

## *What is Zoopharmacognosy*

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### **What is Zoopharmacognosy?**

Zoopharmacognosy is the study of wild animals self-medicating, using plants and natural compounds as a preventative or direct medicinal cure to regain health in their natural habitat (Lozano, G.A. 1998) . This ability which is innately engrained in the animal, enables them to communicate and relate to plants within their environment allowing them distinguish between a poison and a medicine. The Greek origin of the word zoopharmacognosy translates to animal, drug, knowing (Rodriguez, E. and Wrangham, R. 1993). Since domestication has restricted an animal's freedom of movement the opportunity for them to seek out medicinal plants is very much reduced nor do they have access to the variety of plants that would be found in their wild habitat. Applied Zoopharmacognosy provides this opportunity to captive and domestic animals by allowing them to express this innate behaviour through the offering of plant extracts and natural compounds that would be similar to those found in the animals' natural homelands. The objective of this study is to research self-medicative behaviour in wild animals and how this knowledge can be used to help with the health and well-being of domestic and captive animals.

### **Help your animal to heal themselves.**

The sense of smell is used as an important survival tool, used to communicate with family members and different animal species, but also how an animal identifies plants and natural compounds. Using this innate ability to self-medicate, animals have been able to adapt to their environment and ultimately used for their survival (Raman, R and Kandula, S. 2008).

Since the discovery of this behaviour a number of theories have developed as to how animals have acquired the ability to self-medicate. An animal's adaptation to their environment has resulted in them developing a number of methods to utilize the medicinal properties of plants (Attardo, C. and Sartori, F. 2003). Wild animals experiencing ill health are able to forage for medicinal plants as soon as symptoms arise, however due to the very restrictive environments in which our domesticated and captive animals live, rarely do they have the opportunity to deal with the initial symptoms of ill health and more challenging health problems often occur.

Examples of self-meditative behaviour in domesticated animals like the dog and cat can be seen by the observation of ingesting grass. The ingested of grass can be used to induce vomiting for the removal of toxins, bacteria and parasites and also selected for nutritional reasons. Evidence of self-medication has gathered through the observation of wild animals. The Great Ape can be used as one example; they can be subject to numerous parasite species and have been observed ingesting the bitter pith of *Vernonia Amagdalina plant*. It has been discovered that this plant contains active chemical compounds that are anti parasitic (Mamilapalli et al. 2016). The river banks of the Amazon look to other species like the Red and Green Macaws ingesting clay to neutralize toxins (Gilardi, D. 1996). External application of plants and natural compounds can also be seen by animals that use masticated plant material and other objects such as insects to rub on areas of the body. The use of citrus fruits is rubbed into the fur by the Capuchin Monkey as an insect repellent (Baker, M. 1996).

To enrich the environments of domestic and captive animals, applied zoopharmacognosy provides a wide range of plant compounds such as essential oils, CO<sub>2</sub> extracts, macerated oils, dried herbs, powders, clays and algae. This approach is very much tailored to the individual as animals experiencing the same symptoms may choose to select a different remedy. A healthy animal would be deterred by ingesting a plant containing medicinal secondary metabolites when it is not needed as it would be bitter to taste and perhaps have an unpleasant smell. However, a change in the animals' health can alter the taste and smell preferences of a plant making a once unpleasant plant become sought after. The relief of the animals' symptoms follows the rejection of the plant since they have dealt with the problem (Ingraham, C. 2018). This demonstrates that the animal has the ability to take just the right amount of medicinal compounds needed. Based on this dosing mechanism medicinal compounds are not added to an animal's feed as, if not needed, the animal has no control over its dose and it may induce adverse side effects.

The method in which an animal will choose to self-medicate is dependent on the location and the specific condition which the animal is experiencing. Self-medication could be in the form of ingestion, sublingual administration, smelling, inhalation, using the vomeronasal organ also known as the flehmen response and topical application.

## Equine case study: Tendon injury (Manica Flexoria)

Paddy 11-year-old Cob, ridden as a pleasure horse sustained a tendon injury in a hind limb. The opinion of the veterinary surgeon was that surgery was needed with 6 months rest. The table below lists the plant extracts that were selected on the first consultation. The chosen plant extracts were regularly offered to Paddy. At 3 months after the initial consultation, it was confirmed the injury had healed.

**Plant Extracts Selected | Behavioural Response | Therapeutic properties** Chamomile flower *Matricaria chamomila* | Ingested | Antihistamine, anti-inflammatory, anxiety, tension Wild Carrot seed essential oil *Daucus carota ssp maximus* | Inhaled, topical application to swelling | Internal bleeding Cell repair Liver disorders Tumours, sarcoids and cysts Nettle leaf *Urtica dioica* | Ingested | Kidney, liver and blood support. Detoxifying. Nutrient rich. Cleavers *Galium aperine* | Ingested | Aids the lymphatic system Comfrey leaf *Symphytum spp* | Ingested | Inflammation – stomach and lungs Muscle, tendon, ligament, cartilage and soft tissue damage Meadowsweet *Filipendula ulmaria* | Ingested | Inflammation, flushing out toxins from kidneys

Rosehip shells *Rosa canina* | Ingested | Cell regeneration, support stomach and immune function. Slipperyelm powder *Ulmus fulva* | Ingested small quantity | Colic Diarrhoea, constipation Inflamed mucous membranes Stomach ulcers tapeworms Yarrow flowers *Achillea millefolium* | Ingested | Inflammation Barleygrass powder *Hordeum spp* | Ingested | Anxious behaviour, Nutrient rich, especially magnesium, skin problems Flax – fixed oil *Linum usitatissimum* | Oral administration | Skin disorders, anti-inflammatory, supports nervous, reproductive, circulatory and immune systems Comfrey macerate *Symphytum spp* | Oral administration | Inflammation – stomach and lungs Muscle, tendon, ligament, cartilage and soft tissue damage Peppermint essential oil *Mentha piperita* | Oral administration, topical application to swelling | Anti-inflammatory Burns Digestive stimulant Excessive heat Colic Itchiness Nerve damage respiratory Seabuckthorn oil *Hippophae rhamnoides* | Inhaled, topical application to swelling | Cell renewal and tissue regeneration Repair of skin and eyes UV blocking Garlic essential oil *Allium sativum* | Inhaled | Antibacterial, immune stimulant, insect repellent, anti-parasitic Seaweed extract *Fucus vesiculosus* | Inhaled, topical application to swelling | Vaccine reactions or toxic conditions Wounds and abscesses Thyroid conditions Run down, loss of condition Liver and nerve dysfunction Laminitis Colic Degenerative disorders Immune function German Chamomile essential oil *Matricaria recutita* | Oral administration | Antihistamine, anti-inflammatory, anxiety, tension Wintergreen essential oil *Gaultheria fragrantissima wall* | In-

haled, topical application to swelling | Inflammatory pain, Muscular aches, trapped nerves.  
Yarrow essential oil *Achillea millefolium* | Inhaled, trance like state | Wounds Trauma

**Why are animals selecting plant extracts that they would not find in their natural environment for health benefits?**

Plants are made up of many chemical compounds that can be found in different plant species across the world. An animal can be observed to self-medicate on a plant that it would have never encountered during its life because it is able to identify therapeutic compounds within plants rather than the whole plant. An example of this can be seen with Lavender, the principal constituent being Linalool, can be found in over 200 species of plant throughout the world (Ingraham, C. 2018).

**Domesticated and captive animals are offered plant extracts such as dried herbs, macerates and essential oils instead of fresh plants that would be selected by their wild counterparts.** Generally fresh plants contain smaller concentrations of medicinal compounds than plant extracts, for example 10 kilos of fresh garlic bulbs has the equivalent potency in 5ml of garlic essential oil. An animal in the wild has the opportunity to self-medicate as soon as symptoms arise and so can usually deal with the illness in its early stages. Due to the restrictive nature of a captive and domestic animals' environment, they do not usually have this opportunity. This can result in their condition worsening to the stage where fresh plants would not be effective enough to help.

Applied Zoopharmacognosy provides an animal the opportunity to regain all areas of their own health whether it be physically, mentally or emotionally. Observing an animal's body language in response to an extract offered will guide the person as to how the animal is working with the remedy. To ensure that the plant extract is not forced upon the animal, they must be allowed to walk away from the extract that is not needed. Every animal will differ its response to an extract that has been offered, sometimes very subtle responses have been observed.

As an individualized approach to health, what is one animal's medicine is another animal's poison so not one treatment will be the same. Consideration will need to be taken if the animal is on prescribed medication as this may affect the efficacy as well as contraindications with the use of plant chemicals. The quality of plant extracts will impact the results, the greatest success will be achieved when the animal has acquired the correct dose from high quality plant extracts. Plant extracts and compounds of poor quality may not be selected leaving the impression that the animal does not require the remedy.

The ability of an animal to self-medicate is not only fulfilling nutritional needs but is an innate behaviour that should be enhanced to stimulate and enrich their environment. The

opportunities for animals to self-medicate should be incorporated as one of the 5 freedoms of animal welfare. Further exploration and studies on the technique in which animals use to self-medicate is a way forward to understanding the process and sequence of behaviours that animals display. For example, a plant extract may be needed to support an area of the body before the animal can then go on to select other needed remedies or a plant extract that is selected after a previously selected plant to neutralize compounds. Not only would further study highlight the behaviour of animals but it would further our knowledge of botany and potentially lead to future sources of medicine.

## References

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