

BIOSECURITY: SHEEP



BASICS

OVERVIEW

- Biosecurity represents a comprehensive set of plans, programs and procedures that prevent or limit the introduction, multiplication and dissemination of harmful microorganisms, parasites and/or biological toxins in pastures and on farms.
- Biosecurity measures can be implemented on a flock, state/provincial, national or international level. Primary responsibility for flock-level biosecurity rests with the flock owner or producer and lie nested with progressively higher levels of oversight residing within corresponding governmental agencies.
- In the 21st century, biosecurity must also include preparations for the possibility of adversarial threats to agriculture and the food supply such as the intentional introduction of foreign animal diseases or infectious agents with zoonotic potential.

PROCESS

- The production process presents a wide variety of biosecurity risk portals. Ideally, the entry of all people, vehicles, feed, supplies and animals should be carefully monitored and appropriate risk management procedures should be employed at each potential portal of entry.
- All visitors should be screened, authorized entry and supplied with personal protective equipment (PPE). A visitor log should be maintained and reviewed on a regular basis. The personal hygiene and cleanliness of all workers should be emphasized. All vehicles should be sanitized or access-restricted.
- The equipment utilized within the facility should be cleaned and disinfected according to Standard Operating Procedures (SOP). The physical facility itself should have SOPs for maintenance and records documenting completion of tasks.

STANDARD OPERATING PROCEDURES

- SOP's should be developed that describe in detail all the operational activities of the animal facility.
- Key documents would include descriptions of rules for entrance to the facility, animal husbandry procedures, animal ordering and receipt, quarantine processes, equipment operation and maintenance, and a copy of the emergency management plan.
- Ideally, personnel are required to review the documents prior to working in the facility and their training should be documented.
- SOP's provide a mechanism that supports consistency of animal care, protects the health of the animals and helps to assure humane treatment.

FACILITIES

- Facilities should be comprised of materials that allow for effective and routine disinfection of housing areas as well as vehicles, instrumentation and equipment. Facility design should incorporate effective waste management systems.
- Temperature and air changes should be within the established ranges for the species and housing areas should be of adequate size so that over-crowding does not occur.
- Exposure to wildlife represents another potential bio-risk portal to sheep. Fences should be secure and rodent and pest control programs should be in place.

SANITATION

- Sanitation is critical to minimizing biosecurity risks.
- The prompt removal of organic waste when animals are in confinement is extremely important to the well-being of the flock and farm. There are a wide variety of soaps, detergents and disinfectants available that can assist in this purpose. These agents should always be mixed and applied in strict accordance with manufacturer guidelines.
- Cleaning technique should be systematic and proceed from top to bottom including all surfaces, ceiling, fans, fences, walls, doors, troughs, waterers and floors. Disinfection schedules should be established for all housing areas. Footbaths should be placed at entryways. Footwear should be cleaned of all organic debris prior to stepping into the footbath.
- Numerous biosecurity risk agents have zoonotic potential: *Brucella*, *Chlamydia* (Enzootic Abortion), *Coxiella* (Q-Fever), Orf (Contagious Ecthyma) and *Toxoplasma*. This factor can be very relevant during sanitation and management procedures

FEED

- All feed, forage and hay should be obtained from known and approved sources with well documented quality control programs. Feed may be contaminated with animal toxins such as prion proteins, or with parasite eggs or also with environmental, primary fungal, secondary metabolite mycotoxins, or intrinsic plant toxins. Feed sources should be documented. Water sources should be tested regularly as well.

NEW ARRIVALS

- The introduction of new or replacement animals represents the single greatest bio-risk portal to the flock. Animals should be procured from known approved sources rather than from an auction or sale barn and transported directly to the facility. The arriving vehicle should be disinfected prior to entry to the property. New arrivals should be weighed, shorn if feasible, passed through a zinc sulfate footbath and quarantined by source for 30 days.

- Prior to introduction to the flock each animal should be assessed individually by the veterinarian, tested and treated for parasites, inspected for foot rot and monitored for any indication of disease. Healthy animals should be vaccinated for *Clostridium perfringens* C and D, and also can be vaccinated with tetanus toxoid, and for *Vibrio* and *Chlamydia*.
- Those individuals manifesting clinical illness should be treated or culled. The flock should have an ongoing surveillance program for objective documentation of health status.
- Overall animal health status should be viewed holistically and include vaccinations, deworming, internal and external parasite control, nutrition, barn/shed ventilation and the possibility of direct or indirect wildlife contact.

EMERGENCY MANAGEMENT PLAN

- The safety of personnel as well as animals needs to be addressed. The plan should include evacuation instructions for personnel as well as directions for relocation of animals and a protocol for emergency euthanasia.
- Contact information for responsible parties and community based response groups such as the fire and police department should be posted and remain current. First responders to any emergency are the fire or police department, in which case they are the primary decision makers and will assume command and control with support and advice from senior ranking staff members of the animal facility.
- Training for personnel and coordination with local authorities should be documented and reviewed regularly. A risk analysis of various emergencies including natural and man-made threats should be carried out with the most probable events given the most planning and resources. PPE should be stockpiled and inventoried routinely.

CLIENT EDUCATION

- Client education is critical to successful biosecurity programs. Ovine biosecurity programs must address the entire ecosystem of the facility. Considerations should include the human, animal and physical components. They should include farm traffic and transport patterns, the movement of people, the introduction of new animals and equipment, and the cleaning, and disinfection, and sterilization procedures utilized to reduce or eliminate pathogens, toxins or other injurious agents.



MISCELLANEOUS

SEE ALSO

Biosecurity for Research Herds (www.fiveminutevet.com/ruminant)

ABBREVIATIONS

SOP (Standard Operating Procedure)

PPE (Personal Protective Equipment)

SUGGESTED READING

AK Wiethoellter, D Beltran-Alcrudo, R Kock, and SM Mor. 2015. Global trends in infectious diseases at the livestock-wildlife interface. PNAS 112(31) <http://www.pnas.org/content/112/31/9662.full.pdf?withds=yes>

APHIS: Biosecurity for Sheep and Goat Producers. 2015
https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/sheep-and-goat-health/CT_Biosecurity

APHIS Factsheet: Biosecurity Protecting Your Livestock and Poultry. 2007
http://www.tahc.state.tx.us/news/brochures/USDABrochure_LivestockPoultryBiosecurity.pdf

Department for Environment, Food and Rural affairs. Improving Lamb Survival. 2004
http://www.fao.org/fileadmin/user_upload/animalwelfare/lambsurvival.pdf

A Elbers and R Knutsson. Agroterrorism Targeting Livestock. 2013. Biosecurity and Bioterrorism 11(1)
<http://online.liebertpub.com/doi/pdfplus/10.1089/bsp.2012.006>

Food & Agriculture Organization of the United Nations. 2007. FAO Biosecurity Toolkit.
<http://www.fao.org/docrep/010/a1140e/a1140e00.htm>

National Animal Disease Information Service. 2016. Abortion in Ewes
<http://www.nadis.org.uk/bulletins/abortion-in-ewes.aspx>

R Casagrande. 2002. Biological Warfare Targeted at Livestock. Bioscience. Oxford Journals
<http://bioscience.oxfordjournals.org/content/52/7/577.full>

Texas A & M University. 2011. Major Zoonotic Diseases of Sheep and Meat Goats
<http://iiad.tamu.edu/wp-content/uploads/2012/06/Meat-Goat-and-Sheep-Part-2-English.pdf>

DG Pugh and AN Baird. 2012. Sheep and Goat Medicine. W.B. Saunders

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CLIENT EDUCATION HANDOUT AVAILABLE ONLINE