NATIONAL DAIRY DEVELOPMENT BOARD ANAND GUJARAT

ANIMAL HEALTH UPDATES

Animal Health Group

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Disease - Biosecurity in bovine farms

Definition

Biosecurity in bovine farms refers to the management practices that reduce the chances of disease causing agents from entering, spreading or leaving the premises where bovines are being maintained. It usually involves a set of procedures which include screening and testing incoming animals, quarantine of newly purchased or returning animals, hygiene and sanitation etc, and continuos monitoring or evaluation.

Importance

Biosecurity helps to control the disease occurrence. The farm benefits by saving on treatment cost, loss of production, product withhold, loss of market value of the animal etc. Moreover, certain diseases are also zoonotic and therefore good biosecurity also reduces risk to human beings.

Modes of disease entry

1. New animals or animals that have commingled with, or exposed to, other animals usually present the greatest risk. The disease causing agents may be present in some or all secretions and excretions of the animal.
2. Farm personnel and visitors
3. Feed, water and air
4. Farm equipment and fomites
5. Farm waste
6. Animal products

Risk Analysis

The principle aim of risk analysis is to provide an objective and defensible method of assessing the disease risks associated with any procedure or activity related to the farm. The four components of risk analysis are hazard identification, risk assessment, risk management and risk communication. Hazard identification involves identifying the pathogenic agents associated with an importation which could potentially produce adverse consequences. Risk assessment identifies the hazards with an importation, a procedure, exposure scenarios and types and amounts of data and information. The level of risk can be categorized as low, medium and high (see tables). Risk management is the process of deciding upon and implementing measures to achieve the appropriate level of protection, also ensuring that negative effects are minimized. Risk communication is the process by which information and opinions regarding hazard identification, risk assessment and risk management measures are communicated to the decision-makers. Each and every person who lives, works or visits the farm has a stake and role in the biosecurity plan. *To make a biosecurity plan effective and easier to follow, it is important to adopt practices that are customized to the individual farm setting.*

Ideal biosecurity measures in farms

A. Livestock

- Develop a testing, vaccination and quarantine protocol before bringing any purchased animal onto the farm.
- Transport animals in a vehicle that has been cleaned and disinfected before pick up.
- Keep records of all animal movement onto and in the farm.
- Minimise non-resident animal contact (other livestock, stray dogs and cats, wild life, birds, rodents etc)
- Implement an integrated pest management programme for control of insects and insect borne diseases.

B. Farm Personnel

Boot cleaner
Source: www.biosecuritycenter.org

- Follow all the Standard Operating Procedures (SOPs) strictly to reduce chances of infection.
- Have good personal hygiene.

C. Visitors

- Discourage visitors and limit access.
- Determine if there is actual need for the visitor to enter any housing areas on the farm.
- Establish one area (not an animal housing area) on the farm where visitors can enter.
- Explain disease prevention procedures to visitors.
- No visitors with soiled clothing and/or footwear from another farm should be allowed on the farm.
- Keep a record of names and dates of visitors along with area visited.
- Provide footbath at the entrance of the farm and each animal housing shed.
- Do not let visitors walk through the animal housing area.
- Do not allow visitors to walk through feed mangers.
- Ensure that the visitors clean boots when moving between the sheds.
- Wear farm clothing over street clothes, such as coveralls. Change them between farms.
- Visitors should be instructed not to touch the animals unless it is part of their job.

- Do not allow animal products, clothes, luggage, clothes or other items from outside onto the farm.
- Ensure that the coveralls do not leave the farm premises.

D. Feed/Fodder

- Purchase feed/fodder from sources using quality control measures to minimize the risk of faecal, organic or chemical contamination.
- Ensure that there are no disease outbreaks from the areas where feed/fodder is purchased.
- Ensure that purchased feeds/feed additives do not contain protein derived from ruminant tissues.

E. Farm equipment, fomites and traffic

- Specify a location, which is far away from the animal sheds, in which vehicles entering the farm should park.
- Spray and disinfect vehicles before allowing entry onto the farm premises.
- Bring the animal to the truck which should be parked at an area away from the animal sheds.
- Do not let off-farm vehicles drive through the animal sheds.
- Any equipment coming onto the farm should be cleaned and disinfected at a location away from the sheds.
- Have one common entrance/exit onto the farm.
- Stop all non-essential vehicles from entering the farm.
- Keep a record of all deliveries.
- Use separate restraining ropes for each animal shed.

F. Farm waste and animal products

- Protect against manure entry onto the farm from vehicles and equipment or run off from neighbouring animal premises.
- Avoid use of manure (poultry, cattle or other livestock) or manure products from off premises.

G. Carcass disposal

Disposal of dead animals is very important for preventing the spread of any infection in a farm. Methods of disposal and its advantages/disadvantages are:

a. Rendering : Not advised due to biosecurity issues.
b. Burial : Has potential to contaminate ground water.
c. Incineration : Ordinary incinerators are costly owning to their high throughput and, they also adversely affect the air quality due to dioxin emissions etc. Presently, air curtain incinerators (both above and in-ground types) are preferred since

(Continued on page 3)

Biosecurity risk assessment for various activities on farm

Biosecurity risk assessment for farm management			
Details	**Low risk**	**Medium risk**	**High risk**
Purchased animals	Screening test + quarantine for 30 days after purchase	Minimal screening quarantine >15 but <30 days	Little or no screening and no quarantine or <15 days.
Protective outer clothing for personnel	Clothing and boots worn on home farm and not worn to different farms	Clean clothing and disposable or sanitized boots	Clothing and boots worn on home farm and different farms
Immunisations	Timely, comprehensive, well coordinated and professionally supervised	Immunisation not necessarily part of total plan	Haphazard immunization which is not coordinated nor professionally supervised
Animal Transportation	Haul own animals only in own trailer or truck	Haul animals in hired trailer or truck that has been cleaned or sanitized	Haul animals in hired trailer or truck that has not been cleaned or sanitized
Visitors, farm traffic, manure use & disposal, water use, vehicles, equipments, personnel, disease control, disinfection, dead animal disposal, documentation	Have standard operation practices (SOPs) developed for each to reduce chances of infection which are strictly adhered to.	No SOPs but have limited procedures to reduce chances of infection which are strictly adhered to.	Haphazard procedures which are not followed strictly.
Biosecurity knowledge	Understands and promotes biosecurity for industry.	Exposed to biosecurity principles but is not an advocate.	Little appreciation for biosecurity and does not view it an an industry issue.
Biosecurity risk assessment for feed storage equipment			
Storage facilities	Properly maintained, easily cleaned between uses. Appropriately sized for needs. Sealed to minimize vermin, pest access. Located away from manure and pesticide storage.	Some maintenance on storage structures Minimal cleaning. Potential for vermin infestation. Location from potential contaminants not ideal.	Poorly maintained storage structures. Porous surfaces not easily cleaned. Evidence of vermin. Location near manure or pesticide storage.
Feed inventory	Properly rotated to maintain quality. Free of pests, molds contamination.	Some inventory control. May have some evidence of mold, weathering, vermin.	Inventory not rotated. Signs of molding, moisture. Feed exposed to weather, vermin.
Equipment usage	Properly maintained and cleaned regularly. Written SOP. Not used for moving manure or dead animals. Water storage appropriately located away from contamination risks and sealed.	Some level of equipment maintenance. Cleaned but not disinfected. Used occasionally for other purposes, but cleaned. Water storage not effectively sealed.	Equipment not maintained. Highly contaminated with dirt, manure. Multiple usages. No use protocols. Open water storage readily contaminated.
Traffic flow	Feed mixing and delivery equipment does not cross manure handling paths.	Feed delivery may pass through some manure paths.	Feeding and manure handling paths cross frequently.
Biosecurity risk assessment for contamination in dairy herds (contagious organisms)			
Purchase herd replacements	Closed herd	Purchase with screening tests.	Purchase with no screening tests.
Milking protocol	Single service towel	Occasionally more than one cow per towel.	More than one cow per towel
Milkers cleaning and drying hands	All milkers all the time	Some milkers or sometimes	Less than half or none
Monitor mastitis cases with periodic cultures	Culture frequently	Culture just chronic cows	Rarely culture
Dry cow therapy in all animals	Good protocol based on sensitivity data.	Good protocol, no basis for selection.	Poor protocol, no basis, less than 100% treated.
Effective, approved teat dip. Teat coverage.	Effective dip and good skin coverage.	Effective dip and fair skin coverage.	Questionable efficiency and poor coverage.
Bulk tank cultures	Routine culture as a part of quality protocol.	Only culture when problems arise.	Rarely or never culture bulk milk.
Control of contagious mastitis organisms in heifers	Do not feed waste milk, or pasteurize. Good fly control. Programme to check quarters early.	Feed whole milk but not mastitis milk. Fair fly control. Only check quarters if clinical.	Feed waste mastitis milk. Fly control is not ideal. Treat mastitis without plan.

Biosecurity risk assessment for contamination in semen stations			
Details	**Low risk**	**Medium risk**	**High risk**
Preparation of bull. Preparation of semen collection and processing equipments, buffer, diluent, sanitation practices in semen laboratory, semen collection and processing procedures	SOP developed and followed strictly. Samples cultured frequently.	No SOP, but limited procedures followed strictly. Occasionally culture.	Poor protocol. Rarely culture
Frozen semen testing	Routine tests done.	Tests only when problem arise.	Rarely or never do any tests.
Biosecurity risk assessment for feed quality issues			
Farm feed ingredients	Feeds harvested at proper maturity and moisture. Routinely evaluated for nutrient content.	Reasonable quality control on harvesting practices. Some level of evaluation.	Feed not harvested at proper maturity or moisture. No evaluation for nutrient content.
Purchased feed ingredients	Routinely evaluated for nutrient content consistency. Delivery date, weight recorded and sample retained for reference. Obtained from reputable supplier.	Different sources used for feeds. Some evaluation for quality control.	Deliveries not inspected, samples not retained. Nutrient analysis not done.
Contamination potential	Feed visibly evaluated daily and routinely monitored for bacterial or fungal growth. No evidence of faecal contamination.	Feed occasionally evaluated for contamination. Some pest problems.	Feed not evaluated at any time. Evidence of heavy faecal or vermin contamination.
Animal protein feeds	Only use allowable feeds and keep records. Routinely evaluate nutrient content and bacterial contamination.	Incomplete records of animal protein usage. Some evaluations.	Used without regard to feeding regulations. No evaluations.
Medicated feeds	Properly labeled, stored and used only according to labels and veterinary directions.	Medicated feeds reasonably used, but may increase levels as needed.	Medicated feeds indiscriminately used and stored without labeling.
Biosecurity risk assessment for reproductive and other diseases			
BVD, IBR	All AI breeding. No purchased animals. Separation of groups. Good vaccination programme.	Incomplete vaccination programme. New additions after some testing. Contact between animal age groups.	New additions without testing. No vaccination programme. Poor nutrition.
Neospora	No new additions. Routine surveillance. Good feed biosecurity. No dogs on farm.	New additions after testing. Dogs on farm.	New additions without testing. Faecal contamination of feed. Dogs on farm.
Trichomonas/ Campylobacter	All AI breeding. No new additions. Vaccine use.	New additions after testing. Natural service.	All natural service with untested bulls.
Leptospira	Good vaccination programme. No wildlife contact. No rats.	Moderate vaccination programme. Exposure to wildlife. Feed contamination.	No vaccination programme. Grazing practices. High wildlife exposure. Vermin contaminated feed.
Ureaplasma, Mycoplasma, Chlamydophilus,Haemophilus	No new additions. All AI breeding. Clean AI equipment. Single use calving pen. Vaccine use.	New additions after screening. Some natural service. Group calving pen. Poor transition nutrition.	New additions without screening. Natural service, no bull testing. Contaminated calving pen. Poor nutrition.
Brucella	No new additions. Vaccine programme.	New additions after screening. Improper removal of aborted foetus or placenta.	No vaccine use. Exposure to wildlife. Exposure to aborted foetus or placenta.
Johne's disease	No new additions. No faecal—oral contact of calves with milk or manure from older animals. Separation of groups.	New additions after screening. Contact between animal age groups. Periodic testing and culling of herd positives.	New additions without screening. No testing and culling programme.
Bovine tuberculosis	No new additions. Good vector control.	New additions after testing. Workers also tested. Periodic testing and culling of herd positives.	New additions without screening. No testing and culling programme.
Miscellaneous bacteria , mold	Calving pen cleaned after each use. Good feed biosecurity. Good nutrition programme.	Multiple use calving pen without routine cleaning. Lapses in nutrition and transition programme.	Common calving area not cleaned. Poor nutrition programme. Moldy feeds. Faecal contamination of feed.

Above ground air curtain incinerator
Source: www.airburners.com

In-ground air curtain incinerator
Source : www.airburners.com

In-vessel composting
Source : www.biosecuritycenter.org

Ag-bag Environmental EcoPOD composter

they do not have the disadvantages of the ordinary incinerators. *(Continued from page 2)*

d. Composting: It is the method of choice for carcass disposal. The common methods are :
1. Static piles: Takes a long time to compost.
2. Open windrows: Labour intensive
3. Vessel composting: Construction costs are prohibitive.
4. Ag-bag Environmental EcoPOD Technology: Requires electricity.

e. Other methods of carcass disposal are pyre burning, biogas production, alkaline hydrolysis & bio-refining.

H. Cleaning and disinfection

The general facts about disinfectants are given in the table. *(Continued on page 4)*

WHO sets intake limits for melamine

The tolerable daily intake (TDI) of melamine has been set at 0.2 mg per kg body weight. This is the outcome of a meeting organized by the World Health Organisation (WHO) in collaboration with the Food and Agriculture Organisation (FAO) between 1-4th December, 2008 in Ottawa, Canada. The meeting was hosted by 'Health Canada' (govt. department responsible for national public health). Based on this TDI, a 50 Kg person could tolerate 10 mg melamine per day.

Source :www.foodqualitynews.com

Note : Dr. S K Saxena, Director, National Analytical Laboratory (NAL), Anand, was an expert invitee to this meeting.

OIE - Significant animal diseases reported to OIE during Oct– Dec'08

Sl.No	Disease Outbreak	Countries reporting
1	Foot and Mouth Disease (strains in parenthesis)	Botswana (SAT 2), Laos (O), China (Asia 1), South Africa (SAT 2)
2	Anthrax	Slovenia, Laos, Sweden
3	Blue Tongue	Spain, Netherlands, Algeria, Israel
4	Highly pathogenic Avian Influenza	Germany, India, Hong Kong, Cambodia
5	Low pathogenic avian influenza	South Korea, Germany, Norway, Taiwan, Belgium
6	Brucellosis (*B.suis*)	Romania, Germany
7	Sheep and Goat pox	Mongolia, Russia
8	Rabies	Italy, France, Argentina, Indonesia
9	West Nile Fever	Austria
10	African Swine Fever	Namibia
11	Equine Influenza	India
12	Classical Swine Fever	Croatia, Russia
13	Bovine Anaplasmosis	Canada
14	Bovine Babesiosis	New Caledonia (France)
15	New Castle Disease	Bulgaria, Belize, Japan
16	Porcine Reproductive and Respiratory Syndrome	Philippines
17	Contagious Equine Metritis	USA
18	Rift Valley Fever	Madagascar Source :www.oie.int

GENERAL FACTS ABOUT DISINFECTANTS USED IN FARMS

Chemical	Gm+ve bact.	Gm-ve bact.	TB like bact.	Fungi	Virus	Best pH for act.	Activity in org.mat	Common uses
Chlorhexidine	SA	SA	SA	SA	Most	Wide range	Good	EPF
Formaldehyde & Aldehydes	++	++	++	++	++	Wide range	Good	EPF
Chlorine & Chloramines	++	++	SA	++	SA	Acid	Very poor	CE
Iodophors	++	++	SA	++	SA	Acid	Fair to Poor	CE
Sodium Hydroxide	++	++	SA	++	++	Alkaline	Good	P
Quaternary ammoniums	++	+	No	SA	SA	Alkaline	Fair	CE
Phenols	++	++	+	SA	SA	Acid	Good	EPF
Potassium peroxymonosulphate	+	+	+	+	++	Acid	Good	EPF

SA - Some activity E– Equipment P– Premises F– Footbaths C– Clean equipment

Sources: (1) www.farmandranchbiosecurity.com (5) www.vetextension.psu.edu
(2) www.mass.gov/agr (6) www.nyschap.vet. cornell.edu
(3) www.wvdk.wisc.edu (7) www.biosecuritycenter.org
(4) www. cahe.nmsu.edu (8) www.oie.int

The deadly dozen on the rise?

A dozen diseases are likely to spread and get worse as a result of climate change, according to a report released by the Wildlife Conservation Society (WCS).WCS suggests monitoring wildlife to detect signs of these pathogens before a major outbreak. The deadly dozen include:

1. Bird Flu: H5N1 infections are becoming the rule rather then the exception in farmed poultry worldwide. It has forced the culling of millions of ducks, chickens and geese globally—and has killed more than 240 people.
2. Babesiosis: This disease carried by ticks is endemic in the tropics, but has cropped up everywhere from Italy to Long Island, N.Y. It is rare in humans at present and seldom deadly (treatable with antibiotics) but may become more problematic as the globe warms.
3. Cholera: This bacterium thrives in warmer waters and causes diarrhea so severe that it can kill within a week. Without improved sanitation, rising global temperatures will increase deadly outbreaks.
4. Ebola:This virus is lethal to humans and other primates, and has no cure. In addition, it is unclear where the disease, which causes fever, vomiting and internal or external bleeding, comes from—though scientists suspect fruit bats. What is clear is that outbreaks tend to follow unusual downpours or droughts in central Africa- a likely result of climate change.
5. Parasites: Many spread easily between humans, livestock and wildlife. Higher average temperatures and more rainfall will help many parasites to thrive in the wild before finding a host.
6. Lyme disease: This bacterium-caused disease will spread as climate changes extend the ranges of the ticks that carry it.
7. Plague: Changes in temperature and rainfall will affect rodent populations globally as well as the infected fleas they carry.
8. Red Tides: Poisonous algal blooms in coastal waters may increase as a result of warming temperatures or changes in littoral sea life.
9. Rift Valley fever: A newly emergent virus, carried by mosquitoes that causes fever and weakness, has spread quickly through Africa and the Middle East, killing people, along with camels, cattle, goats and sheep.
10. Sleeping Sickness: Global warming will change the distribution of the tsetse fly that carries the disease, now infecting more than 300,000 people yearly in Africa. Victims become lethargic and may suffer severe swelling of the lymph nodes.
11. Tuberculosis: Both the human and livestock varieties of TB are likely to increase, particularly the latter as droughts bring livestock and wildlife into closer proximity at watering holes.
12. Yellow fever: Mosquitoes spread this disease between wildlife and humans causing fever and jaundice like symptoms, and is likely to spread into new areas as the climate changes.

Source: www.sciam.com

New forms of prion disease in ruminants

The active surveillance of Transmissible spongiform encephalopathies (TSEs) in ruminants based on a large-scale biochemical testing of brain tissue samples from carcasses, has revealed prion profiles unnoticed so far which has led to the recognition of a novel scrapie strain in sheep and goats, called Nor98, and of two variant strains in cattle. Studies have also shown that low quantities of infectious prions are excreted in the urine suggesting it to be a possible source of prion transmission.

Source : www.ncbi.nlm.nih.gov

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