Introducing Animals to New Foods

Animals are born knowing what to eat. It's innate. But if diet selection is truly innate, consider these scenarios:

- Steers from a Western ranch arrive at a feedlot. The feed bunks are filled with a nutritious ground ration, but the steers refuse to eat.
- Dairy cows reared in a barn all their lives stand knee-deep in nutritious orchardgrass pasture and bellow at the gate to be fed.
- To cut the high cost of winter feeding, an animal scientist feeds beef cows ammoniated straw. Half of the cows maintained themselves on the straw while the others did not.

If animals know what to eat, why do these things occur?

The fact is animals are not born knowing what to eat. They need to learn which foods to eat and which foods to avoid. Learning about foods is essential regardless of the quality of the food or its toxicity. Understanding some basic principles of behavior can help managers improve animals' acceptance of new foods. Consider the following when conditioning animals to eat new foods.

Neophobia and age. All animals are cautious of new things—that is they are neophobic. Animals typically eat small quantities of new foods. If the food is nutritious, they gradually increase intake over several days. However, if the animal experiences toxicosis (illness) or the food is low in nutrients, the animal will avoid eating that food in the future. If animals never experience toxicosis after eating, they become less cautious. But if they become ill repeatedly after eating new foods, they are less likely to eat any new food.

Young animals are neophobic, even while learning to eat foods with their mothers. But they are less neophobic than older animals. Young animals learn about foods by eating with their mothers and by sampling many foods. Preferences for foods are formed early in life when animals are learning to forage. Older animals can learn about novel foods, but they are less likely than younger animals to sample new foods and even less likely to incorporate a new food into their diet once their dietary habits have been established.

Social models. Young animals quickly learn to eat the foods their mothers eat, and they remember those foods for years. Research shows that lambs fed nutritious foods like wheat with their mothers for 1 hour per day for 5 days eat more wheat than lambs exposed to wheat without their mothers. Even 3 years later, with no additional exposure to wheat, intake of wheat is nearly 10 times higher if lambs are exposed to wheat with their mothers than if inexperienced lambs are exposed alone or not exposed at all. Animals can also learn about foods from other adults and their peers, but mom remains the most effective role model.

Food quality. After sampling highly nutritious foods, animals generally eat them readily. However, care should be taken to ensure that ruminants do not over-ingest foods high in soluble nutrients, such as grains, which can lead to acidosis. Animals should also be introduced slowly to nutritious foods that

contain toxins, such as white clover, which contains cyanide, or endophyte-infected grasses which contain alkaloids. If animals are familiar with a food before experiencing illness, declines in intake will likely be temporary. But if the food is relatively novel, animals may reduce intake of the food permanently. In Missouri producers likely encounter this scenario when they purchase replacement animals from other areas and place them on endophyte-infected tall fescue pastures. These animals probably over-ingest grass, experience illness, and form a food aversion that reduces intake.

Animals can also learn to eat poorly nutritious foods if they are exposed to the foods early in life with their mothers. Kids exposed to mature blackbrush, a poorly nutritious shrub, with their mother from one to four months of age, ate 30% more blackbrush than kids that were not exposed to blackbrush. The kids with early exposure ate 30% more blackbrush even when the shrub was offered with a nutritious food like alfalfa pellets. Other studies have shown similar results for both cattle and sheep.

Animals should not be forced to eat toxic plants because doing so will likely increase morbidity and death losses. Repeated over-ingestion of toxic plants may actually impair an animal's ability to detoxify the plant. Animals can, however, eat greater amounts of toxic plant material if they are given some means to detoxify the toxic compounds. For example, supplementing animals with polyethylene glycol can increase consumption of foods high in tannins. Likewise, supplementing animals with readily available sources of energy (grain) and protein (soybean meal) allows animals to increase consumption of a variety of toxic plants.

Location. Animals are more apt to eat novel foods it they are in a familiar environment. Food neophobia is greatly increased when animals are moved to a new location, even just a few miles, and offered novel foods. If animals will encounter new foods at the new location, they should be exposed to the novel foods before moving. Animals are also more likely to consume familiar toxic plants in new environments than in familiar locations. Thus, animals are more likely to suffer from toxicosis and die when new areas contain only familiar toxic foods and unfamiliar nutritious foods. Arizona rancher Mick Holder learned this lesson when he moved part of his cattle 100 miles from his ranch during a drought. Cattle moved to the unfamiliar location suffered severe losses from lupine and loco poisoning. None of the animals left at the ranch were poisoned even though both plants grew at both locations.

Nutritional status. Animals are less likely to try novel foods, even highly nutritious foods, if their nutritional needs are met. For example, lambs fed a basal diet adequate in energy and protein are more reluctant to eat new foods, while lambs fed a diet inadequate in energy or protein readily eat novel foods.

Conclusions. So what did our scenarios at the beginning of this article have in common? All of the animals were mature when they were offered new foods. In the first two scenarios, cattle were moved to new locations and presented novel foods. Exposing these animals early in life with their mothers in familiar locations to foods they would encounter later in life would have improved intake of the foods, reduced the stress of moving to a new location and improved performance. In the third scenario, half of the cattle were exposed to straw for two months as calves while the other half had never seen straw. Throughout the three-year study, the experienced cows maintained higher body condition, produced more milk, lost less weight and bred back sooner than cows with no exposure to straw, even though they had not seen straw for five years.

Additional Readings:

Provenza, F. D., 2003. Foraging Behavior: Managing to Survive in a World of Change. USDA-NRCS. To order: www.behave.net

Wiedmeier, R.D., F.D. Provenza and E.A. Burritt. 2002. Performance of mature beef cows wintered on low-quality forages is affected by short-term exposure to the forages as suckling heifer calves. Journal of Animal Science 80:2340–2348.

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Website: www.behave.net
Email: behave@cc.usu.edu