SALMONELLA DUBLIN: A THREAT TO DAIRY HEIFER SURVIVAL AND FUTURE PERFORMANCE

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Summary

Salmonella dublin is a bacterium that can have devastating effects in dairy herds. It is most deadly with calves that range in age from 10 days to 5 months. *Salmonella dublin* is shed from carrier animals through feces, milk, and colostrum and spread by oral ingestion. Clinical signs are not detected easily until after the infection is well established. Calves may suffer from septicemia, diarrhea, fatigue, and unthriftiness. Death is not an uncommon outcome of this disease. Clinical signs of infection in adults may range from none to enteritis or abortion. Combating the disease requires an awareness of the disease, a preventive herd health program, and attention to detail in caring for the newborn calf.

(Key Words: *Salmonella dublin*, Heifers, Calves.)

Introduction

Salmonella is an invasive pathogen that must be taken seriously in today's dairy industry. *Salmonella dublin* and *S. typhimurium* are the strains most frequently isolated from cattle. *Salmonella dublin* is the topic of concern in this report. In calves, the bacterium cause septicemia with high rates of morbidity and mortality. Clinical signs are less severe in adult cows.

Many producers purchase outside replacement heifers or utilize outside growers, placing them at risk of exposing their herd to *S. dublin*-infected animals. Calves that are exposed to carriers of *S. dublin* are at a high risk of developing clinical salmonellosis and/or becoming carriers themselves. The most common route of transfer to uninfected animals is *S. dublin* shed by carrier animals in feces, colostrum, or milk. Only one carrier of *S. dublin* is needed to infect an entire herd. Good biosecurity practices are essential to prevent the entry and control the spread of *S. dublin* in dairy herds. This article reviews recent research concerning the effects of *S. dublin* on the survival rate and subsequent performance of dairy heifers.

Review of Research

An important step in raising replacement heifers is to ensure that newborn calves receive adequate amounts of quality colostrum shortly after birth. It is critical that this colostrum be from cows that are not carriers of *S. dublin*, because the bacteria may be ingested by the neonatal calf. Research indicates that during the time just before parturition, shedding of *S. dublin* from the cow increases; thus increasing the likelihood of it passing into the colostrum and into the calf.

Young calves are more susceptible to *S. dublin* than older calves and adults. This is partially due to higher pH (5.2) in their abomasum. The abomasal pH levels of 4.8 or less commonly found in older calves and adults are detrimental to viability of *S. dublin*. Ruminal contents from calves that are >6 wk of age also have been shown to inhibit *S. dublin*.

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Calves infected with *S. dublin* do not show specific clinical signs of infection until the disease is well established. Pneumonia, septicemia, diarrhea, unthriftiness, and death commonly are seen with *S. dublin* infection. As the infection progresses, strands of intestinal mucosa and blood may be found in the feces. The loss of intestinal mucosa reduces the calf's ability to absorb nutrients and combat other infections that challenge the intestinal lining. Cattle that recover from an acute infection of *S. dublin* may shed the pathogen for 4 to 6 wk afterwards. A small number of animals may recover clinically, but remain carriers of the bacteria. Many calves that are infected with the pathogen and recover never reach their full performance potential.

Fecal culture commonly is used to diagnose *S. dublin* infections in cattle, but false negatives are common because of intermittent fecal shedding. Submitting multiple fecal samples from a single animal can minimize false negatives. However, because of cost of fecal culture and the intermittent fecal shedding by the cow, this test is not practical for herd monitoring.

Studies also show that *S. dublin* can survive up to 30 mo in dried feces, 120 days in pasture soil, 115 days in pond water, and 87 days in tap water. Therefore, good manure management must be practiced on the entire farm. Good manure hygiene practices are critical in maternity and calf rearing areas. Maternity pens should be cleaned routinely, and calves should be removed from calving areas as soon as possible and placed in clean areas free from adult manure. Calves should be fed an adequate amount of quality colostrum obtained from a *S. dublin*-free dam. Pooling colostrum from multiple cows increases the chances for calves to be exposed to *S. dublin*. Minimizing calf-to-calf contact from the minute the calf is born until weaning also is important in preventing the spread of disease.

Along with good management practices, vaccination against *S. dublin* can be used to protect neonatal calves from infection. However, vaccination alone, without good biosecurity measures, is not sufficient to prevent and control *S. dublin* infection. Preventing and controlling *S. dublin* in dairy herds can be accomplished only with a multidimensional approach.