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ACTHA Inc. News
Feb - **Mar '15**
Newsletter of the ACT Herpetological Association Inc.

The display of four locally endangered and threatened species took pride of place at this year's *Snakes Alive!*

(*at right from top to bottom*)
Corroboree Frog
Green and Golden Bell Frog
Striped Legless Lizard
Grassland Earless Dragon

Your Committee for 2014 - 2015

President	Dennis Dyer
Vice President	Ric Longmore
Secretary	Vacant
Treasurer	Margaret Ning
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Committee Members	Iris Carter
	Greg Flowers
	Peter Child
Student Representatives	Vacant

* *Denotes Life Members*

In this issue

Diary date

The *bi-monthly* meetings of the Association are usually held on the **third Tuesday of the month at 7.30pm**. Our usual venue is:

***Belconnen Soccer Club*, Hawker**
(cnr Belconnen Way & Springvale Drive)

Upcoming meeting

Tuesday, 17 February 2015

Ainslie to Kossie: window on wonder wander
Matthew Higgins, formerly a senior curator at the National Museum of Australia, is our guest speaker this month and he has penned some words to describe his talk:

"An illustrated presentation mainly on the natural values of the straight-line route between Canberra and Mt Kosciuszko, looking at animals, birds, plants, geology, water, snow, fire, climate and some underlying human stories of our high country. Cultural aspects of some species' stories will be discussed, and a little bushcraft thrown in. As well as celebrating biodiversity along the route, the talk will look at several key issues including feral species, local extinctions and climate change threats."

The evolution and convergence of eco-morphology in pythons, boas and their relatives

The following is largely based on Damien Esquerre's comprehensive notes and has been presented here by Mandy Conway

The guest speaker at ACTHA's 21 October '14 meeting was Damien Esquerre, Keogh Lab, ANU. Damien gave an extensive overview of his work on the above subject and presented it in his own passionate way.

Damien started his presentation by stating "Ecomorphology is the study of the relationship between the ecological attributes of an organism and its morphology. This has been central in evolutionary biology since Darwin." His first slide illustrated the forelimb of different mammals which have adapted to suit different environments. "Natural selection has acted on the limb morphology of mammals and created this remarkable diversity of "tools" perfectly adapted to their way of life, be it swimming in the ocean, galloping the savannas, swinging in the trees or flying through the skies."

Convergent evolution is defined as the independent evolution of similar traits or phenotypes. It gives evolution, a rather unpredictable phenomenon, some kind of predictability. Certain traits evolve again and again under similar conditions. One of the most impressive cases is the independent evolution of the complex camera eye in cephalopods and vertebrates. Convergence can drive distantly related species towards the same adaptive optima. This can be sometimes driven by engineering constraints, for example, there is a limited number of ways, maybe even one, to construct a camera eye. (*See below).*

Parallel evolution could be said to be a kind of convergent evolution. The main difference is that parallelism is the evolution of the same phenotype from the same ancestor, whereas convergence is usually referred to as the evolution of a similar phenotype from distantly related taxa. The problem with this scenario is that you cannot draw a clear line of distinction, because all organisms eventually share a common ancestor.

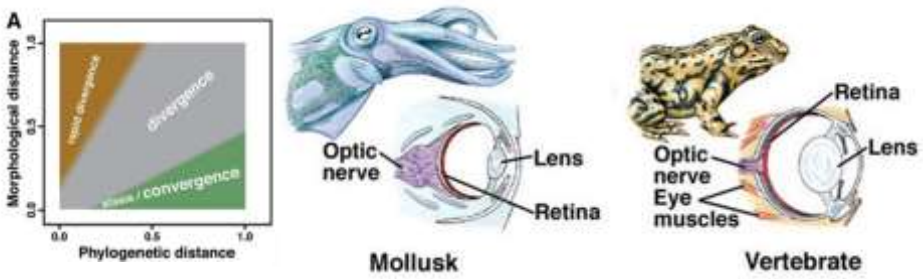
On a shallower scale, there is a remarkable convergence of morphology within a wide variety of ecological niches between Australian marsupials and placental mammals. Both evolved from the same mammal ancestor. However, because they diversified and radiated in isolation in the different parts of the world they occupied, in the same available niches, we independently got the origin of moles, anteaters, mice, climbers, gliders, 'cats' and 'dogs'; a sloth and a koala, for example, could be considered convergent ecomorphs.

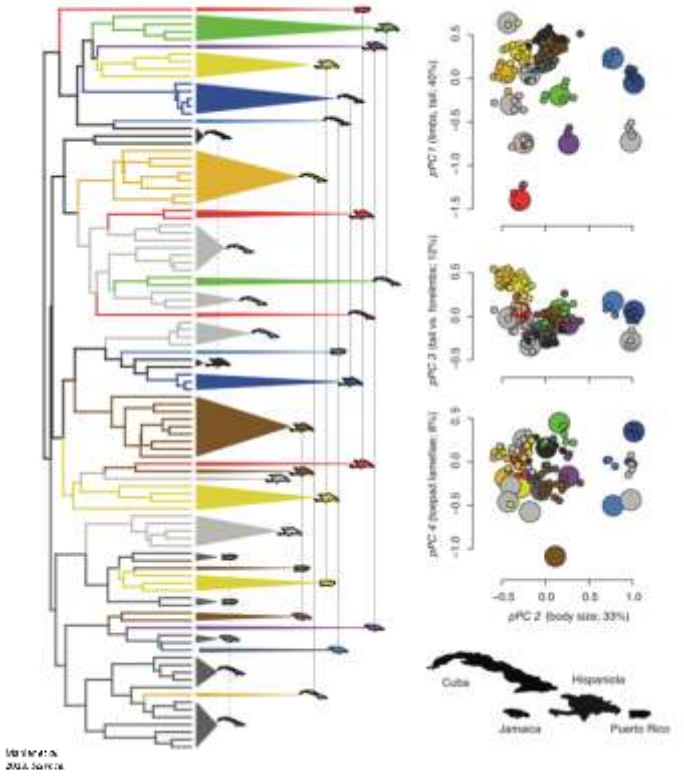
Convergence can also occur between more closely related species.

A classic example of this is the famous study of the cichlid fish in the lakes of Eastern Africa. The study looked at two different lakes; Lake Malawi, which has more than 400 endemic species, and Lake Tanganyika. The study found the extraordinary convergence of morphology between the two similar lakes, which according to phylogenetic analyses have independent evolutionary origins.

Kocher et al. 1993. *Mol. Phyl. Evol.*

Convergence can also occur within a genus. Another well studied case is that of the Caribbean Anoles, the *Anolis* genus being the richest reptile genus in the world. These lizards live on different islands of the Caribbean and have all independently adapted to live in different parts of the vegetation. They have not only evolved to live independently in the same habitat and evolved the same body proportion, they also resemble each other to the point of having similar colours.



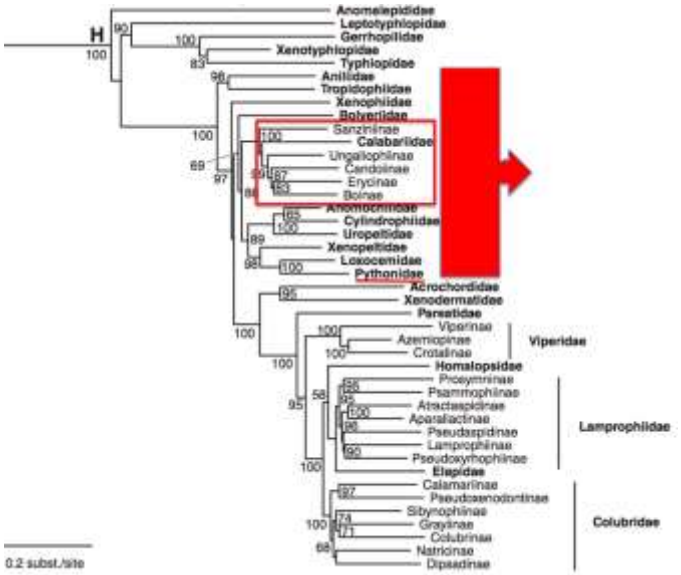


The image above shows what convergence looks like in a phylogenetic tree. This tree depicts the evolutionary relationships of the anoles. Each color represents an adaptive optimum, or phenotype. The same coloured phenotypes are convergent and arose independently.

Another recent study shows the convergence between North American colubroid and Australia elapids. The colubrids include rattlesnakes, vipers and coral snakes. Death adders look astonishingly like vipers, with which they have never coexisted. This is just a case of pure convergence due to adaptations.

Damien's study group

My group of organisms is becoming harder to label. At the top of this phylogeny, or evolutionary, tree are the Scolecophidia or



(The evolution & convergence of eco-morphology in pythons, boas and their relatives, cont'd,...)

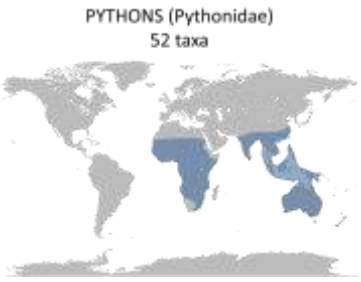
"primitive snakes", which resemble earthworms. The next category includes the Alethinophidia or true snakes, 90% of which are Caenophians or 'Advanced' snakes, being the snakes most people are most familiar with. They include almost 3000 species of elapids, sea snakes, colubrids and vipers. There are many branches that diverge before the formation of the Caenophians which have been traditionally called the Henophidians, which include 257 taxa of "pythons, boas and relatives". These have traditionally been considered part of the Boidae family because they resemble each other so much. However, DNA analysis has revealed that pythons and boas are actually not each other's closest relatives at all. They are a very ecologically and morphologically diverse group.

Most Henophidians share three characteristics: they are non-venomous, usually constrictors, most of them retain vestigial pelvic girdles which are a vestige from their hind-limbs, and they have two developed lungs (advanced snakes have one reduced or even absent left lung).

When people hear the words python or boa they usually imagine a giant snake lying in a river bed waiting to ambush an innocent victim. They indeed include the world's largest snakes, like the reticulated python that can grow up to 10m and the green Anaconda, the heaviest snake in the world. And human fatalities, although extremely rare, have been recorded several times. This group also includes the now extinct Titanoboa, the largest snake ever known to live. It is thought to have reached 13m in length and weigh over 1 ton.

However, the python group also have some of the smallest, harmless, delicate and secretive snakes known. And as we will see and extraordinary diversity in form, ecology and reproduction that goes way beyond size.

(The evolution & convergence of eco-morphology in pythons, boas and their relatives, cont'd,...)



Pythons (Pythonidae)

Pythons are one of the most fascinating, diverse and successful groups of snakes. There are now 52 recognized taxa distributed in Africa, southern Asia, New Guinea and Australia.

Pythons are sit and wait predators, most of whom rely on heat sensitive pits to detect their prey. The most conspicuous difference from boas is their oviparous reproduction. Moreover, females exhibit one of the most dedicate maternal care of the reptile world. Females tightly coil around their eggs to keep them warm by bringing in exterior heat or by shivering, which releases extra energy from their bodies.

We can identify 3 main lineages within this family

True Pythons, or the Afro-Asian pythons which belong to genus Pythonidae include the world's best known species and some of the largest snakes on earth. They are found in Africa and South and South-East Asia. They are generally terrestrial or semi-arboreal.

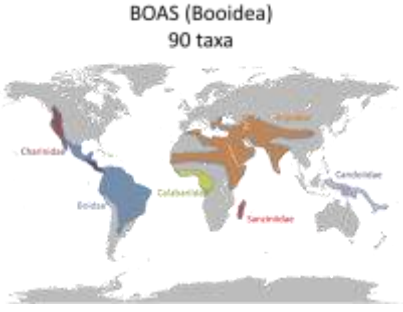
The second main lineage is formed by the genus *Malayopython*, from south-east Asia. This genus used to part of the True Python clade however with DNA evidence we now know that they are more closely related to Australian pythons. It includes only two species, the giant Reticulated Python, *Python reticulatus*, and the Lesser Sundas Python, *Malayopython timoriensis*, of which little is known. These snakes live in South-East Asia and are semi-arboreal.

By far the most diverse lineage of pythons, in number of species, ecology and morphology, are the Australo-Papuan Pythons, found in Australia, New Guinea and some Indonesian Islands. This lineage includes seven genera and 38 taxa. This group, which this audience might be particularly familiar with, defies the usual conception of pythons with its variety. *Bothrochilus* and *Aspidites* are semi-fossorial species, the Papuan *Leiopythons* are terrestrial and *Liasis* includes terrestrial and semi-aquatic species.

Simalia include the Amethistine and Scrub pythons, which are a very long but thin semi-arboreal snake. The genus has colonized any habitat available, and also includes the mysterious *Boelen's python* from the highlands of New Guinea. We also have the tiny terrestrial *Antaresia*, which includes the world's smallest python, the Pigmy Python measuring only 60 cm. And finally *Morelia*, which includes the carpet pythons and the Green Tree Python, the only fully arboreal python in the world.

Loxocemidae has only one species, the Mesoamerican Python from Central America and is the sister group of the pythons, which is interesting because pythons are an exclusively old world radiation. The next sister group are the Xenopleltidae, or sunbeam snakes, with two species distributed in South-East Asia. Sunbeam snakes are notorious for having iridescent scales, or oily, shiny skin. These snakes are medium sized, and enjoy spending a lot of time either underground or under logs and leaf litter. That's why they are called semi-fossorial or semi-burrowers.

Boas (Booidea) are the most species rich and widely distributed group of the Henophidia. They occur across the globe, excluding Australia. Judging by their distribution, it becomes obvious that their origin is pre-Gondwanic.



(The evolution & convergence of eco-morphology in pythons, boas and their relatives, cont'd,...)

Pythons and boas have managed to avoid each other which is probably why they have converged so much, having occupied the same available niches. This diverse group of 90 taxa is now being divided into six families. Boas kind of mirror the python radiation, in the sense that they have diversified into a wide array of forms and ecologies. The main difference from the python is that, besides a few exceptions, they are viviparous. They are all also sit-and-wait predators and true boas use heat-sensitive pits to locate their prey.

The family Boidae, or true boas, are ecologically the most diverse boa group and could be compared to the Australo-Papuan pythons. They live exclusively in Central and South-America including the Caribbean. Among them we have the famous semi-arboreal boa constrictors, one of the few animals whose common and scientific names are the same, the tree boas in the genus *Corallus*, the aquatic anacondas or *Eunectes*, the terrestrial rainbow boas in *Epicrates*, and the semi-arboreal West Indian boas in *Chilabohtrus*. As you can see, we can find a true boa living anywhere from the tree tops to the water.

Pacific Island boas are found in New Guinea and several South Pacific islands. They include 4 species divided into several subspecies in the genus *Candoia*. They range from the stout and terrestrial 'Viper Boa', to the slender and arboreal Pacific Tree Boa.

Sand boas are found in Northern Africa, Asia and include the only boa found in Europe. They are all in the genus *Eryx*, and there are 15 recognised taxa. However, compared to other groups, they are very conservative in their morphology and ecology in the sense that they are all medium or small in size and strict burrowers, hence being called sand boas. They also include the only oviparous boas in the world.

Charinidae is a family that has been controversial and its members have been dispersed into different families by taxonomy. Recent molecular studies have been able to prove that they do in fact share a common ancestor. They include the North American Rubber Boa, the northernmost Henophidian in the world, the Rosy Boa and the extremely rare and unknown *Oaxacan* and Banana boas. These snakes are usually fossorial, although the Banana Boa, or *Ungaliophis*, has been described as an 'arboreal burrower', because it is commonly found hidden in bromeliads as high as 20m in the canopy.

Sanziniidae is endemic to Madagscar and they really resemble the true boas in South America. This is because Madagascar is an old Gondwanan fragment and unlike Africa and Asia was never in contact with Eurasia. It therefore lacks typical afro-asian animals like monkeys, agamas and pythons. It instead has iguanids and boas, just like South America! They have two genera, *Sanzinia* which is aboreal, and *Acrantophis* which is terrestrial.

Calabariidae includes only one species, the Calabar Ground Boa, found in the jungles of Central Africa. This species is very enigmatic and it has been very hard to identify its relationships. It has been once called a python, and as you see it is truly oviparous like them. However DNA suggests that they are more related to boas and could be included in their family. They are burrowers, and have a tendency to roll up in a ball like these when they feel threatened.

Asian Pipesnakes or *Cylindrophids* are found in South-east Asia and Sri-Lanka. Sheildtails or *Uropeltids* are found in India and Sri Lanka. The 61 taxa in this group form an impressive species diversity however much of their

biology remains unknown because of their secretive nature. These two Asian families represent fossorial species and are very secretive and small in size. The Asian Pipesnakes have the distinct behaviour of displaying the back of their tails when threatened. As for the Shieldtails, the rough scales at their rear collect mud during excavation to build a blockage at the entrance of their tunnels.

The *Rhinophis*, has an extremely pointy snout, highly specialized for burrowing.

Tropidophis or dwarf 'boas' are not really boas but their close proximity and slight similarity have earned them that name. There are 42 species distributed in the Caribbean, South America and eastern Brazil. Aniliidae contains only one species, the brightly coloured South American Pipesnake, *Anilius scytale*. Growing to 1m in length, which is pretty rare for a burrower, it can be found in tropical areas and whilst being fossorial, it can also be found in water.

Bolyeriidae, Round Island 'boas' are not really boas either. According to new molecular evidence the 2 species within this group actually seem to be more related to advanced snakes rather than Henophidian. They live on a tiny round island off Mauritius in the Indian Ocean and have a rare mixture of primitive and advanced traits; ie no vestigial pelvic girdles and a reduced left lung, and a unique maxilla divided into two hinged sections, believed to be an adaptation to grip smooth-scaled skinks. At least one of them is oviparous. With the introduction of rabbits and goats through European settlement, the soil was badly damaged and severely affected the fauna that depended upon it. One of these two species, *Bolyeria multocarinata*, has become extinct, not seen since the 1975. Nothing is known of its ecology or biology other than it is a burrower, and all that exists are these sketches. *Casarea* has been close to extinction too, but thanks to considerable effort it has been recovering. They are terrestrial.

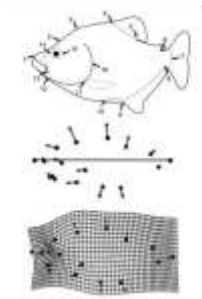
So what are the main questions I want to answer?

Firstly, I want to know if there is allometry in the shape of Henophidians, pythons and boas. Is there a relationship of shape with size, ie does shape change in a compensatory way as size increases? After answering that question and removing any effect of size, I want to know if ecology is a good predictor of shape, in other words, is shape an adaptive trait to the environment. And my last and maybe main question, is there morphological convergence related to life style between these snakes?

The better known case of convergence, which is quiet extraordinary, is the one between green tree pythons and emerald tree boas. They not only look extremely alike and live in the rainforest canopy, they also perch in the same peculiar way, and they also have the same brightly coloured red and yellow. This is a case of extreme convergence! I also want to know if there is a convergence in shape and is convergence more wide spread across other ecomorphs like aquatic or terrestrial species.

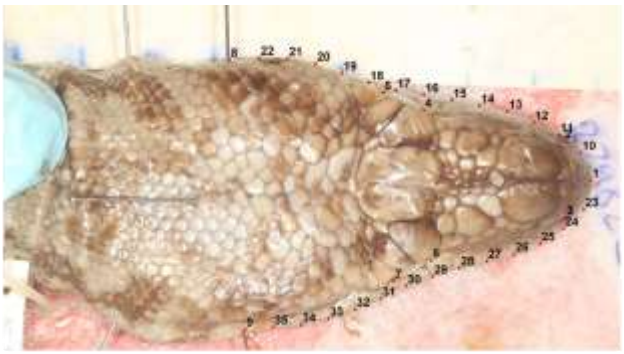
To quantify shape, I am using techniques from a discipline called Geometric Morphometrics, which is the best way to measure and compare pure SHAPE. Basically it is based on the location of landmarks on a structure, which have to be homologous and represent the shape you want to measure. Homologous means they must correspond to each other across specimens.

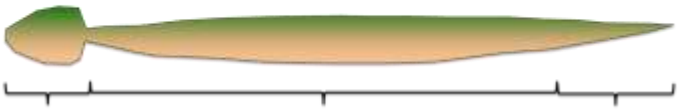
Geometric Morphometrics



At left is an example of landmarks chosen to describe body shape on a fish, and below are two ways to represent shape change between specimens.

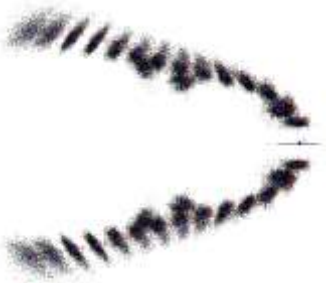
Once landmarks have been digitally placed on all specimens, all variations that are not explained by size must be removed. This is done by a method called superimposition. Firstly the configurations must be rescaled and then translocated and rotated. So, at the superimposed configuration all variation we have are solely explained by shape. Once you have the superimposed coordinates you can begin the analyses.





Above is the landmark configuration I chose to represent the dorsal head shape of the snakes. These are placed on photographs on specialized software. I used homologous and ecologically meaningful structures like the nostrils, eyes and end of the mouth. I also added what are called semi-landmarks used to define curves and outlines to define the outline of the head which I assume must be ecologically very important. Additionally, I took linear measurements of the body to analyse body shape.

I measured a total of 1700 specimens, but for this part of the study I am using 1073 of them. As you can see the sampling was very biased towards pythons and boas. Because they are not sister groups I also included other lineages to see if there is convergence as well. This is for two reasons: firstly they are the really focal groups of this study; secondly, the other groups represent very small and rare specimens in collections, sometimes so small they were not feasible to use with the equipment I was using. I also went through over 400 papers and books to try to categorise as accurately as possible each species into an ecological lifestyle category: arboreal, semi-arboreal, terrestrial, semi-aquatic, semi-fossorial and fossorial.

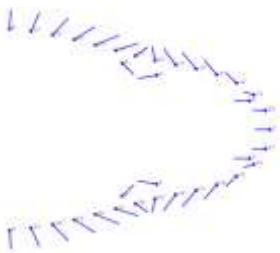


Right: This is how all the landmarks of those specimens look when they are superimposed. This is just to show how much variation in head shape there is, with each dot being a landmark for each species.

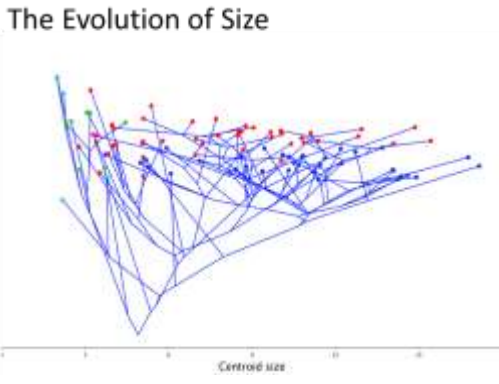
<u>So is there a relationship of shape with size?</u> Yes! And a very strong one as you can see here, for all families.

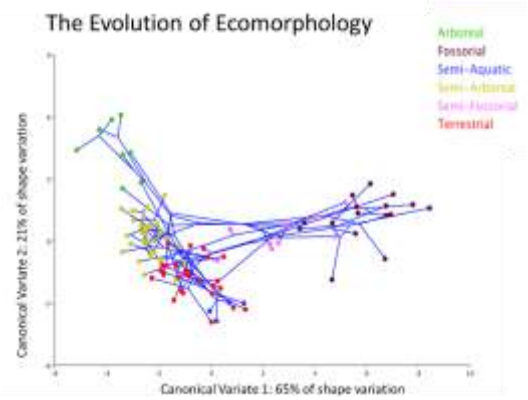
Head shape changes considerably with an increase of size. The dots represent the original form and the lines indicate the direction of change. As you can see, the relative size of the eyes decreases dramatically as the snakes get bigger, and they also get a wider snout. In the following analyses we want to remove this effect of size to see if the differences we are looking at can be explained by ecology.

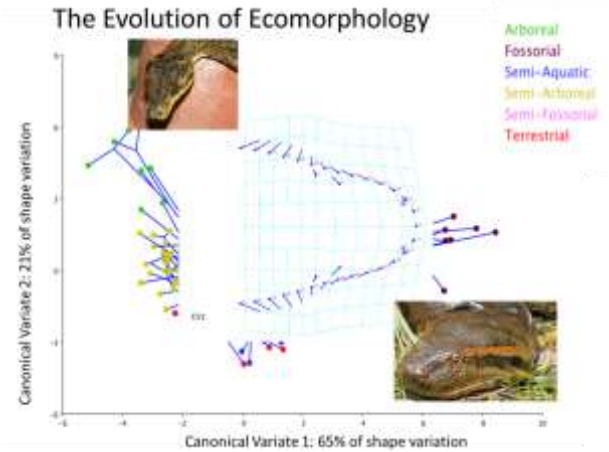
The evolution of size in boas and pythons

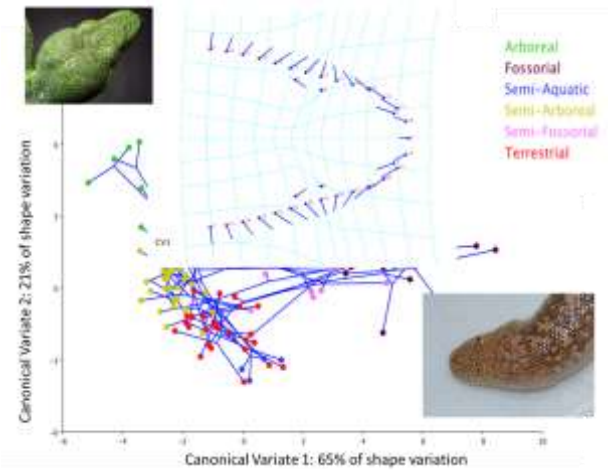


The graph (*at right*) represents size with the phylogeny mapped on it, to see how size evolved. The lines between the dots are a phylogeny or history tree. What becomes very clear here is that more of the size space has been utilized by boas and pythons, the rest of the lineages have remained small. Also, gigantism has evolved independently in boas and pythons, since their closest relatives are all small to medium sized.









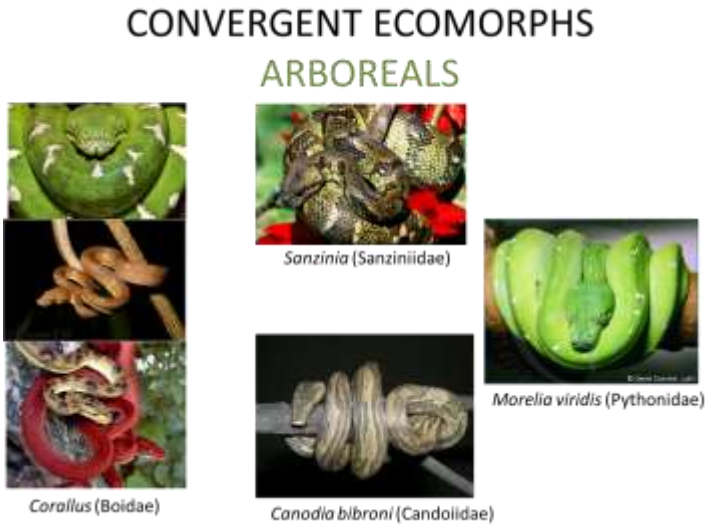
The figures above represent my preliminary results, and is the best thing I could have wished for! These are the results of a Canonical Variates Analysis which, to put it simply, summarizes the variation of several variables, in this case shape variables generated from the landmarks, into as few axes of variation as possible, which remain uncorrelated. Each dot is the average of a species, and its color represents its ecological lifestyle. The lines connecting the dots are the phylogeny so they represent evolutionary relationships. If phylogeny was the factor explaining most variation we would see branches clustered together, meaning that species that are closely related look a lot alike. If head shape in these

(The evolution & convergence of eco-morphology in pythons, boas and their relatives, cont'd,...)

snakes was more driven by adaptation to their lifestyle we would see exactly what we see here, ecological categories clustered together and phylogenetic lines crossing each other. We can see that the separation makes an ecologically very logical gradient, starting at arboreal, then semi-arboreal, terrestrial, semi-aquatic, semi-fossorial and fossorial.

The less arboreal and more fossorial you become, the wider and shorter your head gets, and your eyes become smaller. This makes sense because if you are living in the canopy, which is a highly dynamic habitat, you need good vision. And if you are burrowing underground you don't need good vision but you do need a shovelling shaped head. Then there are arboreals and the aquatics. The more arboreal you become, the more lateral your nostrils and eyes become, giving you a more stereoscopic vision of the world. With aquatics you would like to have your sensory organs to be on top of you so you can see the world from below.

Through these analyses I have been able to spot multiple convergences.



Above: Here are 4 independent lineages which have evolved to occupy the same morphology adapted to life in trees: The Madagascan Tree Boa, The Pacific Tree Boa and the Green Tree Python that all independently evolved into this phenotype.

Above: The next group we have identified are the semi-arboreal ecomorph. Again we have several independent lineages with several species each converging on the same ecomorph, like the West Indian Boas, the carpet pythons, the boa constrictors, the reticulated and lesser Sunda python and the amethystine pythons.

Above: Several lineages also converge on the terrestrial ecomorph, like the rainbow boas, the true pythons, the Round Island Boa, the olive and white lipped pythons, the Viper Boa and *Antaresia*.

Left: Water pythons and anacondas also show a convergence in their semi-aquatic ectomorphs.

Right: The semi-fossorial Charinnidae, *Aspidites*, West-American pythons and Sunbeam snakes

Above: Finally, fossorial snakes, being the Sand snakes, Shieltails and Pipesnakes. This I feel is more a case of stasis instead of convergence because the basal lineages of both snakes are generally fossorial, so they have most likely descended from a fossorial ancestor and not changing. We could say the sand boas, which are unlikely to have descended from fossorials have converged with the other groups.

Conclusions

Is there allometry in shape in Henophidians? YES

Is ecology a good predictor of shape? YES

Is there morphological convergence related to lifestyle between pythons, boas and their relatives? YES

So there are still several analyses I want to do with this data, like ancestral state reconstruction, test for convergence on specialized software, etc…Obtain 3 dimensional CT scans of python skulls and study shape in more detail. I also want to use the rest of my data to see if the ontogeny, or growth, in pythons follows the same path among species. I am also interested in seeing if there is sexual dimorphism in shape.

2015 *Snakes Alive!* Exhibition

From our President, Dennis Dyer…

Snakes Alive! 2015 was conducted over seven days from 12 to 18 January, again at the Australian National Botanic Gardens (ANBG). It was a most successful event which fulfilled one of the Association's aims of educating the general public about the importance of our herpetofauna in the environment.

The theme for this year's display was *'Caring for our native reptiles and fishes'* which was reinforced during feeding talks, etc. Overall, 38 reptile and amphibian species including 12 species and subspecies of python were on display.

A new addition to this year's event was the inclusion and manning of tanks displaying marine species, provided by members of the Canberra District Aquarium Society. (CDAS)

As previously, the display was set up and dismantled by Peter Child and his assistants and this year occupied the three public rooms at the Crosbie Morrison Building. The main room was arranged with glass enclosures around the perimeter and turtles and easily handled skinks in the centre. This resulted in a relatively open area in the centre of the main room which allowed visitors space when viewing the feeding sessions or other activities.

The intermediate room included 5 large Aquarium Society tanks, the Pig-nosed Turtle, the Freshwater Crocodile, pythons, skinks and frogs as well as a continuous slide presentation of local herpetofauna.

This year, the small room was allocated to display local endangered and threatened herpetofauna. These included (*at right from top to bottom*) Corroboree Frogs lent by the ACT Government, Green and Golden Bell Frogs lent by Ginninderra Catchment Group, Striped Legless Lizards from the Australian National University and Grassland Earless Dragons lent by University of Canberra.

Feeding sessions were held each day at 11am and 2pm as well as at other suitable times, with a schedule of the talks and feeding times being prominently displayed. These sessions were very successful and well attended, and included Wayne, a Wildcare venomous snake handler, who fed the Red Belly Black Snake, and feedings and talks on the marine species by a member of the CDAS

The total number of visitors was around 2600. The attendance was generally quieter during the middle of the week than last year but markedly increased on the Friday and weekend. A new feature was the attendance of children and educators from holiday programs, mostly conducted by the YMCA. These student groups provided attentive audiences for the feeding and other sessions and it is understood that many of these will also be future attendees.

(Snakes Alive! 2015, cont'd,...)

Above: King Brown Snake, spectacular!

This year the raffle went reasonably well, with approximately $830 from raffle profits and donations to be provided towards Corroboree Frog research.

Once again the ANBG was very effective with their publicity, providing the wonderful venue and facilities required for the partnership to be a success. The weather was mild, and the local radio stations 666ABC, Mix106 and 104.7FM provided an opportunity for the display to be advertised and promoted. Unfortunately, there was no television coverage this year.

Amongst the many visitors, it was noted that there were several visitors from Central and South America.

The usual Wednesday evening 'Get Together' was also held to celebrate what was a most successful 'Snakes Alive'.

Mid week relaxation session...

ACTHA volunteers gave generously of their time throughout the week, with nearly half of these being at the display for at least six days. The Association is also grateful to those members of the CDAS who willingly gave their time and effort to provide and man their display and readily joined in the spirit of the event. Their professional talks about and feeding of their charges were much appreciated by both the visitors and ACTHA members.

Mention must also be made of those members who provide their time and understanding manning the entrance area to the display and also those manning the shop and selling raffle tickets. It was great to welcome some new enthusiastic *Snakes Alive!* volunteers this year, and it is hoped to see them again next year. In order for members to set aside time, it is important that the dates for next year's event be determined as early as possible.

Members who provided their animals for display, feeding and handling are much appreciated..

Geoff Robertson gives us some of his observations…

Snakes Alive! 2015 was successful by any measure. Over the years many tens of thousands of people have come through the door, taking away the message that the only good snake is a live snake. This is a powerful conservation message emphasising the importance of our indigenous herpetofauna and the need to protect and restore their habitat. Most visitors leave with a much better and informed knowledge of what is happening to conserve our local reptiles and frogs - each person adding to his or her particular knowledge or filling in knowledge gaps. Keeping herpetofauna as pets (although some dislike this term) also has an important message - much can be learnt from pet keeping that underscores the survival and health of wild populations. At any time on any day of the display our volunteers were talking to the many visitors and answering their many and varied questions. This is unlike many other displays where visitors are often left to their own devices.

We were on a winner this year with many more scheduled talks and feedings. We are getting good at this, often with humour. Feeding a python is always a big attraction and the pythons, sometimes with coaxing, were very co-operative. The feedings of the Red-bellied Black Snake, bearded dragons and blue-tongued

(Snakes Alive! 2015, cont'd,...)

turtles, earless dragons and legless lizards, the Corroboree frogs, and fish also quickly captured the interest of visitors and were great opportunities to inform and to propagandise. Often each morning and afternoon we had up to three feeding sessions.

An important innovation this year were the visits of the YMCA and other holiday program groups. While we have done this before, this year was on a much bigger scale. This may provide a continued source of visitors in future.

Our Association is effective, efficient and professional when it comes to putting on this exhibition . It covers organising, getting animals and licences; recruiting, training and managing volunteers; liaising with government agencies, universities, and conservation and wildlife groups; setup and dismantling the Exhibition; daily cleaning of the enclosures, monitoring and managing temperatures, removing poo, etc; the organisation and record keeping for door entry, sales and raffle and banking; arranging advertising, media interviews, etc; organising groups to visit; organising celebrations, etc.

2015 was a make or break year. We made it and successfully so. However, much of the organisation and lead up effort was carried out by Margaret and Dennis who did an absolutely amazing job. I would suggest that planning for 2016 should commence earlier; a Snakes Alive! committee should be formed and responsibilities allocated for particular tasks; and a strategy be developed for promotion and advertising. It has to be remembered that we need to find new avenues and incentives to attract a bigger number of visitors.

Above: Freshwater Crocodile
Right: Shingleback Lizard
Below: Sand Goanna having a bath.

Right and below: Toby King giving a talk about the Coastal Carpet Python to the audience before feeding it. Python feeding is always a crowd favourite, particularly as this is not often seen in real life!

ACTHA's webmaster, Angus Kennedy, has put together a beautiful short film showcasing just some of this year's exhibits. It can be found at https://vimeo.com/119012183 and will appear shortly on our website.

Seeking more photos and stories…

Does anyone who helped out at this year's Exhibition have any pictures? or even some interesting stories and/or experiences? Please share these with your fellow herpers by sending them to **mandycnwy@gmail.com** for inclusion in our next Newsletter.

Obituary

Canberra catering maven **Wendy Hudson** has died after battling cancer. Wendy had been diagnosed with cancer in 2006 and had battled the disease since.

Wendy, who was 65, was well known in the hospitality industry as the owner of Hudsons Catering with her ex-husband and business partner Brian.

For decades they ran a string of cafes and restaurants in Canberra, including the cafe at the Australian National Botanic Gardens (ANBG), two cafes at the Australian War Memorial, two delis, a cafe in Dickson and a fine-dining restaurant at Hawker.

Mr Hudson paid tribute to Wendy, saying she had a uniquely kind personality, and was a trusting woman who had a knack of inspiring loyalty and love among her close-knit staff. She was very well regarded in the hospitality industry and was renowned for working very hard at a job she loved.

Many ACTHA members will recall the wonderful post-Exhibition breakfasts which Wendy organised for us as her way of saying thank you for bringing big crowds along to the ANBG and hence an increased trade for Hudsons Café. Wendy will be sorely missed.

Frogwatch 2015

ACT and Region Frogwatch Post: PO Box 446, Holt, ACT, 2615 Office: Kippax Health Centre, Kippax Place, Holt Phone: (02) 6278 3309 Fax: (02) 6278 3926

Our financial situation

As you all know this year has started grimly as we have no Government support, till funding for the Census activities kicks in mid-year. This means that FW can only run for a few hours per week, through funds made available through the **ACT Herpetological Association (ACTHA)**, the NSW Heritage Grant for Environmental Education, and public donations.

Keep your fingers crossed for Northern Corroboree frogs

In mid December last year just over 200 adults frogs from two captive breeding programs (Toronga Zoo, Tidbinbilla Nature Reserve) had been released into the Brindabella National Park. This month Taronga Zoo's reptile and amphibian unit supervisor Michael McFadden and NSW environment department's threatened species officer Rod Pietsch will be back to monitor how the frogs are doing. So if you are out and about in the area and hear someone yelling "hey frog", stay calm- you have just come across researchers counting frogs, as Northern Corroboree Frogs tend to like such yelling and respond to it with their typical "arc" or "squelch" sound.

If you missed the report on the release of the frogs, just check out this link:

http://www.canberratimes.com.au/act-news/endangered-northern-corroboree-frogs-released-into-brindabella-national-park-20141218-129k8q.html

Only room for one ID request in this issue...

There was a post on the ACTHA Facebook page by someone asking for help in identifying a snake found on a property in Wamboin, NSW. Picture is attached.

ACTHA concensus:

It's a Tiger Snake, *Notechis scutatus*. "They occur at Wamboin and are also adept at climbing when it suits them."

John Wombey added.

House fire starts when a snake terrarium catches fire

Emergency services have advised that a small blaze started around a snake terrarium at a property in Macquoid Place, Kambah, which has left a damage bill of $10,000. The pet python escaped during the blaze.

A reminder that:

- All enclosure fittings should be checked regularly and any heat lights or pads should not be located on, under or near combustible materials. Thermostats to regulate heat output will help prevent excessive heat which can cause a device to get too hot, burn out and potentially cause a fire.
- Make sure proper receptacles are used for bulbs and heaters. Use receptacles rated for the size/wattage of bulb you are using, and use ceramic receptacles (higher heat tolerance) if indicated.
- Do not overload electrical circuits, power bars, or extension cords.
- Make sure your enclosure is safe for the heating you are using. For example, do not set heat lamps on plastic screen tops, or the top will melt.
- Make sure all flammable materials (e.g. artificial plants, other terrarium furnishings) are kept away from heat bulbs or emitters.
- Make sure your curtains, furniture, etc. are well away from heaters. Run electrical cords safely (not under furniture or rugs) and watch for overheating.
- Raise the enclosure off the surface of the stand if using under-tank heating.

School of Art Gallery - Graduation Exhibition

Our very own 'Artist in residence' **Steven Holland** will be exhibiting bronze specimens from his study into bronze sculpture and the elapid snakes of the Canberra district.

"Many people from ACTHA have helped me with my research and a few refreshments and a chance to see the sculptures will be my way of saying thanks."

The Exhibition, entitled '*all things known - all things sensed*' runs from 26 Feb to 7 March '15 The Gallery opening hours are Tuesday to Friday 10.30 - 5.00, Saturday 12.00 - 5.00 and the address is ANU Canberra School of Art Gallery, Childers Street, Acton.

The celebration evening is on Friday 6 March at 6pm.

ACTHA News
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