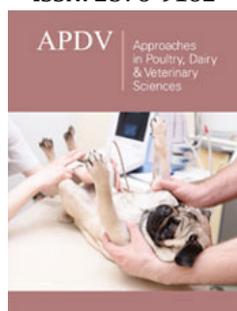


Biosafety in Livestock Facilities, The Road to Efficient Productivity

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ISSN: 2576-9162



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Submission:  August 25, 2020

Published:  September 10, 2020

Volume 7 - Issue 5

How to cite this article: Betancur OJ, Giraldo-Ríos C. Biosafety in Livestock Facilities, The Road to Efficient Productivity. *Appro Poultry Dairy & Vet Sci* 7(5). APDV. 000674. 2020.
DOI: [10.31031/APDV.2020.07.000674](https://doi.org/10.31031/APDV.2020.07.000674)

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Abstract

Biosecurity is a fundamental pillar of livestock production, which allows preserving the health status of the animals. Biosecurity focuses on preventing both the possible entry of infectious agents, and their spread within the farm. At a global level, there are multiple biosafety studies and protocols that are recommended for livestock farms; the implementation of any of these must be based on the epidemiological reality of each farm. Any investment to prevent the entry of infectious agents will pay off financially by maintaining the health of the animals, humans, and the environment, one health concept, and obviously the productivity of the animals. Pest control is a fundamental part of biosecurity protocols. It is always suggested to use products (disinfectants, pesticides, vaccines, etc.) of proven efficacy and good quality.

Introduction

Health, one of the basic pillars of animal production, nowadays finds its best ally in the implementation of biosafety practices. Poultry farmers and pig farmers have come a long way in this regard; however, in some parts of the world, cattle farming systems remain in a “sanitary comfort” zone, where biosecurity programs are not optimally used [1]. When we talk about biosecurity, we talk about prevention. Preventing the introduction of harmful agents (pathogens, toxins, or pests) to a farm is known as bioexclusion; on the other hand, to prevent the spread of harmful agents within the farm it is called biocontainment [2]. The main objectives of biosecurity in livestock farms are to preserve the sanitary status of animals and ensure the production of safe food [3].

Some of the benefits of biosecurity on livestock farms include: improving animal health and welfare, which translate into increased productivity, and therefore greater efficiency and profitability; produce safe, healthy and high quality meat, milk and its derivatives; help prevent the introduction of external diseases; decrease the economic losses of some diseases that cannot be treated or controlled using vaccines or other management strategies (for example, leukosis); minimize the spread of infectious agents from one region to another and from one stable to another; reduce disease treatment costs; reduce the use of medications; increase consumer and buyer confidence; protects human health; maximizes genetic export markets [4]. The resources necessary to protect against the incursion of a disease can be compared to the impact of the disease in the event that biosecurity fails. It has been possible to determine a positive cost-benefit ratio of 1:1.6 (for every dollar invested there is a return of 1.6 dollars) in favor of the implementation of a biosafety program [5].

A biosecurity program is normally developed from a risk assessment process, where the most epidemiologically important diseases for the particular farm are identified; later, a plan is developed to prevent the introduction of harmful agents or their spread within the herd, which requires an optimal understanding of their biology and epidemiology. The next step is the implementation of the program and finally its evaluation [6]. The plan must be written as a standard operating procedure of strict compliance, and must be socialized and understood by all the employees of the farm, here the alignment between the producer, the veterinarian and all the employees of the company is key [7].

In general, livestock biosecurity programs should include:

A. external barriers, such as functional perimeter fences, closed entrance door and with warning signs for visitors, defined parking area and away from animals, sanitary showers [2];

B. plan for the introduction of new animals, buy only animals with a known sanitary status, buy certified semen free of diseases, an adequate quarantine process that allows total isolation with the other cattle on the ranch (they should not share water, food, feces, or contaminated fomites), constant clinical diagnosis and laboratory tests, initiation of the vaccination and antiparasitic plan [8];

C. quality food and drinking water;

D. cleaning and disinfection plan of vehicles, facilities, tools, equipment [2], boots (correct use of foot baths or disinfection mats) [9], for which it is essential to use products of proven efficacy, and ideally disinfectants that act on presence of organic matter;

E. farm staff and visitors, use the stable's own clothing (boots and overalls), records of entry and origin of external personnel, quarantine of visitors, adequate personal hygiene, employee training programs [10];

F. biofertilization of paddocks with manure, in case the local authorities allow its use, it is very important to know the pathogenic load of any manure that is used for this purpose and its sanitary implications; ideally if that manure is previously bioremediated or sanitized before use

G. pest control, implement disinfection practices (especially flies) and rodent control [3].

Today integrated pest management has been commonly referred as bioprotection. Pests are an economic, health and social problem, due to food contamination, damage to facilities, transmission of infectious agents, reduced production, as well as being a constant nuisance for animals and employees. Its epidemiological importance is such that pest control is suggested as a critical control point within livestock facilities [11].

It has been determined, for example, that a rodent can consume 10% of its body weight daily and contaminate 10 times what it is consumed [12]. Rodents can consume and contaminate the balanced feed with feces, urine, and hair, reducing palatability for livestock [13], or worse, contaminated feed represents a significant risk of infection for cattle, as it is clearly established the role of rodents as vectors of a wide number of pathogens, including *Leptospira spp.*, *Salmonella spp.*, *Cryptosporidium spp.*, among others [14]. On the other hand, house flies (*Musca domestica*) are a nuisance for employees and animals, and if not controlled, they can irritate cows, reduce feed conversion and milk production due to the stress they cause in animals. Flies are carriers of a large number of infectious agents; its relationship with infectious mastitis, has been verified, and severe infestations can increase the bacterial

count in milk [15]. Control of flies and rodents must be carried out under an integrated pest management model, which requires discipline, creativity, and the use of products with proven efficacy.

In summary, ranchers need to be aware of the importance of biosecurity plans in their herds. Prevention will always be better than cure. Any biosecurity program must be adjusted to the epidemiological conditions of each farm, as well as the available resources. Comprehensive pest control is a key element as a biocontainment and bioexclusion mechanism in livestock herds. Preserving the health status of our animals is the best way for an efficient production.

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