

## DEATH ADDERS (GENUS *ACANTHOPHIS*): AN UPDATED OVERVIEW, INCLUDING DESCRIPTIONS OF 3 NEW ISLAND SPECIES AND 2 NEW AUSTRALIAN SUBSPECIES.

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### INTRODUCTION

The following paper is similar in many respects to one that I published in *Monitor – Journal of the Victorian Herpetological Society* 9 (2) pp. 20-41 in 1998 save for the further descriptions in this paper of three new Island forms of Death Adder, one West Australian *Acanthophis* subspecies and one South Australian *Acanthophis* subspecies, as well as further information on the other forms where relevant and/or when new information has become available. Most of this paper was written and/or rewritten in 1999, with a few additions in terms of new breeding and other relevant data incorporated in the paper in early 2002.

In the event that times of comments (in terms of dates) appear to be out of sync, it is hoped that the above explanation covers any such anomalies that may follow.

Death Adders (Genus *Acanthophis*) are found in most parts of Australia, New Guinea and adjacent islands. They are unusual among the elapids in that they have evolved to become viperine in appearance and habit. All species are characterised by a broad somewhat flattened, triangular head, short stout body and a thin rat-like body ending in a curved spine. The spine and the presence of subocular scales separates *Acanthophis* from all other Australasian elapids.

Colour is variable, but often reflects the substrate from where the snakes come and dorsally there are usually somewhat indistinct darker and lighter bands (see photos in Hoser (1989) and elsewhere).

Males are usually smaller than females and non-growing adults of both sexes are usually in the vicinity of 60 cm (60 cm) with three foot (90 cm), being very large and very rare.

Accounts of specimens over 90 cm long have met with skepticism unless a photograph of the animal can be produced for independent verification.

A detailed summary of these snakes in Australia is of 1995, including biology, ecology and other relevant information, as well as a substantial bibliography, was published by Hoser in 1995. The 1995 paper has been updated from the world-wide-web at <http://www.smuggled.com/adder1.htm> and is strongly recommended to any reader seeking a detailed background of this genus.

There has been substantial confusion and misinformation regarding the taxonomy of species within the genus *Acanthophis*, particularly for those in northern Australia and Islands to the north, including New Guinea. This confusion has been caused by several factors including the fact that a number of well-known authors have made taxonomic judgments without inspecting animals previously described and/or relatively scant knowledge of the snakes in question. The purpose of this revised paper is to review the current taxonomy and formally redescribe known species and subspecies which to date have been rarely differentiated by herpetologists at the sub-generic level.

The basis of this updated review comes from studies of these snakes over a period in excess of 20 years, a review of published literature, (not all of which is cited here or in Hoser 1995), discussions with many private and professional herpetologists and keepers as well as the inspection of a substantial number of live snakes and others preserved in collections. The author has observed live specimens of all species and subspecies known from Australia (listed below) and some live animals from New Guinea when on tour in the United States in 1993.

Taxonomically, Death Adders present substantial problems in species identification due to the high degree of variability within each species, including within any single local population and the fact that many identifying characteristics sometimes used to separate species are shared to varying degrees by multiple species. Major character differences, such as base colour (i.e. red versus grey), may be affected by as little as one single gene (allele), (Hoser, 1985), clearly indicating that use of such a character on its own to separate species would be hazardous to say the least.

Previous works that cover *Acanthophis* taxonomy, include: Boulenger, (1898), Cogger (1983, 1992), Loveridge, (1948), Macleay, (1877), McDowall (1984), O'Shea (1996), Ramsay, (1877), Shaw and Nodder, (1802) Storr (1981) and Wells and Wellington (1983, 1985a, 1985b). Cogger (1992) and Ehmann (1992), both indicate undescribed forms of *Acanthophis*, or at least species other than the previously most commonly recognised trio, namely, *A. antarcticus*, *A. pyrrhus* and *A. praelongus*.

The use of venom properties to aid in distinguishing between forms and species has increased in recent years. Such has not been attempted by this author although venom analysis by this author has been used by others including Sheumacker in papers dealing with venom properties of *Acanthophis* including Fairley (1929), Kim and Tamiya (1961), Sheumack, Howden and Spence (1979), Stettler (1985) and Woeke (1983).

A recent paper by Fry et al. (2001) and large produced results that supported in all the taxonomic judgements of Hoser (1995) and this work in terms of the identification of

new and hitherto unnamed taxa (see below). Likewise for a paper in 1999 by Aplin and Donnellan

Keys that differentiate different species of *Acanthophis* have not been presented here. All keys seen by this author for the genus *Acanthophis* appear to break down with substantial regularity due to variability within each species, even though a number of species divisions are widely acknowledged.

The keys of both Cogger (1992) and Storr (1981) for the species *A. antarcticus*, *A. praelongus* and *A. pyrrhus* regularly break down when used against their divisions of *Acanthophis* into those three forms (breakdown of keys is generally between *A. antarcticus* and *A. praelongus*). However their keys do indicate trends in differences between the different forms. Keys have tended to rely on external characteristics such as colour patterns and rugosity, rather than head and body scalation, due to the variability of the latter within a single species, and corresponding relative uniformity of the trait within the genus.

For the purposes of this paper, a species of *Acanthophis* is defined as a population that appears to be different from others in physical characteristics, including those known to occur in nearby areas, but for which there is presently no evidence of gene flow between the populations. This definition does not take into account relationships between snakes in a captive situation. For example in 1996 a captive male *Acanthophis* (similar to and possibly *A. hawkei*) from near Camooweal, Queensland, mated with a female Hayes Creek, Northern Territory *A. lancasteri* to produce 31 healthy offspring in 1997, many of which were still alive and well in December 1999 (there were an additional five stillborn and no unfertilised ova). One of these snakes that were bred by a well-known Melbourne-based keeper was depicted on the front cover of *Monitor - Journal of the Victorian Herpetological Society* 9 (2) in 1998 (same photo also appeared on page 31 of the October 1998 issue of *The Reptilian* (UK)). Colouration of young tends to be intermediate between those of the parents, although colouration of offspring was not consistent.

Hoser (1989) published a photo of a captive male *A. pyrrhus* attempting to mate with an *A. antarcticus*. I have also observed both captive *A. praelongus* (from Queensland) and *A. lancasteri* (from Western Australia) attempting to mate with *A. antarcticus* (from New South Wales), while the captive male *A. antarcticus* pictured on the back cover of Hoser, (1989), was observed attempting to copulate with a female *A. pyrrhus* (*armstrongi*).

There is an unconfirmed report of *A. antarcticus* X *A. pyrrhus* crosses being available in the "pet trade" as a result of breeding in Queensland in 2000 or 2001.

As of 1998, there is no evidence of gene flow in the wild between different populations of *Acanthophis*. This is supported by McDowall (1999) who noted that all *Acanthophis* specimens given similar

immediate relationships or are instead due to convergence in evolution to cope with localised conditions.

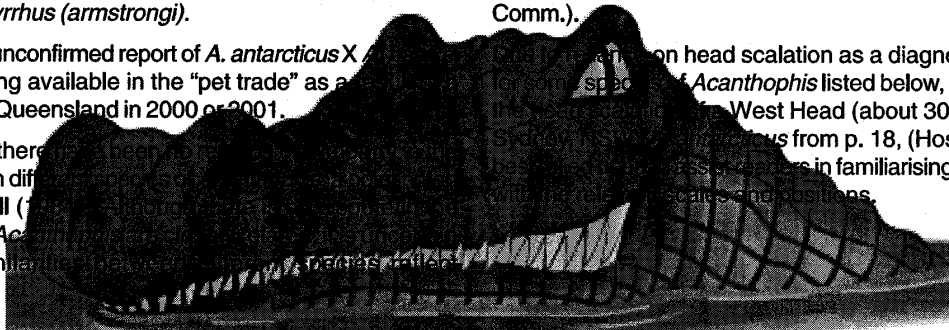
For each species listed below, I have made comments relating to the taxonomy and present understanding of each, including with reference to comments made by earlier authors. Previously unpublished information for some species of *Acanthophis* is given where appropriate. The listing of species and subspecies given in this paper completes that currently known for this genus. It is likely that further species and/or subspecies may later be recognised, particularly for island populations, many of which are suspected as differing from those of adjacent "mainland" populations. There has been little investigation into *Acanthophis* from the large islands north, west and south of New Guinea, such as Seram or Tanimbar and only a small number have been sighted by this author (refer to this paper). Attempts to get hold of specimens, photos and other material at the time the original 1998 paper was published were relatively unsuccessful.

Frank Bambang Yuwono has encountered Death Adders from the following Islands or groups of Islands: Seram (Seram), Aru and Tanimbar. Ed Colijn reports Death Adders from Obi, Haruku, Saparua, Seram, Nusa Laut, Tanimbar, Kai and Aru Islands, Biak and Numfoor. The Amsterdam Museum has specimens from the New Guinea mainland, Seram, Biak Schouten Island and one from the Kai Islands. The Australian Museum has one from Kar Kar Island (as does the Qld Museum), offshore from Madang (separated by the Isamrud Strait). The Museum of Zoology at Bogor has Adders from Tanimbar, Manokwari, Kei Islands, Muluku, Obi, Seram, Yamdena Island and Bintuni (S. Kepala Burung). The Nationaal Natuurhistorisch Museum, Leiden, The Netherlands has *Acanthophis* from the following Islands: Samlakk and Makation, Tanimbar, Aru, Groot Kei, Mefoor, Goram and Soek.

It is therefore safe to assume that Death Adders probably occur on most large Islands off the Northern Australian and New Guinea coasts (north and south sides). This author believes that the various island populations became isolated by rising sea levels over the last 20,000 years as opposed to the snakes 'island hopping' to the various locations.

While some overseas price lists have advertised Death Adders from Halmahera Island (e.g. one from Glades Herpetoculture and another from a Bali-based exporter herpafauna.com), there is some doubt as to whether Death Adders are actually found on the Island (Yuwono pers. Comm.).

When using head scalation as a diagnostic feature for the species of *Acanthophis* listed below, a drawing of the West Head (about 30 km north of Seram) is given from p. 18, (Hoser 1989), is included to assist in familiarising themselves with the species.



As of the publication of this paper, there are now 15 species of *Acanthophis* now recognised. Seven of the 14 species are known only from the island of New Guinea (including offshore islands), while the remaining 8 are known only from continental Australia and offshore islands. It is likely that further island forms will be described in future, either as subspecies or full species.

#### SPECIES AND SUBSPECIES OF ACANTHOPHIS NOW RECOGNISED

*Acanthophis antarcticus antarcticus* (Shaw and Nodder, 1802)

*Acanthophis antarcticus schistos* Wells and Wellington, 1985

*Acanthophis antarcticus cliffcrosswellingtoni* sp. nov. (this paper)

*Acanthophis barnetti* Hoser, 1998

*Acanthophis crotalusei* Hoser, 1998

*Acanthophis cummingi* Hoser, 1998

*Acanthophis groenveldi* sp. nov. (this paper).

*Acanthophis hawkei* Wells and Wellington 1985

*Acanthophis laevis* Macleay, 1877

*Acanthophis lancasteri lancasteri* Wells and Wellington 1985

*Acanthophis lancasteri bottomi* Hoser, 1998

*Acanthophis macgregori* sp. nov. (this paper).

*Acanthophis praelongus* Ramsay, 1877

*Acanthophis pyrrhus* Boulenger, 1898

*Acanthophis pyrrhus armstrongi* Wells and Wellington, 1985

*Acanthophis rugosus* Loveridge, 1948

*Acanthophis wellsei wellsei* Hoser, 1998

*Acanthophis wellsei donnellani* subsp. nov. (this paper)

*Acanthophis woolfi* Hoser, 1998

*Acanthophis yuwoni* sp. nov. (this paper)

(Total of 15 species)

*Acanthophis antarcticus antarcticus* (Shaw and Nodder, 1802)

Type data lost, however modern authors have assumed that the "Sydney" Death Adders are of this species, treating it as the "typical" form. Cogger (1983) made the following species names junior synonyms, *palpebrosa*, *cerastinus*, *brownii*, *ambigua*, *acanthophis*, *sorda* and *aculeata*. All had missing type data and/or specimens. Known distribution of *A. antarcticus* is southern Australia (except coldest parts), and the east coast and adjacent areas, including much of inland Queensland. There is a gap in the distribution in the region of the SA, Vic, NSW border.

There are no reliable modern records for the species (Coventry 1997). The only authentic locality is "Sydney".

There are several records from "Victoria", but none are reliable.

An alleged sighting in the Pacific Northwest (Menkhurst 1990) was not deemed reliable as it was made by a amateur

herpetologist or corroborated by a photograph or specimen. Contrary to popular belief there is no spinifex (*Triodia* sp.) on the island (Coventry 1997). The diary of Gerard Krefft has an 1856 entry of a drawing of a head and tail of this species from Lake Boga, which is about 15 km south-east of Swan Hill, in Victoria. Coventry and Robertson (1991) concluded that the species no longer occurs there due to habitat destruction for farming.

Specimens of *Acanthophis* from Mount Isa, Cloncurry, Dutchess and Dajarra, Queensland which themselves vary significantly in appearance, and are herein referred to as *A. woolfi* should be investigated further. Externally, they appear to be intermediate between *A. hawkei* (see p. 34 this journal for photos of a juvenile and adult *A. woolfi*) and *A. antarcticus* from more southern areas in general characteristics; however they tend to lack the distinct creamy coloured white-lipped marking (upper lip)(supralabials) of most *A. hawkei* and white labial markings common in most *A. antarcticus*. For example refer to the reddish coloured specimen from Dutchess, Qld., depicted on page 34 of Hoser (1998) and in Hoser, (1995), pages 10-11 top, and compare with the specimens of *A. hawkei* depicted in Hoser (1995) pages 10-11 centre, the (different) specimens on the cover of *Monitor* 8 (3) 1997 (Hoser 1997a) and in Hoser (1989) or ones in Hoser (1998).

*Acanthophis* from near Camooweal, Queensland, tend to have heavy white markings on the lower supralabials, (upper lips) but unlike in *A. hawkei* from Anthony's Lagoon, NT, they do not quite form a distinct "white-lipped" appearance. Some reptile keepers have classified these snakes as "Barkly Adders" (= *A. hawkei*) and it is probably with these snakes that the Camooweal *Acanthophis* have closest affinity, noting that Camooweal is situated roughly on the edge of the black soil part of the Barkly tableland. This author regards Camooweal *Acanthophis* as *A. hawkei*.

There may also be an undescribed subspecies in inland south-eastern Queensland (see under the discussion for the newly described subspecies *Acanthophis antarcticus cliffcrosswellingtoni* subsp. nov.).

Biology: Biological and captive breeding information about *A. antarcticus* is provided by the following author's: Carpenter et. al. (1978), Gilbertson-Middlebrook (1981), Hay (1972), Hoser (1981, 1982, 1983, 1984a, 1984b, 1985a, 1985b, 1985c, 1987, 1989, 1992, 1995, 1997a), Hoser and Williams (1991), Hudson (1979), Johnston (1987), Mirtschin (1976, 1982, 1985), Mirtschin and Davis (1991, 1992), Shine (1976, 1985), Swan (1990), Worrell (1972). Excellent information on this species can be found in Ehmann (1992), which is more comprehensive than in any other publication to date), and Knowles (1988) and many other publications.

Behavior: *A. antarcticus* has been documented to be very shy (Hoser 1997a) and the behavior tends to be stereotyped in the wild with the accounts published by Carpenter and Fergusson (1978). Mating has also been observed by this author in *A. lancasteri*, *A. praelongus* and *A. pyrrhus*, with all species tending to behave in a similar manner.

Notable is a common trend that young inexperienced snakes tend (on average) to take longer to effect a successful copulation than more mature and experienced ones.

Size: Despite the variations within the literature, it is generally thought that *A. antarcticus*, *A. hawkei* and *A. woolfi* are the three largest species of *Acanthophis* - at least within Australia.

The largest *A. cummingi* seen by this author was a three foot (90 cm approx. female) held by Chris Hay in Gisborne, Victoria as photographed in *Monitor* 9(1).

The largest *A. hawkei* known to this author is one over 3 foot held in the past by Brian Barnett in Melbourne.

On 23 February 2002, this author was able to visit the facility of Alex Staszewski at Blacktown, New South Wales to see what was purportedly a four foot Death Adder. The adult female *A. antarcticus* from the Sydney region was the largest of the species seen by this author to date. It was not measured as such. However it was sitting in a straight line with a 180 degree turn in it's body (running parallel to itself), and against the side of the cage, which was a known 3 feet 11 inches. The snake was conservatively estimated by this author as measuring at least between 3 foot five inches and 3 foot eight, based on how it measured against the known length of cage.

It is hoped to get a more accurate and verifiable measurement of the snake at a later date and/or upon death.

In terms of averages for *A. antarcticus*, non-growing adult males average about 57 cm and non-growing adult females about 70 cm, (just under and just over 2 feet).

Trade: Hoser (1991, 1993, 1996) discusses the legal and illegal trade of Australian reptiles, including *Acanthophis*, as well as conservation of these snakes. Persons within Australia contemplating trapping, studying or keeping these snakes, or any other *Acanthophis* and complying with the relevant state laws are referred to Hoser (1993, 1996).

***Acanthophis antarcticus cliffrosswellingtoni* subsp. nov.**

Holotype: A specimen in the South Australian Museum (Adelaide), R24412 from the Coffin Bay area, South Australia, Lat 34° 30' S 135° 19' E.

Paratype: A specimen in the South Australian Museum (Adelaide), R28460 from the Coffin Bay area, South Australia, Lat 34° 30' S 135° 19' E.

Diagnosis: Similar in most respects to *Acanthophis antarcticus*, the type subspecies being defined as coming from Sydney New South Wales, from which they differ in their slightly smaller average size and different ground coloration. The degree of variation in the grey speckling of the *cliffrosswellingtoni* subspecies is as grey as the grey of the type specimens. The ground coloration of *cliffrosswellingtoni* is slightly more towards

an orangeish, rather than a salmon or reddish pink as in *A. antarcticus*.

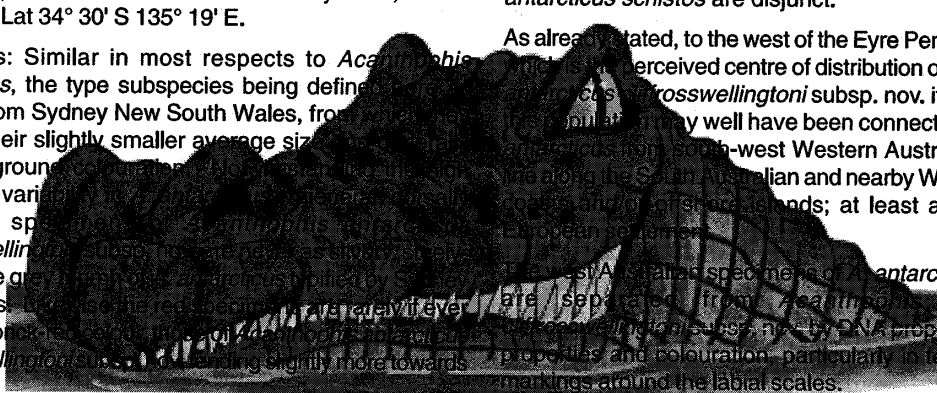
Furthermore this subspecies has (on average) less neurotoxic venom than all other variants of *A. antarcticus* known, including *A. antarcticus antarcticus* from eastern Australia and the South-west West Australian population, herein referred to as *A. antarcticus schistos* (see the taxonomic note near the end of this paper). *Acanthophis antarcticus cliffrosswellingtoni* subsp. nov. is separated from all other *Acanthophis* (all species and subspecies) by DNA and venom properties and distribution.

*Acanthophis antarcticus cliffrosswellingtoni* subsp. nov. is separated entirely from east Australian populations by distribution. The status of historical populations from southern NSW and far north Victoria (based on museum records) and now thought to be extinct is uncertain as to what subspecies they should properly be assigned to. This author is attempting to investigate this at the present time.

While this is certainly the case as of 2002 that Eastern Australian and South Australian populations of *A. antarcticus* are separated, it may not have been the case at the time of European settlement of Australia in the 1700's, although it appears to have been the case based on museum records and knowledge of the pre-existing habitats in the relevant parts of NSW, Victoria and South Australia. What the status of the two populations was, in terms of distribution at the time of Aboriginal settlement of Australia is effectively impossible to determine at the present time.

*Acanthophis antarcticus cliffrosswellingtoni* subsp. nov. is also separated from *A. antarcticus schistos* (as defined here, being the population centered near the south-west of Western Australia) by distribution, with an apparent and limited gene flow in recent historical times between these populations. The intergrade zone is believed to be in the region of the SA/WA border area, where *A. antarcticus* remains common in some localities, but this may not be so, and further research is required to determine the true status of these and other populations between central southern South Australia (Eyre Peninsula) and South-west Western Australia. Because of modern farming practices, there is little doubt that now the populations of *Acanthophis antarcticus cliffrosswellingtoni* subsp. nov. and *A. antarcticus schistos* are disjunct.

As already stated, to the west of the Eyre Peninsula region, the perceived centre of distribution of *Acanthophis cliffrosswellingtoni* subsp. nov. it appears that they may well have been connected with the *A. antarcticus* population in south-west Western Australia via a thin line along the South Australian and nearby West Australian coastal strip of grassy lands; at least at the time of European settlement. A single specimen of *A. antarcticus schistos* (SA) from the Eyre Peninsula, South Australia, was identified from the *A. antarcticus cliffrosswellingtoni* subsp. nov. population. The DNA properties, venom properties and colouration, particularly in terms of usual markings around the labial scales.



*A. antarcticus schistos* is usually separated from other subspecies of *Acanthophis*, including *Acanthophis antarcticus cliffrosswellingtoni* subsp. nov. by its relatively unique colouration of the upper and lower lip scales (labials) which on the lower surface are usually characterized by about six relatively thick creamy bars, interspersed with five thinner brownish (or greyish) bars which are sometimes slightly darker on the margins, and on the upper labials characterized by about five thinnish white and elongate triangles, the apex facing up, interspersed with initially thicker (at the front of the head), then thinner (towards the rear of the head) inverted triangles of darker pigment that is usually darker towards the rear of the head.

In *Acanthophis antarcticus cliffrosswellingtoni* subsp. nov. the lighter triangles on the front upper labials are generally either less distinct than in *A. antarcticus schistos* or even absent, instead being replaced by dark pigment.

*A. antarcticus antarcticus* (from Eastern Australia) usually has similar upper labial markings to *A. antarcticus schistos* and in similar number, from which it is also separated from *Acanthophis antarcticus cliffrosswellingtoni* subsp. nov..

However the lighter markings on the upper labials *A. antarcticus antarcticus* are generally of blunt triangular shape, rather than sharper and narrow as in *A. antarcticus schistos* and are also far less well defined and distinct as in *A. antarcticus schistos*.

Based on the very obvious trend differences in common colour patterns between forms from South Australia (Eyre Peninsula) and south-west Western Australia, including with regards to the markings on the labials (as defined above), it appears that the historical gene flow between the three main regional populations of *A. antarcticus* is at best, minimal, thereby making it perfectly reasonable to split the populations into different subspecies.

Photos of *Acanthophis antarcticus cliffrosswellingtoni* subsp. nov. in life are found in Hoser (1989).

It is also likely that the *A. antarcticus* from the Brigalow and adjacent regions to the south of there in Queensland (to near Moonie/Goondiwindi) may also be an undescribed subspecies. This possibility is being investigated by this author at present, but is being somewhat hampered by the relative lack of museum specimens from these areas as well as a lack of captives in private collections. A further problem is that the Queensland National Parks and Wildlife Service (NPWS) is loathe to issue collect permits for any *Acanthophis*, a genus of snakes they regard as "poisonous" or words to that effect, which seems ridiculous to me in mind the fact that vast numbers of these snakes are killed on an annual basis through road accidents. The latter number is about 1000 per year, and scientists believe that the population does not appear to be declining from the NPWS or any other government agency application to issue collect permits for purposes in Queensland has also been refused.

Distribution: As mentioned already *Acanthophis antarcticus cliffrosswellingtoni* subsp. nov. appears to be distributed on the Eyre Peninsula of South Australia and nearby places to the east and west in South Australia. The status of *Acanthophis* populations near Eucla near the SA/WA border and those on nearby offshore islands is not entirely certain.

Captivity: There have been captive-breedings of this subspecies in the literature and this author is aware of others that have not been reported or published. Notwithstanding this, more of the type subspecies *A. antarcticus antarcticus* are bred on a regular basis in captivity than the variant *Acanthophis antarcticus cliffrosswellingtoni* subsp. nov.

Etymology: The subspecies was named after Cliff Ross Wellington for his contributions to herpetology, including as co-author with Richard W. Wells of a series of controversial taxonomic papers in the 1980's. Those papers were subject of much heated debate over the following two decades, including even at present (2002), however many of their significant taxonomic changes were evidently overdue and have since been adopted by the majority of herpetologists, including names given to various python taxa and species skinks.

#### ***Acanthophis antarcticus schistos* Wells and Wellington, 1985**

Wells and Wellington gave the name to a specimen from near Perth WA. They gave no other significant information or reason for their naming the snake "*Acanthophis schistos*". However most herpetologists recognise the western populations of *A. antarcticus* as having at least minor differences to those from the east and also South Australia. Therefore at the present time, in this author's view, the name remains valid, at least as a subspecies (refer to the taxonomic note below).

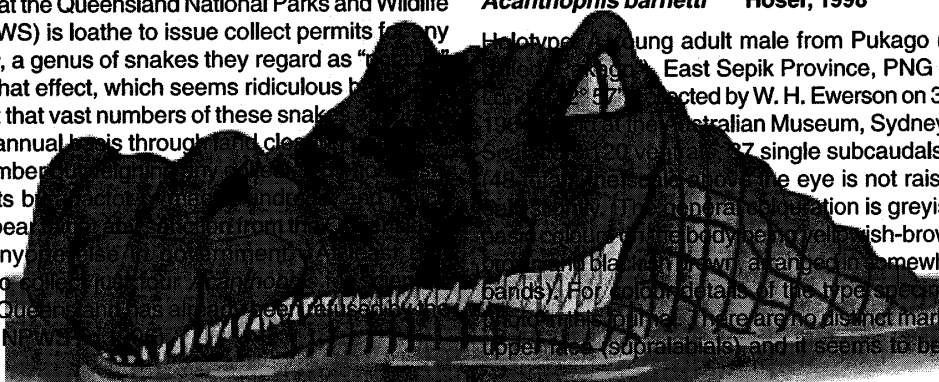
Storr, Smith and Johnstone (1986) and Bush et. al. present photos of live *A. antarcticus schistos*.

Captivity: Little has been recorded to date on this subspecies from Western Australia.

Ken Aplin from the WA Museum and others do not recognise the Wells and Wellington names (refer to Aplin 1999, Hoser 1999, and Wells and Wellington 1999 for the relevant arguments for and against, as well as Shea's views in the taxonomic note near the end of this paper).

#### ***Acanthophis barnetti* Hoser, 1998**

Holotype: Young adult male from Pukago (sometimes Pukago) East Sepik Province, PNG Lat: 03° 52' S, Long: 152° 57' E. Collected by W. H. Ewerson on 31st October 1987. Australian Museum, Sydney, R129223. Snout-vent length 277 mm. 27 single subcaudals, 11 paired, 11 unpaired. The eye is not raised, or if so, the eye is very low. General coloration is greyish brown (3 bands) with the body being yellowish-brown, greyish-brown and blackish brown arranged in somewhat indistinct bands. For color details of the type specimen see the description in Hoser (1998). There are no distinct markings on the upper lip (supralabials) and it seems to be mottled all



over, which is relatively unusual for PNG *Acanthophis*, (or at least certainly in the series held at the Australian museum). The front ventrals are dark grey with white at the posterior side, seeming almost like bands (one per scale).

**Diagnosis:** A medium sized *Acanthophis* from the northern part of New Guinea. The animal is readily distinguished from *A. laevis* by the fact that the supraocular scale (scale above the eye) is not raised in the same manner as in *A. laevis* and it's higher average ventral scale count (over 118 in *A. barnetti*). It is also separated from *A. laevis* by there being heavier dark pigmentation under the chin and near ventrals (evident in the type specimen of *A. barnetti*) (*A. laevis* has relatively little in this region of the body). *A. barnetti* is separated from *A. rugosus* by distribution (north of the central highlands, versus south) and the lack of rugosity on the head and neck. (Also see for *A. laevis*, *A. rugosus* and *A. crotalusei*, below).

It has been suggested that further studies of *Acanthophis* north of the New Guinea central highlands may ultimately result in all forms being treated as subspecies of a single "lowland" species (not *laevis* or *rugosus*). If such ultimately occurs, then the name *barnetti* should be treated as the nominate subspecies in favour of *crotalusei*.

**Biology:** Nothing known. No captive records known for the species.

**Etymology:** Named after Brian Barnett. Having devoted nearly 50 years to the study of reptiles, Barnett has kept and successfully bred many species of reptile in Australia, including being the first to do so for many species. In 1977, he formed the Victorian Herpetological Society which through his 21 year presidency of the society (ongoing in 1998) has helped many hundreds of people to keep and study reptiles.

Many people who first approached Barnett to obtain their first pet snake have long since completed tertiary studies and are now doing research of their own, as are many more who through Barnett's guidance and encouragement are similarly making new discoveries about Australasian herpetofauna. Barnett's achievements have also included the bringing in of a workable reptile licensing system in the State of Victoria, which while being far from perfect, has been vastly superior to the regime enjoyed in New South Wales over most of the past two decades, where his influence was not felt by the authorities. Barnett's wife of many years, Lani and children have also played an essential role in his herpetological efforts and the species *A. barnetti* was also named in their honour.

#### *Acanthophis crotalusei* Hoser, 1998

**Holotype:** An adult male, Australia, New Guinea, Madang District, Madang, PNG, Lat: 5° 12' Long: 145° 47' Collected by N. B. Blood, R120879, from Madang, Madang District, PNG, Lat: 5° 12' Long: 145° 47', Collected by H. G. Cogger on 20 May 1986. R121443, R122103 and R122104 all from Kar Kar Island, Madang District, PNG, Lat: 4° 37' Long: 145° 54' collected by G. Mengden and F. Parker in May 1986. All held at the Australian Museum in Sydney.

**Paratypes:** R15750, from Madang, Madang District, PNG, Lat: 5° 12' Long: 145° 47', Collected by N. B. Blood. R120879, from Madang, Madang District, PNG, Lat: 5° 12' Long: 145° 47', Collected by H. G. Cogger on 20 May 1986. R121443, R122103 and R122104 all from Kar Kar Island, Madang District, PNG, Lat: 4° 37' Long: 145° 54' collected by G. Mengden and F. Parker in May 1986. All held at the Australian Museum in Sydney.

**Details of R15750:** young adult female, 45.5 cm snout-vent, 8 cm tail, 53.5 cm total length. 126 ventrals, 45 subcaudals (total), first 13 subcaudals single.

**Diagnosis:** A moderate sized *Acanthophis* believed to be widespread in New Guinea, although the current confirmed distribution is confined to the Madang area. (Further specimens in the collection at the Australian Museum conformed to this species, but time constraints prevented further inspection, including scale counts of these to confirm that they were in fact *A. crotalusei*).

This species is in many respects intermediate between *A. laevis* and *A. barnetti*. It is essentially similar in appearance to *A. laevis* from which it may usually be separated by the following characteristics, more black pigment on the upper labials, a more thick-set build in adulthood and higher average ventral count (under 118 in *A. laevis*, over 118 in *A. crotalusei*, refer to scale counts quoted by McDowall (1984)). Some but not all specimens of this species (*A. crotalusei*) have a well defined temporal line, particularly in front of the eye (as in *A. barnetti*). Separated from *A. barnetti* by the fact that *A. crotalusei* does not have distinct black lines running up the infralabials to the mouth (like in *A. barnetti*). *A. crotalusei* tends to have a more raised supraocular scale than is usually seen in *A. barnetti*. Both species are also presently separated by distribution. *A. crotalusei* is more common in the lowland areas of New Guinea, while the head and neck of *A. rugosus* (in adulthood) is more rugose. This author has not inspected any young specimens of this species (*A. crotalusei*) in the collection at the Australian Museum (1998). It is shown in Hoser (1998) as 157 (lower).

**Biology:** Nothing known. As assumed to be similar for other *Acanthophis*. Likewise for captivity through to date.

**Etymology:** Named after the author's dog, (itself named

The head and neck scalation is slightly rugose.

For colouration details see photo in this journal. Colouration is a greyish-brown colour scheme with bands which appear to be indistinct (the snake was sloughing when killed and was not tampered with when inspected by this author, noting that markings would tend to be somewhat brighter after completing the slough). All supralabials and infralabials have distinct dark blotches in their centres. None of these blotches reach to the lip. the second last supralabial is very large. A distinct temporal line runs through the eye, apparently coordinating to an extent with the eye colour. The head is marginally darker than the neck. The belly has a mottled appearance but appears to be very dark. The tail has a yellow tip.

**Paratypes:** R15750, from Madang, Madang District, PNG, Lat: 5° 12' Long: 145° 47' collected by N. B. Blood. R120879, from Madang, Madang District, PNG, Lat: 5° 12' Long: 145° 47', Collected by H. G. Cogger on 20 May 1986. R121443, R122103 and R122104 all from Kar Kar Island, Madang District, PNG, Lat: 4° 37' Long: 145° 54' collected by G. Mengden and F. Parker in May 1986. All held at the Australian Museum in Sydney.

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**Biology:** Nothing known. As assumed to be similar for other *Acanthophis*. Likewise for captivity through to date.

**Etymology:** Named after the author's dog, (itself named



after a North American genus of snake) who guarded the author's house and files against break ins and raids for over 9 years (now over 10 years).

#### ***Acanthophis cummingi* Hoser, 1998**

**Holotype:** An adult female specimen in the Australian Museum, Sydney, Australia, R12438 from Yirkala Mission, near Darwin, NT. Lat: 12° 15' Long: 136° 53'. Scalation: 23 mid-body rows, 31 single subcaudals (at least)(this is not the complete number of subcaudals), 124 ventrals, about 56 bands on the body (excluding the head and tail). Black or dark coloured tip of tail. The type specimen was collected by W. S. Chaseling. For the colour of the type specimen, see the photo with this paper. Note that the specimen appears to have faded over time.

**Paratype:** Another adult female from the same locality, (Lat: 12° 15' Long: 136° 53'), R12552 held at the Australian Museum in Sydney. 23 mid-body rows, for the subcaudals, the 1st is paired, the next 17 are single, 1 is paired, one is single then the rest are paired (running towards the tail tip) (this is not the complete number of subcaudals), 121 ventrals. Black or dark coloured tip of tail. The paratype was collected by W. S. Chaseling. Note: both the type and paratype presented difficulties in counting scales accurately; hence no complete count of subcaudals for either.

**Diagnosis:** For the colouration in life, see this magazine depicting a specimen from just south of Darwin, NT. It should be noted that in line with other *Acanthophis*, *A. cummingi* is extremely variable in colour, even within a single locality.

For many years *A. cummingi* have been mis-identified as *A. antarcticus*. (e.g. Gow 1977). In the last decade or so, many private reptile keepers have called these snakes "floodplain *praelongus*" in order to differentiate them from the "hill form" now known as *A. lancasteri*, which occurs in hilly areas of the Kimberley ranges and elsewhere. There is uncertainty as to the exact distributional status between both very similar forms. In spite of similarities between what is herein regarded as *A. cummingi* and *A. lancasteri*, it is proposed that two taxa are involved, hence the assigning of *A. cummingi* to the above described variant of *Acanthophis*. Genetic testing may help resolve the accurate status of the relationship between these snakes.

*A. cummingi* is a relatively large form of *Acanthophis* and can usually (in life) be separated from *A. lancasteri* and other *Acanthophis* by the following suite of characteristics. Scalation ranges from smooth to very slightly rough (less than is usually the case seen in *A. lancasteri*). Prominence of the subcaudal keels appears to be more prominent in males than in females, a trend which is also seen in *A. lancasteri*. In life, *A. cummingi* in life appears to be a more robust snake, which appears to be more robust than *A. lancasteri*. The snake flattens out during its attack, giving it a more snake-like appearance. The head is more rounded than *A. lancasteri* (distinct white markings on the head, especially the snout and lip) than is usually the case seen in *A. lancasteri*. The paratype as described above is shown in this journal.

They also appear to be marginally more thick-set than *A. lancasteri* and are known to attain larger sizes (length and weight - see below).

Three live captive *A. cummingi* in Victoria had ventral counts of 121, 122 and 120, implying 120-124 is the approximate range for the species.

Some specimens of *A. cummingi* become greyish towards the head and upper neck regions, which is a trait shared with some *A. lancasteri*. *A. cummingi* is separated from all other Australian *Acanthophis* by known distribution. Contrary to earlier publications (e.g. Gow 1977), it is now accepted that there are no *A. antarcticus* at the top-end of the Northern Territory.

**Maximum size known:** This author has seen and photographed a specimen in captivity held by Chris Hay of Gisborne, Victoria, measuring 92 cm in total length (in 1997) and of substantial girth, weighing 800 grams (measurements confirmed by this author). As of April 1998, Hay reported that the snake had grown slightly since the earlier (1997) measurement had been taken. A specimen nearly as large was held by Stuart Bigmore at Lara, Victoria. This makes *A. cummingi* substantially larger than any *A. lancasteri* known (refer to Storr 1981, who gives a maximum snout-vent length for WA *A. lancasteri* in his study as 48.2 cm or Cogger 1992 who gives an average size of 40 cm and maximum of 70 cm (for *A. praelongus*, including *A. lancasteri*). This author has never seen an *A. lancasteri* in excess of 75 cm total length.

**Venom Toxicity:** No published research results are known. On 16/4/96, Chris Hay, an adult male reptile keeper in Gisborne, Victoria was bitten by a large (92 cm long) captive adult female *A. cummingi* (referred to above) from near Humpty Doo, NT, and was admitted to the Royal Melbourne Hospital in Parkville, Victoria. He was given 18,000 units of Death Adder anti-venom to neutralise the venom. This is three times that usually required to neutralise a Death Adder bite.

**Known Distribution:** *A. cummingi*, is believed to be restricted to the floodplain and adjacent regions of the far north of the Northern Territory in the vicinity of Darwin, including Fogg Dam and near the Marakai Floodplains where it is apparently very common. These are the only areas from where the species is currently known.

**Captivity:** No breedings of *A. cummingi* were known to this author in 1998. Relatively few are held in captivity. Reptile keepers Fred Rossignoli, Ringwood, Victoria, and Stuart Bigmore, Lara, Victoria and Chris Hay, Gisborne, Victoria, have presented no husbandry problems and are rearing them in the same manner as *A. lancasteri* and *A. antarcticus*. Reptile keepers who have had success with *A. cummingi* in life have not reported any breeding in captivity to date (or at least none that I am aware of). This is probably due to a lack of specimens available for study, and possibly to any inherent difficulties in breeding. At the time of writing the bulk of this (newer) paper in December 1999, Chris Hay's female (listed above) was held by another *A. cummingi* from the same locality. It is anticipated that he will publish his breeding results.

Roy Pails of Ballarat, Victoria, also bred *A. cummingi* in 2000, and noted that young are vastly smaller than those of *A. hawkei* (when born). This size feature was also observed by this author, even though the animals at Pails' facility were not physically measured when seen by this author.

A case of cannibalism is known for the species. A large captive female of about 75 cm (total length), ate a male of about 60 cm (total length). There was no food in the cage at the time. The female digested the male in the same manner as usual food eaten.

**Etymology:** Named after Fia Cumming, political reporter in 1998 with the Sydney *Sun-Herald* newspaper. In August 1981, she became the first journalist to report on corruption involving stolen reptiles within the NSW National Parks and Wildlife Service (NPWS). She followed up with newspaper stories over the following 15 years and her investigations into a kangaroo meat substitution racket involving senior NPWS officials and other reptile-related matters, culminated in material included in the book *Smuggled-2* (Hoser 1996). That material became subject to a series of failed defamation actions against this author in 1996, which then led to a series of events culminating in the effective disbandment of most of the (now discredited) law enforcement arm of NPWS and introduction of a rational reptile licencing system in NSW for the first time ever in late 1997.

Without the investigations and reportings by Cumming, it is probable that no such overhaul of reptile and other wildlife laws in NSW would have ever occurred which would have continued to severely restrict ongoing herpetology and conservation in that state and by extension, throughout Australia. In effect, Cumming has possibly contributed more to the field of herpetology in Australia than any other non-herpetologist.

#### *Acanthophis groenveldi* sp. nov.

**Holotype:** A male specimen held in the Zoological Museum of Amsterdam, The Netherlands, ZMA 16220 from Wai Matakabo, North East Seram Approx. Lat: 3° Long: 129°. Total length 38.9 cm, tail 9.9 cm 113 ventrals. The type specimen is nearly 100 years old and thus the colouration may be slightly different from that in life. The dorsal colouration of the type specimen is one of a brownish nature consisting of alternating darker and lighter crossbands. The darker and greyish ones being the broader. The head has dominantly lighter pigment, however the two rear supralabials have large dark blotches. There are dark blotches in the four anterior supralabials. The ventralia are pale with dark spots near both ends.

Photos of the holotype (in colour) can be found on the internet address <http://www.smuggled.com/addtax3.htm> immediately after original publication of this paper in "hard copy", by following the relevant link/s from that webpage (via the thumbnail images accompanying the description and no more than three mouse clicks from that webpage).  
 The holotype was collected in 1902 from Wai Matakabo, North East Seram, North East of the island of Seram, The Netherlands, ZMA 16220 from Wai Matakabo, North East Seram Approx.

Lat: 3° Long: 129°. Total length 47.8 cm, tail 9.7 cm 114 ventrals. The type specimen is nearly 100 years old and thus the colouration may be slightly different from that in life. The dorsal colouration of the type specimen is one of a brownish nature consisting of alternating darker and lighter crossbands. The darker and greyish ones being the broader. The head has dominantly lighter pigment, however the two rear supralabials have large dark blotches. Unlike the type specimen, this snake does have dark blotches in some of the more anterior supralabials, but with the exception of the third from the rear, none are prominent. (Live specimens from Ceram sighted by this author did have distinct dark blotches in the rear five supralabials). The ventralia in the paratype are pale with dark spots near both ends.

Photos of the paratype (in colour) can be found on the internet address <http://www.smuggled.com/addtax3.htm> immediately after original publication of this paper in "hard copy", by following the relevant link/s from that webpage (via the thumbnail images accompanying the description and no more than three mouse clicks from that webpage).

**Diagnosis:** Known at this stage only from the Island of Seram to the West of New Guinea. This is also diagnostic for this species. *A. groenveldi* is the only *Acanthophis* found on Seram.

*A. groenveldi* appears to be most closely related to *A. laevis* and it can be safely assumed that they derived from the same ancestral stock. Common to both species are the low ventral scale counts (usually under 118), which is diagnostic for both species when compared to all other *Acanthophis*. Both appear to share a suite of other traits, including their similar adult sizes (on average smaller than for some other *Acanthophis*), relatively smooth scalation, raised supraocular and a relative lack of dark pigmentation around the labial region of the head. These just listed traits are also shared by a third *Acanthophis*, namely *A. macgregori*, described for the first time in this paper (below). That species (*macgregori*) is separated from the other two by distribution, *A. macgregori* being the only *Acanthophis* found on Tanimbar. Specimens of *A. macgregori* seen by this author do not appear to have the supraocular raised as much as in the other two species, but this may not be a consistent trend between the species.

The two snakes (*laevis* and *groenveldi*) are most easily separated from one another by distribution. Furthermore specimens of *A. laevis* inspected by this author from New Guinea are intended to have a different configuration of black blotches on the infralabials. *A. laevis* tend to have their blotches pointing towards broad triangles with the apex towards the mouth. In *A. groenveldi* the blotches are more irregular in shape. By comparing comparative photos of the two species it was suggested that *A. groenveldi* and *A. macgregori* should be treated as subspecific to *A. laevis*, as they are in the physical distance of Seram and Tanimbar from New Guinea and the time it is assumed that popula-



tions of *Acanthophis* from these places have had their populations genetically isolated, it was decided to treat the three groups of *Acanthophis* as being of separate species unless and until compelling evidence to the contrary arises. All species of *Acanthophis* as identified here can be separated via DNA analysis.

It is notable that among the islands to the west of New Guinea, Seram is by far the most mountainous. Noting that *A. laevis* tends to be associated mostly (but not always) with montane areas in New Guinea, it isn't altogether surprising that a similar form of *Acanthophis* (*groenveldi*) is the form native to Seram. Noting that *Acanthophis* are known from the relatively nearby (to Seram) island of Obi, it is probable that a similar form with a low ventral count exists on that Island. However this remains speculation at this stage, as this author has yet to see specimens from there.

**Captivity:** Little known. Frank Yuwono (pers. comm.) noted that *A. groenveldi* seems unlike *A. rugosa* in that it does not readily take to warm-blooded prey, such as mice or young chickens. *A. groenveldi* seems to prefer frogs. According to Yuwono, captive *A. rugosa* readily take mice and young chickens. Other reptile keepers from the northern hemisphere have made similar comments.

**Etymology:** Named after of Axel Groenveld in tribute to his ongoing contributions to herpetology.

#### *Acanthophis hawkei* Wells and Wellington 1985

Known colloquially as the Barkly Adder, a sub-adult female was depicted on the front cover of *Monitor* 8 (3) 1997 (refer to Hoser (1997a)). Apparently it lives on black-soil plains and is probably the largest *Acanthophis*. In spite of the preceding statement, quotes of adult sizes in the literature are not matched by the sizes of specimens in museum collections or for that matter private facilities.

*A. hawkei* is closely related to *A. antarcticus*, with which it was confused for many years. Distinguished from most other *A. antarcticus* by the fact that the lower part of the supralabials (upper lip scales) usually (but not always) tends to be creamish in colour without darker markings reaching the lip, giving it a jagged "white-lipped" appearance (e.g. see photos in Barnett and Gow 1992 or Hoser 1989, 1995, 1997a).

This jagged "white-lipped" appearance is relatively unusual in *A. antarcticus* and has never been seen to the same degree as is typical for *A. hawkei*. Excluding *A. antarcticus*, adult *A. hawkei* could not be confused with any other Australian *Acanthophis*.

**Captivity:** Breeding data for captive specimens of *A. hawkei* by Barnett and Gow (1992) show that the average lengths of offspring are 100-120mm. This is far in excess of any other *Acanthophis* including *A. antarcticus* and is only exceeded by *Acanthophis* including *A. antarcticus* and is only exceeded by *Acanthophis* including *A. antarcticus* and is only exceeded by *Acanthophis* including *A. antarcticus*. Barnett in Victoria (again) and North Queensland (Australia).

Paul Woolf (Brisbane, Queensland) bred the species in the 2000-2001 season as did Roy Pails of Ballarat. Neither did so the following year.

#### *Acanthophis laevis* Macleay, 1877

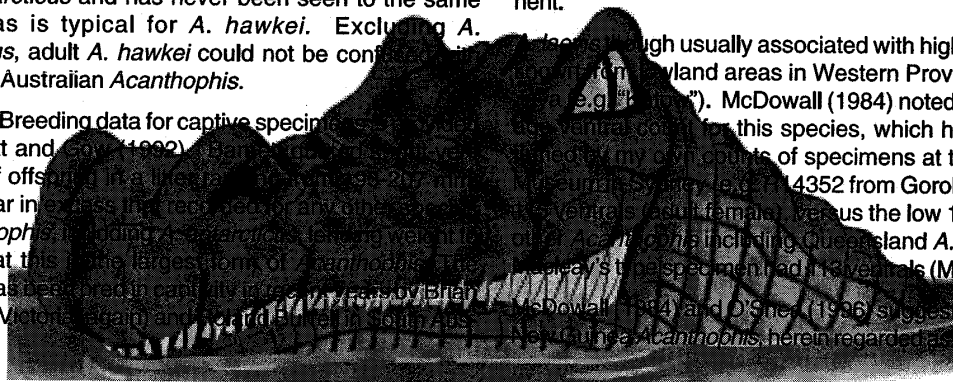
This species herein resurrected from the (relatively recent) synonymy of *A. praelongus*. Type locality Katow, PNG, Lat: 09° 06' Long: 143° 00'. (Katow is the old name for Mawatta on the Binaturi River in southern Trans-Fly of Western Province, PNG)(O'Shea, 1998). *A. laevis* is also separated from *A. praelongus* and *A. lancasteri* by its average lower ventral count, (usually under 118 in *A. laevis*, and higher than that in *A. praelongus*).

The type specimen of *A. laevis* has not been inspected by this author, however an inspection of *Acanthophis* from the same locality and nearby areas conform with Macleay's description and this author has assigned all those snakes to *A. laevis*. The snake in question is substantially different to the *A. praelongus* described by Ramsay, which is presumably based on a north Queensland *Acanthophis*, from near Somerset, (Cape York) Queensland. *Acanthophis laevis* has smooth scales, while *A. praelongus* tends to have slightly keeled scales. Head patterning of both species is also usually radically different. For example compare the photo of *A. praelongus* from North Queensland (plate 380, Hoser, 1989) with the *A. laevis* shown here.

For most *A. laevis* seen by this author, the last supralabial and adjoining temporal shield have a distinct black blotch in the centre. Such markings have not been observed by myself in *A. praelongus*, where instead the darker markings in this region are not defined the same way and tend more to merge into that of the slightly lighter upper head.

*A. laevis* from the central and Western Highlands regions of the Island of New Guinea (including Irian Jaya) tend to have little in the way of darker head markings or blotches (above the mouth) except for those at the rear of the mouth (rear supralabials). This includes those from around "Katow", which appears to be a lowland locality. Those from more eastern highland areas, west to about Goroka often tend to have mottling on the forward supralabials, (refer also to photos on page 157 of O'Shea (1996)). While many species of *Acanthophis* have a raised scale above the eye (supraocular), particularly in younger specimens, none have this trait to the same extent as *A. laevis*, which retain the trait into adulthood, when the raised scale remains prominent.

Though usually associated with highland areas is also found in lowland areas in Western Province and Irian Jaya (e.g. "Katow"). McDowall (1984) noted a lower average ventral count for this species, which has been confirmed by my own counts of specimens at the Australian Museum (e.g. n=14352 from Goroka, PNG, with 120 ventrals for males, versus the low 120's for most of *Acanthophis* including Queensland *A. praelongus*). McDowall (1984) and O'Shea (1996) bases that highland *Acanthophis* herein regarded as *A. laevis* have



strong affinities to *A. antarcticus* from Australia. This author disagrees with that conclusion. Besides the obvious difference of the very raised scale above the eye (noted by both authors), head markings tend to be quite unlike most *A. antarcticus* from Australia. Furthermore, this author has yet to see any specimens from the New Guinea highlands that attain the size and weight of some Australian *A. antarcticus*. Confusion within Australia between *A. antarcticus* and *A. praelongus* may have led to the above authors making their statements, meaning to imply similarity to *A. praelongus* (from Queensland), instead of the more southerly distributed *A. antarcticus*.

Reference by O'Shea (1996) of a localized "small montane race (to 300 mm)" are probably of this species (*A. laevis*). All anecdotal evidence, suggests that *A. laevis* is the smallest of the four species of *Acanthophis* known from New Guinea (this paper), including that of O'Shea (1996) and McDowall (1984). McDowall (1984) noted that *Acanthophis* from south-western PNG (near Australia), have little in common with those from Queensland, Australia, further confirming the different specific nature of New Guinea *Acanthophis*. That McDowall was referring to *A. laevis* is not in doubt as he identifies it as "a form with reduced ventral count, reduced black pigmentation and the temporolabial entering the mouth". Inspection of specimen number R23960 at the Australian Museum confirmed McDowall's assertion that *A. laevis* also on occasion occurred away from the central highlands, including south-western PNG.

Data for R23960 is as follows:- Collected at Balimo, Aramia River, Western District, PNG, Lat: 08° 01' Long: 142° 57' on 3 November 1963. Identified by this author as *A. laevis*. Age: adult. Snout-vent 39.5 cm, Tail 10.5 cm, Total length 50 cm. Sex: male. Scalation is smooth with 111 ventrals (2 of which were paired), 34 single subcaudals, 14 paired, (48 total). Other specimens from the same locality are held at the Australian Museum.

Lindgren (1975), plate 88 depicts a head photo of a snake this author believes is probably *A. laevis* in life. However it's facial markings are not like the *A. laevis* at the Australian Museum. It is believed that the non-black dark pigment tends to fade faster than the black pigment in preserved animals; this trait is believed to be common to all *Acanthophis*. The point is noted here as a lack of black pigment in *A. laevis*, may make specimens fade more than other *Acanthophis* species.

Biology: Little known, but presumed to be similar to other *Acanthophis*. Worrell (1972) records this species being most active at the end of the wet season, which parallels the activity of *Acanthophis* as noted by the author's observations. O'Shea (1996) in Lindgren (1975) notes that *Acanthophis* is nearly 2000 metres from the coast. *Acanthophis* is found in areas west of

Captivity: No

sumed that specimens are in captivity in the northern hemisphere.

#### ***Acanthophis lancasteri lancasteri* Wells and Wellington 1985**

Originally described by Wells and Wellington as "*Acanthophis lancasteri*", based on a specimen from near Halls Creek, WA. The same type of animal is depicted in Hoser (1989), plates 378, 379 listed there as *A. praelongus* from Kunnanurra, WA, (which is not far from Halls Creek) and in Storr, Smith and Johnstone (1986), p. 127. So far all *Acanthophis* from the East Kimberley region seen by this author can be readily assigned to this species. Wells and Wellington differentiated *A. lancasteri* from *A. praelongus*, including giving it's distribution as being the top end of the Northern Territory and Western Australia (namely the hilly tropical north, including the Kimberley Ranges and Arnhem land escarpment). However they failed to give any separating characteristics between the species.

Perhaps the most readily identifiable difference is in ventral colouration. *A. praelongus* tends to have well defined brown spotting on the ventral scales, which is relatively unusual in *A. lancasteri*. *A. praelongus* usually has two well defined white markings which are more or less triangular in shape on the lower supralabial scales (upper lip). *A. lancasteri* (from WA at least) rarely has such markings, or if present, they are usually not clear and well defined, but rather mottled in appearance, tending to merge with the adjacent colour. (Both species have well defined white markings on the infralabials).

This author has also been told that *A. lancasteri* has a higher average ventral count than *A. praelongus*, but has not seen sufficient data to confirm this assertion. Storr (1981) gives a range of 122-134 (N=12) for *A. lancasteri* (which he calls *praelongus*). Ramsay (1987) gives a number of "about 120" for the original North Queensland *A. praelongus*, which is just outside the range quoted by Storr for his limited sample of *A. lancasteri*. In 1980, this author counted a Cairns, Queensland, *A. praelongus* as having 124 ventrals.

*A. lancasteri* appears to be restricted to rocky and hilly habitats or adjacent areas and seems to be most common in areas where *Triodia* grasses dominate. My own experiences in the East Kimberley indicate the species is extremely common where such conditions occur, but rare or absent elsewhere. Personal communications from [redacted] have collected "*praelongus*" type *Acanthophis* in the Northern Territory indicate a similar situation usually [redacted] no *Acanthophis* (of any species) [redacted] of Carpentaria running several [redacted] the southern most part of [redacted] known from the islands [redacted] (Lindgren) and Mornington [redacted] species, nor [redacted] separates *A. lancasteri* from *praelongus* in north Queensland.

A [redacted] noticeable in some specimens. *A. lancasteri* is

darkening of the head and neck area. An example of this is seen in Hoser (1989), plate 378. This feature is not unique to this species, also being seen in *Acanthophis wellsei* the Pilbara region of Western Australia and possibly other forms as well (also see Wilson and Knowles (1988), p. 330. In *A. lancasteri* this trait is seen in populations throughout the range of the species, but becomes more pronounced in populations from the eastern section of the Northern Territory (see *A. lancasteri bottomi* below).

The nominate subspecies *A. lancasteri lancasteri* is herein confined to Western Australia and probably adjacent western sections of the Northern Territory (see below).

**Captivity:** *A. lancasteri* is very hardy in captivity and readily takes to feeding on mice. Male specimens kept by this author (in Sydney) from Kunnanurra and Turkey Creek, Western Australia presented no problems until stolen in 1984. At least one remained alive and healthy at Taronga Zoo, Sydney until at least 1992, when it was photographed by the author, meaning it had been held captive at that stage for 9 years. It had been adult when caught. Cannibalism has been recorded for this species, although it is regarded by this author as being relatively unusual.

**Breeding:** Has been bred in captivity a number of times, perhaps most notably by keeper Rob Valentic, of Greensborough, Victoria, whose snakes were identified as *A. lancasteri* or "*hill praelongus*". Valentic has detailed records of his results and is expected to publish details of them. A photo of one of Valentic's females giving birth in 1996 was published by Hoser (1997b).

#### ***Acanthophis lancasteri bottomi* Hoser, 1998**

**Holotype:** An adult female specimen in the Australian Museum in Sydney, Australia. R26274. Collected at Angurugu Mission, Groote Eylandt, Gulf of Carpentaria, Northern Territory, Australia, Lat: 13° 58' Long: 136° 27', by D. Levitt.

**Paratype:** An adult female from Groote Eylandt, Gulf of Carpentaria, Northern Territory, Australia. Lat: 13° 59' Long: 136° 28', collected by H. E. Warren. R10218 held at the Australian Museum in Sydney. Details of paratype: Snout-vent: 53.5 cm, Tail: 8.5 cm, Total length 62 cm, 129 ventrals, 24 single subcaudals, 18 paired/divided subcaudals, 42 total subcaudals.

**Diagnosis:** Essentially similar to the type subspecies *A. lancasteri lancasteri*. A moderate sized *Acanthophis* with strongly rugose scales on the head and neck. Young specimens have distinct bands which tend to fade with age, (based on observations of a series of specimens at the Australian Museum). For colour see the photo with the keeper. The animal's colour is brown to greyish brown with a few markings of yellow and cream in colour on the ventral surface. Distinguished from *A. lancasteri lancasteri* by its strongly marked head which appears to be diagnostic of adults in the range of this subspecies (*bottomi*) also appears to be diagnostic of the adjacent Australian

mainland, although in some areas, it forms apparent intergrades with the type subspecies and in some localities specimens assignable to either subspecies may occur.

**Ecological notes:** Little known. It is supposedly most abundant in hilly areas, but also is found around dunes on Groote Eylandt. Assumed to have similar habits to the type subspecies.

**Captivity:** Nothing recorded, but presumably similar to other *Acanthophis*.

**Etymology:** Named after investigative journalist Robert Bottom, author of several best-sellers about organised crime in Australia. In the mid 1980's he did a series of reports about corruption involving fauna officials in New South Wales. In 1991 he reported on Police corruption in Victoria a full twelve months before other "mainstream" newspaper journalists dared run with the story.

#### ***Acanthophis macgregori* sp. nov.**

**Holotype:** A specimen held in the Museum of Zoology, Bogor from Tanimbar, Lat: 7°30' Long: 131°30', specimen number MZB 338.

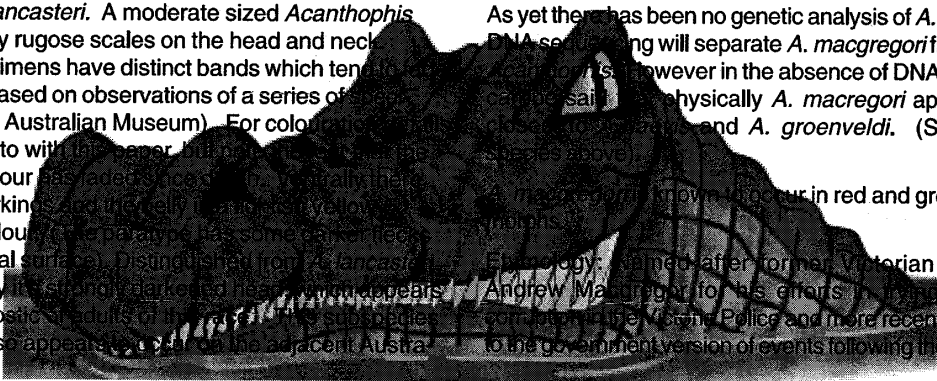
The dorsal colouration of the type specimen is typical for *Acanthophis* in that dorsally it has alternating darker and lighter crossbands.

**Paratype:** A specimen held in the Museum of Zoology, Bogor from Tanimbar, Lat: 7°30' Long: 131°30', specimen number MZB 2056. The dorsal colouration of the paratype specimen is also typical for *Acanthophis* in that dorsally it has alternating darker and lighter crossbands.

**Diagnosis:** This *Acanthophis* is separated from all others in the genus by distribution, being the only species to occur on the Island of Tanimbar. It is separated from all other *Acanthophis* species except *laevis* and *groenveldi* by its ventral scalation, which is usually under 118. Ventral scale counts for two specimens of *A. macgregori* came to 113. The relationship of *A. macgregori* to those *Acanthophis* from adjacent islands is uncertain. Specimens of the species observed by this author appear to be different from *A. laevis* and *A. groenveldi* in that the supra-ocular is not quite as raised. However this may not be a consistent diagnostic trait. This species appears to be quite unlike *A. rugosa* and *A. lancasteri* found to the mainland areas north and south of Tanimbar in adjacent New Guinea and Australia.

As yet there has been no genetic analysis of *A. macgregori*. DNA sequencing will separate *A. macgregori* from all other *Acanthophis* species. However in the absence of DNA evidence, it is possible that physically *A. macgregori* appears to be most closely related to *A. laevis* and *A. groenveldi*. (See for both species photos in Hoser (1997b).) *A. macgregori* occurs in red and greyish brown with a few markings of yellow and cream in colour on the ventral surface.

**Etymology:** Named after former Victorian Policeman Andrew Macgregor for his efforts in 1901 to expose corruption in the Victorian Police and more recently in relation to the government version of events following the Port Arthur



Massacre in Tasmania.

***Acanthophis praelongus* Ramsay, 1877**

Herein restricted to the Cape York region of Queensland and adjacent areas. Refer to above descriptions of *A. laevis* and *A. lancesteri*. Populations of *Acanthophis* from Western Australia and the Northern Territory formerly referred to as this species are now classified as *A. lancesteri*. Populations of *Acanthophis* from New Guinea and other Islands north of Australia that may have been referred to as this species are no longer regarded as such (see for *A. barnetti*, *A. crotalusei*, *A. laevis*, above and *A. rugosus* below).

Specimens of *Acanthophis* from islands in the Torres Strait region north of Cape York in the Australian Museum have been seen by this author. While being tentatively assigned to this species (*A. praelongus*) by this author, do have intermediate characteristics between this species and *A. laevis*, the most notable being reduced ventral scale counts. Noting that Aplin and Donnellan (1999) identified a zone of hybridization between *A. wellsei* and *A. pyrrhus* in Western Australia, it is likely that such may in fact occur between another two *Acanthophis* species in the Torres Strait area.

It is therefore suggested that there be further research into these island populations to determine their correct status and other ecological and conservation considerations.

**Captivity:** *A. praelongus* has been bred in captivity by Roy Pails of Ballarat, Victoria, Andrew Lowry of Brighton, Victoria and others. Young are substantially smaller at birth (on average) than for *A. lancesteri* which have been bred by Rob Valentic of Greensborough. Excellent photos of live *A. praelongus* appear in Hoser (1989, 1995). Young appear to be more difficult to raise than for other *Acanthophis*, including *A. lancesteri*.

The Lowry breeding was of two Cardwell, Queensland, *A. praelongus* which resulted in six live young averaging just 12-13 cm in total length.

**Taxonomic note:** Prior to Hoser (1998) most major herpetological texts, including those of Cogger regarded all Death Adders from tropical Australia as belonging to the species *A. praelongus*. Hoser (1998) followed Wells and Wellington (1985) in dividing this species as previously recognised to be more than one taxa, namely *A. praelongus* and a north-western variant known presently as *A. lancesteri* (see later taxonomic note on this). Hoser (1988) went further and added further taxa to this list, including "*bottom*" from Groote Eylandt, NT and "*A. cummingi*" from the floodplains area of the NT.

That the Hoser division was correct was confirmed by the serological results of Fry et al. (2001). The name "*praelongus*" is therefore retained for *Acanthophis*, and *A. praelongus* is used to describe that form.

***Acanthophis***

Type locality

Photos of West Australian *A. pyrrhus* (*armstrongi*) appear in Hoser (1989, 1995) and Storr (1981). Northern Territory *A. pyrrhus* is depicted in Cogger (1992).

**Captivity:** Breeding data for captive specimens is provided by Fyfe and Munday (1988) and Gow (1981). Photos of mating *A. pyrrhus* are published in Glasby et. al. (1993), and Shine (1991). Cannibalism for this species has been recorded several times, indicating that it is probably more prone to this behavior than any other Australian *Acanthophis*.

***Acanthophis pyrrhus armstrongi* Wells and Wellington 1985**

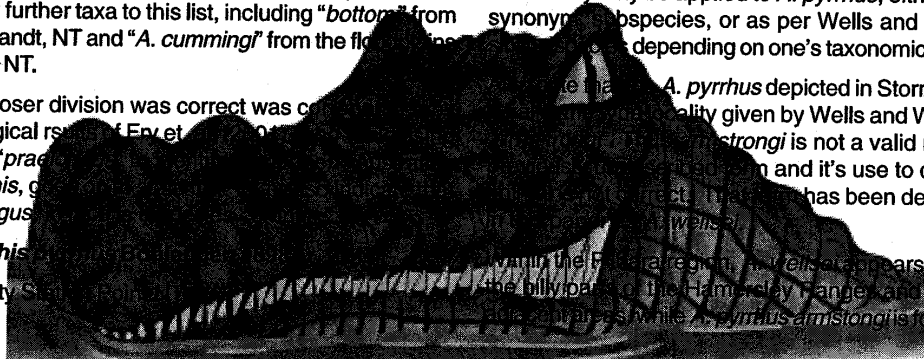
In 1985, Wells and Wellington assigned all Western Australian *A. pyrrhus* to a new species, namely "*A. armstrongi*". That they intended placing all *A. pyrrhus* from Western Australia into the new species is confirmed by their statement 'Storr (1981:207-208) provided a description of a species from north-western Australia that he regarded as *Acanthophis pyrrhus*. However, we consider that this is really an undescribed species, herein named *Acanthophis armstrongi*, and that the species *Acanthophis pyrrhus* is confined to central Australia. *Acanthophis armstrongi* is believed confined to the Pilbara and Kimberley regions of Western Australia and can be identified by referring to the illustrations in Storr (1981: fig 3) and Gow (1983: Plate 15, (upper), specimen from Port Hedland, Western Australia vide Gow, Pers. comm.).'

The type specimen of "*Acanthophis armstrongi*" was a snake collected 5 km east of Giralalia, Western Australia, and is an adult in the Western Australian Museum, number R61357. The name "*armstrongi*" has since erroneously been used to describe a previously undescribed form from the hilly parts of the Pilbara region south of the Great Sandy Desert, including those from Millstream, Pannawonica and 60 km NNW of Newman, Western Australia (e.g. Hoser 1997).

These snakes, herein referred to as *A. wellsei* are radically different from the more northern *A. pyrrhus*, including those from Port Hedland, WA. As Wells and Wellington clearly indicated they were referring to a snake known as *A. pyrrhus* and that it was the form depicted in Storr (1981) and Gow (1983), which is still recognised by all other Australian herpetologists as the species *A. pyrrhus* (or close variant thereof) rather than the other form, the name *armstrongi* can clearly only be applied to *A. pyrrhus*, either as a junior synonym subspecies, or as per Wells and Wellington a synonym depending on one's taxonomic judgements.

The name *A. pyrrhus* depicted in Storr 1981 is from the locality given by Wells and Wellington for *armstrongi* is not a valid name for the form depicted in Storr and it's use to describe that form has been described later.

Within the Pilbara region, *A. wellsei* appears restricted to the hilly parts of the Kimberley range and immediately adjacent areas while *A. pyrrhus armstrongi* is found in flatter



more arid areas to the north, south and east. The exact distribution of both types of *Acanthophis* in the Pilbara is not known. Museum collections appear to have substantial gaps in distributional samples.

This author regards *A. pyrrhus* from the Great Sandy Desert of WA and adjacent areas, including coastal parts of the Pilbara as being sufficiently different from the nominate form to be given subspecific status.

Specimens of *A. pyrrhus armstrongi* observed by this author in life appear to have more yellow colouring dorsally than those seen from central Australia, although whether this is a general trend difference between both forms is not yet known.

#### ***Acanthophis rugosus* Loveridge, 1948**

Type locality Merauke, Irian Jaya (south coast of New Guinea). The type specimen has not been inspected by this author. However an adult specimen in the Australian Museum R147655 with the same locality data is obviously the same species.

Upon viewing the *Acanthophis* at the Australian Museum spirit house, the animal R147655 was immediately retrieved as being like no other *Acanthophis* in the collection. That it's collection locality data matched that of specimen number 22812 at the Museum of Comparative Zoology (the type) came as no surprise.

Unlike other species from the island of New Guinea, *A. rugosus* has very strongly rugose scales on it's head and neck. The scale above the eye, does not appear to be raised as in *A. laevis*. Markings on the labials and head differ from those of other New Guinea *Acanthophis*, however other *A. rugosus* may display different head markings. At the time of publication of my 1998 paper *A. rugosus* was not known from any other locality. However the species and/or similar species also occurs on at least some Islands to the south of New Guinea (refer to this paper).

Cogger (1993) incorrectly declared *rugosus* a junior synonym of *praelongus*. Neither species is remotely similar. It is assumed that Cogger had not inspected type specimens or others from the same localities. *A. laevis* from the Highland regions of the Irian Jaya side of the border seen by this author have looked similar to the one pictured with this paper.

#### ***Acanthophis wellsei* Hoser, 1998**

Holotype: An immature specimen held at the Western Australian Museum from Wittencoom Gorge, WA, 22° 15' Long: 118° 23', R8886.

Paratypes: R21538 also from Wittencoom Gorge, WA, 22° 14' Long: 118° 20'; R21539 from Marandoo, WA, Lat: 22° 20' Long: 118° 19'; R21540 from Mount Meharry, WA, Lat: 22° 20' Long: 118° 19'; R21541 from Marandoo, WA, Lat: 22° 20' Long: 118° 19'.

Diagnosis: Known from the Pilbara region of western Australia including Pannawonica and Newman, WA where it

is very common (Ball 1993). Distribution appears to be centred on the Hamersley Range area. It has been up until now an undescribed form. Many specimens tend to have black bands and darkening of the head (usually black), although this is not a diagnostic trait of the species as some specimens are not marked this way (see Ball 1993).

*A. wellsei* appears to be most closely related to *A. lancasteri* and/or *A. pyrrhus*, and tends to have smooth to moderately rugose scales, particularly on the sides. *Acanthophis wellsei* can in all cases known to this author, be distinguished from *A. pyrrhus* by having two prefrontals as opposed to four in *A. pyrrhus* (Bush 1988). The head of this species appears to be "deeper" than seen in *A. pyrrhus* and the side of the head does not flare below the eye as in *A. pyrrhus*. In these respects it is like *A. lancasteri*. *A. wellsei* is unlikely to be confused with any other *Acanthophis*.

Distribution of this species appears restricted to the range areas around the Hamersleys and Chichester Range of the Pilbara, although it does extend to lower areas nearby. Coastal areas to the north and east are evidently populated by *A. pyrrhus*. To date no areas of sympatry are known. Bush (1988) speculated that hybridisation between the two forms may occur. Further survey work in the Pilbara is required to fully resolve the distributional status of both forms. Ken Aplin from the WA Museum was working on this species at the time this paper was written.

Captivity: The species has been bred in captivity. Photos of the snake in life are shown in by Hoser (1998) and can also be seen in Ball (1993) as well as in Mirtschin and Davis (1992). The author understands numbers of this snake are being held captive at the present time, both in WA and the eastern states, and in 2001 received an unconfirmed report of an adult female from near Newman WA, producing a total of 12 young.

Cannibalism has not been recorded but based on the fact the species is similar to both *A. pyrrhus* and *A. lancasteri*, both of which are known to have cannibalistic tendencies, the habit is likely to be observed in *A. wellsei*. In terms of general husbandry matters, private keepers have not indicated problems.

An instance of mite infestation in a long-term captive reported to this author was cured without adverse incident on the captive snake.

Taxonomic History: In 1981, Glen Storr of the Western Australian Museum published the results of his study of *Acanthophis* in Western Australia (Storr 1981). The study was apparently based on preserved museum specimens. Records published for *A. pyrrhus* in that paper, included preserved specimens of *A. wellsei* but were not distinguished from the earlier described species. This was done from his listing 11 out of 33 specimens of *A. pyrrhus* having two prefrontals, which appears to be diagnostic for *A. wellsei* as well as the locality information given. 33 specimens examined from some locations included areas now known to only have *A. wellsei*. Type data given here was derived from that paper.

In 1991 the Western Australian Museum was supplied with two specimens of *A. wellsei* (Ball 1993). Other specimens were found by Dave Robertson and Brian Bush. Bird (1992) reported Ken Aplin of the Western Australian Museum as having discovered the snake. In 1993, the Second World Congress of Herpetology was told that Aplin would soon be publishing a description of the snake. After further effluxion of time it appeared that Aplin had chosen not to publish a description of the species as it was thought that Wells and Wellington had already published a description in 1985 and therefore the species was thought to already have a name ("*armstrongii*").

In 1997-8 when doing a taxonomic review of *Acanthophis*, this author obtained a copy of the Wells and Wellington paper and noted that they had in fact described "*A. armstrongii*" as a Pilbara death adder. However what had apparently been overlooked was that the snake described by Wells and Wellington had not been the undescribed form of *Acanthophis*, but rather the local variant of what is commonly known as *A. pyrrhus*.

Bush (1998) confirmed that the snake described by Wells and Wellington was not the undescribed form herein described as *A. wellsei*. This fact is further confirmed by referring directly to the Wells and Wellington paper and the fact that the snake was apparently unrecognised by all until the early 1990's. The Death Adders from Giralia, WA are not the formerly undescribed form, but rather *A. pyrrhus*, or what has been recognised as such (noting Giralia as the type locality for "*A. armstrongii*") (also see photo in (Storr 1981) of an *A. pyrrhus* from Giralia, WA).

By 1998, this author had been in regular contact with the Western Australian Museum staff for many years and received correspondences from them implying that they may undertake and publish a second review of the genus *Acanthophis* (e.g. Smith 1997), the first review being that of Storr (1981). It was noted that a time frame of over 6 years had elapsed since the undescribed Pilbara *Acanthophis* was originally found by scientists and staff at the Western Australian museum. It was noted that to date in 1998 they had chosen not to describe it as a new species and hence this author's decision to assign it the name *wellsei* in 1998..

Further noting the apparently conflicting views from Western Australian herpetologists over their impressions of the true taxonomic status of the previously undescribed Pilbara *Acanthophis*, (e.g. Storr 1981, Bird 1992), this author decided to publish a formal description of the snake as a new species in 1998 (see Hoser 1998).

This was later confirmed by Ken Aplin from the Western Australian Museum as taxonomically correct (Aplin 1999). In 1999, Ken Aplin and Steve Donnay published a paper describing a new species, but I had already published a paper describing the species. I understood that Aplin and Donnay were publishing a more detailed taxonomic review of the genus *Acanthophis* as well as genetic results from Giralia, WA. The genetics of which appeared in Aplin (1999).

Finally, since publication of Hoser (1998), a number of authors have cited the species as "*A. wellsii*". This is an error as the name was always intended to be "*A. wellsei*".

Original Etymology of "*A. wellsei*": Named after Richard Wells. He is a highly knowledgeable and talented herpetologist who in the mid 1980's published a series of controversial taxonomic works, described by some critics as "reckless" (cited at the end of this paper).

An attempt was made by a number of high profile herpetologists to have the International Commission of Zoological Nomenclature (ICZN) to have the relevant works of Wells and co-author, C. Ross Wellington formally suppressed. Such did not occur (Shea 1998) and many of the names proposed by the pair have found their way into widespread acceptance (e.g. *Antaresia*, *Morelia spilota mcdowelli*). Other taxonomic judgements by the two have either been disagreed with or following further research found to be in error. However such a situation is not unusual in taxonomy, noting for example similar judgements being made against the taxonomic works and conclusions of Storr (e.g. Bohme 1992), Sprackland (e.g. Shea 1998) and others, whom are still highly regarded and respected within their areas of publication. Therefore disagreement by peers with the conclusions of Wells and Wellington should not be in itself relied upon to cast adverse judgement upon the pair.

Disagreements about taxonomic conclusions are part and parcel of the science of zoology. In the main the papers of Wells and Wellington assigned species names to well recognised taxa that until then did not have such names and as such their taxonomic judgements are not in doubt.

In recent years there seems to have been an attempt by some in the "herpetological establishment" to wipe any references to Wells and Wellington from the record, perhaps encapsulated in the attempt by Sprackland et. al. to wipe the name *Varanus keithornei* (Wells and Wellington 1985) in favour of his later proposed name *Varanus teriae* (Sprackland 1991), which violates the basic ICZN rule of "priority". That case being before the ICZN in 1998. Refer to Shea (1998), or other relevant articles within the *Bulletin of Zoological Nomenclature* published in 1997-8 (cases 3042-3043). Another example is the apparent suppression of a name given by Wells and Wellington in 1985 to the western form of "Children's Python", subsequently re-named as "*stimsoni*" again in violation of the ICZN priority rule.

The name *wellsei* was chosen to help ensure that recognition of the substantial contribution to herpetology in Australia of Richard Wells remains in the future and is not lost to the historical record. This should not be taken as an endorsement by this author of Wells' taxonomic views in all matters.

#### *Acanthophis wellani* subsp. nov.

*Acanthophis wellani* subsp. nov. (Figure 1) was first found in the Western Australian Museum collection in 1985. It was found in a lighthouse, Western Australia. (Storr 1981, Bird 1992, Hoser 1998, Aplin 1999).



Paratype: A specimen in the Western Australian Museum number: R19674, from Vlaming Head Lighthouse, Western Australia, Lat. 21°48'S, Long. 114°10'E.

Diagnosis: Similar in most respects to *A. wellsei wellsei*, from which it is separated by the following suite of characters

Females have on average, statistically significantly lower ventral scale counts than *A. wellsei* from elsewhere, as well as a relatively longer tail. The supraocular scales are distinctly flared when compared with other *A. wellsei*.

Keeling is more pronounced on scale rows 1-4 and specimens from this region appear to be paler in ground colour than those from elsewhere.

Dorsal ground colour is often lightish with yellowish greyish crossbands superimposed on a light-reddish-brown background, with black tips on the posterior margins of the yellowish grey crossband scales (black tips are on the last row only on each band). *A. wellsei donnellani* subsp. nov. is restricted to the Cape Range area of Western Australia as opposed to the main *A. wellsei wellsei* population that is found in the region centered around the Hamersley and Chichester ranges of WA.

Aplin and Donnellan (1999) page 285, stated that obvious differences between specimens of *A. wellsei* (Cape Range populations - now *A. wellsei donnellani* subsp. nov. and *A. wellsei wellsei*) "may also relate to differences in substrate between the two areas (limestone and sand vs iron-rich rocks and skeletal soils)", and then on page 289 provide a "detailed distribution" of *A. pyrrhus* and *A. wellsei* in north-western Western Australia. This map shows a disjunct distribution for the Cape Range population of *A. wellsei*, separated from the main Pilbara population by a population of the more widely distributed *A. pyrrhus*, thereby giving further evidence of the genetic isolation of the Cape Range population.

Furthermore, while it is obvious that habitat requirements (such as substrate) would influence the evolution of morphology of snakes, the character differences (scalation traits and so on) observed by Aplin and Donnellan are effectively genetically fixed in these snakes and while substrate may have led to these states arising, it does not at any given point in time affect the phenotypes produced by adult snakes in terms of the character states they have commented on. This is being genetically predetermined as evidenced by the same characters appearing in captive-bred snakes bred in plastic tubs on newspaper and similar set-ups.

By way of example, in the Sydney region *A. antarcticus* are known from various rock-type substrates, namely shale/clay (where they are relatively uncommon) and sandstone, and there is no evidence whatsoever of differing scale and other traits in terms of the habitat substrate the snakes are found on.

Furthermore bearing in mind that we are talking subspecific differences and not species divisions, it is not essential to prove total genetic isolation of the two populations as implied by Aplin and Donnellan (p. 285) in order to validly assign

subspecific designation to the Cape Range population.

Bearing in mind the ongoing need to conserve an ever increasingly fragmented biodiversity, coupled with the risk of private keepers hybridizing snakes from widely differing gene pools, the need to properly name the Cape Range population of *A. wellsei* sooner rather than later is important.

It is also noted that West Australian herpetologists have in the past taken an overly conservative view in terms of naming taxa that they have inspected (e.g. Storr 1981). Rather than take the chance that another 20 years will elapse before this taxa is appropriately named, this author takes the opportunity to formally name it forthwith.

Distribution: restricted to the Cape Range area of Western Australia, where it is most common in hilly areas and near watercourses. There is also a population of *Acanthophis pyrrhus* in the generally lower region that apparently separates the population *A. wellsei donnellani* subsp. nov. from the main population of *A. wellsei wellsei*. It is assumed by both this author and Aplin and Donnellan, that *A. pyrrhus* is a more derived species than *A. wellsei* and it is further presumed (by this author at least) that in the relatively recent geological past, *A. pyrrhus* have extended their range and numbers at the expense of *A. wellsei*, this event perhaps occurring in tandem with the progressive drying out of Australasia within the last million or so years.

Captivity: Little known, but thought to be similar in captive requirements to the type subspecies *A. wellsei wellsei*. A few live specimens of *A. wellsei donnellani* subsp. nov. from the Cape Range area are believed to be held in captivity in WA at the present time (Aplin and Donnellan, 1999).

Etymology: The diagnosis for this subspecies, including the information as provided above was essentially provided by Aplin and Donnellan (1999) and subsequently corroborated by this author from inspection of living specimens from the relevant places.

Hoser (2001) named a variant of *Cannia australis* in honour of Ken Aplin. Thus the opportunity is now taken to name a subspecies of snake in recognition of the research done (on these very snakes) by Steve Donnellan.

#### ***Acanthophis woolfi* Hoser, 1998**

Holotype: Held at the Queensland Museum from "Mount Isa area", Queensland, Lat: 20° 44' Long: 139° 29'; R61449.

Paratype: Held at the Queensland Museum from "Mount Isa area", Queensland, Lat: 20° 44' Long: 139° 29'; R61538

Diagnosis: Similar in most respects to both *A. hawkei* and *A. antarcticus*, to which this form is obviously most closely related. *A. woolfi* may usually be distinguished from the previous two species by the relative lack of white on the supralabials. See the photo published in Hoser (1998).

Scalation can be moderately rugose and colouration varies, although reddish/orangey colour forms are most common, which no doubt reflects the dominant soil colour in their range. In line with *A. hawkei*, young *A. woolfi* tend to have slightly darker and more intense colours than adults, indicating colour change through life.

The species has in the past been confused with *A. pyrhus* due to its colour and distribution. However it appears that most if not all *A. pyrhus* recorded from Western Queensland are in fact assignable to this species. The species has been confused with *A. antarcticus* due to its similar size and build.

In more recent times a number of herpetologists, including curators at the Queensland Museum have confused this species with the better-known *Acanthophis hawkei*.

In 2001 this author saw a specimen in a jar labelled as "*Acanthophis hawkei*", which was in fact this species.

*A. hawkei* invariable has thick cream barring on the upper labials above the mouth, which is distinctive of that species. *A. woolfi* does not have this, instead having dark or dark barred pigment on the upper labials. Anecdotal evidence from private breeders suggests that *A. woolfi* has smaller young than seen in *A. hawkei*, but in the absence of hard and consistent data, this is not a certainty. However it is mentioned here so as to encourage private keepers to publish their breeding results for this species.

**Known Distribution:** The area bounded by Mount Isa, Cloncurry, Dutchess and Dajarra, all in north-west Queensland. To the north-west, *A. hawkei* appears to take over, while to the west *A. pyrhus* becomes the species encountered. Where *A. woolfi* occur, no other *Acanthophis* are known. There is a possibility that *A. woolfi* may occur further south and east of the range indicated here. Museums throughout Australia appear to lack in *Acanthophis* specimens from north-west Queensland. This most probably reflects a lack of collecting rather than any actual rarity. *A. woolfi* appears to be reasonably common in the area between Dutchess (Lat: 21° 21' Long: 139° 52') and Dajarra (Lat: 21° 42' Long: 139° 31'), with herpetologists reporting seeing up to five in a single night's driving.

**Captivity:** Of three specimens known by this author to have been kept in captivity, none presented any husbandry problems and each lived for some years. Qld/NPWS refused to give this author a permit to collect and keep this species, but did grant a permit to collect, hold, photograph, then release any form of reptile in that state. It is hoped that several people are eventually allowed to hold these animals legally so husbandry and ecological questions can be answered.

**Etymology:** Named after herpetologist Paul Woolf. He has assisted many other reptile people for some years through his involvement with the Herpetological Society of Queensland and other groups. For his efforts he's been unlawfully harassed by wildlife officials in Queensland and New South Wales, one of which is where he resided in 1998.

***Acanthophis yuwoni***

Holotype

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cross-bands, the darker cross-bands being more than twice as broad as the lighter ones and with darker scales towards the anterior edges. The top of the head has dominantly darkish pigment, with a distinct light brown line down the anterior centre of the head. Some of the labials have dark blotches.

Photos of the holotype (in colour) can be found on the internet address <http://www.smuggled.com/addtax3.htm> immediately after original publication of this paper in "hard copy", by following the relevant link/s from that webpage (via the thumbnail images accompanying the description and no more than three mouse clicks from that webpage).

The tail has a yellowish-almost white tip. The ventralia are dark brown with a pale edge.

**Diagnosis:** This snake is similar in many respects to *A. crotalusei* and *A. rugosa* from which it can be readily separated by distribution. *A. yuwoni* is the only *Acanthophis* known from the Kei Islands. It is separated from *A. laevis* from nearby New Guinea, *A. groenveldi* from nearby Ceram and *A. macgregori* from nearby Tanimbar by its higher ventral count (more than 118). At this stage there is no known overlap in this character between *A. yuwoni* and the other three species (*laevis*, *groenveldi* and *macgregori*). *A. yuwoni* is separated from all other *Acanthophis* by distribution. One can also separate all species by DNA analysis.

**Etymology:** Named after Frank Bambang Yuwono for his ongoing contributions to herpetology in a relatively understudied part of the world, namely the Indonesian archipelago.

**Final taxonomic note:**

Following publication of Hoser (1998) a number of authors including Ken Aplin and Steve Donnellan (1999) and Glen Shea (2002) criticised this author for using 1985 Wells and Wellington names that they asserted did not comply with the ICZN's code in terms of diagnostic information separating the named taxa from other identified forms. At the species level, this only applied to the name "*lancasteri*", as the other species "*hawkei*" was conceded as complying wholly within the ICZN's code.

Shea wrote:

"Secondly, your use of the name *Acanthophis lancasteri* is not in accordance with the International Code of Zoological Nomenclature. The name *lancasteri*, as published by Wells and Wellington (1985), is a nomen nudum (i.e., not accompanied by sufficient information to validate the name - Wells and Wellington neither provide in words characters that purport to differentiate the taxon, nor give reference to a published statement that purports to differentiate the taxon - in addition, reference to Storr's published redescription of *Acanthophis* under the name *praelongus* is insufficient to validate the name - Wells & Wellington name, as Storr's name *praelongus* is not available to apply to the taxon in question as it is not available as distinct from *Acanthophis* and the name *praelongus* should be reserved as either *praelongus* or as *Acanthophis*." "The name *praelongus* as published by Hoser (1998) becomes applicable to all populations of the species (as it is properly separated from all

other similar taxa), with the populations cited by Hoser 1998 and above as "*lancasteri lancasteri*" becoming an unnamed taxa at the subspecies level.

In relation to the subspecies "*A. antarcticus schistos*", the same criticisms have been leveled against Wells and Wellington (and in turn myself for using their names). If in fact "*schistos*" is an invalid name, the West Australian subspecies would then not have an available name and would in effect need a formal redescription as a subspecies taxa.

#### Final legal note for Australian snake keepers:

The *Acanthophis* names as used by Hoser (1998) have become adopted by some, but not all wildlife authorities and within this ambit, some names are recognised by some and others are not.

By way of example, as of early 2002, both Queensland and WA wildlife authorities recognise both *A. wellsei* and *A. hawkei*, but not the other taxa newly named in Hoser (1998) over and above the widely recognised trio of *A. antarcticus*, *A. pyrrhus* and *A. praelongus*.

Identified NSW NPWS officials have privately stated that they would never formally recognise anything named by this author, while other states authorities appear to be in a state of confusion and/or undertaking to follow whatever Hal Cogger puts in his books.

The relevant issue is that in some states it is illegal to hold so-called "unscheduled" species. For keepers who legally hold "new" species that have resulted from a reclassification of a known taxa (via a splitting of one species into more than one) and held them prior to such being published, they are generally regarded as being within the law. Or at least that is the consistent legal advice received by this author.

However there is a bit of confusion with regards to others who may knowingly obtain such taxa from legal sources after the 1998 reclassification.

Hoser (2002) in a letter to the Victorian Wildlife authorities has attempted to clear up this matter with the DNR (as they call themselves) and at the time of writing here was still awaiting their response and formal position.

Notwithstanding this, potential keepers of *Acanthophis* species should confirm their legal positions and options with the relevant legal authorities before embarking on such a course.

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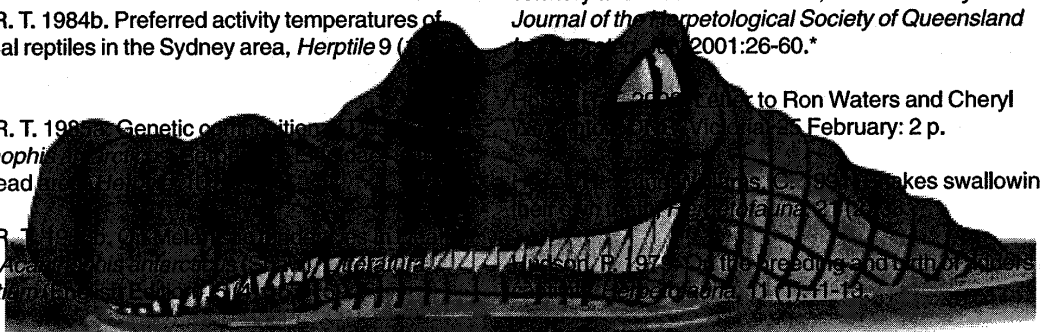
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