African Swine Fever in Germany, Spread Tendencies, Measures, Prevention and Impact on Military Exercises and Troop Movements

Peste porcine africaine en Allemagne, tendances de propagation, mesures, prévention et impact sur les exercices militaires et les déploiements des troupes

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Summary

African Swine Fever (ASF) is a listed animal disease affecting exclusively suidae. It has been spreading among the domestic and wild pig population of Eastern -and subsequently- Central Europe since 2014. An outbreak of ASF is usually followed by officially ordered biosecurity measures for the affected and surrounding area, as the socio-economic consequences can be severe. In fighting the spread of ASF, a collaborative effort of both civilian and military veterinary authorities is needed. One of the main aims following the confirmation of ASF is to prevent the spread of the virus via wildlife, forestry, agriculture and worldwide transport with the latter applying to military activities as well. In this context the sanitation of military vehicles and material moving between affected and non-affected areas needs to be carefully planned and executed. This article aims to give an overview on the pathology of African swine fever, report on historical and recent outbreak developments as well as measures of surveillance, control and prevention regarding military exercises and troop movements.

Key Words: Animal Disease Transmission, African Swine Fever, Veterinary Public Health, Transmission countermeasures, Wild Boar, Military Exercise, Military Transportation, African Swine Fever Surveillance, Carcass Detection, Carcass Search, Culling, Cleaning, Sanitation.

Résumé

La peste porcine africaine (PPA) est une maladie animale répertoriée qui touche exclusivement les suidés. Depuis 2014, elle se propage parmi les populations de porcs domestiques et sauvages d'Europe de l'Est, et ensuite d'Europe centrale. L'apparition d'un foyer de peste porcine africaine est généralement suivie de mesures de biosécurité prescrites officiellement pour la zone touchée et ses environs, étant donné que les conséquences socio-économiques peuvent être graves.
Pour lutter contre la propagation de la peste porcine africaine, les autorités vétérinaires civiles et militaires doivent collaborer. L'un des principaux objectifs après la confirmation de la présence de la peste porcine africaine est d'empêcher la propagation du virus par la faune sauvage, la sylviculture, l'agriculture et les transports mondiaux, ce dernier point s'appliquant également aux activités militaires. Dans ce contexte, l'assainissement des véhicules militaires et du matériel circulant entre les zones touchées et non touchées doit être soigneusement planifié et exécuté. Cet article vise à donner un aperçu de la pathologie de la peste porcine africaine, à rendre compte de l'évolution historique et récente des foyers ainsi que des mesures de surveillance, de contrôle et de prévention concernant les exercices militaires et les mouvements de troupes.

Mots clés : Transmission des maladies animales, peste porcine africaine, santé publique vétérinaire, contre-mesures de transmission, sanglier, exercice militaire, transport militaire, surveillance de la peste porcine africaine, détection des carcasses, recherche des carcasses, abattage, nettoyage, assainissement.

Introduction

ASF is a notifiable animal disease caused by African Swine Fever Virus (ASFV) of the Asfarviridae virus family. It exclusively affects suidae, both wild boar and domestic pigs are susceptible. ASFV is an enveloped double stranded DNA-virus 200-300 nm in size. It is highly resistant to environmental conditions especially in dry and cold weather and can survive in raw pork products up to four months and in bone marrow or carcasses up to seven months. Inactivation occurs at temperature levels above 69°C, very low (<3.9) or high pH values (>11,5), gamma radiation or appropriate chemical treatment.[1]

The virus originates from sub-Saharan Africa where it is transmitted in a sylvatic cycle among warthogs and soft ticks of the Ornithodoros genus. The infection in warthogs is usually not accompanied by clinical signs nor overall increased mortality.

Among the Eurasian wild boar and domestic pig population, where the virus was only introduced in 2007, virus transmission is mostly animal to animal contact related, but indirect transmission also occurs (for example via ingestion of raw pork products).

In Europe, clinical symptoms may vary, depending on virulence of the virus strain and immune status of the animals. Peracute

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and subclinical courses are possible, but due to a mostly innocent population and high virulence of the circulating strains an acute disease with severe symptoms currently presents as the most common: after an incubation period between three to 15 days- the infection leads to an acute illness with up to 90% lethality in both domestic pigs and wild boar. The most common symptoms are fever, respiratory as well as gastrointestinal symptoms, hemorrhage (Pig Ebola), blue skin, movement disorders, somnolence and – in almost all of the affected animals- neurological seizures and finally death. Post mortem-findings often show enlarged ebony-colored lymphnodes as well as petechial hemorrhages in organs like kidney and liver in addition to disruption of the gastrointestinal mucous membranes and lung edema.

Typically, not all of the animals are infected: an only moderate contagiosity is accompanied by nearly 90% lethality. Thus, an uncontrolled outbreak in wild boar usually leads to the establishment of the virus among the population, as enough animals initially stay healthy and the carcasses of the diseased, carrying the viable virus, provide a source of infection for a long time. Hence, in a natural environment the infection is not self-limiting.

Because of the socio-economic consequences, strict governmental measures and trade restrictions are put in place, following the confirmation of an outbreak of ASF. These restrictions itself may have a harsh influence on local forestry, agriculture and meat production businesses, but try to avert further damage from the overall economy.

Fig. 1. Skin hemorrhages

Fig 2. petechial hemorrhages kidney © Friedrich-Loeffler-Institute

Outbreak History:

ASF is of African origin and was first described in areas south of the Sahara Desert. As a natural reservoir African wild boar species like warthog and bush pig as well as African leather ticks were identified. In these species, the virus is able to persist without causing symptoms. The first description of ASF occurred in Kenia 1921[2], when the virus transferred from African wild boar to domestic pigs originating from Europe and farmed in colonial settlements. African swine fever itself reached Europe in 1957 when it was detected in a Portuguese pig farm. This outbreak was quickly controlled, but the virus reappeared in Portugal just three years later, spreading to Spain and France this time. From the 1960s to the 1990s when the virus was present in Spain, short episodes of outbreaks were also reported in France, Malta, Belgium and the Netherlands due to food trading and poor feeding practices. In 1978 the virus was introduced to Sardinia, where it is still present. With the exception of Sardinia, where Ornithodoros leather ticks are indigenous and the outbreak developed to an autochthone self-sustaining infection cycle, ticks are not a part of the reproduction cycle and measures were successfully put in place to extinct the outbreaks in the named countries. In the 1980ies a South American outbreak hit Cuba, Brasilia, the Dominican Republic and Haiti with a successful extinction of the disease there as well. However, the virus has reemerged in the Dominican Republic and was present from July 2021 until the end of December 2022.[3]

By now ASF has been or is present on every continent of the world. Since being introduced to Georgia via merchant ships in 2007 and subsequently spreading throughout the transcaucasian region we are experiencing the so-called Caucasian outbreak in Europe just now.

Starting in Georgia, South Russia, and Armenia the velocity of the propagation of the disease was around 5 km per year. Since 2020 a slightly quicker propagation velocity has been noted. The specific reasons for this increase in velocity are yet unknown, but virus mutation, slower disease onset

and progress as well as high density of wild boar population are discussed.

In 2013 Northwest Russia and Ukraine were affected by ASF for the first time, followed by the Baltic States in 2014. After a massive spread there, the first outbreak was confirmed in Poland at the Belarussian border. Until 2018 infection rates rose steadily in those Nations. In addition, the disease reached the Peoples Republic of China in August 2018 and has been spreading on the Asian continent until today.

In Autumn 2018 a single (spot-infection) outbreak in Belgium occurred. Suspicions were voiced about transmission by military vehicles, but Belgium military could prove that NATO cleaning and sanitation protocols had been strictly followed before transportation.

The first ASF outbreak in wild boar in Germany was confirmed on the 10th of September 2020 in the rural district Spree-Neisse, Brandenburg, near the Polish border at a time when ASF had already been present in wild boar in the adjacent part of Poland. Measures were executed immediately, but as the infected wild boar carcass had been found in an advanced state of decay, further spread amongst the wild boar population of Germany had already occurred and several more cases were subsequently detected in the vicinity.

As a first measure restriction zones needed to be established and soon expanded, as more and more cases among wild boar were confirmed. On the 31st of October 2020 the first case of ASF in wild boar was confirmed in Saxony. In addition to the spread from the borders, two outbreaks in wild boar, retrospectively classified as spot infections occurred in Germany: October 2021 in the area of Meissen/Dresden (Saxony) as well as November 2021 in the rural district of Ludwigslust-Parchim in Mecklenburg-Western Pomerania close to the Brandenburg border.

As result of the established countermeasures in Germany, cases in wild boar decreased from 1600 in 2022 to 887 in 2023. In 2024 84 cases have been reported by the middle of May. Restriction zones in Brandenburg have been lifted and reduced in size.

Military installations affected by outbreaks:

Overall, nine military properties of the Bundeswehr have been a part of ASF-restriction zones. After several zones have been lifted, three of them still remain inside restriction zones as of today. The largest of them, the Military Training Area (MTA) Oberlausitz is located in Saxony, close to the Polish border and -with 16,800 hectares- is the third largest Bundeswehr MTA in Germany. The military significance of MTA OBERLAUSITZ is derived from its unique landscape profile of extensive forest as well as vast dune areas, which provides ideal conditions for the deployment of armored troops as well as live firing with high-value weapon systems, such as combat helicopters.

The Bundeswehr has been conducting a monitoring program for emerging wildlife diseases at selected MTAs since 2014. This included the sampling and examination of wild boar shot during social hunts for Classical and African swine fever. Since the first outbreak of ASF in Germany, all Bundeswehr sites have been subjected to increased monitoring and all wild boar shot or found dead have been examined.

Following the first outbreak in Saxony which occurred only meters from the border of the MTA, the Training Ground Oberlausitz has been partially inside the restriction zones. Exercise operations on the MTA were initially completely suspended and only resumed almost a year later in September 2021 after risk assessment of individual exercise projects and the establishment of comprehensive prevention and control measures. The first outbreak on the training ground itself was confirmed on the 18th of February 2021.

The control of ASF on the military training grounds is carried out in close cooperation with the locally and professionally responsible military and civilian authorities (ministries, districts and veterinary offices).

For MTA Oberlausitz this meant the immediate fencing of the larger Eastern part of the training ground to prevent immigration of wild boar from the east, monitoring of the wild boar currently present using both wildlife cameras and drones, the reduction of said animal population using both hunting and culling methods plus the reduction of the infective agent via extensive carcass searches. Furthermore, as the MTA is normally not only used by troops from all over Germany, but also by armed forces of allied nations, cleaning and disinfection measures were put in place for all vehicles and material used on the MTA off paved roads. Initially all exercises were suspended and only allowed to recommence almost one year later, when all measures had begun to take effect.

Measures under military consideration:

Drones

At MTA OBERLAUSITZ civilian drone technology was initially used to assess the wild boar population and to determine the day- and night-time locations of the animals. Subsequently it was also used for carcass searches and assisted hunting, identifying wild boars and carcasses via zoom and thermal imaging without living animals being disturbed by the drone.

In our experience the team operating the drones should be backed up by at least one person with professional hunting/wildlife experience. Ideally all controllers monitoring the flight visuals should have a hunting license or similar experience in addition to their technical skills.

Military drone systems were also evaluated in both theory and practice tracking live animals and carcasses, but were found not to be suitable for theses specific tasks.

Trapping

Trapping is a method for culling entire packs of wild boar at once. This method represents an animal disease control measure for rapid and effective population decimation.

The classic boar trap consists of a rigid steel grid cage, with a steel grid trap door. Anchoring of the cage in the ground is necessary to prevent the whole trap from being levered out by larger boars. After the trap is erected, an initial habituation phase follows, in which the trap door is secured in an open position. In this phase the target species is attracted with preference food. After trap habituation, the trap door is activated and triggered under direct visual or video control when the animals are in the trap. As the door is rigid and heavy there is a substantially risk of trapping especially younger boar underneath the door. When the trap door is triggered using video control the risk is even higher, because of time delays in network connections[4].

After closing the trap, the animals are killed inside as soon as possible.

At MTA OBERLAUSITZ, several mobile net traps (Pig Brig Trap®) have been used for removal since the beginning of 2022.

This equipment had already been scarcely used in the civilian sector for wild boar population reduction but still had proven its worth[4]. After several weeks of operation on the MTA, clear advantages could be ob-

Fig. 3. PigBrig®-Trap ©Bundesforstbetrieb Lausitz (Hr. Graf v. Plettenberg)

served in terms of user-friendliness, occupational safety and animal welfare aspects: The net trap is basically used in the same way as the classic boar trap, but due to its unique design offers many advantages. During the habituation phase at first only the fence posts are present. Later the net is hung up high, so the animals can move in and out of the trap freely. During the active phase the net is lowered to the ground, anchored and folded inwards [see Fig.3.] so the animals can still move in, but not out anymore.

Another advantage is that it is significantly easier to assemble and relocate. Regardless of which system is used, one of the most important aspects contributing to successful trapping is the location of the trap. The PigBrig® net trap can be moved promptly and with little manpower, in case a selected trap site in retrospect proves to be unsuitable or is not accepted by the animals during the habituation phase.

Most importantly, the risk of injury to the animals is much lower due to the flexible parts and the absence of a door. Furthermore, even when the trap is armed, animals can still follow the pack from outside, which reduces the stress level of the animals.

Last but not least, there is also a reduced risk of injury for the hunters due to the net, as the risk of stray bullets ricocheting off course is minimized by the small number of rigid parts.

Prophylactic Measures – Cleaning and Disinfection

As mentioned before, MTA OBERLAUSITZ is not only used by troop units throughout Germany, but also by allied nations. To prevent the spread of the ASF virus to unaffected parts of the country or abroad, a strict cleaning and disinfection regiment had been established for vehicles and material used at the MTA before use was granted again. All material and vehicles leaving the training area are cleaned and - if used on unpaved roads or in the field - disinfected. Special care is taken to remove all soil deposits.

As the disinfection time and efficiency is subject to temperature und other weather conditions, a large tent has been erected on site, which can be heated to an appropriate temperature during the winter. The disinfection solution is distributed to the material via a foaming system to ensure better adhesion to the material. As the exercises maneuvers especially with the vehicles can be intense and tanks often reach the cleaning point covered in mud, scaffolding has been erected inside the tent, to make sure all parts of the vehicles can be reached.

The same measures are applied during international movement. For Deployment adherence to the guidelines of the target or transit country are followed. For Redeployment the risk of ASF transmission is assessed by operation assigned senior veterinary officers and the necessary measures determined by German Military Headquarters. As the Baltic states are common ground for military exercises and ASF is widely spread among the wild boar population in these countries, prophylactic measures are required before Redeployment to Germany.

Conclusion

The animal disease prophylactic surveillance of Bundeswehr properties and the order of appropriate measures for control in the event of an animal disease pose a great challenge. Animal welfare and species protection aspects have to be considered and implemented as well as the restrictions for the exercising troops have to be kept as low as possible. This requires intense coordinated action between the civilian and military veterinary authorities, the Federal Forestry Service, the MTA commander and the exercising troops. In doing so, it is important to know the respective priorities of the individual parties concerned and to take them into account in an appropriate manner.

Fig. 4. Tank chain during disinfection © V. Steudel

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