Animal Health Management

Review of issues that influence Animal Health Management

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PRODUCTION SYSTEMS AND ANIMAL HEALTH MANAGEMENT

Introduction

Production systems have a profound effect on animal health management. They are systems in which animals are raised in varying degrees of confinement and are to a greater or lesser extent fed and tended. Broadly divided into extensive and intensive production systems, the aim is generally to reach production goals in the most cost-effective way possible. The least developed type of production systems, in which animals are grazed on communal land and receive a minimum amount of care and feeding, are usually characterized by low productivity, but may nevertheless be the most cost-effective way for poor owners who do not have good market access. However, commercial farmers expect a better return and large investments have been made in developing animals and production systems that will yield a high return on the investments made.

Classification of production systems

The characteristics of production systems are discussed in detail in modules on livestock production. More details are also available in Module 1.2 on the influence of production systems on animal health management. For the purposes of the animal health management modules the classification system is based on the implications of the different systems for animal health management (rather than on socio-economic considerations such as potential to generate income):

- Extensive production systems
  - Sedentary (fixed) systems
    - Ruminant production
      - Commercial
    - Subsistence and communal grazing land
  - Pig production
  - Poultry and ostrich production
Nomadic/pastoralist systems: cattle, sheep, goats, camels

- Landless production systems in the peri-urban setting
- Intensive production systems
  - Zero-grazing dairy
  - Feedlots (cattle, sheep, goats)
  - Pigs
  - Poultry
  - Crocodiles

## Extensive livestock production systems

Extensive livestock production systems are systems in which animals are kept free-range for part or all of their production cycle.
Commercial ruminant production

The principal infectious disease threats are vector-borne diseases, reproductive diseases and, in most parts of Africa depending on the area, wildlife/livestock interface diseases. The main challenges for animal health management are:

- Sufficient observation to ensure early diagnosis of problems
- Logistics of rounding up for observation, vaccination and treatment
- Applying the necessary level of biosecurity to prevent uncontrolled access to pastures and animals

Production on communal grazing

In addition to the above diseases and challenges, additional challenges to animal health management are:

- Failure of treatment, e.g. prophylactic treatment against parasites, because not all the animals are treated owing to different levels of commitment amongst owners, resulting in high levels of pasture contamination
- Build-up of pathogens that may affect production and reproduction (Brucella spp., Mycobacterium bovis, Salmonella) as a result of limited availability of land
- Complete lack of control over access to the land by people, newly introduced animals and sometimes wildlife, resulting in exposure to a wide range of new pathogens including fatal diseases like MCF
• Uncontrolled movement of animals

**Extensive pig production**

Most extensive pig production in sub-Saharan Africa occurs in traditional systems in which pigs are never confined, confined only at night or seasonally to protect crops, and find most of their own food.

![Scavenging pigs, Ghana](image)

Pigs kept extensively are free from the majority of infectious diseases that commonly occur in confined pigs, such as PRRS, porcine multisystemic wasting syndrome, porcine pleuropneumonia, enzootic pneumonia, swine dysentery, porcine proliferative enteropathy, Glässer’s disease to name a few), but are more prone to ASF and CSF because they may be in contact with wild pigs, carcasses of pigs that have died, and pigs from other herds. Large populations of free-ranging pigs can become a reservoir in which the viruses of those diseases can circulate for long periods of time, probably indefinitely. They also often have access to human waste and in that way ingest the eggs of the pig tapeworm, *Taenia solium*, and become infested with the cysts formed by the larvae that migrate mainly to striated muscle. Ingestion of raw or undercooked pork containing cysts by humans, the definitive host, enables the cycle to be completed. There are no known clinical effects on the pig, and the effects of human taeniasis are generally mild, but neurocysticercosis caused by pig tapeworm, resulting from accidental ingestion of the eggs by humans and migration of the larvae to the brain, is a serious zoonosis recently recognised by WHO as a ‘major neglected disease’ and a major cause of epilepsy in sub-Saharan Africa and many of the poorest countries elsewhere where free-ranging pigs are raised and hygiene standards are low. Pork that is infested with cysts is not able to be sold in the formal market.
The main challenges for animal health management in extensively kept pigs are:

- Lack of observation leading to delayed diagnosis of serious diseases
- Lack of investment in pig health by their owners
- Lack of awareness by the owners about diseases like porcine cysticercosis
- Uncontrolled movement of pigs
- Difficulty in applying preventive or control measures

In compliance with consumer demands for pigs to be kept under more natural conditions, pigs in outdoor systems are becoming more frequent in developed countries, for example member states of the European Union, with pressure on other pig-producing countries to follow suit. These systems differ markedly from the traditional extensive systems in that the pigs are fed, the property is fenced and there is likely to be some health management by the owners. Many of the diseases to which confined pigs are prone will be eliminated because pathogens are less concentrated and may be destroyed by exposure to the elements. However, increases in helminths including large roundworm (*Ascaris suum*) have been observed. Although the origin of the outbreak of CSF in UK in 2000 was never confirmed, it was first diagnosed in outdoor sows and it appeared that the disease may have been present for some time before it was noticed. It was also surmised that the first infection could have been due to infected material being fed by a passer-by to outdoor pigs, although this was of course impossible to prove.

**Extensive poultry and ostrich production**

There is inevitably contact between poultry kept out of doors and wild birds, which can enhance the chances of infection with Newcastle disease and avian influenza. As in all extensive systems, it is more likely that disease, unless it causes high mortality, will not be noticed and will be able to spread throughout the flock before it is noticed. This is particularly true in the case of subclinical infection, which apparently occurred in the 2011 outbreak of H5N2 avian influenza in South Africa. Like outdoor pigs, outdoor poultry flocks are spared the diseases of intensification that can occur in housed birds. For more information on extensive poultry production systems see modules on poultry health and production.

**Nomadic/pastoralist systems**

Nomadic systems involve cattle, sheep, goats and camels, as the other commonly kept species of livestock are not susceptible to herding and therefore to moving about with their owners. The movement of herds varies from seasonal movement over relatively short distances to take advantage of grazing that is only seasonally available in another area to long-distance movements that may involve crossing the borders of one or more countries. Nomadism is a major reason why diseases like foot and mouth disease, peste des petits ruminants (PPR) and sheep-
and goatpox and camelpox have proven impossible to eradicate, because flocks regularly come into contact with new flocks and infections can be exchanged. The main challenges for animal health management are:

- Mingling of herds and flocks that originated from different areas at water points, in grazing areas and at markets
- Inconsistent or no access to animal health services

On the other hand, nomadic livestock owners are usually strongly dependent on their animals for their livelihoods and will often take the best care of them that they can based on a fund of traditional knowledge.

Landless livestock production systems

Landless livestock systems refer to those systems where livestock are raised on a minimum amount of land, generally on land that is not dedicated to the purpose of keeping livestock. They are in this module restricted to smallholder production in the urban and peri-urban setting, i.e. backyard farming. Most backyard farming involves small stock and poultry, but sometimes cattle and equids are also kept under those conditions.

In terms of diseases, ‘backyard farms’ can range from models of biosecurity to potential sources of outbreaks. Restricting access to a residential property is relatively easy and making sure that a good level of hygiene is maintained prevents living conditions on the property from becoming unpleasant and generating complaints from neighbours. However, unhygienic conditions may prevail in poorer communities. These will attract flies and rodents. Wet conditions can lead to foot and skin problems. The main challenges for animal health management are:
Lack of hygiene that results in a build-up of pathogens including internal and external parasites and consequent disease; consumption of rotting material can result in botulism

Feeding animals on waste material that in the worst case scenario may emanate from a port and contain infective material that will introduce an epidemic disease like ASF, CSF or FMD

Lack of information about the animals being kept in backyards, which complicates disease control, particularly in an outbreak

Lack of awareness and resources on the part of the owners

**Intensive livestock production systems**

Many of these systems are also essentially “landless”, since the animals are housed and fed. They include feedlots for cattle and small ruminants, zero-grazing dairy production, and indoor and semi-indoor systems for pig and poultry production, as well as production of more unusual species like rabbits and crocodiles. A production system may combine extensive and intensive components, depending on the production stage of the animals. Thus, dairy cattle may be kept on pasture but calves are raised in indoor systems; dry sows may be kept in large outdoor camps in pig production systems that are otherwise fully intensive.

Biosecurity measures are easier to apply in intensive systems, particularly if the animals are housed, as it is possible to restrict access and to plan the farm so as to minimise entry of vehicles and people to the facility. However, internal biosecurity can become a problem because large numbers of animals are being kept at close quarters and a build-up of pathogens is likely unless hygienic measures are strict. The main challenges for animal health management in intensive production systems are:
• Maintaining a management plan and level of biosecurity that will be effective in preventing disease but affordable; this will have a strong emphasis on hygiene and disinfection as well as restricting access to the facility where the animals are kept

• Reducing stress as far as possible

• Ensuring rapid detection and intervention in the event of a disease occurring to minimise its spread and effect on the herd or flock