Enviroscope

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KEEPING GUIDES ON TARGET

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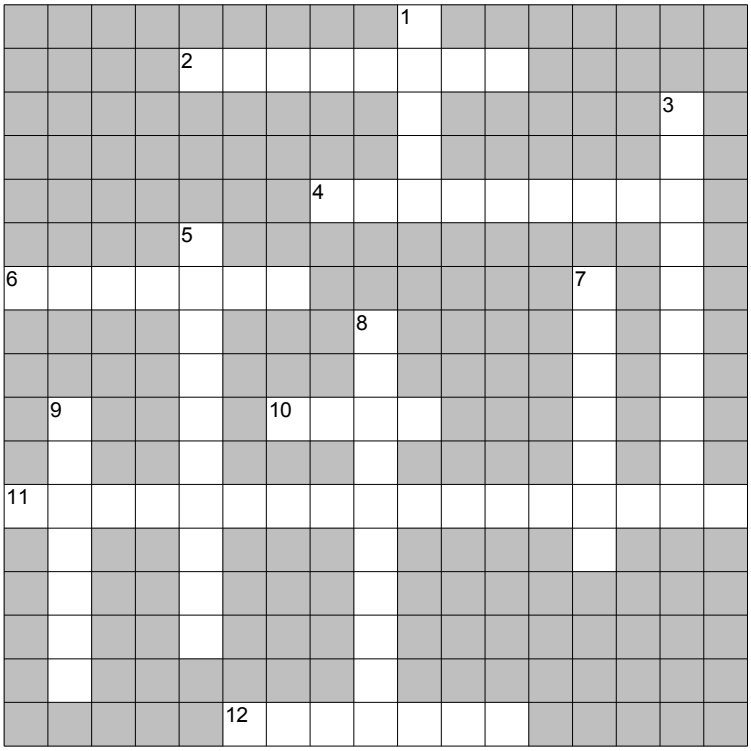
What is It?

Crossword – focus on the letter "B"



EclipseCrossword.com

Across

2. An animal chewing a dry bone found in the bush may contract this acute non-infectious bacterial disease called ..... (8)
4. A plant having a life cycle that normally takes two seasons from germination to death to complete. Flowering and fruiting usually take place in the second season. (9)
6. The total mass of living matter in a given unit area. (7)
10. The thick rear part of the rifle stock that is shouldered when aiming the rifle. (4)
11. The property of being symmetrical about a vertical plane. (Two words) (17)
12. Having two feet / walking on two legs. (7)

Down

1. A major biotic community characterized by the dominant forms of plant life and the prevailing climate. (5)
3. The amount of ground in an area covered or occupied by the lower parts of grass plants (not by the canopy). (10)
5. The study of the forces, dynamics and flight performance associated with firing a projectile. (10)
7. Widely distributed in forestry areas by birds and especially by the rameron pigeon. (7)
8. A red super giant star forming the right shoulder of Orion. (10)
9. The area of the lower chest between the front legs of bovine animals. (7)

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"The whole continent was one of continuing dismal wilderness, the haunt of wolves and bears and more savage men. Now the forests are removed, the land covered with fields of corn, orchards bending with fruit and the magnificent habitations of rational and civilized people."

- John Adams, 1756 -

Try carrying this book in the bush!

The first 30,000 pages of a new online biodiversity resource have been unveiled. Called the **Encyclopaedia of Life (EOL)** - the massive work aims to catalogue every one of our planet's 1.8 million known species and then some. The resource is designed to be used by everyone from scientists to lay readers and has been described as the "ultimate field guide". The work will encompass all six kingdoms of life, and even viruses - which many researchers do not consider to be living organisms.

The project began in spring 2007 and already has placeholder pages for one million species, of which 30,000 have been populated with detailed information. All 1.8 million entries are due to be complete by 2017.

Click here to Visit Encyclopaedia of Life

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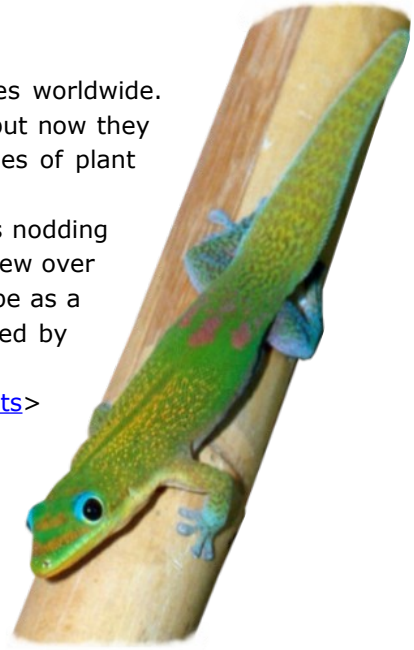
Gecko 'begs' insect for honeydew



The day geckos of Madagascar are among the most beautiful reptiles worldwide. They have long been known to be fond of nectar and sweet liquids, but now they have been recorded entering into a bizarre relationship with a species of plant hopper insect.

The lizard apparently approaches the plant hopper and begins nodding its head repeatedly until the insect starts to flick small balls of honeydew over for it to eat. The reason why the insect does this is unclear but may be as a reward for keeping other predators away. The behaviour was recorded by the BBC for its series "Life In Cold Blood".

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How to pronounce biological Latin - Final

Based on the historical interpretation of Latin as mentioned last month, several rule systems have been developed to assist in its teaching. Needless to say, because of the four different approaches, confusion now abounds. What does seem to remain fairly constant however is that the following pronunciations are accepted as standard.

- **ch** (as in *Carcharodon*) = a hard **K**
- **ae** at the end of a word (as in Felidae) = **EE** (not AY)
- **ae** and **oe** in the body of the word are both pronounced with an **E**. **Ae**stivation, **oe**strogen and **oe**sophagus are all pronounced with a short **E** (as in st**e**p) while **ae**stivate, c**ae**cum am**oe**ba and larv**ae** are pronounced with a long **E** (as in key).
- **ii** (as in *bibronii*) = **EE-eye**
- **i** (as in *defilippi*) = **EYE**
- **iae** (as in *virginiae*) = **ee-ee**
- **oides** (as in *oleoides*) = **oh-EYE-dees**

- **ph** is pronounced **F**

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If civilization has risen from the Stone Age, it can rise again from the Wastepaper Age.

Jacques Barzun, The House of Intellect, 1959

Plant identification could be as easy as reading a barcode

Scientists have long been using bar-coding to identify the differences and similarities between animals using the CO1 gene found in their mitochondria. Now plant researchers have identified a similar gene in the chloroplasts of plants called the matK gene. This gene shows slightly different traces between different species and is nearly identical within a species. Using this technique, they are able to distinguish between plant samples that appear identical to the eye.

The technique will likely not be able to distinguish all plant species on earth. For example, in areas where rapid plant speciation took place, the differences on the matK gene are not enough to distinguish them from each other. Also, hybridization between species rearranges their genome and confuses the issue. It is hoped that in future the method can be combined with analysis of nuclear DNA to increase the accuracy of the test. As it is, the test should work for better than 90% of plants on earth.

Dr Vincent Savolainen, (from Imperial College London and the Royal Botanic Gardens) and his team analyzed around 1,600 samples taken from the tropical forests of Costa Rica and the Kruger National Park to fine tune the technique. "*In the future we hope that non-experts will be able to take a small portable device, capable of reading a plant's genetic barcode, into species rich areas of the world for their plant composition to be established*," he says.

The work is reported in the Proceedings of the National Academy of Sciences journal.

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Oh Beautiful for smoggy skies, insecticided grain,
For strip-mined mountain's majesty above the asphalt plain.
America, America, man sheds his waste on thee,
And hides the pines with billboard signs, from sea to oily sea.

George Carlin

Ecotones

An ecotone is the region where two adjacent ecological communities adjoin, the word coming from eco (logy) and the Greek word *tonos* (tension). In this region, habitats may blend gradually from one into another such as between savanna and woodland, or may change abruptly such as at the junction of land and sea.

Ecotones are particularly useful to mobile species which are able to take advantage of a wider range of habitats by moving between them. In this way a better resources become available to them and potentially increases their foraging and reproductive success.

A well known phenomenon associated with ecotones is the edge effect in which species diversity tends to be higher at the junction of two different habitats than it is in either habitat alone. It is important that the graduation between habitats is kept natural or the effect is lost. For example, where an area of forest is clear cut, the abrupt transition from open area to forest allows penetration of alien plant species, windy dehydrating conditions, excess sunlight, fire etc. This

negates the edge effect completely. It is estimated that the amount of Amazonian area modified by edge effects exceeded the area that had been cleared. (Skole and Tucker, 1994[1])

Edge effects also apply to plant succession in that species may be more or less suited to the centre or edge of the habitat. This results in a varied plant distribution within a habitat. The orientation of the edge is also important. The upper edge of a habitat on a mountain slope will experience different forces to the lower edge. The same applies to the northern and southern edges of habitats. Each will produce a different edge species composition.

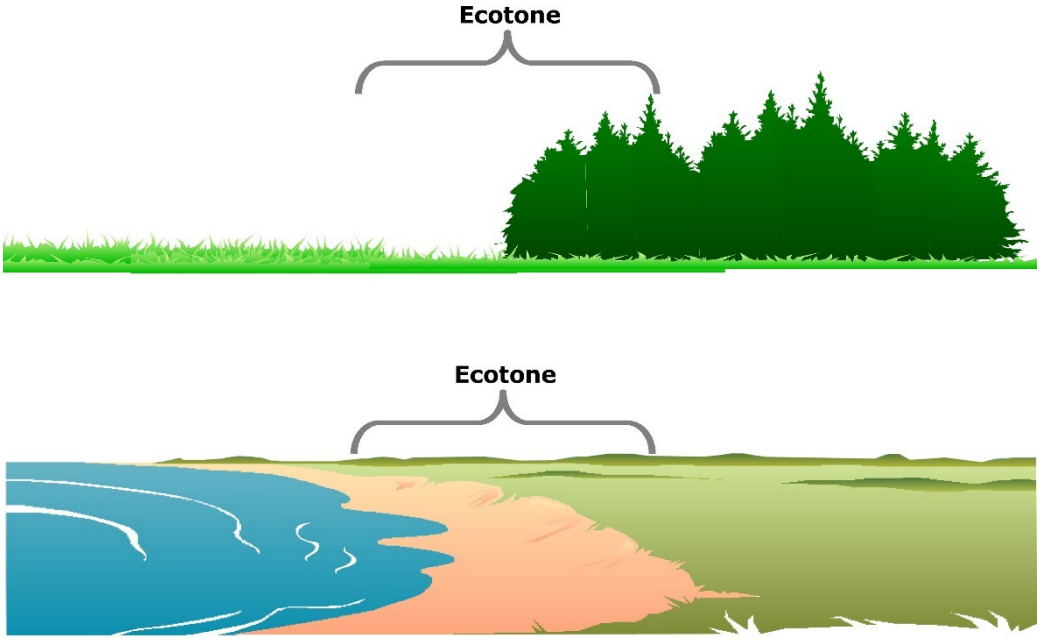

Figure 1. Simple illustration of the location of ecotones

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Elephants are good ecosystem engineers

A new study in Kenya has made a direct correlation between the number of elephants and dwarf geckos in the environment. The researcher (Robert Pringle) found that as elephants bash and browse through the trees of the African savanna, they create nooks and crannies for geckos to hide from predators and the hot sun. The number Kenya dwarf geckos increases proportionally with the number of trees with limbs snapped, trunks split, bark stripped, and branches fallen in the wake of an elephant run-in.

This is obviously a constructive role being played by the elephant that logically extends far beyond just dwarf geckos to all manner of other small species. It also illustrates the importance of broken trees and thicket habitats in savanna ecosystems generally. The replacement rate of broken vegetation must also be an important factor when one considers that fire plays exactly the opposite role to elephants in this respect. Fire removes habitat that elephants create. The balance between the two rates is the important one and is the Holy Grail being sought by scientists w.r.t. elephant stocking rates.

This process of ecosystem engineering (in which one species structurally modifies another's habitat) has important conservation management implications. The exclusion of elephants from conservation areas may have an effect on a whole cascade of species which are endangered by the lack of elephant engineers.

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[1] Skole, D. L.; C. Tucker (1994). "Tropical deforestation and habitat loss fragmentation in the Amazon: satellite data from 1978-1988". *Science* 260: 1905-1910.

Komodo eggs hatch to virgin mom

The Kansas Zoo recently had two very unusual arrivals – virgin born komodo dragons. The zoo has had two females since 1993 when they were only a year old and not sexually mature. The two have been together since that time and began laying eggs every year since 2000. In May 2007 one female laid 17 eggs, two of which hatched this month.

Parthenogenesis is well known in lesser animals, but is rare in vertebrates. This is the third recorded case of komodo dragons laying fertile eggs to "self fertilisation". The other two cases both occurred in England in 2006.

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Tricks of croc digestion revealed

> ***"The crocodilian heart is, in fact, the most hydro-dynamically efficient heart known to science and possibly the most complicated and advanced heart of any creature alive today."***
> (Franklin & Axelsson, 1994)

Biologist C.G. Farmer from University of Utah has made a very interesting discovery regarding crocodile digestion that will be published in the March-April issue of the journal ***Physiological and Biochemical Zoology***. It has long been known that crocodiles have highly efficient circulatory systems, but now she has found that the way in which blood is directed around the body has a direct bearing on the way in which they digest their food.

To understand this properly, one has to understand the way their heart works. Unlike other reptiles, the crocodiles all have a four chambered heart that has a unique "valve" called the foramen of Panizza. This neurologically controlled valve allows blood to be shunted from the left to right aorta and vice versa. This means that when there is no need to use the lungs (e.g. when holding breath underwater) the blood bypasses the lungs and travels to more important parts of the body like the brain. As a consequence of bypassing the lungs, the amount of dissolved carbon dioxide in the blood increases rapidly since it is not exchanged to the outside air. As this blood reaches the stomach it reacts with the gastric system producing stomach acids up to ten times faster than is possible for other animals.

Farmer and her colleagues discovered this by surgically altering some crocodiles so that they could not use the valve to send blood past the lungs. They then measured how quickly the crocs could secrete stomach acid and found that those with the valve intact produced acid at a much higher rate. "*If any animal eats a meal that size, they can't process it immediately," Farmer said. "As the meal is being broken down, the stomach holds on to the bulk of the food and sends little bits on to the intestine. If they weren't able to secrete a lot of acid in their stomachs, the food there would putrefy due to the overgrowth of bacteria. Eating big meals infrequently has selected for this ability*."

The foramen of Panizza is only known from crocodiles, but all reptiles are known to have some or other method of bypassing the lungs. Farmer believes that snakes and in fact probably all reptiles use a similar system. *"They do have a shunt system, and I'll bet you they're using it," she said. "It's just hard to study for technical reasons. But I bet you money this is going to apply to all reptiles."*

Ref: Franklin, C. & Axelsson M. 1994, The Intrinsic Properties Of A Perfused Crocodile Heart. J. exp. Biol 186 269-288. [Article available online here]

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Bats use magnetite to help them navigate

In 2006 it was discovered that bats use the earth's magnetism to help them navigate, but the method they used remained a mystery – until now. It appears that a substance called magnetite

(found in all mammal and bird tissues) is the key. Dr Richard Holland from Leeds' Faculty of Biological Sciences and Professor Martin Wikelski from Princeton University devised an experiment in which bats were exposed to conflicting magnetic impulses while they were released 20km from their home roosts. Only half of the conflicted bats made it home, while the control groups all returned safely. The implication is that the magnetite is used as the internal compass although the exact way in which it does this still remains to be discovered.

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In the news locally …

Elephant cull moratorium lifted

In a recent statement, Minister of Environmental Affairs and Tourism Marthinus van Schalkwyk said elephant culling would again be allowed from 1 May this year – the first time in 13 years. He said that culling would only be used as a last resort under strict control, using acceptable methods.

As expected animal rights groups are up in arms and are already planning tourist boycotts and other means of protest. This could get interesting!

WWF criticises SA's water plans

The Worldwide Fund for Nature (WWF) does not believe South Africa knows how to manage its water and is facing "a looming water crisis". Minister Lindiwe Hendricks said in a statement: "*South Africans can rest assured that we do not have a 'water crisis' resulting from poor planning; our planning systems are strong and have looked at future water needs, however, we cannot allow that comfort to lead to inaction. Water should be a concern for all South Africans*." Isn't that what they said about electricity?

Cell C's Hummer promo hammered

Some prominent environmentalists have recently cancelled their cellphone contracts with Cell C as an objection to that company's advertising campaign involving Hummers. The American vehicles are supposed to be gas guzzlers and by promoting them they are sending an unhealthy lifestyle message to consumers.

Energy, water crisis early warning sign - WWF

The power supply crisis and looming fresh water shortage are early warning signs that South Africa needs to curb use of natural resources, the WWF said recently. "*South Africa has a narrowing time window in which to act decisively to prevent critical resource shortages that could dash our hopes of sustained economic growth*," said WWF chief executive Dr Morne du Plessis.

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Crossword – last month's solution

■	■	1A	Q	U	I	F	E	R	■	■	■	■	■	■	■	■	■
■	■	L	■	■	■	■	■	■	■	■	■	■	■	■	2A	W	N
■	■	L	■	■	■	3A	S	S	O	C	I	A	T	I	O	N	■
■	■	O	■	■	■	■	■	■	■	■	■	■	■	■	■	T	■
■	■	P	■	■	■	■	■	■	■	■	■	■	■	■	■	I	■
■	■	A	■	■	■	■	■	■	■	4A	■	■	■	■	■	C	■
5A	L	T	R	I	C	I	6A	L	■	N	■	■	■	■	■	Y	■
■	■	R	■	■	■	■	A	■	■	7A	L	L	O	P	E	C	I	8A
■	■	I	■	■	■	■	R	■	■	B	■	■	■	■	■	L	■	R
■	■	C	■	■	9A	L	D	E	B	A	R	A	N	■	■	O	■	B
■	■	■	■	■	S	■	W	■	■	T	■	■	■	■	■	N	■	O
■	■	■	■	■	T	■	O	■	■	I	■	■	■	■	■	E	■	R
■	■	■	■	■	E	■	L	■	10A	C	T	I	O	N	■	■	■	E
■	■	■	■	■	R	■	F	■	■	■	■	■	■	■	■	■	■	A
■	■	■	■	■	O	■	■	■	■	■	■	■	■	■	■	■	■	L
■	11A	E	S	T	I	V	A	T	I	O	N	■	■	■	■	■	■	■
■	■	■	■	■	D	■	■	■	■	■	■	■	■	■	■	■	■	■
■	12A	L	T	O	S	T	R	A	T	U	S	■	■	■	■	■	■	■

EclipseCrossword.com

What is it – Answer

The owl shown is the African Wood Owl (*Strix woodfordii*). Characteristic of this species is the yellow bill and the dark brown eyes with red eyelids. The head is large and round with no ear tufts and the feet are yellow. The white patches between the eyes and the barred feathers distinguish it from the marsh owl. The wood owl is unrelated to any other owl species in South Africa, its closest relative being the tawny owl (*Strix aluco*) of Europe.

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