

EPIDEMIOLOGICAL STUDY OF THE INCIDENCE AND RISK ANALYSIS IN MAJOR DISEASES OF ANIMALS IN ROMANIA AND IN THE WORLD IN THE PERIOD 2007-2014

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Abstract

Epidemiological dynamics in major animal diseases, suffered extensive changes since the year 2007 and was dominated by vesicular disease, foot and mouth disease and Sheep and goat pox, to the detriment of diseases such as classical swine fever or avian flu, which dominate global epidemiological picture in the beginning of the years 2000. This paper aims to highlight the dynamics of major diseases in the last decade, the factors that led to their reappearance in areas that were eradicated for a long time, and the impact of national programs accelerated eradication of diseases like equine infectious anemia, classical swine fever, and others.

Keywords: major diseases, epidemiological dynamics, accelerated eradication, incidence

INTRODUCTION

The history of recent years shows that we assist to extensive changes in the global epidemiological situation in terms of major diseases of animals. Thus, diseases such as classical swine fever, highly pathogenic avian influenza H5N1, which in 2004-2006, dominated epidemiological picture world, were replaced by other diseases, some of which (ex. Dourine, sheep and goat pox, peste des petits ruminants, vesicular diseases) eradicated for decades. Also, the epidemiological situation of Romania has suffered dramatic changes in recent years, she confronted with a number of diseases until then considered exotic, such as avian flu, scrapie, blue-tong or West Nile meningitis. The causes of these diseases are various in Romania, one of them referring to the intensification of trade in animals and animal products after 2007, the existence of these diseases on the borders of Romania, and the ineffectiveness of the monitoring and prevention programs the ingress of these

diseases from the outside. In the context of the European Union, Romania is its eastern border, which implies an increased risk for all major diseases of animals and, of course, surveillance and control programs more extensive than in other Member States within the European Union.

MATERIALS AND METHODS

Analysis of the appearance and propagation of major diseases, epidemiological statistics and epidemiological surveillance, have always been a priority for specialized international organizations such as the World Organization for Animal Health, World Health Organization, the European Food Safety Authority or the United Nations agriculture and Food. This paper proposes a pertinent analysis of all these issues in consultation documents produced by these organisms in recent years (WTO. Uruguay Round Final Act, 1994; OIE /WTO, 1995).

We also studied the risk analysis regarding potential threats to Romania, made in recent years by the Romanian national veterinary administration that showed the following (Government Decision no. 1189/2009):

-bluetongue in 2010-2011 was considered the greatest threat, which was also true in 2014;

-classical swine fever believes it will continue to constitute a danger due to at least three factors: Romania is the border southeast of the European Union; limited control of feral pig populations and breeding of pigs in population households lacking biosecurity conditions. The most important general methods to prevent the introduction swine fever virus in commercial farms with pigs remain strictly comply with stringent biosecurity conditions and interdiction staff who work with these animals, to hold pigs in their own households, or having a hobby hunting;

-african swine fever, foot and mouth disease (FMD) and other vesicular diseases, will continue to pose a major threat to all European countries;

-Newcastle disease seems to be dominate avian pathology in the near future;

-meningitis West Nile will continue to evolve in Europe. Evolution asymptomatic at animals, except horses, the large number of species susceptible, virus transmission by mosquitoes, favors diffusivity disease.

Of all Member States of the European Union, now Italy is epidemiologically like a "reservoir" in which interacting both diseases removed / extinguished in the years 1960-1965 (ex. dourine) and "modern" disease of this started century (OIE General Session, 2014). On the other hand, all these changes related to the global epidemiological context, which is subjected to constant changes, so what exist today, tomorrow may be considered history, but that we must draw lessons.

RESULTS AND DISCUSSIONS

Qualitative risk analysis carried out mainly on epizootic dynamics and respecting the other links of the "chain epizootic" reveals the following situation:

-out of European countries in which *classical swine fever* has evolved in the past five years include: Russia, Croatia, Lithuania, Bulgaria, Serbia, Hungary, the last three countries are located in close proximity of Romania. However, except Russia facing with numerous active outbreaks of classical swine fever in both the European and the Asian part, the incidence of this disease in Europe has declined; however, it is found an increased frequency in Asia and Africa.

In Romania, the last outbreak of classical swine fever was notified in 2007, and this led to the inclusion of Romania in the Decision 2008/855/EU. This allows trade in meat and meat products produced in Romania, opening prospects for the Romanian producers to put on the European market quality products in order to market them in the Community. The next desiderate, would be the status of classical swine fever free country, where vaccination is not practiced, and the continuation of the national epidemiological surveillance programs, approved and financed by the European Commission.

Vaccination of domestic pigs in all commercial farms in Romania was prohibited in April 2007, and vaccination of domestic pigs from non professional holdings on 31 December 2009. Vaccination of wild boars of hunting funds continued until the fall of 2011, as a "buffer belt" of 10 km along the state border with Moldova and Ukraine (EU Commission Decision 2008/855).

African swine fever continues to dominate the Epidemiological map of Asian and African countries, but also in Europe, in countries like Russia and Italy (Sardinia where evolves endemic) and Ukraine.

The first outbreak of African swine fever were reported in Transcaucasia (Georgia, Armenia, Azerbaijan, Russia) in 2007-2008, but the current epidemiological situation in the Caucasus region is relatively stable, with no new outbreaks. Concern is the situation in the Russian Federation where the situations regularly reported to the OIE, shows that the disease has become endemic in some regions, it constitutes a permanent threat to the

surrounding areas, including EU member states in Eastern Europe. So far, the disease has spread in Belarus (2 outbreaks in 2013), Ukraine (1 outbreak in 2012, two in 2014), Poland (2 cases in 2014), Lithuania (2 cases in 2014) (FAO Empress, 2013; Commission Decision 2005/176/EC).

Member States of the European Union have a common policy of not vaccinating against ASF, applying, in case of suspicion or confirmation legislative provisions of Council Directive 2002/60/EC which one establishes specific provisions to combat African swine fever. African swine fever has never been diagnosed in domestic pigs and wild in Romania. However, the lack of information in the computer system of the World Organization for Animal Health (OIE) on the evolution of any outbreak of classical swine fever and African swine fever in Moldova, is a great unknown against which Romania must implement effective measures. Also in the case of Romania, are at risk domestic pigs and wild boars and pigs reared in semi-liberty in some areas (Danube Delta, Balta Brailei) which may come into contact with sick animals or carriers or non heat treated products or by-products coming from them. Respecting the rules of animal farm biosecurity, establishing minimum rules for non-professional holdings, the risk constituted of introducing disease in the country, can be reduced significantly. Even if the risk of an outbreak of African swine fever in Romania, at present, is low to medium, introduction of disease in Romania would have major consequences on the national economy by spending huge posed by the eradication costs and restrictions trade and export of live pigs and products and by-products derived from them (Council Directive 425/90/EC). Once entered in the territory, because the percentage maximum of mortality due to evolving, following the application of measures to eradicate incorrect coordinates, the disease may become endemic in a short time, blocking the entire pig sector's growth, causing significant economic losses to pork producers and economy in general (Council Directive 2002/60/EC).

Fever disease developed in 2007-2011, in 70 countries, most Asian and African countries. Very important is the evolution of FMD in 2011 in Europe, in Bulgaria, Russia and Turkey, which leads to the conclusion that we assist to an expansion of this pandemic; also, the evolution of swine vesicular disease in Italy shows slight tendency to return this vesicular disease in Europe. FMD virus currently circulate in parts of Europe and in the vicinity of about 100 countries in Africa, the Middle East, large parts of Eurasia and parts of South America. European Commission pays special attention to the Balkans, a region which one includes both Member States and non-EU states, area being closer to the infected countries in South and East. Consequently, FAO has helped these countries to develop and test emergency plans, and recently they have been tested in Bulgaria, Serbia and Macedonia, where government veterinary services took part in a computer-aided simulation concerning simultaneous appearance of more outbreaks of FMD in these three countries (ANSVSA Order no. 113 of 27.04/200).

Still 1998, *bluetongue* began to spread in Europe, including territories increasingly stretched. In late 2001, several Mediterranean countries and neighboring area, were confronted with the appearance of this disease. New serotypes reported that occasion were 2, 4, 9 and 16 along the south-east borders of the countries in Europe, to which were added serotypes 6, 10 and 13 earlier diagnosed. The top of disease in Europe, was the 2006-2009 period when there was a progressive increase from 2479 cases in 2006-2007 to 63,182 cases in 2007-2008, 39 737 cases in 2008-2009, followed by a decrease in the period 2009-2010, when there were 219 cases.

Bluetongue has evolved in the past 5 years in 31 countries, over 50% of which are European countries such as Belgium, Cyprus, Switzerland, Denmark, Germany, Greece, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom, Turkey. In July of 2014, Bulgaria, and Greece, notified by codified system ADNS of EU and on the OIE WAHIS system, disease recurrence after about

ten years of absence, and in August the disease recurs in the Republic of Macedonia. Thus, a risk analysis carried out by the central veterinary administration of Romania, it considered that risk of developing this disease is very high in Romania, which was also true a month later. In the near future bluetongue will dominate the epidemiological situation of European countries, which requires a new approach, including the aspects of immunoprophylaxis susceptible animals, with live vaccines (Council Directive 2000/75/EC; Commission Decision 2005/176/EC).

Bovine spongiform encephalopathy (BSE), is a disease that develops predominantly in Europe -Austria, Czech Republic, Switzerland, Italy, Ireland, Germany, Netherlands, United Kingdom, France, Spain, Slovenia and Portugal, and outside Europe have reported cases, is really very rare in Canada, Brazil, USA, Japan and Israel; however no cases of BSE have been notified in Asian and African countries; this epidemiological situation is an argument to continue to maintain severe restrictions on the marketing of live animals of species susceptible to BSE and products derived from them. In the period 1987-2013 the United Kingdom has registered more than 184,000 cases of BSE. From the data analysis, is observed there is a maximum number of cases in 1992 to 37,280 cases of BSE, but after this peak annual number of BSE cases began to decline, while in 2012 and 2013 to be declared only by 3 cases annually. Between 1987-2014 period, in the world, except in the United Kingdom, were declared 6044 cases of BSE, which is about 3.2% of total cases in the United Kingdom.

At the present time the global epidemiological situation, is relatively stable due to preventive actions and corrective actions to reduce the risk from BSE to an acceptable level.

In Romania, the disease has not been reported until now and the level of this risk is unacceptable, the main preventive action applied our country is implementing annual programs for the eradication and monitoring of animal transmissible spongiform encephalopathies (BSE and scrapie), co-

financed by the European Commission, and specific preventive measures, required by Community legislation directly applicable in national law (Regulation (EC) no. 999/2001). Regarding the evolution of *scrapie*, in the world has been a constant evolution of the disease in 25 countries of which 20 are European countries, in 2007-2011. This trend was maintained in the coming years, with a slightly higher incidence from year to year. According to the OIE Bulletin No. 3/2013, published on 16 October, Romania has declared as free from scrapie for 19 counties. Although the information sources indicate the presence of disease in the world for over 200 years, scrapie has been officially confirmed in Romania in 2002, by the Institute of Diagnosis and Animal Health, only in one case (Regulation (EC) no. 999/2001/).

Regards equine infectious anemia (EIA), except for Romania where evolve and where it runs a program of accelerated eradication of this disease of equidae, the disease evolves in other European countries such as Croatia, Germany, Greece and Italy. However, experts believe that this chronic disease evolves in several European countries, but the absence of screening disease programs and use of equine mainly as pets, make real epidemiological situation, may not be known (ANSVSA Order no. 46/2014).

As for the evolution of *avian influenza* in Europe in recent years, it was a sporadic and, in all cases the origin of avian influenza viruses have been in wild birds, an avian influenza H5N1 highly pathogenic continuing to generate alerts major in Asian countries. Over time, the disease has evolved somehow sporadically global, after World War II, it was believed to have disappeared, but she appeared abruptly in 2004, covering 11 countries in East Asia and Southeast, and affecting more than 150 million birds. In the period 2004-2014, bird flu has evolved in Asia, Africa, Europe and Middle East, with a peak of 56 countries in 2006. Besides, the disease first appears in Romania in 2005, and in neighboring countries like Russia, Ukraine, Turkey, Croatia, but top disease is registered in 2006, and includes other European

countries like Austria, Bulgaria, Croatia, Denmark, France, Greece, Hungary, Italy, Poland, Bosnia, Serbia, Slovakia, Slovenia, Spain, Sweden and Switzerland.

In Romania, during 2005-2014, 152 outbreaks were recorded as follows: in 2005-10 outbreaks, in 2006-109 outbreaks in 2007-one outbreak of disease, and two outbreaks in 2010. Thanks control measures applied in Romania and in Europe, after 2008 has regressed disease recorded in the three countries in 2009 and 201, and in one country, Italy, in 2013(Law no. 221 of 31/05/2006).

If avian pathology in recent years has been dominated by avian influenza, currently there is an exacerbation of *Newcastle disease* in poultry in both the developed European countries (France, Switzerland, Sweden, Turkey) and in Asian countries (Israel where the disease progresses endemic) in Australia and the United States, and because it has an extremely high diffusivity, *Newcastle disease* it is provided that will continue to evolve over the next years worldwide (ANSVSA Norm of 27/06/2006).

Regarding *West Nile meningitis*, in 2007 has evolved in seven countries, located in Central America and Asia; in 2009 W. N. cases doubled, in 2010 have tripled, and 50% of cases were diagnosed in European countries. In the last years, the disease was diagnosed in 11 countries: Canada, Cuba, Israel, Italy, Macedonia, Romania, Spain, Hungary, USA, Guatemala, Haiti, which means maintaining in "plateau" of the disease, especially in Europe. In november 2014, 74 human cases of West Nile fever have been reported in the EU and 136 cases have been reported in neighbouring countries since the beginning of the 2014 transmission season, of which 27 in Romania.

Variola, *dourine*, *peste des petits ruminants*, *equine encephalomyelitis*, although are diseases that are no longer threats recently, confirming their evolution in European countries (Italy, Greece, Turkey) and their character readily diffusible, should be an alarm signal in disease management animals.

CONCLUSION

In the context of the European Union, Romania is its eastern border, which implies an increased risk for all major diseases of animals and, of course, surveillance and control programs more extensive than in other Member States within the European Union. Origin of risk regarding the introduction of these diseases in Romania, can be represented by:

- evolution of the disease in third countries bordering the northern, northeastern, eastern and south-eastern part of Romania,
 - the epidemiological statute unknown of the third country, in the immediate vicinity of Romania (according OIE)-illegal traffic with animals,
 - movement of people and vehicles, especially at border of crossing points. At none of crossings point the borders of north-east, Romania does not have appointed road disinfectors and any other means of disinfection, which significantly increases the possibility of penetration of the disease in the country. Romania's central veterinary authority must decide the opportunity to arrange disinfection facilities on these boundaries. They serve both, protection against all major diseases in animals (FMD, avian influenza, etc.), in those areas where, often, the epidemiological situation is delicate,
 - hunting action (Council Directive 662/89/CEE).
- Inside Romanian origin of the risk may be represented by:
- lack of implementation biosecurity conditions in farm,
 - lack of implementation minimum biosecurity conditions in households population,
 - uncontrolled movement of animals,
 - direct or indirect contact from households, with wildlife animals.

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