Hybridisation in Carpet Snakes Genus: Morelia (Serpentes:Pythoninae) and other Australian pythons

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Introduction

There has been a substantial amount of literature detailing breeding activity in both wild and captive Australian pythons. This includes Banks (1974, 1980), Barker and Barker (1994), Barnett (1979, 1987), Chiras (1982), Covacevich and Limpus (1973), Dunn (1979), Heijden (1988), Hoser (1980, 1981, 1989, 1990, 1992, 1993, 1995), Kend (1992, 1997), Kend and Kend (1992), McLain (1980), Ross (1973, 1978), Ross and Marzec (1990), Sheargold (1979), Williams (1992), J.W. (year unknown) and references therein.

There have also been documented cases of hybridisation between Australian python species and subspecies, including by Hoser (1989, 1991, 1993) and Kortlang (1987) and references therein. A number of different taxonomic arrangements for Australian Pythons have been proposed and/or used by a number of authors in recent and not-so-recent times including Barker and Barker (1994), Cogger (1986, 1992), Ehmann (1992), Gow (1977, 1981, 1989), Greer (1993) Hoser (1981a, 1981b, 1981c, 1982, 1988, 1993), Irvine (1976), Kinghorn (1956), Martin (1973), Mattison (1980), McDowall (1975), Mirtschin and Davis (1992), Schwaner and Dessauer (1981), Smith (1981a, 1981b, 1985), Stull (1932, 1935), Waite (1935), Weigel (1988), Wilson and Knowles (1988), Wells and Wellington (1984, 1985), Worrell (1951, 1970) and references therein.

To date there has been hybridisation in Australian Pythons documented as follows:-

Carpet (Jungle) male (*Morelia spilota cheynei*) X Water Python (*Liasis fuscus*) (see Hoser 1989)
Carpet (Jungle) male (*Morelia spilota cheynei*) X Scrub Python (*Morelia amethistina*) (see Hoser 1989)
Various combinations in the *Antaresia childreni* species complex (see Hoser 1993)
Diamond Python (*Morelia spilota spilota*) X Coastal Queensland Carpet Python (*Morelia spilota mcdowelli*) (Peter Harlow personal communication and others)
Diamond Python and Inland NSW Carpet Python (*Morelia spilota metcalfei*) (see Hoser 1989)

While it is presumed that other hybridisations between regional forms of the Carpet Python (*Morelia spilota* subspp.) have occurred in captivity, there appears to be a relative paucity of information on this activity.

The primary purpose of this paper is to document a recent case of captive hybridisation between a Victorian (inland form) Carpet Python (*Morelia spilota metcalfei*) and a coastal Queensland Carpet Python (*Morelia spilota mcdowelli*) as well as another case of hybridisation between a male Centralian carpet Python (*Morelia spilota bredli*) and a female inland NSW Carpet Python (*Morelia spilota metcalfei*).

CASE 1

This involved an inland Victorian Carpet Python (*Morelia spilota metcalfei*) and a coastal Queensland Carpet Python (*Morelia spilota mcdowelli*). The case happened in the early 1990's when herpetologist Matt Hingley lived in Victoria at Vermont. The two adults were housed together in a large cage when they mated. Eggs were laid and incubated in a fairly standard manner (50% water to 50% vermiculite by weight) in an incubator made out of a converted fridge. Incubation temperature was kept at about 30 degrees Celsius. The hatchlings appeared to be intermediate in colouration between the adults but didn't really look like either. Most off the eggs incubated and hatched in a routine way and the young animals posed few if any problems in rearing. At the time of writing (early 1999) some of these offspring remain alive and in good health.

CASE 2

This involved a male Centralian Carpet Python (*Morelia spilota bredli*\pard fs18) and a female inland NSW Carpet Python (*Morelia spilota metcalfei*), that were being held on public display at the Buxton Zoo about 110 km east of Melbourne, Victoria, located on the Maroondah Highway. On 8 November 1995, 12 eggs were laid and incubated at between 29 and 30 degrees Celsius in a mix of 55% vermiculite and 45% water by weight.They hatched in the following order:-

12th January 1996 - 2 hatched
13th January 1996 - 3 hatched
15th January 1996 - 5 hatched

The remaining two eggs failed to hatch. All young were born healthy and survived. These were later split into two groups of five. One lot remain alive and well with sizes ranging from half-grown (about 1.1 metres) to nearly full-grown (2.2 metres) in February 1999.

This includes the single runt from the clutch that survived and continues to do well. It's growth exceeded that of some others and it is now no longer the smallest of the five snakes. None of these snakes shows any sign of apparent abnormality or birth defect. The fate of the other five snakes is not known by this author. The scalation of these hybrids was not noted, but by cursory inspection showed no obvious differences between that of other carpet snakes. Readers should note that in Gow's original description of '*Python bredli*' (Gow 1981), he noted that scalation properties for the form overlapped those of other Carpet snakes.

In other words scalation was not diagnostic for the species. Notable among these younger snakes is that their colouration is not in any way intermediate between that of the two parents. They don't obviously look like either! Some specimens are rather brilliant in colouration and in some way appear reminiscent of the 'Jungle' form. Other specimens are of different and more subdued colouration and pattern, appearing sufficiently different to appear to be of different parentage to the brighter ones (if the observer was not informed of the common parentage).

There have been faster and slower growing specimens of both colourations indicating that this is not a relevant or reliable indicator of general health or other properties. Growth rates have been determined solely on the basis of food intake by the snakes. This is in line with the husbandry of all other carpet snakes. This author photographed some of these snakes on 24 February 1999 (3 years of age). See this publication for one or more of these photos.

Most of these hybrid snakes have also been fairly snappy (tending to strike at handlers), which is in contrast to both parents. There is no evidence to suggest that any of these snakes are infertile.

Discussion

That the Murray/Darling and Coastal Queensland carpet snakes hybridise in captivity isn't surprising. Most herpetologists regard them as being subspecies, hence hybridisation fits within this pattern. The hybridisation of the Centralian Carpet Python with the other carpet Pythons has so far been unknown and/or at least not documented. By strict (classical) definition, snakes of different species do not cross-breed and produce fertile offspring. The above case would therefore imply that *bredli* is a subspecies of *spilota* (Diamond/Carpet snakes) and NOT a species in it's own right.

This is in spite of the fact that in the last ten years, myself (e.g. Hoser 1989) has been almost alone in classifying and/or treating bredli as a subspecies (race) rather than a full species (e.g. Barker and Barker 1984, and Gow 1989). However the physical attributes of the hybrid offspring between *bredli* and *Morelia spilota metcalfei* may be interpreted by some to support the hypothesis that the two forms are different species. The hybrid snakes do not seem to have the distinctive eye of *bredli. Bredli* usually have a distinct bluey-grey eye which contrasts strongly with the reddish brown and yellow colouration. Most other carpet snakes including the hybrids lack this property, instead having eyes that more closely seem to match the body colour pattern. Furthermore there are no snakes known from any location in the wild that on close inspection seem to match the *bredli* X *Morelia spilota metcalfei* hybrids that resulted from the mating.

Those who argue for the continuation of treating *bredli* as being a different species to other carpet snakes may rely on the fact that there appears to be no hybridisation between these forms and other carpet snakes in the wild. At least none is known at this stage. Some people may argue that the captive hybrids are 'unnatural' and therefore do not aid any argument for merging the two species. Ultimately, whether or not *bredli* is accepted as a full species or a subspecies may revolve around how one defines a species.

A question worth asking may be, 'Are *bredli* merely an isolated population of carpet snakes (*Morelia spilota*) and does this simple fact justify the arbitrary making these reproductively isolated snakes into a full species in their own right?' Within Australia, bredli has gone from being an unusual captive in the early 1990's to a common snake in collections by 1999. Based on the above case it is likely that more captive produced hybrids will arise in the future.

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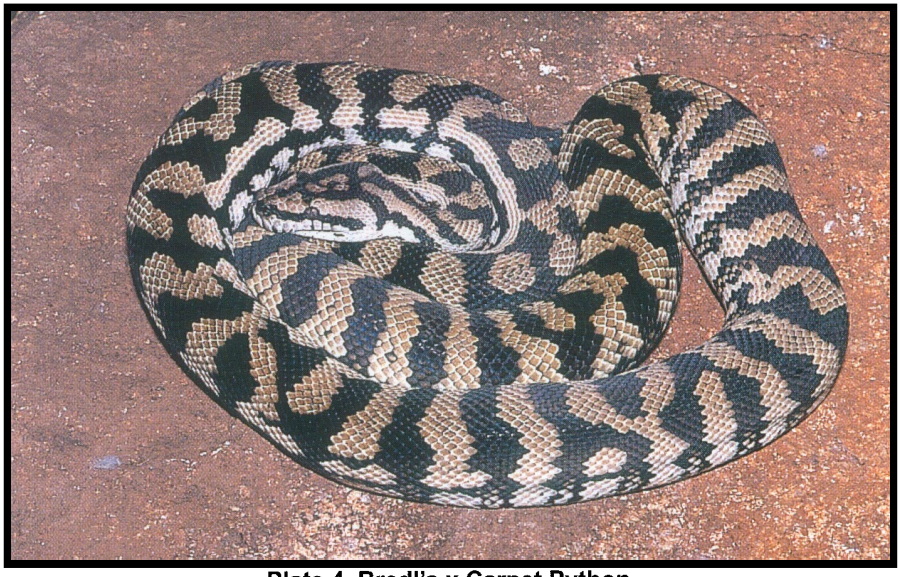

Plate 4. Bredl's x Carpet Python

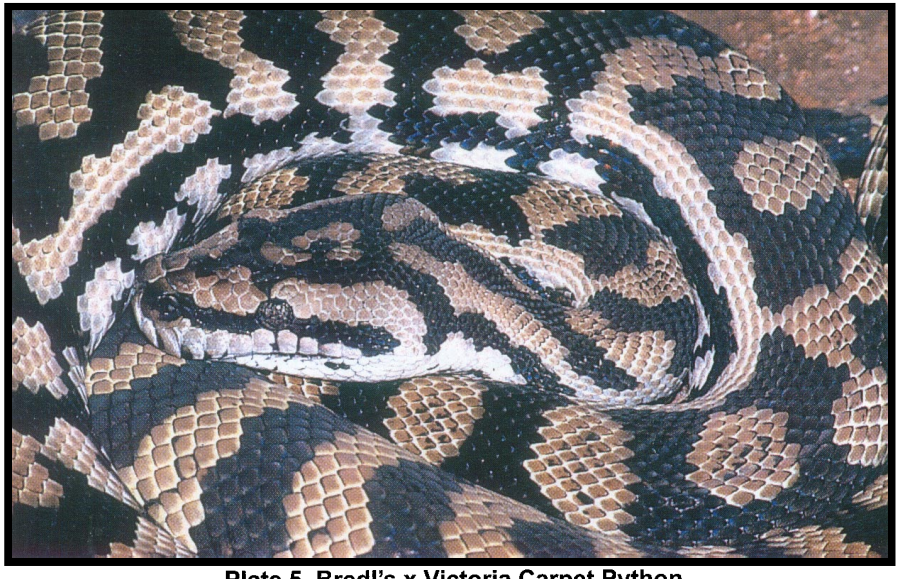

Plate 5. Bredl's x Victoria Carpet Python
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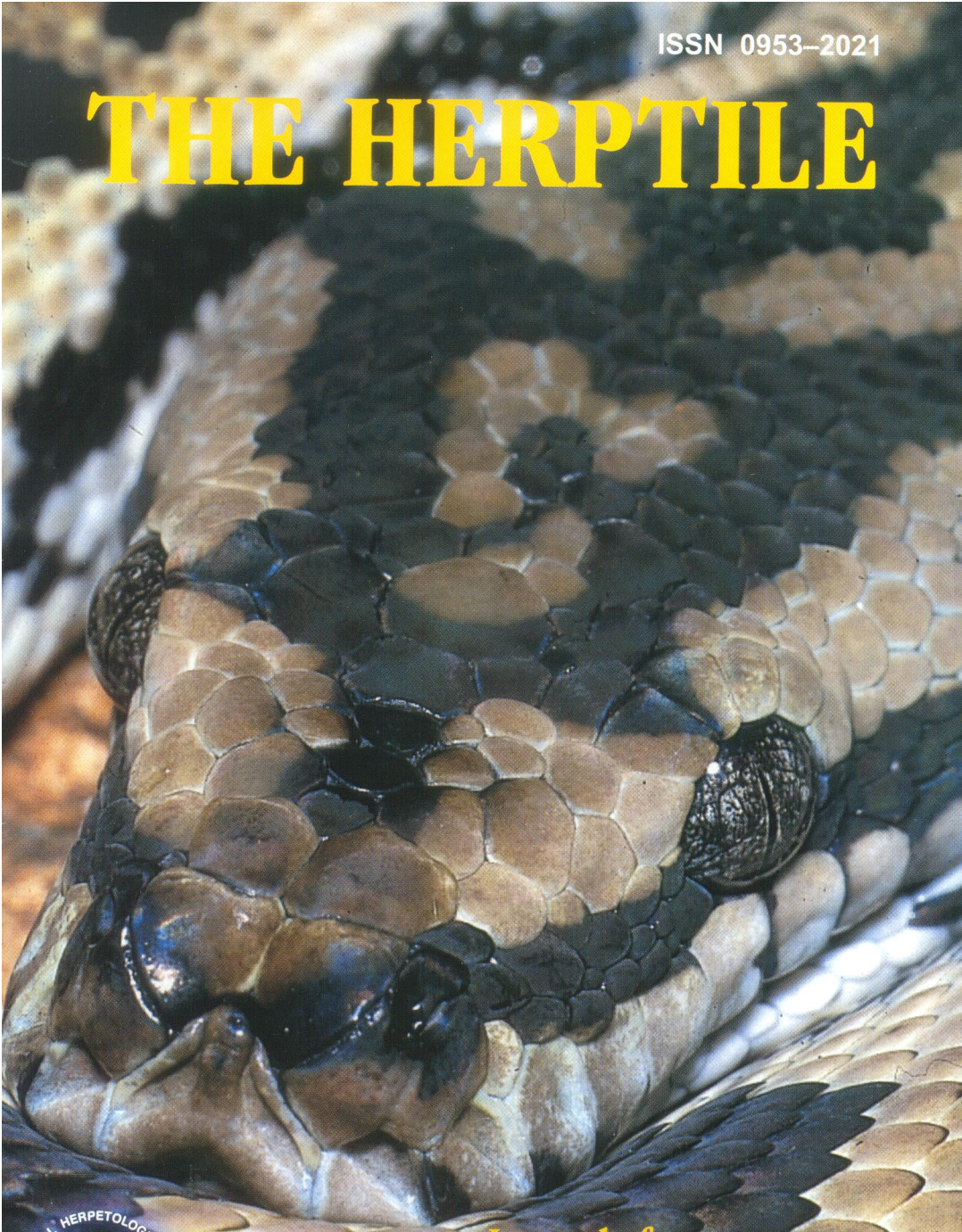

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