

## **TIMING OF VACCINATIONS IN ESTROUS SYNCHRONIZATION PROGRAMS**

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The development and implementation of an effective vaccination program requires the consideration of many factors such as nutritional status, age, stress, environment, colostral interference, and disease challenge. These factors can significantly alter the effectiveness of a vaccination program.

No vaccine provides 100 % protection against disease. Thus, we recognize in any population of animals there is a portion of those animals that remain susceptible to disease challenge. It is then important to consider not only the individual animal immunity but also the population or the herd immunity as a whole. An effective vaccination program should focus on decreasing the number of susceptible animals within the herd and thereby increase the level of collective herd immunity. In doing so, we hopefully decrease the potential for a widespread outbreak of disease in the herd or, more importantly, if a disease pathogen is introduced into the herd, the pathogen effects are minimized so the disease outbreak is mild or sub-clinical in nature.

One of the critical areas in developing an effective program is insuring adequate immunization of young stock. Vaccinations in replacement stock have two specific goals that need to be considered. The first is to prepare the calf against pathogens causing disease problems and secondly, to prepare the calf for entry into the adult herd with a good foundation of protection from which to build herd immunity (Cortese, 1999).

Given the factors mentioned above, it is a common recommendation made by many veterinarians that replacement stock receive initial vaccinations against the major diseases that cause reproductive losses and reduced reproductive performance in cattle beginning at or before weaning followed by appropriate boosters in yearlings prior to first breeding. The common diseases included in these vaccination protocols are *leptospira*, *campylobacter* (*Vibrio*), bovine virus diarrhea (BVD), bovine herpesvirus type-I (IBR), and optionally *bovine trichomoniasis* and *hemophilus*.

Both modified live and killed virus vaccines are commercially available for IBR and BVD. Controversy still surrounds the efficacy and safety of modified live versus killed IBR and BVD vaccines and both have strong advocates and opponents.

The reproductive effects of IBR and BVD in the pregnant animal are well documented. However, reproductive effects in the non-pregnant animal are less well defined. Reduced fertility resulting from a necrotizing oophoritis has been reported in animals infected with IBR virus either from natural infection or vaccination with modified live IBR vaccine (Chiang, 1990; Smith, 1990; Miller, 1991). The most severe effect described was damage to the corpus luteum during the first three to four days post ovulation (Smith, 1991). As a result of luteal dysfunction,

the estrous cycle was severely disrupted. This effect appears short lived. In most heifers, the subsequent estrous cycle occurred on schedule and was normal.

Ovarian pathology has also been reported as a result of natural infection or vaccination with modified live virus BVD vaccine (Grooms et al., 1998). Although these studies showed oophoritis associated with BVD virus, effects on fertility were not evaluated. Also, sero-negative, virus negative animals were used in these studies. The authors point out in previously immunized animals, modified live vaccines may have no effect on the ovaries (Grooms et al., 1998).

One common characteristic of many of the current synchronization protocols for beef cattle is the necessity of putting cattle through the chute multiple times to complete the protocol. Commercial cow-calf producers often combine as many procedures as possible to minimize time and labor. This may result in vaccinations being given too close to breeding with potential negative effects to the success of the synchronization and AI breeding program. An example would be vaccinating at the time prostaglandin is injected.

To offset any potential negative effect from vaccination, veterinarians should ensure their clients have an understanding regarding timing of vaccinations in relationship to breeding. A commonly recommended vaccination protocol is to allow a minimum of 30 days and preferably 45 to 60 days between vaccination and breeding. Vaccination can be incorporated into a pre-breeding examination performed 45 to 60 days prior to breeding. This allows evaluation of the animals far enough in advance so potential problems identified can be corrected and concerns relating to vaccination can be minimized.

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