NATURAL HISTORY OF THE WESTERN TIGER SNAKE: CAPTIVE REPRODUCTIVE POTENTIAL AND LONGEVITY

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Between 1976 and 1987 I worked as a windmill mechanic on the Esperance sandplain. During that time I observed the local indigenous snakes both in the wild and in captivity. The female tiger snake which is the subject of this article was one of my study snakes reported on in Bush (1983).

The western tiger snake, *Notechis scutatus occidentalis* is one of the most common large elapids on the southern coast of Western Australia. It shows a preference for the periphery of poorly drained swampy habitats and may also be found along rivers. It is generally a frog eater but will also take birds. Occasionally I have it around hay stacks feeding on mice, suggesting it does forage away from its preferred habitat.

To illustrate the local abundance of *N.scutatus*, during a one hour visit to the Coomalbidgup Swamp (33°43'S, 121°22'E) in May 1990 I observed 36 individual tiger snakes and 12 crowned snakes, *Drysdalia coronata*, a small elapid commonly found in similar habitats.

Published longevity records for Australian snakes are all but nonexistent, and I can find no records on the reproductive history of an individual snake. The following record involves a snake born and kept continuously in captivity. A study of this kind in the wild would be a massive undertaking and may span many years. I suggest here that this study only presents reproductive potential under optimum conditions for this species, and may not relate to the natural situation.

A female *Notechis scutatus occidentalis* born in captivity in April 1979 from wild parents collected at Lort River, WA in 33°44'S, 121°17'E was introduced to conspecific males and females at age 30 months. It was housed in the same enclosure, an open corrugated iron "pit", until May 1987 before being housed separately in a glass-fronted cage with a floor area measuring 60 x 90 centimetres.

Between March 1983 (age 47 months) and June 1987 (age 97 months) it produced five litters (1 per year) numbering in total 136 offspring plus 2 infertile oocytes in the final clutch. The combined mass of offspring was 950.6g. At death (Aug. 1992 and 160 months old) this snake had a snout-vent length (SVL) of 1040mm and weighed 584g. Nineteen months previous this snake was the same length but weighed 715g. The successful breeding of this snake each consecutive year is of particular interest. Fearn (1993) reports biennial reproduction in tiger snakes from the Tasmanian region.

Although she had been housed with several males, both separately and simultaneously, she failed to produce a 6th litter, although unsuccessful attempts at copulation by different males had been observed on several occasions since the 5th litter. This may be a result of attaining an age when ovulation ceases. Or alternatively the change of environment from open pit to enclosed cage may have triggered a halt in this. I am of the opinion that this female had attained an age when it was reproductively senile, suggesting under optimum conditions in the wild a female may produce a maximum of five consecutive clutches, although in the wild this many consecutive clutches from a single female would be unlikely. Data on female SVL and mass relative to litter, date of birth, litter size (N), neonate SVL and weight (W) and reproductive effort (RE) are included in Table 1. All measurements of length are in millimetres and weight in grams. Means are in brackets. RE is presented as a percentage - total offspring weight to female weight with measurements recorded immediately after birth.

Table 1. Data on female *Notechis scutatus occidentalis* and 5 clutches of offspring produced in consecutive years from 1983. First clutch at 47 months old.

Date	11-03-83	09-04-84	08-04-85	30-04-86	08-06-87	Jan 91
SVL	763	886	948	991	1018	1040
W	400	503	560	613	634	715
N	20	32	31	35	18+2	
Juv. SVL	223-237 (229)	202-222 (211)	194-216 (208)	185-221 (212)	188-210 (200)	
Juv. W	8.1-9.2 (8.6)	5.9-7.2 (6.6)	5.2-7.0 (6.5)	4.7-7.8 (7.0)	5.6-6.8 (6.1)	
RE	43.2	41.9	36.0	40.0	19.2	

SVL - Snout vent length (mm)

W - Weight (gm)

N - Number of offspring in respective clutch

RE - Reproductive effort as a % of females' weight immediately after birth.

DISCUSSION

Shine (1991) in a summary of his work states that the number of offspring correlates with female body size. This is partly the case here: 1st litter 20, 2nd 32, 3rd 31, 4th 35, however, the 5th litter regressed both in number (20) and size. Mean offspring weight of 4th 6.97g and 5th 6.1g. In present study RE decreased generally with age (except 4th) consistent with Shine's findings. Reproductive data presented by Bush (1992) suggests this is also the case in the small elapid *Echiopsis curtus*, while the reverse occurs in another small elapid *Drysdalia coronata.*

The size at birth of Western Australian *N.scutatus* are larger than some populations in eastern Australia. Shine (1978) during a study at 2 sites in New South Wales found mean SVL and mass in neonates to be 189.4mm and 4.59g versus 211.9mm and 6.96g in present study. This difference may be exaggerated by including the large offspring from my females' first litter (mean SVL 228.8mm, W 8.63g), while Shine's data may be from a single litter from one snake. However, excluding my first litter from calculations, birth sizes in WA *scutatus* still appear larger. Shine (1977) was of the opinion that the snakes in his study area, which was the same as for his 1978 paper, were generally smaller than elsewhere. WA *scutatus* are smaller as adults than the population he studied, maximum SVL 1020mm (Storr, 1982) v. 1200mm (Shine, 1978). The larger neonate size recorded here is not only consistent with his findings that elapid snakes in which the adults are smaller have proportionately larger young than do larger species, but this also is the case intraspecifically between populations of different adult size. My study snake is definitely heavier than comparable length representatives from Uralla, eastern Australia (Shine & Bull, 1977), but this is probably a result of life in captivity.

Shine also found a high percentage of infertile oocytes (9.2%) in his study population of *scutatus* compared to only 1.4% of the total in this captive female. Gravid females collected from the same site as the parents of the snake reported here and retained until parturition passed very few infertile ova (pers. obs.). However I have two records (Bush, loc cit) of small elapids passing

large numbers of infertile oocytes (57% in *D.coronata* and 43% in *E.curtus*). Maybe, if a female is carrying insufficient fat-bodies to sustain the available ova and food continues to be scarce, some ova are not fertilised or suffer early embryonic death. Little resorption of yolk is evident (Shine & Bull, 1977) however, I get the impression, if conditions are bad, that the females' body tissue may sustain the embryos to full-term leading to death of the female after parturition. I have collected female *scutatus* in the Esperance area of WA in May and June that appear so emaciated that I doubt they could recoup condition to survive through to the following spring. Maybe if fertilisation of some of the oocytes is aborted then a portion of a potentially larger clutch survives. The alternative, when food resources are scarce, is the demise of not only the entire clutch but the female as well. I remember a large obviously gravid "skin and bone" female I collected at Lort River. She aborted, passing dead, partly developed embryos and then died within the week. I experienced something similar in a Master's snake, *Drysdalia mastersii*. It gave birth to two healthy offspring and one dead, partly developed embryo, but went on to survive the ordeal.

The few infertile oocytes recorded here in western *N.scutatus* may be the result of the small sample size involved. If there is a dichotomy in the frequency of infertile oocytes between western and eastern populations then this divergence in reproductive physiology warrants further investigation. It may just be that in western populations there is considerably more prey or less competition from other similar sized predators for the available food resources. The problems mentioned above may be totally unrelated to this.

SUMMARY

Captive life span	13 years, 4 months
Total offspring	136
Maximum weight attained	715g
Maximum post-parturition weight	634g
Weight at death	584g
SVL at death	1040mm
Number of sloughs during life	32

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