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From the Planter to the Carpet: Toxic Plants and the Small Animal Patient

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INTRODUCTION

For curious dogs or cats, it's difficult to resist the allure of plants. Pet Poison Helpline receives multiple calls on a daily basis from concerned pet owners and veterinarians about plant ingestions. While many plants are simple gastrointestinal irritants, some have the potential to cause life-threatening toxicity. Thus, it is helpful for clinicians to be familiar with common plants that have the potential to cause severe toxicosis in small animals.

PLANTS CAUSING SERIOUS SYSTEMIC DISEASE

Plant name: Lily (*Lilium* spp. and *Emerocallis* spp.)

- Other common name(s): Easter lily, tiger lily, Japanese show lily, stargazer lily, rubrum lily, day lily.
- Species of concern: Cats.
- Toxic dose: 1-2 leaves or petals.
- Toxic portion of plant: All, even pollen.
- Onset/duration of clinical signs: Hours/days.
- Clinical signs: Early onset vomiting, depression, anorexia. Acute anuric renal failure in 1-3 days. Azotemia, epithelial casts (12-18 hrs post ingestion) proteinuria, and glucosuria.
- Treatment: Aggressive decontamination and IV fluid therapy x 48 hrs. Peritoneal or hemodialysis has been successful.
- Prognosis: Good if treated early and aggressively; poor if treatment is delayed 18-24 hr or anuria has developed.

Plant name: Foxglove (*Digitalis lannata* and *D. purpurea*), Oleander (*Nerium oleander*), Lily of the Valley (*Convallaria majalis*), Kalanchoe (*Kalanchoe* spp.)

- Other common name(s): Yellow Oleander, Lucky Nut, Be-Still Tree.
- Species of concern: All.
- Toxic dose: 2-3 oleander leaves; 1.5 gm dried foxglove toxic to children.
- Toxic portion of plant: All, even oleander nectar/honey ("mad honey").
- Onset/duration of clinical signs: 45 min/4-5 days.
- Clinical signs: These plants contain cardiac glycosides. Signs may include vomiting and abdominal pain within 45 min, hyperkalemia, bradycardia with 1st, 2nd or 3rd degree AV block, ventricular arrhythmias, and asystole. Kalanchoe may also cause neurological signs.
- Treatment: Early emesis and activated charcoal. ECG monitoring x 24 hrs. Atropine, beta-blockers, lidocaine, a temporary pacemaker and digoxin antibody fragments (Digibind®, 1-2 vials needed, \$600/vial).
- Prognosis: Poor unless treated early and aggressively.

Plant name: Rhododendrons and azaleas (*Rhododendron* spp.), Laurels (*Kalmia* spp.)

- Other common name(s): Mountain Laurel, Sheep Laurel.
- Species of concern: All.
- Toxic dose: >0.2% of animal's body weight. An adult human can eat 3 leaves/flowers without developing clinical signs.
- Toxic portion of plant: All.
- Onset/duration of clinical signs: As early as 1 hr, more typical 4-12 hrs/1-3 days.

- Clinical signs: These plants contain grayanotoxin glycosides which bind to sodium channels causing a prolonged depolarization. This may lead to bradycardia or tachycardia, arrhythmias, and hypotension. May also cause cholinergic signs such as vomiting, diarrhea, salivation, and dyspnea.
- Treatment: Aggressive decontamination, monitor an ECG and blood pressure, sodium channel blockers, atropine, aggressive IV fluids to maintain perfusion.
- Prognosis: Good with early intervention.

Plant name: Cycad palm (*Cycas* spp., *Macrozamia* spp.)

- Other common name(s): Sago palm, leatherleaf palm, and Japanese fern palm. These are not true palms.
- Species of concern: Dogs.
- Toxic dose: 1–2 seeds are fatal in a medium sized dog. A “few bites” can cause toxicity.
- Toxic portion of plant: All, especially the seeds.
- Onset/duration of clinical signs: Variable (hours to days).
- Clinical signs: Common: Vomiting and diarrhea (+/- blood), lethargy, depression, liver failure, death. CNS signs possible and often related to liver failure.
- Treatment: Aggressive decontamination with multiple doses of activated charcoal, supportive care for GI signs and liver failure. Liver protectants such as SAME and/or silymarin.
- Prognosis: Good if treated prior to the onset of liver failure.

Plant name: Cyanobacteria or blue-green algae (*Microcystis*, *Nodularia*, *Anabena*, *Aphanizomenon*, *Lyngbya*, and *Oscillatoria*)

- Species of concern: All.
- Toxic dose: A few mouthfuls of contaminated water.
- Toxic portion of plant: Most algae blooms are non-toxic but you cannot determine toxicity by visual examination.
- Onset/duration of clinical signs: Neurotoxin: Onset of 1–60 min. Hepatotoxin: Onset of 1–4 hours.
- Clinical signs: Two toxidromes: Acute CNS toxicity or hepatotoxicity (rarely both). CNS: Cholinergic signs (SLUD), dyspnea, tremors, seizures, respiratory paralysis. Liver: Vomiting, diarrhea (+/- blood), weakness, pallor, acute hypovolemic shock secondary to hepatic hemorrhage.
- Treatment: Aggressive decontamination and activated charcoal, atropine, diazepam/phenobarbital for seizures, IV fluids, liver protectants such as SAME and/or silymarin.
- Prognosis: Grave if symptomatic. Death is often seen within hours with the neurotoxin.

Plant name: Castor bean (*Ricinus communis*) and Rosary pea (*Abrus precatorius*)

- Other common name(s): Prayer bean, jequirity bean, precatory bean (all names for *A. precatorius*).
- Species of concern: All.
- Toxic dose: 1 seed (hull needs to be cracked/chewed).
- Toxic portion of plant: Primarily the seeds but castor bean plants have some toxin in the leaves.
- Onset/duration of clinical signs: Onset is generally within 6 hours but may be delayed as beans digest/signs may persist many days, often until death.
- Clinical signs: The seeds contain toxalbumins (ricin and abrin) which inhibit cellular protein synthesis. Abdominal pain, vomiting, diarrhea (+/- blood), depression, seizures, cyanosis, shock, and death. Elevated liver enzymes, renal values, WBC count, albumin, and globulins.
- Treatment: Aggressive decontamination with activated charcoal, supportive care for GI signs and organ failure.
- Prognosis: Poor if signs have already developed.

Plant name: Autumn Crocus (*Colchicum autumnale*) and Glory Lily (*Gloriosa* spp.)

- Species of concern: All.
- Toxic dose: 1.5–2 gm of plant material, 2–3 seeds, ½ a flower.

- Toxic portion of plant: All portions contain colchicine (inhibits cell division).
- Onset/ duration of clinical signs: Onset = 2–12 hrs. Bone marrow suppression = 4–5 days.
- Clinical signs: Early onset anorexia, salivation, vomiting, diarrhea (+/- blood), abdominal pain, weakness, collapse, and ataxia. May progress to anemia or leukopenia.
- Treatment: Aggressive decontamination with activated charcoal, supportive care for GI signs and organ failure. Use of colchicine-specific Fab fragments have been successful in human beings. Filgrastim (Neupogen) may be helpful.
- Prognosis: Poor if multiple organ systems are affected.

Figure 1. Autumn crocus (*Colchicum autumnale*). (Photo courtesy of Ron Mandsager, DVM, DACVA, Oregon State University College of Veterinary Medicine, Corvallis, OR.)



Plant name: Yesterday, Today and Tomorrow (*Brunfelsia* spp.)

- Species of concern: Potentially, only the dog, rat and mouse. This remains to be verified.
- Toxic dose: Unknown.
- Toxic portion of plant: All, especially the juicy fruit.
- Onset/ duration of clinical signs: Minutes–hours/ days.
- Clinical signs: Signs mimic strychnine toxicity. Salivation, vomiting, retching, agitation, nystagmus, decreased motor activity, tremors, extensor rigidity and seizures.
- Treatment: Emesis and activated charcoal. Reduce external stimuli. Prevent and control seizures with diazepam, barbiturates and/or short-acting anesthetics.
- Prognosis: Poor good with early and aggressive care.

Figure 2. Yesterday, today and tomorrow (*Brunfelsia* spp.). (Photo courtesy of Lynn R. Hovda, DVM, DACVIM, Pet Poison Helpline, Bloomington, MN)



POISON CONTROL RESOURCES

For assistance managing a potentially poisoned patient, a number of resources are available. In the US and Canada, veterinarians or pet owners may call Pet Poison Helpline (\$35/case) at (800) 213-6680 or the ASPCA's Animal Poison Control Center (\$60/case) at (888) 426-4435. Both of these services are available 24/7 and are staffed with experts in the field of veterinary toxicology. Pet Poison Helpline is additionally staffed with veterinary specialists in emergency and critical care and internal medicine, as well as PharmDs. The author recommends using either of these services in order to obtain the most accurate and current veterinary-specific clinical advice.

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