RB51: A NEW BRUCELLOSIS VACCINE

The brucellosis eradication program has made significant progress toward reaching the desired goal of the United States being free of cattle brucellosis by 1998. California has only one herd (dairy) under quarantine as of September 1996. Nationwide there are only fifty-one quarantined herds, and the only quarantined dairy herd is in California. Thirty-six states are now classified as brucellosis "Free". We have obviously made substantial progress in eliminating brucellosis in cattle.

One difficulty in the eradication program is the number of "false positive" test results found in some vaccinated animals. The term "false positive" refers to animals that are positive on a laboratory test but do not have the disease, in this case, brucellosis. Cattle vaccinated with the Brucella Strain 19 products may become "false positives" due to vaccinating heifers after they become sexually mature (usually those more than 10 months of age), or by accidentally vaccinating calves twice.

All cattle that react to laboratory tests must be carefully evaluated because they can be infected with a field strain of Brucella abortus even after calfhood vaccination with Strain 19. Also, infection with both organisms can occur. When vaccination ear tags fall out and vaccination tattoos "disappear", these vaccinated cattle appear like naturally infected cattle.

Cattle that are "false positive" on the surveillance tests cannot be differentiated from cattle with the natural disease unless tissues are cultured and the Brucella organism identified in the laboratory. It is not possible to definitely differentiate "false positive" from naturally infected cattle. Cattle with "false positives" on the surveillance tests must be treated as if they were naturally infected. Any other procedures for handling such cattle are not recommended.

A new vaccine that should reduce the number of false positive test results has been developed and conditionally licensed for use in the United States. This new Brucella abortus vaccine is called RB51. This mutant strain of Brucella abortus does not produce cross-reacting antibodies in vaccinated cattle that are detected in the routine surveillance tests. That is to say, cattle vaccinated with RB51 remain negative on the brucellosis surveillance tests and "false positive" reactions may be a thing of the past. Although the use of the Strain 19 vaccine has been a key element in the brucellosis eradication effort, there are disadvantages to its use in addition to the "false positive" reactions. These include persistent infections following calfhood vaccination, arthritis, and very rarely abortions (if pregnant cattle are vaccinated). Some of these conditions may also occur with RB51.

As with any new vaccine, the major questions revolve around efficacy and safety. Does the vaccine work to prevent disease (efficacy or effectiveness) and is the vaccine safe to use in cattle? The new RB51 vaccine has been undergoing safety studies nationwide, including trials here in California. It appears to be a safe vaccine for calves. The question of efficacy has not been clearly answered to date and further trials are being undertaken. Most states have adopted the use of RB51. California has not yet done so because of the question of efficacy - will the vaccine adequately protect our cattle against disease?

Other characteristics of the new RB51 vaccine are similar to Strain 19 vaccines. Both are modified live bacterial vaccines. The RB51 vaccine will be used to vaccinate dairy heifers at 4-8 months of age and beef heifers at 4-12 months of age; the best age to vaccinate calves is about six (6) months. RB51 should be considered capable of causing disease in humans and any accidental exposure should be handled similarly to accidental Strain 19 exposure. Accredited veterinarians contracted with the California Department of Food and Agriculture will administer the RB51 vaccine, ear tags, and tattoos similar to the procedures used with the Strain 19 vaccination. The RB51 tattoo differs from the Strain 19 tattoo in that an "R" will be put in place of the letter (A, B, C, or D) formerly used to designate the quarter of the year when the Strain 19 vaccine was administered.

The cattle industry must consider whether to continue requiring calfhood vaccination for brucellosis or to recommend vaccinating only in areas or herds with high risk of exposure to disease. With the low number of infected herds nationwide, it must be decided if it is better to stop mandatory vaccination and continue surveillance testing, and removing infected herds as they are identified. There are obvious risks to individual herds with this approach that the cattle industry must evaluate. We must remember that the brucellosis eradication program is also a public health program, aimed at eliminating the risk of humans acquiring Brucella abortus infections. Historically, cattle are the main source of this infection for people and elimination of this agent from cattle (and wildlife such as bison) will be the primary means of controlling the disease in humans. Also, the abortion storms caused by Brucella abortus in cattle can be devastating to the individual producer.

We hope that Brucella abortus in cattle will soon be eradicated nationwide. This new vaccine, RB51, and the progress already made in eradication could soon end this chapter of disease control in cattle.

Anita J. Edmondson, MRCVS, MPVM John Maas, DVM, MS
Staff Veterinarian, Brucellosis Program Diplomate, ACVN & ACVIM
Animal Health Branch Extension Veterinarian
Division of Animal Industry School of Veterinary Medicine
California Department of Food & Agriculture University of California-Davis

Richard E. Breitmeyer, DVM, MPVM
Director, Division of Animal Industry
California Department of Food & Agriculture