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Houseplant Poisoning in Small Animals

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Plant poisoning in small animals is often overlooked as a cause of clinical problems. Even though it is an infrequent occurrence, veterinarians need to be aware of the various problem plants and their actions on the animal's body. The most common body system affected is the gastrointestinal system, followed by the cardiovascular and nervous systems.³ Plants also cause irritation to the skin as well as mechanical injury.

Some toxic substances found in plants are used to manufacture commonly used drugs. There are many examples including cardioactive glycosides, atropine, and acetylcholine. When consumed in sufficient quantities by a healthy animal even these substances can be fatal.

One of the major problems with poisonous plants is their identification. The same common name often refers to many different plant species. It has been suggested that when certain plants are sold, they bear labels concerning the hazard of poisoning. Federal agencies propose that the most dangerous plants in interstate commerce be labeled as hazardous. Plant nurserymen and commercial horticulture associations have resisted vigorously. While the federal agencies believe that some plants are fundamentally dangerous, horticulturalists argue they are not dangerous since people use them decoratively. Because of the insufficient amount of scientific literature on the subject this conflict will be difficult to resolve.

It is not required that plant poisonings be reported, and authenticated reports of plant poisonings in small animals are rare.² Even though the possibility of poisoning is present, do not be led to believe that a person cannot have pets and plants in the same house. Dogs and cats are carnivores, not

herbivores, and normally don't consume large amounts of plant material. Plant poisoning is usually accidental and only minimal precautions need to be taken to prevent poisoning. There is more of a problem with younger animals as they are more active and curious, especially with their mouths. Teething irritation can be relieved by chewing on objects in the environment. Older and immature animals can resort to chewing and eating plants due to boredom. There is an increased chance of poisoning when any new plant is introduced into the environment. The novelty of something new is just too hard to resist. Any change in daily routine, such as moving to a new home, having the owners go on vacation, or a new baby, can upset the animal enough that it starts chewing on household plants. Psittacine birds (seed eaters) can be at higher risk due to higher concentrations of poisonous substances being found in the seeds of plants.

Defining what constitutes a poisonous plant is not easy, as almost any plant can cause adverse reactions if enough is ingested. One definition states that "Poisonous species are those that contain specific components capable of causing specific biochemical or physiological symptoms when small quantities are ingested."⁴ Another describes a poisonous plant as "One which contains, in its entirety or in any of its parts, substances which, even in relatively small quantities, can cause varying degrees of disability and even death."⁵

Allergic plants differ from poisonous plants in that their effect depends on a pre-existing sensitivity. A poisonous plant acts independently of this sensitivity. An allergy is an oversensitive reaction to a certain stimulant, and as such it affects only certain individuals, usually sporadically.⁵ The stimulant, or allergens, can be toxic in themselves or only in the case of these hypersensitive individuals. An allergen stimulates the body into producing a specific antibody, called a reagin, which reacts in future contacts between the allergen and the

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body. One of the reactions which occurs is the release of histamine. Histamine causes vasodilation and erythema of the exposed area. There will also be increased capillary permeability resulting in swelling of the area. These reactions can be localized, but if histamine is produced in sufficient quantity to enter the blood stream, other areas of the body can be affected. An allergy tendency can be hereditary, and sometimes the antibodies (reagins) which cause the allergic reactions can be detected in the blood. Symptoms caused by the ingestion of allergenic substances are often similar to those caused by poisonous substances including vomiting, diarrhea, and abdominal pain. Skin reactions, such as erythema, pruritis, blisters, and other eruptions, are usually caused by allergenics instead of poisons. Inhaled allergenics produce reactions similar to hay fever in man, usually due to wind-borne plant pollen. Dermatitis is another form of allergic reaction and is manifested when the contact between the allergen and the animal occurs at skin level.

Plants that are poisonous have no special distinguishing features. All parts of poisonous plants are not toxic, and the poisonous substances may only be present in the plant during certain seasons or at certain stages of growth. The identification of a plant will be easier if a large amount of the plant is available for examination. It is equally important to identify a plant or plant part that is nonpoisonous because therapeutic measures may upset the patient more than a mild intoxication.

Following is a list of poisonous and nonpoisonous plants found in many households. Both common and scientific names are given.

POISONOUS

FAMILY ARACEAE

- Dieffenbachia* spp. — dumb cane
- Philodendron* spp. — sweetheart vine
- Alocasia antiquorum* — elephant's ear
- Caladium* spp. — fancy leaf
- Epipremnum aureum* — devil's ivy or pothos

FAMILY ARALIACEAE

- Hedera* spp. — english, heart, needlepoint, and ripple ivy
- Schefflera actinophylla* — umbrella plant

FAMILY LILIACEAE

- Asparagus* fern

FAMILY LORANTHACEAE

- Phoradendron flavescens* — mistletoe

FAMILY AQUIFOLIACEAE

- Ilex aquifolium* — holly

FAMILY EUPHORBIACEAE

- Euphorbia pulcherrima* — poinsettia
- Codiaeum variegatum* — croton

CACTI

- Lophophora (Echinocactus) williamsii* — peyote
- Euphorbia ingens* — candelabra
- Cephalocereus senilis* — pencil

NONPOISONOUS

FAMILY LABIATEAE

- Nepeta cataria* — catnip or catmint

FAMILY ANACARDIACEAE

- Rhus radicans* — poison ivy
- Rhus diversiloba* — poison oak
- Rhus vernix* — poison sumac

Family Araceae

One of the most popular families of houseplants is the Araceae. They are seen in many homes, and are commonly the culprits in plant poisonings, both human and animal. There are about 1800 species in this family, and most are perennial herbaceous plants of tropical origin. The Araceae family includes the well known *Dieffenbachia* or "dumb cane", and *Philodendron* spp., as well as many others.

The *Dieffenbachia* are perennials which come from Brazil and the West Indies. They have straight stems with clusters of thickly veined leaves on their sheath-like petioles. In their natural habitat they can reach a height of two meters. They are favorites as houseplants because they can adapt to the dry air of centrally heated rooms. In the West Indies during the slave era, *Dieffenbachia* was used as a means of torture and was sometimes used to temporarily silence unwelcome witnesses, hence the name "dumb cane".

A special anatomical character of the Araceae family is the presence of isolated oil cells, often so numerous as to allow pharmaceutical use of their natural metabolic product, the essential oil. All Araceae contain calcium oxalate, mostly in the form of raphides, (also seen as clusters called druses), crystal sand, or larger single crystals.

Calcium oxalate crystals (raphides) play a part in the strong irritant action that most Araceae have

on the skin and mucous membranes. These needle-like raphides, grooved at both ends, are present throughout the plants in the millions, and are partly located in highly specialized ejector cells.⁶ Slight pressure causes the caps of the ampoule-shaped raphide ejector cells to open, and with a sudden swelling of the mucilginous cell contents, the raphides are instantly expelled from the cell. These fine needles, up to 250um long, are able to penetrate the mucosa of the mouth and throat very easily. The grooved ends of the needles allows simultaneous injection of any adhering cell contents, as happens during a bite by a venomous snake with grooved fangs. When a victim bites into a leaf, he frequently cries out in pain as these crystals pierce the sensitive membranes of the mouth and lips. Because of this intense pain and stinging, a second bite is avoided and serious systemic poisoning is rare.

In addition to the crystalline (insoluble) calcium oxalate, significant quantities of oxalic acid or its soluble salts are present. These soluble salts can enter the circulation and cause severe kidney damage. Oxalates can also combine with calcium in the blood and deposit crystals in the bladder. Coma can occur from the resulting hypocalcemia.

Besides the oxalate crystals themselves, the needle-like raphides cause mechanical injury to the mast cells in the subcutaneous connective tissue leading to a massive release of histamine. The clinical signs are immediate and alarming. Symptoms include localized edema with pain and irritation in and around the mouth. The animal will shake its head excessively, paw at its mouth, and if possible, drink water to try and wash its mouth out. Swelling of the mucous membranes in the pharynx and particularly around the vocal folds is a more serious sign. Severe dyspnea develops and the tongue swells to the point of protruding from the mouth. Treatment involves the use of antihistamines as well as supportive care such as oral and gastric lavage, anaesthetics, and analgesics. Special care must be taken to assure a patent airway.

Eye injury can be a problem if the sap of the stems is squirted out when bitten. There is epiphora and blepharospasm. The conjunctiva of the eye shows the presence of injected material; the surface of the cornea has a nodular appearance, and in it can be recognized very fine needles. Generally these eye injuries heal spontaneously after three to four weeks without any permanent damage. Riede demonstrated in animal experiments that treatment with an eye ointment consisting of 1% ethylmorphine, which improves permeability of the cornea, and 2% disodium edetate, which dissolves the cal-

cium oxalate needles, almost halves the period required for the injuries to heal.⁶

Seasonal Houseplants

Christmas holidays bring a greater potential for plant poisoning with the many beautiful live decorative plants brought into the home. Mistletoe, holly, and poinsettia can pose problems when eaten by a family pet.

Mistletoe contains sympathetic amines of the tyramines class plus choline. These chemicals exhibit direct smooth muscle stimulation and marked oxytocic properties. Blood pressure is increased as are pulse and respiration rates. Ingestion of large amounts of mistletoe may cause nausea, vomiting, and gastroenteritis. Treatment consists of fluid therapy and maintenance of electrolyte balance.

There have been various compounds found in holly which can cause adverse effects. Among these are an extract with digitalis-like cardiotoxic and a saponin, which has hemolytic activity. Symptoms of holly poisoning are non-specific, consisting of abdominal pain, vomiting, and diarrhea, and are only likely to occur after ingestion of a large amount of the fruit.

Many discrepancies have arisen concerning the poisonous properties of the poinsettia plant. Many feel the plant is very safe, having no toxic effects. In contrast, others have found the plant's milky sap to be irritating to the skin and conjunctiva, or if ingested, to the gastrointestinal tract. Nevertheless, the best thing to do is to keep the plants away from the pets, for the protection of both plant and animal.

Poisonous Plants

Poison ivy, poison oak, and poison sumac, are all a threat to the trail hiker, but contrary to popular belief, these plants are not a hazard to pets. Urushiol, an oil, is the irritant substance present in these plants. The oil is released from the broken surface of the leaf or stem. The berries and the hairs of the plant are not irritating unless they have been covered with the oil. Urushiol is an active allergen which causes severe dermatitis when contacted by a susceptible individual. Animals that run through the brush and get the oil on their coats are not affected, but they do pose a problem as a source of oil to the owner.

Prevention

Plants add beauty and life to a home, but it can be frustrating trying to keep a household pet from taking a bite. Keeping the plants out of the

animals' reach is the best prevention, but in many homes this is impossible.

One training method has been described and found to be a safe and effective way to keep pets from chewing on plants. This involves applying powdered ginger to the tips of the most accessible leaves of the plant. Misting the leaves with water first will help the powder stick. Though a flavorful cooking and baking ingredient, ginger has a strong and unpleasant taste when eaten plain. The ginger lasts a long time unless washed off, and will not harm pets or plants.

When choosing houseplants to fit in with the pets' environment, pick plants that are sturdy enough to resist bumps, and don't allow the accumulation of pet fur. A layer of rough decorative rocks over the topsoil will keep paws from digging in the dirt. Decorative bark is not a good choice because the chips are attractive as a toy and there is a danger of splinters in the paws. Heavy planters should be used to avoid accidental (or purposeful) spills.

Whenever a question arises with regard to the toxicity of a certain plant, contact local authorities, such as a greenhouse, horticultural groups, veterinarians, or the library. It is better to be sure the plant is safe before your pet finds out differently. If an animal exhibits any abnormal signs after chewing on a plant, try and take the plant along for proper identification when seeking help. Questions can also be answered by calling the University of Illinois Toxicology Hotline for Animals at (217) 333-3611. It operates 24 hours a day, seven days a week.

Following is a list of attractive, hardy, and safe plants that make good choices for the household with pets.

- Asplenium spp.* — spleenwort
- Zebrina* or *Tradescantia spp.* — wandering jew
- Maranta spp.* — prayer plant
- Peperomia spp.*
- Cissus spp.* — grape ivy
- Dracaena spp.*
- Coleus spp.*
- Cacti — (avoid those poisonous species mentioned previously)
- Aspidistra elatior* — cast iron plant
- Hypoestes phyllostachya* — pink polka dot
- Crassula argentea* — jade plant
- Sedum morganianum* — donkey's tail

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