Reactors in Bovine Brucellosis

studies initiated to determine means of detection of carriers of organisms causing brucellosis

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Calf-hood vaccination is the principal successful weapon against bovine brucellosis in California.

The program of calf-hood vaccination with Strain 19—a vaccine developed by the United States Bureau of Animal Industry—has been successful; the number of abortions due to brucellosis has greatly decreased, as has the number of reactors to the blood test, in the limited amount of testing that has been done.

Were cattle only to be considered in the campaign against brucellosis, the solution would be relatively simple. The genus *Brucella* is capable, however, of infecting species other than the bovine, such as swine, goats and man. Thus, although the incidence of abortion in cattle by this organism has been markedly reduced, some vaccinated animals remain as carriers of infection for other species, the most important being man.

The important question is how the apparently normal carriers of infection can be detected. The blood agglutination test will detect infected animals if they have not been vaccinated as adults, or recently as calves. Vaccinated animals will react to the blood test in a manner similar to that in infected animals. When animals are vaccinated as calves they usually recover from the vaccination reaction, and subsequent reactions are likely to be the result of infection; a few carry a persistent reaction. Adult animals, on the other hand, when vaccinated are likely to remain as reactors. Then, if they acquire an infection, the reaction from the infection is obscured by the persistent vaccination reaction.

The problem is to distinguish between the vaccination reaction and that caused by infection. It is necessitated by the desirability of eliminating infected cattle from the herd. Vaccinated non-infected animals do not eliminate the organism from their secretions, whereas infected stock, vaccinated or unvaccinated, may shed the bacteria to spread infection to susceptible species. The organism can be detected in the secretions only by guinea pig inoculation, a procedure which takes at least five weeks and is, therefore, impractical.

One approach to the problem may lie in the dilution of serum at which the reaction takes place. This dilution is known as the blood titer. When blood serum is tested it is diluted to one part serum to 50 parts of saline, 1 to 100, and 1 to 200. A cow reacting at 1:50 is usually considered negative; if the reaction is at a higher dilution, it is considered either suspicious or positive. This interpretation has been based on investigations conducted before the widespread use of vaccines and when blood testing and elimination of reactors were the sole means of controlling the disease. In view of the widespread use of vaccines in many areas, perhaps the interpretation of the blood titer could be revised and blood reactors at 1:100 considered non-infected. To do this, it is necessary to reinvestigate the status of the 1:100 reactor with respect to the presence of *Brucella* in the secretions.

In addition to the blood test, the milk whey test, the whole milk plate test and the ring test, are used in brucellosis control under certain conditions. Some work has been done which suggests that the milk whey test may be of value in differentiating between the infected and the vaccinated animal. Possibly a combination of tests may assist in the problem.

The University of California with the co-operation of the United States Bureau of Animal Industry has undertaken an investigation to determine the role of these various tests, compare their efficiency in detecting infection, and ascertain if a significant number of vaccinated animals that are classified as reactors are actually infected with virulent *Brucella.*

Because of ordinances being introduced in certain areas requiring that market milk come from herds that are free from brucellosis as determined by the blood test, the project is of great importance to the dairyman. In milk sheds for such areas, vaccination as well as blood testing is employed in the control of the disease. With the widespread use of the vaccine, these areas are now experiencing a larger number of cows that are classified as suspicious because of an incomplete reaction at the 1:100 dilution. Conceivably these reactions are caused by the vaccine and the herd is non-infected. The project now underway will throw light on the problem.

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grasses showed some discoloration but the injury was temporary and the plants regained their regular color after about four to five weeks.

In October 1952—two months after plugging—the spread of U-3 bermudagrass was determined and the results are summarized in the table on this page.

Mean Increase in Area of U-3 Bermudagrass Plugs, Plugged in a Stand of Common Bermudagrass.

Treatment	Mean Increase in area (sq. in.)	Difference from previous value
MH* and fertilizer	35.27	....
Fertilizer and no MH	13.28	21.99
MH and no fertilizer	5.12	8.16
No MH and no fertilizer	0.71	4.41

* Maleic hydrazide.

Any difference, or cumulative difference greater than 9.38 indicates a significant increase at 5% probability over observations with lower values.

The most striking increases in spreading were obtained in the treatment where the plots were sprayed before the plugs were set followed by the placement of fertilizer at the bottom of the hole.

The differential fertilization, in which a good supply of nitrogen was made available to the introduced grasses—by placement at the roots of the grasses in the plugs—was highly successful. Nitrogen in an organic form had the advantage of availability over a longer period of time than would have been afforded had easily soluble inorganic sources of nitrogen been used. This treatment temporarily checked the growth of the existing turf during the critical period while the grass in the plugs is establishing new roots. The combination of differential local fertilization and spraying with maleic hydrazide resulted in a great spread of the plugs.

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