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Curing What Ails You

What can elephants teach us about medicinal plants?

By Alex Greene, ethnobotanist and National Geographic Explorer
As you read, think about what people have learned from observing elephants.
A truck stops in front of a large, open-air tent. Elephants stand under the shade of trees. **Mahouts**, caretakers of the elephants, unload spiky vines from the truck. We are at the Thai Elephant Conservation Center (TECC) in northern Thailand. These vines will be made into herbal medicine for the elephants.

I first came to TECC in 2017 as a guide for student groups. I noticed many interesting things. TECC had one of the most advanced elephant hospitals in the world. One of the ways they treated elephants was with herbal medicine. Since I am an **ethnobotanist**, this appealed to me. I study the ways that people use plants. I knew that plant-based medicine and **biomedicine** (or “Western” medicine) aren’t often found together.

Next, I noticed the elephants’ interest in their herbal medicine. I knew that elephants love sweet foods. Sweet corn and sugarcane are favorite snacks here. But, elephants will also eat spiky vines, although they are very bitter. Spiky vines are powerful medicine. Did the elephants know this was medicine? A year and a half later, I returned to Thailand to try to find answers.
Working With Elephants

Elephants have lived among people for thousands of years in Thailand. I decided to work with a group of people called the Karen. They live in the mountains of Thailand and the neighboring country of Myanmar.

The Karen are famous for working with elephants. How did this bond begin? One story tells of how the elephant was originally human. Then it lost its humanity. It became a helper of humankind.

Elephants played a role in nearly every part of life here. They knew the forest. So, they were the best way to travel long distances over land.

Their strength allowed them to move heavy objects like logs. But as cars and machines replaced them, the elephants’ usefulness has fallen. Also, after centuries of too much logging, forests became threatened. In 1989, logging was banned.

Elephants were no longer needed for this type of work. Today, most elephants are in elephant camps for tourists.
Research Begins

I returned to TECC. My first goal was to note which plants were being used to treat sick elephants. How did they use these plants? What did they cure? I set out to visit the Karen in northern Thailand. I worked with an interpreter. We explained my interest to village leaders, camp owners, and mahouts. They agreed to help. We asked them to describe what plants they used for elephant medicine.

Language was a big challenge. I speak English and am just starting to learn Thai. The Karen people speak their own language, Pakinyaw. Many also speak Thai. Some questions had to be translated twice. With patience and repetition, we made progress.

Next, I asked the mahouts to bring me into the forest. There, I collected samples of key plants. I dried them in a plant press. I identified each one. Then I took them to a library for plant specimens, an herbarium.

Analyzing Data

After several months, we had learned about 34 plants. They were used in more than 40 different treatments. The most common use was as a tonic. It keeps elephants healthy.

![Map of Asia, Thailand, Myanmar with markers for Thai Elephant Conservation Center and Karen people]
Raw or cooked rice is added to the tonic. Tamarind fruits and bananas are added, too. Then, mahouts make balls or pellets of this mixture. They feed one or more to the elephants each day.

Other plants were used to treat wounds, eye problems, broken bones, skin problems, and snakebites. Banana flower and ginger root are fed to mother elephants. Some plants are ground up. Others are boiled in water for elephants to drink.

Recording Data

Here is some of the data I collected.

Number of plants used for medical treatments of elephants:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin</td>
<td>1</td>
</tr>
<tr>
<td>Fatigue</td>
<td>1</td>
</tr>
<tr>
<td>Snakebites</td>
<td>2</td>
</tr>
<tr>
<td>Milk production</td>
<td>2</td>
</tr>
<tr>
<td>Broken bones</td>
<td>2</td>
</tr>
<tr>
<td>Indigestion</td>
<td>3</td>
</tr>
<tr>
<td>Eye problems</td>
<td>5</td>
</tr>
<tr>
<td>Internal injuries</td>
<td>5</td>
</tr>
<tr>
<td>Wounds</td>
<td>8</td>
</tr>
<tr>
<td>Health tonic</td>
<td>13</td>
</tr>
</tbody>
</table>

These plant parts are the most commonly used for elephant medicine:

- Bark 32%
- Stems 18%
- Roots 15%
- Whole plants 15%
- Fruits 15%
- Leaves 12%
- Seeds 3%
- Flowers 3%

I use a special press to preserve plant specimens.
Asking More Questions

I wondered: Where did this knowledge of medicine come from? In ancient India, books were written about caring for elephants. But, many of the plants we learned about were not in those books.

Many of these plants are used for people in the same way that they are used for the elephants. The plants used to treat elephant eye infections are the same used for eye infections in people. In fact, 55 percent of elephant medicines had the same use for people!

In addition to people, the elephants were another source of knowledge. Several of their medicine plants didn’t have any uses for people. And many healing plants were sought out by the elephants in the forest.

Eighty-four percent of these plants were chosen by elephants to eat as they roamed the forests. Did they know that these plants were medicine?

My colleagues and I discuss our work.

This plant is used to treat elephants’ broken bones.
Going Further

To prove that elephants eat these plants on purpose would be difficult. But the Karen mahouts weren’t interested in having their knowledge proven. After all, generations have observed elephants in the jungle. Many believed that the elephants did eat specific plants to treat specific problems.

Karen mahouts reported that 19 plant species they used to treat elephants were also chosen by the elephants themselves!

Many of the medicines used to treat elephants came first from humans. Some plants used by the elephants first, only later were used by people. For some, it was hard to tell the origins.

Learning From Others

People often forget that other species have their own knowledge. Sometimes it can be even greater than our own. We learned how to build dams from beavers. We copy the shapes of airplanes from birds.

In the same way, the Karen have borrowed from elephant knowledge. Especially their knowledge of plants.

The next time you see your dog or cat chew up strange plants in the yard, watch closely. They may be snacking on medicine!

WORDWISE

biomedicine: the branch of medicine concerned with the application of biology and biochemistry to medical research or practice

ethnobotanist: a person who studies how communities traditionally use plants

herbarium: a systematically arranged collection of dried plants

mahout: a person who works with, rides, or takes care of an elephant
This stone moved on its own. How?

Come along as scientists try to solve this and more of nature’s mysteries.

By Lynn Brunelle
CIRCLES IN THE SAND

A dragon stirs deep under a desert. It breathes a poisonous gas as it goes. The gas bubbles up to the surface. There, it burns circles of bare dirt in the grass.

Or so one story goes. No one has seen this mythical beast. Yet some people in southern Africa say it’s there. It’s how they explain mysterious dirt circles that dot the eastern edge of the Namib Desert.

Thousands of circles stretch as far as the eye can see. Some are small. Others are wide. The dragon has been busy.

Searching for a Cause

Scientists don’t believe in dragons. They believe something else causes these strange circles. Some think ants chew on the roots of the grasses. Others think a toxic plant may spread its poison and kill the grasses.

These ideas are only theories. They could be possible. Yet scientists have to prove a theory. Only then will a theory become a fact.

Desert Discoveries

Norbert Juergens wants to solve this mystery. He’s a biologist. He studied 1,200 of the circles.

Juergens looked for things all the circles had in common. He tested the dirt and measured water in the soil. He made a list of animals and plants in the circles. He charted the weather. Then he studied his data.
**Common Clues**

Juergens found something surprising. In dry weather, the grasses around the circles stayed alive. He wondered why. Then he found wet sand under each circle. The water in the sand kept the grass alive.

He also found sand termites under each circle. Water and termites were the common clues. Juergens thought about them and formed a theory.

**Mystery Solved?**

Juergens thinks that termites eat the grass roots. That kills the grass and leaves a circle of bare dirt.

When rainwater soaks into the dirt, it forms a pool of water under each circle. The termites drink this water. That’s how they survive. Grass around the circle soaks up the water. That’s why the grass stays alive. Maybe now the mystery is solved!
SOMETHING FISHY

Yoji Okato pulled on his dive gear. The underwater photographer gathered his waterproof cameras. Then he dove into the sea off southern Japan.

When he reached the seafloor, he saw something odd. It was a giant circle in the sand. The sand in the center looked smooth. A pattern of ridges was piled up around the edge of the circle. Other divers said they’d seen these mysterious circles, too. Yet no one had ever seen what made them.

A pufferfish swims back and forth as it makes a sand circle.
Searching for a Cause

People came up with theories to explain the circles. Some thought they were caused by ocean currents. Others said maybe a UFO had landed on the seafloor!

Okato wanted to solve this mystery. He teamed up with some scientists and filmmakers. The team returned to the spot where he had seen the circle many times. They watched, but didn’t get any clues. The sand circles remained a mystery.

Mystery Solved

Finally, the team caught the artist in the act. It was a small male pufferfish. The little fish made tiny waves by swimming back and forth. The waves made a circle of sand. He used his fins to dig dips and build ridges in the sand circle. He collected bits of shell in his mouth. He placed them on the ridges. It took him a week to finish his work.

Okato’s team also learned why the male pufferfish built this circle. He’s trying to get the attention of a female pufferfish. His efforts worked. She laid her eggs inside the circle.

Okato’s patience paid off. The mystery of the sand circle was finally solved. The circle was a nest.
A big boulder sticks out of the dried mud. This rock is too heavy to pick up. Yet, it has mysteriously moved. A trail shows where it moved across the dirt.

This isn’t the only rock on the move here. Many of the rocks in this part of Death Valley in North America don’t stay in one place. Their trails crisscross the cracked mud of a dried lake.

Some rocks move in straight lines. Some move in pairs. Others zigzag this way and that, leaving a jagged trail. How did they move? No one has ever seen it. It’s a mystery.

Searching for a Cause
Over the years, people have wondered what makes the rocks move. They have come up with some wild ideas. Some people think the rocks are magical. Others say pranksters secretly move the rocks.

Scientists wanted a better theory. So, they looked for some evidence.

Looking to Nature
An early theory was that gravity moves the rocks. Gravity is a force in nature. It pulls things down. Many rocks moved uphill, not downhill. So, gravity wasn’t the answer.

Another theory was that strong winds pushed the rocks. Scientists tested this theory. The tests showed that even the strongest winds in the area weren’t strong enough. They couldn’t move big boulders.

Cold Clue
Then scientists realized an important fact. The rocks move only in winter, when this area floods. One scientist decided to study the water.

She found a slimy bacteria grew in the water. The slime made the ground slippery. On a windy day, a small wind could make the rocks slide.

An Experiment
The water gave another scientist a different idea. He knew that ice floats. Maybe ice helped the rocks move.

To test his theory, he froze a rock in a tray of water and sand. The ice lifted the rock a little bit. When he blew on the rock, it moved! It left a trail in the sand.

The bacteria and ice theories might be true. Yet no one has seen the rocks move. This mystery remains unsolved.
Boulders mysteriously zig and zag in Death Valley, California, U.S.A.
Pink, poisonous, or ... polka dot? Take a tour of some of the planet’s most peculiar lakes.

By Beth Geiger
Ah, lakes! Great for fishing, swimming, and paddling. Or... maybe not. From polka-dot water to salt that melts your skin, these lakes are among Earth’s weirdest bodies of water.

Seeing Spots
Take a peek at Spotted Lake, British Columbia. Does it remind you of your favorite polka-dot pajamas?

Spotted Lake fills a low spot in one of Canada’s deserts. The lake is a dead end. Water rich in minerals flows in. But nothing flows out. In summer, most of the water evaporates. It leaves behind many small pools filled with minerals.

Canada’s First Nations people thought the lake had healing powers. Feeling ill? Take a dip in the pools!

Poison or Paradise?
Don’t bother taking a dip in Lake Natron, Tanzania. In the dry season, most of the water evaporates. What’s left is hotter than bathwater and red from bacteria living in the water. The water is so salty, it will burn your skin.

You’d also have to compete with millions of flamingos. The water doesn’t bother them. They build their nests there. The poisonous water around them keeps their young safe from predators. What protects the flamingos? Their leathery legs!
**Extreme Lake**

Big, bold, cold, and beautiful. That’s Lake Baikal, Russia: Earth’s deepest. It’s more than 1,000 meters (3,280 feet) deep and 636 kilometers (400 miles) long. This huge lake contains a fifth of the planet’s liquid *freshwater*.

Lake Baikal is also Earth’s oldest lake. It dates back 25 million years. The lake is home to some 1,500 species—many found nowhere else on Earth, like the nerpa. The nerpa is the only seal that lives only in freshwater.
**'Jellyfish Central'**

Gliding globes of golden jellies. Gobs of them! That's what you'll find in Ongeim'l Tketau. This tiny lake on a tiny island in the Pacific Ocean is known as "Jellyfish Central."

Over thousands of years, these jellies have lost their sting. But if you swim here, be prepared. These jellies are busy. They float from east to west to follow the sunlight. Why? They get their energy from algae in their bodies. Where do the algae get their energy? From sunlight, of course!

**What's Cooking?**

Everyone likes nice warm water. But Boiling Lake on the island of Dominica, is extreme. It boils, like soup on a stove.

Dominica is formed by volcanoes. And volcanoes often have fumaroles: searing hot holes where heat and gas escape. Boiling Lake fills a fumarole. No wonder it's boiling. There's melted rock underneath! Getting there means hiking up a slippery trail. The air is filled with steam and a gas that smells like rotten eggs. Yuck!
Down The Drain

It’s summer on Greenland’s ice sheet. Lakes of meltwater dot the frozen surface like blue jewels. The darker the blue, the deeper the lake.

Some of these meltwater lakes play a disappearing act. One year, all 45 billion liters (12 billion gallons) of water in a single lake disappeared in two hours! What happened? As the air warms in summer, the ice melts and cracks. Water leaks through the cracks. It drains the lake. It’s just like bathwater going down a drain!

Scientists wonder. If temperatures keep getting higher, can all of Greenland just slip away?