

Use of remote drug delivery devices continues to grow, but researchers and concerned veterinarians urge producers to use dart guns out of necessity rather than convenience.

PHOTO BY TROY SMITH

DARTING BQA PROBLEMS

In the balance of stewardship and convenience, does remote drug delivery put BQA at risk?

by Troy Smith, field editor

I feel like a hypocrite, because I really don't like the idea of using a dart gun to treat cattle with antibiotics. But, I admit that I sometimes use one," says veterinarian Russ Rice. "We've sold dart guns to clients and demonstrated how to use them. In responsible hands, dart guns have their place, but I still don't like them."

Rice is associated with Vet Care and Consultation, Broken Bow, Neb., where he and his colleagues serve a clientele composed predominately of cow-calf operators. In Rice's estimation, dart gun use by area producers has increased significantly in the last two, maybe three years.

Testimony to the trend is the number of darts the clinic sells — lots of darts, with most going to non-clients. Maybe it's the clinic's location on a major highway, but walk-in customers often stop in seeking darts specifically. Some

buy in volume. Demand is so high, it can be hard to keep the shelves stocked at times.

Filling a need

In part, the growing popularity of dart gun use might be attributed to the advancing average age of cattle producers. Maybe it's because of the region's production environment, which ranges from loess hills and canyons to rolling sand hills. Many area producers graze cattle in pastures located far from their own

headquarters and far from anything resembling a cattle working facility. Sometimes clients summon Rice to such remote locations to render a diagnosis and treat diseased animals.

"These days, fewer producers can rope a critter that needs to be treated," says Rice, noting a growing scarcity of people possessing the skill required to doctor pasture cattle cowboy-style. So how do you handle an animal with foot rot, pinkeye or pneumonia when it's out there in a section-pasture, miles from the nearest set of pens?

"In those situations, a dart gun might be the only way an animal will receive timely treatment," states Rice. His concern is with their misuse.

BQA concern

"What worries me is the way dart guns are being used more routinely, even when there are alternatives," says Rice. "I'm afraid they're becoming a crutch, and I'm afraid that could be a big step backward for BQA (Beef Quality Assurance)."

Rice and some other like-minded veterinarians are most concerned about producer attitudes toward use of remote drug delivery (RDD) devices — the technical term for dart guns. They don't condemn the technology, but they fear a cavalier approach to its application. They

worry too many producers have made a dart gun their go-to method of administering antibiotic treatment. They question whether these producers have considered the limitations of



RDD and the consequences of its misuse.

Many producers appreciate the availability of a treatment method that can be applied in the pasture, with no sorting, capture or restraint of animals required. However, dart guns are also used to treat cattle being grown or finished under confinement. Rather than sorting animals and putting them in a chute, dart treatment is applied in the feeding pen.

Producers have shared dart gun experiences, in pasture and pen, through online discussion groups. These producers probably represent a small percentage of total dart gun users, but their comments made under the presumption of anonymity are telling.

Producer comments posted online have addressed different types of RDD systems and the relative merits of compressed air, carbon dioxide gas or blank 22-caliber cartridges for propelling darts. There are ample anecdotal claims that preferred RDD systems have worked every time. The darts deployed, medications were injected, the darts fell out quickly, and animals responded to treatment. Some producers say their systems have worked as expected hundreds of times.

Dart gun users often praise RDD as being less stressful and more humane than alternative methods involving restraint for treatment.

Texas A&M University (TAMU) veterinarian Tom Hairgrove calls that debatable. He maintains cowboys skilled at both roping and cattle handling can pasture-treat animals in a low-stress manner. If working facilities are nearby, moving cattle to a chute doesn't have to be a high-stress event.

Hairgrove says "low stress" does not necessarily describe what happens when producers use dart guns. It depends on their proficiency with the technology and their stockmanship.

"I don't think this is an animal welfare issue. The main driver of dart gun use is convenience," states Hairgrove. "Cattle in a remote location need treated.

There are no facilities, and it's hard to find people with the necessary skills to do it another way. I get it. I'm not dead set against them; I've used them occasionally. But dart guns have to be used judiciously."

Gun-shy

Hairgrove cringes a little when producers enthuse about how fast, easy and fun it is to treat cattle with a dart gun. He's even heard it described as though it were a recreational activity by a producer who liked to take guests for a drive through his cattle "to see if anything needs darted."

But producer anecdotes suggest that becoming proficient and confident with RDD can be challenging. Some producers say the technology worked, but cattle eventually became gun-shy, making it hard to get close enough to dart animals safely and accurately. Others complain about RDD device accuracy and how hard it is to place darts within the BQA-approved injection site area of the neck. There have been reports of darts striking animals in the face or hitting cervical neck vertebrae. In some instances, producers said, they stopped striving for BQA compliance and instead aimed for the animal's rump.

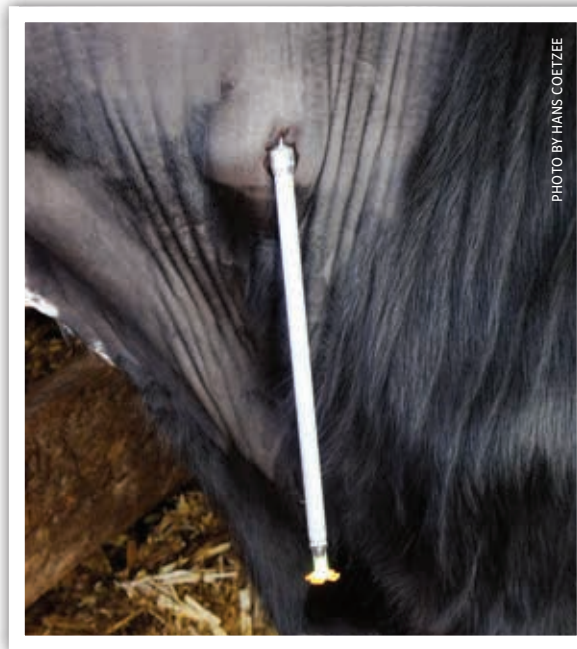


PHOTO BY HANS COETZEE

According to veterinarian and Kansas State University researcher Hans Coetzee, darts have been documented to remain in an animal for up to one hour after delivery. This, combined with inadvertent injection of a drug into the muscle as opposed to under the skin, can result in significant swelling at the injection site.

If used, use correctly

"Using a dart gun correctly is not as easy as many people think, and some people are satisfied if they just get a dart in the animal. From a BQA standpoint, that is not acceptable," says Hairgrove.

"You definitely need to know how to adjust the pressure on the dart gun," Hairgrove adds, noting how too-little propelling force may result in accuracy issues or darts bouncing off an animal's hide.

At the other extreme, darts fired with excessive force have resulted in projectiles penetrating too deeply. Hairgrove says packers have reported the finding of broken needles and, occasionally,

entire darts embedded in beef chucks and rounds.

There can also be problems associated with delivering the correct dosage of medication via RDD. Commercially available darts do come in a variety of sizes to accommodate different volumes of liquid medication. For example, a manufacturer may produce darts in 3-mL, 5-mL, 7-mL and 10-mL sizes. However, the appropriate dose required to treat a given animal may not match available dart sizes, or the dart sizes the user has on hand.

"A dart must be filled completely, to capacity, in order for the drug it contains to be injected," explains Hairgrove. "If the available dart is too large for the required dose, some producers will add something else — some additional liquid — to fill up the dart."

Water might be the most frequently used additive, though not necessarily sterile water. One producer admitted to adding soda pop to top off a dart. It's all he had at the time. Other producers have mixed two different drugs in the same dart. Hairgrove emphasizes that dilution of a drug or combining two or more products amounts to "drug compounding" — a practice

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Concerns with using remote delivery device technology when administering animal health products

Excerpted from page 58 of the Beef Quality Assurance national manual, available at <https://www.bqa.org/resources/manuals>.

- ▶ Entire darts or dart components embedded in the muscle tissue from cattle have and continue to be found during fabrication of carcasses in packing plants. This adulterant creates beef quality and safety issues, violates federal food safety regulations, and risks losing consumer confidence.
- ▶ Research has repeatedly demonstrated failure to RDD systems to consistently deliver the intended labeled therapeutic dose of the antibiotics commonly used to treat BRD in beef cattle tested including failure to achieve the FDA intended therapeutic blood and tissue levels of the antibiotic.
- ▶ Darts delivered with an RDD can inadvertently strike sensitive tissues, such as the nose or eye; deliver the product into a nonBQA-compliant area (i.e., round, loin, shoulder) rather than the injection triangle of the neck, or administer the product IM rather than [sub-Q] or vice versa.

In university and independently sponsored studies, antibiotics injected into the rounds of beef cattle using an RDD caused visible lesions and loss of tenderness in muscle tissue.

that may be performed only by a licensed veterinarian.

Some problems associated with dart gun use might be remedied by due diligence, but not all. In Hairgrove's opinion, a problem inherent to RDD is the inability to know, for sure, that a drug was injected by the correct route, whether subcutaneous (sub-Q) or intramuscular (IM), according to label directions. Even when using the short, side-port needles manufacturers recommend for dart administration of sub-Q injections, it is suspected that a portion of a dose is injected IM.

Another concern is the length of time required for a fired dart to become disengaged from an animal. Darts are supposed to drop soon after discharging their contents. Most do, within a few minutes, but not all of them.

Researchers and some producer reports agree that darts may remain attached to the animal for longer periods of time, sometimes

for hours. Extended duration of attachment can challenge producer ability to recover darts and know that medication was successfully delivered. If darts become lost in pastures or pens, they can present a hazard to livestock or wildlife.

Results of recent TAMU studies of RDD have yet to be published, but Hairgrove says outcomes show inconsistent absorption of dart-gun-delivered drugs, as compared to conventional injection by hand-held syringe. Also inconsistent were the amounts of time required for elimination of drugs from the treated animals' bodies.

There has not been an abundance of research involving large numbers of cattle, but studies completed thus far have been conducted under controlled conditions, with animals under restraint and RDD applied optimally to alleviate operator errors. Results from work at the University of Nebraska, Mississippi

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“A dart must be filled completely, to capacity, in order for the drug it contains to be injected.” — Tom Hairgrove

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State University and Iowa State University raised concerns about the numbers of darts that actually deliver the full volume of the drugs they contain, and the disposition of drugs that are injected by dart.

Formerly at Iowa State and now at Kansas State, researcher Hans Coetzee says he and his colleagues found some darts fail to discharge their contents or fully inject the correct dose. They also found considerable variation in the concentrations of drugs in the tissues of darted animals. This could be due to portions of a dose being injected IM as well as sub-Q, and could extend drug withdrawal time beyond that shown on the product label.

According to Coetzee, manufacturers of injectable

antimicrobial products have not tested them using RDD. Product labels don't indicate that RDD is an appropriate method for administering them. From a legal point of view, Coetzee explains, RDD is considered extra-label drug use and would be regulated by the *Animal Medicinal Drug Use Clarification Act* (AMDUCA).

“It's likely that as soon as a drug is put in a dart, it becomes an extra-label use,” says Coetzee. “There is no doubt that RDD can be convenient, but it requires an extra amount of diligence and stewardship. RDD may have unintended consequences, and producers must consider that its use can put BQA at risk.” ■

Editor's note: Troy Smith is a freelance writer and cattleman from Sargent, Neb.