

# CASTOR BEAN TOXICOSIS— One Mean Bean

Mindy G. Bough, CVT

ASPCA Animal Poison Control Center  
Urbana, Illinois

The ASPCA® Animal Poison Control Center is hosting a free online toxicology CE course on the Veterinary Support Personnel Network on October 13 and 20 from 9:30 PM to 11:30 PM (ET). Register at <http://www.vspn.org>.

Castor beans have long been known to be toxic. Nevertheless, in the year from May 1, 2001, to May 1, 2002, 11 cases of *Ricinus communis* exposure were reported to the ASPCA Animal Poison Control Center. Veterinary technicians can play an integral role in educating pet owners about potential toxicants that may be accessible to their pets in the home or outdoors.

## THE CASTOR BEAN PLANT

The castor bean plant, *R. communis*, is a large shrublike herb that is native to the tropics and cultivated in parts of the United States to produce castor oil, which is used medicinally and industrially. It is also an ornamental plant (generally outdoors). In the tropics, the plant may reach 30 to 40 feet in height. The plant has become naturalized in the southern United States due to mild winters and may grow 3 to 15 feet tall.<sup>1-3</sup> There are many vari-

eties of *R. communis*, but most plants become treelike with stout, fibrous roots and soft, woody stems. The leaf stalks are long and green or reddish. The leaves are large and notched into 5 to 11 palmate lobes with toothed margins. The oval seedpods are covered with spines. The seeds are elliptical, glossy, mottled (black, brown, and gray) or white, and 1 to 2 cm long.<sup>3</sup> These attractive seeds are used in craft projects (e.g., handmade jewelry) and musical instruments (e.g., maracas).<sup>4</sup> This plant is used to repel moles from gardens and lawns and is sometimes referred to as *mole bean*. Other common names for *R. communis* include palma christi, wonder tree, African coffee tree, Mexican weed, koli, moy bean, dog tick seeds, and castor oil plant.<sup>1,2</sup>

## TOXICITY

The toxic principle, ricin, is present in the entire castor bean plant but is most concentrated in the seeds, comprising up to 30% of the seed weight.<sup>1</sup> Ricin is a toxalbumin–water-soluble glycoprotein; therefore, ricin is not found in castor oil.<sup>5</sup> Laboratory tests indicate that ricin is one of the most toxic compounds of plant origin, but heat and aging reduce its toxicity. Ricin affects the body at the cellular



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level, causing cell death after protein synthesis stops.<sup>1</sup> It is believed that ricin is released from castor beans when mastication occurs and the seed coat is disrupted. Therefore, beans that are swallowed whole may not produce clinical signs.<sup>2</sup> Ingestion of one castor bean in a companion animal is potentially life threatening.<sup>5</sup> In addition to direct toxicity, castor beans are highly allergenic and can cause dermal and systemic hypersensitivity reactions.<sup>4</sup>

## CLINICAL SIGNS

When ricin toxicosis occurs, the cells of the gastrointestinal (GI) tract are destroyed, leading to potentially severe GI irritation that may progress to hemorrhagic gastroenteritis.<sup>2</sup> Signs often occur within 6 hours of exposure but may begin as late as 24 to 48 hours after exposure. Signs after ingestion may include vomiting (with or without blood), depression, diarrhea (with or without blood), abdominal pain, anorexia, weakness, hyperthermia, ataxia, hypersalivation, recumbency, tachycardia, convulsions, and even death (often from hypovolemic shock).<sup>1,2,5</sup> In a survey of 98 incidents of *R. communis* ingestion in dogs, 9% of the incidents ended in death or euthanasia.<sup>2</sup> Postmortem evaluation indi-

cates that multiple organs (i.e., heart, stomach, lungs, liver, kidneys, pancreas) are affected by ricin.<sup>2</sup>

## TREATMENT

When exposure to *R. communis* occurs, early decontamination is recommended. In animals without clinical signs, an appropriate emetic should be administered after giving a soft meal. Activated charcoal is also beneficial and should be given with a cathartic, such as sorbitol, provided the animal does not have diarrhea. Because of its potential for inhibiting GI healing, activated charcoal is contraindicated in animals exhibiting hemorrhagic gastroenteritis.

Stabilization of a symptomatic animal is crucial. If seizures are occurring, diazepam may be administered. Intravenous lactated Ringer's solution is recommended to help prevent or treat hypovolemia and maintain hydration and electrolyte balance. If hypovolemia is present, blood replacement therapy may be indicated.

GI protectants (e.g., sucralfate or kaolin–pectin and cimetidine, famoti-

Just one castor bean (from the plant, handmade jewelry, or a maraca) is enough to kill a cat or dog.



## Case Studies

### Case 1

A veterinarian called the ASPCA Animal Poison Control Center (APCC) regarding two 4-month-old collie-mix dogs that were both exposed to *R. communis* about 13 hours earlier. One dog was vomiting and had a bloody stool, both of which began 4 hours after the exposure. Chewed castor beans were observed in the vomitus. The dog then went into shock. The APCC veterinarian discussed toxicity, possible signs, and associated risks with the attending veterinarian and recommended aggressive therapy for both dogs.

Despite treatment, the symptomatic dog died approximately 26.5 hours after the exposure. Shortly thereafter, the second dog became symptomatic. Aggressive treatment was continued, and the dog recovered 2 days after its signs began.

### Case 2

A pet owner called the ASPCA APCC because he thought that his 6-month-old English springer spaniel may have ingested some castor bean seeds more than 24 hours earlier. The owner wanted to know if the castor beans were causing the dog to vomit. The APCC veterinarian recommended that the dog be taken to a veterinarian for intensive care. Approximately 2 hours later, the dog's veterinarian called the APCC. The APCC veterinarian recommended symptomatic and supportive care, including GI protectants and intravenous fluids. The attending veterinarian implemented the recommended therapy, and the dog recovered completely.

dine, or ranitidine) will help protect the GI tract until healing can occur. Other symptomatic care may include parenteral pain medication and antiemetics. Baseline CBC, serum chemistries, and electrolyte levels should be obtained to assess clinical status and potential organ damage as toxicosis progresses.

## PROGNOSIS

The prognosis for castor bean toxicosis is promising if decontamination and treatment are implemented soon after exposure. The prognosis is guarded if an animal is already symptomatic when presented.

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## GRAPES OF WRATH?

Veterinary staff at the ASPCA Animal Poison Control Center are investigating the relationship between dogs ingesting large amounts of grapes or raisins and the development of acute renal failure. Although there have been reports that indicate a connection, the toxic principle of grapes/raisins is currently unknown. Dog owners and veterinary staff who suspect an exposure of this kind are advised to contact the ASPCA Animal Poison Control Center to report the incident and obtain current treatment recommendations.

Hotline: 888-4ANI-HELP (888-426-4435) or 900-443-0000

