Biosafety

It is the development and implementation of a set of strict operating policies and standards that will have the function of protecting animal production against the introduction of any kind of infectious agents, whether they are virus, bacteria, fungi and/or parasites.

Once a solution of continuity occurs in the biosafety of a production system and determined pathogen(s) contaminate the herd(s) it is necessary for the biosafety program to be redesigned immediately and adapted to the new health situation of the system under analysis.

This is, if it were economically, technically and legally possible to cohabitate with the infectious agents now present in he system, the biosafety program should pre-establish standards (new vaccines, different production flows, separation of production phases, etc.) that allow maximum control of multiplication and dissemination of these agents as well as a minimum impact on system productivity.

There are certainly a lot of subtle variations, others not so much, when people define biosafety, but generally, all biosafety definitions must, obligatorily, include the following principles:

- Control of multiplication of endemic biological agents. An uncontrolled growth in the population of these organisms could cause a chronic negative effect (decrease) in the performance and productivity of the herds.
- Prevention of contamination of herds by highly contagious and potentially lethal organisms. These may have devastating effects on the production system.
- Control (and prevention) of those infectious agents of importance in public health (zoonoses). The presence of some of these agents, for example, salmonellas, can pass unnoticed because they will not always affect the performance of contaminated animals.
- Control (and prevention) of those infectious agents of vertical transmission that may not only affect performance and productivity of the progeny as they can be disseminated easily on a large geographical area and can affect a lot of independent production systems.

Biosafety is a technical concept, or even, a technical philosophy applied to health of animal living beings, and in this case, the herds of modern animal production. Through specificity and at the same time coverage of its technical conceptuation, the term biosafety becomes much more appropriate when the matter is animal health.

Components of Biosafety

As reported above, biosafety are procedures designed to mainly prevent the entry and dissemination of diseases in an animal production system or to

maintain under control existing diseases in the system. This is reached through maintenance of lesser possible flow of biological organisms (virus, bacteria, parasites, fungi, rodents, wild animals, people, etc., etc.) through borders of the production system.

No disease prevention program will be effective without this basic procedure. Biosafety has basically nine main technical operating components that function as links of a chain. That is, a biosafety program will only reach full success when all links of this chain are firmly joined to each other. Each of these links needs permanent maintenance and review to avoid points of weaknesses in the chain or consequent failure in the biosafety of the system.

That is, the effectiveness of a biosafety program will always be equal to the resistance of the weaker link (component) of the chain.

The chain of basic components of a biosafety program.

The links of the biosafety chain have already been described, at different detailing levels, in other publications, and this article will be limited specifically to some main general aspects related with biosafety programs for broiler farms. However, it is important to emphasize that all aspects discussed herein, can , in their totality, be applied to turkey fattening farms. **Definition of Challenge and Risks**

Before the elaboration and implantation of any BIOSAFETY PROGRAM, it is necessary for an analysis and definition of risks and challenges to be conducted to which the animal production system is liable. That is, the following questions must be answered in an organized and detailed way.

What are the health challenges of the herd (presence of etiological agents and/or occurrence of symptoms and clinical disease) that must be prevented and/or controlled by the biosafety program to avoid losses of productivity and profitability?

What are the diseases (and their agents) that must be prevented and/or controlled by force of law?

What are the diseases (and their etiological agents) that must be prevented and/or controlled by force of requirement of importing foreign customers?

What are the diseases (and their etiological agents) that must be prevented and/or controlled by force of requirement of national customers

What are the diseases (and their etiological agents) with possibility that may become of obligatory control in short or medium term, that must be prevented and/or controlled by force of law?

What are the possible forms of entry and maintenance / perpetuation

(epidemiology) of these diseases (and their etiological agents) in the production system?

What are the failures of the production system in question based on the responses of the previous questions?

Based on the responses of the foregoing questions, the veterinary physician of the system could design a biosafety program directed specifically towards system needs. This will be effective only to the system in question and could not simply be transferred to another production system. Only the basic operating principles of a biosafety program (Figure 2) are applicable to any animal production system.

All operating standards related with each of the principles must be obligatorily be adjusted, modified and adapted to the needs of the production system (shed, nucleus of sheds, farm, nucleus of farms, etc.) where they will be implanted specifically. The risk assessment must be integral part of a well elaborated biosafety program. The risk of introduction of an agent as well as the risks to productivity of the breeding stock and to commercial performance (sales of end products) must be assessed simultaneously. Assessing risks is a difficult process, and many times a large number of aspects must be assumed, although they must always be assumed based on epidemiological scientific knowledge.

There are some official methodologies (protocols, formulas, indexes, etc.) for the analysis of risks of entry of diseases in animal production systems (Pérez-Guatiérrez, 2003).

However, although these methodologies may be well documented and reliable, normally they show to be much more effective and practical for governmental risk assessments of national and international scope. The main point is that the veterinary physician responsible for the biosafety program has some formal type of assessment of biosafety risks of the production system (for example, scores or indexes of: a) rodent infestation, b) biosafety level of facilities, c) biosafety level of the animal feed or ration plant, etc. This way alone, the biosafety program could really contemplate the largest number possible of failures and breaches of the system.

Two of the most important tools that propitiate the success of a biosafety program is the HACCP methodology (Hazard Analysis and Critical Control Points) and GMP (good Manufacturing Practices). HACCP is a scientific methodology of processes that aim to identify and to minimize biological and/or microbiological, chemical or physical hazards (risks) associated with the manufacture and operations of services of the food area.

Now GMP is the methodology used in the description of procedures and practices that aim to prevent the introduction of pathogens that may affect health of birds and/or cause public health problems.

Both methodologies, HACCP and GMP, applied to animal production are very well described by Grando et. al. (2004) and must be attentively studied by all those involved in the elaboration, implantation and maintenance of a biosafety program