Enviroscope

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KEEPING FIELD GUIDES ON TARGET

In This Issue

What is It?

This large moth is found widely in Southern Africa. Do you know what it is, or anything interesting about it?

See last page for answer.

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"Synthetic Gecko"

As a follow up to the story regarding gecko Velcro in the last newsletter, it has now been reported that scientists at BAE Systems have succeeded in producing an imitation of the sticky gecko foot that they call "Synthetic Gecko". Apparently a square metre of material would be enough to suspend the averaged size family car! The polymer material is reusable and even sticks to dirty surfaces. They envisage a host of applications ranging from aircraft repairs to "Spiderman suits" that can be used by cleaners to scale the sides of buildings. Although the material they have made is very good and could be used even to suspend an elephant, it comes nowhere close to the efficiency and strength of the real thing - the gecko's foot.

[See more at http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/5217240.stm]

Apparently Elephants do Run

Until recently, there has been some controversy whether elephants can actually run or just walk really fast. The argument went that for an animal to qualify as running, it had to have all four of its feet off the ground at some point during its stride. Now, that definition has changed to one in which the springiness of the leg during the stride is deemed more important. Using high speed cameras, they filmed a running elephant and discovered that the legs act as "pogo sticks" successively compressing and rebounding with each step. Elephants do run. So, it seems that the scientists have just discovered something that any person who has been charged by an elephant knew all along - elephants run - blerry fast!

[The research appeared in the Biotechnology and Biological Sciences Research Council journal.]

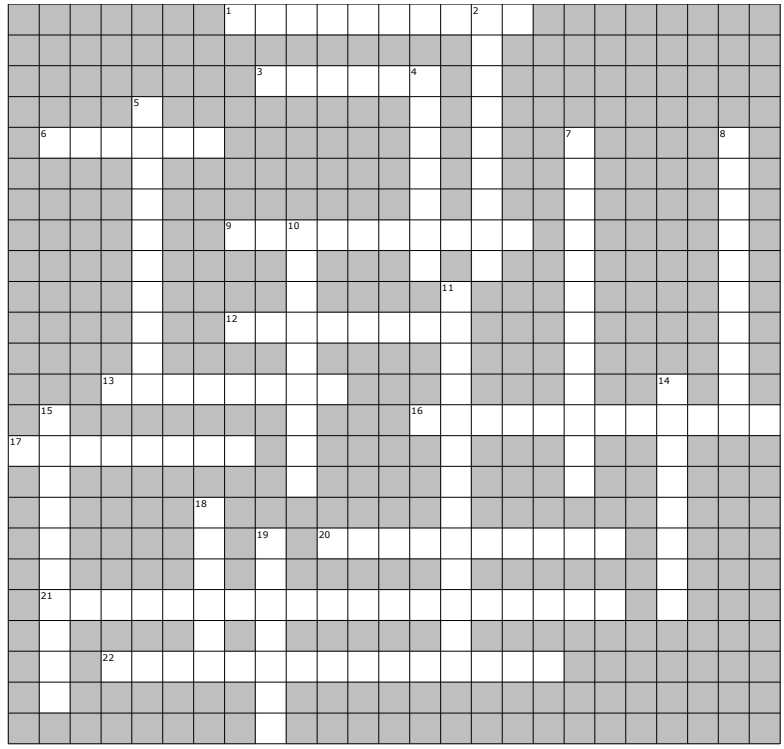
Much Muscle in Mussels

The lowly mussel is in the spotlight for similar reasons to geckos - their incredible ability to stick to things. Mussels it seems are able to sustain their grip on almost any organic or inorganic surface, through strong water currents and all this in salt water. How they do it is still poorly understood, but a new study at the National Academy of Sciences (USA) is focussing on an amino acid called 3,4-L-dihydroxyphenylalanine (DOPA) which is found in the "glue" proteins of mussels. This substance allows the formation of reversible bonds with inorganic substrates and irreversible bonds with organic substrates. The bonds are strengthened when oxidised by seawater. This ability is being researched with the idea of improving adherents and repellents for medical implants. The glues will create bonding surfaces that prevent protein, cell and bacterial build-up surrounding implants.

The teacher asks,

- "*Jessica, what part of the human body increases ten times when excited?*" Jessica blushes and says, "*That's disgusting, I won't even answer that question*."
- The teacher calls on Johnny: "*What part of the human body increases ten times when excited?*"
- "*That's easy*," says Johnny. "*It's the pupil of the eye*."
- "*Very good, Johnny*," responds the teacher. "*That's correct*."
- She then turns to Jessica and says, "First, you obviously didn't do your homework. Second, you have a dirty mind. And third, you're in for a BIG disappointment."

Crossword – Animal Diseases



Created with EclipseCrossword — www.eclipsecrossword.com

Across

1. Until 1993 it was illegal to transport these animals from one place to another in South Africa because of an infectious disease called BMC. (10)
3. Called sleeping sickness when seen in human victims. (6)
6. A fatal disease also known as hydrophobia. (6)
9. A disease of ungulates in which victims show agitation, arching spine, gnashing teeth and rapid eye movements. (10)
12. Micro-organisms with a distinct cell nucleus and (usually) organelles of movement, some of which cause serious animal diseases. (8)
13. The correct name for any disease producing agent. (8)
16. The barrier fence between KNP and the private game reserves was initially erected to prevent the spread of this disease. (12)
17. An animal chewing a dry bone found in the bush may contract this acute non-infectious bacterial disease called ..... (8)
20. The common name for Bovine Malignant Catarrhal Fever. (10)
21. An animal that carries a source of a disease, but does not suffer from the disease symptoms. (19)
22. A serious bovine disease vectored by Brown Ear Ticks. (15)

Down

2. This organism causes highly contagious mange outbreaks (Generic name). (9)
4. The usual name for the disease referred to in the Bible as the plague of boils. (7)
5. Rod-shaped bacteria that live in biting arthropods (as ticks and mites) and cause disease in vertebrate hosts. (10)
7. The man credited with inventing the first vaccination against smallpox. (12)
8. This disease almost wiped out the entire South African buffalo population in the early nineteen

hundreds. (10)

10. An uncommon condition in which an animal balds itself by over-grooming is called autogenous ..... (9)
11. A disease caused by a slow virus in cattle. (13)
14. Infectious disease that may be transmitted from animal to man and vice versa. (8)
15. Any disease whose outbreak must be reported to the state authorities immediately is termed a ... disease. (10)
18. Agent responsible for transferring disease from one place to the next. (6)
19. This organism causes demodectic mange (Generic name). (7)

Spring is Sprung ...

An interesting challenge to the skills of botanists has been understanding exactly how plants know when to flower. The process is called vernalisation - in which the plant waits for the coldest part of the year to pass and then begin blooming in the spring. New research by Richard Amasino of the University of Wisconsin-Madison has shown that a suppressor gene prevents them from flowering as the length of daylight hours starts to decrease towards autumn. After the first weeks of cold, the suppressor gene is somehow turned off and loses its impact. This "turns on" the genes which allow them to prepare for spring flowering. Further research is being conducted to discover what mechanism plants use to determine temperature - the other key factor in plant flowering.

Don't believe the old story ..

.. that spitting cobras aim only for the part that moves the most! This old piece of wisdom has long been known to be false, but now researchers at Bonn University have conducted exhaustive tests to prove it conclusively. Katja Tzschätzsch conducted experiments using black-necked and Mozambique spitting cobras and found that they only spat for the face. In only two cases, did the snakes get fooled into spitting at photographs of people, but they were never fooled into spitting at a moving hand.

The snakes had an accuracy record of between 80 and 100 percent accuracy, the Mozambique spitters being the more accurate of the two species. High speed video clips show that the snake shakes its head up and down very rapidly when spitting to increase the chances of a hit. Spitting cobras have never been known to subdue prey by spitting - this is reserved for biting only.

Size apparently doesn't count

Research by Paul Manger at Wits University has revealed that although dolphins' brains are large, this does not automatically make them clever. On the contrary, he discovered that dolphins are rather dim-witted and are routinely outperformed on tests by lab rats and even goldfish. The knowledge that dolphins are actually rather slow was known long ago to the Russian military who quickly gave up trying to train them as bomb delivery devices. The American navy however, persisted with this for more than fifteen unsuccessful years! Speaking of intelligence!

Manger's research shows that most of the cetacean brain is made up of glia and not neurons. These cells are responsible for creating the warm and nourishing environment in which the neurons are able to work. The number of neurons and not glia is what determines intelligence - and dolphins have very few neurons. It appears that the large brain size is designed to keep the brain warm and alive in the cold marine environments in which cetaceans typically live.

As an example of their lack of problem solving ability Manger cites the case in which dolphins are trapped in tuna nets. The nets are level with the sea surface, yet the dolphins do not leap over them. Even normal fish trapped in rock pools attempt to do this.

Manger's research results are to be published in the peer review journal of "Biological Reviews of the Cambridge Philosophical Society".

While driving down a steep and curvy forestry road, a group of biologists lose control of their Landy and careen down the hill. The vehicle crashes to the bottom of the canyon, and everyone aboard perishes. Surprisingly, they all go to heaven. At an orientation they are asked, "*When you are in your casket and your friends and family are mourning your death, what would you like to hear them say about you*?"

- The first guy, a well known botanist says, "I would like to hear them say that I was one of the greatest botanists of my time, and left an eternal contribution to the botanical *world*."
- The second guy, an ornithologist, says, "*I would like to hear that I was a wonderful birder and made a huge difference in the recovery of our bird populations*."
- The last guy, a scruffy mammalogist, replies, "*I would like to hear them say... 'LOOK, HE'S MOVING*!!!'"

Speeding in the corners

Research by Dr Usherwood, detailed in December 2005 in the Journal "Nature" documents how greyhounds are able to keep running at full speed through curves and around corners. Humans running on curved tracks battle with gravity and centripetal forces which combine to make the legs carry a greater weight. Each foot has to spend more time in contact with the ground to counteract these forces and consequently, the running speed diminishes and effort increases.

High speed videography revealed that unlike humans, the dogs feet spent no extra time in contact with the ground. The difference is that the muscles used by a dog for running are not required to support its weight during normal running - this is taken on passively by the bones and tendons, leaving the muscles to do what they were designed to do - run.

Although this research has not been conducted on cheetah and animals evolved for high speed running, it is likely that the same situation exists.

What is It? Answer

The moth shown is the Death's Head Hawkmoth (*Acherontia atropos*) – a species common in the warmer parts of the world. The skull-like "emblem" on its thorax has given it an evil reputation and several myths and superstitions have developed around it. In some parts, the presence of one of them in your house is an omen of bad luck. The species has also been used in several films to depict such evil. Most people will remember this from *The Silence of the Lambs* in which the killer's victims had the pupa of the death's head moth lodged in their throats. When adult moths are caught or disturbed, they raise their wings high and jump around squeaking. This bizarre sound is apparently made by expelling air from the pharynx.

Adult moths feed on bee honey which they obtain by raiding beehives. They use the proboscis to pierce the honey cells. Their thick cuticle prevents them from being stung by the hive guard bees and they have a high resistance to their venom. They also give off a pheromone that makes them smell like bees, so they are left alone by the workers in the hive. The larvae feed mostly on members of the Solanaceae (Potato family, *Solanum*, *Datura*, *Ceratotheca* etc)