

# Do Animals Self-Medicate?

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## STORY AT-A-GLANCE

- › “Zoopharmacognosy” is a type of animal behavior in which animals self-medicate
- › Many species of animals are known to select and ingest or topically apply plants, soils and insects with medicinal properties, in order to prevent or reduce the harmful effects of pathogens, toxins, etc.
- › Baboons in Ethiopia eat the leaves of a plant to combat the flatworms that cause schistosomiasis
- › Fruit flies lay eggs in plants containing high ethanol levels when they detect parasitoid wasps, a way of protecting their offspring
- › Red and green macaws, along with many animals, eat clay to aid digestion and kill bacteria
- › Pregnant elephants in Kenya eat the leaves of some trees to induce delivery

People often assume that animals are "passive" beings who know nothing and don't have cognitive processes like we do. Personally, I think it's very arrogant to think that. Any pet owner or anyone who spends time around animals knows that animals have personalities and emotions just like us, and that their behavior is usually "thought through."

## Zoopharmacognosy

In the 1980s, a new branch of science was born, dedicated to "zoopharmacognosy," meaning "animals' knowledge of medicine." In the words of the wildlife researcher [Michael Huffman](#), it stands for "what an animal does to maintain homeostasis and how not to feel bad."

The discipline came out of the scientists' observations of animals medicating themselves. On a side note, it is fascinating to me how human beings have been aware of this type of animal behavior for millennia – and even learning about certain plants by watching animals self-medicate – but the buzzword, the "scientific" term for it appeared only when credentialed western experts said so. A funny world!

## **Animals Treat Themselves Against Parasites**

Surprise! Many animals rid themselves of parasites by using substances and plants with rough surfaces to clean and "detox" – and by seeking out and eating medicinal herbs.

For example, giant humpback whales have been recently [caught on camera](#) rolling around on sandy seabeds, "to shed parasites that live on their skin, known as ectoparasites, which can make the whales less hydrodynamic." A number of primates seem to seek out medicinal plants to fight pathogens and eliminate parasites.

Fruit flies (*Drosophila melanogaster*) select plants with high ethanol content for laying eggs when in the presence of endoparasitoid wasps – whose "babies" feed on fruit fly "babies" but die from consuming too much ethanol. When detecting endoparasitoid wasps, fruit flies lay their eggs in leaves with high ethanol content as a means of protection for their offspring.<sup>1</sup>

These wasps, especially those of the *Leptopilina* genus, inject their eggs in approximately 80% of fruit fly larvae.<sup>2</sup> As the wasp eggs develop, they consume the larvae. As the wasps are consuming more of the larvae, they also consume more ethanol, which kills the wasps. This type of behavior is called "transgenerational prophylaxis."<sup>3</sup>

Adult monarch butterflies prefer to **lay their eggs on toxic plants** such as milkweed, which reduces parasite growth in their offspring caterpillars. Pigs love to wallow in the mud, and **one of the reasons** they do it is to get rid of external parasites.

Woolly bear caterpillars (*Grammia incorrupta*) are sometimes lethally infected by tachinid flies. If infected, they ingest plant toxins called **pyrrolizidine alkaloids**, which confers resistance against the flies. Notably, parasitized caterpillars are more likely than non-parasitized caterpillars to specifically ingest large amounts of pyrrolizidine alkaloids, and excessive ingestion of these toxins reduces the survival of non-parasitized caterpillars.<sup>4</sup>

Sparrows have been noticed to **integrate cigarette butts into their nests**. Researchers believe that it is not a random choice of nesting material, and that the sparrows have somehow figured out that nicotine residue impedes parasitic mites. The tobacco hornworm ingests nicotine which reduces colony growth and toxicity of *Bacillus thuringiensis*, leading to increased survival of the hornworm.<sup>5</sup>

Ants infected with *Beauveria bassiana*, a fungus, selectively consume harmful substances (reactive oxygen species, ROS) upon exposure to a fungal pathogen, yet avoid these in the absence of infection.<sup>6,7</sup>

According to a 2022 **paper** published in *European Journal of Wildlife Research*, during cold and rainy seasons, the crested porcupines (*Hystrix cristata*) in Central Italy often become infected by different species of ectoparasites and endoparasites. During this time porcupines actively seek out a rather large variety of medicinal plants, mostly with antiparasitic properties. Those plants appear to be relieving the symptoms of the infections, for example, inflammation.<sup>8</sup>

More than 200 species of song birds "wipe" themselves with ants, a behavior known as "**anting**." Birds either grasp ants in their beaks and wipe them along the spine of each feather down to the base, or sometimes roll in ant hills so the ants crawl through their feathers. Birds most commonly use ants that spray formic acid. In lab tests, this acid is harmful to feather lice. Its vapor alone can kill them.<sup>9,10</sup>

# Science Accepts the Fact That Animals Self-Medicate

Here is what the 2014 [article](#) titled, "Animals that self-medicate," published on the NIH website, had to say:

*"A wide range of animals self-prescribe the plants around them when they need a remedy.*

- *Bears, deer, elk, and various carnivores, as well as great apes, are known to consume medicinal plants apparently to self-medicate.*
- *Some lizards are believed to respond to a bite by a venomous snake by eating a certain root to counter the venom.*
- *Baboons in Ethiopia eat the leaves of a plant to combat the flatworms that cause schistosomiasis.*
- *Fruit flies lay eggs in plants containing high ethanol levels when they detect parasitoid wasps, a way of protecting their offspring.*
- *Red and green macaws, along with many animals, eat clay to aid digestion and kill bacteria.*
- *Female woolly spider monkeys in Brazil add plants to their diet to increase or decrease their fertility.*
- *Pregnant lemurs in Madagascar nibble on tamarind and fig leaves and bark to aid in milk production, kill parasites, and increase the chances of a successful birth.*
- *Pregnant elephants in Kenya eat the leaves of some trees to induce delivery.*

*In the 1960s, the Japanese anthropologist Toshisada Nishida observed chimpanzees in Tanzania eating aspella leaves, which had no nutritional value. Harvard primatologist Richard Wrangham saw the same behavior at Jane Goodall's Gombe reserve, where chimps were swallowing leaves whole ... In 1996, biologist Michael Huffman suggested the chimps were self-medicating.*

*Huffman, an American who has worked for years in Japan at the Primate Research Institute at Kyoto University, first saw a parasite-ridden, constipated chimpanzee in Tanzania chew on the leaves of a noxious plant it would normally avoid. By the next day, the chimpanzee was completely recovered."*<sup>11</sup>

Here is a fascinating interview with Michael Huffman from last year:

In 2001, Michael Huffman published an [article](#) titled, "Self-Medicative Behavior in the African Great Apes: An Evolutionary Perspective into the Origins of Human Traditional Medicine." In the paper, he looks not just at the ways that some animals self-mediate but also at how in some cases, people learn about medicinal properties of plants by observing what animals do to treat themselves.

*"Close to a century ago a Tanzanian medicine man, Babu Kalunde, discovered an important treatment that saved the lives of many people in his village, who were suffering an epidemic of a dysentery-like illness. He learned about the potential medicinal value of a plant known to the WaTongwe as mulengelele by observing a similarly sick young porcupine ingest the roots of the plant.*

*Before these opportune observations, Babu Kalunde and the people of his village had avoided this plant, which they knew to be highly poisonous. After telling the villagers his story of the porcupine, however – and taking small doses of the plant himself – he persuaded them to use the plant on the sick.*

*To this day, the WaTongwe use the roots of mulengelele as medicine. Babu's grandson, Mohamedi Seifu Kalunde, now a respected elder and healer himself, uses this plant to also treat gonorrhoea and syphilis.*

*In traditional human societies, the difference between food and medicine may not always be clear. This idea is expressed in a Japanese saying, "ishoku dougen," which directly translated means "medicine and food are of the same origin."*

*It is perhaps no coincidence, then, that traditional spices, condiments, and vegetables used around the world are also important sources of antitumor agents or possess antioxidant, antibacterial, antiviral, and antiparasitic qualities.*<sup>12</sup>

*The concept of food as medicine goes a step further. Etkin (1996)<sup>13</sup> found that 30% of the plant species identified as food among the agricultural Hausa of Nigeria were also used as medicine. Furthermore, 89% of species used to treat symptoms of malaria were also used in a dietary context."*<sup>14</sup>

## **Animals Treat Other Animals, Too**

The 2022 [paper](#) in Current Biology titled, "Application of insects to wounds of self and others by chimpanzees in the wild," talks about chimpanzees using insects to treat their own wounds as well as the wounds of other chimpanzees.

*"On several occasions, researchers observed 'different chimpanzees applying or moving an insect not to their own wound, but to the wound of another chimpanzee. (Video S1) ...' Given the unambiguous context in which the observed behaviour occurred (injured individuals with open flesh wounds), we suggest that they may represent another case of medicative behaviour in non-human animals."*

## **Animals Use Insect Repellants, Digestive Aids, and More**

North American brown bears (*Ursus arctos*) have been observed to make a paste out of Osha (*Ligusticum porteri*) roots and saliva and rub it through their fur to repel insects or soothe bites. The plant, locally known as "bear root," is known today to contain 105 active compounds, such as coumarins that may repel insects when topically applied. There is a legend that the Navajo Indians learned to use this root medicinally from the bear for treating stomach aches and infections.<sup>15,16,17,18</sup>

A number of primates rub millipedes onto their fur and skin. Millipedes contain benzoquinones, compounds known to be potently repellent to insects.<sup>19,20,21</sup>

A number of animals, such as different birds, colobus monkeys, mountain gorillas and chimpanzees, tapirs, and forest elephants seek out and **eat clay**, which absorbs intestinal bacteria and their toxins and alleviates stomach upset and diarrhea. Cattle eat **clay-rich termite mound soil**, which deactivates ingested pathogens or fruit toxins.

I would like to end the story with Dr. Becker's interview of Caroline Ingraham, who is known as an expert in animal self-medication.

On a side note, it is funny how the times have changed. Just a few years ago, the topic of allowing animals to "select" medicines was kosher enough to be talked about on **BBC** (OMG)! Today, they don't even want human patients to have a say in what goes into them! Forget the patients, they don't even want licensed doctors to "select" what works! A certain "horse medicine" comes to mind by association, but I digress.

Here is a very interesting interview with Caroline Ingraham in which she talks about her experience of helping domestic pets.

## About the Author

To find more of Tessa Lena's work, be sure to check out her bio, [Tessa Fights Robots](#).

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