HUSBANDRY IN TWO SPECIES OF AUSTRALIAN HYDROPHIIDS (SEA SNAKES)

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INTRODUCTION

Recently I had the pleasure of going to the Melbourne Aquarium, not to look at the many wonderful species of fish and other marine creatures, but to observe the habits of their Reptile collection. Craig Thorburn, the Curator of the Melbourne Aquarium was more than happy to show me around its facilities on and off public display.

Reptile species currently held at the Melbourne Aquarium are as follows;
Eastern Snake Necked or **Long Neck Tortoise** *Chelodina longicollis*.
Murray or **Macquarie Tortoise** *Emydura macquarii*.
Green Turtle *Chelonia mydas*,.
Hardwick's Sea Snake *Lapemis hardwickii*.
Yellow Bellied or **Pelagic Sea Snake** *Pelamis platurus*.

The snakes are maintained at the Melbourne Aquarium for education and are also used to potentially save lives. The Australian Venom Research Unit (AVRU) is currently working in close conjunction with the Melbourne Aquarium to make anti venom for Australian and Indo Chinese species of sea snakes. This is sent to many countries without which, people would surely die without anti venom. As well as making anti venom the AVRU also breaks down venoms for use in medical and other industries. Dr. Bryan Grieg Fry is heading up the sea snake research and is currently spending much of his time in the field, working on sea snakes not only in Australian waters but also in South East Asia. He was also the person who initially collected the Hardwick's Sea Snakes *L. hardwickii* currently on public display in aquarium.

Additional observations on husbandry in Sea Snakes is provided in (West, 1990).

Melbourne Aquarium has only been open a short period of time, (approximately 2 years) and it appears to be one of the most up to date facilities in the world.

THE NATURAL HISTORY OF THE TWO SEA SNAKE SPECIES.

Hardwick's or Spine Bellied Sea Snake *Lapemis Hardwickii:* (Gray, 1835)

Hardwick's Sea Snake *L. hardwickii* is a relatively common species over much of Australia's Tropical north, ranging from Brisbane in Queensland, right

around the coast to Broome in Western Australia. Occasionally specimens are found outside of this range but this is generally due to storms and strong currents. It is also found throughout the Indo- Chinese Sea.

It is found in a wide range of habitats (Cogger, 2000) from reefs to estuaries.

Average length is about 1 metre with a maximum length of 1.2 metres. Scalation is as follows Midbodys: 23 to 45 rows, Ventrals 110 to 240, Preanal scales are barely enlarged (Cogger, 2000). Colouration of this snake is greatly varied from pale through to dark grey and occasionally brown. Its ventral aspect is creamish white to yellowish below the 2 colours joining in an irregular line. The darker dorsal colours can form blotches numbering from 30 to 55 against the lighter ventral colours. (Cogger, 2000).

Hardwick's Sea Snake *L. hardwickii* is known to reproduce almost all year round, with a litter size of 1 to 15 with an average of 5 (Greer, 1997), neonate sizes range from 254 to 279 mm (Greer, 1997).

It is generally a diurnal species preferring sand in the wild as substrate (Greer, 1997). In the wild the main prey of Hardwick's Sea Snake *L. hardwickii* is fish, however some invertebrates are taken. It's highly venomous, with at least one fatality recorded overseas (Ehmann, 1992).

Yellow Bellied or Pelagic Sea Snake *Pelamis Platurus*: (Linnaeus, 1766)

The Pelagic Sea Snake is one of the most widespread species of reptiles in the world. It is the only species of sea snake found in the Americas with a distribution from the West Coast of the Americas right through the Pacific Ocean around the Eastern, Northern and Western Side of Australia and through the Indian Ocean to the Eastern Coast of Africa. There are suspect reports of this snake being in the Carribean Sea however this has not been proven as yet. It been found in Victoria near Mallacoota (Coventry and Robertson, 1986) and also into Tasmania (Cogger, 2000). These specimens are however, generally regarded as "strays" being taken off course by large storms.

P. platurus are generally found more commonly in warmer waters. It is the only species of "true" sea snake that can be found in the ocean and has adapted itself in many ways to this.

They average about 700 mm in length, with a maximum length of 1.13 metres. Scalation is as follows, Midbodys: 47 to 69 and the ventrals 264 to 406 (Cogger, 2000). They are spectacular looking snakes, the dorsal half being a bluish black or dark Brown and the ventral colouration being a bright yellow through to cream. The tail is usually a white to yellow colour with black blotches on the sides. It is very smooth to touch. The Buccal cavity is bluish black (Similar to that of Western Brown Snakes Pseudonaja nuchalis.)(pers.ob).

Reproduction occurs year round with a litter size of 1 to 6 with an average of 3 (Greer, 1997). The neonates size at birth ranges from 230 to 280 mm with a weight of 7 to 9 grams in juveniles averaging 250 mm (Greer, 1997).

In the wild, it mainly feeds of surface species of fish but has in captivity also taken frogs (Switak, 1998). The feeding of *P. platurus* is very different to many other species of Hydrophiids, as it is an ambush predator. The snake lies motionless at the surface and waits, In the open ocean small fish congregate around any cover including sea snakes. So the snake waits until a small group of fish are surrounding the snake and slowly swims backwards so the fish are now more or less around the head of the snake. A quick sideways strike snares one of the fish and the snake begins to swallow it in "normal" fashion. The mouth has evolved for this with the fangs being pushed back from the front of the mouth and are now mounted in the middle of the mouth, this is probably so the chances of envenomation of prey are significantly higher.

It is extremely venomous with a powerful neurotoxin, a number of fatalities have been recorded (Hoser, 1989).

Another feature of this unique snake is that it occasionally "slicks"; this is where thousands and thousands of snakes swim together forming a writhing mass, and no one actually knows why *P. platurus* does this.

THE HUSBANDRY OF THE MELBOURNE AQUARIUM'S SEA SNAKES.

Housing

A pair of *L. Hardwickii* is housed in a very large display tank in the public area of the Melbourne Aquarium. The tank is made from an acrylic plastic that is 80 mm thick; this is due to the fact that the tank holds 75, 000 litres of water. The snakes are in half of this, which is separated by 2 walls made from a heavy gauge wire mesh, which is cleverly disguised with rocks that are tied through the mesh. This separates the snakes from a few fish but one in particular a Hump-Head Maori Wrasse *Cheilinus undulatus* which used to attack the *L. hardwickii*, the *P. platurus* and actually ate another species of Sea Snake previously held at the aquarium (*Acalyptophis peronii* the Horned Sea Snake).

The thickness of the walls of the tank is not because of the snakes but the 75 tonnes of water it must prevent from escaping. Both cages have fresh treated seawater that is continually pumped through both cages to maintain clarity for visibility and the general health of the enclosure. The substrate in the display tank is a crushed coral, which seems to do well for the snakes. However, in the wild they tend to be found over a sand bottom (Greer, 1997). Other objects within the cage is a "mock" coral reef, in which there are many suitable hiding places. Lighting above the aquarium is mainly for the coral and fish; it is lit by a series of 1,000-watt metal halide lights. General wiping with a cloth cleans both enclosures.

The *P. platurus* are now held off display in a small tub, which is 120 cm's across by 45 cm's tall. The water depth in the tank is about 30 cm's. This enclosure holds two sub adult snakes that are approximately 50 cm's in length. The substrate is a fine layer of gravel. The cage is very basic in design with a piece of plastic sea kelp, however this is on occasion replaced with a rubber coral fake, that is used for a refuge in the snake's enclosure. The water temperature is the same as for *L. hardwickii* at 26 degrees Celsius, the water for both aquariums originally comes from Port Phillip Bay (Melbourne) where it goes through a number of filtration systems before it reaches the snakes. The process is as follows: The water is shipped to the aquarium where it goes through the first stage of cleaning via Bio Balls…this takes most of the large matter out of the water. It is then pumped through an Ozone filter, which kills any live organisms still living in the water. From there it goes through a protein skimmer and a pressure sand filter, then again back through the Ozone filter and then heated to the desired temperature (in this case 26 degrees Celsius) and finally into the tank. The pH or acidity/ Base of the water is at an optimum level of 8.3. The water is also what's known as "a low nitrate/ammonia" water which emulates true seawater.

No Lighting is used above the *P. platurus*, however some daylight finds its way into the cooling tower where the snakes are kept, so they get a natural Melbourne photo period.

Feeding:
L. hardwickii is fed by hand. A diver goes into the cage and approaches one of the snakes at a time and offers it a dead comparatively sized fish. If the snake is hungry its takes this and feeds in a typical snake fashion, the amount of food taken is shown in table 1.

P. platurus is fed the by introducing a number of small fish to its enclosure and it feeds naturally, this is observed to rule out a risk of cannibalism. Initially they where reluctant to feed and had to be force-fed but after time the problem snake took food naturally. See table 2.

Growth:
The Hardwick's Sea Snakes *L. hardwickii* held by the aquarium are sub adults so they tend to grow slower than their younger counterparts (Yellow Bellied Sea Snakes *Pelamis platurus*). See Tables 3 and 4.

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