Biosecurity in livestock production

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Introduction

Too often the conception of "biosecurity" is limited to "the measures to be taken to prevent the introduction of new infectious diseases into a herd". In our opinion it should go beyond this limited approach. A better coverage of the principles of biosecurity is to be found in the definition given by Harvey: "all the steps you must take to protect your herd from disease". This, however, widens the definition such that it becomes impossible to cover all aspects in one article. What we hope to present here is an enumeration of various building-stones of the fortification needed to reach optimal production performance combined with maximum food-safety, this without being able to compose the total building.

One thing must be clear, "health management" (another word for biosecurity) must be "a lifestyle" and does not allow for compromises. When it is in regard to biosecurity, more than in any other field, the chain will break at the weakest link.

Biosecurity: prevention of introduction of infections from outside.

A lot of people have described the risks of disease introduction and have tried to quantify and specify these risks. Recently Sandra Amass et al. have written a review on pathogen transmission, survival and disinfection. This review describes the known pathways of possible introduction of pathogens into a herd and lists the literature available. From this review it becomes clear that a lot is still unknown or only tested under laboratory circumstances. It is concluded that until more is known, it is hard to tell what to do. There is a risk that when ineffective biosecurity measures are put in place they will unnecessarily increase costs. On the other hand, insufficient biosecurity measures not only may present a risk to the unit itself but also may put total populations in an area at risk for economically devastating disease outbreaks.

These conclusions justify an approach of common sense in avoiding possible introduction of infections. A listing of the measures will always have the risk of being incomplete but still we would like to mention the most important ones:

- **Location of the farm:**
- Although often a given fact, knowledge of the surroundings and the risk factors involved are of high importance. This includes geographical setting, prevailing wind, situation in relation to traffic, etc. In this respect it could be an interesting option to negotiate with direct neighbours on equalising sanitary status and possibly using the same sources of breeding stock and finisher pigs.

- **Functional fencing and entry control:**
  - Fences not only should surround the farm as such but also need to be checked regularly for quality. They should be dug in or placed on a concrete foundation in order to avoid entry of vermin.
  - A functional gate - with call-bell included - ensures that unexpected visitors and vehicles are kept out.
- **Introduction of new genes**:
  - Limit the number of sources of breeding material (preferably single source) and know the health status of both your own unit and the unit of origin (monitoring and matching)
  - Well organised transportation policy (cleaning & disinfection, top-down logistics, filtered air inlet)
  - (Isolated) quarantine and adaptation (Q&A) as the routine of introduction of breeding stock; respect time needed for Q&A before introduction (6-12 weeks)

- **People:**
  - Limit visitors to the unavoidable minimum, define a minimum downtime of pig contacts (depending on the health level) and log the contacts in order to have a guarantee and to be able to trace possible failures
  - Use an effective hygiene-sluice, preferably work with shower-in and shower-out procedures or at least have people change into farm-owned clothing and wash their hands before entry. Be sure this counts for all people entering the unit (owner and veterinarian included)
  - No uncooked meat allowed inside the unit
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- **Other animals:**
  - Prevent entry of animals
    - Birds: wire netting over in-/outlets
    - Vermin: rodent prevention (fence) and eradication
    - Flies: prevention and eradication (cleaning, disinfection, manure pit management)
    - Other animals (also pets): keep them outside
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- **Feed:**
  - Avoid (non treated) animal sourced ingredients
  - Always check the quality of the raw materials and their storage
  - Use methods to minimise contamination risks (i.e., pelleting, acidification, prevention of excessive buffering capacity etc.)
  - Delivery of feed at the fence line of the premises
  - Regular inspection of feed containers, transport-lines, troughs etc. to avoid build up of infections and mould

- **Materials & maintenance:**
  - New and easy to clean materials
  - Only use farm owned equipment and materials
  - Don't economise on quality (maintenance)

- **Deliveries & contacts:**
  - Animal dispatch at fence line (delivery unit)
  - Manure storage and removal at fence line
  - Carcass and waste storage (cooled) at fence line
  - Clean (paved) places where outside trucks and cars park
  - Drain the liquids and solids from external cleaning to storage outside the perimeter fence separated from (internal) manure storage; give extra attention to the cleaning & disinfection places for the delivery lorries.

On farm biosecurity

Not only is it important to keep diseases out, but it is also important to prevent a disruption of the balance between existing pathogens and the defence mechanisms and immune status of the present stock in the farm. A keyword for this is stress prevention where stress often triggers a misbalance.

- **Strict separation of clean and dirty area:**
  - It is very important to prevent any introduction of infectious agents from outside, as it disturbs the balance inside the unit.
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- **Housing aspects:**
  - Good quality flooring and installations ("clean-ability", maintenance & repair)
  - Keep pig density within limits (# animals per m^2 and per m^3)
  - Present the right environment per animal type (ventilation, temperature)

- Separate ages and categories and work all-in all-out per compartment (cleaning and disinfection routines)
- Limit age differences within compartments especially in younger ages
- Have places available for sick animals (sick-pen, sick-bay)
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➢ **Management aspects:**
- Strict working routines (daily / weekly) and in farm logistics
- Cleaning and disinfection routines (allow units to be dry and empty)
- Foot dips, hand sanitation etc.
- The premises are to be kept neat and clear
- Monitor animal behaviour
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➢ **Health monitoring:**
- Daily health checks of all animals (use colour markers)
- Check on effects of treatments
- Make notes
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➢ **Vaccinations and immunity:**
- Introduction of new animals through isolated quarantine / adaptation
- Balanced build up of parity structure (herd immunity)
- Guarantee colostrum uptake by new-born piglets
- Strictly follow the vaccination scheme (adapted to the need of farm and region)
- Correct storage and handling of vaccines and vaccinations
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➢ **Treatments:**
- Reduce treatments to the minimum
  - Treat only on indication and monitor the effect
  - Use laboratory results and sensitivity tests
  - Work according to protocols (consult the vet)
- Prevent preventive and routine treatments, they often cause more harm then cure
- Preference in route of administration of medication:
  - Injection --> drinking water --> top dressing --> in feed
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- Be aware of negative side effects of treatments
  - Induction of resistance
  - Killing "the good ones with bad ones", possible disturbance of the intestinal flora (colonisation of single strains of bacteria)
  - Risk of residues in the in food chain (consider withdrawal times)

Herd health monitoring and quality assurance programs

Herd health monitoring systems are put in place in more and more production chains. This allows supplier and client to be aware of their actual health status and to anticipate such that an optimal match can be put in place.

Quality Assurance Programs not only have to be considered as restrictive bodies providing guarantees to the processor, the retailer and the final consumer but when

organised properly also act as a source of valuable information flowing back to the producer.

Following the steps of HACCP (Hazard Analysis of Critical Control Points) will keep people alert on biosecurity policies in their units. This has to be an ongoing process in order to prevent weak links from appearing in the chain.

Conclusion

Biosecurity does not allow us to target one specific infection but has to protect against all possible disturbances in the balance of health on a farm. It has to be a way of living in intensive livestock production to ensure the production of healthy products in a healthy way.

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