

Vaccination Programs that Work

Vaccination programs are routinely employed by most Alberta dairy producers. Immunization is necessary to prevent cattle from becoming infected with such common diseases as Blackleg, Malignant Edema, IBR, PI3, BRSV, BVD, Hemophilus and Leptospirosis.

Vaccines available for some of these diseases have proven to be effective for many years. However, others have been much less effective, creating confusion about the best way to use them. It is important to remember that a vaccine increases the animal's resistance to disease, but that resistance can be overwhelmed if good management practices are not followed.

Within the past year, reports of vaccination failure for both IBR and BVD have challenged researchers to focus on the reasons for these failures. Some of the reasons suggested include :

- the organism in the vaccine may be slightly different from the infecting organism;
- colostral antibody may interfere with the production of an immune response;
- the design of the vaccination program may be incorrect and repeat vaccinations may not be given at proper intervals, if at all;
- the vaccine may provoke an inadequate immune response;
- the immune system may be compromised due to immunosuppressive factors.

Modified Live vs Non-infectious vaccines

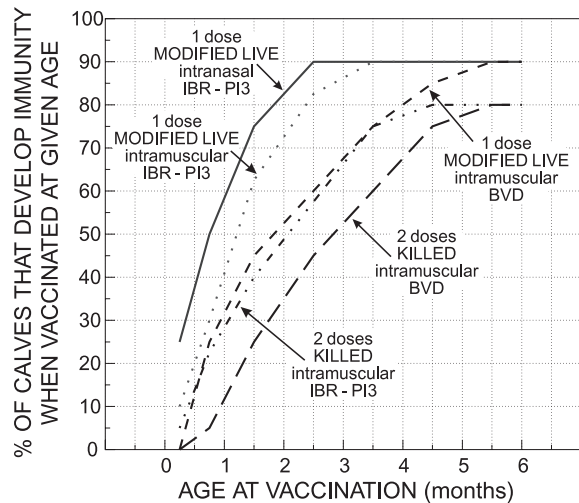
There are two basic types of vaccines. These are the *modified live* vaccines and the *non-infectious* or *killed* vaccines. Modified live vaccines in general produce the best immune response. However, there are some disadvantages to this type of vaccine including :

- they can't be administered to pregnant animals or cattle in contact with pregnant animals (except for IBR-PI3 intranasal vaccine);
- they may cause a mild disease, elevated temperature, or drop in appetite;
- they should only be given to healthy animals which are not exposed to stress;
- there is always a remote possibility that the vaccine strain could become increasingly infective since it is a live organism.

On the other hand, the non-infectious or killed vaccines are often considered to be safer. They do not contain live viruses or live bacteria and because of this they can be used on pregnant cows. However, vaccines of this type also have some major disadvantages :

- they contain a large amount of virus and/or bacteria and therefore are much more likely to cause hypersensitivity reactions;
- adjuvants are required in killed vaccines in order to stimulate immunity and they may also lead to hypersensitivity reactions;
- they are less effective in producing an immune response;
- they induce an immune response that is of shorter duration than would be induced by a modified live vaccine;
- they require booster vaccinations at precise intervals or no protective immunity will be established.

Non-infectious vaccines require multiple doses of vaccine to immunize and the vaccinations should be given two or three weeks apart. Even when given at precise intervals the immunity is not as good as with modified live vaccine. Non-infectious vaccines given only once and then followed by yearly boosters are ineffective in producing protective immunity.



Immune response is reduced in young calves due to the presence of antibodies from colostrum. Modified live vaccines are more effective in producing immunity in younger calves.

To realize a return on your vaccine investment and achieve protective immunity in your herd, the first vaccination given to calves must be either a single dose of modified live vaccine or repeat vaccinations of the non-infectious vaccine at the precise label recommended intervals. Also, to reduce possible interaction with colostral immunity, consideration must be given to the age at which calves are vaccinated, as shown in the graph on page 1.

Recommendations

There is a great debate among experts as to which vaccine type and which vaccination protocol should be recommended. However, in general terms there are some conclusions which can be drawn :

- modified live vaccine can only be used in young calves in most Alberta dairies as this is the only group which is not in contact with pregnant cattle. (IBR-PI3 intranasal vaccine is the exception to this rule).
- one vaccination per year of non-infectious vaccine is of no value unless the animal was initially vaccinated with either modified live vaccine or multiple doses of non-infectious vaccine at the proper intervals;
- modified live vaccine produces a better immunity than 2 doses of non-infectious vaccine when used as the first immunization in a young animal;
- non-infectious vaccines are generally more effective in stimulating a secondary immune response due to the increased content of antigen in the vaccine;
- modified live vaccine will not produce an optimum immune response if it is used following non-infectious vaccine;
- modified live vaccine should be used carefully and only on healthy animals and each user must be aware that the vaccine contains live organisms.

There are many different vaccination programs which could be developed from the principles which have been discussed above. Each dairyman should consult his or her local veterinarian to develop the program which best fulfills the needs of that dairy. A *sample* vaccination program which utilizes modified live vaccine is shown on the right.

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Sample Vaccination Program Using Modified Live Vaccine

Consult your local veterinarian for a program that is best for you!

- 1** Pick two major vaccination days approximately six months apart (one in the spring and one in the fall).
- 2** In addition to the two major vaccination days, groups of calves reaching three months of age should be vaccinated at appropriate intervals throughout the year.
- 3** Vaccination Program:
 - **3 - 6 months :**
 - ✓ INTRANASAL MODIFIED LIVE IBR, PI3, *plus* KILLED 7 WAY CLOSTRIDIAL.
 - **6 - 12 months :**
 - ✓ INTRAMUSCULAR MODIFIED LIVE IBR, PI3, & BVD *plus* KILLED 7 WAY CLOSTRIDIAL, LEPTO and HEMOPHILUS.
 - ✓ *This vaccination cannot be given to pregnant animals or cattle exposed to pregnant animals.*
 - ✓ This group should consist of open heifers older than 6 months and being vaccinated for the first time (except for INTRANASAL IBR & 7 WAY).
 - **12 - 24 months :**
 - ✓ INTRAMUSCULAR KILLED IBR, PI3, BVD, LEPTO and 7 WAY CLOSTRIDIAL.
 - ✓ *This vaccination can be given to pregnant animals.*
 - ✓ This group should consist of open or pregnant heifers which have been vaccinated at least once with modified live virus vaccine.
 - **Open Cows & Heifers :**
 - ✓ can be given the SAME VACCINATION AS THE 6-12 MONTH GROUP, however, if this is done they must not be exposed to pregnant animals and this is impractical for most dairies in Alberta.
 - **Pregnant Cows & Heifers :**
 - ✓ must be given KILLED VACCINE except for IBR PI3 INTRANASAL VACCINE.
 - ✓ If the first viral vaccine in life was not a modified live virus vaccine or multiple doses of the killed vaccine at proper intervals, one vaccination per year with killed vaccine will not produce a protective immunity.
 - ✓ Killed vaccine given to animals previously vaccinated with modified live vaccine will produce the best immune response.