NOTES ON FEEDING INTERACTIONS IN AUSTRALIAN REPTILES

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INTRODUCTION

Feeding interactions by reptiles may be the result of:

Two reptiles (usually snakes) attempting to eat the same food item with one reptile also eating the other attached reptile. This type of accidental predation is commonly observed and documented for captive snakes.

Severe hunger confinement or some other stressful situation causing a reptile to depart from normal behaviour and eat another. This may be a smaller member of the same species or another species.

Normal behaviour in the feeding on other members of the same species, which is demonstrated in both wild and captive animals.

Cannibalistic behaviour has been reported in a number of Australian reptiles. Specific cases and species previously documented include:

Sand Goanna *Varanus gouldii,* Johnson (1976)
Black-headed Python *Aspidites melanocephalus,* McPhee (1979)
Spotted Python *Liasis maculosus,* Maguire (1990)
Desert Death Adder *Acanthophis pyrrhus,* Fyfe and Munday (1998)
Gow (1981), Hoser (1989)
Highland Copperhead *Austrelaps ramsayi,* Jenkins and Bartell (1980)
Copperhead *Austrelaps* sp., Gow, (1982, 1983, 1989), McPhee (1979),
Shine (1977)
Small-eyed Snake *Cryptophis nigrescens,* McPhee (1979)
Swamp Snake *Hemiaspis signata,* McPhee (1979)
Tiger Snake *Notechis scutatus,* McPhee (1979)
Black Tiger Snake *Notechis ater,* Gow (1983, 1989)
King Island Tiger Snake *Notechis ater humphreysi,* Worrell (1970)
King Brown Snake *Pseudechis australis,* Gow (1982, 1983, 1989), McPhee (1979)
Blue-bellied Black Snake *Pseudechis guttatus,* McPhee (1979)
Eastern Brown Snake *Pseudonaja textilis,* McPhee (1979)
Myall Snake *Suta suta,* McPhee (1979)
Little Whip Snake *Unechis flagellum,* Turner (1987)
Gould's Snake *Unechis gouldii,* Shine (1977)

Cases of cannibalistic and similar feeding behaviour is documented here for the Lace Monitor *Varanus varius*; Desert Death Adder *Acanthophis pyrrhus*; Swamp Snake *Hemiaspis signata*; Yellow-faced Whip Snake *Demansia psammophis*; Red-bellied Black Snake *Pseudechis porphyriacus.*

OBSERVATIONS

Lace Monitor *Varanus varius*

During the period 1975-83, I held seven adult Lace Monitors *Varanus varius* in two interconnected outdoor pits some 15 metres long and 6 metres wide in near natural conditions in a Sydney suburb (Hoser, 1989. p.182).

On separate occasions, at least five adult Blue-tongued Lizards *Tiliqua scincoides* and two adult Eastern Water Dragons *Physignathus lesueurii* were placed inside the pit and were immediately eaten (swallowed whole) by one of the dominant male *V. varius.*

During January 1978, two sand monitors *Varanus gouldii* both measuring in excess of 1000mm total length were housed with the *V. varius.* A single 1500mm Heath Monitor *V. rosenbergi* had been kept with the *V. varius* for some years without incident.

About two weeks following the introduction of the two *V. gouldii* into the pit one of the male *V. varius* was found with the tail of the smaller *V. gouldii* protruding from its mouth. It was forced to regurgitate the *V. gouldii,* which was dead. The male *V. varius* measured 1760mm in total length. Neither it nor any other monitor in the cage was underfed although all were kept hungry (in warmer months), unlike some captive *V. varius* which tend to become excessively obese.

The second, larger *Varanus gouldii* was left in the cage with the *V. varius* as its substantially larger bulk would, it was thought make it more compatible with the *V. varius*

A week later the same male *V. varius* was found with the second *V. gouldii* protruding from its mouth. The *V. varius* had only managed to swallow the anterior half of the body. It was again forced to regurgitate the *V. gouldii* which was already dead.

On at least two occasions in the pit, a female *V. varius* excavated a hole and deposited eggs. These eggs were dug up and eaten by one or more monitors in the pit. On one occasion, only *V. varius* were resident in the pit.

Desert Death Adder *Acanthophis pyrrhus*

During the period 1976-84, I held a number of Death Adders *Acanthophis antarcticus,* Desert Death Adders *A. pyrrhus* and Northern Death Adders *A. praelongus.* All were kept indoors in glass cages with an average of 2 snakes per cage, although these numbers varied as the snakes were moved between identical cages. On some occasions, different species were caged together, virtually always without incident.

On two separate occasions an adult male *A.pyrrhus* was found to have eaten a cage cohabitant of the same species and sex. The eaten snakes were subsequently found regurgitated and dead. No food had been in the cages at the times of the incidents and neither snake was in a state of undue leaness.

On another occasion an adult (approx. 550mm) male *A. pyrrhus* ate a female *A. antarcticus* (approx. 320mm) that was in the same cage. The snake was subsequently regurgitated in a largely undigested state.

No behaviour that could be construed as cannibalistic was ever observed in *A. antarcticus* or *A. praelongus.*

Yellow-faced Whip Snake *Demansia psammophis*

A large captive adult male *D. psammophis,* 1000mm in length, was observed feeding on a juvenile of the same species. At a later date, the same snake fed on a Green Tree Snake *(Dendrelaphis punctulata)* of similar length. Both incidents occurred in the spring of 1976 (Robert Croft, pers. comm.).

Swamp Snake *Hemiaspis signata*

In late spring 1976, one adult Swamp Snake *Hemiaspis signata,* one juvenile of the same species, estimated at about 9 months of age and two adult Copper-tailed Skinks *Ctenotus taeniolatus* were caught and placed in a single bag. Later the bag was opened and found to contain only the adult *H. signata.* Inspection of the snake revealed that it had fed on the three other reptiles placed in the same bag (Robert Croft, pers. comm.).

Red-bellied Black Snake *Pseudechis porphyriacus*

In 1973, I held a 1200m Red-bellied Black Snake *P. porphyriacus* and a 900mm Freshwater Snake *Tropidonophis mairii* in the same 1300mm cage. The Black Snake ate and later regurgitated the Freshwater Snake which failed to survive. Both snakes had been together in the cage for several months without incident and both were in good health feeding exclusively on frogs. No frogs were in the cage at the time of the incident.

DISCUSSION

The saurophagous nature of *V. varius* is well known and further documented here. The incidents detailed here indicate that *V. varius* is a potentially cannibalistic species. Smaller specimens certainly run the risk of being eaten by members of the same species.

To my knowledge, the only Australian varanid documented to date as being potentially cannibalistic is *Varanus gouldii* (Johnson 1976, Polis and Myers 1985).

That Desert Death Adders *Acanthophis pyrrhus* are apparently prone to cannibalism, while *A. antarcticus* and *A. praelongus* are not may have something to do with the dietary preferences of the three species.

Fyfe and Munday (1988) commented that newborn *A. pyrrhus* had to be separated after the first slough to prevent cannibalism. In natural conditions, neonates would be unlikely to come into contact with one another shortly after birth, consequently the risk of cannibalism would be slight. However captive conditions could be a catalyst for cannibalistic behaviour in young of the species. Gow (1981) also recorded cannibalism in this species.

D. psammophis aggregates and is commonly found in pairs (Hoser 1980, 1990). Cannibalism by this species in the wild would be unlikely and it would seem that the cases observed by Croft in 1976 were abnormal behaviour.

McPhee (1979), noted that Hemiaspis signata is "prone to cannibalism" and the circumstances in the case described here were such as to induce cannibalism.

Red-bellied Black Snakes *Pseudechis porphyriacus* aggregate for breeding purposes, (Hoser 1980, 1990). Therefore the case documented here could not be interpreted to imply that cannibalism is normal for this species. Worrell (1970), plate 59, shows a photo of this species consuming an eel, a long creature of similar form to a snake. It is possible and likely that *P. porphyriacus* will feed on suitably sized snakes of other species should the opportunity arise.

In relation to the Blue-bellied Black Snake *Pseudechis guttatus,* McPhee (1979), states "It is almost certainly cannibalistic." He also makes a similar comment for the Small-eyed Snake *Cryptophis nigrescens.* He quotes a large number of snakes as having cannibalistic tendencies including a species which Worrell (1970) makes a point of stressing is not cannibalistic, namely *Notechis scutatus.* Gow (1983, 1989) not does not note cannibalistic behaviour in *N. scutatus,* but does in *N. ater.* Worrell (1970) also documents cannibalism in *N. ater.*

I question some of the cannibalism records documented by McPhee (1959, 1979), although comments made by Polis and Myers (1985), stress that physically at least, most reptiles are capable of cannibalism.

Globally, Polis and Myers (1985) found reports of cannibalism and/or oophagy in over 100 species of reptile and amphibian. They concluded that "since few reptiles and amphibians are morphologically incapable of cannibalism, we expect the number of known cannibalistic species will increase as more research is completed."

Wilson (1975), noted the correlation between those species most studied as those most likely to have cases of intraspecific predation recorded or observed. Such is certainly true for Australian species. With more people keeping snakes in captivity it is not surprising that there

are more cases of cannibalism recorded for snakes than lizards, and relatively few cases of cannibalism recorded for Australian frogs.

Cases of alleged cannibalism in many species of snake or other reptile may be induced by captive conditions, and therefore may not really indicate the natural behaviour of the species in question.

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REFERENCES

Fyfe, G. and Munday, B. (1988), "Captive breeding of the Desert Death Adder *(Acanthophis pyrrhus).*" *Herpetofauna* 18 (2), p.21.

Gow, G.F. (1982), *Australia's Dangerous Snakes,* Angus and Robertson, Sydney, Australia. 103pp.

Gow, G.F. (1983), *Snakes of Australia* (Revised edition), Angus and Robertson, Sydney, Australia. 140 pp.

Gow, G.F. (1981), "Notes on the Desert Death Adder *(Acanthophis pyrrhus)* Boulenger 1898, with the first reproductive record.", *Northern Territory Naturalist* 4, pp.21-22.

Gow, G.F. (1989), *Graeme Gow's Complete Guide to Australian Snakes,* Angus and Robertson, Sydney, Australia. 171 pp.

Hoser, R.T. (1980), "Further records of aggregations of various species of Australian Snake.", *Herpetofauna,* 12 (1), pp.16-22.

Hoser, R.T. (1989), *Australian Reptiles and Frogs,* Pierson and Co., Sydney, Australia. 240 pp.

Hoser, R.T. (1990), "Pairing behaviour in Australian Snakes.", *Herptile* 15 (3), pp 84-93.

Jenkins, R. and Bartell, R. (1980), *A Field Guide To Reptiles Of The Australian High Country,* Inkata Press, Melbourne, Australia. 278 pp.

Johnson, C.R. (1976), "Some behavioural observations on wild and captive sand monitors *Varanus gouldii* (Sauria: Varanidae). ", *Zoological Journal of the Linnaean Society* 59, pp.377-80.

Maguire, M. (1990), "Accidental cannibaliam in Children's Pythons *(Liasis maculosus).", Herpetofauna* 20 (1), p.33.

McPhee, D.R. (1959), *Some Common Snakes and Lizards of Australia,* Jacaranda Press, Brisbane, Australia. 125 pp.

McPhee, D.R. (1979), *The Observer's Book of Snakes and Lizards of Australia,* Methuen of Australia, Sydney, Australia. 157 pp.

Polis, G.A. and Myers, C.A. (1985), "A survey of intraspecific predation among reptiles and amphibians.", *Journal of Herpetology* 19 (1), pp.99-107.

Shine, R. (1977), "Habitats, diets, and sympatry in snakes: a study from Australia.", *Candian Journal of Zoology* 55, pp.1118-1128.

Turner, G. (1987), "Unusual case of cannibalism.", *Herpetofauna* 17 (2), p.29.

Wilson, E.O. (1975), *Sociobiology: The New Synthesis,* Havard University Press. Cambridge, Mass. USA.

Worrell, E. (1970), *Reptiles of Australia.,* Angus and Robertson, Sydney, Australia. 169 pp.