

Our Johne's control tools do work

Infection rates in herds using preventive measures dropped significantly. Beware of supershedders.

by Ken Olson

TARGETED competitive research grants are a major tool used to expand our knowledge of Johne's prevention and control. But more important is the bringing together of workers in the discipline who have a wide range of expertise to share ideas and work toward solutions. That's why researchers, veterinarians, industry representatives, and government officials met earlier this year in Texas for the third annual conference of the Johne's Disease Integrated Program (JDIP).

Presentations at the conference highlighted progress in current projects and described new efforts. Officials who work with Johne's programs in Australia, the European Union, Israel, Spain, and Canada participated in the meeting to share information about their programs and become more familiar with work in the U.S.

Testing control practices . . .

Chuck Fossler, coordinator for the National Johne's Disease Demonstration Herd Project in the U.S., provided a project overview. Started in late 2003, primary objective of the project is to evaluate the effect of long-term herd practices.

The project includes 67 dairy herds in 16 states and 25 beef herds in 11 states. All herds selected for the project were known to be infected with *Mycobacterium avium* subsp. *paratuberculosis* (MAP), the organism that causes Johne's. Information being collected includes herd risk assessments and individual cow information along with culling and testing data. Monensin use was added as a measure to be evaluated in late 2005. Twenty of the project herds were using the product, so its effect will be studied.

There now is three years of data for most herds. While in the early stages, analysis will assess the association between changes in on-farm practices and the seroprevalence and fecal prevalence of the disease, as well as the number of clinical cases. The project is examining the association between environmental and individual cow results, and the economic cost of the disease and control programs, as well as the effect of vaccination.

While the national project is only three years old, Minnesota began work with project herds six years ago. Two presentations provided insights gathered from those herds.

The first study, presented by Scott Wells and Cecille Ferronillet, used data from six herds gathered between February 2000 and January 2001. Two herds were in the 45- to 50-cow range, while the others ranged from 220 to 330 cows. Four herds had samples collected annually and the others at every confirmed pregnancy. In the beginning of the study, 13.5 percent of the cows were positive by serum ELISA and 12.9 percent by fecal culture. Clinical signs were observed in between 3.4 and 20 percent of the animals.

What Minnesota has learned . . .

The analysis evaluated the impact of changes in the risk assessment score with "survival." Herds whose risk assessment score decreased (meaning they improved their management) had a reduction in the incidence of Johne's. Those with little change in the score had little change in disease

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incidence. Conclusions included the following:

- Implementation of the Johne's control program reduces new infections.
- The disease was not eradicated over this time period . . . six years.
- Recommended management changes do have an effect on animals up to a year of age.
- The greater the reduction in the risk assessment score, the better the results for the herd relative to reduction in the incidence of Johne's.

The second Minnesota study, presented by Eran Raizman, provides initial insights on economics. Two herds with a total of 1,300 cows were included. Both herds had clinical signs of Johne's in at least 10 percent of all culled cows. The objective was to evaluate the financial impact of cows shedding MAP prior to calving and those later culled with clinical signs.

During the study, 56 cows were culled due to clinical Johne's, and 84 cows were fecal positive before calving. The researchers found that fecal

potential for what is called "pass through." This involves cows that are not truly infected but may appear to be infected due to consumption of organisms present in their environment from the "supershedders."

The study concluded that, in these six herds, 10 to 15 percent of all positives were "supershedders." The stage at which they become a "supershedder" varied greatly, ranging from a few months to a few years.

The impact of these animals on the environment can be significant. In a 125-cow herd where environmental samples were taken, removal of a single "supershedder" resulted in environmental samples returning to negative within a week of the removal of that cow and remaining negative in subsequent sampling. In the six herds, it was determined that 30 to 70 percent of the fecal culture positive animals actually were in a "pass through" situation. When the "supershedders" were removed, these cows reverted to culture negative status.

Other presentations provided updates on JDIP-related work of the past year as well as a review of plans for the coming year.

The basics. Luiz Bermudez (Oregon State) and Adel Talaat (UW-Madison) reported on genetic mapping efforts that are identifying specific genes, conditions, or both that allow MAP to survive and establish infections in animals. This has helped to identify new targets for vaccine development. As a result, several new vaccines will be tested during the coming year.

Improved tests. While new technology is being developed, other workers are finding ways to use existing technology more effectively. Michael Collins (UW-Madison) and Shigetoshi Eda (University of Tennessee) reported on novel and more sensitive ELISA tests, while work of Natalia Cernicchiaro (University of Minnesota) demonstrated advances in speed and accuracy with automated liquid culture equipment. All have the potential to diagnose the disease more rapidly and accurately.

Outreach. Much remains to be learned. However, existing tools can help producers deal with the disease. JDIP-supported "on-line" training is now available at <http://vetmedce.vetmed.wisc.edu/jdvc/>. The modules are designed to help veterinarians and producers. New sections will be added during the year.

The international interest in Johne's also was evident. Douwe Bakker (EU) reported that, during the past year, the European Union has initiated a project, funded under their food safety program that is similar to JDIP. It seeks to develop improved tools for the detection of MAP in livestock and food, while also addressing the risk of human exposure. Their consortium includes 28 partners from 14 countries and has identified 16 "work packages." This EU program, as well as programs in Australia, Canada, and Israel will offer JDIP additional opportunities for future collaboration.

In closing the conference, Vivek Kapur, leader of JDIP, said, "The science behind the work that has been reported at this meeting is outstanding, but the greatest benefit of JDIP is the networking and sharing of ideas that are occurring as a result of the project."

Visit www.jdip.org/ to learn more about JDIP, its projects and plans.



CLEAN, DRY CALVING AREAS with quick removal of calves soon after birth are among the key Johne's control recommendations. Minnesota research involving many herds has documented that these practices really do make a difference in infection rates.

positives were more likely to be culled than fecal negative cows, and there was a loss of \$280 associated with each fecal positive cull . . . primarily due to their lower body weight.

Fecal positive cows produced less milk and had \$750 less income over feed cost than fecal negative cows. The cost of other diseases was not different. Reproduction costs were higher for fecal negative cows because the fecal positives often were culled prior to breeding. Depressed milk production and early culling of fecal positive cows had a substantial economic impact in these herds.

There are supershedders . . .

Robert Whitlock, University of Pennsylvania, discussed supershedders. They are cows that shed MAP organisms at extremely high levels . . . up to 10,000,000 colony forming units (cfu)/gram of manure. He collected data over a two-year period from three herds in a New York, Pennsylvania, and Vermont project, and a second group of three Pennsylvania demonstration herds. There were 78 culture positives among the 562 cows in the first group and 60 among the 800 cows in the Pennsylvania herds.

Whitlock found 15 supershedders in the first group (19 percent) and six in the second (10 percent). The presence of "supershedders" raises the