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The effect of metaphylaxis and housing on performance of commingled beef calves

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There is a growing demand for cattle raised without the use of antibiotics. Most beef farms in the northeast are small and to efficiently and economically meet this demand, the aggregation of cattle from multiple farms to a central feeding facility is required. Unfortunately, this comingling of cattle from smaller farms can lead to an increase in bovine respiratory disease (BRD). Farmers need new technologies to reduce the incidence of BRD and minimize the use of antibiotics. Not only does controlling respiratory disease reduce antibiotic use, but maintaining a healthy herd increases animal welfare along with the quality of the beef produced.

Mass treatment of cattle using injectable antibiotics has been shown to reduce illness in large feedlots but little information is available for small farmer feeder operations in the northeast US. Local producers have indicated that receiving high risk feeder cattle into outdoor lots reduces the incidence of BRD compared to indoor housing; however no data exists documenting the effect of housing on BRD.

Three experiments were conducted; two at Cornell University and one on a private farm. The objectives of this project was to gain new knowledge that will be used to develop recommendations for farmers on selecting health treatment and housing protocols that minimize the use of antibiotics and the risk of respiratory disease in aggregated cattle.

Over the three years of this project, we conducted experiments to evaluate the use of mass treatment and housing on the health and animal performance of feeder cattle brought to a central feeding facility. In year 1, 94 calves were assembled at the Cornell University Teaching and Research Center. Seven days after arrival 50% of the calves were treated with an antibiotic. There were no statistical differences in the initial and final weight, average daily gain, feed efficiency, carcass traits or profitability due to whether cattle received antibiotics or not.

In the second year, 63 calves were again assembled at the Cornell University Teaching and Research Center. In addition to receiving an antibiotic or not, a portion of the calves were housed in a facility with access to an outside run. The remainder were housed completely indoors. Different that year 2, there was a tendency ($p = 0.09 - 0.12$) for cattle that received antibiotics to gain at a greater rate than those not treated. Housing also was a factor in that outdoor housing tended ($p = 0.08 - 0.12$) to favor performance over indoor housed cattle. If the facility would have had more outdoor pens, the number of animals in this treatment would have been greater, increasing statistical power and perhaps increasing significance. Even without the ability to make a scientific conclusion, the belief is that while the air temperature of outdoor housed cattle is lower, air quality is better, which results in better lung health.

Finally, in year 3 the experiment was moved to a commercial farm due to the unavailability of the Cornell University Teaching and Research Center. At this farm, 53 calves were assembled directly from another farm. Different from the first two years, these cattle would be considered high risk for respiratory disease. They had not been weaned or vaccinated prior to arrival, and the bull calves were intact. The day after arrival the calves were vaccinated and the bulls castrated. Seven days after arrival they were randomly treated with an antibiotic.

After 80 days the calves were weighed; the treated calves had a 23% higher ($p < 0.05$) average daily gain compared to the non-treated calves. Not surprisingly the effect on the castrated bulls was greater than on the heifers. The stress of weaning, castration and a new environment was mitigated by using an antibiotic as a preventative measure.

This work has several implications. In the first two experiments the effect of increasing animal performance through mass treatment with an antibiotic was low. While the second year indicated some trend for an effect, for the most part the value in terms of animal response, health and economics was not covered by the cost of the antibiotic. The cattle in these two experiments had been weaned at least 30 days prior to arrival and had been vaccinated against all of the viral and bacterial respiratory diseases. The contrast between the results of years 1 and 2 with year 3 further substantiate the importance of proper management. The cattle in year 3 which were highly stressed responded to the mass use of antibiotics. The lesson for farmers is that properly managed cattle will remain productive even through the process of shipping and commingling. Housing is an issue that needs further study. The lack of significance may have been due as much to animal numbers as to treatment effect. Therefore for producers interested in selling cattle into a market that does not allow the use of antibiotics for treatment of respiratory disease, the cattle need to be weaned, bulls castrated and properly vaccinated. In addition, use of housing that allows cattle access to outdoors may also improve animal health.

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