

# Don't Supplement the Wrong Animals

Feeding your herd supplements can prove both frustrating and expensive, especially when those needing it the most are the least likely to benefit.

by Ed Haag



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PHOTOS BY SHAUNA ROSE HERMEL

Montana researchers have substantiated what many of us have long suspected — the distribution of supplements in most herds is rarely equitable.

A thorough study, using external feed markers to determine each animal's intake of supplements, concludes that up to 30% of the cattle in a given herd don't even get to taste the formulation.

"We have found that there is a tremendous variation in the individual consumption of each cow," says Jan

Bowman, Department of Animal and Range Sciences, Montana State University (MSU).

"It is the younger, lighter animals — the ones that really do need the supplements — that are being left out."

## Overwhelming evidence

In 2002, Bowman and her fellow researchers at MSU set out to confirm their suspicion — supplements are rarely distributed equally among the animals in a grazing beef herd.

Bowman enlisted 121 pregnant Angus-cross cows [3 to 9 years of age; averaging 1,402 pounds (lb.)  $\pm$  110 lb.] to help determine effect of herd size and cow age on individual supplement intake of a hand-fed pelleted protein supplement, variation in supplement intake, individual forage intake and performance. The research took place at MSU's Red Bluff Research Ranch near Norris, Mont., from Oct. 14, 2002, to Dec. 13, 2002.

Seventy-six cows were assigned to a large herd, and 45 cows were assigned to a small

herd. Each herd was relegated to one of two native range pastures to achieve equal stocking rates.

In order to determine supplement intake of each animal, titanium dioxide was added to the supplement at 1% as an external marker. Individual fecal samples were collected on days 23, 36, 38, 40 and 61 to obtain five measurements of individual supplement intake. Forage intake was estimated using estimates of fecal output obtained using chromium boluses and *in situ* 48-hour dry-matter (DM) digestibility, and by doing a frame survey on each pasture.

Bowman's data showed that forage intake was higher for cows in the large herd than for cows in the small herd, while average daily gain (ADG) remained the same in both herds.

Average daily gain was highest in the 7-year-olds, while it was the lowest in the 3-year-old animals. As for average supplement intake, the overall consumption rates in both herds were equal, with the exception of Day 36, when the intake was higher for the large herd.

For Bowman, the really telling data emerged when the supplement intake of the younger cows was compared with those of older ones. The average dry-matter supplement intake was 33% lower for 3- and 4-year-old cows compared to 8- and 9-year-olds. She says the conclusion that can be drawn from the study is that cow age may have more influence on individual supplement intake than herd size. Bowman also notes that 3-year-old cows had the lowest supplement dry-matter intake (DMI) and the lowest average daily gain compared to all other age groups.

### Forage utilization

Bok Sowell, MSU Animal Range Science Department, has worked extensively with the relationship between supplementation and the mother cow's ability to utilize forage.

"Some of our studies show that by providing supplements we increase digestibility by as much as 30% to 40%," he says. "That alone is enough to put 50 pounds on a supplemented vs. unsupplemented animal."

Sowell notes that in a competitive pasture environment it is critical that younger females receive the nutrition necessary to develop into healthy, productive cows. He adds that appropriate supplementation plays an important role in that process.

"A lot of your supplementation strategy is designed to increase digestibility and forage intake," he says. "What we are trying to do is provide some nitrogen to the bugs in the rumen so that they can be better digesters."



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### Reproductive efficiency

When heifers and young cows are prevented from consuming supplements, forage intake isn't the only process to suffer, Sowell says. Essential trace elements are necessary for the well-being of the animal. These are needed in sufficient quantities to promote health and to optimize production and reproduction.

For example, a study published in the *Journal of Animal Science* (J. Anim. Sci. 66 Suppl. 1:462) compared mother cows supplemented with zinc (Zn), copper (Cu) and manganese (Mn) to mother cows that received no supplementation of the trace minerals. The average length of time from the beginning of the breeding season to conception was 22 days for trace mineral supplement treatment vs. 42 days for nonsupplemented cows.

Another study out of New Mexico State University indicates that these trace minerals could have particular relevance to beef operators attempting to breed back first-calf heifers. The study determined that the days to conception were reduced by 10 days when the animals supplemented with amino acid complex forms of copper, zinc, manganese and cobalt (Co) were compared to sulfate forms and controls with no additional trace minerals.

### Immune system

A series of studies conducted at MSU in the 1990s focused on the relationship between trace minerals and the bovine immune system, which is a highly developed mechanism that accesses a diverse cell population to protect its host against invasion of bacteria, fungi, parasites and viruses.

Zinc, iron (Fe), copper, manganese and selenium (Se) were some of the trace minerals identified as important for normal immune function and disease resistance. Data from several western states indicate that some of these minerals — particularly zinc and copper — can be deficient in many of the forages cattle consume.

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Almost as important as the inclusion of key minerals in an animal's diet is the balance that must be maintained among the trace minerals themselves. This poses a major challenge due to antagonistic interactions that can occur between minerals. These include the negative effect of high molybdenum and sulfur levels on copper absorption; the interference caused by high iron levels for absorption of zinc, copper and manganese; and decreased zinc absorption in the presence of high dietary calcium.

Sowell notes that one of the best ways to



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make sure range cows receive the appropriate trace minerals is to include a spectrum of minerals in a single supplement package. Here are some strategies to make sure all the animals in a herd receive their fair share.

### Supplement distribution strategies

Sowell believes that there are practical ways to make sure even the most reticent heifers receive the supplementation they need to remain healthy and productive.

For Bowman, a big part of solving the initial problem is recognizing that there is one. "Once you really start watching herd behavior solutions start to present themselves," she says. "It is a matter of observing and responding."

As noted in MSU's 2002 study, if animals of different ages are placed together in a herd, a high percentage of the younger, lighter animals consume little or no supplements. Bowman recognizes that two herds mean double the labor, but with some groupings it is the only way to assure that all animals benefit from supplements.

"It really does make sense to split your animals," she says, adding that cows that are in particularly poor body condition should go in with the heifers and younger animals.

Bowman warns that when dividing cows into two groups one should not confuse fighting dominance with animals that overconsume supplements. "In fact there is some research that indicates the really aggressive cows spend a lot of time fighting and less time eating," she says.

A surprising bit of information gleaned from Bowman's research is that a certain amount of competition will actually increase the likelihood that more animals receive supplements.

"Although too much competition will prevent the thinner animals from feeding, too little competition will encourage animals to fight rather than feed," she says, adding that the goal is to size the feeder space so that it encourages a continual rotation of animals accessing the supplements.

### More supplements, less frequently

One fact to emerge from Bowman's study is that increasing the target amount of supplements from 2 lb. per cow to 5 lb. per cow per day will contribute to the likelihood that more cows will consume supplements and the variability between high consumers and low consumers will be narrowed.

This doesn't necessarily mean that the overall cost of supplementation must increase. "One way you can increase the target amount is to feed supplements less frequently — say every other day," Bowman says. "That strategy works particularly well with high-protein supplements of 20% or higher."

### Consider delivery system

Bowman has found that one way to improve supplement distribution is to change how animals are fed.

"Most of the research that has been done comparing the different delivery methods has shown less variation on intake for hand-fed supplements when compared to self-fed supplements," she says, cautioning that before buying in on a new delivery system one should factor in all additional costs associated with it and decide if it makes good economic sense.

She adds that research has also shown that supplements that are softer and more easily consumed do tend to receive broader herd distribution than those that require more effort.

### Flavor factor

Another consideration when trying to broaden the distribution of supplements in a herd is flavor.

"I have ranchers call me up and tell me that they use quality supplement products but their cattle won't touch them," Bowman says. "I tell them to switch to another brand and see if their animals like that better."

She adds that perseverance will eventually pay off in the form of more animals in a herd receiving adequate supplementation.

### Early conditioning important

Finally, conditioning calves to eat supplements is one of the most practical ways to assure that they will consume them as adults, Bowman says. "This gives the mother cow an opportunity to teach them."

For heifers and young adult cows that are not already conditioned to consuming supplements, Bowman recommends they be confined in an enclosed area with easy access to supplements for a few days before being released onto the range.



PHOTO BY MICKY WILSON

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