

WHAT WE KNOW ABOUT

coyotillo

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COYOTILLO IS A TOXIC PLANT that has poisoned people, cattle, sheep, goats, guinea pigs, horses, swine and chickens. It is found in 32 Texas counties from Corpus Christi and Brownsville along the Rio Grande River to the mouth of the Pecos River, as well as in Mexico and as far west as Baja California. Because no definite cure for coyotillo poisoning is known, livestock producers should take preventive measures to reduce losses.

Coyotillo (*Karwinskia humoldtiana*) is a 3- to 20-foot-tall shrub or small tree that grows on dry, gravelly hills and shallow range sites. Its twigs are smooth and may have short hairs. The fruit is highly palatable, about 3/8 inch long, rounded to egg-shaped, and brownish-black when ripe in the fall.

The leaves are oval to elliptical, 1 to 3 inches long, on short petioles (the slender stem that supports the blade of a leaf), rounded or nearly heart-shaped at the base, blunt or sharp at the tip, smooth on both sides, green above, paler beneath, sometimes with short hairs beneath, and with the edges somewhat rolled back. The leaf veins are feathered and prominent, with black spots and lengthwise markings.

Coyotillo was first mentioned as being poisonous to humans in 1789 in Baja California. The seed was thought to be the primary source of poisoning, which appeared only after the fruit had been consumed continually for several days. Paralysis was the primary symptom.

Early Mexicans used the seeds to treat convulsions. Crushed and soaked leaves were reportedly used for fevers. Hot teas have been used for toothache.

The seeds and leaves are poisonous to animals. The toxic agent has recently been identified as Karwanol-A.

In the late 1920s, C. Dwight Marsh, a scientist for the U.S. Department of Agriculture, and his associates conducted animal feeding experiments to determine the toxicity of the coyotillo plant. In experiments with the



Whole plant



Leaf detail



Leaves and fruit

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fruit, 63 percent of the sheep, 60 percent of the cattle and 33 percent of the goats were poisoned. Poisoning from leaves occurred in 10 percent of the sheep and 30 percent of the cattle.

From Marsh's work, the minimum toxic doses of dry fruit appear to be about 0.15, 0.05 and 0.2 percent of body weight for sheep, cattle and goats, respectively. Lethal doses appear to be about 0.2 percent of body weight for sheep and 0.15 percent for cattle.

For example, a 130-pound sheep would have to eat only about 0.26 pound of fruit (dry weight) to consume a potentially lethal dose. For a 1,150-pound cow, about 1.7 pounds could be deadly. If lethal levels for goats are like those for sheep, an 80-pound goat would have to eat only 0.16 pound of dry fruit.

In his experiments, Marsh used single feedings of dried, ground fruit. In sheep, symptoms appeared within 2 to 47 days of the feeding; cattle symptoms appeared within 7 to 16 days. The average length of time between a feeding and the appearance of symptoms was 18.2 days for sheep and 8.4 days for cattle.

Feeding experiments with leaves occurred over several days. Symptoms appeared within 4.5 to 5 days of the last feeding for sheep, and within 1.5 to 7 days in cattle. The average appearance of symptoms after the last feeding was 5 days for sheep and 3.8 days for cattle.

Cumulative toxic and lethal doses of green leaves for sheep appear to be about 21 percent of body weight. For cattle, toxic and lethal doses are thought to be at about the same levels, 19 to 21 percent of body weight (Table 1).

The time lags between consumption and appearance of symptoms make it difficult to diagnose coyotillo poisoning. In severe cases, recovery is rare. Although animals may eliminate some of

the toxin, the effect of coyotillo appears to be cumulative in at least some cases.

Historical reports indicate that the fruit is sweet and palatable. Most of the reported poisoning cases appear to be from eating the fruit. In feeding experiments, some animals refused to eat the leaves.

Symptoms from eating fruit and leaves differ.

Fruit symptoms

- *First appear in movements of hind legs:* Weakness, dragging the feet and muscular incoordination
- *Mild cases:* A little uncertainty of movement
- *Pronounced cases:* High-stepping action with the leg jerked up and set down randomly; movement in a spasmodic manner, apparently going backward when intending to go forward; may go by jumps; may be extended to forelegs; lack of coordination may be accompanied by weakness and almost or complete loss of the use of its legs; does not appear to produce pain
- Appetite may be good
- If recovery occurs, it is slow
- No fever, irregular pulse or irregular respiration
- Death

Leaf symptoms

- No paralytic symptoms
- Nausea
- No fever, irregular pulse or irregular respiration
- *General effect:* Chronic condition of unthriftiness, depression, progressive weakness and weight loss
- Death

The greatest losses appear to be with animals unfamiliar with coyotillo when they are first exposed to the plant. This inexperience could be of particular concern with the increased meat-goat production in South Texas. Because the fruit appears to be very palatable, do not expose inexperienced animals to the plant when the fruit is present (fall and winter).

Preventing poisoning appears to be the best approach to minimizing losses, as there are no definite antidotes. Some purgatives and stimulants have been reported to help in early stages. Supplemental feeding and proper stocking rates will also help in prevention.

Grubbing is a management option on level range sites with deeper soil, but not on low stony hill sites, where coyotillo is often found. Of the currently labeled range herbicides, none has yet shown acceptable levels of plant control.

Table 1. Estimates of lethal amounts of green and dry coyotillo leaf for sheep, cattle and goats. Goat estimates are based on lethal levels for sheep. The dry leaf weight was calculated assuming that coyotillo foliage contains 75 percent moisture (adapted from Marsh et al. 1928).

	Sheep	Cattle	Goats
Animal body weight, lbs.	130	1,150	80
Average number of days to eat lethal dose	16	26	16
Total green leaf eaten, % of body weight	21	20	21
Total green leaf eaten, lbs.	29	228	18
Green leaf eaten, lbs./day	1.8	8.8	1.1
Green leaf eaten, % of body weight/day	1.4	0.8	1.4
Total dry leaf eaten, lbs.	7.3	57	4.5
Total dry leaf eaten, % of body weight	5.6	5.0	5.6
Dry leaf eaten, lbs./day	0.5	2.2	0.3
Dry leaf eaten, % of body weight/day	0.4	0.2	0.4

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