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Keeping Guides on Target

**Enviroscope**

## What is an Umbrella Species?

Nature conservation is an uphill battle of fundraising, creating awareness and attempting to persuade otherwise intelligent people to understand that the damage being done to our earth is going to harm them and their offspring. It is hard enough trying to get the world to care about the last remaining 3500 wild tigers on earth, let alone trying to get them interested in the plight of the African oystercatcher!

One of the tricks used is to draw attention to the cute and cuddly (or big and fierce) animals as examples of conservation in action. We try and get people to be concerned about rhinos and tigers, pandas and

elephants in order to protect the entire environment where they live and not just the individual species concerned. These are then referred to as umbrella species.

Protecting them helps

protect the environment in which they live and therefore, by extension, the other species that rely on that environment for their survival.



**"The word 'wilderness' occurs approximately three hundred times in the Bible, and all its meanings are derogatory."**

**René Dubos, *The Wooing of Earth*, 1980**

## Jupiter's moons

There are a whole bunch of moons (if one can call them that) orbiting around Jupiter, but of the 64 catalogued so far, only four are really worthy of the title "moons". These are the ones which are big enough to be seen through binoculars - Io, Europa, Ganymede and Callisto. They are collectively known as the Galilean moons since they were the ones first seen by Galileo in 1610. Together they make up 99.9 percent of the total mass of Jupiter's satellites!

The really interesting thing about them is that each has

its own distinctive character and each one is scientifically very interesting in some way or another.

Io for example is the most geologically active object in our solar system, with more than 400 active volcanoes and massive mountains caused by tectonic movements. At first glance this is apparently caused by its close proximity to Jupiter and the fact that it gets so squeezed and tugged by that giant planet as well as the other three Galilean moons that it is in a constant state of geological turmoil. This is not absolutely clear



**Malcolm Douglas**

Tel: 083 233-5264 | Fax: 086 619-5492 | Email: [malcolm.enviroskills@gmail.com](mailto:malcolm.enviroskills@gmail.com)

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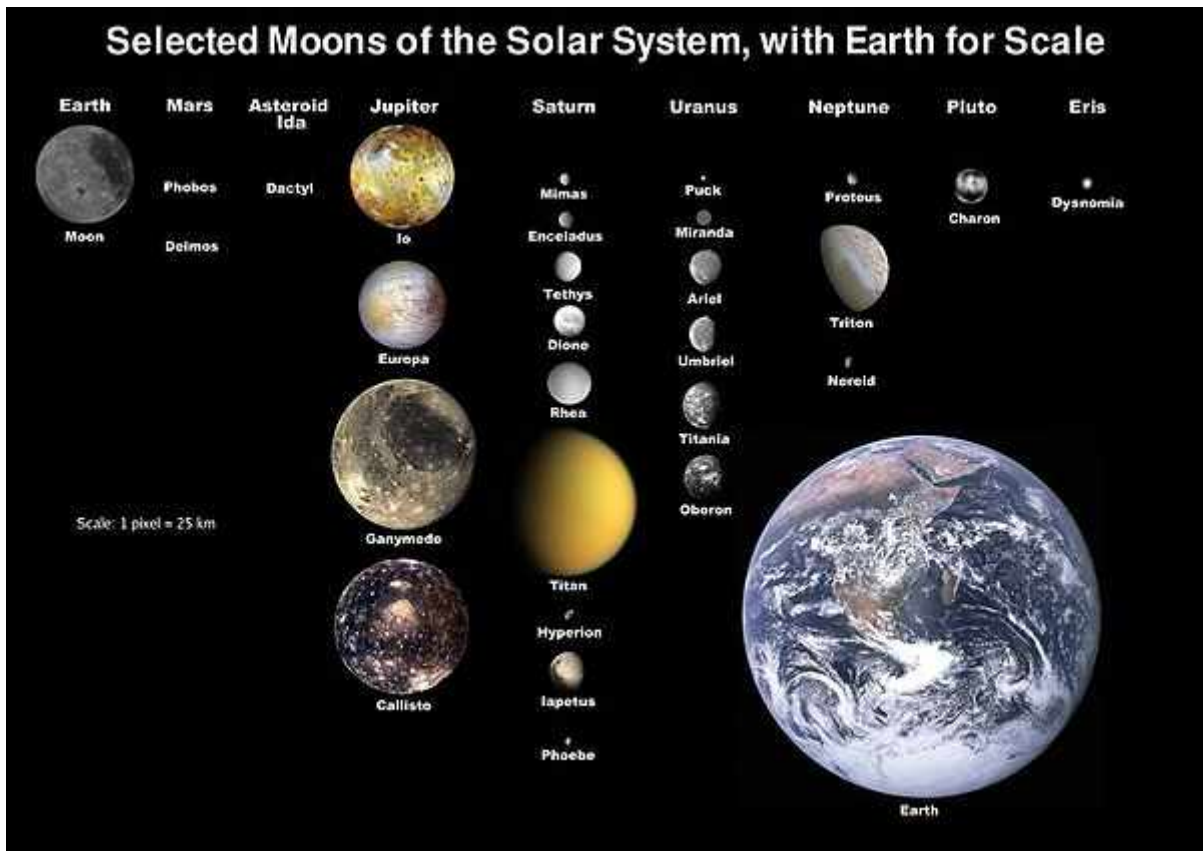
however, and the Juno space mission launching later this year is partially designed to assess exactly why Io is so active.

Europa on the other hand is a quiet moon covered by a massive sheet of ice maybe 2 to 30 kilometers deep. Under all that ice is a salt water ocean which is probably bigger in volume than all of earth's oceans. The chief question here is whether or not that ocean harbours life. Europa is the top candidate for its own dedicated space mission in the future.

The biggest moon in our solar system is Ganymede (larger even than Mercury) which sports the only other

known magnetosphere apart from earth. This magnetic "halo" deflects highly charged radioactive particles which come from the sun. Earth's magnetosphere is believed to be formed as a result of rotation of the iron core at our centre and Ganymede is probably no different. Studying Ganymede may shed some light on the mystery surrounding earth's magnetic field.

Callisto orbits further from Jupiter than the other moons and as a result still bears the scars of meteorite impacts that have scarred its surface for millions of years. In fact it is the most heavily cratered object in the solar system.



Credit: NASA

## Wild dog dispersal one of the longest on record

We all know that wild dogs are highly nomadic and move vast distances to meet their daily feeding and social requirements, but how far do they disperse to find new mates and new territories.

An example of this was recently seen when a male which had been photographed in the northern Tuli game reserve in Botswana "popped up" in the Save valley in eastern Zimbabwe 400 kilometers away a few months later. The discovery is the work of four projects: The Carnivore Conservation Group, The Painted Dog

Project, Northern Tuli Predator Project, and Lowveld Wild Dog Project.

This again underscores the importance of the need to protect large areas of land if this species is to survive. It also shows us very acutely, the shortcomings of the protected area network that is still left intact in Africa. Even a tract of land the size of Kruger National Park is not big enough to meet the needs of a huge number of its residents.

"I do not know of any environmental group in any country that does not view its government as an adversary."

Harlem Brundtland

## Why do scorpions fluoresce?

For some reason, scorpions have been endowed with properties that few creatures on earth have. Even one of their abilities is amazing, but to have such an array of adaptations seems like evolutionary overkill. Scorpions can survive massive doses of nuclear radiation, they can survive submersion for periods of time that are unsurvivable by most other animals, they can see with their tails, they can inject a (sometimes) lethal venom, they can sense vibrations that are almost unrecordable by man's most sensitive instruments AND they glow an eerie turquoise colour when bathed in ultraviolet light.

The reason for this is still not known, and arachnologists have spent untold hours trying to answer that very question. One theory is that it may help them to find one another. Other ideas are that it may baffle their prey or even act as a sunscreen, but upon close investigation none of these theories are adequate. One of the latest theories is that it has no function at all, being a quirk of evolutionary randomness!

Now Carl Kloock, an arachnologist at California State University thinks he and his team are beginning to unravel the secret of the scorpion's glow. What they have discovered is that scorpions shy away from

ultraviolet light wherever possible. They always avoid the sun, but are also much less active when there is a full moon. This is because there is a strong ultraviolet component to moonlight. The idea is that the eerie glow helps them to determine the levels of ultraviolet light in their environment and to help them avoid moving around at that time when they will be most vulnerable to predation.

Carl T. Kloock, Abraham Kubli, and Ricco Reynolds. *Ultraviolet light detection: a function of scorpion fluorescence*. Department of Biology, California State University.



Photo: Wikimedia Commons

## In the news

### **Serengeti Highway - Confusion over the decision**

The controversial Serengeti highway has supposedly been canned, but support for this move is less than perfect and is still subject to being overturned by the Tanzanian president who did not sign the agreement. Sceptics believe that the announcement was merely an election campaign promise and nothing more.

### **2 tonnes of pangolins seized in Indonesia**

10 July - customs officers at Jakarta's Sukarno-Hatta Airport seize 1,732 kg of pangolin meat and a further 380 kg of pangolin scales. The de-scaled pangolins were packed in boxes labelled as fresh fish and destined for Singapore.

### Orb spiders older than previously thought

A chance find by farmers in Inner Mongolia has lead scientists to learn that today's largest web-weaving spiders are about 130 million years older than previously thought. One of the best preserved spider fossils is that of a female orb weaver dated to 165 million years.

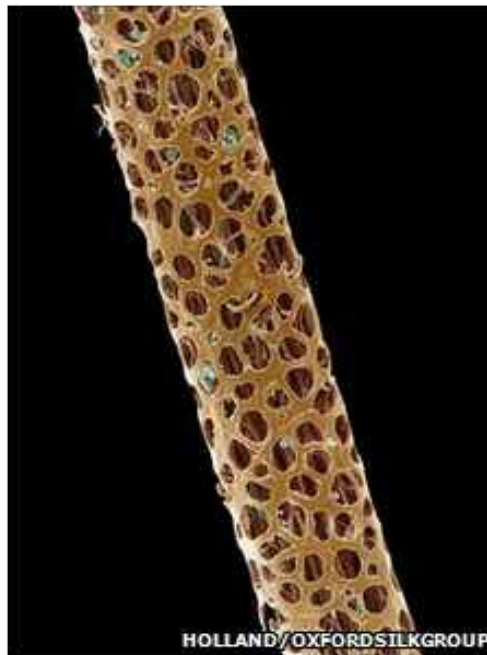
### Entire pride of desert lions wiped out

An entire pride of desert lions has been wiped out in Namibia's Skeleton Coast. For the first time in 13 years, a small pride of lions arrived in the Hoarsuib River valley where they immediately started feeding on the resident's prized cattle. They then moved of into the Skeleton Coast Park where the lioness gave birth to 2 cubs. They settled in the park feeding mostly on oryx, but the dispersal of these animals during the rainy season caused the lions to seek prey elsewhere and again they started killing livestock outside the park. After a long battle to protect them, they were finally destroyed by poisoning and hunting.

## I always knew rats were tricky!

In Africa's tropical north east there is a large, slow moving rodent called the crested rat (*Lophiomys imhausi*) which has a very strange reputation. Common wisdom is that it is poisonous and that if a dog bites one it will drop dead from the poison it produces. The story has persisted despite the fact that it sounds so dubious, which makes one wonder why? The answer has now come to light and it is true, the rat IS poisonous.

The discovery was recently made by a multi national team headed by Professor Jonathan Kingdon (Oxford University) and has been published in the Proceedings of the Royal Society B. What the team discovered is that the rat cannot actually produce its own poison, but sequesters it from the bark of the round-leaved poison bush (*Acoanthera schimperi*) which it then rubs onto specially adapted black and white contrasting hairs



on its flanks. The hairs are pitted in such a way as to absorb and store as much poison as possible and are unique among mammals (inset).

When a predator attacks a crested rat, the animal does not try to run away, but offers its flanks to the attacker. A bite in that area can quickly prove fatal to the attacker, but if not, the result of the bite will not be forgotten and the animal is unlikely to ever try attack one of these rats again!

The poison found in the tree is a powerful cardiac stimulant which in large enough doses causes the heart to beat so strongly that the victim will likely have a heart attack. Jonathan Kingdon said "*The need to deter predators has led to one of the most extraordinary defences known in the animal kingdom.*" They are now keen to discover how the rat itself can survive the effects of the poison.

## Why do spiders decorate their webs?

Many species of web weaving spiders weave elaborate structures (called stabilimenta) into the centre hub of their webs, but the exact reason for this is still unclear. Previous research has in fact shown that decorated webs do tend to last longer, but why do they?

In the course of my training I have often challenged course participants to come up with possible reasons of their own. This has actually proved to be quite an

interesting activity because without any special skills or knowledge they have arrived independently at every scientifically proposed theory I have ever read about including this "latest" one.

The different ideas my students have come up with are;

- To strengthen the web by simple structural reinforcement



Blue waxbill caught in web of banded legged nephila.  
Photo: M Douglas

- To alert animals that there is a web in the way and not to walk or fly into it, much like we place crosses of tape on windowpanes in new buildings
- To reflect ultraviolet light from the structure in order to attract flying insects into the web
- To allow the spider itself to hide on the web, with its legs and body hidden away behind the structures

the journal Behavioural Ecology and Sociobiology which discusses how spiders use stabilimenta to protect their webs from damage by large animals which are passing by.

The interesting thing about this research is that they discovered that the spiders responded to the level of damage inflicted on their webs by weaving ever larger and stronger stabilimenta. If there was no damage done, they did not bother with adornments, but if there was frequent damage, they would then make a much larger warning structure.

This again proves to me that one does not have to be a scientist to have good ideas. We are all scientists in our own right. Keep observing and thinking and never accept the word of a scientist as being the voice of authority. They are fallible and often have much to lose (like funding!) if their theories are disputed or disproved. Well done my field guiding friends, you arrived at (one of) the right conclusions ten years before the scientists!

Australian researchers lead by Dr Andre Walter at the University of Melbourne have now published a paper in

*"Whoever undertakes to set himself up as a judge of Truth and Knowledge is shipwrecked by the laughter of the gods."*

Albert Einstein

## New snakebite treatment?

Snake venom is made up of large protein molecules which take time to travel through the lymphatic system before they can be absorbed into the bloodstream. This caused Megan Saul to think about nitric oxide which inhibits the "pumping" action of the lymphatic system. She devised tests to see if application of a nitric oxide releasing cream could slow down absorption of snake

venom. The results in humans and rats showed that it could practically allow a 50 percent increase in time before absorption takes place - a possibly life saving delay that would allow one to receive medical care and antivenom. The results of the study were published in Nature Medicine. *(Thanks Chris for bringing this to my attention!)*



I provide the following services to the guiding and nature conservation industries. Please call me or email me to discuss your requirements.

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- Group presentations and talks on nature related issues of your choice.
- Snake handling courses.
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- Field guide assessments for FGASA L1, 2, 3, Trails Guide, Advanced Rifle Handling.
- Nature conservation skills training, specifically for the national certificates Resource Guardianship and Natural Resource Management: Terrestrial.