

NOTES ON THE BLACK SNAKE GROUP (*PSEUDECHIS*) IN CAPTIVITY

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INTRODUCTION

The black snakes are a large, heavily bodied group of elapids native to Australia, Papua New Guinea and Irian Jaya.

This paper is intended to help the future keepers of the genus *Pseudechis* and add more information to the keeping knowledge of this spectacular group of elapids.

There are seven (possibly eight) species of *Pseudechis* with seven in Australia. They are all classed as dangerously venomous with two known killers (the Mulga or King Brown Snake *Pseudechis australis* and the Papuan Black Snake *P. papuanus*). *P. Butleri*, *P. colletti* and *P. guttatus* could kill a healthy adult, while *P. porphyriacus* could easily kill a child. The effects from a bite from *Pailsus pailsei* are unknown, but it should be classed as dangerous until research into its venom is undertaken. All bites should be treated with caution.

Four of the group are well represented in captivity with only the Butler's Snake *P. butleri*, *Pailsus pailsei* and the Papuan Black Snake *P. papuanus* being rare in captivity. If the Wildlife departments in the various states relaxed their laws slightly it would be possible for the professional and amateur herpetologists alike to learn about and admire these beautiful elapids. I am in agreement with Mr Robert Valentic in that I believe that these should be only bred within a similar lineage, this species has been crossbred in the past but to my knowledge the hybrid animals are sterile.

These snakes are on the whole are an easy species to raise, keep and breed in captivity if all of the basic husbandry rules are followed, common sense used and records are kept.

I also believe that they are best starting genus of elapids to keep as they are a fairly quiet. Their bites are generally not life threatening, but great care should be taken as their venom can cause necrosis (a crippling condition that may cause a need for an amputation of a finger or a limb). Bites are also extremely painful.

This paper will be drawing upon my personal experiences with these elapids. As I have not kept *P. butleri*, *Pailsus pailsei* or *P. papuanus* the information about these species is from previously published and unpublished data.

HOUSING:

As they are dangerously venomous the *Pseudechis* group should only be kept in cages that are lockable and safe to work with, I think that only top- opening cages should be used for these elapids. See Figure 1.

P. australis, *P. butleri*, *P. colletti*, *P. guttatus*, *P. papuanus* and *P. porphyriacus* are all large, heavily bodied elapids so a large, well-constructed cage is needed to keep these species successfully. Juveniles are also quite large in comparison to the other similar sized elapids (the Brown Snakes *Pseudonaja*, the Tiger Snakes *Notechis*) "Click Clack" type containers are good to use for juvenile snakes as they have clear lids and are top opening. This minimises the risk of being bitten which is a very unpleasant experience.

Ventilation is very important, plastic grills usually used for ventilating cupboards are effective for cages holding adult specimens. Each vent should be checked by placing about three kilograms of pressure at the weakest point of the vent with your fingers (this can be checked by using a set of scales to work out how much force is to be used on the vent). The "Click Clack" containers are best ventilated by the use of a standard soldering-iron rather than a drill as the latter might cause the lid to shatter and crack thus creating sharp edges that could be detrimental to the future inhabitants of the cage.

Water bowls are standard in the cages however they should be non-spillable but large enough to allow the snake to soak (this is especially important to animals nearing sloughing (shedding), and for juveniles, who can die within hours if dehydrated). I use absorbent paper towelling as a substrate for juveniles and newspaper for the adults as the cages are kept clean more easily. I change the paper when it is soiled and if not soiled within a week of the last paper change, it becomes changed and fresh paper is put in the cage. After the dirty paper is changed I use a mix of Dettol and water (90 % water and 10% Dettol).

The cage size should be approximately 1.0 metres long by 0.6 metres deep by 0.6 metres high for a pair of adult snakes. If the animals are to be housed individually (which is what I recommend) they can be housed in smaller facilities of 0.6 metres long by 0.5 metres deep by 0.6 metres high, this has been successful for my *P. australis*, *P. colletti*, *P. guttatus* and my *P. porphyriacus*.

HEATING:

The *Pseudechis* group is found all over Australia except for Tasmania and the South-Western corner of Victoria. They have two wide ranging species, *P. australis* and *P. porphyriacus* both of which have specimens that range from colder regions to the warm tropics.

Information on where your captive snakes (or its parents) are from is very important; For example I have *P. porphyriacus* from the Adelaide Hills S.A. And others from Sydney N.S.W. Neither of the animals are given heat during summer but during winter I only heat the Sydney *P. porphyriacus*. The same goes for my *P. guttatus* as I have snakes from Allora Q.L.D. and ones from Scone N.S.W. I only heat the snakes from Allora because the individuals from Scone are juveniles and they are kept in a room that sits at around 20 degrees Celsius.

Northern *P. australis*, *P. colletti* and northern *P. porphyriacus* should be kept in cages ranging from 28 to 31 degrees Celsius. *P. guttatus* should be kept in cages with range of 26 to 28 degrees Celsius. Southern *P. australis* and *P. porphyriacus* can be kept cages with a temperature range from about 24 to 27 degrees Celsius.

A heat gradient is very important for adults and juveniles. For the adults I achieve this by putting a heat pad on one third of the cage floor and a 15-watt "blue" globe up one end of the cage. Both of these heating devices are run off separate thermostats set at the according temperature for the particular snake. For the juveniles a heat mat is placed under half the cage. This creates a heat gradient so the cage occupant can choose between hot spots and cooler spots. This re-creates their natural environment so thus minimising the chance of death through over-heating.

FEEDING:

The *Pseudechis* genera are large and robust throughout their lives; this is an advantage for keepers as they are large enough to eat pinkie mice from birth, unlike juvenile Death Adders *Acanthophis* or Copperheads *Austrelaps*. They are easily assist-fed and at times take food

voluntarily from day one. They are like “pigs” and once feeding do not look back. Please be extremely careful when feeding *Pseudechis* as they get very excited and will strike at any movement. I own a young female Collett’s Snake *P. colletti* that is 90 CMS S.V.L. That is very quiet at the best of times but when she gets the scent of a mouse she becomes one of my most dangerous snakes. This is also true for my Red-Bellied Black Snakes *P. porphyriacus* and my Spotted black Snakes *P. guttatus*. It has been noticed that the other *Pseudechis* act very similar to each other around feeding. The Black snakes all feed in a similar way, when the scent of the prey item is recognised the individual emerges from its retreat and strikes at the prey item. When the snake has bitten the prey it hangs on until it is satisfied that the prey is dead and then commences feeding in the typical snake fashion. It is noteworthy that unlike some other snakes it may not eat the prey item headfirst, this can cause problems when feeding fish as some species of fish have spines and these can rip the snakes oesophagus. Adults may be fed at a rate of once a week (size of food item and type depends on what the snake is already eating) while juveniles once every 4 days. They should be fed preferably thawed dead mice or rats depending upon size of the snake.

In the wild *Pseudechis* eat a wide variety of prey with reptiles, frogs, mammals and birds making up the predominate percentage of the food items. Other animals recorded include invertebrates, fish, carrion and reptile eggs. They have been known to eat unusual food items including eels and quolls. Cannibalistic behaviour (also known as ophiophagy) has been recorded for *P. australis*, *P. guttatus* and *P. porphyriacus*. It is suspected that the remainder of the genus also has cannibalistic tendencies. So if these snakes are to be housed communally they should at least be feed separately to avoid accidental cannibalism.

Fish has been used in captivity to feed *P. colletti*, *P. guttatus* and *P. porphyriacus* with successful results. (Kortlang, 1990). And I think it would be possible to also feed *P. australis* and *P. butleri* on a diet of fish.

In addition to feeding a varied diet, vitamin and mineral supplements are also important. I use Cod- liver oil and Rep-cal (available through The Herp Shop +61 3 9363 6841) mixed in together and injected into the dead food item.

SLOUGHING (SHEDDING):

The genus *Pseudechis* are on the whole good shedders unlike some other genera (the Death Adders *Acanthophis* and the Tiger Snakes *Notechis*). When they are young they might cause some problems. These are usually resolved with the soaking of the individual in warm water (remember to change the water every 25 minutes, as you do not want your snake to get a chill). The addition of a rough rock or log to the cage (If the object can be moved easily replace it so there is no risk of injuries to the particular snake(s) concerned) to assist in shedding.

LIGHTING:

Lighting is an important point of captive husbandry often over-looked. The black snakes have both diurnal and nocturnal species. *P. colletti* however is predominantly nocturnal, in my experience sloughing, feeding, mating and combat has taken place at night, while *P. porphyriacus* are very diurnal in captivity and in the wild. The others of this genus are active when the appropriate temperatures are reached regardless of whether it is day or night.

The use of Ultra-Violet light is necessary for *P. porphyriacus* as it is a diurnal species but is not needed for *P. australis*, *P. butleri*, *P. colletti* and *P. guttatus*, as these species are predominantly nocturnal. The use of Ultra-Violet lighting is known widely as being beneficial in the dragons (family Agamidae) and recently in some species of tree frogs *Litoria sp* (Martin pers. comm). I firmly believe that all diurnal species of reptiles and frogs should have access to Ultra-Violet lighting.

Photo periods for *Pseudechis* should be 14 hours daylight and 10 hours night from October to March and 12 hours daylight and 12 hours night from April to September. This emulates the natural day light hours during the year.

MATING:

Mating in *Pseudechis* is basically uniform throughout the whole genus. The act of mating can last from a few minutes to a few hours. I have witnessed six matings in *Pseudechis* of three different species. Three of the matings were of *P. colletti*, one of *P. guttatus* (blue-bellied black phase) and two of *P. porphyriacus*.

All of the males were cooled during winter and all except one of the matings were after male combat. The mating where no combat was witnessed was unintentional. I was inspecting a pair of *P. colletti* in the morning of December 5th 1997 at Mr Drew Williams's residence. Outside, it was a warm day approximately 26⁰ Celsius. We put down the animals on the lawn the male (150 CMS approx.) Started to develop an interest in the female (180 CMS approx.). The male positioned his vent adjacent to the females vent and started to rub his chin up and down on the dorsal side of the neck region of the female. Then the male's hemipenis everted and mating commenced, during mating the male continued to rub his chin on the female's neck and move his tail in an erratic movements, this lasted for 57 minutes. When we replaced the snakes back into their cages it was noticed that the female was bleeding from the cloaca. This mating resulted in a successful clutch of eggs. The other matings were similar but before the actual mating there was another males in the cage and combat was observed. One of these matings was successful in producing a clutch (*P. porphyriacus*).

INTRA-SPECIFIC AGGRESSION (MALE COMBAT):

The act of male combat in *Pseudechis* has been recorded on numerous occasions by Fleay (1937); Shine (1986); Mirtschin & Davis (1992) and in this paper. It has been recorded in the wild and in captivity. The combat involved the two snakes writhing and twisting together with each snake trying to dominate the other by keeping its head on top of the opponent and trying to throw the other off balance. I have personally seen it in my *P. colletti* and in my *P. porphyriacus*, I have also seen it on the Murray River near Yarrowonga, Victoria. Male combat has been recorded in *P. australis*, *P. colletti*, *P. guttatus* and in *P. porphyriacus*, but it is also suspected in *P. butleri* and *P. papuanus*.

COOLING:

Most species of reptiles need to be cooled down prior to breeding in captivity. Cooling is where you drop the temperature in the cage to the point where its inhabitant is not feeding and in a state of semi-torpor. This essential for males as if they are not cooled to a low enough

temperature. They will not be able to produce healthy sperm and so while he might mate with the female, she will not be able to produce fertile eggs or develop embryos in the case of *P. porphyriacus*. As said earlier in the paper knowing where your snake(s) are from is important. Northern and central *P. australis*, *P. butleri*, *P. colletti* and *P. guttatus* should be cooled for 4 weeks at 18^o Celsius. Southern *P. australis* and *P. porphyriacus* should be cooled for 5 weeks at 15^o Celsius. It is not advised to allow under weight, sick, recovering or juvenile snakes the chance to cool as it may kill them. To induce mating in northern specimens misting every day for about 3 weeks when coming out of cooling may help as it acts as a simulation of the wet and dry seasons of Northern Australia thus making the snake more comfortable. As I live in Victoria I cool my snakes from the 21st of July to the 1st September. The September date coincides with the start of spring in the Southern Hemisphere. When cooling your snakes to do it gradually, drop the temperature by one degree every day. This will not shock your snakes. When warming them up again use the same principle.

INCUBATION AND CARE OF GRAVID FEMALES:

As most species of this genus are egg layers they need a box to deposit their eggs in. This can be made from any material but I advise that either a wooden box or a plastic “ice-cream” type container filled half-way with coarse grade vermiculite or peat moss (these are available from most garden centres and nurseries), moistened with water to create a humid environment. This should be placed into the females cage about 2 weeks prior to oviposition thus giving the snake time to adjust to the new object in its cage. Once laid, the eggs should be moved into an incubator for incubation. Humidity in the box containing the eggs should be kept high (between 90 and 100%) and constant. One way of doing this is to place the vermiculite in the container and then put the same amount of water in, eg: 1 kilogram of vermiculite to 1 litre of water. If there is no air holes in the container then the water cannot escape and thus the humidity should stay constant. At the end of laying the eggs will sink in, this is quite normal. If this happens early on in the incubation period add some water to the incubation medium as it means that it is too dry in the incubation container.

The care of gravid females is fairly uniform for all snakes. Offer food throughout the pregnancy and keep her warm. Most females will go off their food while pregnant. As soon as she has laid her eggs or given birth they will seem like they can never get enough food. This is because her fat reserves are depleted and she is trying to get back to her normal weight. For clutch sizes, lengths of incubation and juvenile lengths see Table 1.

CONCLUSION:

If this paper has helped one person with their snakes I will feel that it has served its purpose. Information on our “pets” is needed; it all helps us whether it is breeding of Rough-Scaled Pythons *Morelia carinata* or fighting between Grass Skinks *Lampropholis delicata*. Write it down and send it in!

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Species/ Origin	Fecundity	Mating to birth/ovi postion	Incubation time/Temp	Neonat e size	Reference
<i>P. australis</i> (N.T)	16	Unknown	65-68 days @ 30-32 c	224 mm/ 13g	Fyfe 91
<i>P. australis</i> (Q.L.D)	11	54 days	70 days @ 22-32 c	226 mm/ 9.7g	Fitzgerald et all 80
<i>P. australis</i> (Q.L.D)	16	45 days	70-72 days @ 22-32 c	215 mm	Fitzgerald et all 80
<i>P. australis</i> (Q.L.D)	16	45 days	72 days @ 22-32 c	224 mm/ 7.6g	Fitzgerald et all 80
<i>P. australis</i> (S.A.)	15	Unknown	95-99 days @ 27 c	279 mm/ 16.2g	Mirtschin 88
<i>P. australis</i> (S.A.)	14	39 days	97-104 days @ 27 c	295 mm/ 15.7g	Mirtschin 88
<i>P. australis</i> (S.A.)	12	Unknown	95-101 days @ 27 c	260 mm/ 14.8g	Mirtschin 88
<i>P. australis</i> (S.A.)	13	39 days	Unknown 81days @	n 221 mm/	Mirtschin 88
<i>P. australis</i> (W.A.)	22	48 days	30 c	8.4g	Bush unpub
<i>P. australis</i> (W.A.)	16	42 days	85-88 days @ 30-32 c	224 mm/ 9.4g	Bush 95
<i>P. butleri</i>	11	77 days	71-73 days @ 30 c	302 mm/ 17.8g	Bush unpub
<i>P. butleri</i>	15	84 days	75 days @ 30 c	13.3 g	Bush unpub
<i>P. butleri</i>	9	Unknown	79-80 days @ 23-34 c	Unknow n	Fitzgerald et all 87
<i>P. butleri</i>	12	85 days No	65-67 days 30 c	268mm	Fitzgerald et all 87
<i>P. butleri</i>	9	mating	70-74 days 30 c	Unknow n	Fitzgerald et all 87
<i>P. colletti</i>	7	59 days	67-69 days @ 27-30 c	280 mm/ 24g	Charles et all 83
<i>P. colletti</i>	14	62 days	56-58 days @ 31 c	370 mm/ 25g	Charles et all 83
<i>P. colletti</i>	12	Unknown	66-70 days @ 30 c	Unknow n	Charles et all 83
<i>P. colletti</i>	13	Unknown	65 days @ 30 c	Unknow n	Charles et all 83
<i>P. colletti</i>	12	61days	Unknown 84 days @	n Unknow	Present Study
<i>P. guttatus</i> (B.B.P)	7	Unknown	Room temp	n	Charles et all 80
<i>P. guttatus</i> (B.B.P)	10	Unknown	Unknown	234 mm	Charles et all 80
<i>P. guttatus</i> (B.B.P)	13	Unknown	54 days @ 29 c	281 mm	Charles et all 80
<i>P. guttatus</i> (B.P)	12	Unknown	Unknown	232 mm Unknow	Prostamo pers comm
<i>P. pailsei</i>	5 7 to	Unknown	Unknown	n Unknow	Pails pers comm
<i>P. papuanus</i>	11 8 to	Unknown	Unknown	n	Shine 87 b
<i>P. porphyriacus</i>	40 Unk now	Unknown	N/A	200 mm	Cogger 92
<i>P. porphyriacus</i>	n	182 days	N/A	Unknow n	Greer 97
<i>P. porphyriacus</i> (V.I.C.)	12 4 to	176 days	N/A	224 mm/ 11.4g	Present Study
<i>P. porphyriacus</i>	18	Unknown	N/A	220 mm	Shine 89

