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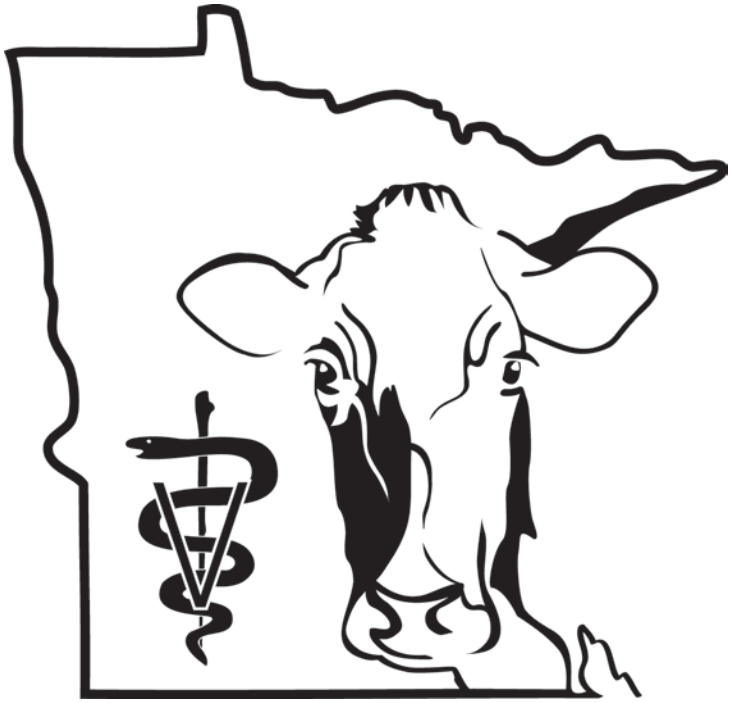

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BIOSECURITY IN MIDWEST EXPANSIONS

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As the Midwest dairy industry continues the trend towards larger and larger dairies, the question of biosecurity has become more important. Expansion is bringing large numbers of animals into formerly closed herds. These animals are rarely coming from a single source, and the potential for disease "wrecks" is enormous. Vaccine costs to prevent disease is an ongoing cost of production. The dairy industry will continue to evolve toward the model of the swine industry expansions, although we are years behind and species and husbandry considerations will prevent us from even completely following that model.

Manifestation of disease in animals is due to a combination of host immune status and pathogen exposure dose. Immune status can be increased by proper vaccination programs, good nutrition, and proper cow comfort and husbandry to relieve stress. Pathogen exposure dose can be decreased by segregating diseased animals or avoiding the introduction of the pathogens into the herd. The term biosecurity relates to all those practices which aid in preventing the introduction of pathogens into the susceptible population. This paper will discuss some of the current and possible future concepts of biosecurity.

Current Status of Dairy Biosecurity

Biosecurity by definition relates to any management principle that aids in the prevention of the introduction of new diseases into a susceptible population. This is accomplished by two separate methods, preventing the introduction of carrier or infected animals, and preventing the pathogens from being introduced by non-animal vectors. Currently the industry has the ability to improve at both methods, and in reality neither practice is widespread.

Stopping the introduction of vector born diseases requires sound rodent and stray animal control program as well as closing the units to outside and unnecessary visitors. Feed trucks must be able to make deliveries without entering the animal areas. Rodent control programs must be intense to avoid an overpopulation due to the amount of feed in open commodity sheds. Employees should keep clothes at the dairy to change into when they arrive. Clean or disposable boots and overalls should be provided on the farm for routine visitors such as nutritionists, breeders, veterinarians, etc. Open ventilation often makes it impossible to keep birds out of these units. Many dairymen who have just expanded (and their equipment and building suppliers) are so proud of their units that they become showplaces for everyone who wants to visit. This attitude will have to change if the unit is to become more secure.

Biosecurity for preventing the introduction of pathogen carrier animals is much more difficult. Probably the most important step is getting a thorough honest history from the herd of origin, and this is impossible if buying through auction markets or cattle suppliers. A minimum history should include information about reproductive problems (especially abortions), SCC information and bulk tank samples to eliminate infectious mastitis possibilities, vaccination programs (specific

products and the time they are routinely given) and baby calf survival and treatment rates. This information should be documented whenever possible, and herd veterinarians should be prepared to answer any pertinent questions if necessary.

Even with a complete history, the current state of technology and husbandry will make the introduction of certain diseases inevitable. Better diagnostic tests and rethinking certain industry paradigms will help in the future. Following is a partial list of diseases and the status of the industry's ability to screen for carriers.

BVD - Virus isolation off buffy coat smears is a very effective way to screen for persistently infected animals. Samples must be very fresh or isolation percentages drop dramatically. This technique of screening combined with a well directed vaccination program could minimize BVD problems in the herd. All health professionals and consultants must push dairymen to vaccinate all youngstock for BVD pre-breeding. It is the author's opinion that there is far more significance to the fact that the majority of youngstock are not being vaccinated properly than there is to the discussion of MLV vs Killed vaccines in the cow herd.

IBR - New marker vaccines make it theoretically possible to screen for IBR on arrival. The ubiquitous nature of this disease makes it impractical unless the use of unmarked vaccines is phased out, as was the case with porcine PRV. This will probably not happen in the dairy industry.

SALMONELLA - S. dublin could theoretically be screened if a diagnostic test that did not cross react with other Salmonella species could be developed. S.typhimurium probably could never be eliminated because of it's presence in so many other species.

JOHNES - This is one disease where a better diagnostic test would allow an owner to completely keep a disease out of a unit. The ELISA test currently in use in most labs will only detect about half of the infected carriers, and the culture technique is too slow to be practical for this use. Further research and refinement of the ELISA will be necessary to begin a serious eradication program whether that program is on an industry or individual herd level.

BLV - The AGID test available can certainly be used to screen for carriers, and the management and husbandry techniques necessary to maintain BLV status have been well documented. Unfortunately, such a high percentage of replacement animals are already exposed that it actually becomes difficult to find enough negative animals. Once the herd is closed, it should be possible to slowly work the virus out of the herd.

OTHER BACTERIAL PATHOGENS - Other bacteria such as P. hemolytica, P. multocida and H. somnus will be very difficult if not impossible to screen for with simple diagnostic tests. Vaccination programs will have to be designed with the idea in mind that exposure is inevitable.

PARASITES - Basic parasite control is often overlooked when replacement animals are added to formerly closed herds. All incoming animals should be treated for both internal and external parasites with products and programs designed to eliminate, not control the parasites.

In summary, the dairy industry is moving forward on the concept of diagnostic biosecurity, but there is a real need for further refinements in the testing procedures, vaccination programs, and basic disease pathogenesis before meaningful screening of replacement animals becomes a reality.

The Future of Biosecurity: The Swine Model

Dairy veterinarians today have a unique opportunity to observe a different but closely related industry as it deals with rapid expansions. After years of trial and error, the swine industry has not developed a fairly scientific answer to biosecurity. All in all out (AIAO) buildings and multiple site production (MSP), coupled with hard research on colostrum degeneration curves and basic disease pathogenesis have combined to allow huge expansions. Although species and industry considerations will prevent us from simply transferring this technology, it is important for dairy consultants to understand what has been done and begin a slow concerted effort to move somewhat in the same direction if we are to decrease our cost of producing milk by maintaining disease free units.

Swine leaders have learned that the number one way to break a disease cycle is with the AIAO concept. If all the pigs in a building or room are moved in and out at the same time, disease breaks are minimized, rooms can be cleaned completely before the next group, and vaccination and medication schedules can be tailored to the entire group. Dairymen have seen the advantages of the AIAO concept with calf hutches, so this is nothing new. The swine industry has taken the AIAO concept one step farther with MSP. Multiple site production simple means that these AIAO buildings are truly separated, often by a distance of miles. In return for the extra labor of moving pigs, there is virtually no chance for these pigs to expose themselves to pathogens from outside groups.

Making these two concepts work required both some good hard research and the total destruction of many of the industry's paradigms. First and foremost, everyone involved in the farrowing aspect of these hog production units had to be committed to getting adequate colostrum into all the pigs. This often meant hand labor as pigs are fostered off to even up litters. Next, colostral decay curves for antibodies to specific diseases had to be established to allow movement of pigs while still under the sow's immune protection and to establish effective vaccine and treatment protocols. Third, the industry had to change it's thinking about weaning ages. This often has proved to be the hardest part, but success has created believers. It was found that pigs can mix and travel fairly well at weaning time if maternal protection is still present. To accomplish this, weaning age was dropped form 21-28 days to as early as 14 days. Receiving nurseries then had to be redesigned for these small pigs.

Sizing the nurseries and pig grouping is the area where the dairy and swine industries are far apart. the new swine units are trying to accomplish the avoidance of mixing of pigs from different groups at any time after weaning. To accomplish this, huge nurseries are being built (often holding several thousand pigs). These nurseries are filled on an AIAO basis with freshly weaned pigs from several sow units. After three to five weeks in the nursery, these pigs are all moved to grower units on different farms. The pigs may be broken up into smaller groups, but outside pigs

are never added to the groups. From the growers, the pigs are again moved to finished units. Each move results in smaller groups of extremely uniform pigs. After each move, the units are thoroughly cleaned. This concept of pig flow takes a lot of coordination and is possible only with a large pool of sows. The obvious advantage is the tremendous decrease in medication costs and the increase in production numbers we are seeing in these units.

The dairy industry can learn from this model, but it will take a concerted effort by our leaders to begin the move in this direction. Looking into the future, several things will be necessary to break the cycle of disease we face in so many expansion units:

1) The industry will need to continue to support the emergence of professional calf raisers. These calf raisers would buy a large group of two day old calves that had adequate colostrum (or check serum protein levels on arrival), raise these calves in individual calf huts or crates, and deal with the diarrhea pathogens and parasites. These units would run on an AIAO concept. As the calves mature and are weaned off milk, they would be moved to a grower unit on another farm, also run AIAO. From the grower they could be moved to multiple small feedlots. This whole situation could be operated by one individual or a cooperative of individuals specializing in one aspect of calf rearing and sharing the profits. This would break the continuous flow disease cycle that the majority of calves are raised under in he Midwest.

2) The industry will need to continue to support the research needed to expand our understanding of the disease pathogenesis and diagnostics of certain diseases. Once this information is known, we will need to disseminate it and follow it. Diagnostics and vaccination concepts are changing almost daily. Quick screening diagnostic tests will allow us to trace back disease exposure and modify management or vaccination programs.

3) Larger dairies will need to avoid the current concept of raising replacement animals. AIAO calf rearing on multiple sites will break the disease cycles we deal with today.

4) More cooperation between dairymen will become the norm, as the industry moves toward suppliers of specific commodities for the larger farms. These commodities will include replacement animals as well as feeds.

In summary, biosecurity in the dairy industry is a concept in it's infancy. Closing the units to outside traffic, carefully designing the units for traffic flow away from the animal areas, and security fences will become the norm. Breaking the cycle of carrier animals being added to the herds will be more difficult, but achievable. The swine industry has shown us the possibilities, it will be up to the dairy industry to commit to these concepts. Better quality milk produced by healthier animals will be the result of our work.