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Corn in Deer Management - Too Much of a Good Thing?

by David Hewitt

Many articles, presentations, and campfire conversations about deer nutrition state emphatically that corn is not good for deer. In a general sense, this is true because corn is low in protein (9%), has a poor mineral profile, and can cause digestive upset and metabolic problems. However, general statements that corn is bad for deer simplify a more complex relationship between deer and corn. When corn is part of a diverse diet, the nutritional deficiencies of corn can be overcome and corn's high energy content may be beneficial. This issue of the CKWRI e-news deals with the digestive and metabolic problems of eating corn and similar foods.



Corn is high in starch and a good source of digestible energy, but can cause problems in a deer's digestive system.

Background

Corn causes problems in the deer's digestive system because of characteristics of both corn and the deer. Corn is composed primarily of starch, which is meant to serve as an energy source for the corn seedling after germination. The starch intended for use by the growing corn plant is also readily available to the deer, which is why deer crave corn.

Although starch is an important source of energy, it may be a problem for deer because deer are ruminants. Ruminants have a large sac-like structure called the rumen that is part of their digestive tract (see e-news on deer digestive anatomy - [Amazing Insights from the Insides of a Deer, May 2010](#)). The rumen houses beneficial microbes that produce nutrients while breaking down, or more properly, fermenting, portions of plants that the deer cannot digest on its own. However, the microbes do not limit themselves to the poorly digested portions of the deer's diet. In fact, the microbes attack starch with a vengeance and can ferment it much more rapidly than other portions of the deer's diet. This rapid fermentation leads to problems.

Effects of Eating Too Much Corn

When deer eat too much corn or other high-carbohydrate food, many complex changes occur in the rumen. Some microbes proliferate while others die. The amounts and types of products produced by rumen microbes change. These microbial products may overwhelm the deer's ability to handle them, causing problems throughout the deer's body. For example, the deer's rumen may become acidic, and if the rumen acidosis is severe, the deer's entire body may become acidic. Finally, the interior surface of the rumen itself may be damaged by all these changes, allowing bacteria and toxins to enter the deer's blood. These changes in the deer's rumen have many consequences.

A short-term consequence of eating too much corn is that the deer feel sick. They quit eating and become lethargic. Losing their appetite can be good because the deer will cease eating corn and give themselves a chance to recover. Deer that have eaten too much corn may also develop diarrhea, bloat (potentially lethal build-up of gases in the rumen), polioencephalomalacia (a potentially lethal condition of the nervous system), and in severe cases, blindness, seizures, and death.

Other problems may develop when deer eat a lot of corn. In addition to damaging the rumen lining, over-consumption of corn may cause hoof problems. The feet of deer may become sore, causing the deer to continually lift one foot at a time off the ground to relieve the pressure on their hooves. A long-term consequence of eating too much corn are hoof deformities in which the hooves grow too long, giving the deer the appearance of wearing elf shoes with the toes curling up. Deer with such hoof deformities may no longer walk solely on their hooves, but instead their feet collapse so that their dew-claws also contact the ground.



*Eating too much grain or other high starch foods can cause deformed deer hooves.
Photo Credit - Donnie Draeger*

Using Corn and Other High-Starch Foods in Deer Management

Clearly deer can experience problems if forced or allowed to eat too much corn. The same problems can occur when deer eat large amounts of other high-starch foods, such as pelleted supplements (commonly known as "protein pellets"), nuts (e.g. acorns and pecans), and fruits. All these foods are readily available to deer throughout their range at sometime during the

year, so why do we not regularly see deer experiencing digestive upset or worse?

With proper adaptation, deer can safely consume corn and other high-starch foods. In a graduate study by Donny Kahl at the CKWRI's Alkek Captive Ungulate Facility, deer were given unlimited access to corn and to a low energy, high protein pellet. Over an 11-month period, the deer selected a diet composed of 53 - 83% corn. No diet-induced problems were noted. Deer can consume high-starch foods because:

- Compared to many domestic ruminants, a deer's digestive system is ready-made for high quality forage. Deer have a small rumen and rapid passage rate, features that reduce the potential for rumen acidosis.
- Deer adapt to high-starch diets by learning quickly how much to eat before becoming sick and by seeking high-fiber forages that dilute the corn or reduce fermentation rates.
- Rumen microbes also adapt to high-starch diets by favoring microbe species that can exist in the resulting rumen environment. A drawback of this adaptation is that the deer may become less efficient at digesting their normal forages.

When feeding corn or other high-starch feeds, do the following:

- Introduce the food gradually, over a 2 - 3 week period, allowing the deer to adapt to the new food, just as they do to the gradual increase in naturally occurring nuts and fruit.
- Feed corn in a manner that limits intake. Timed feeders or spreading corn across a large area slows the rate at which deer can eat corn.
- Once you start, feed the corn or pelleted feed consistently. Feeding once every 1 or 2 weeks may not give deer the opportunity to adapt to eating these foods.
- Ensure a diverse array of alternative forages so that deer can choose foods to compensate for nutrients deficient in corn and minimize digestive and metabolic problems.



Spreading corn over a large area reduces the rate at which deer can consume corn and may reduce digestive upset.

One final question - If deer can adapt to eating corn and other high-starch foods, why do some deer develop hoof problems, diarrhea, or other problems associated with these foods? There are several scenarios that could explain these observations.

- Corn is introduced quickly and deer eat too much without the proper adaptation period.
- A change in social status, such as death of a dominant animal that limited access to feed sites, could allow a deer to suddenly eat a lot of corn.
- Young deer finally get big enough to jump into the feed pen where they gain access to abundant corn for the first time.
- Other conditions may make deer susceptible to high-starch diets, such as internal parasites, infections, or other disease.

The Bottom Line

Corn, pelleted supplements, and other high-starch foods have a role in many deer management programs. If used wisely and in the context of a diverse diet, these foods have

nutritional benefits and can help address a variety of management goals. If used otherwise, they can cause problems and, for some deer at least, could be too much of a good thing.