

## **Tools and opportunities for African swine fever control in wild boar and feral pigs: a review**

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Appendix S3: Detailed information on the point introduction in Czech Republic, Belgium and Italy

Three-point introductions have been reported in Europe: Czech Republic, Belgium and Italy. We do not address the two introductions into Greece, since the first one was limited to domestic pigs and the second one might be the consequence of nearby epidemic fronts. For the same reason, we do also not consider the second ASF entry to the Czech Republic.

**Czech Republic**

The days immediately after detecting the first ASF case in a wild boar are extremely important. On June 26, 2017, two dead wild boar were detected near the city of Zlín in the eastern part of the Czech Republic. Neither the veterinary services (SVA) nor the hunters were prepared for this unexpected ASF outbreak. Veterinary services immediately (June 27) banned hunting, supplementary feeding, and bait feeding (baiting) of wild boar. This ban was valid until July 7. On June 28 SVA established the State ASF Eradication Commission which had 12 members (mostly politicians, veterinarians, researchers, biologists, and epidemiologists), and was an advisory body to SVA. On August 1 SVA ordered farmers in the core area to keep 115 hectares of field crops (mainly corn and wheat) unharvested to ensure food and cover opportunities. Recommendations to hunt dominant adult females were disregarded to avoid disrupting social groups and increasing ASF spread.

Considering the literature and expert opinions, the following outbreak investigation and early intervention actions should be triggered:

- Habitat, habitat connectivity, and natural and artificial barrier mapping.  
Map pig farms and fenced wild boar populations of game parks if present.
- Targeted carcass search to preliminarily draft the contour of the infected zone.
- Epidemiological investigations to uncover the probable origin of the outbreak.

- Stop all non-vital activities in the zone to avoid disturbance and further animal or human-mediated ASF spread.
- Inform the relevant stakeholders and the public.

In the days immediately after the first ASF detection, comprehensive carcass search, removal, and destruction are unlikely. Rather, there will be an opportunistic carcass search to define the infected zone, signalling carcass locations for subsequent disposal. In this context, deterrents were found to contribute to reducing wild boar carrion consumption (Denzin et al. 2020). Inside the infected zone, avoiding disturbance seems advisable to avoid further infection spread. In Czechia, no driven hunts took place inside the infected zone (EFSA et al. 2018a). In Belgium, as soon as the outbreak was detected, a total ban on hunting and all other forestry activities was imposed in the infected forests (EFSA et al. 2019). The expected level of disturbance of a range of forestry and leisure activities has been assessed (Petit et al., 2020).

After having defined the contour of the infected area, zoning can take place. In the Czech Republic, 5 zones were defined. Zone 1 was the "core area" (57 km<sup>2</sup>), defined by the occurrence of positive cases and the strictest control measures. This zone was partially fenced with odour repellent (July 22) and electric fences (August 4), although their actual effectiveness was not evaluated (Bíl et al., 2018). For three weeks (August 9-31) there was also a total ban on public entry into uninhabited parts of the core area. Baiting was banned here from the beginning of the infection until August 9, when it was possible to start baiting again in limited doses (5 kg / 1 baiting station / 100 ha) in preparation for the installation of trapping cages (August 24). Limited hunting with firearms was allowed again in the core area on September 11 (only 3 trained hunters per 1,000 ha). However, such strict conditions did not lead to the necessary efficiency, so police snipers with night-vision technology were called in (October 16). Within 10 weeks (snipers stopped hunting in the core area on December 22), they shot 157 wild boar in the core area, of which 8 were ASF positive.

Zone 2 was a "high risk" buffer area around the core area. Similar rules and measures as in the core area were applied. The only difference was that this buffer was not surrounded by fencing. Nine positive dead wild boars were found in this buffer, about 4 km from the core area boundaries on December 28, 2017. Zone 3 was an area with a "low risk" of infection of approximately 1,000 km<sup>2</sup>. The rules according to Implementing Decision (EU) 2017/1162 applied here. Hunting was allowed here on July 21. However, there were biosecurity rules that the hunters did not agree with, so hunting was very limited in the beginning. Blood samples were taken from all individuals hunted (shot). During the entire period of infection, 1,852 individuals were hunted here, and 380 carcasses of dead wild boar were found, all testing negative. A reward of EUR 150-300 was paid for each dead boar shot or found. In addition, compensation (for loss of venison sales) was also paid to all individuals whose wild boar carcasses were sent to the rendering plant after shooting. Zone 4 was an intensive hunting area of approximately 8,000 km<sup>2</sup>) where otherwise prohibited hunting methods (silencers, night vision) were allowed and financial rewards were paid for each wild boar shot, from which a sample was sent to analyze the presence of ASF (voluntarily). Finally, Zone 5 covered the rest of the Czech Republic. Extraordinary measures still in force in the country include a baiting limit (maximum 20 kg/1 baiting station/50 ha).

### **Belgium**

On September 13, 2018, the presence of African swine fever (ASF) was confirmed in Belgium for the first time in wild boar. The two first positive cases, 1 found-dead adult and 1 sanitary-shot young wild boar, were detected in a forest area (latitude 49.6332°N and longitude 5.6145°E, Etalle, province of Luxembourg, south-east of Wallonia). The origin of the outbreak is unknown but clearly linked to human activities, a judicial investigation is ongoing. After confirmation of the outbreak, preventive and control measures were immediately implemented. Pig farms within the zone (involving about 5000 pigs) were pre-emptively depopulated with generous compensation. After zoning and restrictions as required by the

Commission Implementing Decision 2014/709/EU, interventions included carcass search and removal, fencing, and wild boar culling. Fencing details have been described elsewhere (EFSA et al. 2020), and information on carcass removal and culling follow in the next paragraphs.

In the Belgian ASF management zones, an active search of carcasses was implemented by the regional authorities with punctual participation of the army (priority in Part II and to a lesser extent in Part I). Hunters and landowners were requested to notify dead wild boar but without active participation for removal and without incentive. Maps of priority search areas were created and continuously adapted according to previous results (localization of the last ASF positive fresh cases, organization of passive surveillance in previous weeks). Wetlands, heat load index, and distance to the river were also considered to target specific zones (Morelle et al., 2019). In the field, groups of 6 to 8 professionals from the Forest Services were conducted by one or two local leaders, progressing in line in a systematic way. The objective was to detect carcasses without disturbing live animals. As soon as a carcass was detected, it was located using a GPS or a smartphone and communicated to the professionals of the Civil Protection to arrange retrieval, transport to the collection centres for sampling and then transport of the carcasses to the rendering plant. From September 2018 to March 2021, 1,338 carcasses were discovered in the entire ASF zone of 1,106 km<sup>2</sup> (1,206 in Part II and 132 in part I). Amongst carcasses discovered in Part II, 801 (96% of all the 833 positives from Parts I and II) were confirmed ASFV positive.

In Belgium, several wild boar population control tools were implemented: trapping, night shooting, single hunting at baiting points, and driven hunts with/without dogs, with specific restrictions according to the area and with the objective to drastically depopulate the different areas and the epidemiologic situation. Destruction within the infected zone was carried out by the regional authorities whereas hunters were enrolled with the administration for depopulating in the white zones. Compensations (50 € or 100 € per wild boar) were provided for participating hunters. The latter were enrolled provided they had received specific training

on biosecurity procedures, including for carcass packaging and transport to the collection centres. Night shots, carried out by trained forest rangers, proved essential for implementing a targeted destruction strategy without disturbance in the infected area (especially when the density of wild boar has decreased due to the disease). The professionals were also active in the white zones to help the hunters to depopulate. The rangers were equipped with rifles fitted with night vision scope, thermal imaging, and GSM cameras on baiting sites. Traps also proved an efficient ancillary method (Licoppe et al., 2020). Up to 170 traps were deployed by the regional authorities (~3 traps / 10 forested km<sup>2</sup>) from January to June 2019. They were operated with the collaboration of hunters for baiting and culling. During the first three months of the epidemic phase (September 2018 to December 2018), hunting was strictly forbidden in the infected area, but hunters were stimulated to organize driven hunts in the white zones, with or without dogs depending on the presence of fences (Table 1).

**Table 1.-** Mortality data recorded during the hunting season before the outbreak (2017-2018) and during the 3 years following the outbreak (% compared to 2017-2018, considering both hunting and ASF mortality). Personal communication: A. Licoppe.

<b>ZONE</b>	<b>2017-2018</b>	<b>2018-2019</b>	<b>2019-2020</b>	<b>2020-2021</b>
<b>Infected zone (598 km<sup>2</sup>)</b>	754	1505 <b>(+100%)</b>	607 <b>(-19%)</b>	120 <b>(-84%)</b>
<b>White zone (508 km<sup>2</sup>)</b>	1042	1803 <b>(+73%)</b>	2516 <b>(+141%)</b>	526 <b>(-50%)</b>

## Italy

In Italy, the first ASF case was reported on 7th January 2022, corresponding to a wild boar carcass found on 29th December 2021 near Ovada (Piedmont) (Iscaro et al., 2022). A few days later another positive case was reported in Liguria about 20 km eastward of the first one. Considering the distance between these two first cases it was immediately clear that the focus was not detected at its beginning, but that the ASF virus had been circulating in the area for

months. One case has been found few weeks later in the city of Genova, which could suggest a possible entry route through the port. Four months after the first reported case, 114 infected carcasses have been mapped in an area that is about 35x35 km (1,250 km<sup>2</sup>). On the 5th of May 2022 a case was reported in the city of Rome, 400 Km distant from the focus in Piedmont/Liguria, and after three weeks another outbreak has been reported in the city of Rieti that is about 80 km far from Rome. Compared to the Czech and Belgian situations, the Italian one seems more advanced and less likely to be contained. Both Piedmont/Liguria and central Italy have high wild boar densities and open-air pig breeding is common in central Italy. After just one month from the first report in the wild boar in Rome, two ASF cases have been found in domestic pigs.

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