# Dipping Vat Problems in the Feedlot

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Dipping on arrival at most feedyards is a common practice, used not only to safeguard cattle from the external parasites (lice, ticks, mites) but is economically mandated by the packers to control grubs and by the USDA-APHIS for scab control.

Dipping vat management is a frequent topic at feedlot meetings, but usually centers around keeping records, cleaning vats, or maintaining an adequate concentration of dip to be effective.

The records are simple - you merely keep a log book that lists the date, pen number of cattle dipped, number of cattle dipped, amount of water and dip added back to the vat, the results of testing and cleaning. (Figure 1) Records also need to include a vat diagram with measurements of all the vat dimensions. This is especially useful for calculating added water. (Figure 2)

Testing should be done before and after each addition of dip between major groups of cattle, and before starting up if the vat has laid idle more than 24 hours.

The only two dips I think you should consider are Coumaphos (CoRal) or Prolate (GX-118). Toxaphene has an extremely long half-life making it an enviromental hazard. Coumaphos is easy to work with since the flowable formulation has come on the market. The dry powder form presented some aerosol hazard to personnel. Coumaphos is an extremely safe compound and has a reputation of being one of the least stressful dips available. The major drawback to the product is the lack of labeling for control of *grubs.* Because the dollars at risk are big, many feedyard managers do not feel comfortable without written assurance from the company that they will stand behind their product in the control of grubs. Disposal of Coumaphos is not hard, but does require a plastic lined evaporation pit.

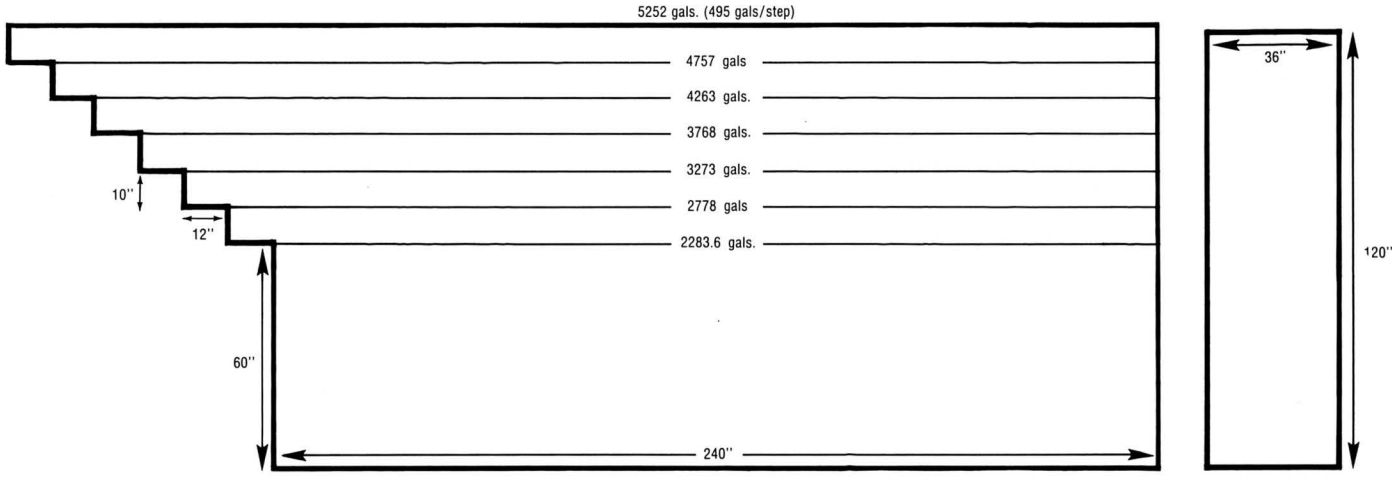
Prolate is also easy to work with. It mixes easy, stores well, and is easy to test. It does not have the reputation of being as easy on cattle as Coumaphos but it does have a grub label and has there been widely accepted by feedlot management. There are two other things that have influenced management to accept Prolate. First, it is easy to dispose of. Prolate is most appropriately dumped on the ground after having sodium bicarbonate added to the dip. The combination of the change in pH and the soils bacterial action renders the product harmless in a very short time. The second thing that has influenced feedlot management is a company that has stood by their product. When a question of toxicity arose my experience with the company has been just as impressive - they are a good company.

I would like to share a case history with you regarding organophosphate toxicity following dipping. In the summer of 1983 a large number of cattle had been contracted to feedyards from Missouri. It was a hot summer and the cattle seemed quite stressed on arrival. Approximately 0.1% of the

FIGURE 1.

| Date | Pen # | # Hd. | Water | Dip | Tests (freeze samples for state lab.) |
|---|---|---|---|---|---|
| | | | | | |

FIGURE 2.



7000 head died within the first 72 hours of arrival. The prominant antemortem features were high temps and respiratory signs; the post-mortem features included red, wet lungs in absence of pneumonia, stippled hemorrhage along the serosal surface of the intestines, and ensisted stomach worms. The pre-shipping history included backgrounding on a fescue-clover pasture, deworming with TBZ and vaccination with 7-way clostridum and IBR. A tentative diagnosis of heat stress, following a fescue pasture, was made. Treatment included flumixin and dexamethazone - it was moderately successful. All virus cultures returned in a few weeks but were negative. I had been particularly interested in R.S.V. Later that summer we started bringing in lighter calves (500 - 600 lbs.). The pre-shipping history was much more diverse, yet they were all from the southeast. They seemed to have even a tougher time following arrival. The signs were much the same (rapid respiration and high temperatures) but more salivation was noted along with more pronounced muscular weakness and diarrhea. The morbidity increased from 15% to 30%. We were receiving 1000 to 2000 animals a day so at the end of the first week I had a real wreck. Symptoms were delayed in all pens 48 to 96 hours, with death coming 24 to 48 hours later. I got my first positive diagnosis (85% reduction in brain cholinesterase) at the end of the first week. All incoming activity was curtailed. While daily dipping vat samples tested less than 0.25% active drug, it was feared the fine particulate matter that is not removed by the dipping vat cleaner might have increased the chemical load to the animal. (Figure 3).

FIGURE 3. Toxicology Lab Summary Comments.

| Blood Cholinesterase | | | |
|---|---|---|---|
| **Pre-Dip Result (pH change/ hour)** | **Post-Dip Result (pH change/ hour)** | **% Depression From Normal** | |
| 0.50 | 0.04 | 87—93 | |
| 0.48 | 0.05 | 83—92 | |
| 0.45 | 0.09 | 70—85 | |
| 0.41 | 0.03 | 90—95 | |
| 0.28 | 0.03 | 90—95 | |
| 0.36 | 0.03 | 90—95 | |
| 0.40 | 0.03 | 90—95 | |
| 0.35 | 0.07 | 77—88 | |
| 0.42 | 0.04 | 87—93 | |
| 0.39 | 0.07 | 77—88 | |
| 0.47 | 0.06 | 80—90 | |
| 0.48 | 0.08 | 73—87 | |
| 0.48 | 0.05 | 83—92 | |
| 0.30 | 0.07 | 77—88 | |
| 0.40 | 0.08 | 73—87 | |
| clotted | 0.04 | 87—93 | |
| 0.35 | 0.03 | 90—95 | |
| 0.30 | 0.06 | 80—90 | |
| 0.38 | 0.08 | 73—87 | |
| 0.37 | 0.02 | 93—97 | |
| 0.40 | 0.052 | 83—91 | Mean |

The vat was drained and freshly charged with a different lot number of Prolate. This stopped any further occurrences. In the meantime exposed animals were sprayed with a bicarb solution in an attempt to wash off and neutralize the dip. The symptomatic animals were treated with atropine at 6 to 8 hour intervals. (Figure 4)

FIGURE 4.

| | | | |
|---|---|---|---|
| SYMPTOMS: | Weakness | LESIONS: | Red wet lungs |
| | Rapid respiration | | Paint brush |
| | Diarrhea | | hemorrhage |
| | High temps | | |
| | Salivation | DIAGNOSIS: | Blood or Brain |
| | Polyurea | | Cholinesterase |

Our death loss was as high as 10% in some groups with total deads exceeding 130 animals directly related to the organophosphate. The principle symptoms were rapid respiration, prostration, muscular weakness, diarrhea and polyruea. The muscular weakness was exhibited by knuckling of the rear claws, inability to pronate the foreclaws and inability to walk for more than a short distance before lying down, much as you would see with myesthesia gravis. Necropsy findings included red, wet lungs but not heavy lungs, paint brush hemorrhage on the serosal surface of the rumen and intestines. Test results on all dip samples were less than 0.25% Prolate with a pH of 4 to 5. Brain cholinesterase levels were for the most part greater than 80% reducted. (Figure 5). Samples of skin, stomach content, liver, muscle, blood, kidney and brain were tested from some of the more severely affected animals. In light of finding no drug in the stomach content and only low levels on the skin it was felt by both toxicologists at Texas A&M and Oklahoma State Diagnostic Labs to be a problem with excessive up take.

FIGURE 5.

| Cholinesterase | pH/HR | % Reduced |
|---|---|---|
| Brain | .075 | 80% |
| Brain | .063 | 88% |
| Brain | .043 | 90% |
| Blood | .063 | 88% |
| Blood | .036 | 90% |
| Blood | .032 | 90% |
| Blood | .073 | 85% |

I do think there was an interaction between the enviromental temperature, stress of processing, previous pastures and the Prolate. I have tested many more animals since and found the brain and blood cholinesterase reduced not more than 60 to 70% at the most. And that is not diagnostic for O.P. poisoning. Some of these had paint brush hemorrhage and red, wet lungs, however, perhaps they were heat stressed as I first suspected. At any rate it was nice to find the company stood behind their product and the loss they stood was into 6 figures.

We continued to use Prolate at all feedyards until Ivomec became available, at which time we started looking into its use - that is where we are today.