



2023

VOLUME 17

current conservation

KIDS

Current Conservation carries the latest in research news from natural and social science facets of conservation, such as conservation biology, environmental history, anthropology, sociology, ecological economics and landscape ecology.

For more details, visit our website at www.currentconservation.org

This magazine is produced with support from:



ISSN 0974-0953

COPYRIGHTS

All content in Current Conservation is, unless otherwise noted, licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)
You are free to copy, distribute and transmit the work, and to remix or adapt the work under the following conditions:

- You must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work).
- You may not use the material for commercial purposes.
- For any other reuse, adaptation or distribution, you must share your version under the same license as the original, while making clear to others the license terms of this work.

Any of the above conditions can be waived if you get permission from the copyright holder.
Nothing in this license impairs or restricts the author's moral rights.

The full text of this license is available at:
<https://creativecommons.org/licenses/by-nc-sa/4.0/>



Contents



fun facts

3 Beautiful Bats

Rachel Brown

A day in the life

8 Of an Irula Snake Catcher

Harsha Prashanth

storytelling

13 The Pangolin Protector

Nidhi Singh & Akanksha Singh



bookshelf

20 The Chronicles of Chitty: A Tale of an Indie and Her Human Being

Shriya Lele

fun facts

23 Figs: Friends and Foes

Anuradha Prasad

emerging voices

26 Aliens on Earth

Sloka Bhushan





Cover art **Shivam Choudhary**

‘Symbiosis’—a close relationship between two organisms—is a recurring theme throughout this issue. In ‘Beautiful Bats’, we learn how bats do us a favour by preying on pesky bugs and pollinating important fruit crops. Pollination also features in ‘Figs: Friends and Foes’, as an example of a ‘mutualistic’ symbiosis—one that is beneficial to both species. But figs also have a dark side, which is explored in the second half of the article. Like figs, humans have complicated relationships with the creatures around us; this is examined in both ‘The Pangolin Protector’ and ‘A Day in the Life of an Irula Snake Catcher’.

There are a few human-animal interactions celebrated as those between people and their pet dogs—a prime example of which is the focus of the book *The Chronicles of Chitty*, glowingly reviewed here. Each of these pieces invites us to consider what symbiotic relationships can teach us about ourselves and our role in nature. This is perhaps most evident in ‘Aliens on Earth’, which asks what we could achieve if humans used their knowledge of tardigrades—and other fascinating species—to improve our lives and those of the countless organisms with whom we share the planet.

– **Caitlin Kight and Payal Bal**

Editor

Kartik Shanker

Handling Editors

Blake Simmons

Daniel Read

Executive Editor

Devathi Parashuram

Geri Unger

Jonathan Barzdo

Managing Editor

(Art & Design)

Shivangi Pant

Copy Editor

Devathi Parashuram

Clarita Mendes

Managing

Editor

Greta Ann Sam

Chief RiT Editor

Krishnapriya Tamma

RiT Editors

Abhishek Harihar

Archana Anand

Geetha Ramaswami

Madhuri Ramesh

Raza Kazmi

Tammy Cloutier

Associate Editors

Caitlin Kight

Eduardo Gallo-Cajiao

Kanchi Kohli

Marianne Manuel

Payal Bal

Tarsh Thekaekara

Advisory Board

Ananda Banerjee

Annu Jalais

Bram Büscher

Brendan Godley

Chris Sandbrook

Eben Goodale

Ferenc Jordan

Fred Nelson

Gladys Kalema-Zikusoka

Josh Donlan

Kalyan Varma

Simon Pooley

CC Kids Editors

Caitlin Kight

Payal Bal

Beautiful Bats

Author **Rachel Brown** | Illustrator **Chandrima Chatterjee**

Bats contribute to some pretty special aspects of our natural environment. In fact, they may have more of an impact on your daily life than you realise. Across the world bats consume tonnes of flying insects every night and help to control pests like mosquitos. Bats are also key pollinators for many types of fruit including banana and mango. Like us, bats are mammals, they have hair on their bodies and milk glands from which they feed their young. But they are

quite different from humans in a few unique ways. Bats have wings which they use to fly and many bat species use echo-location to navigate their way through the night sky.

Bats even inspired one of the most popular superheroes of all time: Batman.





Types of bats: Megabats and microbats

Megabats

Most megabat species are large (well, large for a bat), they have big round eyes and a long snout, making them look a little like an upside-down fox. Many megabats eat fruit and sleep during the day while hanging from large trees. Megabats have excellent sight and smell which they use to locate their favourite food, fruit and nectar, and to navigate through the night sky.

Microbats

Microbats—you guessed it—are micro-sized compared to megabats. Microbats usually have very small eyes, large ears, and use their strong sense of sound to navigate through the sky. Many microbats feast on huge numbers of insects, but some eat fruit, fish and even frogs! Echolocation is used by most microbat species, and unlike megabats, sound is their dominant sense. Contrary to popular belief, bats are not blind. However, microbats have a different eye structure than humans do and don't see the world in the same way.

Let's meet a few bat species!

The fantastic flying fox

The spectacled flying fox (*Pteropus conspicillatus*) is a megabat species found in the tropical rainforests of North Queensland in Australia. This species feeds on more than 35 different types of fruit. Spectacled flying foxes forage by removing fruit from trees with their sharp teeth before flying off some distance to eat. Seeds fall from the fruit as it is being eaten and land onto the rainforest floor. A few weeks or months later, new rainforest trees germinate from the seeds dropped by these bats.

Bats with mohawks

The long-crested free-tailed bat (*Chaerephon chapini*) is an insect-eating microbat found across central Africa. Males of this species have a very interesting way of impressing the ladies. When they reach maturity, males grow a long white mohawk on top of their heads. Lady bats choose a mate with the mohawk that they like best.

Navigating the night

When bats emerge from their roosts at night-time, they use their exceptional flying skills to search for food and water. They have long limbs extending from their bodies that have a similar structure to the human hand and leg. A soft membrane of flexible skin extends over these limbs to form a pair of folding wings. In the air, bats rely on either sight or sound (echolocation) to search for food, which includes nectar, fruit, flying insects, ground-dwelling insects, aquatic insects, small fish and other animals.

Scientific fact: 'Echolocation' is a process by which the bat emits an ultrasonic sound and listens for its echo to find an object (usually its prey). These sounds are at such a high frequency that most bat calls can't be heard by humans at all! Many whale and dolphin species also use echolocation to find food and to navigate.

Where do bats live?

Bats are found almost everywhere across the world, except for Antarctica and some parts of the Arctic circle. From dense tropical rainforests to deserts and every habitat type in between, bats can survive almost anywhere. To make a suitable home, bats need food, water and shelter—much like us humans.

Most bats roost (sleep) during the day, hanging upside down by their feet. Bats roost in some very interesting places, including caves and rock crevices, different parts of a tree (such as under the bark, in the foliage, or in a hollow), in abandoned bird nests and termite mounds. They are also known to use old buildings and bridges as roost sites. Some brave bats have even been found roosting in crocodile burrows!

Bats that make tents

In the forests of Central and South America, lives a very clever little microbat. The tent-making bat (*Uroderma bilobatum*) is not content to roost just anywhere—they specifically like to sleep in tents. Using the leaves of a banana tree, tent-making bats score along the central vein of a large leaf with their sharp teeth until either side of the leaf is pulled into a triangular tent shape. These bats roost in their tents in small groups, protected from the weather and safe from the eyes of predators.

Scary bats

If the name ghost bat sounds scary to you, you'd be right to trust your instincts. Ghost bats (*Macroderma gigas*) are indeed scary. If

you happen to be a tiny bird or a small mammal, such as a mouse or another bat, then stay away from ghost bats! This species of microbat is found across tropical northern Australia and roosts in caves during the day. At dusk, they emerge and swoop down on their unsuspecting prey (mainly birds, small mammals, and large insects), which they carry back to their cave and devour.

Crawling bats

A very unusual species of microbat is found on Codfish Island in New Zealand. The New Zealand lesser short-tailed bat (*Mystacina tuberculata*) can fly like all other bats, but it has a way of foraging for food that is unlike any other bat species. This bat has very large feet

and claws, which it uses to crawl along the forest floor to forage for fallen fruit and ground-dwelling insects.

Building bat homes

The golden-tipped bat (*Kerivoula papuensis*) is an Australian microbat species that feeds on small spiders and roosts in abandoned birds' nests.

Much of the rainforest habitat of the golden-tipped bat has been lost due to urban development. The remaining habitat was further reduced by horrific wildfires that raged across eastern Australia in 2019 and 2020. To help this special species recover from the effects of the fires, an Aboriginal community group have been weaving replacement bird nest roosts from natural fibres. These artificial nests have been placed

amongst rainforest trees to provide much-needed new bat homes.

Keep your hands to yourself please!

Like most wild animals, bats and their faeces can carry harmful and, in some cases, deadly diseases. Bats are animals to be appreciated from afar and never played with. Wild animals, including bats, must never be touched or consumed.

Scientific fact: The transfer of a disease from an animal to a human is called zoonosis. The Australian bat lyssavirus is a good example of zoonosis.



Rachel Brown is a conservation project manager and published author of nature-focussed fiction and nonfiction stories. She is equally passionate about wildlife conservation, travel and culture.

Chandrima Chatterjee is an illustrator based in New Delhi. A former editor and curriculum designer, she loves to tell heart-warming stories through her artworks.

A Day in the Life of an Irula Snake Catcher

Author **Harsha Prashanth** | Illustrator **Mehnaaz Husain**

(This is a fictitious account of an Irula snake catcher, based on the real-life award-winning Irulas, Vadivel Gopal and Masi Sadaiyan.)

I felt a sense of pride and joy as I sat in front of the TV and watched my Irula brothers and mentors, Vadivel Gopal and Masi Sadaiyan, receive the prestigious Padma Shri award— one of the highest civilian awards of the Republic of India. The hard work they had put in all these years was finally being recognised. I felt that I, too, had received an award that morning, because I am also from the Irula community, and our forte is catching snakes.

Our ancestors have passed down this unique skill to us and now it has become our livelihood. But what people don't know about us is that we are also expert foragers of herbal medicines and know the forests like the back of our hands. Getting this award is not only a huge experience for Vadivel and Masi but for our entire community, as well.

It hasn't always been 'smooth scaling' for us, pardon the pun. When the Wildlife Protection Act was introduced in 1972, there was a ban on selling snake skins and we found it hard to maintain our livelihood. Then we got a new lease on life when, with the help of a senior

a day in the life





herpetologist (a person who studies reptiles and amphibians) and conservationist Rom Whitaker, we founded the Irula Snake Catchers' Industrial Cooperative Society. Our talent was recognised and put to good use, to help both humans and snakes. It was now official—we were licensed professional snake catchers and venom extractors.

The Irulas were soon recognised as skilled snake catchers and were wanted internationally for snake-catching missions. I had the privilege of accompanying Masi and Vadivel on one of these memorable trips. This was our mission to the US, where we were recruited to catch Burmese pythons, which are considered a threat in Florida as they are an invasive species.

Going abroad to a strange new country where customs are totally different from ours was overwhelming. Being on board an aeroplane was very exciting since I had never flown or stepped outside my country. The huge skyscrapers of Florida towered over me. Amidst the hustle and bustle of the cityscape, I could always feel the cool sea breeze threading its way through, taking me back to good old Chennai.

The Americans found our methods of catching the pythons a little unorthodox. I understand that, to inexperienced people, covering yourself with snake poop is not a very common technique. But my rather experienced friends told them, 'You cannot catch a snake if you are not covered in it'. In other words, to catch a snake, you have to *be* the snake. During our trip, we caught many pythons, but none were as phenomenal as the 16-foot-long female python we caught on our second day. Fun fact, the average adult Burmese python is at least 7 feet long, and goes all the way up to 19 feet in length!

At home near Chennai, we not only track and catch the snakes but also extract their venom. In India, we have four snakes that we are allowed to target for this purpose: Indian cobra, common krait, and saw-scaled and Russell's vipers. We take the venom out of the snake so that the snake is not harmed at all. We do this only in certain seasons, rather than year-round.

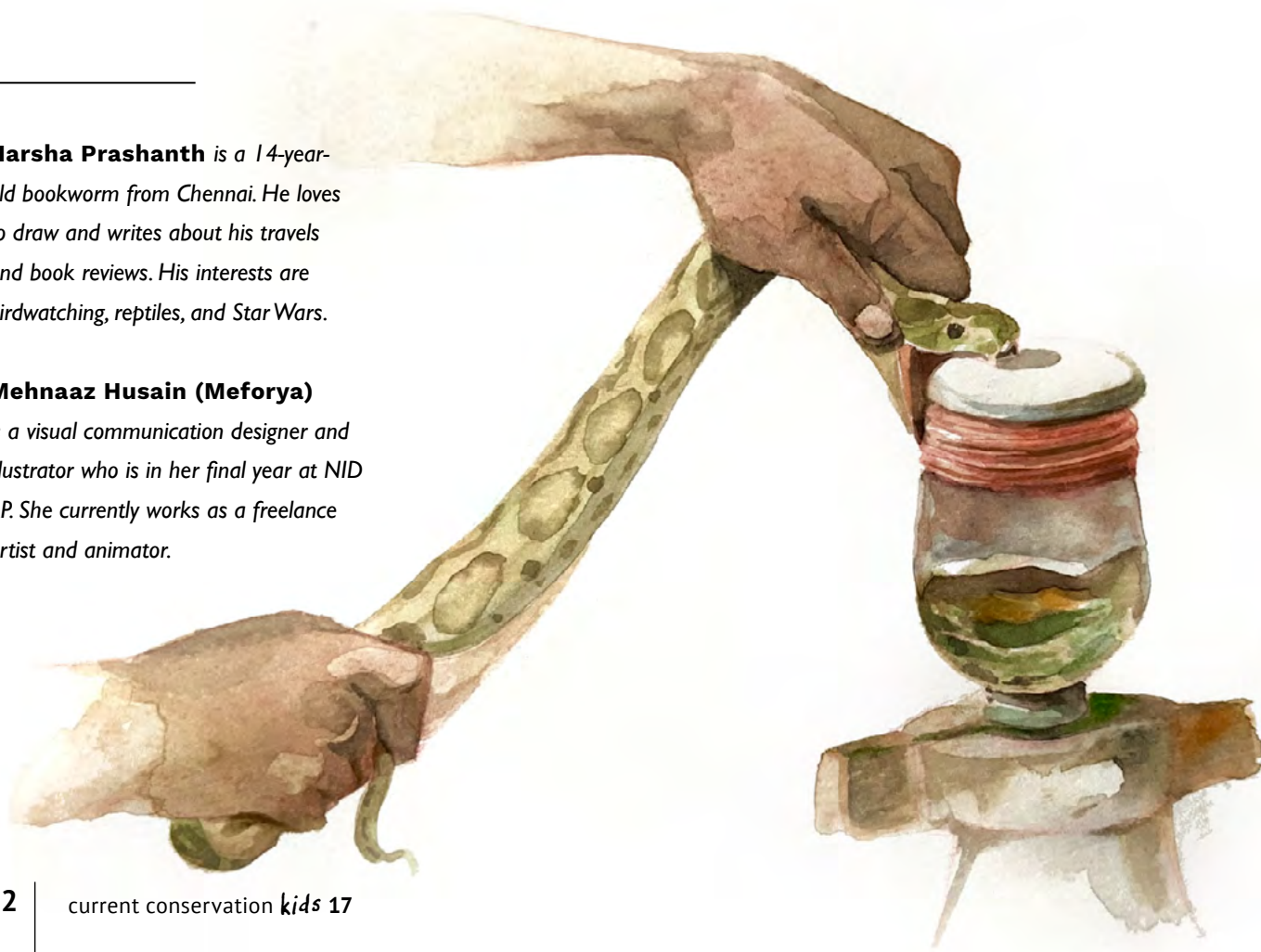
You might imagine a complicated process, but it's pretty simple. We start by catching the snakes and keeping them cool in clay pots. When they are taken out, the snakes open their mouths with fangs, ready to lunge. We keep a container wrapped in a plastic film ready. The fangs go straight through the film and the snake releases the venom into the collection vessel. We mark each snake so we can recognise it in the future, which ensures we do not extract venom from each animal more than three times. After the venom is extracted, the snakes are then released into the wild, to go about their lives, and the collected venom is sent to anti-venom companies. Our Snake Catchers Society has a lot of 'hiss'tory with them (in a good way of course)!

The most rewarding experience is showing our work with snakes to children. These young, fresh minds find our methods and everyday work fascinating. I look at their faces watching us: some are filled with awe, while some are (understandably) drawing back in fear. Snakes don't mean to do any harm. In India, these reptiles feed on pests such as rats and insects that would otherwise have a field day with the farmers' crops. Hence, we consider cobras a friendly species—'nalla pambu', which literally translates to 'good snake' in Tamil. I believe that it is vital that we teach children not to fear snakes and, instead, to appreciate nature and to bust myths and spread awareness about these mostly misunderstood reptiles.

Masi and Vadivel's big win is an even bigger contribution to the Irula community. I think that getting a prestigious award incentivises youngsters like me in our community to use the skills our ancestors have (very carefully) passed down to us. I hope we are a part of the bigger picture—helping humans to bond with their fanged friends!

Harsha Prashanth is a 14-year-old bookworm from Chennai. He loves to draw and writes about his travels and book reviews. His interests are birdwatching, reptiles, and Star Wars.

Mehnaaz Husain (Meforya) is a visual communication designer and illustrator who is in her final year at NID AP. She currently works as a freelance artist and animator.



The Pangolin Protector

A Tale of Discovery and Rescue

Authors **Nidhi Singh & Akanksha Singh** | Illustrator **Shivam Choudhary**

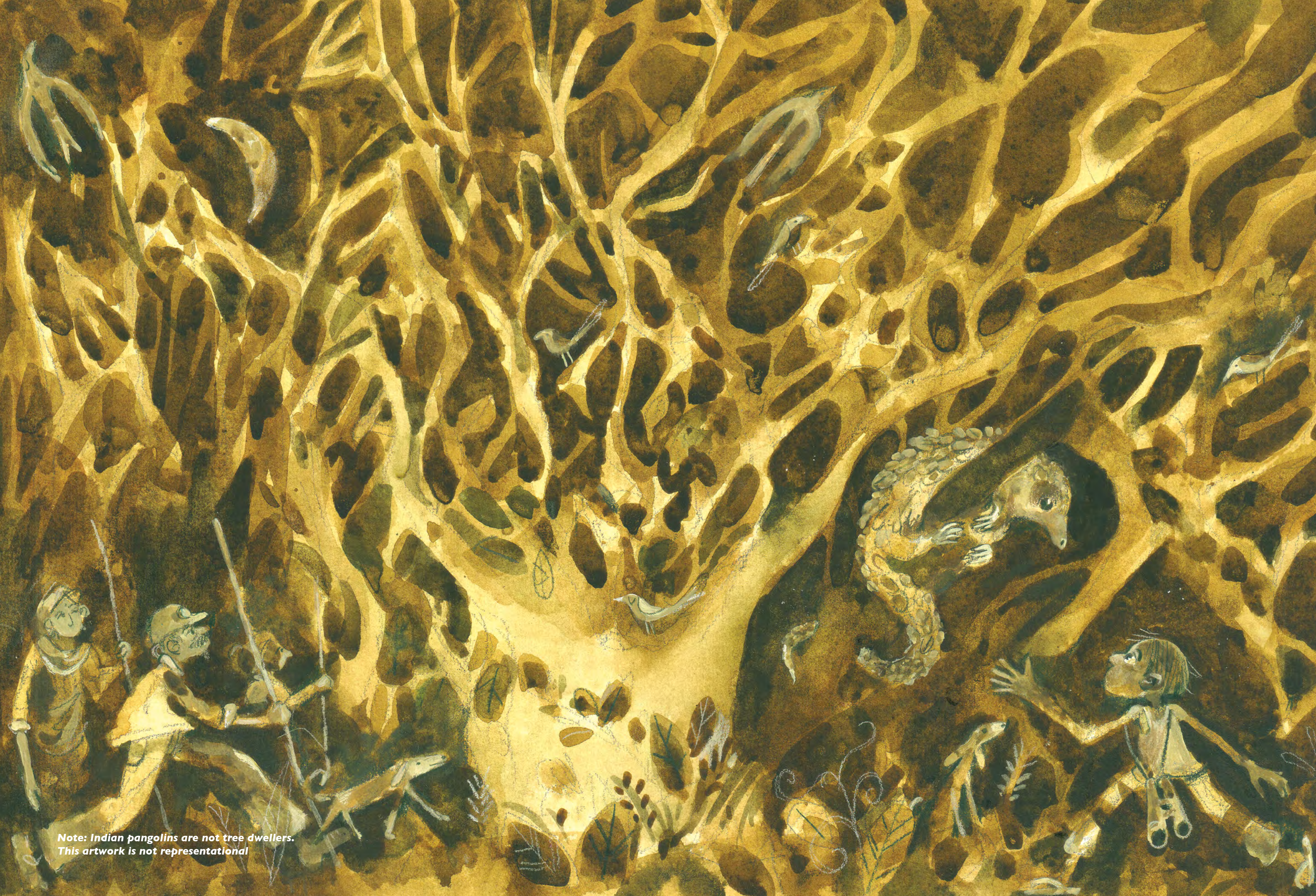
It was a dark and warm June night. Eight-year-old Raju was walking with his father around the lawn in front of their house when he saw a strange creature. It had a long body covered in scales, and it was around the size of a large house cat. Before Raju could figure out what he saw, the creature disappeared into the darkness. It was an Indian pangolin, and it was the first Raju had ever seen. Raju was fascinated and wanted to learn all about these animals.

Raju's father, who worked as a forest guard, lived in quarters near the forest. Raju loved spending time with his dad and learning from him about pangolins and other wildlife.

During summer vacations, Raju would often go with his dad to explore the forest. This is how he learned that the Indian pangolin is an endangered animal, which means that there are only a few of them left in the wild. And, it is also one of the most hunted animals in India because people hunt them for their meat and scales, which are used in traditional medicine. This made Raju feel sad and disappointed, inspiring him to become a conservationist and do all he could to save the animal.

After his first sighting of the Indian pangolin, Raju would often get a chance





Note: Indian pangolins are not tree dwellers.
This artwork is not representational

to see the animal near his lawn, and he figured that maybe the pangolin had made its burrow somewhere near the house. One fine evening as the sun was about to set, Raju decided to go looking for the burrow—from a safe distance, so that he would not disturb or scare the animal. As Raju walked towards the back of his house, he saw a man with his face covered with a black cloth. The man had a knife in one hand and a rolled-up ball covered in scales in another hand. It was the pangolin!

Raju screamed loudly at the man, who was startled and dropped the pangolin as he ran from the place. Raju's father came running out of the house and saw the pangolin lying in front of them. Raju explained what had happened, and his dad immediately called all the nearby forest guards. When they arrived, they searched the area around the forest and found footprints leading away from the site. They followed the trail, which led them deep into the forest. The trail was difficult to follow, but the guards persisted.

They eventually came to a clearing where they found the black cloth and the knife Raju had mentioned earlier.

It was very quiet all around the forest, and then they heard someone's heavy breathing coming from behind some large rocks. They quickly surrounded and caught the man before he could escape. The guards launched a full investigation and soon discovered that

the man was a poacher who was planning to sell the pangolin on the black market to some collectors. The collectors had offered a large sum of money for the animal, and the poacher had a family to feed. The police arrested the poacher and charged him with several counts of animal cruelty and theft.

As for the pangolin, after it was dropped by the poacher, it eventually unrolled itself and

opened its eyes. It could see Raju watching over him from a safe distance; it gave the boy a long look as if thanking him for saving its life. The pangolin then moved back into its burrow.

Raju was very happy that the poacher was arrested and that the pangolin was safe. However, he also knew that this was just one battle in the ongoing struggle to protect endangered animals. He vowed to be more vigilant and to do everything he could to help, such as spreading awareness about the animal.

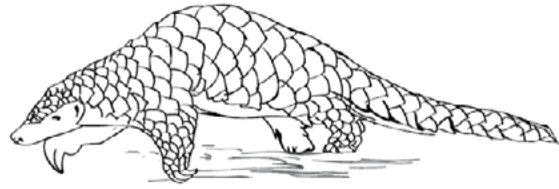


Nidhi Singh works in the field of conservation education in the National Mission for Clean Ganga (NMCG) Project, after having worked in the Himalayan and trans-Himalayan regions of Himachal Pradesh for more than three years. She likes storytelling and writing popular articles

Akanksha Singh holds a Post-graduate degree in Social Sciences from Doon University. She wishes to work with the local community and be able to help those in need. Akanksha likes to make nature videos, and is a frequent traveller to remote regions of the country.

Shivam Choudhary is a kid who looks up at the skies and trees and finds funny shapes hidden in them. He loves to tell stories through the pictures he makes. He is a storyteller in the making who loves to observe, absorb & retell his experiences through his art.

GETTING TO KNOW PANGOLINS

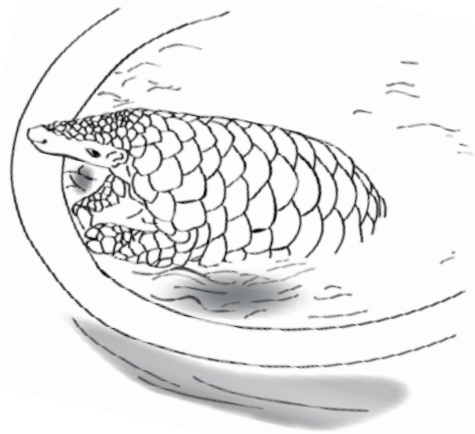


Author **Nidhi Singh & Akanksha Singh**

Illustrations **Rajesh Kumar Mohapatra & Sudarsan Panda***

Q. How many types of pangolins are there?

There are eight species of pangolins found worldwide.
Only the Indian pangolin and the Chinese pangolin are found India.



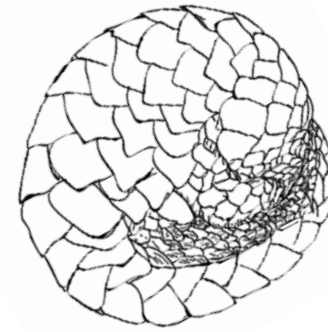
Q. How do they look?

The Indian pangolin is a big anteater with a body covered in 11–13 rows of keratin scales. Adult males are generally larger than females.

Q. Why do they have scales?

The scales, composed of keratin (similar to human hair and nails), serve as a natural armour. They effectively protect the pangolin from predators and other threats in the wild. When scared, they roll up into a tight ball with their scales on the outside, which makes it really hard for other animals to hurt them.

*Rajesh Kumar Mohapatra and Sudarsan Panda (Nandankanan Zoological Park, Odisha, India), CC BY 3.0
<<https://creativecommons.org/licenses/by/3.0/>>, via Wikimedia Commons

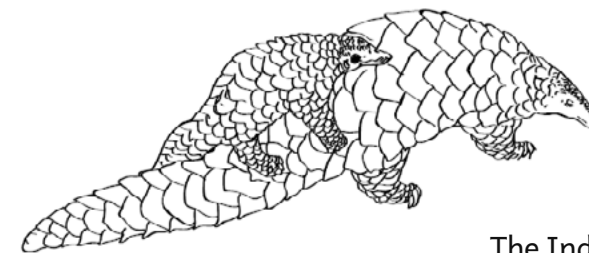


Q. How do they behave?

Pangolins feel more comfortable at night and tend to be shy, often coming out after the sun sets. Even though pangolins don't see well, they make up for it with a fantastic sense of smell. This helps them find their food.

Food:

Pangolins love to eat ants and termites. They use their long, sticky tongues to slurp up their food. Their powerful claws help them break into ant hills and termite mounds.

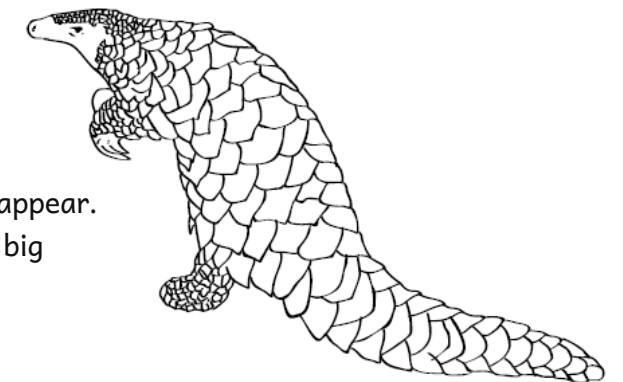


Conservation status:

The Indian pangolin is an endangered animal, which means that there are only a few of them left in the wild. It is one of the most hunted animals in India due to demand for its meat and scales, which are used in traditional medicine.

Q. What can we do?

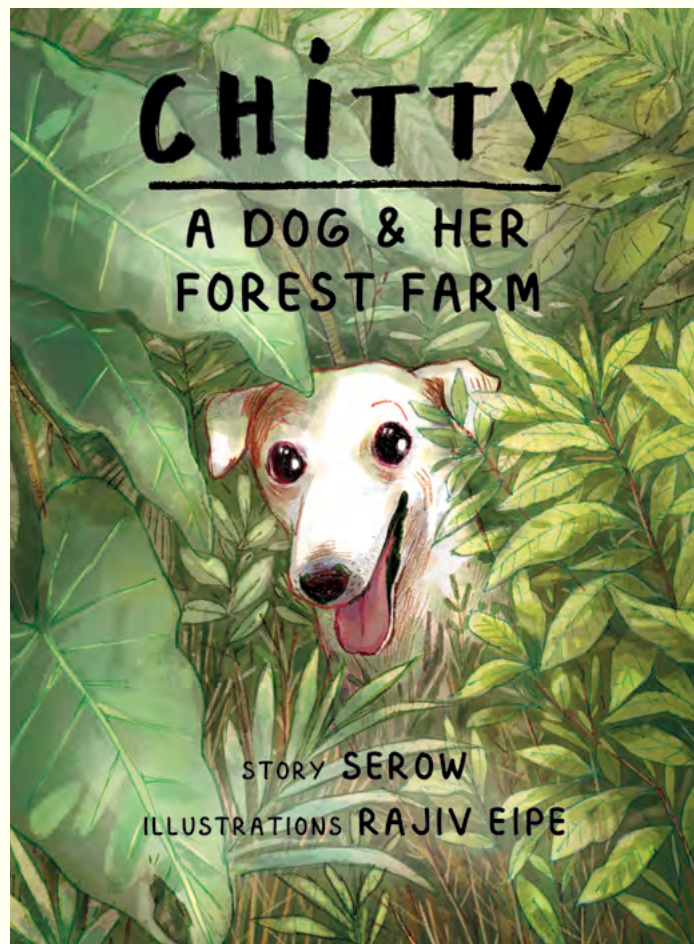
We need to protect them so that they don't disappear. Raising awareness about pangolins can make a big difference, so tell everyone.



The chronicles of Chitty:

A tale of an Indie and her human being

Author **Shriya lele** | Illustrator **Rajiv Eipe**



"I walk beneath a rustling canopy of trees—rosewood, monkey jack, and cinnamon—and the air is rife with the captivating bouquet of the Western Ghats. My face breaks into a smile as I hear the happy patter of a victory lap and a snowy-white pup bounds out from behind the bushes. It's Chitty! Her snoot is red from having sampled some of the kokam fruit thrown at her by the cheeky langurs she so loves to chase. I fall in step with her amble, and we walk towards a veranda where she will later spend her time gazing at the stars once night crawls in."

Actually, I am miles away from Chitty and her home; they just feel real to me because of the immersive storytelling in *Chitty: A Dog and Her Forest Farm*. This book is

a labour of love that chronicles the life of Chitty, a solemn-looking pup rescued from the streets of Pune. It's my favourite kind of narrative, really. One, it features a dog—and not just any dog, but an Indie (a mixture of breeds indigenous to India). Two, it is honest and

heartfelt. Three, it's steeped in the rich tapestry of life on a forest farm, where seasons dictate everyday life and the bonds between people and nature run deep.

Remarkably intelligent, loyal, and highly adaptable, Indies are often a mix of multiple dog breeds that share their ancestry with our very own Kombais, Kannis, or Mudhols, for example. Chitty embodies all the traits that make Indies great companions, and season by season, we see her grow from a reserved puppy into a part-time termite-terminator and full-time forest nymph. The author, Serow, fondly recalls instances of Chitty's animal instinct saving the day, be it from scorpions, snakes, or the unforgiving monsoons. "Chitty had the incredible gift of being in tune with me, as well as with the moods and well-being of the household," Serow writes, and you learn just

how empathetic and communicative Chitty was. You also witness the sensory delights of a forest farm: the scurry of giant Malabar squirrels, the ever-trilling mynas, and the lovely crunch of dry leaves as Serow and Chitty embark on their long walks or "much loved slices of togetherness".

Serow's words are brought to life by Rajiv Eipe's charming—and award-winning—illustrations of Chitty, her home, and its colourful inhabitants. The fact that he spent time on Serow's forest farm seeking out Chitty's favourite nooks and corners is reflected in the way he draws her—be it quietly lounging near 500-year-old Nayaka carvings, pirouetting at termites, or as an older dog: graceful, wise, and with loving,



communicative eyes. Special props for stills that feature “Dr. Poo’s Turdis” and Chitty—now a grande dame—cheekily looking over at Serow’s new pup trying to find his rawhide bone, which has been hidden by none other than Chitty herself. Serow’s fluid writing and Rajiv Eipe’s delightful art effortlessly blend snippets that span 13 monsoons, and by the end of the book, you’ve grown alongside a dog that you never even met.

It's refreshing to read an account of farm life that incorporates snippets of sustainability without coming off as preachy—Serow simply wants you to partake in a life that thrives outside of concrete jungles. She also unwittingly imparts a simple but profound lesson that we should protect and nurture those like

Further reading

Serow. 2023. *Chitty: A dog and her forest farm*. Pune: Kalpavriksh. <https://kalpavriksh.org/our-store/chitty-a-dog-and-her-forest-farm/>

Chitty and her four-legged siblings who roam the streets of our country. Deeply intuitive and capable of unconditional love, dogs could well teach you a thing or two about the universe, if you only stopped to listen.

Well, time to offer an extra hug to the dozens of Indies that grace *my* neighbourhood. As I look over at them running at me, tails wagging and eyes alight with mischief, I am reminded of this particularly moving line from the book: “It struck me that perhaps Chitty had seen the edge of the universe as she gazed at the night sky. Maybe her serenity had come from knowing, in her own doggy way, that we are all only a tiny part of something much larger than ourselves.”

Shriya Lele is a grad student studying childhood cancers using cool tech to know what’s what. She adores writing, photography, potatoes, and dogs—in no particular order.

Rajiv Eipe is an animation film maker and illustrator of comics and picture books.

Figs: Friends and Foes

Author **Anuradha Prasad**

Illustrator **Poorti Bapat**

A young fig wasp is lured by the fragrance of a cluster fig tree. She hurriedly flies to it to lay her eggs. The fig welcomes her like a good host. It knows she is a pollinator, and like a good guest, she is bringing pollen from another fig. Thus begins the story of a mutually beneficial friendship in nature.

We know that there is a lot of interdependence in nature and this is just one of the relationships that you can spot if you look around. Trees provide shelter to birds. Flowers give their nectar to bees. In return, the birds and bees spread the pollen and help make new trees and plants.

We call these relationships between species and organisms **ecological interactions** or **symbiotic relationships**. This simply means their relationship affects one another. When two species benefit and help each other, we call it **mutualism**. When this relationship causes

harm to the other, we say it is **predatorial** or **competitive**. The fig plant can be found in both types of relationship.

Figs as friends

A beautiful story of friendship (or **mutualism**) in nature is that of the fig wasp and the fig tree. A cluster fig tree is an unusual tree. The figs grow directly on the trunk. Even stranger, the flowers and seeds are inside the “fruit,” which is called a **syconium** or an **inflorescence**. So, how do the flowers get pollinated? This is where the fig wasp comes in. A fig wasp is not just any other wasp but a wasp that is made just for the fig tree!

The fig has a little opening in it called an **ostiole**. The female flowers inside it give out a fragrance that attracts pregnant fig wasps. The fig wasp burrows into the ostiole to reach the flower. While entering, she loses her wings—which means she cannot fly out. No matter: she has found a nice, safe space to lay her eggs and feed. When she enters the syconium, she also brings with her pollen from another fig. Thus, her arrival leads to the fertilisation of the fig

tree’s female flowers—so the wasp’s visit ensures the future of both wasp and fig.

The lifespan of a fig wasp is less than two days. She will die after laying her eggs, but new wasps will soon emerge from the eggs she has left behind. The male wasps hatch first. They grow fast and break the eggs of the female wasps and mate with them. The males make holes in the fig, but they never leave. However, the female wasps develop delicate wings that enable them to emerge from these holes. After this, they have a very, very short time to find another hospitable fig where they can lay their own eggs. And so, the cycle continues.

You may ask, what happens to the dead female and the dead male wasps inside? Simple. The fig digests them—but sometimes, if you break open a cluster fig, you can actually see black specks. These are the remains of the wasps. (These types of figs are usually eaten by birds and monkeys. The commercial figs that humans eat don’t need to be pollinated by the fig wasps. It is unlikely that the figs that you buy and eat from the market contain dead wasps in them.)

You may also wonder what happens if the female fig wasp does not bring pollen with her for the female flowers of the fig? It is simple: the tree just drops that fig. This means the fig wasp’s eggs die and don’t get the protection they need to hatch. The tree helps the wasp only if the wasp helps the tree.

The relationship between the fig tree and the fig wasp is important for our ecosystem, but it has been negatively impacted by climate change. Hotter temperatures make it difficult for female fig wasps to survive as long, which

means that they have even less time to pollinate a fig and lay their eggs. This is bad news for both species as they could slowly die out.

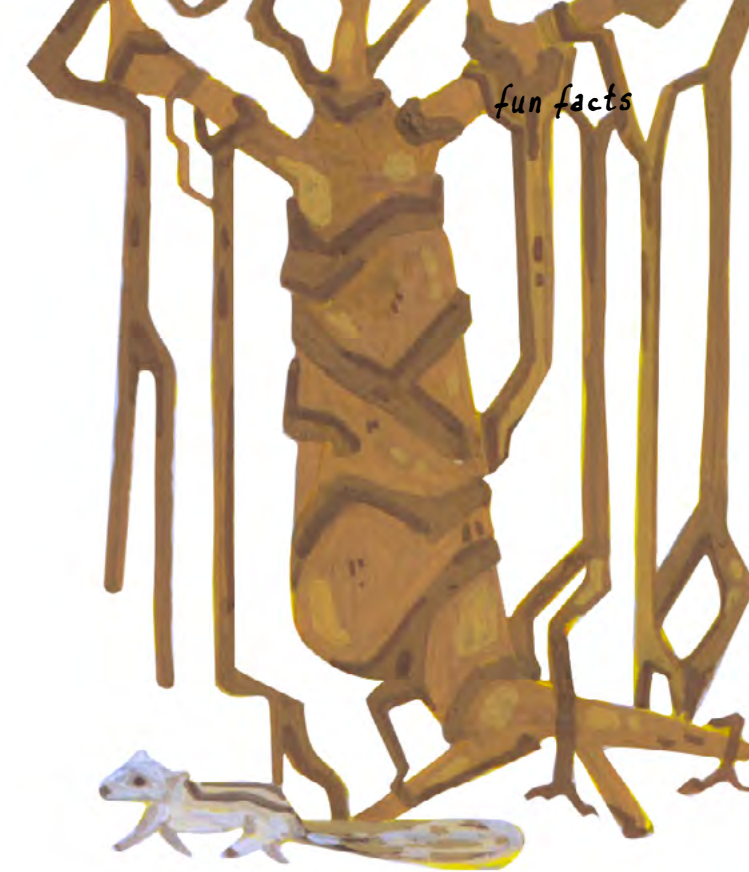
Figs as foes

Figs are not always friendly. Sometimes they are involved in relationships that are predatory or parasitic. Have you seen a strangler fig? It sounds scary, doesn’t it? It is called a ‘strangler’ because it literally strangles the host tree. An example of a strangler fig is the banyan tree.

Strangler figs are also called **hemiepiphytes**. An epiphyte is any plant that grows on another plant. A hemiepiphyte is a plant that starts its life in this way, but eventually grows such long roots that it makes contact with the ground.



Anuradha Prasad is a writer and editor living in Bangalore, India. She is currently exploring her interest in place, wildlife, and nature. She reviews books for an eco-literary journal and writes short fiction, essays, and poetry.



When birds and monkeys eat figs, they may happily perch on random trees while enjoying their little treat. If they are messy eaters, seeds from the fruit can drop onto the tree, allowing these hemiepiphytes to establish themselves on their host. Over time, they flourish, developing aerial roots that grow down to the ground and anchor the fig tree. Initially, the fig offers protection to the host tree during storms, but, slowly, the host tree withers until nothing is left but a hollow trunk. However, even in this state, it continues to support the ecosystem by providing a home to small animals and birds.

Pay close attention and you will see many such friendships and enmities, even right in your own backyard!

Poorti Bapat is a graphic designer and children’s book illustrator. She currently works as a designer at a tech company and illustrates for children’s publications.





Aliens on Earth

Author **Sloka Bhushan** | Illustrator **Karunya Bhaskar**



Imagine *the* most extreme situation ever. Extreme heat, extreme pressure, extreme cold and radiation—like a volcanic eruption, or a nuclear war. Scary, right? Not very welcoming to human bodies, which are just so sensitive! The conditions for unaided human survival are quite limited, if you think about it. It doesn't help that conditions on Earth are becoming harsher by the year, owing to phenomena such as climate change. Yet, we're humans; we want to explore not just every corner of this world, but the universe, too! Could there be anything we could do to survive under extreme conditions?

Let's start by trying to imagine an indestructible animal—one so resilient that it could survive any of the extreme situations above, and more. Such an animal might be able to survive if you crushed it, cooked it, or even sent it to outer space. How cool would that be?! Learning about an animal like this could help us learn how to tolerate extreme conditions ourselves.

What if I told you that such an animal actually exists? Let me introduce you to the humble, but amazing, tardigrade.

They're tiny, only visible under a powerful microscope. They're also cute, resembling tiny little bears, with eight stumpy legs and round bodies. They're practically everywhere—found on every single continent. Oh, and they're practically invincible. Researchers have thrown them into the harshest conditions and, remarkably, tardigrades have

managed to survive. They've been frozen to less than -200°C , a temperature quite close to *absolute zero* (a temperature so cold that even the laws of physics limit us from reaching it). They've been heated to 148°C , well beyond the boiling point of water. They've been shot at by bullets

going a whopping 3,240 kilometres per hour. They've even been sent into outer space, bombarded with solar radiation, and brought back to Earth.

They have managed to survive all of these situations. How, you may ask? The answer is quite simple:

They shut down.

Right now, as you read this, your body is carrying out many, many tasks to sustain you. In your cells, various chemical

reactions are occurring to provide energy for nearly everything that your body does, from digestion to respiration. These are known as *metabolic processes*, and they are absolutely vital for life in all living things.

When most living beings are subjected to extreme conditions, they cannot survive because their metabolic processes can no longer continue. Tardigrades are a special bunch, though. When they are subject to extreme environments, they go into a stage called *tun*. During this stage, they dry out their bodies and curl up into a little hard shell known as an *exoskeleton*. They manage to slow down their metabolic processes to just 0.01 percent of normal levels. In a sense, they reduce themselves to almost-dead, rolled up versions of what they used to be. It is in this stage that they manage to survive the most extreme conditions.

At this point, you probably have one question on your mind:

How do they pull this off?

When tardigrade cells dry up, they are covered by a special gel-like protein that prevents the cells from losing their structure.





But why does this matter to us?

Right now, the world is going through extremes: extreme temperatures, extreme environments, and extreme health crises. This causes problems like damaging crops that do not receive enough water during heatwaves, which means that we humans do not have enough food.

Imagine if we could make use of the incredible survival mechanisms that tardigrades have! We could use the same protein that tardigrades cover their cells with to protect crops, for example. How about using tardigrade survival mechanisms to protect organs before they get transplanted? Maybe we could develop ways to make vaccines last longer in unfavourable conditions, which might make them more effective, for longer? All of this (and more) is currently being explored by researching the survival mechanisms of tardigrades.

When tardigrades are exposed to enough water, the gel-like substance slowly recedes, allowing the animals to rehydrate. Once that happens, tardigrades simply carry on with their lives, almost as if they had never been subjected to these extreme conditions at all. It is this protein that allows them to return to normalcy, and it is found only in tardigrades.

Sloka Bhushan is a physics student who takes an interest in reading and writing about animals from a scientific perspective.

This just goes to show that we do not have to use costly technology, artificial intelligence, or deep-space probes to figure out how to prolong human survival. We can learn an incredible amount simply by looking at tiny tardigrades hiding in moss right in our own backyards. Who knows what we might find if we pay more attention to these (and other) fantastic little critters.

Karunya Bhaskar is a visual designer and artist who loves to travel. Whether it's scuba diving, surfing or trekking through the hills, she's always up for an outdoor adventure.

Interested in conservation, environment, and climate?

GET YOUR COPIES NOW!

editor.ccmagazine@gmail.com



current conservation