

Strategic Use of Antibiotics in Stocker Cattle

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Bovine respiratory disease complex (BRDC), or shipping fever, remains the most important health issue facing stocker-cattle producers. Despite many advances in our understanding of BRDC, vaccine technology, and new antibiotics in the last 40 years, the percentage of cattle that develop BRDC and the number that die from it have remained relatively unchanged. Several factors play a role in these continued losses:

1. Today's 500-pound calf is much younger than it was 40 years ago.
2. Today's 500-pound calf is less likely to have been weaned now than it was 40 years ago.
3. Stocker producers tend to buy cattle more frequently unlike bringing in a major group or two 40 years ago.
4. Stocker producers have larger numbers of cattle than 40 years ago.

The most important of these factors are outside the control of the stocker producer. We must, therefore, design prevention and treatment protocols based on biologic principles and economics. While a virus often initiates BRDC, the problems seen and treated are most likely bacterial pneumonia caused by one of the following bacteria:

1. *Pasteurella (Mannheimia) haemolytica*
2. *Pasteurella multocida*
3. *Haemophilus somnus*
4. *Mycoplasma*

There are three distinct types of treatments to consider for stocker calves with BRDC or at high risk of developing BRDC:

1. Metaphylaxis

2. Individual sick calf treatment
3. Mass medication

Metaphylaxis

Metaphylaxis is a newer term used to describe the treatment of an entire group of calves with an antibiotic upon arrival at your farm. Currently, several antibiotics are labeled for metaphylaxis (see Table 1).

Table 1. Drugs approved for use in metaphylaxis for bovine respiratory disease complex.

Drug	Cost to Treat a 500-pound calf ¹
Micotil® (tilmicosin)	\$8.00
Nuflor® (florphenicol)	\$15.00
Tetradure® (oxytetracycline 300 mg/ml)	\$4.05-\$6.02
Excede® (ceftiofur 200mg/ml)	\$13.12
Draxxin® (tuluthramycin)	\$18.15

¹Based on average national price.

In addition to injectable antibiotics, chlortetracycline (CTC) can be added to the feed of newly arrived calves as a form of metaphylaxis. CTC can be fed at a rate of up to 1 gram per 100 pounds of body weight. The problems associated with the use of antibiotics in the feed are that grain intake is variable among newly arrived calves and the calves having the most trouble adjusting to your farm are the most likely to get sick and are probably not eating enough grain to receive an adequate dose of CTC. Feeding the highest allowable level of CTC (1 gram per 100 pounds of body weight) can also kill off enough rumen bacteria to depress feed intake.

There are many factors that should be a part of your decision to use metaphylaxis (see Table 2).

Table 2. Risk factors associated with a high risk of developing BRDC.

Source of cattle (weekly vs. special sales vs. on farm sales)
Vaccination, deworming history of cattle
Commingled vs. single-source cattle
Age/size of the cattle
Weather
Sex of the cattle (bulls vs. steers)
Time of the year (spring vs. fall)
Weaned vs. unweaned
Your ability to detect and treat sick calves
Your history of BRDC problems
Comfort of your adjustment facilities
Value of the cattle (not a risk factor but important in the decision to use metaphylaxis)

Even with a careful assessment of these factors, it is not possible to predict with certainty what percentage of calves will get sick. A rule of thumb is that if more than 25 percent of the calves are expected to get sick, then metaphylaxis is a good idea. At this level of disease and with the value of today's stocker calves being \$500 to \$700, metaphylaxis makes economic sense in most stocker operations to help reduce losses associated with BRDC.

Treatment of the Individual Sick Calf

Despite all the advances in understanding BRDC over the past 40 years, the most important predictor for successful treatment of BRDC has not changed. That predictor is early recognition and treatment. Calves treated early in the course of the disease will have a much greater chance of responding to treatment than those that are pulled and treated too late. Calves are also much less likely to have severe lung damage that may impair their future ability to grow.

Discuss antibiotic selection with your veterinarian and keep accurate records to assess the results of the selected treatment. The newest generation of antibiotics, while expensive, is very effective at treating most

cases of BRDC. If one of these antibiotics is being used without favorable results, an alternative antibiotic may be indicated. However, the most important thing is to evaluate whether sick calves are being identified early in the course of the disease. The most important reason for therapy failure is not treating calves early enough. Table 3 contains a listing of the antibiotics most commonly used to treat respiratory disease.

Mass Medication

Mass medication is a variation of metaphylaxis. In the middle of an outbreak, there comes a point when the best course of action is to stop treating individual calves and treat the entire group of calves. Two rules of thumb are when the number of new cases of BRDC increases to 10 percent or more for three consecutive days, or more than 25 percent of the calves need treatment on any one day. While not perfect, using these rules of thumb will help guide your decisions instead of you reacting in the heat of the moment or failing to consider mass medication until after 60 percent to 80 percent of the calves have been treated. Mass medication may save time and labor and improve outcomes. When in the middle of an outbreak of BRDC it may be helpful to discuss your options with your veterinarian.

Mycoplasma

Prior to 2000, Mycoplasma was almost unrecognized as a cause of disease in Virginia. Since then, the dairy and beef industries have experienced a steady rise in illness associated with Mycoplasma. Mycoplasma is a tiny bacterium that can cause pneumonia, head tilt, droopy ears, and/or swollen joints. Unlike the *Pasturella* bacterium that tends to cause severe toxemia resulting in calves looking sick very quickly, Mycoplasma tends to be more subtle. It is not unusual for BRDC calves to go unnoticed until they have suffered damage to 50 percent or more of their lungs. You should suspect Mycoplasma when you see a single drooped ear in calves or when a high percentage (more than 25 percent) of calves relapse (get sick again) after initial treatment.

Mycoplasma is very difficult to treat. Several of the commonly used antibiotics do not work well for Mycoplasma. Penicillin, Polyflex[®], Naxcel[®], Excenel[®], and Excede[®] kill bacteria by destroying the cell wall. Since Mycoplasma does not have a normal cell wall, these antibiotics are ineffective in treating Mycoplasma. Micotil[®] shows little or no activity against Mycoplasma as well. No antibiotics are approved for treating Mycoplasma; however, oxytetracycline has produced mixed

Table 3. Most commonly used antibiotics for treatment of Bovine Respiratory Disease Complex.

Drug	Dose/100 Pounds Body Weight	Frequency	Cost to Treat a 500-pound Calf ^a
200 mg oxytet	4.5cc	Repeat if needed in 48 hours	\$1.00-\$2.00
Micotil [®] (tilmicosin)	1.5cc	Once	\$8.00
Nuflor [®] (florphenicol)	6cc	Once	\$15.00
Baytril [®] ² (enrofloxacin)	5cc	Once	\$17.00
A180 [®] ² (danafloxacin)	1.5cc	Repeat in 48 hours	\$13.50
Tetradure [®] (oxytetracycline 300 mg/ml)	3-5cc	Once	\$4.05-\$6.02
Excede [®] (ceftiofur 200mg/ml)	1.5cc	Once	\$12.50
Draxxin [®] (tulathromycin)	1.1cc	Once	\$16.50

¹Based on average national price.

²Cannot be used to treat female dairy animals of any age.

result. The drugs available to treat calves that show the best results are Nuflor[®] and Draxxin[®]. Baytril[®] and A180[®] can also be effective in treating *Mycoplasma* when there is a mixed infection with *M. haemolytica* (Rosenbusch, et al., 2005).

Two factors in the treatment of *Mycoplasma* are important: 1) early recognition and 2) prolonged treatment. Calves that are treated early in the course of the disease respond fairly well but calves need to be treated for longer than the usual course of treatment for BRDC or 50 percent to 70 percent of the calves will relapse and require treatment again. Each time the calf relapses it will have more lung damage and be less likely to get better. Current recommendations are to provide continuous levels of antibiotics to these calves for 10 to 14 days. If you suspect problems with *Mycoplasma*, work with your veterinarian to come up with a treatment protocol that will fit these guidelines. Chlortetracycline at a rate of 0.25 to 0.75 grams per 100 pounds of body weight per day can be added to the feed as part of the extended therapy protocol.

What other drugs may help in treating BRDC? It is important to note that these drugs may be used in addition to, not in place of, antibiotics.

Flunixin meglumine (Banamine[®] and generics) is an anti-inflammatory drug which helps reduce fever and damage to the lungs, and may help sick calves get back on feed quicker.

Providing calves with 1 gallon of warm water and electrolytes per 200 pounds of body weight results in a stimulated appetite and corrects the dehydration a calf usually suffers if sick and off feed for more than 24 hours.

B Vitamins and probiotic pills and pastes can be used to try to help stimulate appetite.

Recognizing BRDC early and selecting the appropriate treatment protocols give you the best opportunity to have favorable outcomes in treating BRDC. Keeping death rates low and decreasing the impact of health problems on animal performance gives you, the stocker producer, a better opportunity to be profitable. Many of the products described in this publication must be purchased from a veterinarian. Utilize your veterinarian as a valuable resource for additional information.

Reference

Rosenbusch, R.F., Kinyon, J.M., Apley, M., Funk, N.D., Smith, S., and Hoffman, L.J. In vitro antimicrobial inhibition profiles of *Mycoplasma bovis* isolates recovered from various regions of the United States from 2002 to 2003, *Journal of Veterinary Diagnostic Investigation* 2005 Sep;17(5):436-41

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