

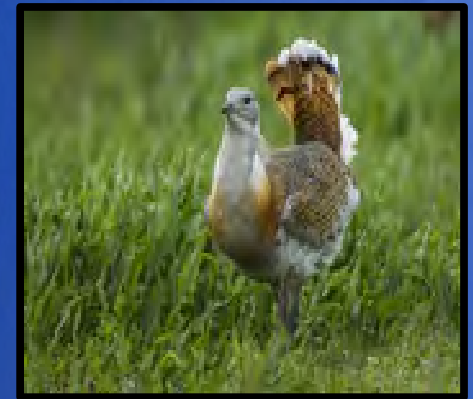
Anti-parasitic, Anthelmintic, Antimicrobial Activity

Chimps use *Vernonia amygdalina* / bitter leaf. African tribes also use extracts from the plant's bark, stems, roots, seeds and leaves to treat a variety of human ailments. Huffman, Seifu 1989

Indian wild boars selectively dig and eat the roots of pigweed (*Boerhaavia diffusa*), which humans use as an anthelmintic. Janzen 1978

Great bustards (*Otis tarda*) seek out *Papaver rhoeas* and *Echium plantagineum* to combat protozoa and nematode parasitic infections.

Bautista-Sopelana et al., Bioactivity of plants eaten by wild birds against laboratory models of parasites and pathogens, Front. Ecol. Evol., 23 November 2022



Elephants in Gabon, western Africa, will sometimes “raid” farms and flatten crops, trampling and ignoring the bananas and papayas to eat the stems and leaves.

We now know **they do this when they are suffering from gut parasites** – banana leaves and papaya stems established as antiparasitic remedies.

Local communities are now exploring ways to provide medicine to the elephants including access to medicinal plants, to avoid crop damage.

Ngama et al., Are crop fields pharmacies for megaherbivores? Ecological Solutions and Evidence 6 (4), e70141 2025

Mahouts (traditional elephant handlers) in southeast Asia
“say that the best way to cure a [sick] elephant is to release
him into the forest, and he will find what he needs and
recover within a few weeks.”



Katarina Zimmer, bioGraphic / Smithsonian magazine, Jan 13, 2026

Elephants have names.

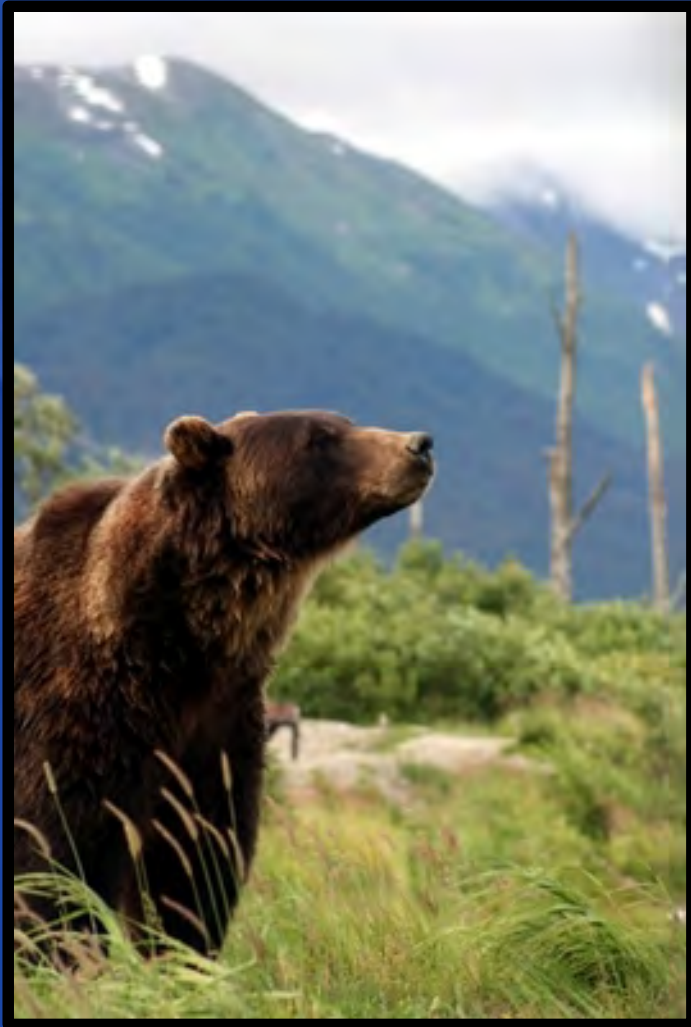
Pardo et al., African elephants address one another with individually specific name-like calls, Nature Ecology and Evolution 8 (7) 1353-1364, 2024

Veterinary care for elephants in South and Southeast Asia, including herbal medicine, is at least 2000 years old.

This study among indigenous people in northern Thailand estimates that 8% of those plant remedies originated with the elephants, 32% with humans, and 60% shared.

Greene et al., Asian elephant self-medication as a source of ethnoveterinary knowledge among Karen mahouts in northern Thailand, Journal of Ethnopharmacology 259 (2020) 112823

Ligusticum porteri
Bear-root; osha



Ligusticum porteri

Bear-root; osha

"...the bear, a generous divine being in their tradition, gave them osha a gift – a medicinal plant of great importance" (Andrews, 2005). Sigstedt argues that "the Native Americans were such excellent scientific observers that they were aware that the bear was using the plant, and they were probably scientifically accurate when they included these observations in their stories".

"Rather than eating the root, the bears chewed it and then spit out the mixture of saliva and macerated plant, methodically rubbing it on their paws and fur."

- "Medicine on the wild side: animals may rely on a natural pharmacy" The Free Library. 1990 Science Service, Inc. 18
Jul. 2016

Do animals use herbs to self-regulate their reproductive health?

Howler Monkeys



*"Glander says he has circumstantial evidence, based on two decades of field studies, suggesting that some mantled howling monkeys (*Alouatta palliata*) **may use diet to dictate the gender of their offspring**. This, Glander says, may explain another finding that emerged during his studies: A significant number of female howlers in Costa Rica bore exclusively male offspring (or, more rarely, only female offspring) over a period of 20 years -- a gender bias unlikely to occur purely by chance.*

*Glander says **he suspects some fertile females seek out either estrogen-like compounds or chemicals that change the pH of the vagina** -- two methods known to help shift the gender odds in humans. "*

*-"Medicine on the wild side: animals may rely on a natural pharmacy.."
The Free Library. 1990 Science Service, Inc. 18 Jul. 2016*

Elephants and Pregnancy



-Biser 1998 reporting on work by Holly Dublin, WWF

Gorillas and Reishi

“Still another special food is bracket fungus (*Ganoderma applanatum*), a parasitic tree growth resembling a large solidified mushroom. The shelf-like projection is difficult to break free from the tree; so younger animals often wrap their arms and legs awkwardly around a trunk and content themselves by only gnawing at the delicacy. Older animals who succeed in breaking the fungus loose have been observed carrying it several hundred feet from its source, all the **while guarding it possessively from more dominant individuals’ attempts to take it away.**”

Fossey, D. 1983. Gorillas in the Mist,
Hodder & Stoughton, London.

“Both the scarcity of the fungus and the gorillas’ liking of it cause many intragroup squabbles, a number of which are settled by the silverback, who simply takes the item of contention for himself.”

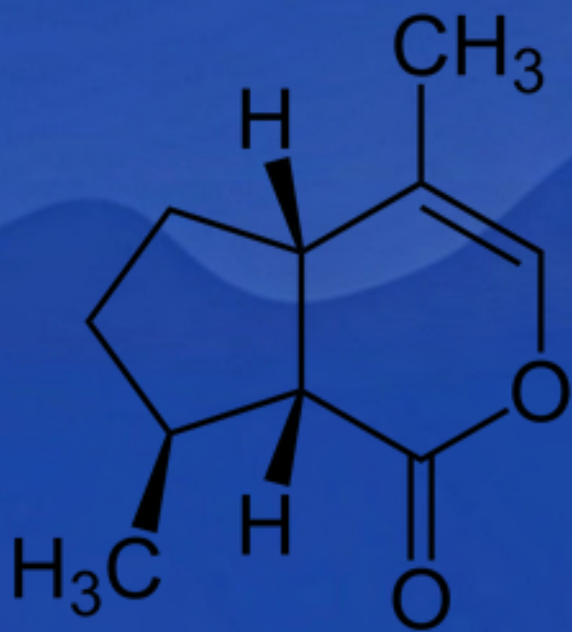


Homo sapiens with *Ganoderma tsugae*



***The Use of Sacred Plants and Natural
Psychoactive Substances by Animals***

Nepeta cataria - catnip



Jaguars and *Banisteriopsis*



"Cattle, horses, deer, elk, and antelope in the American West eat locoweed, which sometimes disorients the animals so much, they walk off a cliff or up to a predator. Dogs in Australia's Northern Territory and elsewhere lick hallucinogenic toxins off the skin of cane toads."

Dr. Barbara Natterson-
Horowitz



The oldest hallucinogen is thought to be the fly-agaric mushroom, Amanita muscaria, discovered in Siberia by observing the behavior of intoxicated reindeer.

-H Abraham, A Aldridge, P Gogia
The psychopharmacology of
hallucinogens, Neuropsychopharma
cology, Volume 14, Issue 4, Pages
285-298



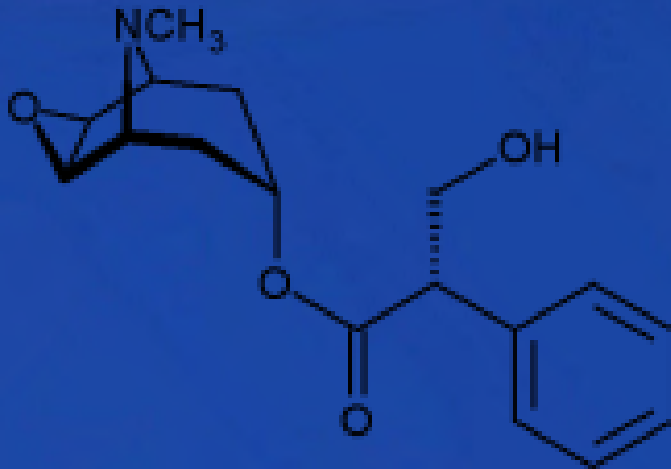
The Origin of Human Coffee Consumption: Legend of Kaldi the Goatherd and the Dancing Goats, Ethiopia and Eritrea



Photo CCSA Jean Rebiffé, Coffee ceremony, Ankober, Ethiopia

Baboons

There are anecdotal reports of baboons eating *Datura innoxia* and *D. stramonium*.



Gorillas and Iboga (*Tabernanthe iboga*)



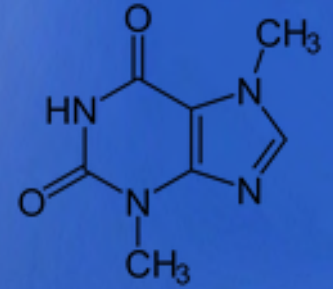
“The plant is employed in traditional African medicine, along with Tabernanthe montana species, for manic depression, leprosy and as an aphrodisiac. In the former Belgian Congo (Democratic Republic of Congo) the sap is used in the treatment of pox, and the leaves for gum and tooth diseases (Dubois, 1955).”

Cousins, Huffman 2002

Iboga

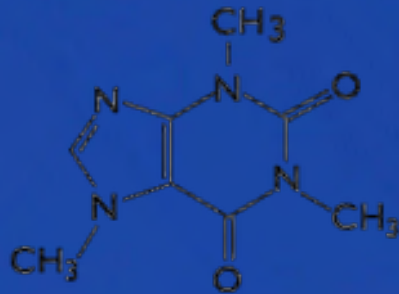
“T. iboga is an essential component in African religious cults and rites...it is possible that the pygmies themselves discovered properties of the plant **by watching wild boars digging up and eating the roots**, only to go into a wild frenzy, jumping around and fleeing from perhaps frightening images. Similar behaviour has been reported by indigenous peoples for **porcupines and gorillas who are said to be fond of the roots** (Pope, 1969; Raponda-Walker & Sillans, 1961).”

Cousins, Huffman 2002



“Gorillas seem to be attracted to caffeine and theobromine bearing plants. In Equatorial Guinea they eat the leaves of Coffea liberica (Rubiaceae) and the fruits of Theobroma cacao (Sterculiaceae) (Sabater Pi, 1977).”

Cousins Huffman 2002



BBC NEWS

Inside the world's largest opium factory

By Amarnath Tewary
Ghazipur

"Monkeys still have the run of the factory, eating opium waste and dozing all day. 'They have become addicted to opium. Most of the time we have to drag dozing monkeys away from this place,' a worker says."



Scientists Gave MDMA to Octopuses—and What Happened Was Profound



Ryan F. Mandelbaum

9/20/18 11:00am • Filed to: MDMA



1.2M 554 19



GIF: Jim Cooke (Gizmodo)

“An octopus doesn’t have a cortex, and doesn’t have a reward circuit,” Dölen, assistant professor of neuroscience at Johns Hopkins University, told Gizmodo. “And yet it’s able to respond to MDMA and produce the same effects, in an animal with a totally different brain organization.”

Edsinger, Dölen, A Conserved Role for Serotonergic Neurotransmission in Mediating Social Behavior in Octopus. [Current Biology : CB](#) 20 Sep 2018, 28(19):3136-3142.e4

“At first, when they received a little too much MDMA, they breathed erratically and turned white. But on lower doses, one animal “looked like it was doing water ballet,” swimming around with outstretched arms. Another spent part of the time doing flips, and another seemed especially interested in minor sounds and smells.”

What do octopuses dream of?

<https://www.pbs.org/wnet/nature/octopus-dreaming-trept6/19376/>



BBC NEWS

'Stoned wallabies make crop circles'

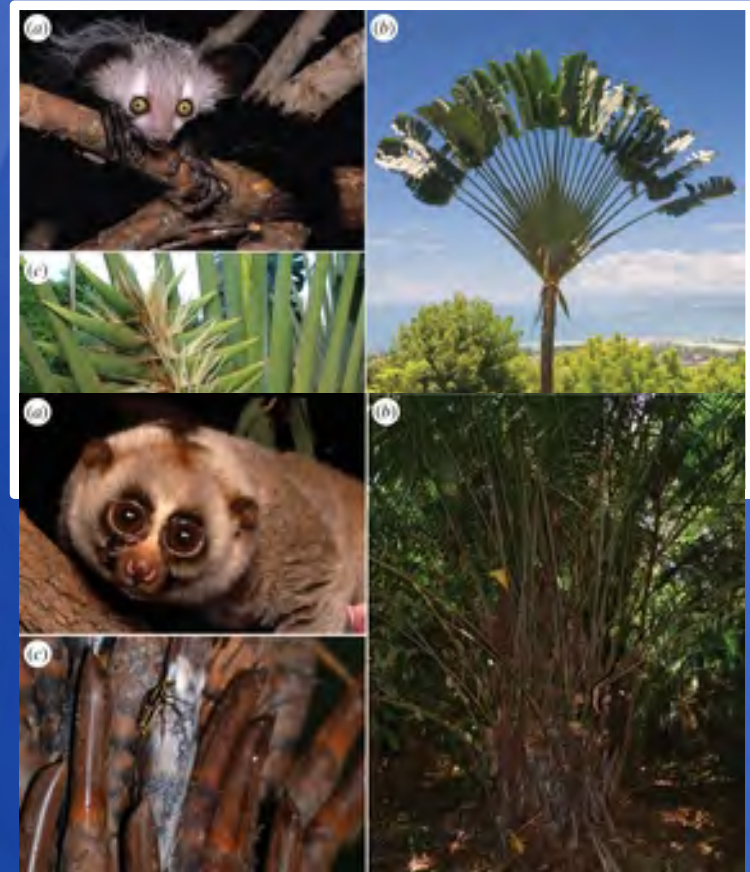


“We have a problem with wallabies entering poppy fields, getting as high as a kite and going around in circles. Then they crash.”

- Lara Giddings, Attorney General, Tasmania, 25 June 2009

Preference for fermented nectar among the aye aye and the slow loris in Madagascar

“We found that both species can discriminate varying concentrations of alcohol; and further, that both species prefer the highest available concentrations. These results bolster... a connection with fermented foods, both in aye-ayes and the last common ancestor of African apes and humans.”





WORLD U.S. POLITICS SPORTS ENTERTAINMENT BUSINESS SCIENCE FACT CHECK ODDITIES MORE

LIVE Trump administration Tennessee special election 'Trump Accounts' Spotify Wrapped Costco

Raccoon goes on drunken rampage in Virginia liquor store and passes out on bathroom floor



The Washington Post

Animals

Raccoons drunk on crab apples cause false rabies scare in West Virginia

“Fruits most likely to contain ethanol are also the rotting fruits most likely to be consumed by birds.”

Levey 2004

Also:

Siegel and Brodie, 1984; Fitzgerald et al., 1990





The Washington Post

Speaking of Science

Scientists show that drunk birds 'slur' their songs

Olson CR, Owen DC, Ryabinin AE, Mello CV (2014) *Drinking Songs: Alcohol Effects on Learned Song of Zebra Finches*. PLoS ONE 9(12): e115427. doi: 10.1371/journal.pone.0115427



SPIEGEL ONLINE

01/18/2011 05:05 PM

Black Out

German Police Pick up Drunken Owl

"The bird will be released once it has sobered up, police said."

“Drunken elk rescued from Swede's apple tree”

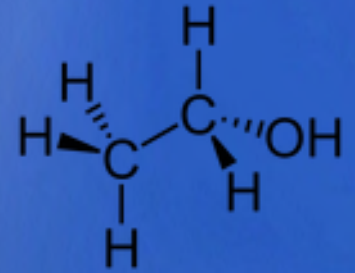
The Local: <http://www.thelocal.se/20110907/36002>
Published: 07 Sep 2011 12:38 GMT+02:00

*“Drunken elk are
common in Sweden
during the autumn
season when there are
plenty of apples lying
around on the ground
and hanging from
branches in Swedish
gardens.”*



Photo: Gustav Johansson

Honey bees and alcohol



“...it has been demonstrated that **ethanol induces aggression and the disruption of locomotive, learning, and decision-making abilities in both humans and honey bees** (Abramson, Stone, Ortezt, Luccardi, Vann, Hanig, et al., 2000; Abramson, Place, Aquino, & Fernandez, 2004; Abramson, et al., 2005; Božič, Abramson, & Bendencic, 2006). Like humans, honey bees also demonstrate self-administration of ethanol and exhibit preferences for commercially available alcoholic beverages (Abramson, Kandolf, Sheridan, Donohue, Božič, Meyers, et al., 2004).

Mixson, Abramson, Bozic 2010

Why?

"Bighorn sheep in the Canadian Rockies scrape psychoactive lichen off rocks, even if it leaves their teeth ground down to the gums. Water buffalo in Asia eat bitter poppies—in other words, opium."

Dr. Barbara Natterson-Horowitz



the guardian

Elephants on drunken rampage kill three people

Village left reeling after around 70 elephants destroyed 60 homes after feasting on hooch produced locally for a festival

Jason Burke

Friday 3 December 2010 12:38 EST

Binge-drinking elephants, drunk on local hooch, have killed three people and destroyed 60 homes in a four-day rampage in east India.

Yesterday they were reported by local officials to be sleeping off hangovers as shocked communities tried to clear the wreckage left by the 70-strong herd in remote villages on the borders of the states of Orissa and West Bengal.

With a local festival approaching, villagers had stockpiled the fermented-rice based drink which is stored in earthenware vessels and, according to Bijay Kumar Panda, a local administrator, the elephants found and drank it.

"Yesterday they were reported by local officials to be sleeping off hangovers as shocked communities tried to clear the wreckage left by the 70-strong herd in remote villages on the borders of the states of Orissa and West Bengal."

World environment on NBCNEWS.com

Elephants electrocuted in drunken rampage

They had found rice beer in Indian village; incident reflects loss of habitat

Is Every Single Elephant a Village-Wrecking Booze Hound?

By El MacKinnon, Life's Little Mysteries Staff Writer | November 9, 2012 11:41am ET

f t g+ o s MORE



*In this hypothesis, **ethanol plumes from ripening fruits may have served for millions of years to guide primates to ripening fruit crops** and also served as an appetite stimulus and welcome source of dietary calories (Dudley, 2000, 2004). Just as we speak today of diabetes running wild in human populations due to excessive caloric intake (Diamond, 1992), so might we speak of ethanol running wild in human populations due to unlimited access to beverage ethanol and the tendency of many to drink to excess. **Thus, biologically-based behaviors that might have served positive functions for pre-human, fruit-eating ancestors, could, under present-day environmental conditions, prove highly maladaptive.***

Milton 2004

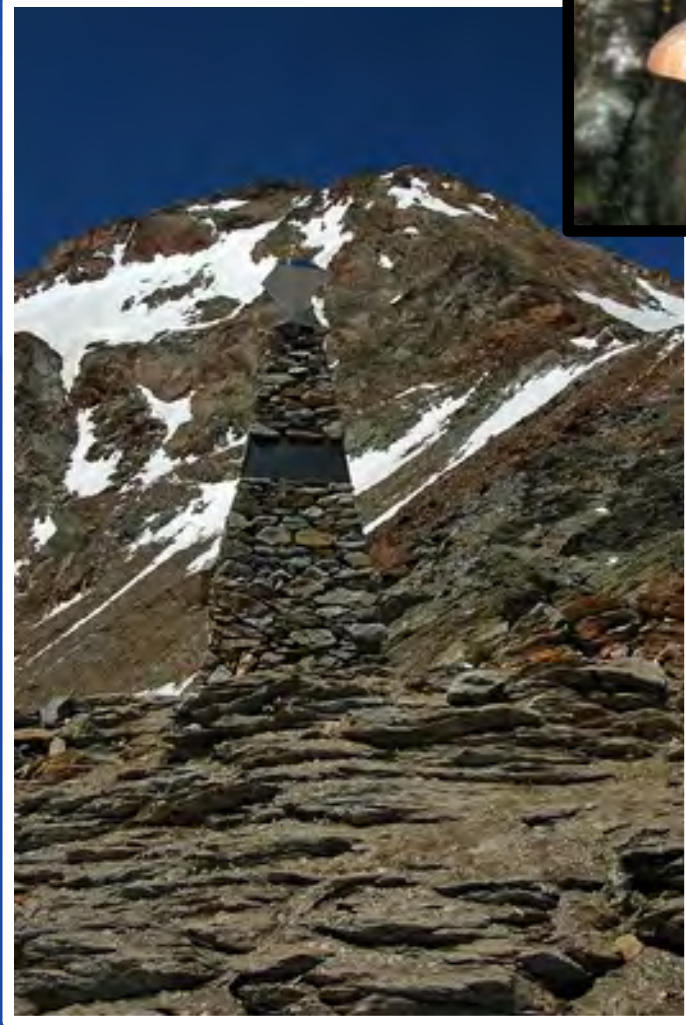
*"...that animals also suffer from addiction; that receptors for intoxicants exist in all kinds of creatures, some dating back millions of years; that these receptors facilitate many life-affirming behaviors in animals and at least some in humans; and that the endocrine and central nervous systems are regulating many of our behaviors—can help us reconceive of human addiction in a more expansive and destigmatizing way. **What some see as a personal failing is not unique, not uniquely human, and not uniquely applicable to our times.**"*

Dr. Barbara Natterson-Horowitz, cardiology professor, David Geffen School of Medicine, UCLA Co-author of *Zoobiquity: The Astonishing Connection Between Human and Animal Health*.

So, what does this all mean for us as
herbalists?

If Herbal Medicine is our *Original Medicine*, how did it originate?

- Trial and error
- Direct communication
- Observing animals
- Is the question the right one? Are the answers mutually exclusive?
- What bias is inherent in this framing?
Questioning the unspoken premise.



Ötzi



50,000 year old Neanderthal evidence

We can never know for sure why yarrow and camomile were ingested at El Sidron, but we propose that the evidence for self-medication offers the most convincing behavioural context.

Hardy, Buckley, &
Huffman, 2013



Did we as human beings discover herbal medicine (as we often frame it without thinking)?

Or...what is more likely, did we evolve into human form already using herbal medicine?

*"There is no question in my mind that the detection of metabolites that "medicate" **probably goes back to the origin of life itself**, with bacteria either deterred by bitter compounds or attracted to compounds produced by other microbes that in turn were essential for survival and reproduction. The co-evolution of natural products and prokaryotes was and is driven by natural selection and the coevolution of early herbivores, especially mammals and their utilization of primitive gymnosperms and later angiosperms as medications."*

-Eloy Rodriguez, personal correspondence

The Harvest



**Zoopharmacognosy can
serve to remind us of**

***who we are
what we have lost
what we can regain***





Western lowland gorilla walking through a cloud of butterflies in the Central African Republic, taken by photographer Anup Shah of the United Kingdom.

General Recommended Reading

- Doctors by Nature, Jaap de Roode, Princeton University Press, 2025
- Wild Health, Cindy Engel, Houghton-Mifflin, Boston, 2002
- Are We Smart Enough to Know How Smart Animals Are?, Frans de Waal, Norton, 2017
- *Children's book: Animal Doctors*, by Trius, Doran, and Blasco, Laurence King Publishing, 2016

References

- Cowen, Ron, *Medicine on the wild side: animals may rely on a natural pharmacy*, Science News, Nov 3, 1990
- Glander, Ken, *Nonhuman primate self-medication with wild plant foods*, Chapter Six of Etkin (ed.), *Eating on the wild side: the pharmacologic, ecologic, and social implications of using noncultigens*, p. 227-239. 1994, The University of Arizona Press, US.
- Biser, Jennifer, *Really Wild Remedies—Medicinal Plant Use by Animals* , Smithsonian ZooGoer 27(1) 1998.
- H Abraham, A Aldridge, P Gogia, *The psychopharmacology of hallucinogens*, Neuropsychopharmacology, Volume 14, Issue 4, Pages 285-298
- Cousins, Huffman, *MEDICINAL PROPERTIES IN THE DIET OF GORILLAS: AN ETHNOPHARMACOLOGICAL EVALUATION*, African Study Monographs, 23(2): 65-89, June 2002
- Dubiec, Góüdü, Mazgajski, *Green plant material in avian nests*, AVIAN BIOLOGY RESEARCH 6 (2), 133–146, 2013
- Jacobus C. de Roode, Thierry Lefèvre, Mark D. Hunter, *Self-Medication in Animals*, Science 340, 150 (2013)
- SINGER , M.S., K.C. M ACE & E.A. BERNAYS . *Self-medication as adaptive plasticity: increased ingestion of plant toxins by parasitized caterpillars*. PLoS ONE 4(3): 2009, e4796. doi:10.1371/journal.pone.0004796
- Richard W. Wrangham, *Relationship of chimpanzee leaf-swallowing to a tapeworm infection*, American Journal of Primatology , 1995 Volume 37, Issue 4, pages 297–303

References

- GEORGE POINAR JR., STEPHEN ALDERMAN & JOERG WUNDERLICH, One hundred million year old ergot: psychotropic compounds in the Cretaceous?, *Palaeodiversity* 8: 13–19; Stuttgart 30 December 2015.
- Eraldo Medeiros Costa-Neto, ZOOPHARMACOGNOSY, THE SELF-MEDICATION BEHAVIOR OF ANIMALS, *Interfaces Científicas -Saúde e Ambiente* , Aracaju, V.01, N.01, p. 61-72, 2012
- Bolton, K.A.; Campbell, V.M.; Burton, F.D. Chemical analysis of soil of Kowloon (Hong Kong) eaten by hybrid macaques. *Journal of Chemical Ecology*, London, v. 24, p. 195-205, 1998.
- Katharine Milton, Ferment in the Family Tree: Does a Frugivorous Dietary Heritage Influence Contemporary Patterns of Human Ethanol Use?, *INTEGR. COMP. BIOL.* , 44:304–314 (2004)
- DOUGLAS J. LEVEY, The Evolutionary Ecology of Ethanol Production and Alcoholism, *INTEGR. COMP. BIOL.* , 44:284–289 (2004)
- Tika Khan, Imtiaz Ahmed Khan, Abdur Rehman, Shaukat Ali, Haibat Ali, Zoopharmacognosy and epigenetic behavior of mountain wildlife towards *Berberis* species, *Life Science Journal* 2014;11(8)
- Olson CR, Owen DC, Ryabinin AE, Mello CV (2014) Drinking Songs: Alcohol Effects on Learned Song of Zebra Finches. *PLoS ONE* 9(12): e115427. doi: 10.1371/journal.pone.0115427
- Wyrwicka, Imitation of mother's inappropriate food preference in weanling kittens, *W. Pav. J. Biol. Sci.* (1978) 13: 55. doi:10.1007/BF03000667

References

- Monserrat Suárez-Rodríguez, Isabel López-Rull, Constantino Macías García, Incorporation of cigarette butts into nests reduces nest ectoparasite load in urban birds: new ingredients for an old recipe?, *Biology Letters*, 5 December 2012. DOI: 10.1098/rsbl.2012.0931
- Berry, J.P. McFerren, M.A. Rodriguez, E., Zoopharmacognosy: a "biorational" strategy for phytochemical prospecting, proceedings, tenth annual Penn State Symposium in Plant Physiology, May 18-20, 1995
- Fossey, D. 1983. *Gorillas in the Mist*. Hodder & Stoughton, London.
- Morrogh-Bernard, Fur-Rubbing as a Form of Self-Medication in *Pongo pygmaeus*, *Int J Primatol* (2008) 29:1059–1064 DOI 10.1007/s10764-008-9266-5
- Proffitt et al., *Wild monkeys flake stone tools*, *Nature* (2016) doi:10.1038/nature20112 Published online 19 October 2016
- *Animals —A Mirror into Human Health, Part II: Addiction & Obesity*, Interview with Dr. Barbara Natterson-Horowitz, HONESTHEALTHNEWS.ORG · MAY 21, 2015
- Michael A. Huffman, Animal self-medication and ethno-medicine: exploration and exploitation of the medicinal properties of plants. *Proc Nutr Soc.* 2003 May;62(2):371-81.
- Howard et al., Numerical ordering of zero in honey bees, *Science* 08 Jun 2018: Vol. 360, Issue 6393, pp. 1124-1126
- Lokoula et al., Bumblebees show cognitive flexibility by improving on an observed complex behavior, *Science* 24 Feb 2017: Vol. 355, Issue 6327, pp. 833-836
- T. ANDREW MIXSON AND CHARLES I. ABRAMSON , JANKO BOŽIĆ, THE BEHAVIOR AND SOCIAL COMMUNICATION OF HONEY BEES (*APIS MELLIFERA CARNICA* POLL.) UNDER THE INFLUENCE OF ALCOHOL, *Psychological Reports*, 2010, 106, 3, 701-717.

References

- Andrew Haynes, The animal world has its junkies too, The Pharmaceutical Journal 17 DEC 2010
- Frederick D Provenza and D F Balph. "Diet learning by domestic ruminants: Theory, evidence and practical implications" Applied Animal Behaviour Science Vol. 18 Iss. 3-4 (1987)
- Larry D. Howery, Frederick D. Provenza, Beth Burrit, Rangeland Herbivores Learn to Forage in a World Where the Only Constant is Change, U Arizona, July 2010
- Rodriguez & Wrangham 1993
- Frederick D Provenza, Juan J Villalba and Ryan Shaw. "Sheep self-medicate when challenged with illness-inducing foods" Animal Behaviour Vol. 71 Iss. 5 (2006)
- Reuven Dukas, P.Kirk Visscher , Lifetime learning by foraging honey bees, Animal Behaviour, Volume 48, Issue 5, November 1994, Pages 1007-1012
- Clayton, Wolfe, The adaptive significance of self-medication, Trends Ecol Evol. 1993 Feb;8(2):60-3. doi: 10.1016/0169-5347(93)90160-Q.
- Helga Gwinne, Male European Starlings Use Odorous Herbs as Nest Material to Attract Females and Benefit Nestlings, Chapter: Chemical Signals in Vertebrates 12, pp 353-362, 17 December 2012
- "Medicine on the wild side: animals may rely on a natural pharmacy.." The Free Library. 1990 Science Service, Inc. 18 Jul. 2016
- Samuel R. Gochman, Michael B. Brown, Nathaniel J. Dominy , Alcohol discrimination and preferences in two species of nectar-feeding primate, R. Soc. open sci. 2016 3 160217; DOI: 10.1098/rsos.160217. Published 20 July 2016



Richard Mandelbaum RH
richardmandelbaum.com