Abstract:

Wildlife surveys following the construction of modified culverts – Developing and providing a vibration-trap

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In Charente-Maritime (France), since 2012, nine modified culverts have been set up under two of the *Autoroutes du Sud de la France* motorway network to restore ecological continuity. To assess whether animals use these crossing structures, wildlife surveys have been conducted by the *Ligue pour la Protection des Oiseaux* since the construction of the modified culverts using infrared camera traps.

First results have shown that infrared camera traps might often fail to catch semi-aquatic mustelids, such as European otter, whose isolated fur have a low surface temperature, sometimes undetectable with infrared technology. However during these monitorings, crossing clues were found several times without video recorded. Some monitorings have also demonstrated an increase in detectability of otter in winter when the temperature of the ambient air decreases.

In the nine modified culverts surveyed in March 2012 to late 2015, 8 structures are located along the river course, and 34 Otter crossings have been recorded with infrared camera traps in 5 of these structures.

European Otter and 3 young crossing a modified culvert (© LPO / ASF).

Other detection problems have been observed: the moving speed of small mustelids (e.g. Weasel), the small size combined with a rapid movement for micro-mammal fauna, and reptiles and amphibians ectothermy.

Further to these findings, and inspired by the work of Lerone who used pressure sensors to detect the Otter, we developed a vibration-trap in collaboration with the company JAMA. It consists of a semi-rigid canvas aluminum of about 1 m², to which is attached a pressure sensor connected to a camera trap. Low mechanical pressure applied to the canvas (animal weight for example) allows the instantaneous triggering of the camera trap. In order to assess efficiency of this device, it has been tested in modified culvert 1.2 meters in diameter,

in parallel with an infrared camera trap already installed for 30 months. The simultaneously monitoring took place over 12 months, divided into several phases of testing and optimization of the device. The results of the two devices were compared (results are given without reference to real crossing).

On the left: infrared and vibration-trap devices set up in the modified culvert (© A. Orseau-LPO/ASF). On the right: Green whip snake detected on the canvas of the vibration-trap (© LPO / ASF).

The first results show a greater efficiency of the vibration-trap compared to infrared trap, both in species diversity (16 species detected against 8), and number of detections (+ 35%). The vibration-trap detected 94% of all recorded crossings against 59% for the infrared trap. Otters, European polecats, reptiles, amphibians and micro-mammal fauna are among the species detected only by the vibration-trap, thus explaining the bias found with infrared detection. For other species, a significant gain in the number of detection is observed, in particular for the Stone/Pine marten (+ 35%) and Genet (+ 45%).

This vibration-trap is already operational and more effective than an infrared system. In the short term, some additional improvements will optimize this new device (long-term use of the aluminum canvas, optimizing the sensitivity, and so on) thus opening up interesting perspectives for improving fauna monitorings of the underpass structures.

Wildlife surveys following the construction of modified culverts

Developing and providing a vibration-trap

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Introduction

Context

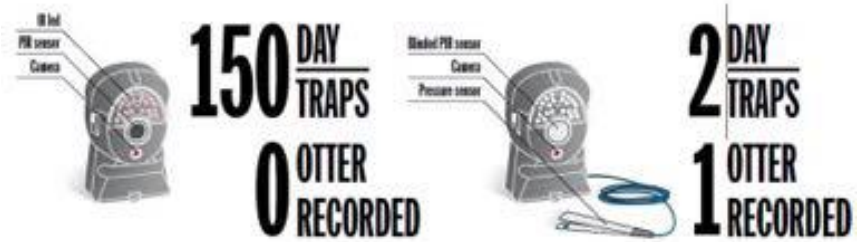
Since 2012, camera-trap surveys have been carried out to study the use by wildlife of 9 newly-constructed underpasses on two motorways in south-western France
Wildlife surveys have been conducted by the LPO since the construction of the modified culverts using infrared (IR) camera traps



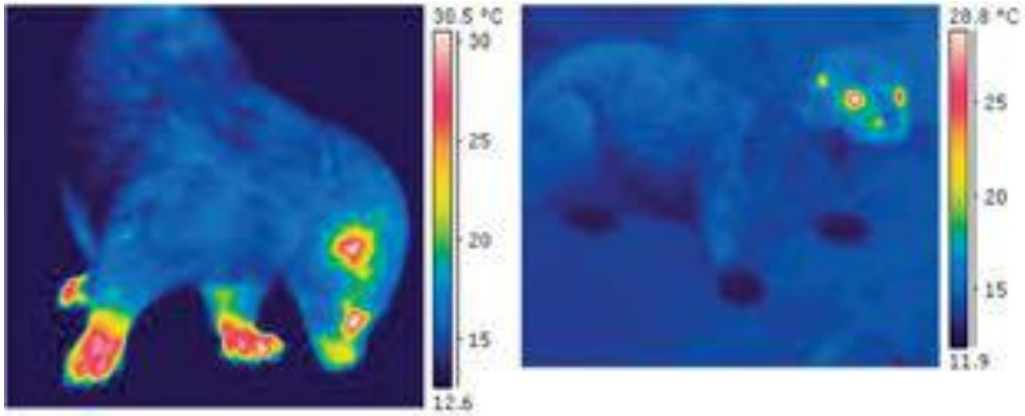

During these monitorings, crossing clues were found several times without any video recording
First results have shown that infrared camera traps might often fail to catch semi-aquatic mustelids, such as European otter (34 crossings), whose isolated fur has a low surface temperature, sometimes undetectable with IR

Bibliography

As observed by Lereone et al. (2011) in Abruzzo with IR captors Vs. Pressure sensor



When otters leave water their body T° = the water T° (Kuhn & Myer 2009)



Vibration-trap

Experimentation

Developing and testing of a vibration-trap in collaboration with the company JAMA

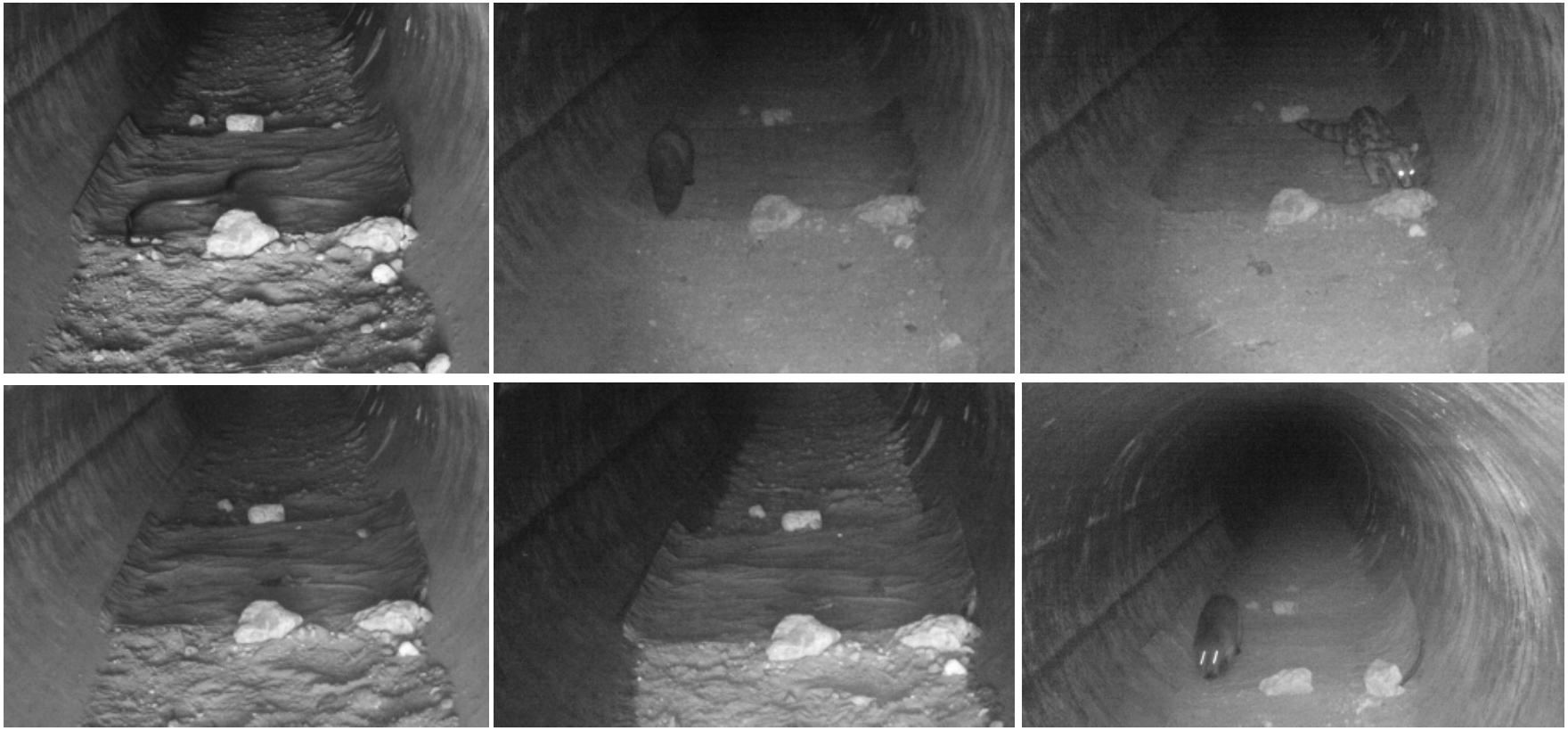
It consists of a semi-rigid canvas aluminum of about 1 m², to which is attached a pressure sensor connected to a camera trap. Low mechanical pressure applied to the canvas (animal weight for example) allows the instantaneous triggering of the camera trap.



These devices are tested in modified culverts, coupled with an infrared camera trap already installed for 30 months
The simultaneous monitoring took place over 12 months, divided into several phases of device testing and optimization
The results of the two devices were compared (results are given without reference to real crossing).

Vibration-trap

Results



In 282 days, the vibration-trap detected 16 species against only eight for the IR camera trap

Vibration-trap

Analysis on a homogeneous period (constant setting) of 72 days

Table : Total number of detections per species, and comparison between the IR camera trap and vibration-trap

Espèces détectées	Nb total de détections	Piège-photo IR		Piège à vibration	
		détections	% détecté	détections	% détecté
Chat domestique	19	17	89%	18	95%
Fouine ou Marte des pins	34	21	62%	33	97%
Genette commune	20	8	40%	17	85%
Mammifère ssp	2	1	50%	2	100%
Couleuvre verte et jaune	1	0	0%	1	100%
Micromammifère ssp	2	0	0%	2	100%
Chiroptère sp	1	0	0%	1	100%
Sous-total	**79**	**47**	**59%**	**74**	**94%**

35% more crossing detection
Otters, European polecats, reptiles, amphibians and micro-mammal fauna are among the species detected only by the vibration-trap, thus explaining the bias found with infrared detection.
For other species, a significant gain in the number of detection is observed, in particular for the Stone/Pine marten (+ 35%) and Genet (+ 45%).

Vibration-trap

Possible answer to IR sensing difficulties: the small size combined with a rapid movement for micro-mammal fauna, reptiles and amphibians ectothermy

Now, the new monitoring setup combines two techniques :

- standardized protocols using IR camera traps over a long period (minimum three years)
- periodic complement thanks to vibration-traps (during targeted periods) to further understand the faults

Thank you for your attention !

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