zone. Most snakes were encountered at air temperatures between 20°C and 28°C.

The chance of encounters is also generally higher in the afternoon than in the morning, except during summer when encounter rates are about equal in morning and afternoon. Walking during very windy weather increases the odds of meeting snakes, possibly because they find it more difficult to see the human



## Do snakes fly?

DO SNAKES dig burrows? Do they hear? Can they fly? Do they have enemies? What sounds do they make?



These questions are a mere fraction of the 100 or so addressed in *Snakes in Question*, a book by professor of biology at Virginia's George Mason University, Carl Ernst, and curator of herpetology at the United States National Museum of Natural History, Smithsonian Institution, George Zug.

Ernst and Zug say the diversity of snakes is an evolutionary success story that began more than 130 million years ago. 'In spite of the human propensity to bludgeon every snake in sight, more than 2600 species remain in the world today, including some as yet unknown to science.'

*Snakes in question* describes basic snake biology – from how they're built, to how they hibernate, kill and eat – using diagrams and photographs to illustrate intricacies such as skin growth and shedding, locomotion, reproduction, dorsal patterning and even the morphology of a rattlesnake's rattle. A selection of colour photographs displays their amazing colours and diversity.

The authors address some common snake folktales. . . No, snakes don't milk cows, and they don't put their tails in their mouths and roll down hills like hoops. And apparently there's no truth in the rumour that injured snakes don't die before sundown. The catch is, however, that nerve reflexes may cause muscle twitches for several hours after death. An elderly Florida man once died following a bite from the decapitated head of a cane-brake rattlesnake. While cleaning the snake to eat, he put a finger in its mouth, stimulating a nervous reaction and the lethal bite.

Other sections of the Smithsonian answer book cover snakebite, keeping pet snakes, giant snakes, and why snakes are important to us. There's also an appendix of snake facts, a table that traces their geological history, a subject index, a taxonomic index, and a hearty reading list.

*Snakes in Question* is available for \$29.95 from CSIRO Publishing, 1800 645 051, sales.publish.csiro.au, www.publish.csiro.au.

form against a confusing background of swaying vegetation.

To the herpetologist, snake responses under given sets of circumstances are quite predictable. Snakes lying secure under dense plant cover, for instance, are less likely to move away and more likely to tolerate close approach. They are relying on camouflage to avoid detection.

On the other hand, those caught out in the open, where crypsis is less effective, have to rely more on offensive behaviour. All the offensive snake 'advances' in the study occurred with less than 20% vegetation cover. However, it is the snakes that remain quite still, rather than move away, that pose the greatest risk to people; these are more likely to be inadvertently confronted up-close or stepped on: perhaps the ultimate insult to a legless animal!

Whitaker and Shine concluded from their study that virtually all so-called attacks by brown-snakes are launched in response to real or perceived attacks upon the snake by people or their dogs. Snakes probably misunderstand our intentions as often as we misinterpret theirs! The research confirms that browns tend to be wary of people and avoid them whenever possible, but will often defend themselves in dramatic fashion if provoked or taken by surprise.

The brown snake is a graceful component of ecosystems in eastern Australia and is useful as a predator of feral mice.

Given its potent venom, however, it seems prudent to take the advice proffered as a result of this study and so avoid close encounters of the fatal kind.

### More about brown snakes

Sutherland, Struan K (1992) Deaths from snake bite in Australia, 1981–1991. *The Medical Journal of Australia* 157:740–746.

Whitaker PB and Shine R (1999) When, where and why do people encounter Australian brown snakes (*Pseudonaja textilis*: Elapidae)? *Wildlife Research* 26:675–688.

Whitaker PB and Shine R (1999) Responses of free-ranging brown snakes (*Pseudonaja textilis*: Elapidae) to encounters with humans. *Wildlife Research* 26:689–704.

**Abstract:** The brown snake is a graceful component of ecosystems in eastern Australia and is useful as a predator of feral mice. It has the second most toxic venom, after the inland taipan, of all snake species so far tested worldwide. Anecdotal reports of unprovoked attacks by brown snakes are frequent, but research has shown that unprovoked attacks are unlikely. In a study on a NSW farm, radio-tracking was used to monitor snake movements. The results showed that the chances of encountering brown snakes are greatest on spring afternoons, and where there is little vegetation cover. Virtually all so-called attacks by brown snakes are launched in response to real or perceived attacks by people or their dogs.

**Keywords:** brown snakes; animal behaviour; defence mechanisms; aggression; snake bites.



Young brown snakes have a black head and are sometimes banded.

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