Comparison between hair, camera, footprint traps and faeces survey to detect mustelids species in a French rural habitat: some preliminary results

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Comparison between hair, camera, footprint traps and faeces survey to detect mustelids species in a French rural habitat: some preliminary results

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Background

Knowledge of species distribution is necessary to better assess their conservation status and to manage conflict between human activities and wildlife, when it occurs. Mustelids distribution has been widely studied but, to date, no standardized methods could be generalized to get an abundance index at a large scale. Considering the nocturnal habits of those cryptic species and their low density, indirect methods are required. We tested four different non-invasive methods to detect the presence of **weasel (*Mustela nivalis*)**, **stoat (*Mustela erminea*)**, **polecat (*Mustela putorius*)**, **pine marten (*Martes martes*)** and **stone marten (*Martes foina*)**: camera-traps, hair-tubes, footprint-tunnels and faeces survey.
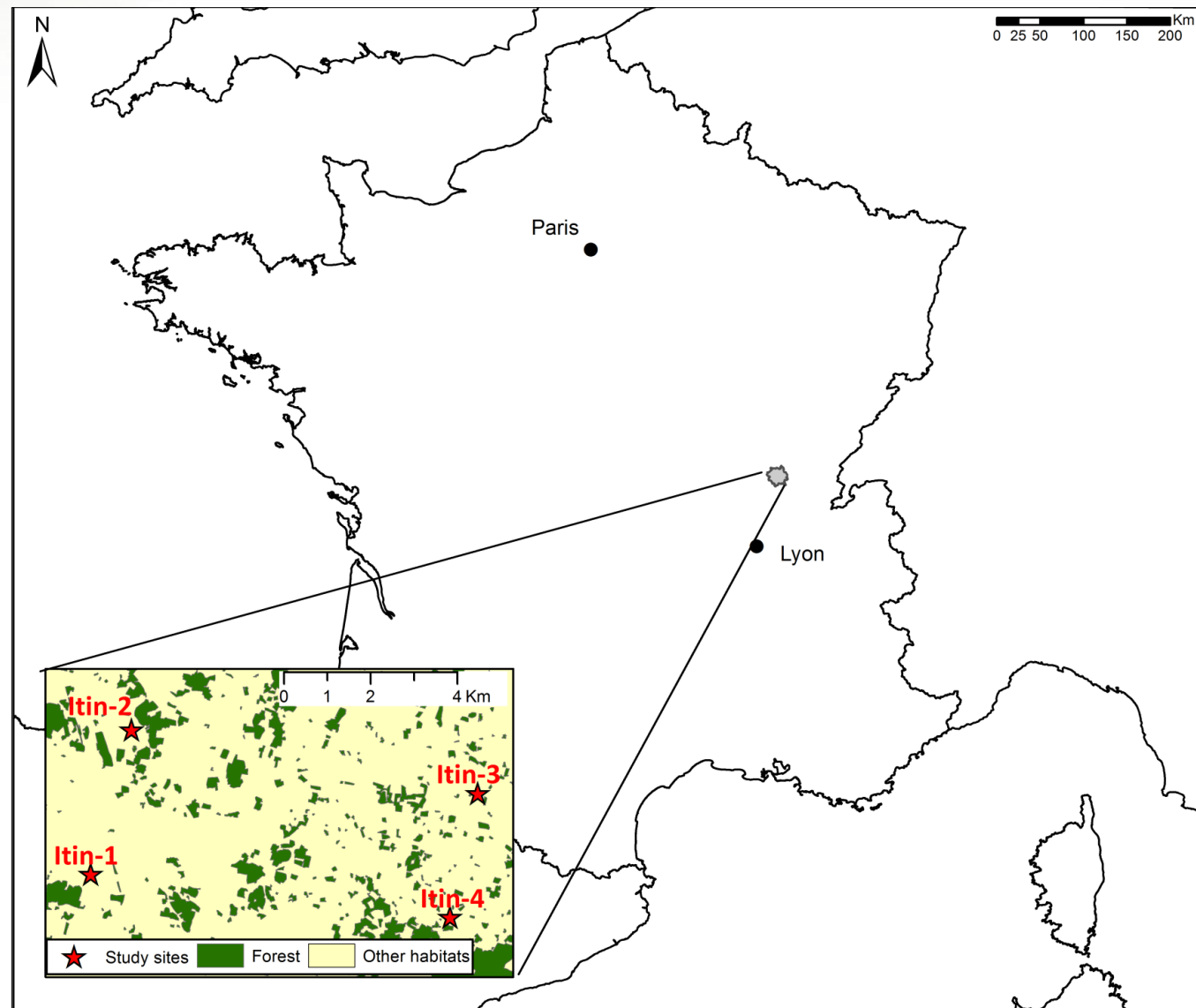
Methods

✓ **4 walked transects** with **6 to 9 stations (n=30)** per transect around poultry farms, in the Bresse region (France).

✓ At each station: **1 hair-tube, 1 footprint-tunnel, 1 combined hair & footprint tunnel and 1 camera-trap** set up closely.

✓ **Faeces survey** along each transect (780 to 1810m long).

✓ 2 periods of 4 weeks (June, 10th – August, 9th 2013).

✓ **Check & reloaded once a week** (duration: 3h15 – 5h30 hours / transect).
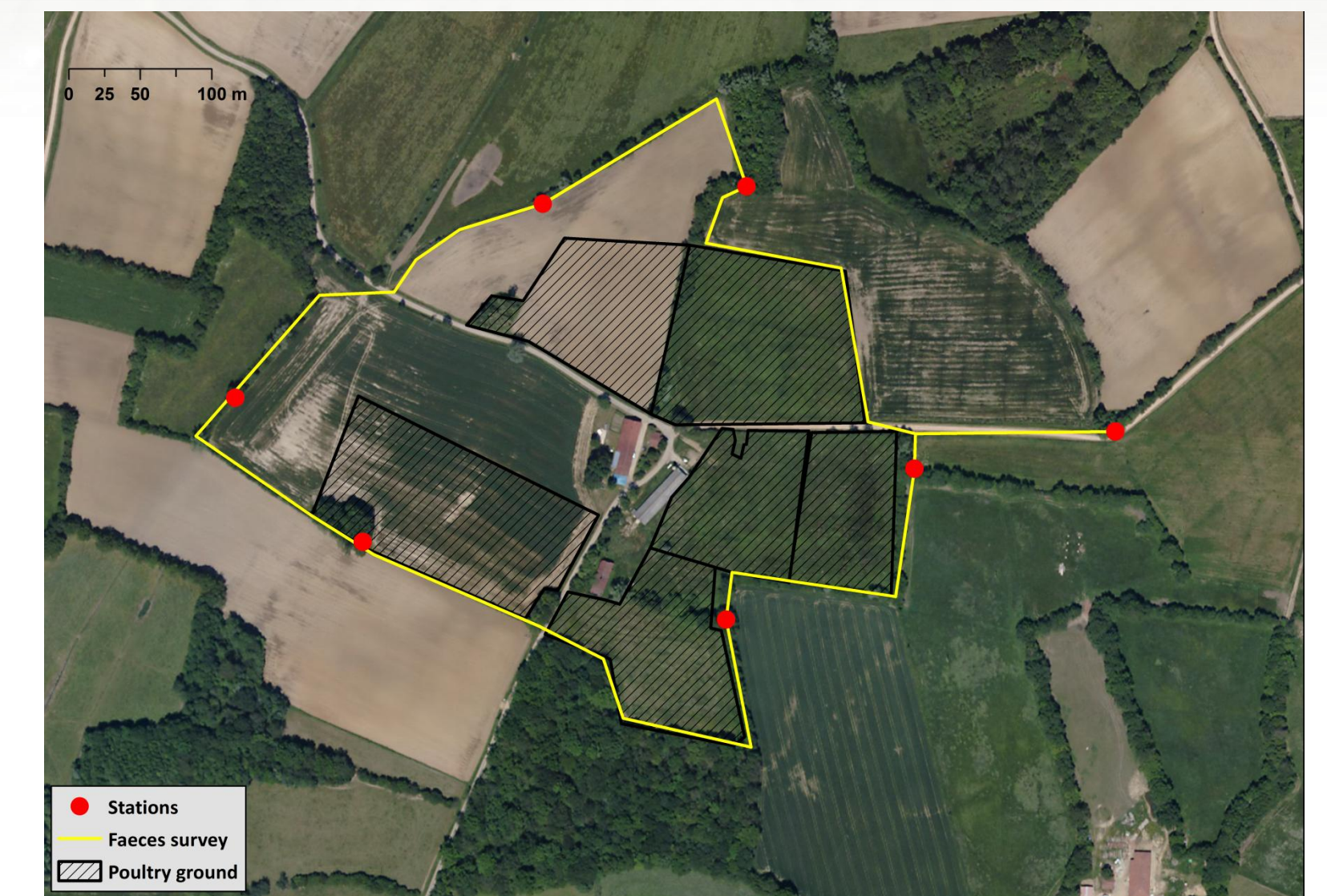
Location of stations along a transect

Camera-traps

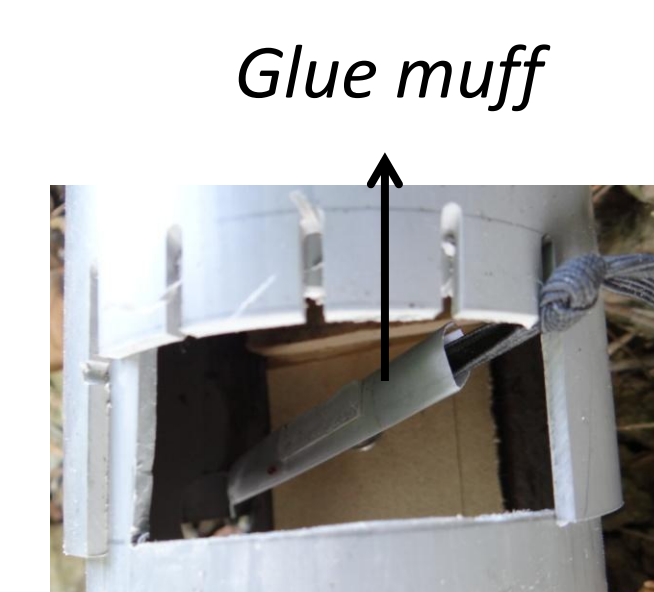Models: Cuddeback Attack IR, Cuddeback Attack Flash and Cuddeback Ambush IR.

Settings: photo only or photo & video, depending on the location and on the camera model.
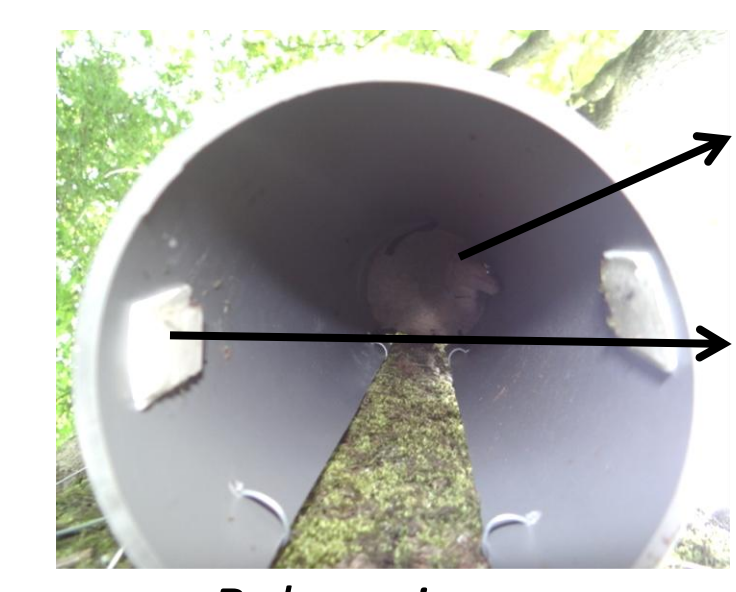
Hair-tubes

Weasel, Stoat & Polecat

✓ **Laid unbaited tubes** with glue muff at entrance & exit ; five positions for height.

✓ Combined with a footprint system ; Ø 80mm, L=50cm.

Glue muff

Pine marten & Stone marten

✓ **Hanging tubes with bait** (chicken wings) & glue patches ; Ø 110mm ; L=40cm.

✓ Inspired by The Vincent Wildlife Trust works [1].

Bait
Glue
Below view

✓ Hair samples will be determined by the **DNA identification**.

Footprint-tunnels

✓ **Pine marten & Stone marten :** footprint-tunnel only, Ø 110mm, L=60cm.

✓ **Weasel, Stoat & Polecat :** combined with hair-tube, Ø 80mm, L=50cm.

✓ Inspired by Mos J., 2011 [2].

Weasel footprint

Paper sheet
Sponge with natural ink (charcoal powder & paraffin oil)

Faeces-survey

✓ **Exhaustive faeces collect** on each transect, **once a week**, so that faeces are no more than one week old.

✓ Only visual criteria (size, shape…) for mustelid identification.

✓ Each sample is **photographed with a scale**, **identified**, **collected in an individual pot** and then **stored at -18°C**.

✓ **Species identification** will be made with the **DNA metabarcoding** method.

Contact rates by method

	Number of positive stations	Number of contacts	Contact rate (%)
Camera-traps	5	9 stone martens / 1 pine marten	0.61
Footprint-tunnels	0	0	0
Combined footprint-tunnels	1	1 weasel	0.06
Hanging hair-tubes	5 positive stations, 7 samples awaiting for a DNA identification		
Combined hair-tubes	21 positive stations, 50 samples awaiting for a DNA identification		

✓ **1 hair sample** at the same station and the same week than a **pine marten's picture**.

✓ Combined tunnels: **1 hair sample** at the same time than **weasel footprint** ; other hair samples with **micro-mammals footprints**.

Contact rates by transect

|	Number of positive stations (footprints & pictures)	Number of contacts	Contact rate (%)
Transect-1	1	1	0.09
Transect-2	2	7	0.28
Transect-3	1	1	0.06
Transect-4	2	2	0.10

✓ When considering footprint-tunnels & camera-traps, **only 20% of positive stations**.

✓ "Transect 2" has a better contact rate.

Faeces survey

✓ 113 faeces collected (mean **2.1 ± 1.9 faeces/walked km/week**).

✓ **High variability** between transects **in the number of faeces collected**: "Transect 2" has a better rate.
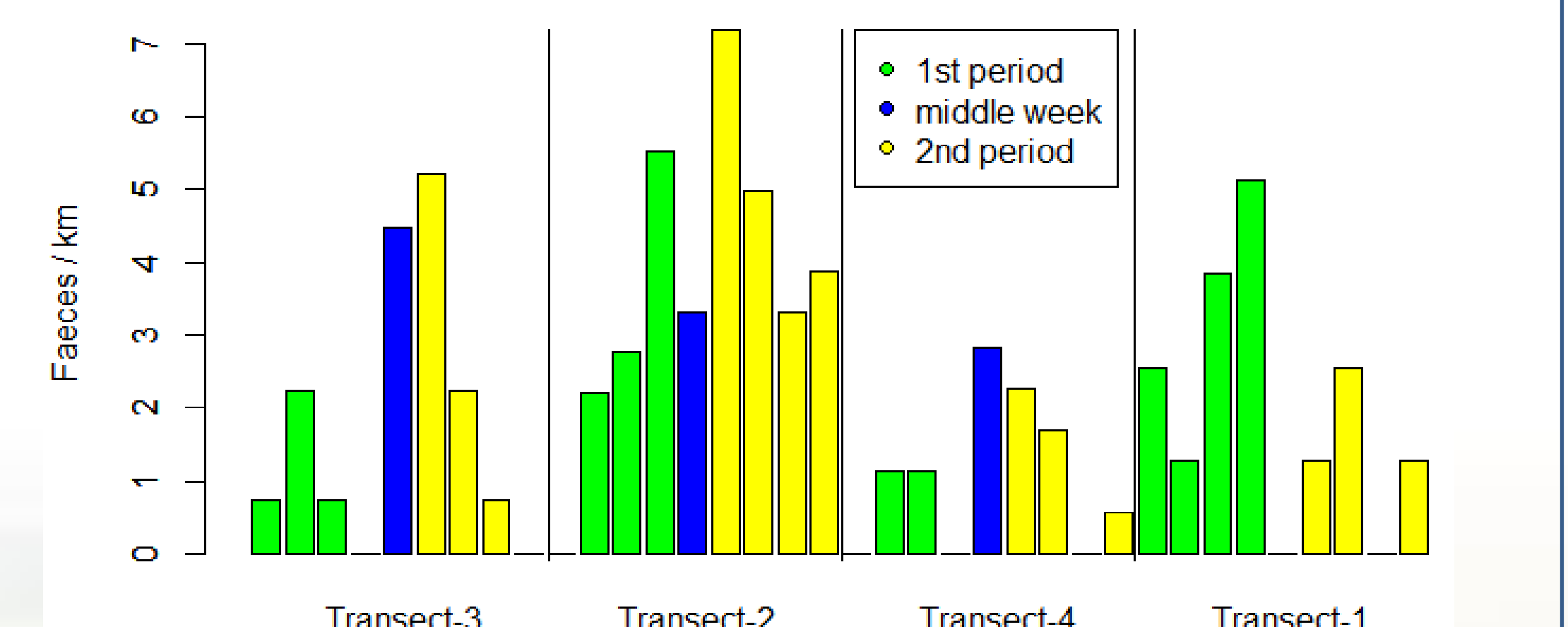
Discussion & Future perspectives

✓ **Low contact rates** when compared to the literature for **footprint-tunnels, camera-traps and hair-tubes**. **Higher contact rates with faeces survey** but awaiting for species identification with DNA metabarcoding .

✓ Suspicion of a **strong seasonal effect** (high food availability, difficulty to find mustelids paths because of ground cover…) → Another field session is **planned in winter**.

✓ **Recommendations to improve our design are welcome.**

References: [1] The Vincent Wildlife Trust. Making, mounting and monitoring Pine-marten hair-tubes (*methodological guide*). [2] Mos J., 2011. Footprint tunnels to study the presence of small mustelids (*poster*).

31st Mustelid Colloquium, 25-26 October 2013, Szczecin, Poland