Using Security Cameras, Doorbell Cameras, and Trap Cameras to Monitor the Behavior of Wild Boar (Sus Scrofa), in Liri, South East Pelion, Greece

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Abstract: *A different project of monitoring the behavior of the species Sus scrofa since 2018 in the area of Liri, a village in central Greece, with different camera types (security camera, trap camera, and smart doorbell with camera). Liri is a small village with Olive tree farming for a profit with scattered small forests around the olive tree farms and intense hunting activity from Men villagers. This in-depth research is unique and revealed to be the first of using those multiple security devices to give us information on how we can monitor better the behavior of wild boars in residential areas.*

Keywords: Wild boar, *Sus scrofa*, Monitor behavior, Pelion, Greece

1. Introduction

The wild boar S*us scrofa* (Linnaeus 1758), is a terrestrial mammal, and its size a medium to large-sized (usually from 110 to 180 cm in length and 85 to 115 cm in height). It can be found in all terrestrial mainland of Greece and in a few islands (Tsachalidis 2009).

According to IUCN Red List, it has been cited as Least Concern Worldwide (Keuling 2019). And the trends of the density of the population are from 0.01 to 43 animals/ km^2 (Pittiglio 2018).Wild boar (Sus scrofa) is an ungulate that can cause a variety of damage to agricultural and forest areas (Ugış 2016).

To have more effective management of the wild boar population we need to have more data about their expansion and their behavior in different situations in residential areas and to do that we need to learn to use the most ofthe technology we already have in our hands and are affordable to everyone.

2. Materials and Methods

The camera swereset up at 39°11'34.4"N 23°19'46.7"E and were aiming at South in an olive tree farm inside a village with the smart bell camera and the security camera, as the trap camera has been set up at 39°11'35.1"N 23°19'46.7"E and was aiming at East.

Figure 1: Wild boars with a smart doorbell.

All the materials (photos and videos) were identified immediately, based on the presence of their unique morphological characteristics.

The equipment that has been used is, an APEMAN 12MP 1080P Trail Wildlife Camera Trap with Infrared Night Vision, a Victure Video Doorbell Camera, Wireless, 1080 HD, Motion Detection, 2-Way Audio, Night Vision, IP65 Waterproof for Home Security (Figure 1), and a Cleverdog DOG-6W Wifi/IP Camera 1080p Waterproof.

3. Results and Discussion

The key to using security cameras as wildlife monitoring is a new way to provide monitoring of damages to agricultural and environmental areas caused by wild boar (*Sus scrofa*) using remote data. In that way, by using security cameras instead of trap cameras we have the opportunity to have live feed 24/7 and to be notified on our phones when wild boars have approached the area we have set up our security cameras.

And by watching live on our phones the behavior of the wild boars we know when we have to act (i.e. scare away the wild boars, or leave them rooting), but to do that we need to know what each behavior means and how is affecting the

farms. If local farmers and local citizens of the area don't know *wild boars* rooting is making significant increases in mineral soil C and N concentrations on their farms (Wirthner 2012), then they might think that wild boars are destroying the roots of the trees on their farms and they might want to kill the wild boars or try to scare them away by making the wild boars panicked.

Smart doorbells and security cameras have 2-way audio, and by talking throughout these devices it shows those wild boars leaving more calm than other extreme sound disturbances, like shooting on the air.

Also, some security cameras have an alarm option in their settings when people aren't home, but that can be activated manually for some hours or days even if people are at home. The alarms of the security cameras could be used in some areas where people are growing vegetables and fruits and don't want wild boars destroying their crops.

The occurrence of crop damage by wild boars raised dramatically in the last decades, implying an increase in social conflicts, expenditures for compensation, and a risk to natural ecosystems (Amici 2012). By having crop damage monitoring, farmers can improve their crops, be more aware of when the wild boars are approaching and what time, as also can affect a better approach in decreasing the wild boar population if needed in local areas.

Each device, which has been used, had some advantages and disadvantages. Smart doorbells and security cameras are working better when they are connected to the power line, instead of working only on batteries but that means it's difficult to move them around in remote areas. Some small solar panels for security cameras can be an advantage but still, they are few available for only some expensive brands of security cameras. One great advantage is that we can have all the data remote downloaded to our computer or phone by WIFI as security cameras and smart doorbells are connected to the wifi and also be able to remote format the SD card.

Figure 2: Wild boars in the rain with a camera trap.

As for the trap cameras is might get us very good photos and videos in quality even on rainy days (figure 2) and we can move them around as we want because they are not connected to the powerline, but there are more disadvantages than having a security camera. With trap cameras, we need to remove the SD card to get the data and if we don't have a trap camera with a SIM card to send us a photo or video we can't know when the wild boars have

approached until we analyze the data. Also, we need to check regularly for the SD card memory and the batteries' status which last usually up to 4 months (depends on the SD card capacity and the batteries we are using).

All of the devices have motion sensors that can be activated with motion (if we are not using 24*7) on everything it moves at the distance of 15-20 meters, except the smart doorbell which has only motion and can't record on 24*7.

4. Conclusion

Using all the devices together shows a better solution for monitoring the behavior of the wild boars but if it needs to have a live feed all day and night it's better to use WIFI / IP security cameras, instead of other devices and it's suggested.

Also, is highly suggested to monitor the wild boars in residential areas, before proceeding to any measurement of decreasing the population where it might not be needed.

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