



Pyrethroids and Bull Fertility: Cause for Caution, Not Panic

by **Troy Smith**

Some producers have read about them, and others have heard veterinarians or animal health suppliers talk about the potentially detrimental effects pyrethroids may have on bull fertility. Producers have been advised to use caution when choosing an insecticide for use near the breeding season. The news left plenty of cattle folk scratching their heads, wondering if their sprays, pour-ons, ear tags or products used to charge back rubs contained the substances said to damage

bull semen quality. Indeed, many name brand products contain pyrethroid compounds.

According to Steve Ensley, a veterinarian and clinical toxicologist at Iowa State University, information about a relationship between pyrethroids and bull fertility has been dispersed “out of an abundance of caution.” He says case reports have suggested pyrethroids as the cause of clinical toxicosis, but available evidence probably doesn’t justify a shunning of pyrethroids.

“There’s no denying that pyrethroids had an effect in

the reported cases,” admits Ensley. “But products containing pyrethroids have been around for quite some time. If they pose a huge risk, I think we should have seen more problems arise in the last five or 10 years.”

What are pyrethroids?

To understand what pyrethroids are, producers first ought to know about pyrethrins, which are compounds extracted from the seed coats of chrysanthemum flowers. Pyrethrins are naturally occurring repellents and, in sufficient concentration, are fatal to insects. They have been used as active components in commercial insect control products. However, pyrethrins are easily degraded and lose their insecticidal properties rather quickly.

Pyrethroids represent a family of compounds synthesized from pyrethrins, explains Ensley. In simple terms, scientists tweaked the molecular structure of pyrethrins to make the resulting pyrethroids last longer under practical application. First-generation (Type 1) pyrethroids were more persistent but still unstable in sunlight. Type 2 pyrethroids are more resistant to degradation, making them better suited to agricultural applications.

On product labels, specific pyrethroids are commonly listed by their respective trade names and might not be readily recognizable. Livestock producers may have seen the trade name “permethrin” listed as an active component of products for controlling external parasites, as permethrin has been a commonly used pyrethroid.

How do they affect bull fertility?

Case reports linking pyrethroids to reduced bull fertility suggest these compounds may inhibit production of an enzyme responsible for converting testosterone to dihydrotestosterone — a hormone necessary to the function of multiple accessory sex glands.

University of Missouri veterinarian Dietrich Volkmann has cited evidence suggesting this problem with pyrethroids may cause bulls to produce lower volumes of semen. Sperm cells may be abnormal and the “freezeability” of sperm collected from artificial insemination (AI) sires may be compromised.

Volkmann has noted certain cases where sperm morphology

and motility were significantly decreased after breeding bulls were exposed to a pyrethroid compound. The effects were observed within a few days after first exposure but were not permanent. Bulls returned to normalcy within two to four weeks after exposure ceased.

Volkmann has stated that all evidence is case-based, meaning there has been no controlled, repeated research regarding the effects pyrethroids might have on bull fertility. The rarity of reported cases, relative to the extent products containing pyrethroids have been used, raises questions? Did all affected bulls receive correct dosages of pyrethroid insecticides? Did other management or environmental factors contribute to the apparent toxicosis? Might some individual animals be more susceptible while others are more resistant to the effects? Further research seems warranted.

Usage tips

Some veterinarians and Extension personnel are advising producers to use insect control products containing pyrethroids judiciously and to avoid “doubling up.” In other words, choose a spray, a pour-on or ear tags, but don’t use multiple pyrethroid products at the same time. Some advisors recommend avoidance of pyrethroid products for bulls at the start of breeding season or during the weeks prior.

“Giving bulls everything — parasite treatments and vaccinations — at turn-out time really isn’t advisable. Ideally, all of that is done 30 days before breeding season. That might be a good idea when using these products,” Ensley says.

He notes that research offers conflicting results regarding effects alternative compounds may have on bull fertility. While some suggest no adverse consequences, other controlled studies have demonstrated that ivermectin-based compounds and organophosphate insecticides can affect semen volume, sperm morphology and motility, and a bull’s ability to pass a breeding soundness evaluation.

Ensley also thinks it’s important to remember that bulls typically produce far more sperm than is really needed to get the job done. So, in a practical sense, even if normal sperm production is reduced by 20%, it’s not going to have a big effect.

“That’s my take on it,” Ensley says. “I still think it’s most effective to use the different kinds of insecticides in rotation. There’s cause for caution, but there’s just not enough evidence to rule out pyrethroids entirely. Not yet.” **HW**



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