EPIDEMIOLOGICAL SURVEILLANCE AND ACTIONS OF THE OFFICIAL VETERINARY SERVICE FOR THE PREVENTION AND CONTROL OF EQUINE INFECTIOUS ANEMIA IN THE STATE OF GOIÁS, BRAZIL

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ABSTRACT

Equine Infectious Anemia (EIA) is one of the main diseases that affect equids. Its prevention, control or even eradication are among the main objectives established by the National Equine Health Program (PNSE). The state of Goiás is an important national reference in equine breeding. Equids in general generate financial foreign exchange for Brazil, in the order of billions of reais annually and an estimated generation of jobs, indirectly, above two million employed people. Goiás has an equine population of over 380 thousand animals. Equine farming has direct interference in the most diverse Brazilian communities, whether at work, sport, leisure or health. Numerous centers for training, breeding and concentration of equids are present throughout the country. Infection occurs by transmission of blood from infected to uninfected horses. The diagnosis of EIA is made by the AGID test. It is estimated that only 10% of the equine population has been tested and that the prevalence in Brazil and South America ranges from 2-3%. In 2018, Goiás had 17 anemia outbreaks completed and another 33 remain pending. EIA is a disease that has no treatment or vaccine with wide efficacy. In order for blood serum to be collected, the professional in charge must be accredited by the SVO (Official Veterinary Service). Acquiring animals with negative tests for EIA, using disposable needles, isolation of positive animals and the sacrifice or sanitary slaughter of HIV-positive people, are among the main prophylaxis measures to be taken. Considering the importance and relevance of this disease, the objective of this work is to review the literature of the most diverse concepts in animal epidemiology and health defense, focused on the side of disseminating and contributing to the execution of the actions proposed by the PNSE, both by the SVO, and by the owners, breeders and professionals who work in equine farming, putting into practice what is determined by the current legislation. Animal health surveillance is one of the most demanding points for the control or even the eradication of diseases in production animals.

Keywords: Anemia Infectious Equine. Sanitary Defense. Vigilance. Epidemiology. Equines. Prevention.

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INTRODUCTION

In 2006, the first study that sought to measure the economic and social importance of the horse was published in Brazil. This study allowed us to see several important aspects of equine farming. Over the years, the data were partially updated and even so, this 2006 work continued to be almost the only economic reference for several technical, scientific and journalistic articles. In the economic aspect, the main changes occurred. At the time, based on 2005 values, it was found that the financial transaction totaled R$ 7,501,791,653.88 (MAPA, 2016).

Considering equine breeding, Equine Infectious Anemia (EIA) is a disease of significant importance and economic impact. It is an infectious disease of mandatory notification; For transit and participation in events, it is necessary to submit the animals to laboratory examination. It affects both horses, mules (donkeys and mules), and donkeys (donkeys), regardless of sex or age. However, the clinical course of EIA virus infection has been widely studied only in horses. The same occurred in serological surveys, in which the investigation of the occurrence of EIA has usually been estimated in populations of majority horses. Donkeys do not show clinical signs similar to those of horses/ponies infected by pathogenic strains of the IEA (OLIVEIRA, 2016).

According to MAIDANA (2011) and ALMEIDA, et al. (2006), cited by OLIVEIRA (2016), EIA is currently the major obstacle to the advancement of equideoculture, as it is an incurable and easily transmissible disease, causing losses to breeders who need the commercialization of these animals and harming the improvement of breeds, in addition to preventing access to the international market.

CURVELO (2014) mentions that, according to Ribeiral (2006), animals in the field that are not submitted to diagnosis represent a risk for the maintenance and dissemination of the disease on the properties, thus justifying the need for serological surveys that evidence and trace an epidemiological profile of the EIA, as well as the real prevalence rate of the disease in the different Brazilian biomes and states, because these indexes, together with the survey of risk factors associated with the disease, are of great importance as a subsidy for strategic decision-making for the control of the disease.

Assuming the existence of two distinct systems: one of care and the other of surveillance, the use of the expression "animal health care and surveillance systems" was common in South American veterinary services. This terminology is present mainly in technical and normative documents produced until the end of the 90s, in the case of Brazil, with emphasis on the classification system of the federation units, such as the classification according to the levels of three risks for foot-and-mouth disease. In short, these two

systems are complementary to each other, and are often confused, and the existence of a good sanitary or epidemiological surveillance system is only conceived from the existence of a structured veterinary care system (MAPA, 2007).

It can be said that, in an instructive and synthesized way, the veterinary care system represented the necessary structure for the practice of epidemiological surveillance. The term "attention" thus encompassed information regarding physical resources (consumables, laboratory, offices, vehicles, means of communication, etc.), human resources (and distribution of personnel, quantity and quality) and those associated with the political and legal fields (line of command, political will and legal instruments), while the term "health surveillance" involved information related to operations such as, for example, number of visits to rural properties, number of animals inspected, results of serum-epidemiological studies, among others (MAPA, 2007).

The veterinary surveillance structure involves, in each instance of the agricultural health care system at the federal and state levels, the coordination of animal health information, laboratories, standardization of procedures, human, material and financial resources. In the present study, the nomenclature "veterinary surveillance" will be used to mean epidemiological surveillance activities in the field of animal health, including structural or care aspects (MAPA, 2007).

Equideoculture plays an important role in state and national agricultural activity. Based on this, we will explain from now on, about one of the main diseases of Equids, guided and governed by the PNSE – National Equine Health Program – which MAPA – Ministry of Agriculture, Livestock and Supply – brings to breeders and professionals of equestrian agribusiness: Equine infectious anemia, also known by the acronym "AIE".

The objective of this work is to detail the main animal health defense actions, with a view to applying sanitary measures for the prevention, control or eradication of equine infectious anemia in the state of Goiás, created and developed by the national health defense agency (MAPA) and executed by the animal health defense agencies in the states of the federation that, in the case of Goiás, it is the Goiás Agency for Agricultural Defense – Agrodefesa.

LITERATURE REVIEW

EQUINE BREEDING IN BRAZIL AND THE HORSE AGRIBUSINESS COMPLEX

In Brazil, CEPEA (Center for Advanced Studies in Applied Economics), in partnership with CNA (Confederation of Agriculture and Livestock of Brazil), has been measuring the GDP (Gross Domestic Product) of agribusiness, including dividing it into agricultural and

livestock. It is observed that the participation of agribusiness in the total income generated in the country has remained between 20% and 25%. The production chain can be understood as a cut within the broader agro-industrial complex. Thus, inserted in agribusiness, there are the chains of soybeans, oranges, milk and various agricultural products. Unlike many agricultural activities, horse agribusiness does not fit into a standard structure, with a linear production chain. In reality, there is a series of intertwined chains, forming what is called an agricultural complex (MAPA, 2016).

As for the international trade in live horses, the problems with statistical data are not limited to the number of animals that make up the national herd. Other relevant information also presents divergences according to the source and operational limitations, as is the case of imported and exported animals. There are at least three important sources for this data: the FAO (Food and Agriculture Organization of the United Nations), the MDIC (Ministry of Development, Industry and Foreign Trade) and VIGIAGRO (International Agricultural Surveillance System), linked to the Secretariat of Agricultural Defense of the Ministry of Agriculture (MAPA, 2016).

The horse agribusiness complex directly employs 607,329 people. Considering the fact that each direct occupation provides four other indirect occupations, it is estimated that 2,429,316 indirect jobs are generated. Thus, the complex is responsible, directly and indirectly, for 3 million employed people (MAPA, 2016).

According to the 2017 agricultural census, carried out by the IBGE – Brazilian Institute of Geography and Statistics -, the population of equids (donkeys, horses and mules) in Brazil is in the order of 5,207,652 animals, clustered and distributed in 1,684,714 breeding establishments.

Comparing the IBGE data, in the 2017 agricultural census, which points to the state of Goiás with an equine herd of 344,715 animals, we observe a significant increase in this volume, when comparing with the data published by SEGPLAN - State Secretariat for Management and Planning - in 2017, with reference to the base year of 2016. This number pointed out by the IMB – Mauro Borges Institute – was 356,611 horses accounted for in the state of Goiás. As we can see in table 1 below (IMB/SEGPLAN, 2018).

Table 1 - Equine herd herd in the State of Goiás, in head, in the years 2014 to 2016.

Year	Equines
2014	385.525
2015	380.405
2016	365.611

Data Source Provider: Instituto Mauro Borges/SEGPLAN-GO (2018)

Some important factors for this discrepancy in the numbers obtained by the institutes; Among them the methodology used, failure to compile data, inefficiency of the personnel responsible for the interviews, lack of follow-up by the team, among others. Or even think of a real increase in this number of horses in Goiás, on the part of the study carried out by IMB/SEGPLAN, considering that it is an institute that belongs to our state and, theoretically, would have better and more precise conditions to do a more thorough and judicious work, than that provided by the IBGE in 2017.

SANITARY SURVEILLANCE, EPIDEMIOLOGY, ANIMAL HEALTH EPIDEMIOLOGICAL REPORTS AND ANIMAL HEALTH DEFENSE

> Some authors classify surveillance actions as primary, secondary, and tertiary, while others classify first, second, and third barriers. Another widely used classification is the definition of actions performed as passive or active measures. The term passive surveillance has generally been used to characterize routine activities involving the care of suspected disease occurrence or the description of the animal population of a region (BRASIL, 2007).

A clear example of this type of surveillance is seroepidemiological monitoring and surveys. According to the manual of veterinary surveillance of vesicular diseases (2007), regardless of the denomination used, epidemiological surveillance applied to animal health, or veterinary surveillance, consists of the following activities: obtaining and recording relevant epidemiological information; consolidation and analysis of the data collected; decision and establishment of preventive procedures; execution of emergency operations and notification and dissemination of communications with information about the disease and the results of the measures applied in all available means to reach a large part of those involved by the surveillance system (feedback).

A good surveillance system must have some characteristics, among them: sensitivity, specificity and timeliness (BRASIL, 2007).

> The veterinary surveillance system is also responsible for establishing the appropriate legal and administrative framework, applying all necessary resources to improve the efficiency performance of controls, including personnel, equipment, vehicles, and financial resources. It is also responsible for training personnel and developing mechanisms to involve the services of other government and private sectors and producers in the veterinary surveillance system (BRASIL, 2007).

The first record of the use of the expression "epidemiology" was in 1802 in Spain, with the historical meaning of epidemics. The physician, scientist and sanitarian John Snow (1813-1858) is considered by many to be the father of epidemiology, due to his famous studies on the cholera epidemic in London; the oldest and most illustrative example of the importance of mapping at the local scale is Dr. John Snow's map of cholera deaths in the Soho district of London in 1848 (ACOSTA, 2012).

According to MADUREIRA (2015) cited by ACOSTA (2012), the dictionary of epidemiology of Last (1995) defines epidemiology as the study of the distribution and determinants of health-related phenomena or states in specific populations, and the application of the results to control health problems.

Another definition of Epidemiology is the science that studies the health-disease process in society, analyzing the population distribution and the determinant factors of diseases, damage to health, and events associated with public health, proposing specific measures for the prevention, control, or eradication of diseases, and providing indicators that support the planning, administration, and evaluation of health actions (ALMEIDA FILHO and ROUQUAYROL, 1992, apud ACOSTA, 2012).

The OIE is an intergovernmental organization, based in Paris, France, responsible for regulating animal health worldwide; they have annual meetings every May, with the international committee. Within health defense, it is the most important body in the establishment of measures for the prevention, control and eradication of diseases in the world. The OIE began in 1920, due to the occurrence of rinderpest in Belgium as a result of the importation of zebu originating in India destined for Brazil. In 1924, 28 countries signed an agreement creating the *Office International des Epizooties (International Organization of Epizootics).* In 2003 it was renamed the World Organization for Animal Health (OIE). Currently, the OIE has the participation of 178 member countries, including Brazil (CHARRO, 2008).

One of the OIE's missions is to ensure the transparency of animal health in the world and to improve the knowledge we have about it. Among the formal obligations of the member countries of the institution, the sending, in a faster (timely) and transparent manner, of information on the pertinent animal disease, including the zoonoses present in

their territory, stands out. For this purpose, a list of diseases of terrestrial and aquatic animals was established that must be reported to the OIE (OIE, 2018).

Among the functions of the OIE, we can mention: collecting, analyzing and disseminating veterinary scientific information; offer experts and promote international solidarity for the control of animal diseases. Provide technical support to member countries in need of assistance for disease control and eradication operations, including zoonoses; support poor countries in helping to control diseases that cause large losses in livestock, as they represent a public health risk and concern member countries. To ensure the safety of world trade, developing sanitary rules for the international trade of animals or products of animal origin (CHARRO, 2008).

The National Animal Health Information System (SIZ) is managed by the Coordination of Information and Epidemiology (CIEP) of the Department of Animal Health, which manages data and information on the occurrence of diseases, as well as other information of interest to animal health. The CIEP is responsible for the immediate notifications of diseases and for the semiannual and annual reports that are sent by Brazil to the OIE, maintaining communication about the occurrence of diseases in the country. The main objectives of the SIZ are: to collect, consolidate, analyze and disseminate animal health information to support the preparation, implementation, evaluation and decision-making on strategies and actions for surveillance, prevention, control and eradication of animal diseases of relevance to livestock and public health; as well as subsidizing national animal health certification with international organizations and countries or economic blocs with which Brazil maintains trade relations (MAPA, 2018).

The SIZ database is based on a list of diseases that must be notified to the official veterinary service. The notification of diseases on the list established by IN – Normative Instruction – No. 50 of MAPA of September 23, 2013, is mandatory for all those who are aware of suspected or confirmed cases, according to the criteria and flows established in the standard. Notification must be made to the official veterinary services of the states – EVS – at the Local Veterinary Units – UVL's – or community service offices, at the headquarters of the EVS's or at the Federal Superintendencies of Agriculture – SFA's – for definition and necessary measures for the control and eradication of diseases (MAPA, 2018).

Until 2013, the OIE list included 141 diseases (FAEMG, 2013). The list is periodically reassessed and in case of modifications adopted by the World Assembly of Delegates (WAD) at its annual meeting, the new list will come into force from the first day of January of

the following year. For the year 2017, the list included 116 notifiable animal diseases, infections and infestations (VETSMART, 2017).

In Brazil, the first list of animal diseases was published by the regulation of the animal health defense service, instituted by decree 24.548, of July 3, 1934, and has since been expanded. This decree was the same one that approved and regulated the animal health defense service in Brazil. It was signed by the then president of the federative republic of Brazil, Getúlio Vargas (MAPA, 2018).

Animal health data collected by the official veterinary service since 1971 are available for consultation. In the period from 1971 to 1998, the data can be consulted in the animal health defense bulletins, and from 1999 onwards, the data can be consulted and extracted using an interactive tool for accessing and importing the data. Every six months, Brazil sends animal health reports on the occurrence of diseases in the country to the World Organization for Animal Health (MAPA, 2018).

Agricultural defense begins with the control of the entry of animals, vegetables and their derived products into Brazil. Luiz Pacífico Rangel described in 2017 the complex routine of agricultural defense in the largest port in Latin America: Port of Santos-SP. A movement of 90,000 containers per month, the need for cargo inspection at import, to prevent the entry of pests and diseases, and the certification for export to more than 150 countries of our agricultural products (MAPA, 2018).

The bibliography on communication in agricultural defense is quite limited, which makes it difficult to deal with the topic without referring to agribusiness in general. According to data from the year 2010 of Abag - Brazilian Agribusiness Association -, agricultural defense guarantees quality and safe supply, contributes to avoid the insertion of pests and diseases in the country and also provides good business opportunities. It is estimated that Brazil does not have access to markets of 20 billion dollars per year in exports, due to diseases that affect our agriculture and that could be eradicated or controlled efficiently (NOGUEIRA, 2013).

EPIDEMIOLOGICAL SURVEILLANCE AND MANDATORY NOTIFICATION: GENERAL CONCEPTS

According to the OIE (World Organization for Animal Health), the definition of epidemiological surveillance is the continuous investigation of a population to detect the occurrence of the disease/infection for prevention and control purposes, and involves the examination (clinical or laboratory) of part of this population (MAPA, 2007).

Notifiable diseases are the diseases on the OIE list, in addition to others that may compromise the national equine herd, the economy, public health or the environment. Any member of the community must immediately report any suspicion or occurrence of notifiable diseases to the unit closest to the agency that executes animal health defense activities. Efforts to prevent the introduction of new diseases in Brazil focus on controlling imports of live animals, animal multiplication material, and products with the potential to transmit etiological agents (MAPA, 2019).

The definition of notification, according to the epidemiological surveillance guide, is the communication of the occurrence of a certain disease or health problem, made to the health authority by health professionals or any citizen, for the purpose of adopting pertinent intervention measures. Historically, compulsory notification has been the main source of epidemiological surveillance, from which, in most cases, the information-decision-action process is triggered (MAPA, 2009).

Among the functions of epidemiological surveillance, we can mention: data collection, processing of collected data, analysis and interpretation of processed data, recommendation of appropriate prevention and control measures, promotion of indicated prevention and control actions, evaluation of the efficacy and effectiveness of the measures adopted, and dissemination of pertinent information (MAPA, 2009).

EQUINE INFECCOUS ANEMIA (AIE)

Equine infectious anemia is a viral, cosmopolitan, multisystemic disease caused by an RNA-virus (BUSATO et al., 2015).

It is an incurable disease with great prevalence in the Brazilian Pantanal, affecting about 50% of service animals (SILVA et al., 2004, apud MARQUES et al., 2012). The virus is classified and known as Equine AIDS (MARQUES et al., 2012). It is also known as swamp fever (SILVA, et al., 2013).

CORREIA (2016) mentions that, according to Aiello et al. (2001), the terms "equine malaria", napping disease or napping are also synonymous for the EIA. Equine infectious anemia was first described in 1843 in France, was recorded in the American continent, in Canada in 1881, in Venezuela in 1960 and in Argentina in 1964 (MONTELARO et al., 1993, apud SILVA, et al., 2013).

In Brazil, in 1954, Bernardino Manente presented clinical and anatomopathological descriptions of EIA during the II Pan-American Congress of Veterinary Medicine, in an experimental case. But scholars of the subject consider that the first properly documented observation is authored by Prof. Octavio Dupont, in 1966, when the author began to

observe the disease among the animals installed in the Brazilian Jockey Club of Rio de Janeiro (MAPA, 1988).

At the time, this diagnosis was established based on findings attributed to the destruction of red blood cells by viral action: presence of sideroleucocytes, deviations in total protein values and fractions in relation to albumin/serum globulin, obtained in the electrophoretic profile, dosage of total serum proteins and seroprotein fractions, as well as the presence of iron deposits in organs of the reticulum endothelial system (MARTINS, 2004 apud, SILVA, et al., 2013).

EIA prevention actions are characterized by being carried out temporarily or permanently, depending on the epidemiological context, through actions, activities, and strategies of health education, environmental management, and animal vaccination, when applicable (BRASIL, 2016).

Once the real situation of risk of anemia transmission (imminent risk) or the introduction of the disease is verified, the epidemiological surveillance area must begin the stage of development and execution of disease control, through appropriate and feasible measures to be applied directly and indirectly to the target animal population, in order to interrupt the disease transmission cycle. Disease control actions, activities, and strategies are subdivided into three types: control of imminent risk of transmission, control of incident disease, and control of prevalent disease (BRASIL, 2016).

After and during the application of the control measures of the target disease, their effectiveness should be monitored and evaluated. Depending on the result of the evaluation, it is necessary to continue with the control measures, until the objective is achieved (reduce or eliminate, when possible, the disease or the imminent risk). Surveillance measures are permanent. It should observe and pay attention to the guidelines recommended in the specific program for the disease, for the appropriate defense, surveillance and control actions, of MAPA (BRASIL, 2016).

MAPA, through the pertinent and current legislation, recommends the sacrifice of seropositive animals to control the disease in most Brazilian regions. In endemic areas such as the Pantanal, the isolation of seropositive animals is allowed, as their sacrifice would cause great damage to extensive livestock in the region, or even make it unfeasible (MARQUES et al., 2012).

No treatment is effective in eliminating the EIA virus, and there is no vaccine. Every Coggins test positive horse should be euthanized, even if it is an unapparent carrier, because of the potential to infect other horses. In Brazil, EIA is a notifiable and mandatory sacrifice disease. It is recommended to perform the Coggins test at least once or twice a

year. Every horse participating in auctions, tests and exhibitions, as well as every horse transported, must present negativity in the Coggins test as a certificate (BUSATO et al., 2015).

Acquire animals with negative tests for EIA, within the expiration date; clean the stalls, to avoid insects; vaccinate or medicate animals only with disposable needles; disinfect equipment before use; participating in events with equine agglomeration where the animals are proven negative for EIA, through laboratory tests, are important prophylaxis measures to be taken by equine owners (MAPA, 2010).

In iatrogenic transmission, humans play an important role in the epidemiology of the disease due to the use of contaminated needles, surgical instruments and utensils, such as bridles and spurs, and can spread the disease within the same herd or even to other properties due to inadequate hygiene and management practices (MORAES et al., 2017).

Another important measure for the prevention of EIA is the isolation of positive animals and the sacrifice or sanitary slaughter of HIV-positive animals (GOIÁS, 2019).

According to current legislation, the results of positive animal tests for equine infectious anemia must be immediately forwarded to the SVO (GOIÁS, 2019).

Normative Instruction No. 45 of June 15, 2004, approves the rules for the control and prevention of equine infectious anemia; among them, it is established, in its first article, the sanitary slaughter of positive animals: article 17, paragraph IV and article 19, sole paragraph. In the case of animal sacrifice on the property, this service must be accompanied by the animal health defense service.

SPECIFIC ACTIONS OF THE OFFICIAL SERVICE IN THE FOCUS OF THE DISEASE

According to article 17 of IN 45 of 2004, the following animal health defense actions must be carried out by the SVO:

> I - Interdiction of the property after identification of the carrier equid, drawing up a term of interdiction, notifying the owner of the prohibition of the transit of equids from the property and the movement of objects that may transmit the EIA virus;
> II - Epidemiological investigation must be carried out on all animals that reacted to the EIA diagnostic test, including transit history;
> III - Permanent marking of the equids carrying the EIA, by means of the application of a burning iron on the left side shoulder with an "A", contained in a circle of 8 (eight) centimeters in diameter, followed by the acronym of the UF, according to the model;
> IV - Sacrifice or isolation of carrier equines;

V - Carrying out a laboratory examination, for the diagnosis of EIA, of all horses existing on the property; Note: identification must be made in a proper and individualized form. The animals will be reviewed, the papers will be filled out and signed by a veterinarian registered by the official veterinary service;

VI - Disinterdiction of the focus property after carrying out 2 (two) tests with consecutive negative results for EIA, with an interval of 30 (thirty) to 60 (sixty) days, in existing equines;

VII – Guidance to the owners of properties that are in the perifocal area, by the official veterinary service, to submit their animals to laboratory tests for the diagnosis of EIA.

Sole Paragraph. The marking of equidae is the responsibility of the official veterinary service and will not be mandatory if the animals are immediately euthanized or sent for sanitary slaughter. If the transport to the slaughter establishment cannot be carried out without a stop for rest or feeding, the animals must be marked and the resting place previously approved by the animal health service of the respective UF.

AGRODEFESA, through IN No. 006 of June 2018, established guidelines for the qualification and registration of veterinarians from the private sector with the official service, for the collection of samples for laboratory diagnosis of EIA and Glanders. With the objective of standardizing the actions carried out by autonomous professionals, as well as greater control of the inspection of documents issued and generated by these professionals, within the scope of animal health defense.

The Agency also has available for consultation, on its website, a manual/booklet for the review of equids, which will be submitted to laboratory tests. It deals specifically with the various types of equine coats. It is a very interesting material, well illustrated and that satisfactorily meets the needs of both field professionals (self-employed from the private sector), breeders and owners, as well as the State Agricultural Inspectors - FEA - for the exercise of their inspection activities.

It is worth mentioning that the qualification of veterinarians to collect and send samples for laboratory tests of Glanders will be granted by the Ministry of Agriculture, Livestock and Supply. The veterinarian qualified by MAPA to request, collect and send samples for glanders laboratory tests will be automatically registered to request, collect and send samples for EIA laboratory tests. For this registration with the Agency, the professional must be mandatorily qualified by MAPA (GOIÁS, 2018).

The culling or isolation of equine animals carrying EIA should be determined in accordance with the standards established by the SVO. When the indicated measure is the

sacrifice of the carrier animal, this will be carried out by the official veterinary service, within a maximum period of 30 (thirty) days, from the result of the diagnostic exam, preferably on the property where the animal is. If it is not possible for the sacrifice of the carrier animal to be carried out on the property, the sanitary slaughter may take place in a slaughterhouse with an inspection service and the transport must be an appropriate vehicle, with a numbered seal applied at the origin. The sacrifice of the carrier animal must be quick and painless, under the responsibility of the SVO; On the occasion, a term of sanitary sacrifice will be drawn up, signed by the official veterinarian, by the owner of the animal or his legal representative and, at least, by a witness. The owner of the sacrificed animal will not be entitled to compensation (BRASIL, 2004).

In its article 25 to IN 45 of 2004, it provides information that the equine, with permanent marking of EIA bearer, that is found on another property or in transit will be summarily sacrificed in the presence of 2 (two) witnesses, except when proven to be destined for slaughter. The property where this animal is found will be considered a focus (BRASIL, 2004).

In chapter 7 of this IN, specifically articles 26 to 28, it is dealt with with the properties controlled by the IEA. The property will be considered controlled for EIA when it does not present a positive reactive animal in 2 (two) consecutive diagnostic tests for anemia, carried out with an interval of 30 (thirty) to 60 (sixty) days. In order to maintain the situation of controlled property for the disease, all its equine herd must be tested at least once every 6 (six) months and present a negative result. For the property declared controlled for anemia by the SVO of the respective state, a certificate will be conferred, at the request of the interested party, renewed every 12 (twelve) months (BRASIL, 2004).

PRECAUTIONS TO BE OBSERVED WHEN SENDING SAMPLES TO THE LABORATORY

In order for the laboratory to receive the blood serum for the examination of equine infectious anemia, in addition to the review form, if it is not the veterinarian responsible for delivering the sample(s), a form of "Appointment of Carrier and Statement of Counter-Proof for EIA" must be completed and sent by the person responsible for delivery. This form, in addition to identifying and designating the person who is being assigned the responsibility of delivering the sample to the laboratory, is also made necessary to use it, when it is necessary to take a counter-test of the test. In this form, the declarant assumes, in addition to all responsibility for sending and delivering the sample(s) to the laboratory, also the responsibility for having accompanied the centrifugation and/or fractionation of the sample(s) (Agrodefesa, 2019).

Another important form for the laboratory to receive blood serum, for the purpose of diagnosing the EIA virus, is the veterinarian's term of commitment. Without this document completed and signed by the professional responsible for collecting the material, the laboratory does not receive the sample(s). In summary, in this document, the professional registered by the SVO, assumes to comply with what is determined by the current legislation (whether for the IEA or glanders), undertakes to make good identifications of the equids (reviews), to provide clarifications, is responsible for divergences, etc. (Agrodefesa, 2019).

In the case of a serological survey for property control, the requisition and result form for the EIA test may be used for serological survey purposes, which is not valid for transit (BRASIL, 2004).

According to LABVET - Veterinary Analysis and Diagnosis Laboratory - of Agrodefesa, in the review forms, all fields must be properly filled in. The address of the owner and the veterinarian must be complete (street, n.º, neighborhood, city and telephone with area code). If the owner resides on the farm, put the name of the farm, highway and km where the property is located or its state registration. Lack of information, incomplete/incorrect information, erasures, documentation, stamp and signatures, will result in the retention of samples in the screening sector until the pending documentation is resolved. Specifically for the equine infectious anemia form, it must be in 3 copies, with the review of the first copy with a blue pen, the original signature and the stamp must be stamped in all copies (Agrodefesa, 2019).

Among the recommendations passed on by LABVET, with regard to the quality of the sample itself, we can mention the main points of note: At least 2 mL of serum (refrigerated or frozen) are required for each test, with 1 mL intended for the test and 1 mL sealed as a counter-test. The tubes must be properly identified and packed in an isothermal box containing disposable ice or in a plastic bag. Samples should arrive at the laboratory at a maximum of 8 °C. Whenever the technician of the sample screening sector deems it necessary, due to the conditions in which the sample arrived at the laboratory, the temperature will be measured and in those situations in which a temperature above the recommended temperature is verified, the sample will be discarded. Hemolyzed samples, with evidence of contamination or without identification will be discarded (Agrodefesa, 2019).

LABVET warns: "Samples sent in syringes, gloves, vaccine tubes and the like will not be accepted; When sending blood to the laboratory, be aware that it may hemolyze during transport, which will lead to its disposal!" (Agrodefesa, 2019).

With regard to the deadline for delivery of results and the validity of the tests, LABVET says that the deadline for delivery of the EIA result is up to 3 working days after inoculation, and samples delivered to the screening sector until 15:00h, if there are no pending issues, will be processed and inoculated on the same day and those delivered after this time will be processed only on the following day. The samples delivered after 15:00 on Thursday, together with the samples delivered on Friday, the result will be made available on Monday. EIA tests with negative results will be valid for 60 days after sample collection. Positive results will be forwarded first to the coordination of PESE as well as MAPA and, later, to the requesting veterinarian (Agrodefesa, 2019).

REGULATION OF ACTIONS AND GUIDELINES RELATED TO SANITARY DEFENSE AND EPIDEMIOLOGICAL SURVEILLANCE (LEGAL FRAMEWORKS)

First, it is worth mentioning that, in one of MAPA's publications, in 2010, by the SFA – Federal Superintendence of Agriculture -, the material released at the time (folder), dealt specifically with the IEA and glanders. They reported on equine influenza, but it is evident that the emphasis was much more significant on those first two diseases than on the last one (MAPA, 2010).

It is important to highlight the importance of making a brief chronological analysis of MAPA's normative acts, with a view to regulating the actions and guidelines to be taken regarding health defense and epidemiological surveillance activities, both for the IEA and for glanders. In this sense, we can list the following "legal frameworks":

- Decree No. 24,548, of July 3, 1934: Approves the regulation of the animal health defense service;
- Ordinance No. 200, of August 18, 1981: Includes equine infectious anemia in the list of diseases subject to the application of animal health defense measures;
- Ordinance No. 84, of October 19, 1992: Approves the standards for the accreditation and monitoring of EIA laboratories;
- Service Instruction No. 17, of November 16, 2001: Determines the adoption of sanitary measures due to the occurrence of equine influenza;
- Normative Instruction No. 24, of April 5, 2004: Approves the norms for the control and eradication of glanders;
- Normative Instruction No. 45, of June 15, 2004: Approves the norms for the prevention and control of the EIA;

- Decree No. 5,741, of March 30, 2006: Regulates articles 27-A, 28-A and 29-A of Law No. 8,171, of January 17, 1991, and organizes the Unified System of Agricultural Health Care (SUASA);
- Normative Instruction No. 17, of May 8, 2008: Establishes the National Equine Health Program within the scope of the Ministry of Agriculture, Livestock and Supply;
- Normative Instruction Mapa No. 06, of January 17, 2018: Approves the guidelines for the control, eradication and prevention of glanders in the national territory;
- SDA Ordinance No. 35/18, of April 17, 2018: Defines laboratory tests for the diagnosis of glanders in Brazil;
- Normative Instruction No. 006/2018, of Agrodefense, of June 18, 2018: Provides for the procedures for the qualification and registration of veterinarians from the private sector with the Goiás Agency for Agricultural Defense for the collection and submission of samples for laboratory diagnosis of equine infectious anemia and glanders, in the state of Goiás.

FINAL CONSIDERATIONS

Having knowledge of the epidemiology, pathogenesis, clinical signs, treatment and prevention of the most diverse diseases that affect farm animals are fundamental pillars for the correct application of animal health defense and epidemiological surveillance tools.

As we have seen, in 2018, the state of Goiás had 17 EIA outbreaks completed and another 33 that still remain pending. In many cases, it is the deficiency in communication between health defense agencies and the private sector or even the lack of human, structural and technological resources, which contribute to the appearance of data that are at the same time inconsistent, flawed and dangerous for animal epidemiological surveillance. Situations of this type put at risk the animal health defense system of any state, whether in Brazil or abroad.

In the state of Goiás, we have a single study from 1978, which is still what we have as official data on the prevalence of EIA, not leaving us reassured, of the current epidemiological situation that we are facing the disease.

Practical measures can be taken by the SVO, in situations of animals proven positive for the IEA. In this list of actions, we can mention the interdiction of property or breeding for the transit of equines; the marking of positive animals with the letter "A"; isolation of positive

animals; epidemiological investigation on the affected property and slaughter or sacrifice of seropositive animals.

This is undoubtedly one of the major obstacles that the animal health defense service faces. Many owners are resistant to putting their animals to diagnostic tests, when on many occasions, animals that may be seropositive there are a constant risk to other existing equine populations. Not to mention those situations where the animal is confirmed positive for EIA and the owner does not comply with what is provided for in the Legislation, committing numerous infractions, frauds and many others, in an attempt to "circumvent" the inspection and performance of the SVO.

The effective actions and actions of animal defense agencies, such as: OIE, MAPA and Agrodefense, for example, are fundamental for the application, maintenance and improvement of sanitary control measures, in order to combat, prevent or even eradicate anemia

In view of the exposures to the IEA and the agricultural defense service, we can make an analogy and observe that epidemiological surveillance is fundamental for the maintenance of the state or country free, controlled or even eradicated from diseases. When there is interaction and consonance between the governmental spheres: be it municipal, state or federal, we can notice that the so-called "gear" of the animal health defense system works in its fullness and harmony.

In addition to seeking cooperation and partnership from the most diverse bodies, entities and institutions in the agricultural sector, we must promote health education actions, so that information about the EIA, its agent, means of contamination, symptoms, care and prevention can be taken, not only by the SVO; but mainly by owners, breeders and professionals from the private sector.

REFERENCES

1. Acosta, L. M. W. (2012). **Vigilância epidemiológica: conceitos** (31 f.). Trabalho de conclusão de curso de Especialização Multiprofissional na Atenção Básica - UNASUS. Universidade Federal de Santa Catarina/UFSC-SC, Florianópolis.

2. Agrodefesa, Laboratórios. **Análise de diagnóstico veterinário: formulários e orientações. Anemia Infecciosa Equina-AIE**. Disponível em: http://www.agrodefesa.go.gov.br/images/imagens_migradas/upload/arquivos/2017-10/form_-129---termo-de-compromisso-do-medico-veterinario1.pdf. Acesso em: 18 fev. 2019.

3. Agrodefesa, Laboratórios. **Análise de diagnóstico veterinário: formulários e orientações. Anemia Infecciosa Equina-AIE**. Disponível em: http://www.agrodefesa.go.gov.br/images/imagens_migradas/upload/arquivos/2018-05/form_-72---nomeacao-de-portador-e-declaracao-de-contraprova-para-aie-v_-9.pdf. Acesso em: 18 fev. 2019.

4. Agrodefesa, Laboratórios. **Análise de diagnóstico veterinário: formulários e orientações. Anemia Infecciosa Equina-AIE**. Disponível em: http://www.agrodefesa.go.gov.br/images/imagens_migradas/upload/arquivos/2018-02/orientacoes-para-exames-de-aie-e-mormo.pdf. Acesso em: 18 fev. 2019.

5. Agrodefesa, Programa Estadual de Sanidade dos Equídeos. **Informações sobre doenças de equídeos**. Disponível em: http://www.agrodefesa.go.gov.br/defesa-sanitaria-animal/programas.html?id=74:programa-estadual-de-sanidade1&catid=122. Acesso em: 5 jan. 2019.

6. Agrodefesa, Programa Estadual de Sanidade dos Equídeos. **Lista das propriedades fornecedoras de equídeos para abate destinados à OIE**. Disponível em: http://www.agrodefesa.go.gov.br/images/imagens_migradas/upload/arquivos/2018-07/1-relatorio-pfe---03-07-2018.pdf. Acesso em: 4 jan. 2019.

7. Agrodefesa, Programa Estadual de Sanidade dos Equídeos. **Pelagens dos equídeos**. Disponível em: http://www.agrodefesa.go.gov.br/images/imagens_migradas/upload/arquivos/2017-04/cartilha-pelagens-web-2-final.pdf. Acesso em: 4 jan. 2019.

8. Agrodefesa, Programa Estadual de Sanidade dos Equídeos. **Orientações para habilitação e cadastramento de médicos veterinários da iniciativa privada junto à Agrodefesa para colheita de amostras para diagnóstico laboratorial de AIE e Mormo**.

Disponível em: http://www.agrodefesa.go.gov.br/images/imagens_migradas/upload/arquivos/2018-06/in_06_2018____mormo_e_aieanexo_1.pdf. Acesso em: 18 fev. 2019.

9. Agrodefesa, Programa Estadual de Sanidade dos Equídeos. **Orientações para habilitação e cadastramento de médicos veterinários da iniciativa privada junto à Agrodefesa para colheita de amostras para diagnóstico laboratorial de AIE e Mormo**. Disponível em: http://www.agrodefesa.go.gov.br/images/imagens_migradas/upload/arquivos/2018-06/in_06_2018____mormo_e_aieanexo_2.pdf. Acesso em: 18 fev. 2019.

10. Agrodefesa, Programa Estadual de Sanidade dos Equídeos. **Orientações para habilitação e cadastramento de médicos veterinários da iniciativa privada junto à Agrodefesa para colheita de amostras para diagnóstico laboratorial de AIE e Mormo**. Disponível em: http://www.agrodefesa.go.gov.br/images/imagens_migradas/upload/arquivos/2018-06/in_06_2018____mormo_e_aieanexo_3.pdf. Acesso em: 18 fev. 2019.

11. Agrodefesa, Programa Estadual de Sanidade dos Equídeos. **Pelagens dos equídeos**. Disponível em: http://www.agrodefesa.go.gov.br/images/imagens_migradas/upload/arquivos/2017-04/cartilha-pelagens-web-2-final.pdf. Acesso em: 4 jan. 2019.

12. Batista, D. S. do N., Crispim, S. M. A., Comastri Filho, J. A., & De Lima, M. F. N. T. (2017). **Circular Técnica 116: Percepção do público em relação à anemia infecciosa equina**. Corumbá, MS: EMBRAPA.

13. Brasil. Ministério da Agricultura, Pecuária e Abastecimento. (2004). **Instrução Normativa n.º 45 de 15 de junho de 2004**. Diário Oficial [da] República Federativa do Brasil, Poder Executivo, Brasília, DF, 7 de jul. 2004. Disponível em: http://sistemasweb.agricultura.gov.br/sislegis/action/detalhaAto.do?method=consultarLegislacaoFederal. Acesso em: 4 jan. 2019.

14. Brasil. Ministério da Agricultura, Pecuária e Abastecimento. (2008). **Instrução Normativa n.º 17 de 8 de maio de 2008**. Diário Oficial [da] República Federativa do Brasil, Poder Executivo, Brasília, DF, 9 de maio de 2008. Disponível em: http://sistemasweb.agricultura.gov.br/sislegis/action/detalhaAto.do?method=consultarLegislacaoFederal. Acesso em: 4 jan. 2019.

15. Brasil. Ministério da Agricultura, Pecuária e Abastecimento. (2014). **Portaria n.º 378 de 17 de dezembro de 2014**. Diário Oficial [da] República Federativa do Brasil, Poder Executivo, Brasília, DF, 19 de dez. 2014. Disponível em: [http://sistemasweb.agricultura.gov.br/sislegis/action/detalhaAto.do?method=consultar

LegislacaoFederal](http://sistemasweb.agricultura.gov.br/sislegis/action/detalhaAto.do?method=consultarLegislacaoFederal). Acesso em: 5 fev. 2019.

16. Brasil. Ministério da Saúde. (2011). **Portaria 2.488 de 21 de outubro de 2011**. Diário Oficial [da] República Federativa do Brasil, Poder Executivo, Brasília, DF, 24 de out. 2011. Disponível em: http://bvsms.saude.gov.br/bvs/saudelegis/gm/2011/prt2488_21_10_2011.html. Acesso em: 17 mar. 2019.

17. Burger, K. P. (2010). **O ensino de saúde pública veterinária nos cursos de graduação em medicina veterinária do estado de São Paulo** (Tese de Doutorado em Medicina Veterinária Preventiva). Faculdade de Ciências Agrárias e Veterinárias, UNESP, Jaboticabal.

18. Bürger, K. P., Carvalho, A. C. F. B., Sampaio, M. O., & Bürger, C. P. (2009). Diagnóstico de situação - noções de estudantes de Medicina Veterinária sobre a atuação na área da saúde pública. *Revista CES/Medicina Veterinária y Zootecnia*, 4(1), 10–16.

19. Busato, E. M., Souza, I. N., & Dittrich, J. R. (2015). Doenças infecciosas dos equinos. *Revista Acadêmica de Ciência Equina*, 1(1), 34–40.

20. Carvalho, L. R. de O., Rodrigues, H. S. M. de C., Silveira Neto, O. J. da, & Sola, M. S. (2017). A atuação do médico veterinário em saúde pública: histórico, embasamento e atualidade. *Journal of the Health Sciences Institute, Universidade Paulista*, 35(2), 131–136.

21. Charro, F. Organização Mundial de Sanidade Animal (OIE). [S.I., 2008?]. Disponível em: https://www.infoescola.com/saude/organizacao-mundial-de-sanidade-animal-oie/. Acesso em: 2 fev. 2019.

22. Correia, G. S. (2016). **Levantamento soro-epidemiológico da anemia infecciosa equina no município de São Felipe Bahia** (Trabalho de Conclusão de Curso). UFRB/BA, Cruz das Almas.

23. Costa, H. X. (2011). **A importância do médico veterinário no contexto de saúde pública** (Trabalho de Disciplina). UFG/GO, Goiânia.

24. Curvelo, M. R. G. R. (2014). **Anemia infecciosa equina: epidemiologia e distribuição espacial no estado da Bahia** (Dissertação de Mestrado). UFRB/BA, Cruz das Almas.

25. Defesa Agropecuária. **Anemia infecciosa equina**. [2010?]. Disponível em: http://www.defesaagropecuaria.al.gov.br/sanidade-animal/anemia-equina. Acesso em: 9 fev. 2019.

26. Eckerdt, N. S. (2013). **Atribuições da vigilância epidemiológica** (Trabalho de Conclusão de Curso de Especialização). Universidade Federal de Santa Catarina, UFSC-SC, Florianópolis.

27. Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA). (2013). Folder Técnico: **Cuide da sua montaria, previna a anemia - AIE**. Márcia Furlan Nogueira Tavares de Lima. Corumbá, MS: EMBRAPA.

28. Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA). (2004). Folder Técnico n.º 49: **Transmissão mecânica do vírus da AIE por vetores**. Antônio Thadeu M. de Barros. Corumbá, MS: EMBRAPA.

29. FAEMG. (2013). **Mapa atualiza lista de doenças de notificação obrigatória**. Disponível em: http://www.faemg.org.br/Noticia.aspx?Code=4144&Portal=1&PortalNews=1&ParentCode=139&ParentPath=None&ContentVersion=R&Show=all. Acesso em: 2 fev. 2019.

30. Goiás. Agência Goiana de Defesa Agropecuária. (2018). **Instrução Normativa n.º 006 de 18 de junho de 2018**. *Diário Oficial [do] Estado de Goiás, Poder Executivo*, Goiânia, GO. Disponível em: http://www.agrodefesa.go.gov.br/images/imagens_migradas/upload/arquivos/2018-06/in_06_2018____mormo_e_aie-todos-anexos_.pdf. Acesso em: 4 jan. 2019.

31. Goiás. Agência Goiana de Defesa Agropecuária. (2015). **Instrução Normativa n.º 006 de 30 de setembro de 2015**. *Diário Oficial [do] Estado de Goiás, Poder Executivo*, Goiânia, GO. Disponível em: http://www.agrodefesa.go.gov.br/images/imagens_migradas/upload/arquivos/2016-07/in_-06---estabelece-no-estado-de-goiAs-a-obrigatoriedade--do-atestado-de-vacina-contra-influenza-equina20151007135749466.pdf. Acesso em: 4 jan. 2019.

32. Gonçalves, C. M., & Ribeiro, R. M. G. (2005). **Anemia infecciosa equina: revisão de literatura**. *Revista Científica Eletrônica de Medicina Veterinária*, 4, ISSN 1679-7353.

33. Hunt, M. (2012). **Microbiologia e imunologia on-line: Estratégias de replicação de vírus de RNA (Virologia)**. Escola da Universidade da Carolina do Sul, USA. Capítulo IV. Disponível em: http://www.microbiologybook.org/Portuguese/virol-port-chapter4.htm. Acesso em: 25 mar. 2019.

34. Instituto Mauro Borges (IMB). Secretaria de Estado de Gestão e Planejamento (SEGPLAN). (2018). **Goiás em dados 2017**. Goiânia, GO: SEGPLAN.

35. Instituto Brasileiro de Geografia e Estatística (IBGE). **Censo agro 2017 resultados preliminares**. Disponível em: https://censos.ibge.gov.br/agro/2017/templates/censo_agro/resultadosagro/pecuaria.html?localidade=52&tema=75642. Acesso em: 4 jan. 2019.

36. Jardim, E., Silva, R., Almeida, M., Fichtner, S., & Curado, J. (2007). **Incidência de anemia infecciosa eqüina no estado de Goiás**. *Pesquisa Agropecuária Tropical (Agricultural Research in the Tropics)*, 8(1), 156–160.

37. Lobo, J. R. (2016?). **Defesa sanitária animal e o ensino na medicina veterinária**. Termo de Colaboração CFMV-MAPA. Disponível em: http://www.cfmv.gov.br/portal/inscricao_df/material/dia_15/palestra%20de%20jose%20ricardo%20lobo%20Defesa%20sanitaria%20animal%20e%20ensino%20da%20medicina%20veterinaria.pdf. Acesso em: 23 jan. 2019.

38. Marques, A. P. D., Ternes, S., Vilamiu, R., & Nogueira, M. F. (2012). **Modelo matemático para o estudo da dinâmica da transmissão da AIE via mutuca**. In *Congresso Interinstitucional de Iniciação Científica*, 6, Anais... Jaguariúna, SP: EMBRAPA/ITAL.

39. Menarium, B. C. (2007). **Anemia infecciosa equina (AIE): AIDS dos cavalos)**. *Agrolink*. Disponível em: https://www.agrolink.com.br/saudeanimal/artigo/anemia-infecciosa-equina---aie-----aids--dos-cavalos_56646.html. Acesso em: 9 fev. 2019.

40. MINISTÉRIO DA AGRICULTURA PECUÁRIA E ABASTECIMENTO (MAPA). Programa Nacional de Sanidade dos Equídeos. Sanidade de Equídeos. Principais atos normativos em Sanidade dos Equídeos. Disponível em: <http://www.agricultura.gov.br/assuntos/sanidade-animal-e-vegetal/saude-animal/programas-de-saude-animal/sanidade-de-equideos>. Acesso em: 04 jan. de 2019.

41. MINISTÉRIO DA AGRICULTURA PECUÁRIA E ABASTECIMENTO (MAPA). Sistema de Informação em Saúde Animal. Dados Zoossanitários do Brasil. Disponível em: <http://www.agricultura.gov.br/assuntos/sanidade-animal-e-vegetal/saude-animal/sistema-informacao-saude-animal>. Acesso em: 05 jan. de 2019.

42. MINISTÉRIO DA AGRICULTURA PECUÁRIA E ABASTECIMENTO (MAPA). Boletim de Defesa Sanitária Animal: As Doenças dos Animais no Brasil-Histórico da Primeiras Observações. Brasília, DF: MAPA, 1988. 85p.

43. MINISTÉRIO DA AGRICULTURA PECUÁRIA E ABASTECIMENTO (MAPA). Revisão do Estudo do Complexo do Agronegócio do Cavalo: Brasília, DF: MAPA, 2016. 54p.

44. MINISTÉRIO DA AGRICULTURA PECUÁRIA E ABASTECIMENTO (MAPA). Defesa Agropecuária. Histórico ações e perspectivas: Brasília, DF: MAPA, 2018. 298p.

45. MINISTÉRIO DA AGRICULTURA PECUÁRIA E ABASTECIMENTO (MAPA). Folder Técnico: DOENÇAS EM EQUÍDEOS: AIE, Influenza Equina e Mormo. Programa de Educação Sanitária em Defesa Agropecuária e PNSE. Superintendência Federal de Agricultura (SFA). São José, SC: MAPA, 2010, 2p.

46. MINISTÉRIO DA AGRICULTURA PECUÁRIA E ABASTECIMENTO (MAPA). Manual de Legislação: programas nacionais de saúde animal do Brasil. Brasília, DF: MAPA/SDA/DSA, 2009, 1.ª ed., 441p.

47. MINISTÉRIO DA AGRICULTURA PECUÁRIA E ABASTECIMENTO (MAPA). Programa Nacional de Erradicação da Febre Aftosa. Vigilância veterinária de doenças vesiculares: orientações gerais. Brasília, DF: MAPA/SDA/DSA, 2007, 49p.

48. MINISTÉRIO DA EDUCAÇÃO (MEC). INSTITUTO FEDERAL DO NORTE DE MINAS GERAIS (IFNMG). Doenças Emergentes e Reemergentes na Saúde Coletiva. Montes Claros, MG: IFNMG, 2015, 1.ª ed., 137p.

49. MINISTÉRIO DA SAÚDE (MS). Manual de Vigilância, Prevenção e Controle de Zoonoses: Normas Técnicas e Operacionais. Brasília, DF: MS, 2016, 121p.

50. MINISTÉRIO DA SAÚDE (MS). Guia de Vigilância Epidemiológica: Série A. Normas e Manuais Técnicos. Brasília, DF: MS, 2009, 7.ª ed., 813p.

51. MORAES, D. D. A.; GONÇALVES, V. S. P.; MOTA, A. L. A. de A.; BORGES, J. R. J. Situação epidemiológica da anemia infecciosa equina em equídeos de tração no Distrito Federal. *Pesquisa Veterinária Brasileira*, Seropédica, RJ, 2017, vol. 37, n. 10, p. 1074-1078.

52. NOGUEIRA, N. Comunicação na Defesa Agropecuária. In: VILELA. E. F.; CALLEGARO. G. M. (Ed.). *Elementos de Defesa Agropecuária: Sistema normativo, invasões biológicas, comunicação, história, risco e segurança dos alimentos, conformidade e rastreabilidade*. Piracicaba, SP: FEALQ, 2013. cap. 3, p. 115-122.

53. OIE, Educaciónveterinaria. Enlaces relacionados. [S.l.] [2016?] Disponível em: <http://www.oie.int/es/solidaridad/educacion-veterinaria/>. Acesso em 23 jan. de 2019.

54. OIE, Sanidad animal em el mundo - Presentación. [S.l.] [2010?] Disponível em: <http://www.oie.int/es/sanidad-animal-en-el-mundo/>. Acesso em: 02 fev. de 2019.

55. OIE, Listed diseases, infections and infestations in force in 2019. [S.l.] 2019. Disponível em: <http://www.oie.int/en/animal-health-in-the-world/oie-listed-diseases-2019/>. Acesso em 11 mar. de 2019.

56. OIE, World Animal Health Information Database. [S.l.] [2015?] Disponível em: < http://www.oie.int/wahis_2/public/wahid.php/Wahidhome/Home>. Acesso em 25 mar. de 2019.

57. OLIVEIRA, F. G de. Vírus da Anemia Infecciosa Equina em Asininos: Sorologia em Animais Errantes e Avaliação "In Vitro", da Resposta em Macrófagos. 2016. 101 f. Tese de Doutorado em Ciência Animal na área de Medicina Veterinária Preventiva. Universidade Federal de Minas Gerais/UFMG-MG, Belo Horizonte, 2016.

58. ORGANIZACIÓN PANAMERICANA DE LA SALUD. A competency-based curriculum for veterinary public health and preventive medicine. Washington: Paho/WHO, 1975. 115p. (Publicación Científica 313).

59. ORGANIZACIÓN MUNDIAL DE LA SALUD. Grupo consultivo sobre veterinaria de salud publica. Geneva: WHO, 1957. n.º 111, 30p.

60. PFUETZENREITER, M. R.; ZYLBERSZTAJN, A.; AVILA-PIRES, F. D. Evolução histórica da medicina veterinária preventiva e saúde pública. *Ciência Rural*, Santa Maria, v.34, n.5, p.1661-1668, 2004.

61. PORTALEDUCAÇÃO, Programa Nacional de Sanidade dos Equídeos-PNSE. Veterinária. Disponível em: [S.l.] [2008?] <https://www.portaleducacao.com.br/conteudo/artigos/veterinaria/programa-nacional-de-sanidade-dos-equideos-pnse/22806>. Acesso em: 02 fev. de 2019.

62. ROSSI, M.; TERNES, S.; NOGUEIRA, M. F. Comunicado Técnico 121: Considerações sobre o R_o da Anemia Infecciosa Equina a partir dos agentes infecciosos inseto-vetor "Mutuca" e "Seringas Contaminadas". Campinas, SP: EMBRAPA, 2015. 5p.

63. SILVA, C. F.; PEQUENO, N. F.; CLEMENTINO, I. J.; AZEVEDO, S. S.; SILVA, A. Frequência de anemia infecciosa equina em equinos nos estados da Paraíba, Rio Grande do Norte e Ceará durante o ano de 2010. *Brazilian Journal of Veterinary Research and Animal Science*, São Paulo, SP, 2013, v. 50, n. 1, p.12-17.

64. SOUZA, G. da S. e; GOMES, E. G.; REZENDE, A. S. C.; DOS SANTOS, D. R.; NOGUEIRA, M. F.; TRIGO, P.; DE ABREU, U. G. P.; SANTOS, S. A. Avaliação de desempenho de cavalos pantaneiros com o uso de modelos de análise de envoltória de dados. In: *SIMPÓSIO BRASILEIRO DE PESQUISA OPERACIONAL*, 48, 2016, Vitória, ES. Anais... Rio de Janeiro: EMBRAPA/SOBRAPO, 2016.

65. SOUZA, P. C. A.; AMÓRA, S. S. A.; FIGUEIREDO NETO, A. B.; VALLANDRO, M. J.; LUCENA, R. F.; ANJOS, C. B.; PEREIRA, L. R. M. Ensino em Saúde Pública nas Escolas de Medicina Veterinária do Brasil. *Revista CFMV- Brasília/DF*, Ano XVI, N.51, p.16-23, 2010.

66. VETSMART, Lista de notificação compulsória da OIE: o que mudou? Disponível em: <https://www.vetsmart.com.br/blog/2017/02/09/lista-de-notificacao-compulsoria-da-oie-o-que-mudou-2/>. Acesso em: 02 fev. de 2019.

67. WALDRIDGE, B. Equinews Nutrition & Health Daily: What Is a Coggins Test? [S.l.], 2013. Disponível em: <https://ker.com/equinews/what-is-a-coggins-test/>. Acesso em: 20 mar. de 2019.

68. WORLD HEALTH ORGANIZATION. Future Trends in Veterinary Public Health. Report of a WHO Study Group. Geneva, 2002. 85p. (WHO Technical Report Series n.907).

69. WORLD HEALTH ORGANIZATION. Joint WHO/FAO Expert Group on Zoonoses – Report on the First Session, Geneva, 1951.47p. (Technical Report Series n.40).