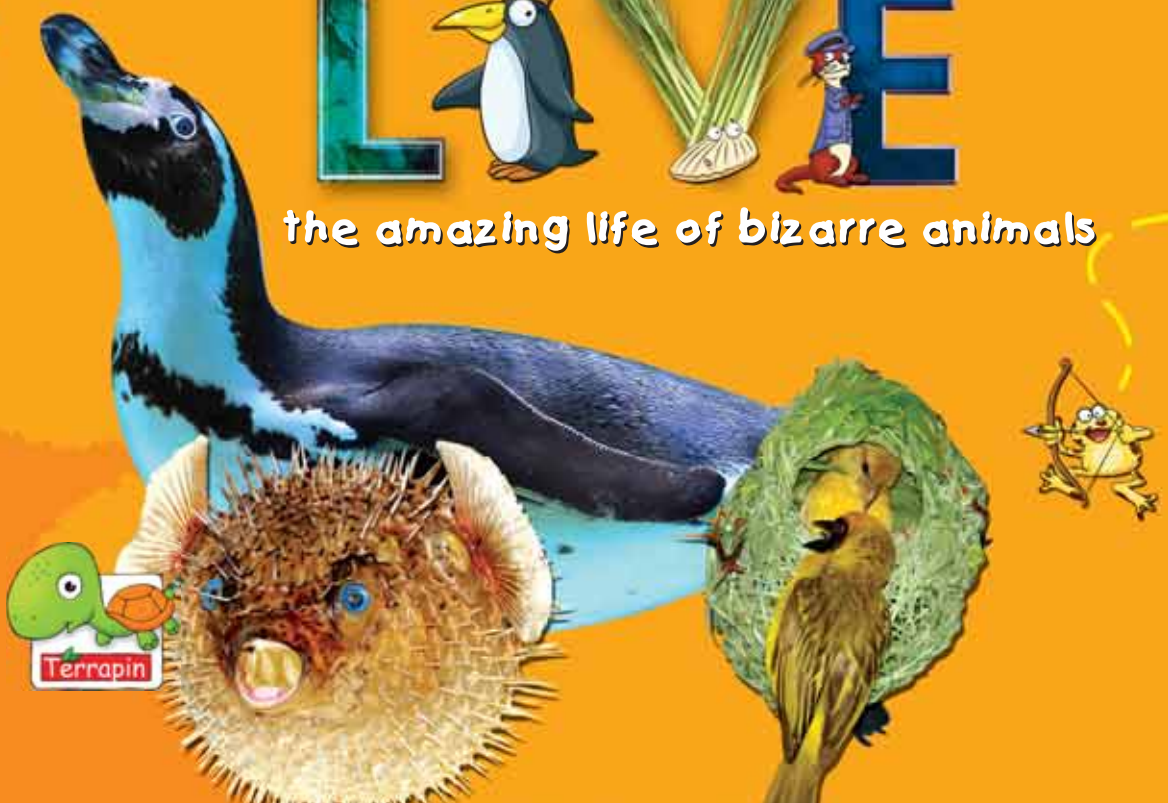
How Come How So?

THAT'S HOW STRANGE CREATURES LIVE

the amazing life of bizarre animals



Terrapin

A note from Dr R K Pachauri

Human society has reached a stage of prosperity, which was not expected several decades ago. Yet, we have a large number of people living in poverty and barely able to keep alive. It appears that they have not been touched by human progress at all. At the same time, what we regard as progress has resulted in damage and destruction of our natural resources and caused serious problems such as human-induced climate change, which threatens all forms of life in the form of sea-level rise, heatwaves, floods, droughts, and melting of glaciers in different parts of the world.

All of this provides a strong reason for us to change the way we have been pursuing human activities and what we have mistakenly believed as human progress. For instance, we must now use renewable sources of energy, eco-friendly methods of production and consumption, make efficient use of water in every activity, and protect biodiversity.

It is in the hands of the children to try to change their own lives towards greater protection of the environment and all our natural resources. They can also take active part in changing the thinking of adults. Children can take a lead in organizing actions at the community level, which support conservation of resources, recycling of waste water, and greater use of renewable sources of energy.

This series of children's books is aimed of providing children knowledge on what needs to be done in all these areas. I hope those who read these books will not only enjoy them greatly but also feel inspired to implement actions that are described in these pages, so that we create a beautiful, peaceful, and healthy future for the human race.

R K Pachauri
Director-General, TERI
Chairman, Intergovernmental Panel on Climate Change

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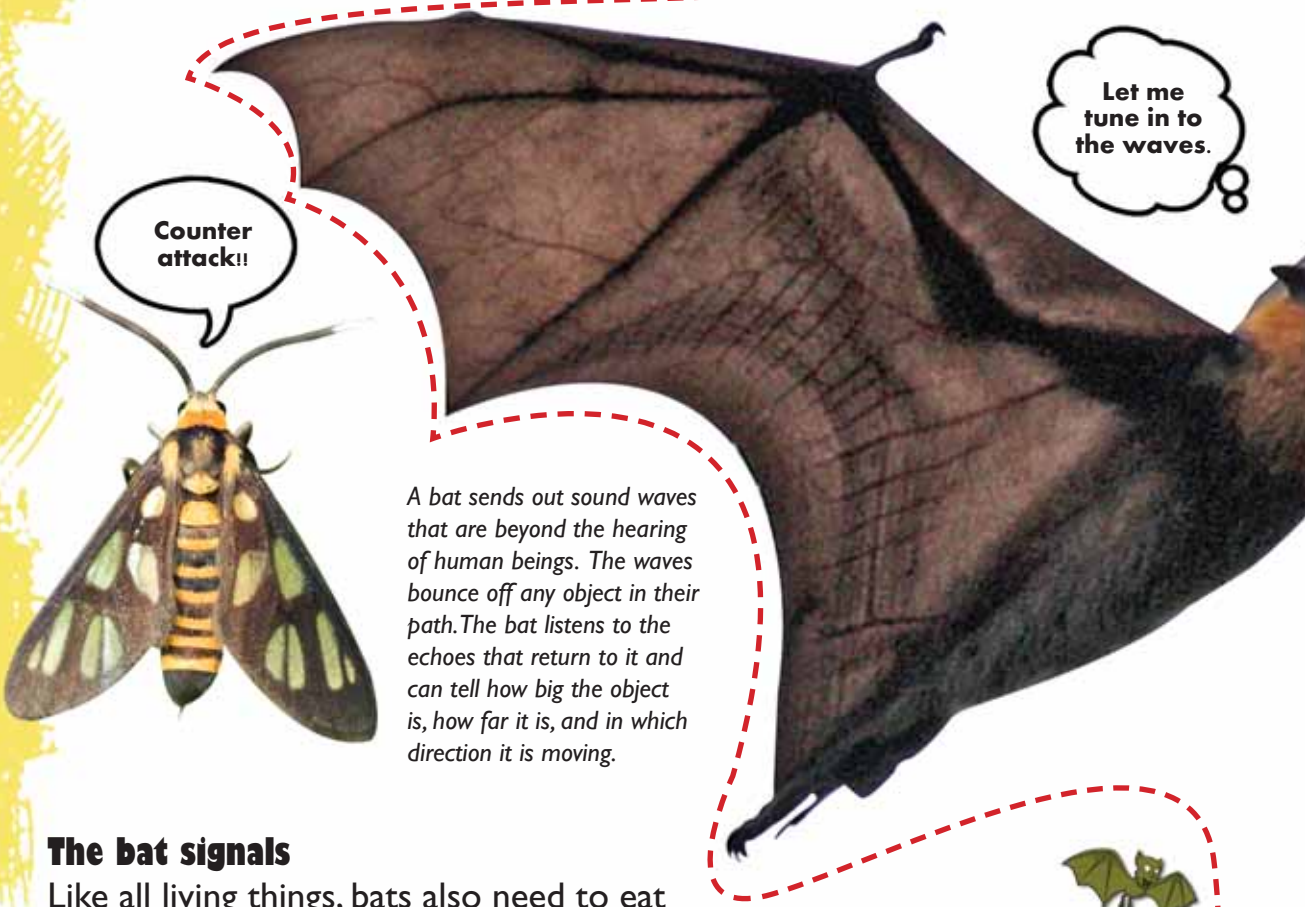
How do moths save themselves from bats?

You have read about wars. But can you imagine a war in nature? And that too electronic? Yes, there is actually such a war! It involves bats and moths. Let's read their side of the story, and then you decide who should win.



A bat sends out sound waves that are beyond the hearing of human beings. The waves bounce off any object in their path. The bat listens to the echoes that return to it and can tell how big the object is, how far it is, and in which direction it is moving.

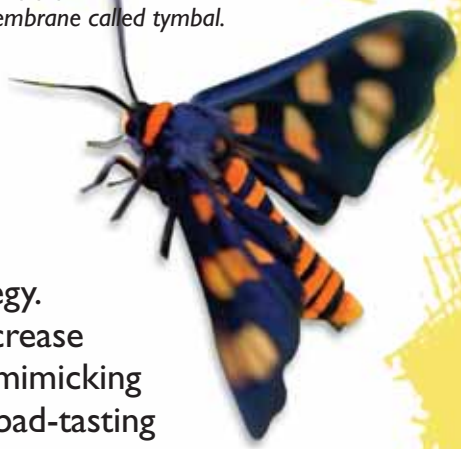
The bat signals

Like all living things, bats also need to eat to survive. The smaller kind of bats love eating moths, but finding them is not an easy task. So, bats have devised a unique strategy to locate their prey. It is called echolocation. Bats make a sound like a beep. The sound is actually a sound wave that travels away from bats. When these waves move outward they hit other things and bounce back, like an echo. The bats are so good at using echoes that they can tell the difference between food, a predator, and an obstruction, by the shape of the echo!

The moth strikes back

If it were so easy for bats to find moths, there would be no moths today. For survival, moths need a strategy to counter the attack. They have very smartly come up with an ultrasonic jamming device that jams the sound waves sent by bats, thereby confusing them.

Tiger moths have come up with an even more advanced strategy. These good-tasting moths increase their chances of survival by mimicking the sounds made by their bad-tasting cousins; they make ultrasonic clicks of their own. Ultrasonic sounds are those that are beyond the hearing of humans. The moths broadcast the clicks from a paired set of structures called "tymbals". They use the tymbals to make specific sounds that warn the bats of their "bad taste".



Tiger moths respond with their own ultrasonic reply, produced from a special membrane called tymbal.

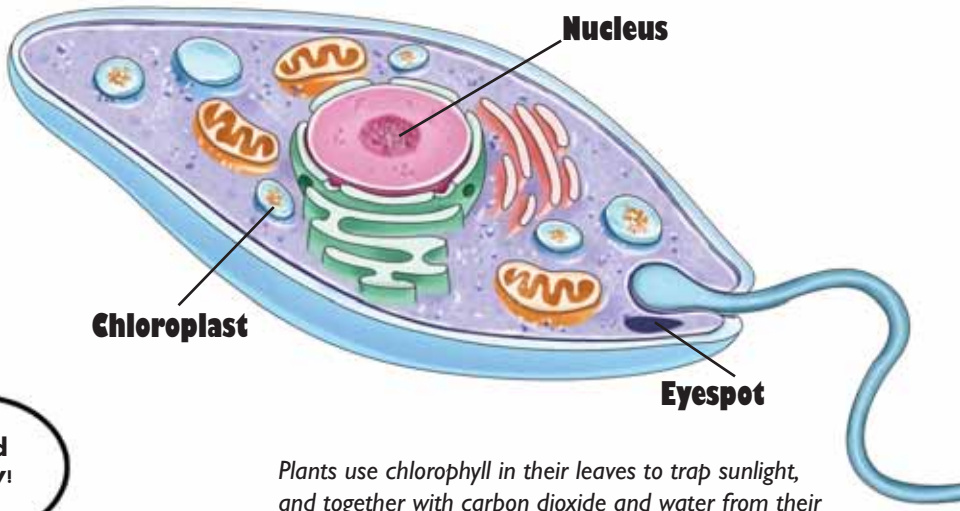
Scientists have found other types of moths similar in size to the sound-emitting moths. These do not make sounds, and are gobbled up by the bats.

Blood-sucking bats

Usually, bats live in caves or other dark places. They eat many other things besides insects. Some eat fruits, others hunt frogs, and some of them, called vampire bats, seek out animals and suck their blood!

How can a creature be both plant and animal?

Ever heard of a creature that is neither plant nor animal? Well, there is such an organism that both botanists and zoologists lay claim to. It is *Euglena gracilis*, a small organism that lives in water and is a combination of plant and animal. The euglena can make its own food like plants, but it can also eat insects like animals do.



Plants use chlorophyll in their leaves to trap sunlight, and together with carbon dioxide and water from their roots, they make sugar and oxygen.

The euglena has an eye patch, quite like a pirate!

What does euglena look like?

Imagine a pirate with an eye patch, only much smaller! The euglena is only made up of one cell. It has a long hair-like structure that stretches from its body, called flagellum. The flagellum looks like a whip, and the euglena uses it to swim. Near the root of the flagellum is a minute "eye patch". This eye patch covers a small, light-sensitive granule, "the eye", which lies at the base of the flagellum. The eye patch is itself not responsive to light. When the eye patch covers the "eye" nothing happens. But when light falls on the eye, it waves the flagellum rapidly and sends the euglena out into the light.

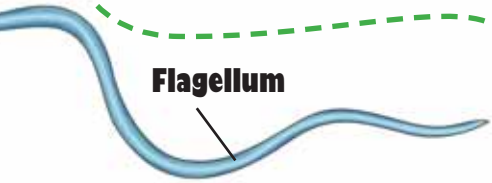
What does a euglena eat?

Like plants, the euglena has a green substance called chlorophyll in its body, which it uses to make food from the Sun. The euglena gets chlorophyll from algae, which it eats. If it doesn't have enough light to make its own food, it eats other things just like an animal would. It eats tiny organisms such as amoeba and paramecium.

Euglena, the hitchhiker!

The euglena is a freshwater creature and lives in ponds, rivers, and marshes. And if your swimming pool isn't clean, it will happily live there as well. But how does it reach these places? Birds like geese and ducks carry it in the wet mud that sticks to their feet from one pond, lake, or any water body to another.

The euglena sticks to the feet of geese and ducks and hitches a ride from one pond to another.

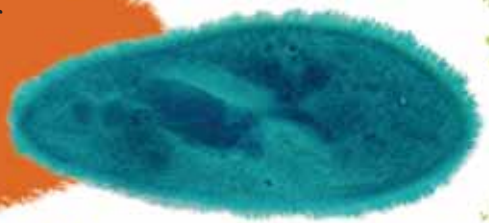


How does a euglena reproduce?

The *Euglena gracilis* can split itself in half and become two new euglenas! It can only do this if it is well-fed and if the temperature is warm.

OF BOTH WORLDS

Scientists cannot decide whether the euglena is a plant or an animal! Right now, most scientists put them in the Protist Kingdom, with other microscopic organisms such as amoeba and paramecium.

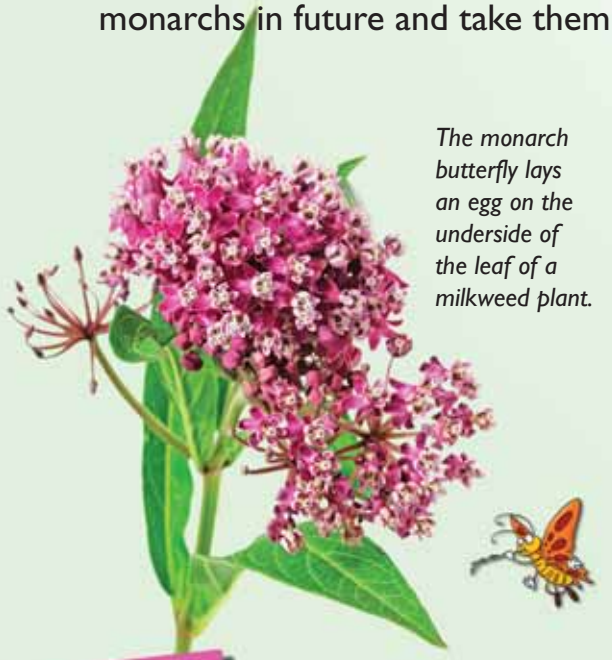


How does the monarch butterfly travel so far?

Do you love watching butterflies flit from flower to flower? Aren't they delicate and beautiful? Can you imagine a butterfly being poisonous? Well, there is one poisonous butterfly – the monarch butterfly. It eats poisonous milkweed in its larval stage and lays its eggs on the milkweed plant.

A poisonous paintbox

The monarch butterfly looks like an artist's palette, with lovely bright colours splashed on its wings. It is bright orange, with black wing veins and outer margins. The wings have white spots on the outer margins, and three orange patches are found near the top of the front wings. The hind wings are rounded, and they are lighter in colour than the front wings. The body is black, with white spots. Animals that eat a monarch butterfly get very sick and vomit (but usually do not die). These animals then avoid monarchs in future and take them off their diet list.



The monarch butterfly lays an egg on the underside of the leaf of a milkweed plant.

Prince to monarch

The monarch starts its life as a ridged, spherical egg, which is only one-eighth of an inch long. The mother butterfly lays only one egg on the underside of milkweed leaves, which hatches in about three to five days. A tiny worm-like larva (caterpillar) emerges. It is always hungry and eats milkweed leaves almost all the time. When the larva is about 5 cm long, it stops eating and turns into a pupa. The caterpillar then turns into a butterfly and emerges from the pupa, ready to soar and glide.

How come? How so? That's how strange creatures live: the amazing life of bizarre animals

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