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The key to knowing what mineral your cattle are already consuming is through forage and water testing.

mineral nutrition, according to South Dakota State University Extension Beef Specialist Cody Wright. He adds, "Appropriate mineral nutrition is key to maintaining animal production and animal health."

Most of the time the forage the cow is consuming, whether it is harvested or grazed, is going to be inadequate in at least some mineral, says Jerry Spears, North Carolina State University animal science professor. He says the goal of a mineral supplementation program is to provide mineral that may be potentially limiting in that area.

Spears likens mineral supplementation to buying an insurance policy. "There are times you may see little or no benefit and there are other times you may see large benefits in terms of growth, reproduction and animal health."

The problems a poor mineral program causes are plenty and depend on what area of the country you are in, the time of year, and the production stage and age of the cattle. Twig Marston, professor of animal sciences and industry at Kansas State University, says there are two ways to have a mineral problem: mineral deficiency and imbalance. Both wreak havoc on animal health.

Wright says one of the problems you will see with mineral deficiency or imbalance is compromised immune function. If you find your calves are getting sick at the feedlot or they are not responding to vaccines like they should, there could be a mineral problem, he explains.

Reproductive function can also deteriorate. Cow fertility and bull semen quality are closely tied with trace mineral nutrition, Wright says. The exact problem, however, is dependent on what sort of mineral deficiency or imbalance the cattle are experiencing, and the individual mineral problem may be specific to a certain geographical location.

For example, Wright says, copper is a real problem in some areas because copper absorption is reduced by sulfur and molybdenum intake. This is the case in North and South Dakota because of high sulfate levels in the water. Because the cattle are consuming very high sulfur levels from the water and forage, they are unable to absorb enough copper, which results in a deficiency.

Another commonly deficient mineral is magnesium, which can result in grass tetany. This condition usually occurs in spring when the cattle are consuming lush grasses or during a fall green up. It is usually remedied by simply supplementing magnesium.

Know what you have

The first step to knowing how much mineral your

cattle need is by knowing what is in their primary feed, Wright says. "If they are being fed hay or crop residue, like corn stalks or wheat straw, take a sample and find out what is in those feeds," he says. Then look at other feed ingredients such as protein supplements that are being incorporated into the diet and figure out exactly what they are consuming already.

If the cattle are on pasture, that can be a little more challenging situation because the nutrients change so much, and you can also have issues related to water quality, Wright says. The first thing to do in that situation is to know what's in your water. "Taking a water analysis and knowing exactly what you have there is a place to start," Wright says. He adds, "Beyond that, take some clippings throughout the year and see what your forages have." Knowing what your cattle are already consuming can save you money because some of their mineral needs are going to be met by the forage.

Spears says testing is a good idea especially if you are applying any type of chemical or manure fertilizer. "One mineral we used to think was a problem was phosphorous, but now, in a lot of areas, they have applied chemical fertilizer or waste and phosphorous is not running low in forage anymore," Spears says. Phosphorous is one of the more expensive minerals in a supplement so if that is the case in your area you could get a supplement that has little or no phosphorous in it.

The county Extension service can help find a place to get these analyses done such as a state laboratory. You could spend between \$100 and \$200 on the tests, Wright says. Still, that investment could save you from spending more on mineral than needed. "In standing forage in a pasture or harvested forage, the only accurate way of knowing whether or not you are overfeeding mineral is to take those samples and have them analyzed," Wright says.

He adds that if the forage is meeting a large percentage of the cattle's requirements, you could save \$1,000 or more on mineral. "So a little bit of an investment in the form of testing may result in substantial cost savings." Wright stresses that knowing what you have is a worthwhile investment especially on a large operation because spending a little bit too much on mineral on a per head basis will multiply quickly with hundreds of cattle.

Know what you need

Once you know what your cattle are already consuming you can look at the animals' requirements and start shopping for an appropriate mineral supplement.

If producers are not going to test their forage and water, the

FOCUS
Supplementing Success

A solid mineral supplementation program is key to maintaining your operation.

by Sara Weller

The goal for cattle producers is maintaining efficiency while consistently producing the highest quality cattle possible. Three beef specialists from across the country say a good mineral program is vital to achieving that goal. Why? Because without a proper mineral balance, money spent on the best bull's semen, the best artificial insemination (AI) technician and the best-bred cows is wasted.

Mineral supplementation can be easily overlooked, so first you must understand why it's important. Then the way to develop a good mineral supplementation program is to know what you have, what you need and remember not to overdo it.

The key components of animal metabolism, reproduction and immune function rely on appropriate



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safest way to make sure the cattle are consuming adequate mineral is to purchase a supplement that will meet approximately 75-100% of an animal's nutrient requirement.

The key is to make sure your cattle are getting the appropriate amount of mineral. There are two things to manipulate with a mineral program, Marston says: that is how much is fed and what form the minerals are in.

Macrominerals such as phosphorous, potassium, calcium, salt and magnesium are only available in inorganic forms. However, trace minerals like zinc, copper, selenium and manganese, among others, can be fed in organic form.

Organic minerals have higher bioavailability, meaning they are easier for the cattle to absorb. Organic minerals are more expensive though, so if the cattle are in a high-stress situation or if you are asking for high production such as an embryo transfer program, you may consider using those, Marston says. Otherwise, inorganic forms will be adequate.

The next decision the producer must make is how to supplement the mineral. If the cattle are on grass only, then a free-choice loose mineral placed in a tub or a mineral block is most common. If the cattle are receiving some type of supplemental feed like cake or a ration, the mineral can be mixed in. There are advantages and disadvantages to both.

Supplying the mineral free choice in a mineral feeder or block is the least inexpensive. However, producers have little control over how much the cattle are consuming. "Sometimes they are so palatable that the cattle will eat more than what they need and that will raise your cost per cow considerably," Spears says. He adds, "In that case you can use a mineral that is less palatable or dilute it with salt. Salt has a great effect on intake because cattle, like humans, have an appetite for salt that is greater than their requirement. So if the salt level is low they are likely to consume more; if the salt level is high they will consume less."

Some companies also put ingredients in the mineral, which makes it even more palatable, such as molasses, grain byproducts or a flavoring agent. These factors will greatly affect the cattle's mineral consumption.

Marston says another disadvantage to free-choice mineral is weather loss. Good

feeders can help reduce losses, but then producers have equipment costs to worry about.

An advantage of free-choice mineral feeding is that you can affect grazing patterns, Spears says. "In some areas where you want the cattle to move around and graze the forage, you can actually move the mineral feeder and that will cause the cows to go into different areas."

On the other hand, feeding minerals in a ration or feed is more expensive and there's the added cost and labor of feeding the cattle everyday. But Wright says, "It's a great way to supply mineral to cattle because you can convince the cattle to eat what they're supposed to." The producer has control over how much the cattle are consuming.

Marston agrees, "You can balance amounts of different minerals and different ingredients more with a total mixed ration."

Now companies like BioZyme Inc., have products on the market like Vita Ferm® that make the producer's choice a little easier. "Companies usually have a wide variety of different supplements to pick from," Marston says. They have specific supplements for specific needs. "They have a mineral for my recipient cows or my donor cows, or if it is grass tetany season, they have it already premixed for you. They

also have it in a form that is weatherized or waterproof so it holds in the feeders better."

Supplements are also available with mixed-in growth promotants, antibiotics or direct-fed microbials. "It just depends on what you need in your area. The key is picking the right one," Marston says.

There are many premixes from which to choose so producers still need to be educated about specific problems in their area like water and forage quality. A year-round mineral program is important, Marston says, "but during times that we ask cows to work hard is the time to really worry about your mineral program." So during breeding and calving seasons and lactation it is especially important to make sure the cows are getting adequate mineral. Also any time the cattle are consuming poor quality forages, Marston says, is a time that will increase their chances of developing a deficiency or imbalance.

Most often, Marston says, people with mineral problems are people who don't have a plan; they just put mineral out. He says, "There are two ways to be wrong. You can either not feed enough and not spend enough on minerals and lose production, or you can spend way too much on minerals and feed that you don't need. More often than not it is people that spend too much on minerals. They feed minerals at the wrong time of the year, like staying on an expensive, high-magnesium mineral when they don't have a chance for grass tetany."

The most important thing



Free-choice loose mineral in a feeder is the least expensive method of supplementation.

is to be educated. Ask your county Extension agent or mineral supplier, or if you choose, hire a nutritionist, Spears says. Talk to someone, he says, with some feel for the forages in your specific area.

Don't overdo it

Remember though, Wright says, that "there is a lot we really don't know about minerals, so in a mineral program, over supplementing mineral 25-50% beyond what the animal actually needs is likely not going to result in any beneficial response in terms of health or reproductive function or animal growth and performance."

Spears agrees, "Don't heed the saying 'if a little bit is good, a whole lot is better,' because that is not true with minerals."

Over supplementing can be avoided by knowing what you have, Wright says. He adds, "if you are really interested in saving money, do some sampling and testing of your forages, feed ingredients and water sources, and balance your diet accordingly from a mineral perspective, and that is the key to making good management decisions relative to your program as a whole." **HW**



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Adequate mineral supplementation is also important for show cattle

Although show cattle are after all, just cattle, we ask much more of them and certainly put them in more high-stress situations than the typical commercial herd. Mineral programs for these animals are going to follow the same guidelines with some greater considerations for the results we expect from them.

"Although show cattle's requirements aren't going to be different from other cattle, it is critical that those animals get an adequate supply because you are after maximal reproduction in the cow and after the healthiest hair coat you can get," says Jerry Spears, North Carolina State University animal science professor.

Cattle that are being hauled frequently need special consideration in a mineral supplementation program, according to Cody Wright, South Dakota State University Extension beef specialist. He says, "Especially when you go to a show, the water changes a bunch and that will affect intake a lot, so in some cases you might need to feed a

little higher concentrations of the mineral to help make sure they are getting what they need."

For example, Wright says, if intake reduces by 20% it's important to make sure the cattle are given a slight increase so that in the 80% they are eating the cattle are still getting enough to maintain their requirement. He adds, if there is any time a little bit more supplementation or a more expensive organic source of the mineral would be beneficial it is with a stressed animal.

However, it is still vital to remember that over supplementing will not increase the performance of the animal and may, in fact, have negative effects. Spears says, "There is a level that's good and you can exceed that with all minerals to a certain margin and it doesn't have any negative effects but if you get way high you can start seeing toxicity signs with most minerals, and if you go high enough, you can kill the animal." **HW**