MISSISSIPPI STATE UNIVERSITY EXTENSION

An Essential Guide to Dairy Cow Vaccination Programs

Introduction

Vaccination is an essential component of disease prevention and herd health management in dairy cattle. While vaccines do not provide absolute immunity, they significantly enhance herd resistance to infectious diseases, thus reducing economic losses due to illness. A well-structured vaccination program should be tailored to each dairy operation, considering local disease risks, biosecurity measures, and herd-specific factors. The effectiveness of vaccination relies on proper handling, administration, and booster of the vaccine, following the product label instructions. A single vaccine dose may not provide sufficient protection to the animal, which is why boosters are recommended for achieving optimal immunity levels. There are many vaccines for dairy cattle available on the market, and it is strongly recommended that producers contact a qualified veterinarian before implementing any herd health vaccination program.

Young calves may not develop strong antibody responses to vaccines due to their immature immune systems. While they can react to vaccines or antigens, their immune function is less developed than older animals, which can limit vaccine effectiveness. Additionally, maternal antibodies transferred through colostrum provide early protection but can also interfere with vaccines by neutralizing antigens before they take effect. This interference, known as maternal antibody interference, can reduce the benefits of early vaccination for certain diseases. However, some vaccines are specifically formulated to work in newborn calves. It is recommended to consult a veterinarian to determine the best vaccination approach for calves under 4 to 6 months.

Neonatal Calves (Birth to 6 Months)

Proper vaccination of neonatal calves is critical for preventing early-life infections. Colostrum management is essential and should be administered within the first hours of birth, as passive immunity from maternal antibodies plays a significant role in protecting calves.

- **Rotavirus and coronavirus**: Oral modified-live vaccines (MLV) should be administered within the first 30 minutes of life **before colostrum ingestion**.
- **Infectious bovine rhinotracheitis (IBR), bovine virus diarrhea (BVD), parainfluenza-3 (PI-3), and bovine respiratory syncytial virus (BRSV)**: The injected vaccine for IBR, BVD, PI-3, and BRSV is typically administered when calves are 3 to 6 months old. However, for earlier respiratory protection, intranasal vaccines can be given as early as 3 days of age.
- **Clostridial diseases (7- or 8-way vaccine)**: Administer at 4 to 6 months of age.
- **Leptospirosis (5-strain vaccine)**: Recommended at 4 to 6 months, particularly in regions with high prevalence.
- **Johne's disease**: Vaccination should be considered in high-risk herds but must be administered by a veterinarian in compliance with state regulations.

Heifer Vaccination (Pre-Breeding)

To ensure reproductive health and reduce disease transmission, heifers should be vaccinated before breeding.

- **IBR, BVD, PI-3, and BRSV**: Booster doses should be administered with either killed or modified-live vaccines.
- **Leptospirosis (5-strain vaccine)**: Essential to prevent reproductive losses.
- **Clostridial diseases (7- or 8-way vaccine)**: Given as a booster to maintain immunity.
- **Vibriosis, campylobacter fetus (Optional)**: Administered 40 to 60 days before breeding in a non-artificial insemination (non-AI) herd.

Pre-Calving Vaccination (3 to 6 Weeks before Calving)

Vaccination prior to calving boosts colostrum antibodies, protecting newborn calves from common diseases.

- **E. coli mastitis vaccine**: Given at least twice at 6 and 3 weeks before calving.
- **Rotavirus, coronavirus, and E. coli (scours vaccine)**: Administered twice at 6 and 3 weeks pre-calving.
- **Clostridial diseases (7- or 8-way vaccine)**: Boosters ensure continued protection.

Adult Cow Vaccination (Lactation and Dry Period)

Modified live virus (MLV) vaccines may not be able to be used at this time. Consult with your veterinarian before using MLV products in pregnant cows.

- **IBR, BVD, PI-3, and BRSV**: Routine vaccination during the dry period ensures herd-wide immunity.
- **Leptospirosis**: Annual booster doses should be administered.
- **Clostridial diseases**: Annual boosters are necessary.
- **E. coli mastitis vaccine**: Reduces the risk of coliform mastitis in lactating cows.
- **Scours vaccines**: Recommended for herds with a history of neonatal diarrhea issues.

Additional Considerations

1. **Work closely with a veterinarian**: Tailoring the vaccination program to herd-specific needs ensures optimal protection.
2. **Some vaccines have a withdrawal period for milk**: These should be given to cows in the dry period if they are safe for pregnant cows. If they are not, any resulting milk loss must be accounted for, and the milk must be discarded during the withdrawal period.
3. **Vaccine handling and storage**: Follow manufacturer guidelines to maintain vaccine efficacy.
4. **Biosecurity measures**: Proper sanitation, nutrition, and ventilation complement vaccination efforts.
5. **Avoid over-vaccination**: Overuse of vaccines can lead to unnecessary stress and reduced efficacy.
6. **Observe withdrawal periods**: Ensure compliance with regulatory guidelines for milk and meat withholding periods.

Conclusion

A well-implemented vaccination program is a cornerstone of a comprehensive dairy herd health strategy. While vaccination alone cannot eliminate disease risks, it significantly reduces morbidity and mortality, leading to improved productivity and profitability. By working closely with veterinarians and adhering to best management practices, dairy producers can optimize herd health and ensure sustainable milk production.

References

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