

USE OF BOAR TRAPPING IN
THE CONTEXT OF THE
MANAGEMENT OF AFRICAN
SWINE FEVER IN WALLONIA

PRACTICAL ASPECTS,
PRELIMINARY RESULTS
AND RECOMMENDATIONS

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Licoppe A., Lievens J., Della Libera F., Herrin T., Malengreaux C., Boudart J.L., De Waele V., Fichet V., Linden A., Lesenfants C., Van Goethem A., Villers M., Scohy J.-P., Herman M.

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Corresponding author :

Alain Licoppe

SPW-ARNE-DEMNA

Avenue Maréchal Juin 23,

5030 Gembloux

Belgium

alain.licoppe@spw.wallonie.be

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INTRODUCTION

On September 13th, 2018, the Public Service of Wallonia (SPW), the Faculty of Veterinary Medicine (Liège University), the National Reference Laboratory (Sciensano) and the Federal Agency for the Safety of the Food Chain (FASFC) confirmed that two wild boars found dead on September 9th, 2018 in the forests of the village of Buzenol (Etalle's township) were positive for African Swine Fever virus (ASFV) (Linden et al 2019). African Swine Fever was detected in 2007 in Eastern Europe (Georgia). Since, the disease spread to other neighboring countries, reaching the European Union in 2014. Very quickly, the Walloon Government took a series of measures implemented in an initial area of 63,000 ha considered to be infected, as determined by the European Commission after consultation with the FASFC and the SPW. Since

then, due to spread of the infection in wild boars, the zoning has been increased five times. To date, areas affected by measures against ASF cover 110,600 ha (including 57,000 ha of forest) (SPW, AFSCA, ANB 2020).

The ASF virus can survive for long periods in the blood, tissues, secretions and excretions of infected animals, and can remain infective in uncooked or undercooked meat products. It can therefore be transmitted by the following routes: blood, excrement, saliva, food contaminated indirectly or through contact between individuals. It is therefore a virus that can survive, in a sustainable way in the carcasses of wild boars present in the environment. The infected boar dies in 95% of cases after circa ten days.

" To date, all of the areas affected by measures against African Swine Fever cover a total area of 110,600 ha (including 57,000 ha of forest)"

The four phases of the dynamics of infection are shown in the figure 1 (Guberti et al 2019). The incursion phase corresponds to the introduction of the virus into a naive host population (or a non-infected population). It is caused either through contact with a neighbouring population of infected wild boars or through an indirect introduction linked to human activities. The invasion phase corresponds to the successful dispersal of the virus in a population of susceptible hosts. Intuitively, we assume that the larger the population of susceptible hosts, the more likely this phase is to succeed. If the invasion phase is successful, the epidemic phase follows with many infected cases depending of time, which takes the form of a Gauss curve whose shape and height will depend on the interactions between the virus and the host population; in

other words, this curve is determined by the number of contacts between infectious animals (including carcasses) and susceptible animals. During the epidemic phase, the probability of eradicating the infection is almost zero due to its exponential nature and therefore the large number of infectious individuals. The intervention of hunting during this phase of the disease is therefore of no interest since it has no effect on the population in comparison with the mortality due to the disease. In addition, hunting in the epidemic phase may lead to a spread of the disease linked to disturbances of wild boar populations, thus increasing the infected area and complicating its management. The endemic phase corresponds to a persistence of the disease in a region, the disease manifesting itself either continuously or seasonally (eg birth or shortage

period, etc.). If the boars remain in sufficient numbers and reproduce before the disappearance of the environmental virus, the increase of the susceptible population will lead to a resumption of the disease. This is the situation encountered since 2014 in the Baltic countries for example, or since 1978 in Sardinia. When the presence of the virus was detected in Belgium, the epidemic phase had already started. In the strategy of eradicating ASF, it is therefore preferable not to allow hunting in infected areas

during the epidemic phase, given that the virus will always be faster and more effective than the methods of destruction. It is only after the epidemic phase, when the population is much lower that intense efforts of destruction must be put in place to eliminate a maximum of susceptible hosts in the infected area. On the other hand, destruction efforts must be intense and sustained in a free area around the infected area as soon as possible.

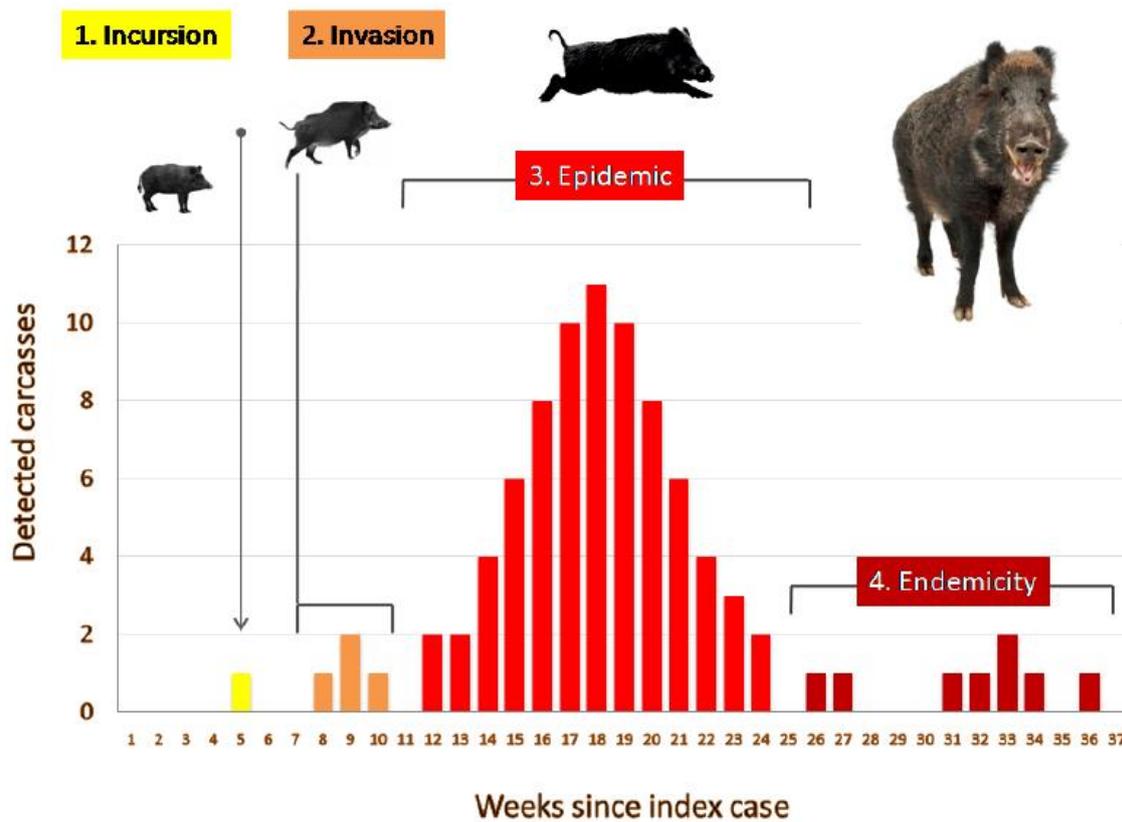
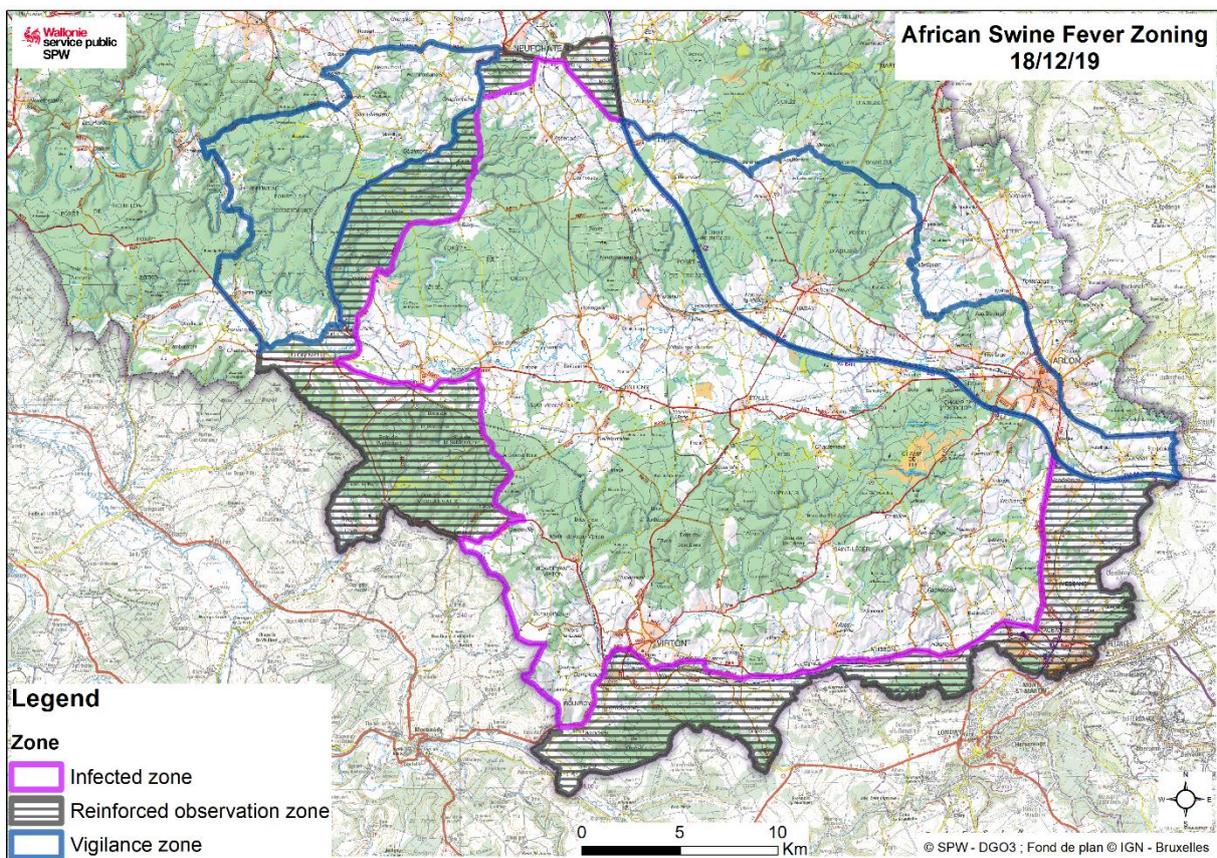


Figure 1 – Theoretical example of the 4 phases of the infection dynamics in a wild boar population illustrated by the weekly positive cases (Guberti et al 2019)

REMINDER OF APPROPRIATE MANAGEMENT MEASURES IN THE FIGHT AGAINST ASF IN WALLONIA

The strategy to eradicate the ASF virus is based on the recommendations of the European Union (European Commission 2015), European experts (EUVET missions) and the strategic committee¹ specially set up when this virus appeared in the wildlife in Belgium. The zoning (SPW 2019) delimits the areas for implementing the measures to control and eradicate ASF. It differentiates the

infected zone (ZI) where the virus has spread, the reinforced observation zone (ZOR) which surrounds the infected zone and is supposed to be healthy, the vigilance zone (ZV) which is located either beyond the ZOR, or beyond the A4-E411 motorway which links Brussels and Luxembourg.



In ZI, all activity in the forest is at a standstill during the epidemic except for ASF management measures. In the post-epidemic phase, measures to depopulate the remaining boars are undertaken with the least disturbing methods of destruction possible, i.e. those likely to cause the least movement of companies. In ZOR and ZV, all

means of destruction are used, with a view to obtain a buffer zone without wild boars to limit the risk of spreading the disease.

Passive surveillance organized by the authorities results in the organization of the systematic search of carcasses in the field, extracting the

¹ The strategic committee is composed of political, administrative regional and federal authorities as well as veterinary scientific experts, epidemiologists and biologists. It meets monthly or in crisis situation in order to give the main guidelines in terms of management in the field.

carcasses and test them. Virological analysis and elimination of all boars culled and found dead towards the rendering plant in strict compliance with biosecurity rules allow monitoring of the situation and compulsory notifications to EU and OIE (World Organisation for Animal Health). The role of passive surveillance is also essential in "cleaning up" the environment and, therefore to reduce viral load. A network of fences was

installed by the authorities to curb the spread of the virus and facilitate depopulation. More than 300 km of fences have been installed, around the infected area to physically confine the wild boars.

The Belgian fences were connected to the fence networks installed in neighboring countries. These measures are summarized in Table 1.

Table 1 – Main management measures to eradicate ASF in Wallonia, according to epidemic status and zoning

Management measure	Area	Forest activities	Depopulation	Fences	Research of carcass
Epidemic phase	ZI	Forbidden	Trapping	Construction and maintenance	Organized research (in ZI prior to ZOR and ZV)
	ZOR and ZV	Authorized	Driven hunts without dogs, single hunting, night shooting and trapping		
Post-epidemic phase	ZI	Forbidden or limited	Trapping, single hunting and night shooting		
	ZOR and ZV	Authorized	Driven hunts, single hunting, night shooting and trapping		

LEGISLATION

Normally the law on hunting in Wallonia doesn't foresee boar's trapping as a hunting method. Exceptions exist in the context of specific destruction requests to guarantee public health and safety (Gouvernement wallon 2002). Non-lethal trapping is also authorized for scientific research under special conditions (Gouvernement wallon 2011). An adaptation of existing legislation (Gouvernement wallon 2018) dedicated to temporary measures to be implemented to fight against African swine fever (ASF) describes the destruction methods authorized in this context.

Destruction can be done by means or using :

1. nets, hatches,
2. traps,
3. catching enclosures and all other devices allowing the capture of live wild boars ;
4. unpoisoned baits;
5. light sources;
6. euthanasia products;
7. firearms;
8. mufflers and night sights ;
9. short quest dogs.

Regarding 6 °, the use of euthanasia products is reserved only for a veterinarian. Regarding 8 °, the use of mufflers and night sights is only permitted to officials of the Administration. The holders of hunting rights and their gamekeepers can also use these accessories provided that the law of June 8, 2006 regulating economic and individual activities with weapons by the federal authority authorizes them there. These destruction measures are

implemented by different actors depending on the ASF zoning. The authorities are responsible for implementing measures in the infected area, with the possibility of granting exemptions to hunters who can intervene under certain conditions, including compliance with biosecurity measures. Hunters are responsible for implementing destruction measures in free peripheral areas (ZOR and ZV).

It is the Administration which gives the green light as to the choice to use one or another method of destruction on the basis of the opinion of the strategic committee according to the epidemiological situation.

Definitions

In this document, we mean :

- **feeding** : artificial food in order to supplement a temporary or permanent nutritional deficiency in the natural environment or to dissuade the wild boar from leaving the forest and thus prevent it from damaging agricultural production. In 2019, Walloon legislation (Gouvernement wallon 2012) authorizes "deterrent feeding" under certain conditions. Feeding is prohibited in Wallonia as part of the fight against ASF ;
- **baiting** : artificial food in order to facilitate the shooting of wild boar from a lookout site. Hunting legislation in Wallonia doesn't provide this possibility (apart from destruction). On the other hand, it is a permitted practice in Flanders and in many Germanic countries. Baiting is permitted in Wallonia as part of the fight against ASF.

« It is the administration which gives the green light as to the choice to use one or another method of destruction on the basis of the opinion of the strategic committee according to the epidemiological situation. »

WILD BOAR POPULATIONS IN WALLONIA AND GAUME

The wild boar is not the subject of any counting organized on the scale of Wallonia. The only information available is shooting statistics at the scale of the hunting council (set of hunting territories ranging from 5,000 to 100,000 ha). As

in all European countries, boar shooting statistics are constantly increasing. The general trend over the last 30 years (1986 - 2018) is a multiplication by 7 with peaks following the years with strong forest fruiting (acorns and/or beechnuts).

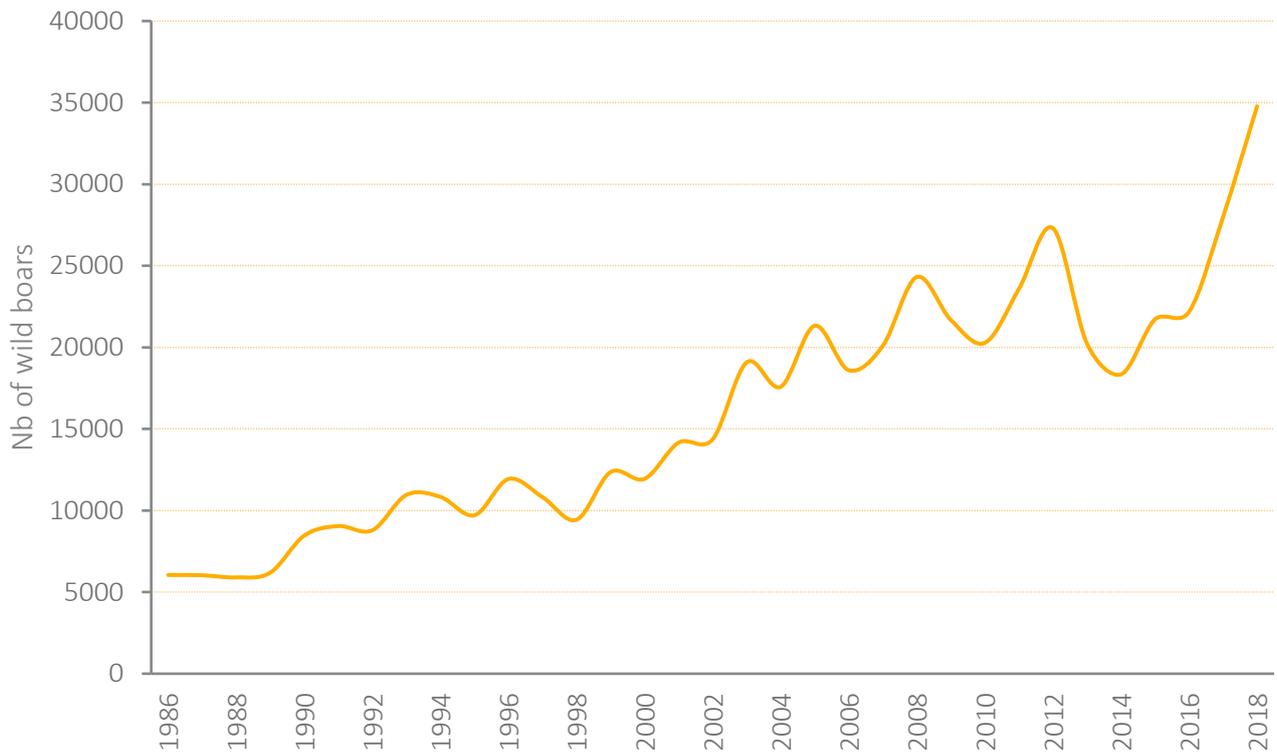
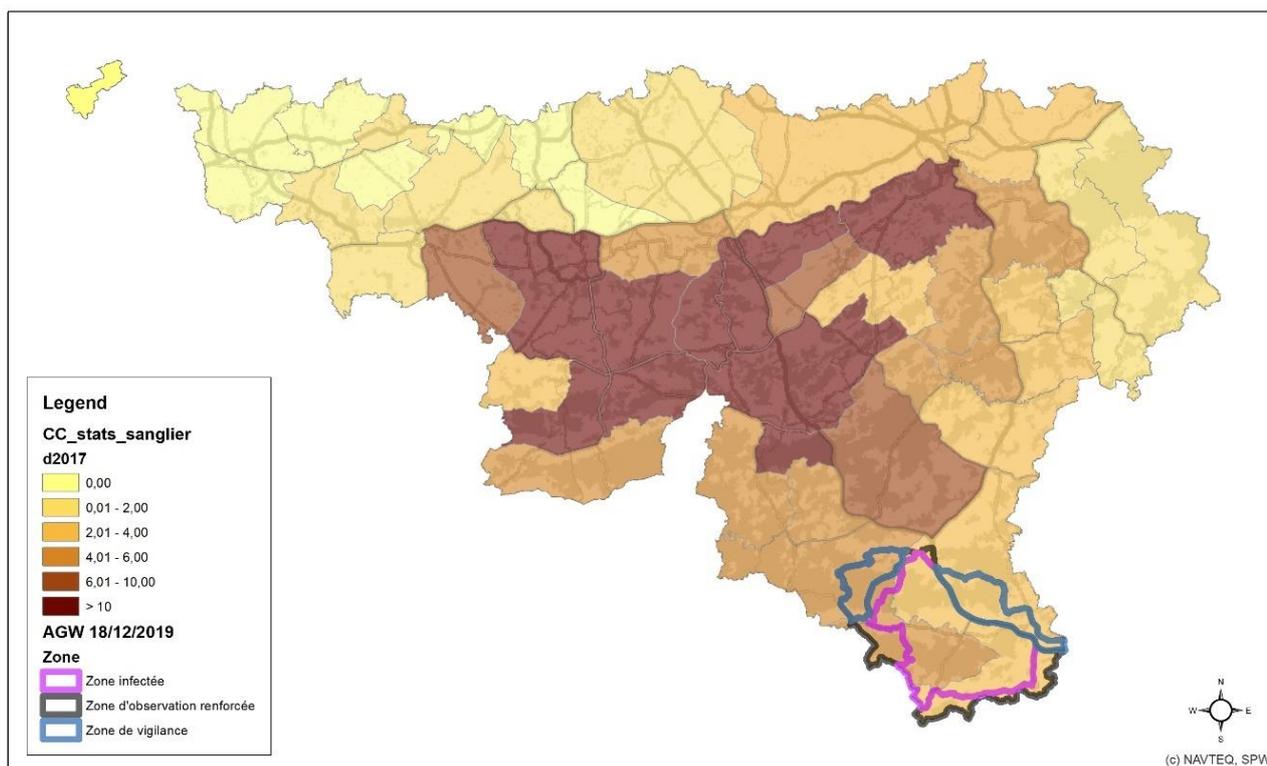


Figure 2 - Evolution of the number of wild boars hunted and declared in Wallonia since 1986 until 2018

The wild boar's range covers most of Wallonia. Its extension has been remarkable during the last 30 years from south to north (Morelle et al 2015). Most of the samples are taken south of the Sambre and Meuse valleys, in the forest regions of the Ardenne, Famenne and Gaume. The area impacted by the ASF (extreme south of Wallonia) has average shooting densities compared to

other regions. Four hunting councils (out of 49) were totally or partially impacted.

For the 2017-2018 hunting season, i.e. the last hunting season before the first case of ASF, hunting statistics reach 1796 wild boars across the entire ASF area (1100 km² including 572 wooded areas).



Fond de carte: © IGN

Figure 3 – Wallonia : Boar hunting statistics per km² of forest in 2017-2018 at the scale of the hunting council. The ASF management area represents 1106 km², including 572 km² of forest, including 314 km² of forest in infected areas.

Table 2 – ASF area shooting statistics 2017-2018 before the ASF outbreak in September 2018 (source hunting councils)

Area	N wild boar shot	Forest and natural habitat area (km ²)	N wild boar shot / km ² of forest and natural habitat	Total area (km ²)	N wild boar shot / km ²
Infected	754	314	2.4	598	1.3
Free area (ZOR and ZV)	1042	258	4.0	508	2.1
Total area ASF	1796	572	3.1	1106	1.6

THE BOAR'S TRAPPING AMONG DEPOPULATION'S MEASURES

The decision to install traps in ZOR and ZI was taken on October 1, 2018, 3 weeks after the notification of the first case of ASF in Gaume on September 13. Trapping was first intended to supplement the possibilities of destruction in the enhanced observation zone (ZOR), i.e. on the immediate periphery of the infected zone. In the ZOR, hunters were responsible for depopulation

trapping and building traps themselves. The aspects taken into consideration were related to both the location of the traps and their technical characteristics. The first trap was installed on the 15th November 2018.

From December 2018, a decision was taken to complete the trapping by night shooting via agents from the Department of Nature and Forests (DNF) in order to target wild boars present in the open environment. In the absence of night vision equipment, night shooting was carried out using spotlights from January 2019. Night vision scopes gradually completed the equipment.

“ From the beginning, the strategic committee considers that trapping is the only admissible method of destruction regardless of zoning and epidemiological situation “

with their usual tools, namely hunting by driven hunts. The depopulation capacity by hunting, which was moreover without the help of dogs, initially prohibited to limit the risk of settling wild boars towards the infected area, seemed insufficient. With its experience in terms of capture (initially for capture-marking-recapture programs), the Department of the Study of the Natural and Agricultural Environment (DEMNA) was therefore responsible for the technical and operational aspects of setting up the network of

From the beginning, the strategic committee considered that trapping was the only appropriate method of destruction regardless of zoning and epidemiological situation. Indeed, it limits the dispersion of animals since it fixes wild boars on their home range thanks to baiting and it allows their elimination in a confined space from which they cannot escape. From March 2019, a network of traps was also installed in the ZV.

Advantages and disadvantages of boar's trapping

Advantages	Disadvantages
<ul style="list-style-type: none"> • Capture of several individuals at once, or even a complete sounder • Possibility of repeated captures over time • Easier biosecurity • Little risk of dispersion 	<ul style="list-style-type: none"> • Non-selective method (age and sex categories) • Unspecific method (non-target species, unless using the remote trigger system) • Time demanding method in terms of installation and monitoring ; qualified manpower required

Trapping network

The installation of an isolated trap has a very local effect and doesn't allow a significant contribution to the reduction of the population with a view to its eradication. The aim was therefore to install a network of traps targeting a density of 1 trap / 300 ha while ensuring the best possible distribution. This standard is the result of GPS monitoring results from several adult wild boars in Wallonia, which indicate that a sounder operates on an area of around 600 ha (Prévot et al 2013). By installing 1 trap every 300 ha, we offer the opportunity to the boar to come across at least 2 traps over their entire home range. The strategy for setting up traps depends on the epidemic wave revealed by the search for carcasses. Most of the traps were installed in a

forest environment downstream of the epidemic front, far enough to act on a healthy population and in sufficient numbers, which increases the effectiveness of trapping. The presence of fences positioned at the edge of the infected area is obviously an advantage since, by significantly slowing the rate of spread of the virus, they allow to install the traps and to capture serenely (Figure 4). The spread of the virus has been measured up to 4 km per month in the longitudinal axis and up to 2 km in the latitudinal axis of the Gaumais massif. Even if the construction of a trap is fast, it takes 5 weeks before catching the first individuals. This period is variable (3-10 weeks) depending on many parameters.



Figure 4 – fence placed along the N88 in Meix-devant-Virton, more than 300 km of this type of fence were placed to confine the boars and facilitate destruction

Choice of trapping site

Before building a trap, several elements must be taken into account to ensure rapid and regular attendance at the site by wild boars.

Firstly, taking advantage of previous feeding sites (practice prohibited from the start of the ASF crisis) makes it possible, by playing on their greed and memory, to reassure the wild boars that went there regularly to eat food safely. Other types of hunting facilities such as salt stones have also been used.

Then, it is necessary to privilege the proximity of strategic points for the wild boar, namely permanent water points allowing them wallowing and, to another extent, thickets allowing them to rest. These strategic points should not be included inside the trap, they could modify the habits of the animals. The proximity of the agricultural plain makes the use of baiting points more uncertain than in the heart of a large forest.

To ascertain attendance at the site before the building of the trap, it is better to place a cameratrap on an element of the environment where an attractant will be placed, for example a stump of a tree or the bottom of a trunk coated with vegetable tar.

There are also some purely practical constraints, such as the accessibility of the trap. It should be easy enough to access for regular maintenance and to evacuate boar when culled in the trap, but far enough from roads and paths to keep it quiet.

A crucial choice criterion relates finally to the degree of collaboration expected with the owner, the hunter or the local gamekeeper, it being understood the tedious nature of the task and the aversion of local people to the slaughter of wild boars by this unusual technique.



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Characteristics of trapping techniques

Several models of traps have been installed and tested in the ASF area. Tawny cages (2m x 1m and 3m x 3m) traditionally used for marking were first installed urgently. They have the advantage of being easily transportable and removable. Subsequently, various larger models (enclosure or Corral type) were built directly on the ground. An estimate of the costs by type of trap is given in the chapter "general considerations - type of trap".

At the end of the field experience, it appears that the recommended trap model is a circular trap with a diameter of 8 to 9 m. Thirty stakes are planted (every 0.8 to 1 m on the arc of a circle) at a depth of 60-70 cm. welded mesh panels are attached to each post (3 posts per panel with a slight overlap of 15 cm between the panels) using jumper nails and strapping (Figure 5).

The panels are nailed to the inside of the stake to ensure strength. The panels are integrated into the ground 5 to 10 cm deep in a trench prepared using a simple spade. A space of 90 cm is left free to place the door one meter wide. The door must be able to rest on the structure. The panel opposite the door is not installed at first. It will be placed when the trap is visited. The door is firmly attached to the stakes.

Two types of door were used. The one-way cat door (Figure 6), the principle of which is based on the principle that the boar pushes itself the slightly inclined panel which pivots towards the inside of the trap. Once inside, the boar can no longer turn around. In practice, the boar rarely pushes the door itself and it is preferable to leave the door open thanks to a wire, itself connected to the closing release system. The guillotine door (Figure 7) is a sliding vertical panel that closes

thanks to the trigger system. It is considered more effective but also more dangerous in the event of closure on animals crossing the threshold of the trap. The width of the door can be adjusted. The wider it is, the easier the boars enter. The right compromise has to be found between width, strength and weight of the door. The doors used are from 60 cm wide (cat door) to 100 cm (guillotine door).

Installation time is estimated at 3 hours for 3 people, excluding transport of equipment. The equipment can be easily moved using a trailer towed by an all-terrain vehicle. Each trap is identified by a number (black A4 panel on a white background) that can be read from a distance or from a cameratrap. An explanatory panel is also added to inform the general public.



Figure 5 – Attachment of the panel to the stake using jumper nails and perforated tape

Table 3 – Example of equipment required for a circular corral trap 8 m in diameter (+ -50 m²)

Equipment	Quantity
Welded mesh panel 165 x 200 cm, mesh 5X5 cm, wires 4mm	16
Treated wooden spruce stakes 220 cm high, 8-10 cm in diameter	+/- 30
Cat door (option 1) or Guillotine door (option 2)	1
Jumper nails	+ - 200
Perforated strip without coating (or strip) for strapping	10 m
Metal screws, nails and wire for fixing the door	Low quantity
Mechanical trigger * or Remote trigger *	1

* Easily removable the same trigger can be used on different traps, it is indeed rare that all the traps are used simultaneously.



Figure 6 – Unidirectional "cat flap" door 1m high



Figure 7 – Guillotine door in plywood panel

Trapping's steps

Once the choice of trapping site has been made, the trap can be constructed by respecting the following steps:

Step 1 – Set up the trap structure

The first step consists in setting up the trap structure (stakes and panels) leaving 2 openings, one for the door, the other which will be closed with a lattice panel later. It is indeed important to keep these two openings free of access to give confidence to the animals.



Plan of the trap in aerial view

Step 2 – Lure into the trap

This step can take time and requires a daily pass to arrange the boar attractants. If a sounder or individuals are already present nearby, you should not risk attracting other individuals who could compete with "local" boars. If no presence is detected in the immediate vicinity, it is necessary to attract them. In theory, you can lure wild boars for several kilometers. In practice, the use of network traps doesn't require attracting wild boars for too long distances, which is also tedious. Generally, the attractants are placed at a maximum of 500 m from the trap in order to be gradually brought closer to the trap. Tar and corn are placed every 50 to 100 m in the direction of the trap from a resting or a wallowing place.

As soon as there are signs of presence related to attractants and / or food, they are gradually brought closer to the trap. The attractant used in our case is a plant tar whose odor is captured at long distance by the boar. The signs of the boar's presence are identified by smears on tar, presence of fingerprints or pictures taken from a cameratrap. Several kinds of plant tar exist. From our experience, it appears that the most effective is the one to which the wild boars have already been subjected. Even if the use of such attractive substances is illegal in Wallonia, each hunting territory uses (or has used) this type of attractant,



Figure 8 – Smear on plant tar

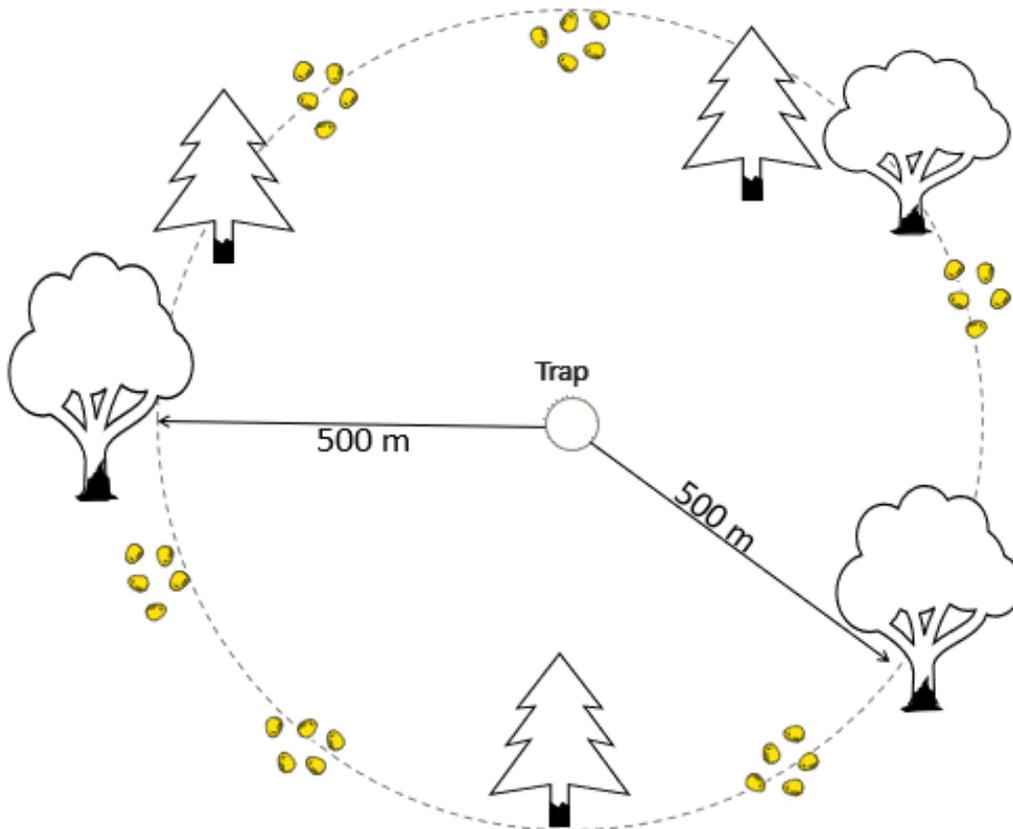
so it is essential to know the brand used locally to save time. If the information is missing, different types of tar should be tested. Plant tar can be placed on tree trunks, at the height of wild boar, but also on stumps and branches on the ground. The smell of tar dissipates over time (even more in rainy conditions), which is why regular application is necessary. The attractant is intended to attract and retain wild boars near the trap. It is then through the food that they are lured into the trap.

The cost of daily baiting material for a trap is estimated at € 1.50. Attractants for more specific use have very variable costs. Food and attractant prices are given in the appendix.

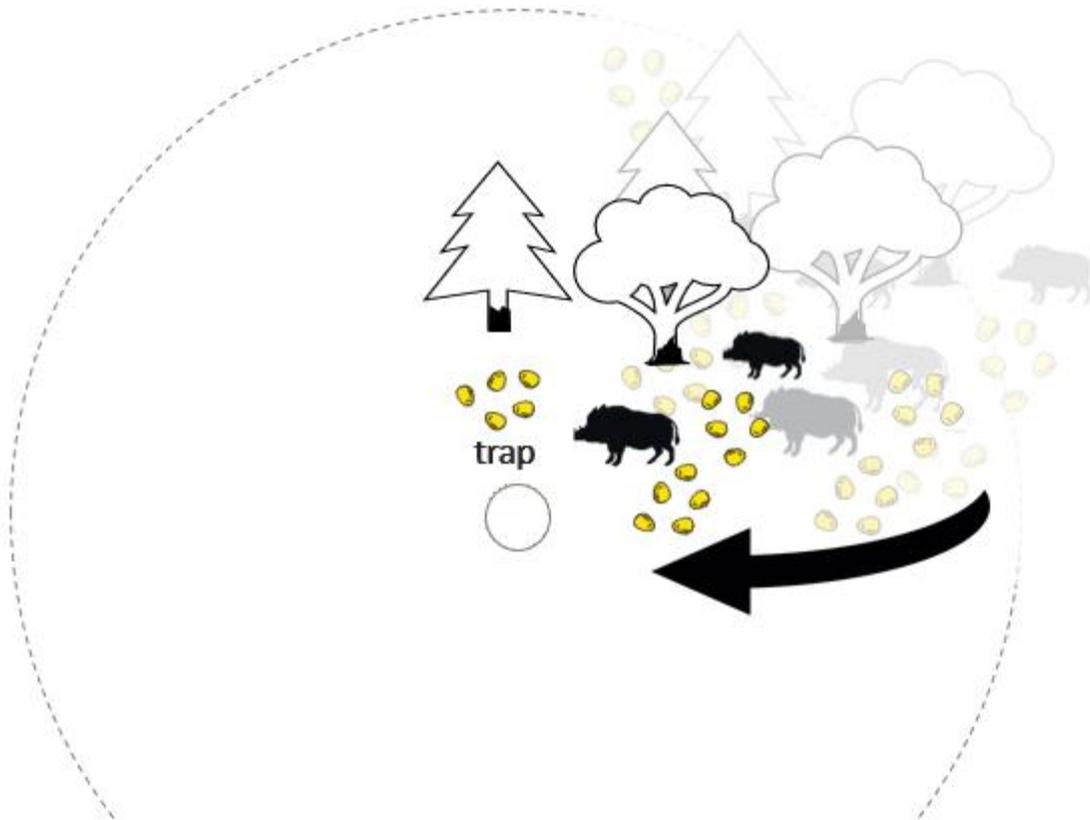


Scrub trees located near a wallowing site / Trace of wild boar / wallowing site / cameratrap equipped with a GSM transmission system

(...) The attractants are placed at a maximum of 500 m from the trap (...)



"(...) In general, the attractants are placed at a maximum of 500 m from the trap to be gradually brought closer to the trap. Tar and corn are placed every 50 to 100 m in the direction of the trap from a resting or a wallowing place. "



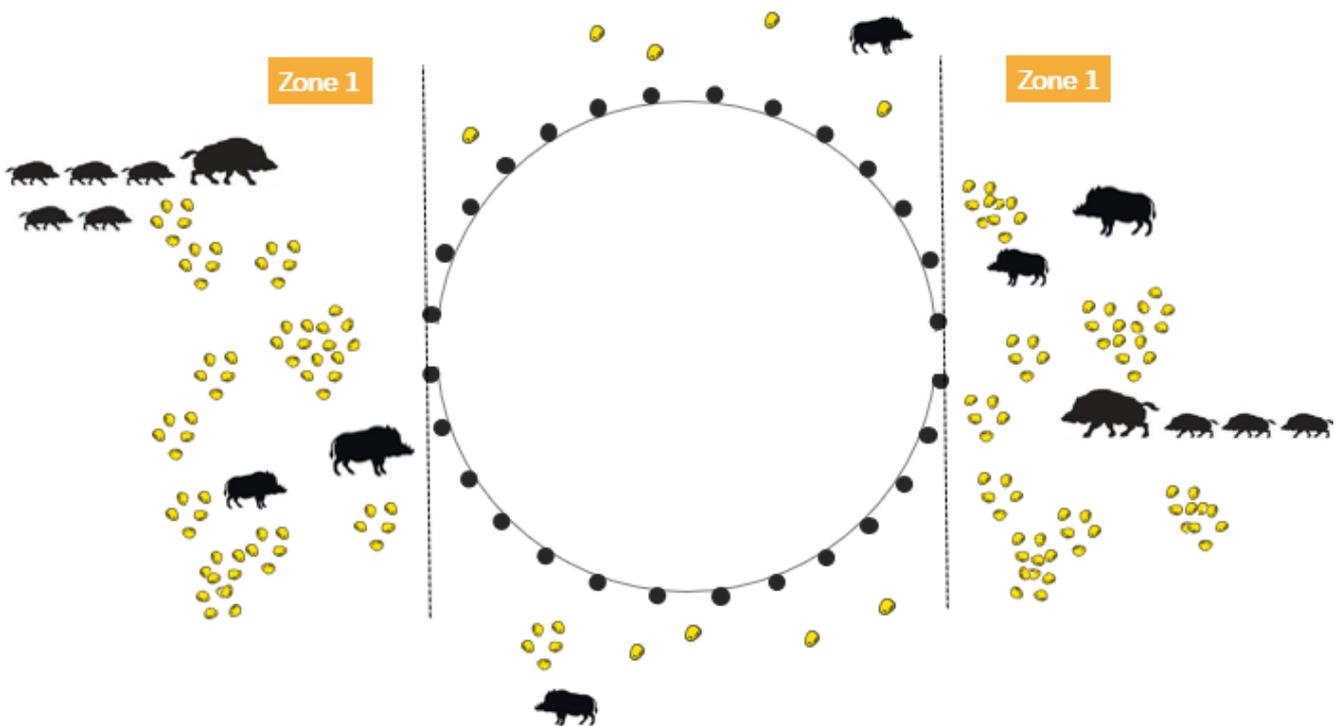
Step 3 – Build loyalty near the trap

Boars now frequent the immediate vicinity of the trap. The use of an attractant such as raw ammonia (an ammonia-based caustic product) in any wallowing puddle and salt stones then makes it possible to retain wild boars on the site.

Corn (a food that has been banned in Wallonia since 2015) remains an easy-to-use favorite food, but in some cases the use of peas, to which the boar has become more accustomed since the change in legislation, may be a good option.

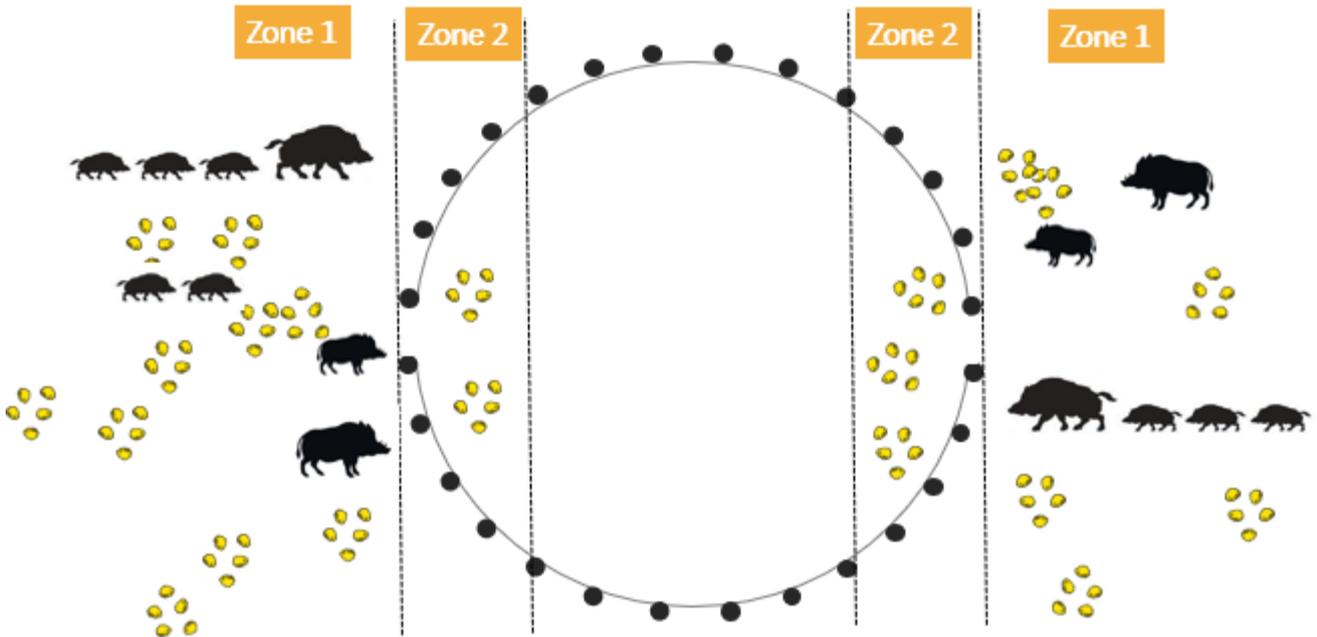
Finally, other devices can work such as Carpathian powder (Fenugreek powder: *Trigonella foenum-graecum*) mixed with the food. The regularity of baiting is more important than the quantity. The food is first used in front of the door in zone 1. There is no point feeding too quickly into the trap for various reasons :

- risk of germination and rotting of the food ;
- risk of habituation of non-target and less shy species (raccoons, badgers, deer, ...) ;
- rationalization of the cost of baiting.

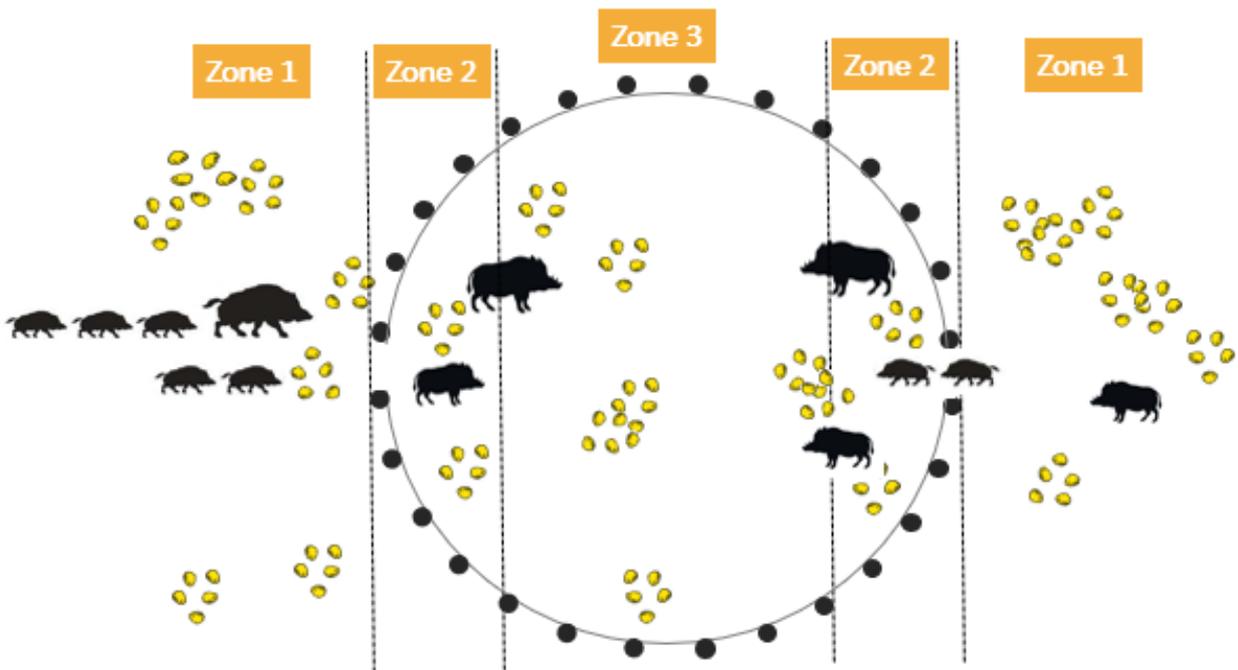


Step 4 – Bring the boars into the trap

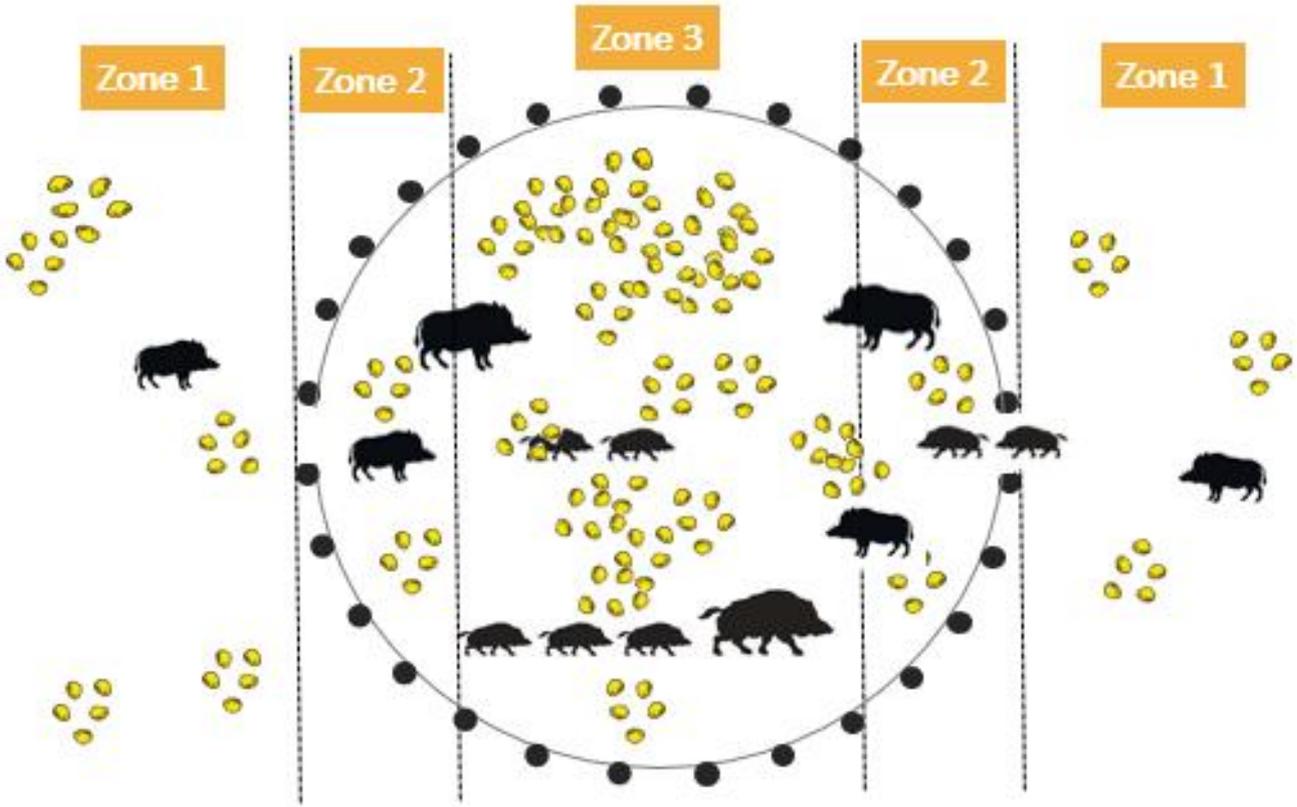
Once the corn from zone 1 has been picked up by the boar, continue to bait in zone 1 and add small quantities (+ -1kg) to the trap in zone 2 (just on the other side of the door). As a reminder, it is essential to always leave access via the two trap openings.



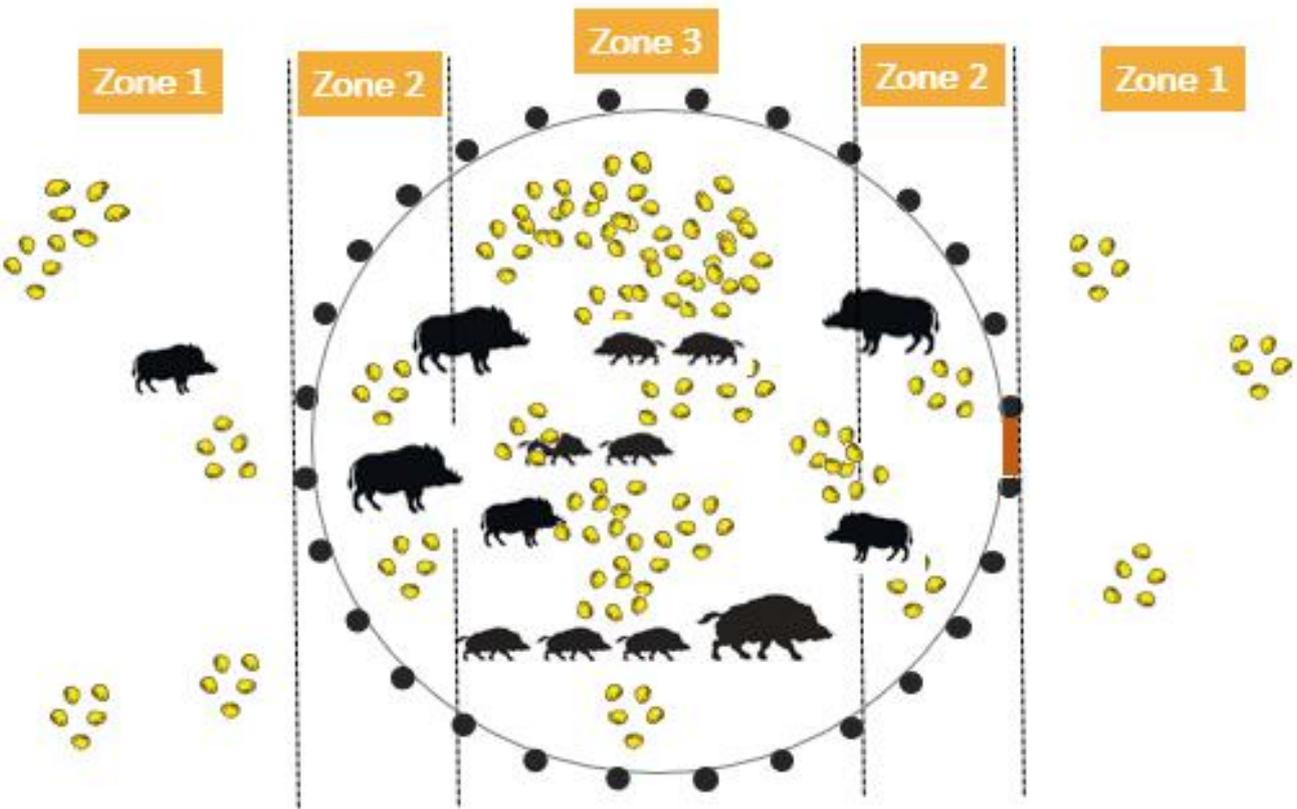
As soon as the corn is consumed in zone 2, the operation must be repeated to give confidence to the boars and get them used to entering the trap. Corn is gradually being distributed to zone 3, where the trigger is installed. Generally, part of the group dares to enter the trap, the most suspicious still remain outside.



Gradually, we reverse the trend by distributing more food in the trap than outside to convince the fiercest of entering. If the company seems to be wary of the trap, the baiting in Zone 1 must be intensified.



Once the habituation acquired, it is advisable to close the panel so that the only possible exit is the main door of the trap which is held mechanically open (hatch fixed using wire or guillotine maintained using 'a nail).



Step 5 – Arming the trap

Once the trap has been regularly used, the trigger system can be armed. This triggering is done either mechanically using the "St-Hubert" trigger, or remotely using a magnetic system deactivated by a phone call. The choice of the type of triggering is guided above all by the frequentation

of the trap by other species than the boar but also to increase the chances of capturing a complete sounder. Table 3 shows the comparison between the two systems. The prices are listed in the appendix.

Table 4 – Comparison between the mechanical release system and the remote release for door closing

	Mechanical release	Remote trigger
Specificity of the capture	Low	High
Number of individuals	Random	Maximum
Cost	Low	High
Workforce	Day monitoring	Night monitoring
Remark	Sufficient GSM network	

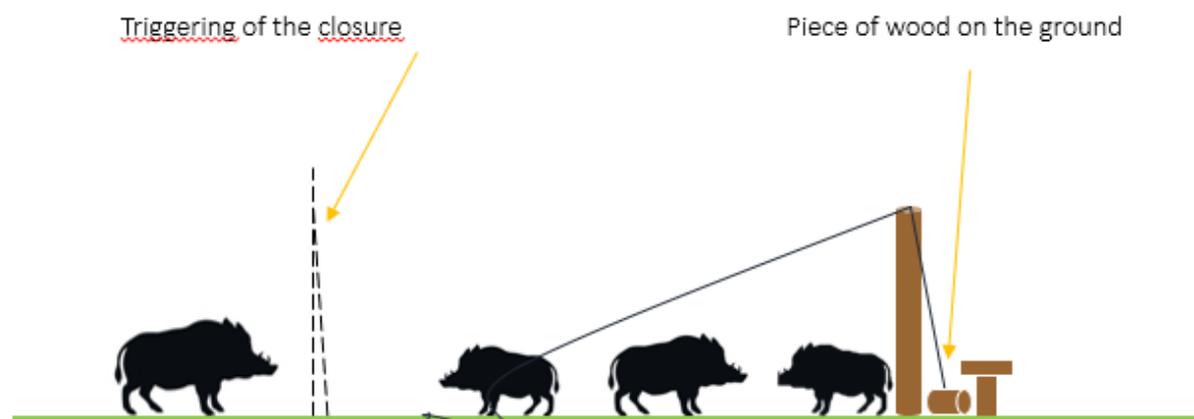
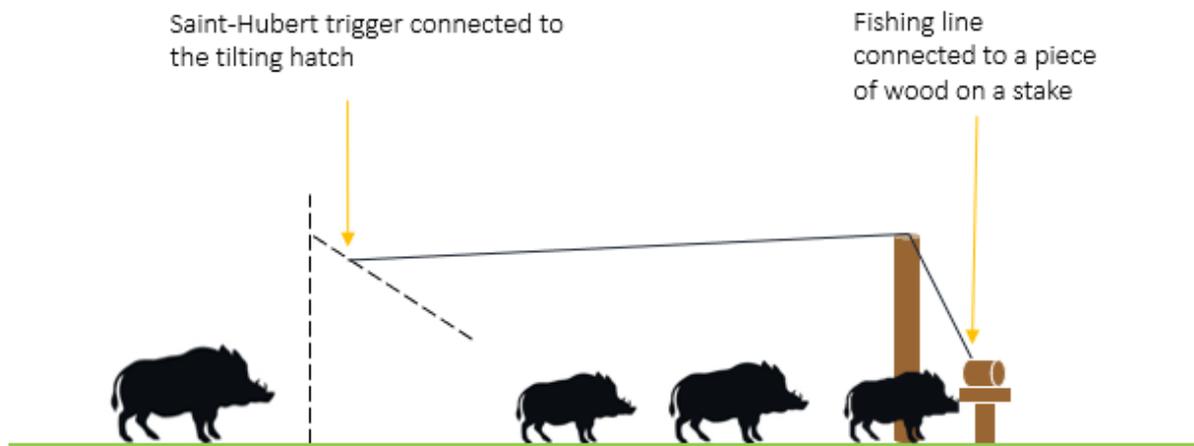
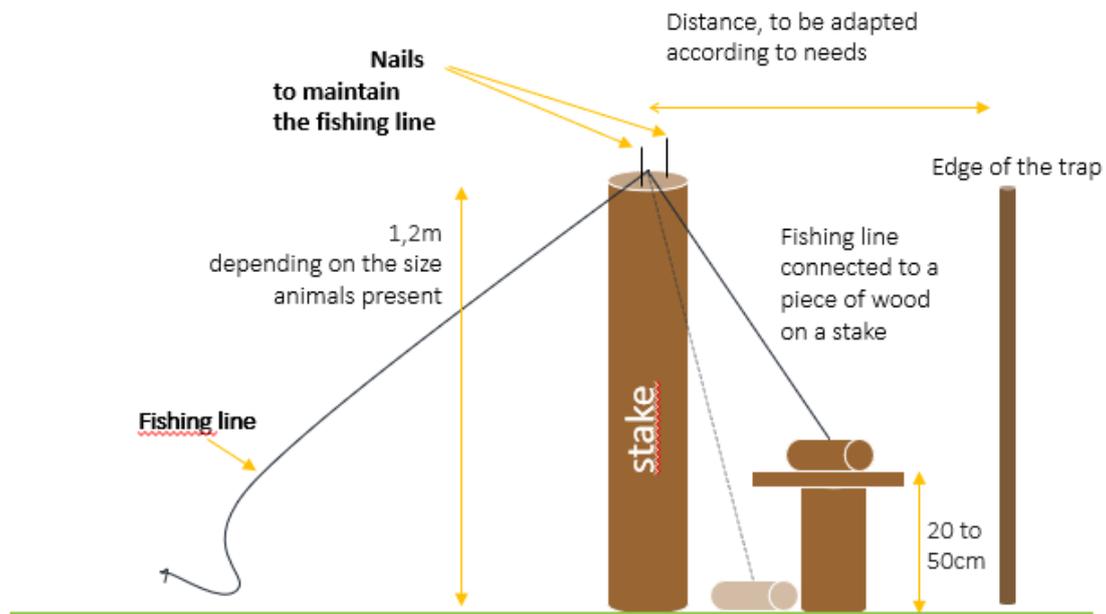
Operation of the mechanical release system

The trigger system is placed in zone 3, to guarantee the capture of a maximum of individuals. It is a piece of wood (+/- 500 g) balanced on a stake 20 to 50 cm high. A live fishing line connects this piece of wood to the

trigger. The piece of wood, jostled by a boar will, in its fall, stretch the fishing line with an instant reaction of the trigger mechanism, a part of which topples and causes the door to close.



Figure 9 – Kieferle GmbH « St-Hubert » trigger



Remote trigger operation

A system of magnets powered by a 12V battery holds the door open. The electromagnetic system, connected to a box housing a GSM system with SIM card, is broken as soon as it receives a phone call, which causes the door to close.



Figures 10 et 11 – Left: the remote triggering system installed in the field (battery, housing and magnet). Right: the box in charge of remotely breaking the current and thus the magnetic field of the magnet.

Step 6 – Pulling out the trapped individuals

The 22LR rifle with Hollow Point ammunition gives full satisfaction despite its low energy and vulcanizing power. The long barrel of a rifle allows for close range shooting. This projectile has the characteristic of expanding well upon entry and not coming out of the head, thus eliminating the risk of ricochets on the bars of the cage, while limiting bloodshed.

These shots must be given at ear level but transversely and not shooting shot. The aim being to damage the central nervous system (cerebellum located between the 2 ears). A mock shot could deviate towards the jaw with suffering for the animal and blood flow in the cage. The animal collapses like a mass as soon as the shot is

fired. If by any chance the bullet was not correctly placed, this first shot allows to stun the animal which facilitates the eventual 2nd shot for the knockout.

When animals seem to show signs of nervousness, waiting next to the cage is one solution and deliver the fatal blow as soon as the animal is well positioned. If you take a sow with its piglets, it is best to start with the largest animal. The smaller ones will generally become calmer, the group leader no longer being there to try to escape. These smaller animals will instead regroup, which will facilitate the shooting. Distributing food (corn, bread, ...) can sometimes keep the animals busy and still.



Figure 12 – Slaughter of a boar in a corral trap

Even though shooting in a trap can be thought to spread a deadly smell, game guards have been able to trap up to 3 times during the same night. These shots were taken at night. The animals lit by the guard's jeep seemed calmer in the dark. Acting as quickly as possible as soon as the boars are caught prevents them from waiting too long in the traps, which makes them nervous.

Some game wardens with only a conventional hunting rifle were able to carry out this destruction correctly. The softer calibres such as

the .17 HMR (Hornady Magnum Rifle), the .22 Hornet, the .222 Remington, the .223 Remington, are still very effective in terms of lethality but generate a risk of ricochets when passing through the animal. The armoured bullet for these calibres, whose eventual exit, would become quite random, is to be proscribed. Whether the bullet is armoured or hollow-point, the effect will be the same, with a preference for armoured ammunition on large boars. The most dangerous remains the shooting between the bars of the trap preventing sufficient latitude.

Step 7 – Clean the trap

Once the boar(s) are slaughtered, the remains are disposed of according to procedures adapted to the epidemiological situation. Whatever the situation, the remains of viscera or blood must be carefully removed using a shovel and rake. In the

infected area, the floor and possibly the walls of the trap are disinfected with virucide (Virkon), although the smell of virucide may have a repulsive effect. The trap can then be rebaited (back to step 2).

Summary in pictures



GENERAL CONSIDERATIONS ON THE RESULTS OBTAINED

Speed of the trap installation

From the end of November 2018 to the end of May 2019, 93% of the traps were set at a rate of 6 traps a week with two peaks at 22 and 25 traps a week. These peaks are explained by the

availability of manpower and equipment, mainly custom-made doors made by a local blacksmith. A team of three people builds a trap in half a day. Most of the traps were built by the authorities.

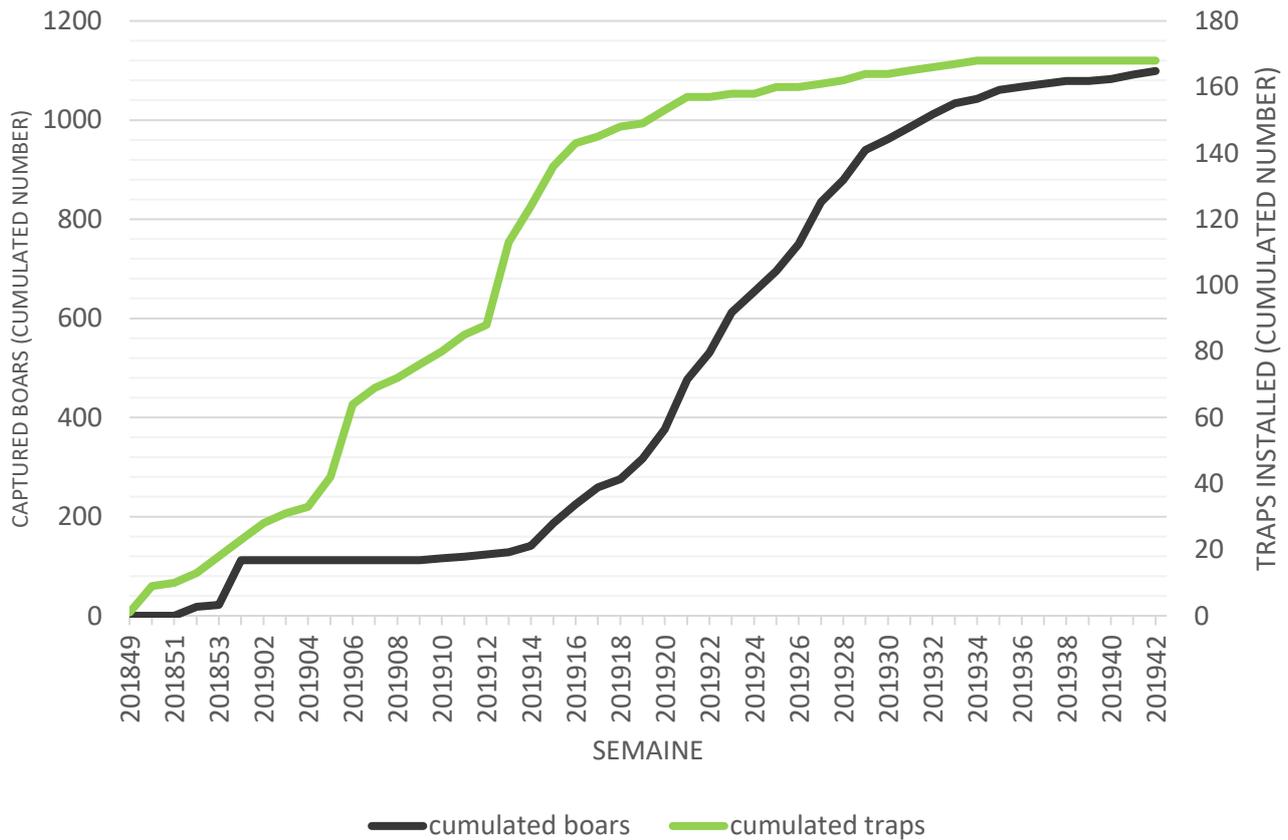


Figure 13 – Weekly evolution of the cumulated numbers of installed traps and captured wild boar (situation November 2019)

Implementation time and interval between captures

There is a certain delay between the installation of the trap and the first catch. This delay depends on many factors, but the main ones are the diligence and efficiency of the trappers. Therefore, the median (not average) value is used to estimate the number of weeks between the installation and the first catch (Figure 14).

It takes about 5 weeks to make a trap effective. Over the entire trap network, some traps captured wild boar 9 times. Traps located in free areas captured more boars than in infected areas. There was a positive relationship between the number of boars trapped and the number of capture events.

Table 5 – Proportion in terms of capture events (from 0 to 9) by status epidemiological situation in the zone (data November 2019)

Capture event	ZI	ZOR	ZV
0	71%	48%	13%
1	22%	17%	13%
2	6%	5%	16%
3	0%	9%	31%
4	1%	8%	9%
5	0%	2%	3%
6	0%	2%	6%
7	0%	2%	6%
8	0%	3%	3%
9	0%	5%	0%
N traps	72	64	32

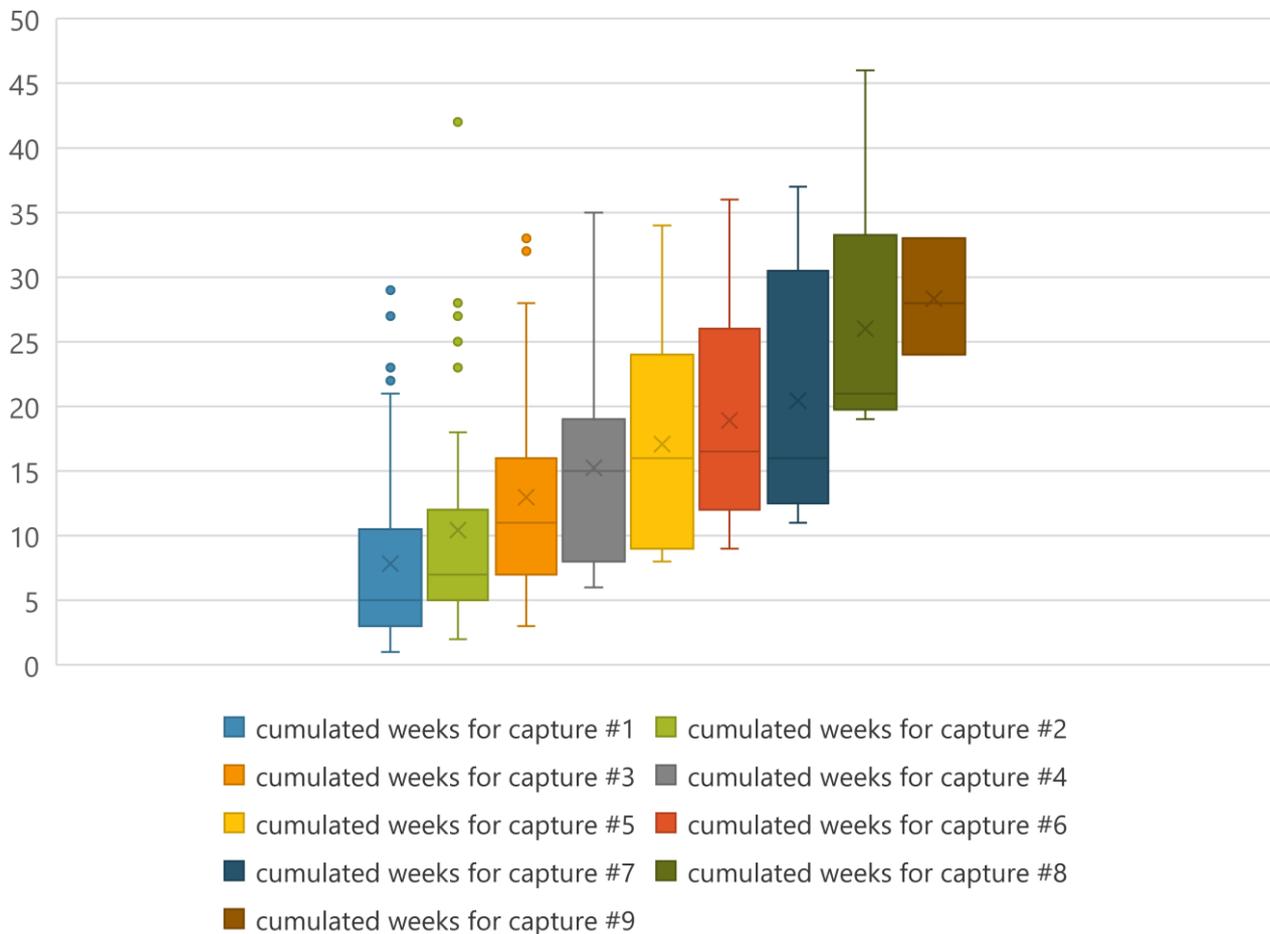


Figure 14 – Number of weeks observed between installation and the nth of capture (center bar = median, cross = average). Data November 2019

Type of trap ... and trapper

The type of trap used has evolved over time. At the beginning of the crisis, cages already existing on capture sites for marking purposes were first used. In a second phase, several pens (>3000 m²) were installed as part of the contract with the companies responsible for installing ASF fences. At the same time, more artisanal models were

developed. These are rectangular (<18 m²) and then circular (30-60 m²) corral cages. Some private owners have developed their own catching system, based on existing old takeover parks or new constructions. The different types of traps used in Gaume are listed below. The costs are listed in the appendix.

Cages < 4 m² (2m X 1m, with the possibility of coupling)



Rectangular corrals < 18 m² mobile in 3 m x 3 m (1) and fixed (2)



Circular corrals (30-60 m²) as described above.



The enclosures (> 3000 m²)



Traps located on passageways along ASF fences



Trapping systems installed in some private homeowners, different models often rectangular attention copyright W. R.



The circular trap recommended in this report is the majority, i.e. 46%, of the entire trap network. It appears to be suitable to meet the imperatives of efficiency and resistance while ensuring an acceptable level of welfare for the captured animals. Its circular shape and the absence of a ceiling make it possible to avoid excessive shocks and limit the risk of injury when animals try to escape. As far as its specificity in catches is concerned, in the absence of a system for triggering the remote closure, species such as badger, fox, cat, raccoon, can leave the trap without any problem either by digging under the wall or by climbing it. As far as deer are concerned, several have been released by opening the door and giving the animal time to find the exit.

The effectiveness of the different types of traps is measured by the number of boars caught. Given the epidemiological situations (ZI vs ZOR or ZV), it is relevant to focus on the effectiveness of traps that have worked at least once. In terms of effectiveness, if we exclude private capture systems not described here (mean number of 22 boars / trap), the types of traps giving the best

results are circular corrals (30-60 m²) with a mean number of 15 boars / trap and pens of more than 3000 m² with a mean number of 14 boars per trap. The cost-benefit/efficiency analysis shows a clear advantage for circular corrals. Small mobile cages are useful in case of emergency, when a sounder is regularly observed at a specific location. They have also been used, in addition to pens >3000 m², to trap the piglets which then serve as bait for the sow, which is shot with a rifle equipped with night vision.

Many wild boar sounders were observed along the new ASF fences with a risk of crossing. Cages have been set up at key locations with potential passage using the fence to guide animals to traps along the fences. They gave nothing but were only 3.

In addition, the trapping efficiency is highly dependent on the "trapper". The motivation and the quality of the trapper are elements to take into consideration but difficult to assess. Five trappers (out of around 85), responsible for 18% of the traps made 63% of the catch!

Table 6 – Number of wild boar caught by type of trap, number of traps, number of traps with capture and type of trap results (situation March 2020)

Type of trap	N of boars captured	N traps	N traps with catch	Mean N boar/trap	Mean N boar/trap with capture
Cages < 4m ²	66	42	11	2	6
Circular corral 30-60 m ²	818	85	53	10	15
Rectangular corral < 18m ²	43	30	8	1	5
Enclosure > 3000 m ²	140	18	10	8	14
Fence passage		3		0	0
Private system	129	7	6	18	22
Overall total	1196	185	88	6	14

Efficiency according to the epidemiological status of the area

The trapping results must be qualified according to the epidemiological situation at the time. Indeed, the infected area has been constantly evolving. In free areas, given the higher density of

wild boar, the trapping efficiency is obviously better. The measurement of the catch effort, i.e. the period during which the trap is maintained and armed, has yet to be estimated.

Table 7 – Number of traps, capture events and boar trapped according to the epidemiological status of the area (data Nov. 2019)

Area	N of traps	N capture events	N boars captured and killed
ZI	72	28	107
ZOR	64	116	574
ZV	32	95	418
Total	168	239	1099

Table 8 – Proportion of traps that captured, average number of capture events per trap having captured, average number of boars captured per event based on the epidemiological status of the zone (data Nov. 2019)

Area	% traps that have caught	Mean N of capture events per trap having captured	Mean N of boars captured or killed per event
ZI	29%	1,3	3,8
ZOR	52%	3,5	4,9
ZV	88%	3,4	4,4
Total	49%	2,9	4,6

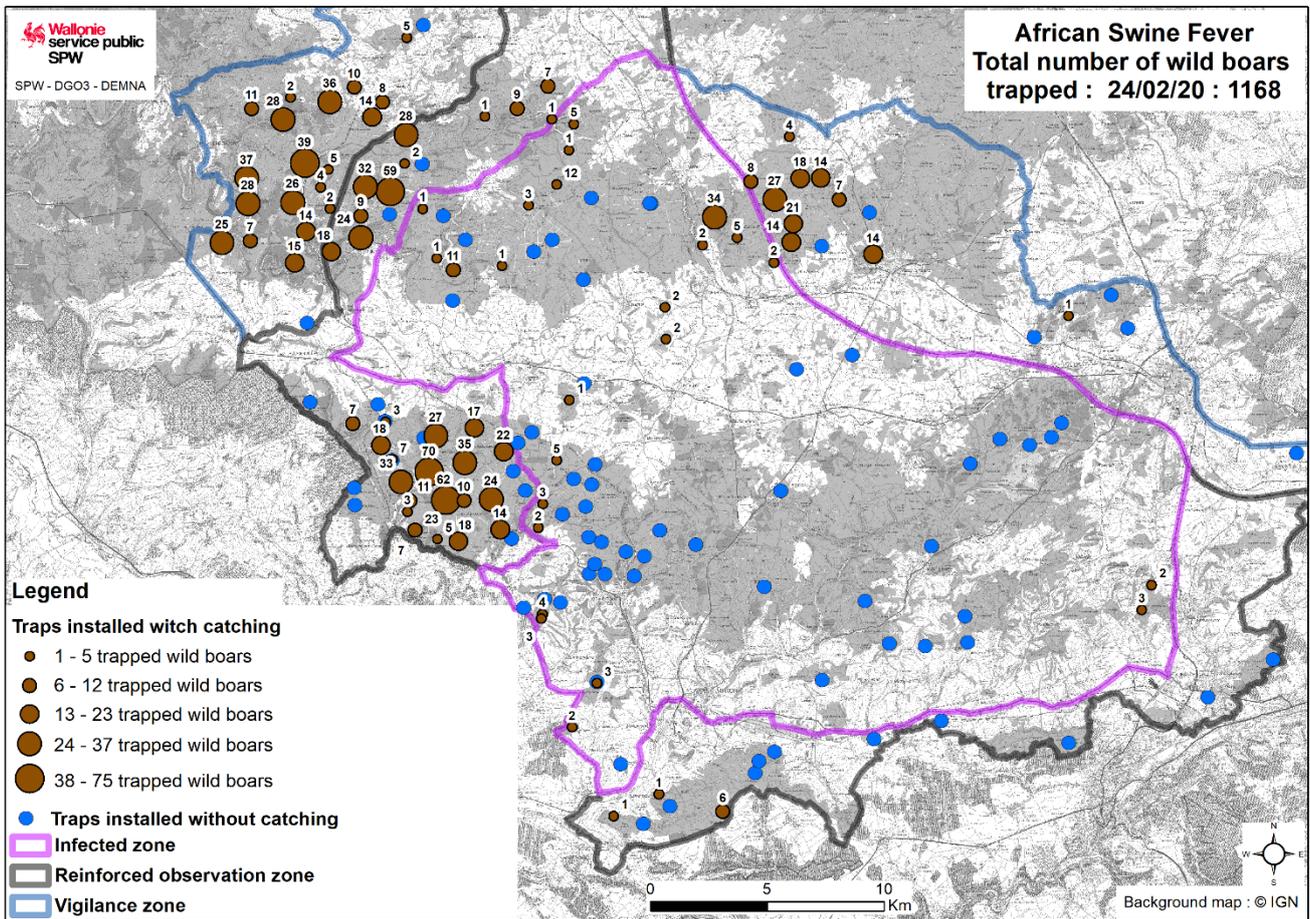


Figure 15 – Location of traps according to ASF management areas and total number of capture events per trap till 24/02/2020

Efficiency according to the season

Most (77%) of the catches took place from May to July 2019 (17 weeks) with an average of 50 boars caught a week with a peak at 101 boars a week. The start of this intensive capture phase was linked to the installation of most of the traps, the end of the driven hunts (in free areas), the low availability of natural food resources (most of the forest fruits were consumed, increasing the attractiveness of

the bait) and the high proportion of piglets in the population. The end of this phase was linked to the prospect of the resumption of hunting and thus the fall in the involvement of hunters and game wardens. The season effect is therefore closely linked to the other methods of destruction preferred by hunters and using traditional hunting techniques.

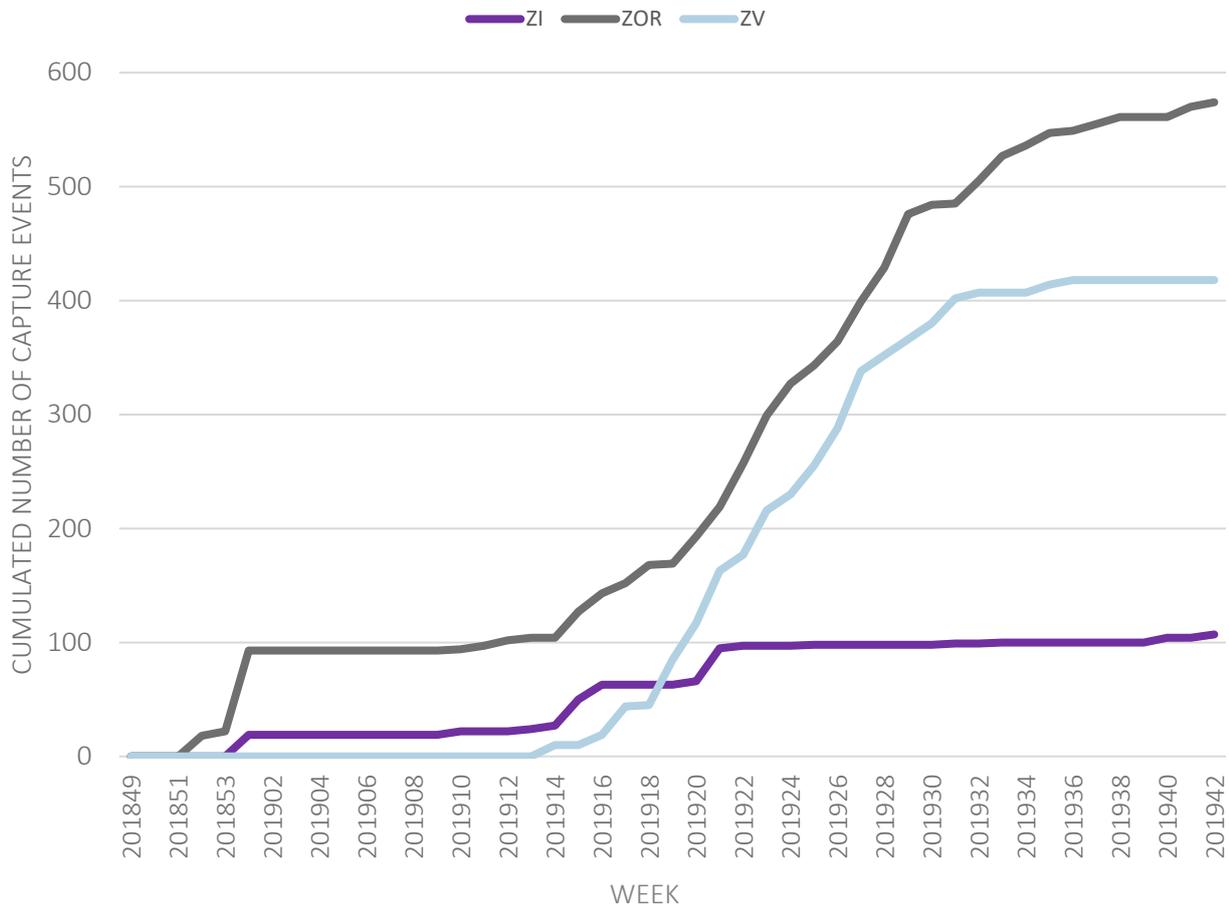
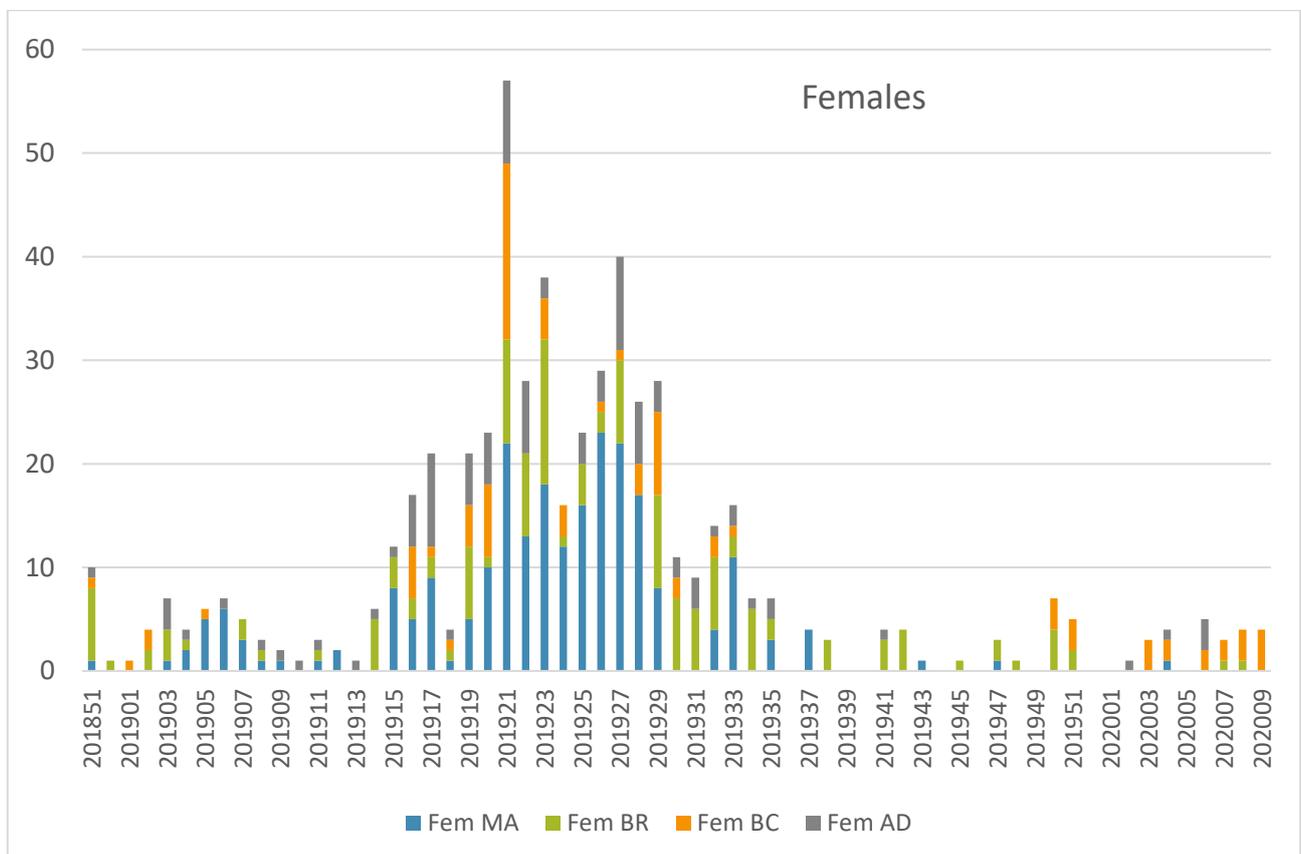


Figure 16 – Cumulative evolution of the number of boars trapped according to the zoning: infected zone (ZI), enhanced observation zone (ZOR) and vigilance zone (ZV)



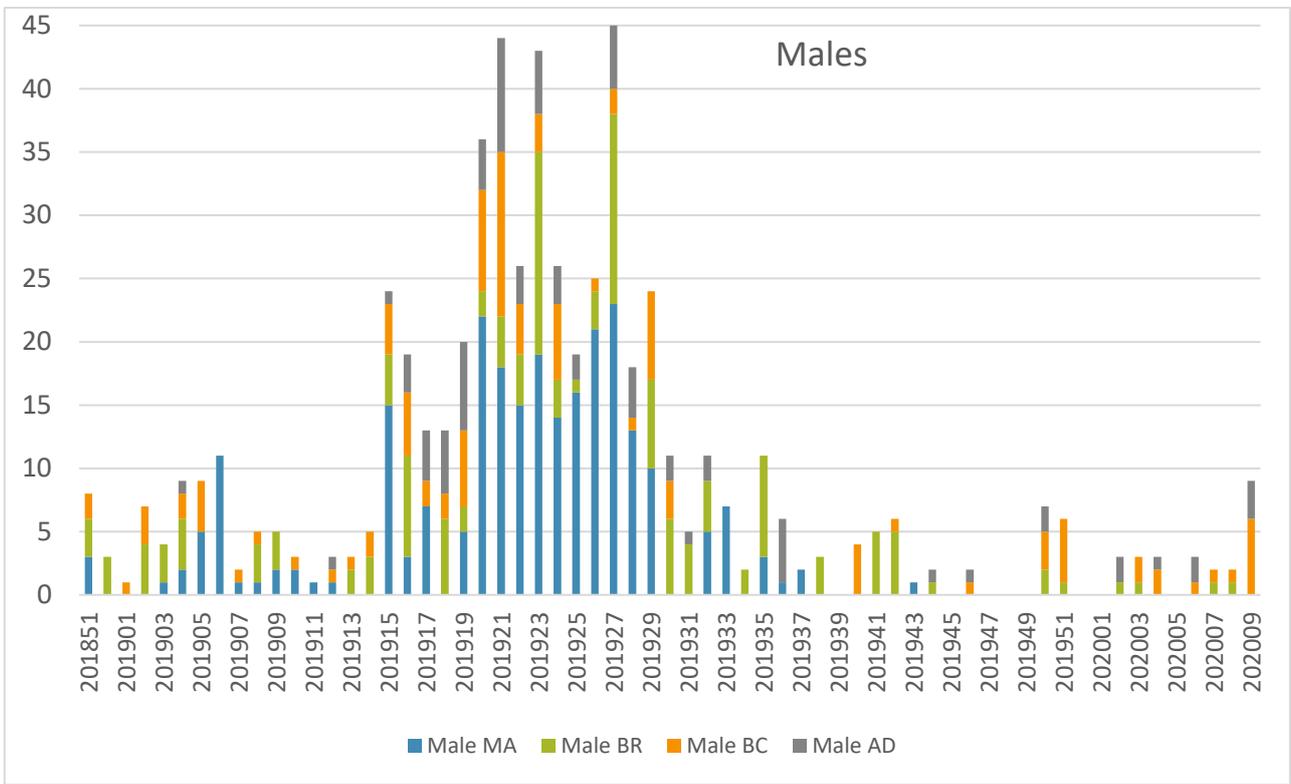


Figure 17 – Weekly evolution of female (top) and male (bottom) wild boar samples as a function of age categories as defined on the basis of tooth eruption (MA = piglet = 0-6 months; BR = redhead = 6-12 months; BC = subadult = 12-24 months; AD = adult = > 24 months) - Situation February 2020

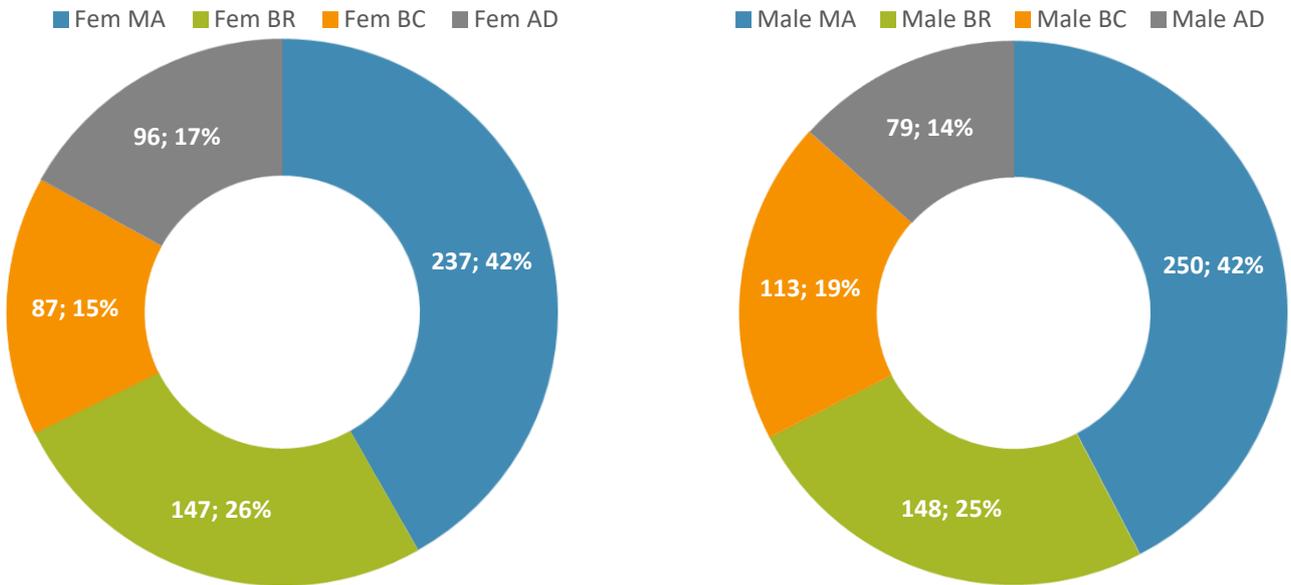


Figure 18 – proportion of the different age categories as defined on the basis of tooth eruption (MA = piglet = 0-6 months ; BR = redhead = 6-12 months ; BC = subadult = 12-24 months ; AD = adult = > 24 months) of trapped female (left, n=567) and male (right, n=590) boar traps. Situation February 2020

Analysis based on gender and age shows an equivalent number of male and female trapped, as well as males and females with a similar age distribution. The proportion of juveniles (< 12 months) in the catches was 67 and 68% respectively.

Trapping specificity

The mechanical triggering system mainly used in this trapping campaign leads to undesirable door closures, generally without consequences for non-target species but especially penalizing for the efficiency of the system. These untimely closures could indeed frighten wild boars approaching the trap.

To illustrate the attractiveness of the species present, images from 35 cameratraps placed on boar traps from 2/01/2019 to 6/05/2019 allowed the identification of the main species frequenting the ASF zone among 38,000 individuals viewed (Lempereur 2019). Apart from humans (7% of observations), regularly present to maintain the traps, the species best represented were wild boar (64%), raccoon (7%), roe deer (6%) and badger (5%). The analysis of daytime use of the traps or their surroundings reveals different

peaks of use depending on the species: deer have a first twilight use of the trap, followed by wild boar, badger and finally raccoon. To limit the risk of deer capture, it is therefore recommended to bait at the end of the day. This also avoids the untimely triggering of birds (some closures due to trees, jays, ...). To limit the capture of badgers, a protected species in Wallonia, there is no solution. For the raccoon, an invasive exotic species, elimination via traps adapted to it is a good option. As the Gaume forest is very largely invaded by this species, this specific type of trapping had to be implemented. Officially a little over 1000 raccoons have been trapped by the administration, not counting those culled by the hunters themselves, which reflects the scale of the problem.

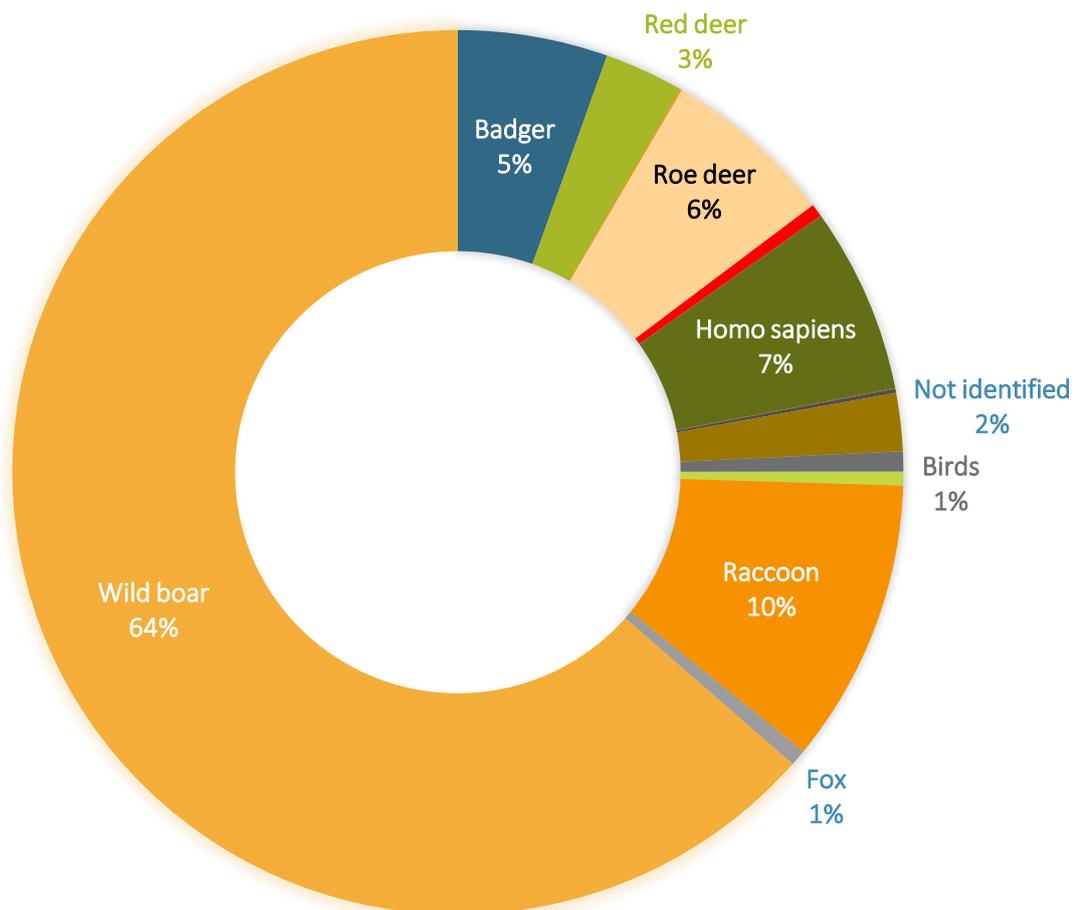


Figure 19 – Proportion of different species detected by 35 cameratraps placed on nearby bait or in boar traps over a period from 2/01/2019 to 6/05/2019

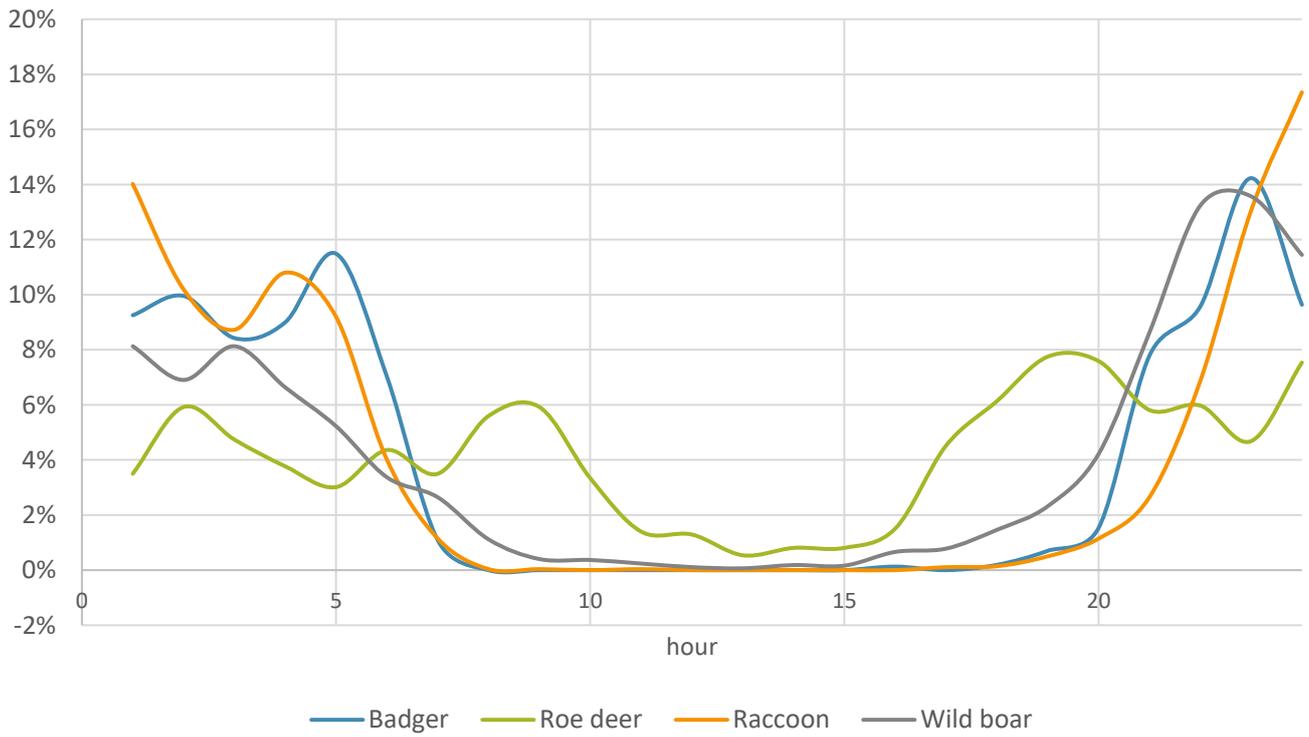


Figure 20 – Relative daily activity of four species in the vicinity of 35 wild boar traps in ASF area measured from 2/01/2019 to 6/05/2019

Animal welfare

According to the Walloon Region's Animal Welfare Code (SPW 2019, Art. D.57. § 1), "an animal may only be killed by a person with the required knowledge and ability, and using the most selective, rapid and least painful method for the animal. An animal shall be killed only after anaesthesia or stunning, except in cases of force majeure, hunting or fishing practices, pest control, or killing actions provided for under the Nature Conservation Act. »

A code of good practice has been drawn up for candidate trappers. It is set out in the appendix. It provides normally a daily check, as early as possible in the day and in any case before noon, of the trap as soon as it is armed (ready to be triggered). If the trap is not armed, its locking system must be secured.

The concern for animal welfare is also taken into account in the type of trap recommended, as explained above: the absence of angles limits the risk of injury, the absence of a ceiling allows species such as wild cats, foxes and raccoons to escape from above, and the lightly buried panels allow badgers to dig their way out from below.

In order to calm the animals in the traps, sedation tests were also carried out by the team of veterinarians and a reference trapper. Two molecules (acepromazine and phenobarbital) were tested orally in several different types of baits designed to mask the taste and smell of the sedative molecules.

As wild boar has a highly developed sense of smell, the major difficulty lies in their distrust of ingesting "improved" baits. Out of 16 field trials, only two gave encouraging results (animals much calmer but not asleep). For the other trials, two scenarios were encountered: either the animals did not enter the trap or they entered but did not touch the bait. Based on these field tests, phenobarbital is the molecule of choice for the following trials and the ideal bait to mask the taste and smell is a mixture of fermented maize with grenadine. Further testing is required with the collaboration of several trappers.

Finally, opaque screens must be provided to approach the trap without being seen and to limit the excitement of caught boars. To do this, either take advantage of existing vegetation (bushes, seedlings) or build a wall of branches against the cage (figure 21).



Figure 21 – Installation of branches along the panels of a circular trap as a screen for easier approach

People's safety

Traps are usually located at a good distance from footpaths, remaining open at the periphery of the infected area. The Walloon Forestry Code provides for the obligation to stay on the paths. Nevertheless, if a walker approaches a trap and decides to enter it, the main risk is that the door will fall off as he passes. This scenario is only conceivable if the trap is armed (ready to be triggered) and equipped with a guillotine door. Traps are never armed during the day, only in the late afternoon before the boars arrive, then are disarmed early in the morning if no animal has

triggered the closing system. When the trap is not armed, a metal pin system is installed to keep the door open. It is nevertheless appropriate to install an information sign to warn the walker of the danger of entering the trap. Regular monitoring of the traps is in any case provided for as part of the baiting process. An additional security is offered by the systematic use of cameratraps with GSM connection to monitor trap in real time and to intervene quickly.

No incidents of this type have been recorded.

Integration of trapping with other management measures

As mentioned above, trapping is one of the many measures developed to effectively control ASF. In the context of the depopulation of wild boar, it seems to us that it does not interfere in any way with other destruction techniques. The reverse is not necessarily true. Even if this has not been

measured, concerted night shooting and in particular the additional baiting points that can

« In the course of the fight against ASF, it becomes clear that the different means of destruction, drive hunts, trapping and night shooting, are perfectly complementary in space and over time. »

interfere with the baiting of traps, as well as the organisation of beatings (in free areas), can interfere with the behaviour of animals regularly coming to the trap. Conversely, night shooting on the plain can keep wild boars in the forest and improve trap attendance. Actively searching for carcasses as organized in teams of 6 to 7 people progressing in a line should, on the other hand, have only a very limited effect on trapping efficiency. Coordination of the different measures is essential.

As depopulation due to destruction or disease occurs, the density of wild boar is reduced to the point of limiting the number of catches per capture event. The trapping network may then

gradually evolve into a baiting network, which the remaining individuals are used to frequent. When the groups have disappeared and only isolated individuals remain, it is appropriate to use it as a point dedicated to night shooting. In some cases, the trap may also be closed on part of the group.

Some individuals then gravitate around the cage to join their fellow individuals. If they are located in a free area, they are fired at (usually at night) before shooting the individuals caught in the trap, without this necessarily compromising its effectiveness afterwards. In infected areas during the epidemic phase, it is best to avoid this practice to limit the risk of virus dispersal.

In the course of the fight against ASF, we realize that the different means of destruction, drive hunts, trapping and night shooting, are perfectly complementary in space and time. They should therefore not be set against each other; so in the event of a crisis, their combination makes possible to optimise destruction.

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To the various locomotives who have invested themselves and are still investing without counting the cost in this trapping effort, who have contributed to the improvement of the tool, and who will recognize themselves.

To Mamy Ginette and Madame François.

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ANNEX

Annex 1 – Trapping vademecum

Département of the Study of
the Natural and Agricultural
Environment

Nature and water Directorate

Avenue Marchal Juin, 23,
B-5030 GEMBLOUX

Tél. : +32 (0)81 62 64 20
Fax : +32 (0)81 61 57 27

To the attention of :

- Agents of the Nature and Forestry Department
- Holders of hunting rights ;
- Private game wardens ;
- Persons mandated by the Administration ;
- Destroyers mandated by the Administration.

Your ref. :
Our réf. :
Annex :

Your contacts :

Julien LIEVENS - +32478522211 / Frédéric DELLA LIBERA– +32479 79 92 51

Subject: Good practices for monitoring and management of boar traps in the context of ASF control destruction

Each person, designated or mandated by the Administration, for the daily management of traps agrees to respect the indications given below and to communicate information relating to trap management to the Administration, either through the DNF sorting agent or to the DEMNA agents in charge of trapping.

To facilitate the monitoring of each trap, a document (in appendix: "daily trap monitoring") must be completed for each trap in order to indicate all the operations carried out during each trapping passage and/or activity(ies).

1. **Biosecurity rules**

- The person mandated by the Administration must agree to respect the biosecurity rules as provided during training sessions and prove that they have followed them (certificate of attestation of participation in the biosecurity training provided by the Administration), namely (not exhaustive) : disinfection of shoes, clothing, vehicles, etc... with the products (virucide) supplied by the Administration.

2. **Food, attractants and others authorized for trapping :**

- Only food and attractants authorized and/or supplied by the Administration can be used for baiting the trap ;
- If foods and other attractants other than those authorized should be used, it will be with the agreement of the DNF and DEMNA agent ;
- Food bags and various attractants are available at the Virton Collection Center (30, Avenue de la Grange au Bois in Virton) and can be taken away provided you have obtained the DNF or DEMNA agent agreement.

3. Verification, monitoring and maintenance of the trap(s) :

By trap management, we mean taking care of all the steps necessary for the trap to function properly, namely :

- remove food for baiting from inside the trap if it is sprouted or rotten ;
- supply the trap and its surroundings with food for baiting ;
- if the trap is little or not frequented by wild boars, make streaks of food over several hundred meters in order to attract animals to the trap (from stains, gauges, anciens old feeding points or sheds frequented by boars) ;
- check the trellis and walls and repair holes if necessary or report it to the reference person (DNF or DEMNA officer) ;
- fill in holes made at ground level if necessary (following the capture of wild boar(s) or following the passage of a badger or another animal) ;
- place the attractants around and in the trap to accustom the wild boars to frequent it ;
- make the trap operational and ensure that it works by checking the device(s) for triggering the hatch of any other system used to trap boars (St-Hubert trigger, electromagnetic trigger, trigger simple mechanics, etc...) ;

4. Activation and monitoring of the active trap :

- When the presence of wild boar in the trap is detected (either by means of camera, or following the observation of the presence indicators) the trap is made active by means of the device provided for this purpose ;
- As soon as it is active, daily surveillance is obligatory and will be done by obligatory visits to the site and/or using the cameras

made available by the Administration and/or the trapper, in the absence of picture, visit is compulsory ;

- If the person in charge of the daily monitoring of the trap can't ensure the follow-up, he can delegate to another person after having obtained the agreement of the DNF/DEMNA agent provided that the delegate ensures to respect the biosecurity rules linked to the use/ management of aeras/traps potentially contaminated with the ASF virus ;
- If the trap can't be daily monitored/checked, it must be secured and blocked to avoid that an animal (boar or another) trapped remains there indefinitely.

5. Destruction of trapped boar(s) :

- If the trap manager is unable to ensure the destruction of the trapped animals, he contacts the DNF/DEMNA agent and/or the destroyer mandated by the Administration to destroy them ;
- Caring for destroyed animals is done according to biosecurity rules and animals will be evacuated to the Collection Center according to the procedure provided for this purpose

For reception :

date :/...../....

Name

.....

(signature)

Annexe 2 – Daily monitoring of the trap



Subject: Good practices for monitoring and management of boar traps in the context of ASF control destruction

Daily monitoring of the trap

N° and trap name :

Operator name :

Date	Activated trap/non-activated	Result	Comments / remarks / bracelet number if possible

Annexe 3 – Consumable costs and investments

Table showing the prices of the food used (daily quantity about 5 kg / trap)

Product	Price/kg	Remark
Corn	0,249 €	Market function
Peas	0,249 €	
Barley	0,249 €	
Wheat	0,327 €	

Table showing the main attractive types, their cost as well as some useful remarks (quantity varies from one case to another, more punctual use)

Product	Price/ kg	Remarks
SCROLIQ (tar)	5,48 €	Difficult to apply in cold weather because the tar becomes too thick
SCROGOUD (tar)	1 €	Difficult to apply in cold weather because the tar becomes too thick
PLUX PLUSVIT (tar)	32,7 €	Remains liquid in cold periods
CINGLAVIT (tar)	11,6 €	Remains liquid in cold periods
SCROFIX (ammonia raw)	0,9 €	Used in existing stains or to create artificial stains
Carpathian powder (Fenugrec)	13,24 €	Used for mixing with food
Cod liver oil	4,8 €/L	Can be mixed with food to give a stronger and more attractive odour
SCROSEL	1,3 €	Flavoured crystals used to retain wild boars
NATRON (Salt)	1,3 €	Mainly for cervids but may also be suitable for wild boar
SCROFARUT	244,8 €/L	Cocktail of aromas similar to milk urine in heat

CINGLASPRAY	37,8 €/L	Concentrate of tars and odour enhancers
SCROFAMIX	2,8 €	Fish kibble - useful as a baiting aid in some cases where corn is not sufficient
Pastis (or other aniseed product)	12 €/L	Macerate with water and corn to make the mixture attractive to wild boar. To be tested when the corn alone does not give satisfaction

Table showing the current prices of the triggering systems for door closure and the average prices for the different types of traps and corrals.

Trap closure	Price
St Hubert release (Kieferle distributor)	30 € TVAC (21%)
GSM trigger + GSM camera trap + SIM cards	<ul style="list-style-type: none"> - Camera trap GSM 400 € - Electroaimant : 101,4 € HTVA - Housing + cable : 150-200 € 650-700 €
Trap type	Price € TVAC (21%)
Mobile cage 2x1 m	900
Mobile cage 3x3 m	1500
Rectangular corral 15m ² fixed	600, including the door 240 €
Circular corral (30-60m ²)	1200, including the door 240 €
Enclosed for 3000 m ²	5000-9000, including the door 240 €

