

EASY SCIENCE

FROGS MATTER

LET'S JUMP IN AND HELP SAVE THEM!

Frogs and other amphibians are dying. After thriving for over 360 million years, a third to half of the world's 6 000 known amphibian species could go extinct in our lifetime. This would be the single largest mass extinction since the disappearance of the dinosaurs.

WHY ARE THEY DYING?

A fungus, called the chytrid fungus, is the most urgent danger but other causes include widespread loss of their habitat, pollution, pesticides, and climate change. Amphibians are among the first species to be affected by changes in the environment, so when their numbers go down in the wild, it serves as a warning to other species, including humans.

WHY DOES IT MATTER?

Amphibians are a very important part of a healthy, natural world. They are not only beautiful creatures in nature, but they also offer many benefits to humans:

- ◆ They play an important role in the food web as both predator and prey. They help maintain the delicate balance of nature.
- ◆ They eat pest insects, benefiting farmers around the world and minimising the spread of diseases, including malaria.
- ◆ The skin of amphibians contains substances that offer possible medical cures for a variety of human diseases.

WHAT CAN BE DONE?

Scientists have named 2008 the Year of the Frog to make people aware of the plight of frogs and other amphibians.

If zoos, botanical gardens and aquariums take action now, they may be able to halt worldwide frog extinction. Scientists from around the world are involved in the Amphibian Conservation Action Plan (ACAP) which aims to help understand and stop the amphibian extinction crisis.

Scientists from ACAP founded the ambitious Amphibian Ark project, which encourages zoos, aquariums, botanical gardens and other institutions to catch endangered amphibians that cannot be protected in the wild. They will keep the amphibians safe and breed with them to ensure they survive.

Zoos, botanical gardens and aquariums around the world will each take in at least 500 healthy frogs from a threatened local species to protect them from the killer fungus, chytrid.

As in the biblical Noah's Ark that the project is named after, the Amphibian Ark is a stopgap measure to protect what's left of amphibian biodiversity before it's too late. According to the scientists behind the Amphibian Ark, the project buys them time by preventing more species from going extinct while researchers figure out how to stop the spread of chytrid and protect amphibians from other problems in their environment.

Each frog species will be kept in at least two places in case of fire or other natural disasters. The facilities will be biosecure, which means diseases will not be able to get in or out easily.

In this way, scientists are buying valuable time for species that would otherwise go extinct. The rescued amphibians will be released back into the wild when they are no longer under threat.

AMPHIBIANS

Amphibians are cold-blooded vertebrate animals. Many live in water, but others live on land, in trees, and even in deserts. There are three orders

- ◆ Frogs and toads which are tailless and have four legs;
- ◆ Salamanders and newts which have long tails and usually have four legs;
- ◆ Caecilians, which are worm-like animals.

FROGS & TOADS

Frogs and toads make up 80% of all amphibian species.

What is the difference between a frog and a toad? As a general rule, frogs have smoother skins than toads and spend much more of their time in water. Toad skin is covered with bumps. The toad bumps are glands that protect the toad by producing a nasty-tasting liquid. In a fairytale, a princess kisses a frog and he turns into a handsome prince. She would definitely not want to kiss a toad!

Male frogs croak to call females during the mating season. They croak by forcing air over their vocal cords. The loudest frogs have an inflatable vocal sac that puffs up with air, like a balloon.

HOW CAN YOU BE INVOLVED?

Spread the word about the importance of saving amphibians from extinction.

Find out from your local zoo if they are involved in the Amphibian Ark project and visit the facilities to see the endangered amphibians. Local zoos such as the Johannesburg Zoo and the National Zoological Gardens in Pretoria are amongst those involved in the Amphibian Ark project.

The Johannesburg Zoo has set up an Amphibian Conservation Centre. Through the centre it contributes to conservation efforts; it also takes part in captive breeding programmes of South African endangered animals.

The programme is focusing on those species it feels "comfortable" breeding and the group has decided to concentrate initially on five non-endangered species of frogs that have similar breeding habits as those that are critically endangered. These non-endangered species are the *Heleophryne natalensis* (painted reef frog), the *Bufo Gutturalis* (guttural frog), the *Hyperolius marmoratus* (Natal ghost frog), the *Breviceps adspersus* (giant bullfrog), and the *Cacosternum boettgeri*.

(Source: www.joburg.org.za)



Red-eyed tree frog eggs
PHOTO: RON HOLT

WHAT IS AMPHIBIAN CHYTRID?

Amphibian chytrid is a fungus that infects the skin of amphibians, the vital organ through which many breathe and drink.

In environments where it thrives, the fungus can kill 80% of the native amphibians within months. Currently, it cannot be stopped in the wild, neither can it be treated.

The amphibian chytrid fungus is thought to have originated in sub-Saharan Africa where it has been documented on African clawed frogs (*Xenopus laevis* – the common platanna) as far back as the 1930s. At that time, these frogs were exported around the world for human pregnancy tests, and presumably, the disease went with them. Over the years, the frogs also became popular research subjects and pets. It is estimated that they have been exported and distributed by the thousands and tens of thousands per year since the 1930s.

Climate change may speed up the spread of this disease. Warmer temperatures dry out the moist areas where most amphibians live. This causes stress that may make them easily contract the disease.

Find out if there are endangered frogs in your area. You can do a science fair project on these frogs to help make people aware of their plight.

EasyScience is produced by the South African Agency for Science and Technology Advancement (SAASTA), an operational unit of the National Research Foundation. SAASTA's mission is to promote the public understanding, appreciation and engagement with science and technology among all South Africans. Visit the website: www.saasta.ac.za for more information.



Panama's Golden Frog, *ATELOPUS ZETEKI*, considered a national icon and good luck charm, is now likely extinct in the wild because of chytrid fungus.
Photo: Gerry Marantelli



The African clawed frog, or common platanna.
Photo: Dirk Petzold

Lemur leaf frog
Photo: Ron Holt

FRED THE FROG GETS TESTED!

Fred the frog, the National Zoological Gardens of South Africa's amphibian ambassador, has been tested for chytrid fungus.

Biologists have found that the death rate from the infection is 100 percent and it causes skin infections in every amphibian species it attacks. While the spread of the fungus is a major new threat to all amphibians, scientists report that the greatest current danger to every threatened species is still the loss of habitat as cities and suburbs expand, streams and ponds and wetlands give way to the needs of farmers, and forest lands are destroyed.

The National Zoo is the only facility in the country that offers the service for testing for this fungus.

FROG FACTS:

What do you call a group of frogs?
Answer: An ARMY of Frogs!

What do you call a group of toads?
Answer: A KNOT of Toads!

HOME IS WHERE THE FROG IS...

To attract a variety of frogs and toads to your garden, you will need to create a variety of watery habitats.

Some frogs only breed in seasonal water, like rain puddles, while others prefer deeper and permanent water such as ponds and streams. It's also a good idea to add frog 'homes' and hiding places like logs and rocks that will give them more security.

Frogs and toads can be noisy additions to your garden, especially during the breeding season. Remember, a noisy garden is the sign of a happy one!

A standard garden pond will attract some toads. Ponds with pumps and small waterfalls will attract river frogs. Wetland plants like bullrushes and reeds will attract the beautiful lily and reed frogs. Damp areas around the pond will make an ideal home for rain frogs.



Guttural toad



Chacoan horned toad

To find out more about frogs and other amphibians visit www.amphibianark.org



A polar bear sculpture made of ice stands outside the Global Seed Vault in Longyearbyen, Norway.

NOAH'S ARK FOR CROP SEEDS

Norway recently opened a Noah's ark of the plant kingdom inside an Arctic mountainside. Millions of crop seeds will be stored in this frozen Global Seed Vault.

These seeds, which are among mankind's most valuable resources, will be safe from threats such as war, natural disasters or climate change. The vault's goal is to store and protect samples of every type of seed from every seed collection in the world.

The Global Vault is part of a large international effort to collect information about plants and their genes, which climate change experts say may indeed prove more valuable than gold.

Blasted out of icy rock 1 000 km from the North Pole, the air-locked vaults would stay frozen for 200 years even in the worst-case scenario of global warming and if mechanical refrigeration were to fail, officials said.

Already 100 million seeds from more than 100 countries have been sent for safekeeping. Each seed sample comes from a different farm or field. The seeds in the Global Seed Vault range from major African and Asian

staples such as rice, maize, wheat, cowpea and sorghum to European and South American varieties of eggplant, lettuce, barley and potato. Genetically modified varieties will not be included.

"Biological diversity is under threat from the forces of nature... and from the actions of man," said the Norwegian Prime Minister Jens Stoltenberg at the opening of the facility. The Global Seed Vault will be a sort of backup hard drive, in case natural disasters or human errors erase the seeds from the outside world.

The seeds will be kept at a storage temperature of minus 18-20 degrees Celsius. Barley can survive 2 000 years, wheat 1 700 and sorghum almost 20 000 years under such conditions. If the freezers failed, the permafrost would keep the cavern at around -4°C, allowing time for repairs.

Source: Planet Ark at www.planetark.com

A LEAP INTO THE SOUTHERN OCEAN

Grade 11 student Nomaphelo Mvinjelwa and intern Lindelwa Mini, both of the Leap School for Science and Mathematics in Pinelands, Cape Town, have been invited by

Dr Isabelle Ansorge of the Oceanography Department of the University of Cape Town (UCT) to join her research team heading for the Prince Edwards Islands in the Southern Ocean.

As part of the International Polar Year, they will spend five weeks aboard the South African research and supply vessel, the SA Agulhas. The team is made up of four oceanography honours students, a post doctoral student, an education officer from the South African Environmental Observation Network (SAEON), and the Leap School duo.

They will be studying the ocean circulation between the Prince Edward Islands (Marion Island and Prince Edward Island) and 58° S. EasyScience hopes to get a personal report of this experience from the learners for our next issue.



Nomaphelo Mvinjelwa (right), a Grade 11 student, and intern Lindelwa Mini (left) of the Leap School for Science and Mathematics in Pinelands, with Professor Isabelle Ansorge of the University of Cape Town. The learners will join a UCT oceanography research team heading for the Prince Edwards Islands in the Southern Ocean. One of the main aims is to attract young scholars into ocean sciences.

Photo: University of Cape Town

