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Keeping Guides on Target

Enviroscope

What is an ecosystem engineer?

Animals and plants may alter the quality of their environment in many significant ways and any species that has this effect may be referred to as an ecosystem engineer.

In ecological terms, there are two sorts of ecological engineers - those which change the habitat mechanically (allogenic type) and those which modify the environment as they themselves change (autogenic).

Elephants, humans, beavers and antbears are all

examples of the allogenic type. In the course of their daily activities, they both create and destroy habitat. Trees on the other hand are autogenic. They start out small, but gradually provide more and more shade and shelter as they grow, thereby altering the environment around them as they change.

Not all ecological engineering is positive. The most significant ecological engineer of all times is humankind. Alien species too have major effects on the environments into which they are introduced and change things (usually) for the worse.

Why cuckoos imitate hawks

I have often been caught out when catching a glimpse of a cuckoo (especially African and red-chested cuckoos) flying away from me. Their colouration, flight pattern and general appearance is so similar to that of a goshawk or sparrowhawk it is easy to make the mistake. As always, there is good reason for their deception.

My thoughts on this matter always came down to two different factors - protection or threat. Looking like a predatory bird may have some advantages in saving your skin from other raptors, but it may also have something to do with frightening off the birds in whose nest you would like to lay your eggs.

This idea is nothing new, except that now for the first time the effect of their hawk-like appearance on host birds has been recorded. The work was conducted at Cambridge

University by Dr Justin Welbergen and the results are published in Behavioural Ecology. The teams experiments involved placing stuffed dummies of cuckoos and sparrowhawks near the nests of reed warblers (and other species) and observing the responses.



The most significant result found was that the barring on the chest seems to be most important. When the chest barring was obscured on cuckoos, the warblers would mob the models. The more they looked like sparrowhawks, the less they were mobbed. In another experiment, great tits and blue tits were found to be as afraid of cuckoos as they were of sparrowhawks. Apparently these tits are not targeted by cuckoos and should therefore have no bias towards them whatsoever,



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however, they treated cuckoos with the same respect owing to a hawk.

What intrigues me is that nothing is mentioned in the research about the cuckoo's flight pattern. The sudden appearance of a "hawk" in the area around your nest should be one of the best ways of frightening a host

bird off its nest or out of the area for long enough to lay an egg. Surely this is an intrinsic part of the deception as well?

Whatever the case, it seems as if this is another part of the "evolutionary arms race" that is going on between cuckoo and host.

Mis(guided) - Giraffe Circulation

An area of "common guiding knowledge" that is full of errors and misconceptions is the matter surrounding the giraffe's circulatory system. What always intrigues me is that guides know so much more than scientists do!

I have tried to find the most up to date information on the various issues pertaining to this interesting subject.

How big is a giraffe's heart?

As far as size is concerned, according to Professor Graham Mitchell at the Centre of wildlife Studies at Onderstepoort, *"we established that the heart is actually quite small. It's smaller than you'd expect in similar-sized animals, but the walls are incredibly thick"*. The "large heart" myth came from a single measurement made in the 1950's. What gives a giraffe's heart its power is not the volume of blood it can pump, but the pressure with which it can pump it. A big heart would be a disadvantage.

How much blood does it pump?

Size for size, a giraffe's cardiac output is roughly equal to that of domestic cattle. In a 450kg animal, it averages around 30 to 60 litres of blood pumped per minute at around 600cc per stroke. The measured carotid blood flow is around 3l per minute.

How does the system prevent syncope (blackouts)?

To prevent blacking out and pinking out, giraffe blood vessels are very flexible and are also collapsible. The plasticity found in them aids blood flow when the vessels are relaxed to allow blood to ascend to the brain. The volume of blood flow is reduced when the vessels are constricted as the blood descends back towards the heart. The walls of the blood vessels also thicken with age as the giraffe's neck grows longer, to avoid rupturing under increasing pressure.

A network of blood vessels in a giraffe's brain called the rostral epidural rete mirabile allows blood to collect and be partially redirected before entering the brain, thereby reducing direct pressure on the brain blood vessels.

To prevent blood rushing back to the brain when the

animal bends down to drink, the jugular veins have a system of "valves" preventing venous return to the brain.

What is a giraffe's blood pressure?

The simple answer is that it has not been accurately measured and the range of pressure fluctuations is not known. Measurements which have been taken don't indicate too much difference with that of humans. One test showed a (very high) value of 280/180 mm mercury when the animal was lying flat, and a normal 120/75 mm mercury when it was standing upright.

Does jugular siphoning assist blood flow to the brain?

The idea behind this is that the blood descending down the jugular of a standing animal has the tendency to pull blood up the carotid arteries by a mechanism similar to siphoning. Most of the work recently done on giraffe circulation revolves around this complex issue. The consensus seems to be that there is little or no siphoning effect at work.

What is so special about the skin on a giraffe's legs?

A big problem with being so tall is the tendency for blood to pool at the end of the lower extremities, a situation that results in swelling. This in turn leads to circulatory problems. To prevent this, giraffes have very tight skin on their lower legs and the capillaries are very fine and are situated close to the bones. So effective is this system at preventing oedema that NASA have studied it to model space suits that are designed with the same purpose in mind.

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Another threat to bees - Colony Collapse Disorder



In the never-ending search of creative ways to make cash, years ago some bee keepers hit on the idea of transporting their hives around the countryside to offer their services to farmers. This seemed like a win win situation in which the farmer got to harvest a

better crop and the beekeeper got to harvest more and better honey. All was well and people patted themselves on the back for thier initiative.

As is so often the case however, underlying problems were developing and now the entire American bee industry is faced with ruination because of "colony collapse disorder" (CCD). The symptom of the disorder becomes apparent in the spring when the beekeeper opens his hive to find that apart from the queen and her brood, **all** the adult bees have mysteriously disappeared. This is happening at the rate of around 30 percent of a beekeeper's hives each year since 2006.

The cause of the collapse is not clear, but scientists are cottoning on to the fact that transporting bees around the country is exposing them to new pathogens like fungi and bacteria at a faster rate than they can adapt. Although there is no firm link between the two the result is what is really concerning.

Some of the issues facing bees (and us humans as a consequence) are;

- The above-mentioned colony collapse disorder.
- Varroa mites which are decimating colonies. The only solution being to incinerate affected colonies.
- Mixing of Cape bees with African honey bees. The resultant hybrid hives have a very low production rate and must also be destroyed.
- The general and systematic reduction in bee numbers worldwide caused by factors which may include environmental pollutants and poisons.
- The declining interest in beekeeping as a career has resulted in fewer hives being kept internationally.

In the news

Javan rhino 'now extinct in Vietnam

The most critically endangered large mammal on earth has come a step closer to its final chapter - having been declared extinct in Vietnam. Research on dung samples in Cat Tien National Park indicated that all samples tested were from the same animal. Now the one-and-only Vietnamese rhino left (*Rhinoceros sondaicus annamiticus*) has been poached for its horn. The remaining 27-44 animals (*R. sondaicus sondaicus*) left on earth are found in Indonesia and apart from the poaching problem, they are now being threatened by an invasive palm tree that is deteriorating the habitat of Ujung Kulon National Park in which they live. Only four or five breeding females are left in the reserve. As a little extra cheery news, NO Javan rhinos exist in zoos anywhere on earth. Pay your respects now.

Iceland exports more Fin whale meat to Japan

The Environmental Investigation Agency (EIA) has confirmed that another 131 tons of fin whale meat was shipped from Iceland to Japan in October. This brings the total exported to more than 1500 tons since Iceland resumed whaling. This despite the fin whale being listed on CITES 1. The Icelandic company Hvalur and its multi-millionaire boss Kristjan Loftsson were identified as being behind the renegade whaling and meat export business. Yahoo Japan is also under scrutiny for allowing (and benefiting from) the advertising of illegal Icelandic whale products on the internet there.

25 new species discovered in UAE's Wadi Wurayah

Last month Wadi Wurayah officially joined the list of 1,932 wetlands under the Ramsar Convention. Any place with permanent water is of great importance to wildlife in the dry desert areas of the UAE and this region is seen as a stronghold for the wildlife of UAE. Its protection is an important step in conserving the highly specialised diversity of life found there.

World's largest shark sanctuary declared in Central Pacific

The Marshall Islands parliament recently passed legislation effectively ending commercial shark fishing in the entire 1,990,530 square kilometres of its waters. To enforce this they have introduced heavy fines of between US\$25,000 to US\$200,000, for anyone who is found to be fishing sharks or in possession of shark fins. In addition, all fishing vessels have to land their catch at one of the country's ports and all sea transfers of fish are banned.

What is it?

These marula "nuts" have been gnawed on by two different animals. On the right hand one, the cap covering the seed has been expertly eaten away to reveal the oily seed inside, while the other has had a

large chunk of the woody material eaten away to reveal the entire length of the seed - leaving the cap intact. Which animals do you think did what?



"A man's ethical behaviour should be based effectually on sympathy, education, and social ties; no religious basis is necessary. Man would indeed be in a poor way if he had to be restrained by fear of punishment and hope of reward after death."

Albert Einstein

Annual Japanese porpoise hunt due to begin this month

Every year a major harpoon hunt for Dall's porpoises takes place mostly from Otsuchi Harbour in Japan, with up to 15000 animals being killed in a single year (over 300000 in the last 20 years). The hunt is due to start again this month, but may not because of the recent Tsunami devastation in that area. The International Whaling Commission (IWC) has described the hunt as "clearly unsustainable" but the hunt continues unabated.

Not only is the "harvest" unsustainable, the meat that is supplied to the Japanese market is actually toxic. As is

the case with fishes off our coastline, the porpoise meat contains levels of PCB's (8X) and mercury (3,5X) which are many times higher than are allowed according to international recommendations.

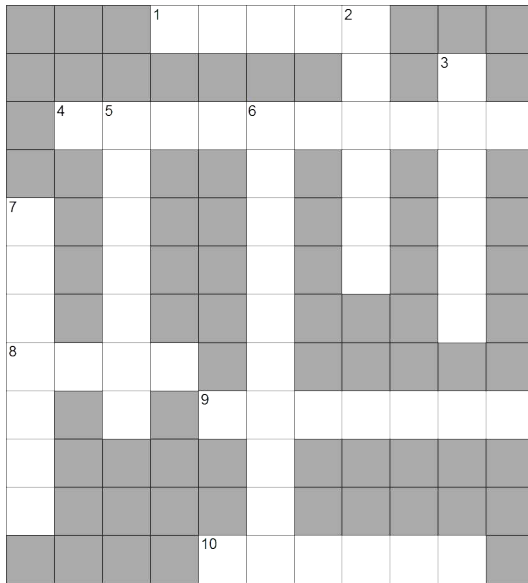
The Japanese public are being misled about the hunt and most have no idea that the hunt in fact even happens. They are further misled when meat is illegally mislabelled as whale meat to try and increase the price.

My feeling about this is that porpoises are no different from the wild animals or fishes which we catch

indiscriminately every day of the year and as such should receive no special exemption from being utilised. As always, the problem comes in with the (un)sustainability of the utilisation. In places like Japan, Iceland and Greenland, meat is difficult or impossible to obtain from land mammals, so the protein provided by cetaceans was invaluable and meant the difference

between death or survival. Their hunting traditions have continued, but now using newer and more effective methods. The human population is so massive and the quality of the environment is declining which inevitably leads to the overharvest of resources we see worldwide.

Crossword



EclipseCrossword.com

Across

1. In some social insects (such as ants) a physically distinct individual or group of individuals specialised to perform certain functions in the colony. (5)

What is it - (slightly shaky) answer

The nut on the right has without doubt been opened by a tree squirrel. These little rodents are a major predator of marulas and have devised a method of extracting the seeds that is quick and efficient. The gape of their mouths is about right to easily span the width of the seed cap, and their chisel teeth are perfect for getting in under it and levering it out. I have often watched them eating seeds this way and am always amazed at how quickly they can get it done. It seems to me (just a value judgement) that they are better at doing this on the dried seeds which they collect in autumn and the winter as opposed to the more freshly fallen ones they harvest in late summer. Perhaps shrinkage of the woody material of the kernel is important in this.

I *believe* that the other nut has been opened by a

4. Behaviour in which an animal redirects attention away from a critical part of the body to a non-critical part. (10)

8. Abbreviation for International Union for Nature Conservation (4)

9. A diminutive flower (especially one that is part of a composite flower). (7)

10. The vocal organ of a bird. (6)

Down

2. A species still in existence. (6)

3. Term used to describe flying mammals. (6)

5. A species no longer in existence (7)

6. The branch of zoology that studies insects. (10)

7. The resemblance of an animal species to another species or to natural objects; provides concealment and protection from predators (7)

porcupine. I did not witness the seed being eaten but some "forensic" analysis leads me to this conclusion. The first clue was that the many damaged nuts I found were situated just outside the entrance of an active porcupine burrow, and although it cannot be seen in this image, the grooved teeth that did the damage certainly belong to a rodent. The width of the teeth is much greater than those of a squirrel and the matching striations of the bite marks indicate that the damage on either side of the seed was done simultaneously, indicating something with a tremendous bite strength.

I initially thought about bushveld gerbils or red veld rats as being possible candidates, but the large tooth size, and the sheer power of the bites on the nuts left me doubting that this was possible.