African Swine Fever Continues to Be a Problem in Romania and Timiș County

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Abstract
African swine fever continues to evolve in Europe and in our country, even in the last two years of the pandemic, and is currently the main threat to the global swine industry. It affects more than 50 countries on 5 continents, with several epidemiological scenarios. Even this year, Romania was not bypassed by this serious disease, which causes many economic damages: in the case of domestic pigs, in the EU Member States were registered, between 01.01-16.01.2022, 24 outbreaks, of which 22 in Romania. In the same period, 565 outbreaks of PPA were reported in wild boars. Most evolve in Poland (177), Bulgaria (120), Germany (78) and Romania (59). Europe is waiting for an effective vaccine against African swine fever (PPA) by 2024, the main risk to pig health worldwide, being the only way to eradicate the disease. Veterinary services continue their efforts to prevent the spread of the African swine fever virus (PPA), those for the management of disease outbreaks, with the aim of reducing outbreaks and spreading this disease, which already has a history in our country, evolving since 2017 almost constantly.

Key words: African swine fever, epidemiological, outbreaks, wild boars.

1. Introduction

African swine fever (ASF) is one of the most important swine diseases, mainly due to its significant health and socio-economic consequences. African swine fever is one of the most complex and economically devastating viral diseases, with a major socio-economic impact on affected countries. Protection against African swine fever virus (ASFV) is not fully understood. Although, ASFV infection induces a small proportion of antibody neutralization against virion proteins, this protection is not sufficient for viral aggression. Despite this, the role of antibodies is important because it provides some protection that reduces viremia, reduces the onset of clinical signs and reduces the side effects of the infection, as demonstrated by the passive transfer of anti-ASFV immunoglobulins. An alternative investigative possibility could be genetic engineering and genome editing for much faster results than traditional approaches to selective animal husbandry. Research is still underway to better understand the interactions of ASF virus with different hosts, in order to improve control strategies for ASF but also to help prevent the global spread of this disease [1]. African swine fever (ASF) is currently the main threat to the global swine industry. It affects more than 50 countries on 5 continents, with several epidemiological scenarios. On November 4, 2021, APC Europe hosted a webinar in which leading experts identified the main gaps that led to the spread of the virus, revealing the best tools to stop

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the spread of ASF virus and the state of scientific research on the long-awaited vaccine. In tandem with the COVID-19 pandemic, two other epidemics are evolving, bird flu and swine fever, which, while not having its devastating economic effects, may affect trade and ultimately the purchasing power of the common man. According to Professor James Wood, head of the Department of Veterinary Medicine at the University of Cambridge, African swine fever is probably the biggest current epidemic threat to global food security [2].

2. The epizootic situation of the last two years

In Europe the number of outbreaks, cases and animal losses caused by ASF in the different world regions since January 2020 was in domestic pigs 3,336, wild boar 16,258, cases 928,376 in domestic pigs, wild boars 27,672 and losses (deaths plus animals killed and disposed of) 1,260,551 in domestic pigs [3]. African swine fever, a forgotten epidemic in the shadow of the coronavirus pandemic, is likely to disrupt markets again and lead, among other causes, to rising food prices [4]. Since the beginning of 2020, in addition to Romania, outbreaks of ASF have been diagnosed in: Bulgaria, Ukraine, Belgium, Estonia, Hungary, Italy, Latvia, Lithuania, Poland, the Republic of Serbia, Slovakia and Greece. Following the outbreak of an African swine fever outbreak in Germany in September 2020, ten countries have imposed import bans on German pork, including China, Japan and Vietnam, leaving an additional 70,000 tonnes pork on the EU market every month. The epidemiological situation of ASF continued to deteriorate between 2020 and 2022. Since January 2020, a number of 6 countries have reported this disease for the first time, while 12 countries have reported its spread to new territories. All this highlights the continued spread of the disease in new countries but also in new territories in the countries already affected. In January 2020, African swine fever (ASF) was occurring in 267 localities in 26 counties, with a number of 619 outbreaks (of which 7 outbreaks in commercial holdings and 2 outbreaks in type A holdings). In 10 other counties, only wild boar cases were diagnosed [5]. Since the first report of the presence of ASF virus in Romania, on July 31, 2017, and until now, 577,071 pigs affected by the disease have been eliminated and 2,765 cases have been diagnosed in wild boars. According to European provisions, wild boar cases are extinguished at least 2 years after their appearance. A total of 2,347 outbreaks were extinguished. By January 2020, 14,800 owners had been compensated, the total value of payments being 403,373,620 lei. In February 2020, African swine fever was evolving in 243 localities, in 27 counties, with 532 outbreaks, according to data provided by the National Sanitary Veterinary and Food Safety Authority (ANSVSA). Since the first report of the presence of ASF virus in Romania, on July 31, 2017, and until now, 652,149 pigs affected by the disease have been eliminated and 3,353 cases have been diagnosed in wild boars [6,7]. On September 7, 2021, the President of the A.C.E.B.O.P. (Association of Breeders and Exporters of Cattle, Sheep and Pigs) from Romania, participated in the first edition of the Farmers' Congress, where he gave a speech on the negative influence of African swine fever on Romanian farmers. This event brought together hundreds of farmers in the country, with the aim of making their voices heard nationally. It has been argued that it is inconceivable that we have the situation we have today with small farmers, in the household, as well as with large farmers, where farms are now divided in two: some of them have African swine fever and the other part, restrictions on movement due to outbreaks in households. It is an unprecedented situation in Romania. If in the first 3 years of the evolution of the swine fever, the red plague, as it is called, we had plague in 6 farms, in the last 2 and a half months, 3 months 14 farms were attacked by this virus, and the rest have restrictions of motion. The president of the A.C.E.B.O.P. noticed the same disastrous situation in the case of the population's households, claiming that the situation there is uncontrolled, because when a pig dies, the owner hurries and buys another. And in this way outbreaks appear out of focus. At the national level, it is a pity that instead of taking care of the Romanian meat chain, selling cereals and bringing meat, thousands of tons, tens of thousands of tons from abroad, expiring, from all categories of meat, with bird and pig predilection. The urge is for Romanian farmers to be united in the face of political decision-makers [8,9]. At the Agriculture and Fisheries Council on 12-13 December 2021, the Czech Republic notified the critical situation of the European pig sector. The Czech Republic and other European countries have joined: Belgium, Bulgaria, Croatia, Estonia,

France, Romania, Greece, Hungary, Latvia, Lithuania, Poland, Portugal, Slovakia and Malta. The Czech delegation argued that the pork industry had been in a state of crisis for some time, both due to the spread of African swine fever and the impact of the COVID-19 pandemic. Consumer demand has fallen significantly, as has EU exports. Under the pressure of rising prices for gas, electricity and feed materials, the average price of pork carcass is 5.4% lower than last year, the same period, respectively 1.311 EUR / kg (EUROSTAT). In piglets, the European average price decreased by 16.2% compared to last year, reaching 29.9 EUR / head. The Czech Republic points out that the situation in the European pork sector is very serious and that there is no way out yet. The European Commission is the only one that can save the pig through specific measures and financial support. Therefore, in order to counteract the market disruption and balance of the pig sector, the Czech Republic, together with the above Member States, including Romania, is calling on the European Commission to take immediate and concrete action immediately, in particular to introduce exceptional support - by measures in accordance with the CMO Regulation. In 2021, Germany continues to find wild boar pigs killed by African swine fever, a sign that the epidemic is spreading from Poland to the west. Germany is one of the largest producers of pork in Europe, and the discovery last year of wild pigs killed by the disease has blocked exports to Asian countries. In Germany, the prices of pigs and piglets have started to rise again as the market recovers after the shock caused by the Asian import bans and the diminishing capacity of slaughterhouses, forced to close due to the COVID-19 pandemic, writes Reuters [10]. Import bans have created a surplus of pigs, and the closure of slaughterhouses has reduced the supply of pork. Thus, pig farmers have found themselves in the situation of selling cheap pigs raised with more expensive feed. German producers have tried to solve the problem of surplus by selling more in other markets in the European Union. Germany is not only a producer of pork, but also an importer because it is one of the leading producers and exporters of sausages in Europe. Prices are rising again as widespread prices rise in several markets, although Europe has not emerged from the crisis created by the pandemic. A German meat trader said that he market is getting stronger again, and optimism is back and sales of German pigs in EU markets are strong. He also sustained that all problems in the pig farming sector, which cannot be slaughtered, are gradually being resolved in Germany and also in Denmark.

In 2021 has been even more difficult for the pork industry in view of the losses caused by African swine fever, which has affected the industry since 2017 [9,11]. Both the number of affected commercial holdings has increased from 24 in 2020 to 36 and the number of non-commercial holdings, from 610 households to 1,245, according to ANSVSA data provided by Economica.net. [12]. In 2021, the costs of African swine fever increased by 50% compared to 2020. Compensation amounted to 283.5 million lei. The representatives of the Romanian Pork Producers Association stated that they are in a perfect catastrophe, the African swine fever has caused a fire on the industry, which has lasted for five years, lacking the support that should have come from the authorities [7]. According to the law, the payment of compensation in African swine fever is made at the market replacement value of the slaughtered, killed or otherwise affected animal or, as the case may be, at the amount of the loss suffered by the owner, on the date of the liquidation disease. The market value is the price that the owner could normally have obtained for the animal immediately before its contamination or slaughter, taking into account its suitability, quality and age. However, not all claims were resolved by ANSVSA. According to the Authority's data, applications were rejected for payment in the total amount of 17.9 million lei for approximately 25,140 heads. The main causes for which the holdings were refused payment are generated by the non-observance of the settlement conditions provided by H.G. 1214/200 regarding the methodology for establishing and paying the compensations due to the slaughtered, killed or otherwise affected animal owners, in order to quickly liquidate the outbreaks, as explained by ANSVSA officials (Table 1). On the other hand, a study conducted by USAMV Cluj-Napoca specialists revealed that the importance of hematophagous insects could be higher in commercial farms than in the traditional system and that the dynamics of the abundance of these insects could explain the increased number of cases in the summer months, which may explain the large number of cases [13].

Table 1. Outbreaks situation of ASF in Romania from 2020

Year	Confirmed outbreaks	Active outbreaks	Extinguished outbreaks
2020	1063	0	1063
2021	1660	32	1628
2022	42	41	1
Total	2765	73	2692

3. The epizootic situation of ASF in the last two years in Timiș County

In Timiș County, Smithfield România SRL- Gătaia Farm, part of the Smithfield group, the largest pork producer in Romania, lost in 2020 25,777 heads for which it received a compensation of 20.5 million lei. According to the law, the payment of compensation is made at the replacement value at the market price of the slaughtered, killed or otherwise affected animal or, as the case may be, at the amount of the loss suffered by the owner, on the date of the liquidation of the disease outbreaks. The market value is the price that the owner could normally have obtained for the animal immediately before its contamination or slaughter, considering its suitability, quality and age. A total of 23 outbreaks were recorded, of which 9 outbreaks in wild boars and 14 in domestic pigs in 2020 (Table 2). In 2021 were recorded 37 outbreaks of ASF identified in Timiș County, of which 3 in wild boars, 1 in Vietnamese pigs and 33 in domestic pigs (Table 3). In 2022, cases of ASF continue to be registered in Timiș County (Table 4).

Table 2. The ASF outbreaks in Timiș County in 2020

Locality	**Date**	**Number of confirmations**	**Type of holding**	**Type of animals**
Bucovig	29.02.2020	4 cases	Non-professional holding	Domestic pigs
Cadar, Tormac commune	4.03.2020	1 outbreak	Non-professional holding	Domestic pigs
Giroc	4.03.2020	1 outbreak	Non-professional holding	Domestic pigs
Mânăstirea Șag-Timișeni	4.03.2020	1 outbreak	Non-professional holding	Domestic pigs
Chevereșu Mare	21.05.2020	3 cases	Hunting background 56	Wild boars
Moșnița	27.05.2020	2 cases	Hunting background 61	Wild boars
Ghiroda (outside commune)	27.05.2020	1 outbreak	Non-professional holding	Domestic pigs
Recaș	27.05.2020	1 outbreak	Former CAP	Domestic pigs
Icloda, Sacoșul Turcesc commune	27.05.2020	1 outbreak	Non-professional holding	Domestic pigs
Drinova	28.07.2020	3 cases	Hunting background **31**	Wild boars
Jdioara, Criciova commune	20.08.2020	1 outbreak	Non-professional holding	Domestic pigs
Icloda, Sacoșul Turcesc commune	25.08.2020	3 outbreaks	Non-professional holding	Domestic pigs
Ghiroda	25.08.2020	1 outbreak	Non-professional holding	Domestic pigs
Botinești	1.09.2020	2 outbreaks	Non-professional holding	Domestic pigs
Găvojdia	6.10.2020	1 outbreak	Non-professional holding	Domestic pigs
Botești, Bârna commune	26.11.2020	1 outbreak	Non-professional holding	Domestic pigs
Recaș	2.12.2020	3 outbreaks	Household	Domestic pigs
Valea Lungă	3.12.2020	1 outbreak	Hunting background 33	Wild boars
Șarlota	7.12.2020	1 outbreak	Hunting background 16	Wild boars
Visag	11.12.2020	1 outbreak	Hunting background 37	Wild boars
Marginea	16.12.2020	1 outbreak	Hunting background 24	Wild boars
Nadăș	23.12.2020	1 outbreak	Hunting background 17	Wild boars
Ohaba	28.12.2020	4 cases	Hunting background 21	Wild boars
Bunea Mare	30.12.2020	2 outbreaks	Non-professional holding	Domestic pigs

Table 3. The ASF outbreaks in Timiș county in 2021

Locality	Date	Number of confirmations	Type of holding	Type of animals
Teremia Mare	8.01.2021	2 outbreaks	Non-professional holding	Domestic pigs
Surduc	8.01.2021	3 cases	Hunting background 29	Wild boars
Colonia Mică	18.01.2021	1 outbreak	Non-professional holding	Domestic pigs
Orțișoara	15.02.2021	1 outbreak	Non-professional holding	Domestic pigs
Teremia Mare	16.02.2021	3 outbreaks	Non-professional holding	Domestic pigs
Calacea, Orțișoara	1.03.2021	1 outbreak	Non-professional holding	Domestic pigs
Parța	1.03.2021	1 outbreak	Urban land belonging to UAT Orțișoara and UAT Parța	Vietnamese pigs
Criciova, Jdioara, Găvojdia, Drinova, Botești, Botinești, Jurești, Bunea Mare, Bichici, Temerești, Colonia Mică	13.03.2021	13 outbreaks	Non-professional holding	Domestic pigs
Coșteiu, Folea	31.03.2021	3 outbreaks	Non-professional holding	Domestic pigs
Lovrin	12.04.2021	1 outbreak	Non-professional holding	Domestic pigs
Honorici	19.04.2021	1 outbreak	Non-professional holding	Domestic pigs
Gătaia nouă	19.04.2021	2 outbreaks	SC SMITHFIELD ROMÂNIA S.R.L.	Domestic pigs
Satchinez	21.04.2021	1 outbreak	Non-professional holding	Domestic pigs
Crivobara, Secaș commune	11.05.2021	1 outbreak	Non-professional holding	Domestic pigs
Nițchidorf	3.07.2021	1 outbreak	S.C. SMITHFIELD ROMÂNIA S.R.L.	Domestic pigs
Nițchidorf, Duboz	6.07.2021	2 outbreaks	Non-professional holding	Domestic pigs
Cadar, Tormac commune	10.08.2021	1 outbreak	Non-professional holding	Domestic pigs
Iersinic, Ohaba Lungă commune	12.08.2021	1 outbreak	Non-professional holding	Domestic pigs
Opătița, Deta town	4.12.2021	1 outbreak	Non-professional holding	Domestic pigs
Bara	9.12.2021	1 outbreak	Hunting background 20	Wild boars
Ficătar, Craiovăț	16.12.2021	2 outbreaks	Non-professional holding	Domestic pigs
Brestovăț, Clopodia, Sacoșu Turcesc	24.12.2021	8 cases	Hunting background 18, 47, 55	Wild boars

Table 4. The ASF outbreaks in Timiș county in 2022

Locality	Date	Number of confirmations	Type of holding	Type of animals
Ficătar, Racovița commune	14.02.2022	1 outbreak	Non-professional holding	Domestic pigs

Several breeders have been left without state money for compensation for pigs killed by African swine fever (ASF) after authorities accused them of violating measures imposed by the Local Centre for Disease Control, which banned the movement animals. The efforts made by the veterinary services to prevent the spread of the African swine fever virus (ASF), those for the management of disease outbreaks, coupled with the intensification of recent controls, have resulted in a significant decrease in the number of outbreaks in both Timiș County and in the rest of the counties.

One measure that contributed significantly was the intensification of controls on this issue, especially those carried out with the support of the County Traffic Police Inspectorates. The more than 2,000 controls, carried out in mixed teams across the country, aimed to prevent the spread of the disease, by verifying compliance with veterinary sanitary restrictions imposed on the movement of pigs in areas affected by active outbreaks of African swine fever. During these actions, persons transporting or marketing animals or meat products without the documents required by the veterinary legislation or with unauthorized means of transport were

discovered and sanctioned, which poses a major risk of spreading the ASF virus. Checks have led to the identification of people who have illegally traded unverified meat and meat products for veterinary health and food safety. Such practices have been severely penalized in view of both the serious danger to human health posed by trichinosis and other diseases, and the risk of spreading the ASF virus in view of its prolonged resistance in frozen meat (over two years), or in meat products (3-6 months in salted and smoked meat). The epidemiological investigations carried out by the veterinarians have established that the main causes and means by which the virus spread that led / lead to new outbreaks are: entry / exit of pigs into / from farms without asking the veterinarian for documents proving their health. Also, the removal of animals from restricted areas (protection, surveillance, infected), so non-compliance with the restrictions provided in the provisions of Delegated Regulation (EU) 2020/687 that must be established and applied in these areas is another cause. Slaughter of sick animals without the veterinarian's notice, meat from sick animals being a constant source of the spread of ASF virus, but also failure to comply with the obligation for owners to notify the veterinarian when diseases occur in the pigs they own and / or mortality has led to the spread of this disease. Other causes of the spread of the virus were the dumping / abandonment of carcasses from ASF dead pigs in the forest, pasture, waterfront, means of transport contaminated with secretions and excretions from infected animals that have not been decontaminated , inadequate, the amount and treatment carried out by unqualified personnel without complying with legal provisions, feed introduced from infected areas directly into pig feed, lack of individual disinfectants at the entrance to the holding, staff employed in professional pig farms in the locality where ASF outbreaks have been confirmed and non-compliance biosecurity requirements and measures established in most non-professional holdings (households) and in some commercial pig holdings. Repopulation of an ASF-infected fattening farm takes 6-9 months. According to the outbreak, more than 30,000 pigs were slaughtered. Apart from the loss with slaughter, the fact is that the farm cannot be repopulated earlier than 6-9 months, after all the stages imposed by the action procedures in the ASF outbreaks have been completed. From the moment the outbreak is extinguished and the animals are neutralized under the supervision of the authorities and in accordance with their decisions, a first stage of disinfection is carried out, followed by washing and mechanical cleaning of all surfaces in the farm. Once these steps are completed, 2 more disinfection steps follow. Subsequently, the farm is subjected to a period of 15 days of sanitary vacuum, followed by the introduction of sentinel pigs to verify the effectiveness of disinfection actions. Going through all the above steps, repopulating an ASF-infected fattening farm takes 6-9 months. Of course, the owner of the farm or the authorities may decide on other necessary measures to enable the repopulation to be carried out, so that the above-mentioned period may be extended [7].

3. The African swine fever vaccine is getting closer and closer to reality

Globally, several strategies for the development of ASF vaccines have been developed. It should be borne in mind that ASF is a contagious disease that has a high potential for spreading to new outbreaks and then spreads rapidly and persists for a long time if early detection and strict control measures are not applied. The mechanisms leading to reduced viral replication and lack of disease in feral pigs after ASF infection are largely unknown. It is possible to identify susceptible or resistant pigs by using marker-assisted selection without being subjected to pathogenic challenge. The prospect of setting up an ASF-resistant pig herd by applying marker-assisted selection will enable farmers and producers to control the disease, ensure pig health and welfare, and achieve high-safety, high-quality pork production [14]. Between 1 October 2019 and 30 September 2023, through the European Union-funded VACDIVA Project (total budget of EUR 10,296,522.75) and completed by the Complutense University of Madrid, Spain, three pilot vaccines for wild boars and domestic pigs will be developed. During this period, the vaccines are close to the registration procedure. The vaccine, which will be used for wild boar, has already been shown to be 92% effective. Epidemiological modeling of global scenarios will be provided in a portfolio of services, with the aim of helping the authorities with responsibilities to eliminate the disease. ASF control is based on early diagnosis and implementation of strict sanitary measures. The measures taken by the affected countries have not been enough to stop the spread of the virus, so an effective vaccine would solve the serious situation

we are in. VACDIVA has the expertise of two global PPA reference laboratories (OIE and FAO), the EU reference laboratory (EURL), six EU national reference laboratories and four prestigious African swine fever research institutions. The prototype is administered to animals through maize baits containing an attenuated virus sample. The tests are performed at the Spanish Centre for Animal Health Research (CISA), the country's leading high-level biosafety laboratory. Romania is among the first countries to try the African swine fever vaccine, along with Lithuania and Kenya. It has been announced that pilot testing for the African swine fever vaccine (ASF) is expected to begin in 2024 in Lithuania, Romania and Kenya, according to the VACDIVA project. US authorities also say they have developed a vaccine to promote swine fever in Africa, which provided immunity for a third of pigs two weeks after vaccination and full protection for all animals at four weeks, which could play an important role in control of the current epidemic that threatens the world's pork supply [15]. U.S. government and academic experts have developed a vaccine against African swine fever, which has been shown to be effective in all cases, according to the American Society for Microbiology, according to Bloomberg. Vaccine research began after a virus outbreak in 2007 in the state had to work harder to meet regulatory requirements before commercialization. This new experimental ASF vaccine is promising and provides complete protection against the current strain that is currently producing outbreaks in Eastern Europe and Asia. It should be noted that there is currently no approved vaccine against ASF on the market, with several countries announcing that they are working on it, with first results giving hope to breeders that the virus will soon be able to be combated. In Vietnam, a vaccine against African swine fever has been tested with promising results and will enter commercial production in the second quarter of the year. The tests were performed by the Vietnamese Department of Animal Health (DAH) and the National Veterinary Action Company (NAVETCO), after working with a prototype developed by the US Department of Agriculture (USDA) that they developed. China may have lost control of the African swine fever pandemic due to unapproved vaccines. Pig prices have already started to rise in the world's largest market. Several cases of infection with new variants of the virus that causes African swine fever in animals have been reported in two provinces that are major producers of pigs. Scientists say the new strains, of which traders are anxiously awaiting information, are less deadly than the dominant pathogen, but they are spreading faster and the disease is harder to detect. In addition to a campaign to curb the spread of the new wave of the pandemic, the Chinese government has called for a strong offensive against counterfeit vaccines, making it clear that no vaccine has been approved for use in China or elsewhere. The ASF virus can interfere with various ways of activating cellular immunity, leading to immunomodulation, which makes the development of an effective vaccine very difficult to achieve [16,17,18]. Strategies known to date for the development of ASF vaccines can be classified into categories such as: live attenuated ASF virus, inactivated ASF virus, live vector subunit, mammalian expression plasmid and combinations thereof. All these types have limitations that block the rapid progress in the development of safe and effective vaccines capable of fighting the virus. The development of an effective ASF vaccine is largely delayed by gaps in our knowledge of the virus and existing host-virus interactions in the processes of infection and immunity [19,20,21]. In order to develop a vaccine that proves to be effective, fundamental research is needed to discover the functions of ASFV genes, to identify protective proteins and their combinations as targets for vaccines, but also the delivery possibilities that develop stable humoral and cellular immune responses, specific to this antigen. It is not yet known which targets of African swine fever virus play important roles in virulence, immunopathology or protection. It is also very important to strike the right balance between mediated antibodies and cells that provide immune responses to ASF virus challenge. A key factor appears to be immune hyperstimulation during ASF disease, more important being the results indicating that high levels of antibodies appear to be detrimental in terms of clinical outcome and protection [21,22]. A change in focus to fewer immunogenic ASF antigens, with the concomitant identification of new neutralizing antigens or epitopes of the ASF virus may be helpful. Determining the type of antibody that aggravates the course of the disease and identifying the epitopes of antigen neutralization is very useful in order to obtain a more targeted immune response and to strengthen the host's defence system. In the present situation there is no universal "ideal" vector, requiring various studies that use certain

vector systems [23,24,25]. There will be advantages and disadvantages to viral vector systems, depending on the target cells chosen and the specifics of each study performed. Advantages of using recombinant adeno-associated vectors (which have the ability to integrate the target gene into the host genome in the right place, preventing unwanted mutations; integration into both dividing and resting cells; a broad transduction profile; low immune response strong and stable transgene expression) place them ahead of other viral vectors and make them a suitable tool for obtaining genes *in vitro* and *in vivo* [26]. When choosing an appropriate viral vector, several factors must be taken into account, such as: safety, ability to spread both divided and undivided cells, capacity and immunogenicity [27,28,29].

Conclusions

African swine fever (ASF) is currently the main threat to the global swine industry. It affects more than 50 countries on 5 continents, with several epidemiological scenarios.

From 2020 until now, the situation has been very difficult for the Romanian pork industry, due to the losses generated by the African swine fever, which affects the industry since 2017. Both the number of affected commercial farms and the number of non-commercial farms has increased.

African swine fever does not affect people medically, but this disease has a huge economic and social impact.

From 2020 until now, there have been numerous cases of ASF in Timiș County, both in domestic pigs and in wild boars, with significant economic losses in the pig breeding sector, attracted by the sanitary-veterinary measures imposed in the affected areas. The efforts made by the veterinary services to prevent the spread of the African swine fever virus (ASF), those for the management of disease outbreaks, coupled with the intensification of recent controls, have resulted in a significant decrease in the number of outbreaks in Timiș County.

Unfortunately, there is currently no approved vaccine against ASF on the market, with several countries announcing that they are working on this goal with first results that give breeders hope that the virus will soon be able to be combated [26,30].

African swine fever continues to be a problem in Europe and our country, but also for other continents as long as there is no vaccine and the prevention measures established by the competent authorities are not fully complied with.

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