ECOLOGICAL SEARCH DOGS ON WOLF FAECES

Ecological search dogs on wolf faeces: proof of concept

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Introduction

In several European countries, people are training ecological detection dogs to detect a variety of wildlife species ranging from fungi to marten. Each targeted-species has its' specific detection challenges.

In Belgium, hitherto two pilot projects have been carried out:

Pilot project 1 (2015-2016): a pilot project was started by Arno Thomaes of the Institute for Nature and Forest (INBO) in collaboration with a professional dog trainer Ellen Van Krunkelsven. Four persons, including two students trained their dogs to locate otters and stag beetle larvae. Ianthe Terpelle, a student of Odisee wrote her dissertation on the stag beetle training[1].

Pilot project 2 (2018-2019): Another pilot project was started by Arno Thomaes on a wider range of species. Trainer Ellen Van Krunkelsven and eight volunteers with a varying degree of dog training expertise are training their dogs on bat fatalities, bullfrogs, lion's mane mushroom, European pine marten, Eurasian otter, stag beetle, hermit beetle, hazel dormouse, and European hamster. Bente Stockmans, a student of Odisee wrote her dissertation on this subject[2]. She concluded that all dogs managed to recognise the goal species in a controlled setting but there is variation in the degree of succes in the translation to detection in the field setting. The volunteers are satisfied about the project and motivated to continue their contribution. There are some learning points concerning the facilitation of the work of the volunteers.

As a result of these projects, there are currently several volunteer detection dog teams that are either operational in field detection (otter & beetle) or almost ready for fully operational monitoring services in Belgium. Given the succes and continuing interest of volunteers, the range of targets can still be expanded. The wolf is a very good candidate species, considering the species' recent return to Belgium, its' detection difficulty and high monitoring concern.

[1] Ianthe Terpelle. 2015-2016. Het gebruik van honden om larven van Lucanus cervus op te sporen. Training van een ecologische zoekhond. Bachelorproef Odisee Hogeschool.

[2] Bente Stockmans. 2018-2019. Het opleiden van ecologische zoekhondenteams. Hinderpalen en succesfactoren. Bachelorproef Odisee Hogeschool.

Aim: we aimed at testing the possibility for trained ecological seach dogs to recognize wolf faeces from other distracting odours and dog faecal samples in an experimental line-up setting.

<u>Material and methods:</u>

<u>Collection of samples</u>

Nearly all Belgian zoos that keep wolves were contacted to ask for their collaboration by providing wolf faecal samples, as well as one Dutch Zoo: Olmen, Pairi Daiza, La Roche en Ardennen, Forestia, GaiaZoo, Crete des Cerfs de Bouillon, Han-sur-Lesse, Aywaille and GaiaZoo. The only Belgian zoo with wolves that was not contacted is Coo. Most zoos agreed to cooperate: Olmen, Pairi Daiza, La Roche en Ardenne, Forestia, GaiaZoo, Crete des Cerfs de Bouillon. One zoo refused to collaborate (Aywaille) and one zoo put their response on a continuous hold (Han-sur-Lesse).

Figure 1 : wolf faecal samples

<u>Selection of volunteers:</u>

Arno Thomaes, the project coordinator of the running INBO project (pilot 2) and trainer Ellen Van Krunkelsven selected the volunteers to conduct a proof of concept with wolf faeces.

- Carina De Pape with her dog: Wietse, a Flatcoated retriever, previously trained on hermit beetle detection

- Guido Franssens with his dog Kikki, an English Springer Spaniel, trained on European hamster detection

- Jurgen David with his dog Pippa, a Malinois, trained on bull frog detection.

Liesbet Brasseur with her dog Jules, a labradoodle trained on bat fatalities.

Ellen Van Krunkelsven coördinated the training and the proof of concept. Odisee student Bente Stockmans was present to assist during the test situation by changing the position of the samples. Hilde Vervaecke provided the wolf samples, scored the reactions, filmed the dogs and wrote up the results.

<u>Proof of concept – day one 13-04-2019</u>

On the first day of the "proof of concept" the volunteers carried out a first test in order to observe the reactions of the dogs upon first contact with the wolf samples. The dogs were trained to fixate on a wolf sample.

Location: the test was carried out outdoors in the farm courtyard in the Geraardbergsestraat 72, 1541 Herne. We worked with wolf faecal samples of La Roche en Ardenne and Forestia, half were fresh, half had been kept frozen and were thawed. The volunteers each took three samples home, from two different zoos. A set of three samples was provided for Liesbet Brasseur who could not be present on the first day.

Following volunteers were present with their dogs:

- Carina De Pape with her dog: Wietse, a Flatcoated retriever, trained on hermit beetle detection
- Guido Franssens with his dog Kikki, an English Springer Spaniel, trained on European hamster detection
- Jurgen David with his dog Pippa, a Malinois, trained on bull frog detection.

Figure : Guido Franssens with English Springer Spaniel Kikki

Figure: Pippa, the Malinois

Figure: in the front, Carina De Pape with Flatcoated Retriever Wietse

The trainer, Ellen Van Krunkelsven, coordinated the session and also participated with her dog Smoke (Malinois), trained on otter and stag beetle detection.

Figure : trainer Ellen Van Krunkelsven with Malinois Smoke

To learn the dogs to fixate upon wolf faeces at first one sample was provided in a glass in a metal holder. The dogs were rewarded when showing an approximation of the correct behaviour i.e. brief sniffing, then a longer fixation of 8 seconds was asked. They were rewarded with food rewards or a toy. Subsequently, a line up with three pots was set up and a line up with 8 metal boxes (Carina De Pape's material). In one box a wolf sample was put. The boxes were randomly rotated.

Figure: metal boxes in which a small containers can be placed

Figure: metal holder in which a glass with a piece of a wolf faecal sample is placed

Training period between 13-04-2019 and 28-04-2019:

In this period the volunteers continued the training of their dogs at home. They were asked to train first upon wolf samples. Dog samples could only be provided when the dogs knew the wolf odour perfectly.

Proof of concept – day two 28-04-2019

On the second day of the "proof of concept" the volunteers were tested with new faecal samples from wolves. Several dog faecal samples were also provided and other distracting odours (sheep faecal samples, chicken faecal samples, stone, lion's mane fungus). There were faecal samples from a dog that had been fed on entire carcasses of rabbits. We tested the dogs in a line-up with wolf samples and the other distracting odours.

Location: the test was carried out in the parking lot of Odisee, Hospitaalstraat 21, 9100 Sint-Niklaas.

Following volunteers were present with their dogs:

- Carina De Pape, dog: Wietse (Flatcoated retriever)
- Ellen Van Krunkelsven, dog: Smoke (Malinois)
- Liesbet Brasseur, dog: Jules (Goldendoodle), trained on bat fatalities

A line up with three glass pots in metal holders was set up and a line up with 8 metal boxes in which plastic holders with a sample were put (Carina's material). The boxes were randomly rotated. The dogs were rewarded with a toy (Wietse) and food (Jules and Smoke) when fixating correctly at wolf faeces.

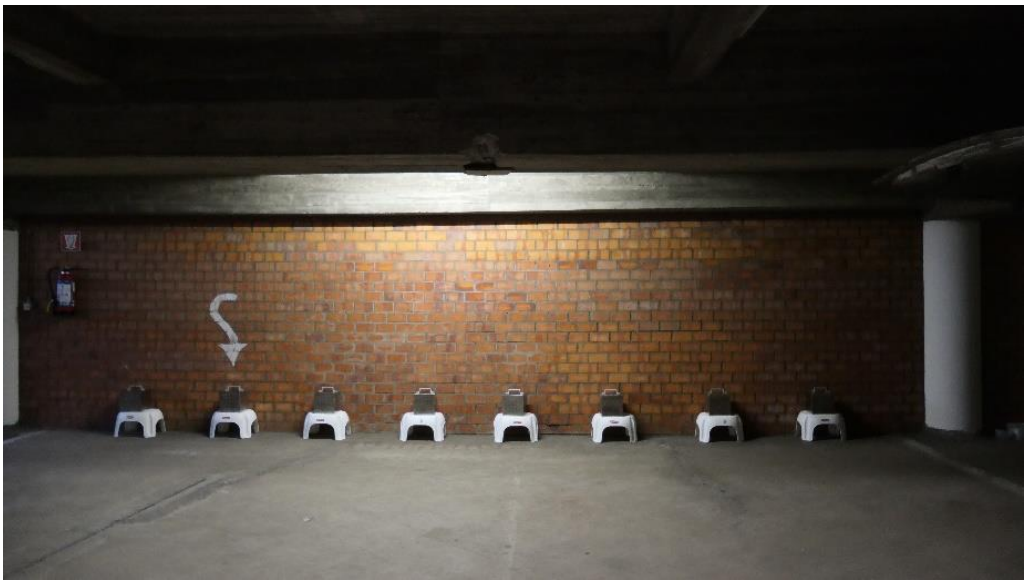

Figure 1: line up of eight odours in pots in metal boxes with holes in (designed by Carina De Pape)

Results:

The first day of the proof of concept :

The training was started with one dog after the other. First they were confronted with one wolf sample to learn to fixate on it. All dogs showed an aversion when first confronted with a wolf faecal sample (3 cm piece of La Roche & Forestia samples).

- Smoke: she backed away and was reluctant to come near the sample or to put the nose close tot he sample.
- Pippa: she was reluctant to approach, averting her head. After some rewards for sniffing she would fixate and lift her back foot at the same time.
- Kiki: avoids going tot the pot and avoids putting her nose above the sample. She keeps focused on looking at other locations away from the pots.
- Wietse: is slower than usual in learning to fixate on the new odour.

For all the dogs, this behaviour differed from their usual behaviour, being trained detection dogs for other odours. After several rewards for approximations of the behaviour all dogs show correct pointing behaviour.

Figure: Smoke showing aversive behaviour to the wolf sample: she prefers to turn away

Figure: Smoke showing aversive behaviour to the wolf sample, stepping by sideways, averting her head

Figure: Smoke pointing from a larger than usual distance.

Figure: Pippa showing aversive behaviour to the wolf sample by reluctance to approach and point

Figure: Pippa correctly pointing. Notice her lifted back foot, possibly a sign of some conflict behaviour due to the aversive odour.

Figure: Smoke pointing correctly

Figure : Pippa gets her food reward for correct pointing

Figure: Wietse learning to point at the wolf sample. Carina holds the tug toy behind her back to reward him after sniffing the pot.

Figure: Kikki learning to fixate at the wolf sample

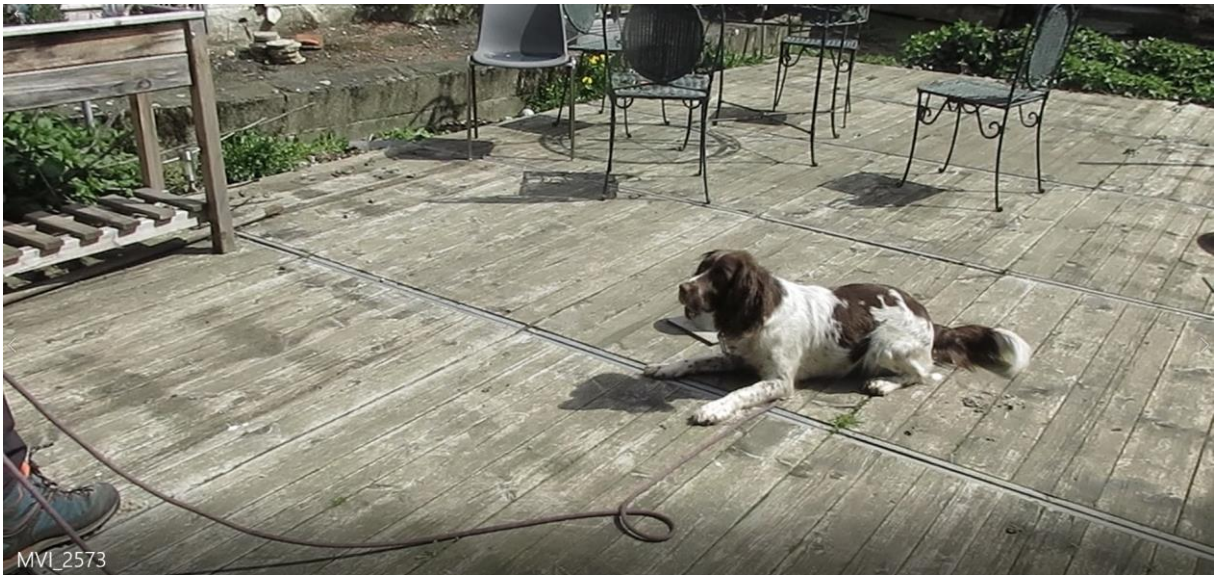

Figure: Kikki lying by the wolf sample

Figure: Kikki is rewarded with food

Figure: Wietse is gaining enthusiasm for the task showing increased tail wagging and excitement.

When all dogs fixated on the wolf sample, a line up of three pots was made, one of which containing a wolf sample.

Figure: Wietse gets a toy thrown towards him as he passes by the wolf sample to associate the wolf sample with the reward

Smoke: The aversion remains. In a line-up with two or three pots, she prefers to point at all the other samples in stead of the wolf. She systematically does not approach the wolf sample, which can be read as an alternative indication in itself. Fixating on the wolf sample improves with an extra toy as a reward. After several trials and rewards of brief correct pointing, she starts to point directly at the wolf sample.

Figure : a tug toy as a reward after correct fixation

Figure : Bente is changing the order of the pots between all trials

Kikki: she shows little interest in the wolf sample and she continues to search at other locations. She is pulled back from the trials with the multiple pots as she first needs to fixate better prior to taking the next step.

Pippa: she continues to avoid the wolf sample. Jurgen's wife takes over the test trials. After several trials with rewards of brief pointings, Pippa starts to point correctly at the wolf sample. She repeatedly lifts her back foot while fixating, possibly a sign of conflict behaviour due to the aversive odour.

Wietse: he is first trained by associating the wolf odour with his toy, that is thrown at him as he passes by the correct pot. After a couple of trials, he correctly waits at the wolf odour and points. He also shows increasing enthusiasm and tail wagging as the correct fixations increase. Wietse shows the strongest progression but all dogs progressed slower than usual.

The trials are ended after two hours. It was decided not to test further in a line up with distracting dog odours as it became clear that more training is needed prior to taking the next step. All the volunteers were asked to continue to train the dogs at home in the next two weeks to conduct the test of wolf versus dog faeces on the second day of the proof of concept.

The second day of the proof of concept:

Smoke : she continues to show an aversion to the wolf sample in a line up with three pots, one of which is a wolf sample, the others are empty. She correctly points after some errors. She had trained once in the in-between period. It is decided not to train her any more on wolf samples due to the reluctance she shows. She hardly ever made errors in previous

trainings and a negative experience could render her uncertain and have a negative effect on her other performances.

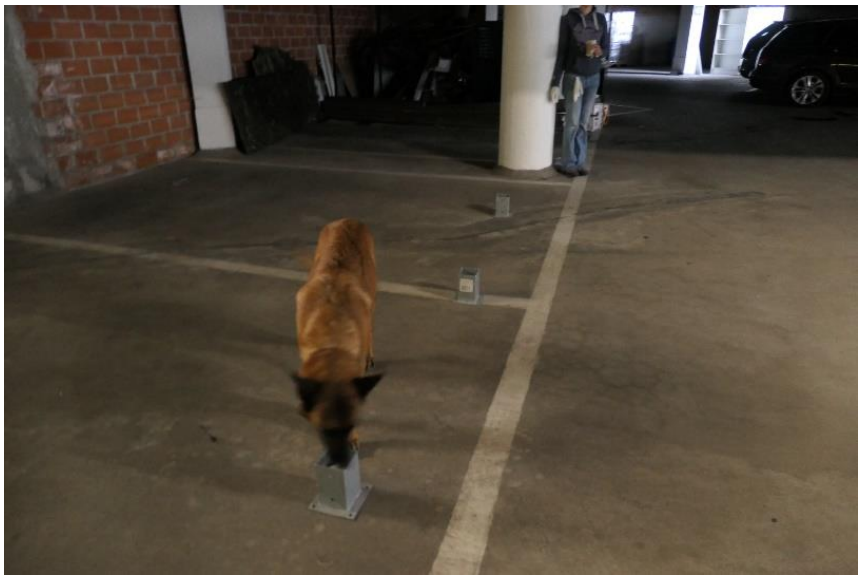

Figure : Smoke fixates at a sample

- Jules: he has trained a couple of times at home in the previous period. Half of the attemps he does not fixate at the known wolf samples in a line up with two additional empty pots. He is slower than usual at learning. It is decided to continue the training at home, only with wolf samples and without presenting distracting odours.

Figure : line up of three glass pots in metal holders. Jules, the Goldendoodle fixates at a wolf faecal sample.

- Wietse: he has trained at home in the previous period in a line up with 8 metal boxes and several distracting odours, including dog samples. 1) He is first confronted with a line up with boxes with an empty pot, a wolf sample (La Roche), a new dog faecal sample, another new dog faecal sample, a sheep faecal sample, a stone, a lion's mane fungus and a known dog faecal sample, which he succeeds. 2) Then he is confronted with a line up with again a new dog faecal sample, and another dry wolf faecal sample. He first shows doubts but fixates correctly at the wolf. This is repeated, then he shows doubts and does not fixate at the dog neither at the unknown wolf . 3) He is confronted with the same line up but now with a fresh wolf sample that has never been frozen (La Roche), which he correctly fixates. 4) The line up is repeated with the wolf and a faecal sample of a dog that ate a carcass of a rabbit. Wietse fixates correctly at the wolf after passing and checking the dog sample. 5) The similar negative line up is offered this time without a wolf sample. Now he passes by the carcass-fed dog, searches further, then returns to the carcass-fed dog sample to fixate, incorrectly.

Figure : Wietse checks the metal boxes with the different odours in the line up

Figure: Carina and Wietse

Conclusion:

All dogs showed some degree of aversion to wolf faecal samples in different ways by not approaching, lifting a paw, turning away their head, fixating from a distance, and by showing slower than usual learning rates. Wietse, the flatcoated retriever, managed to correctly recognise the wolf samples without distracting odours, as well as with several non-dog distracting odours, as well as with dog faeces and carcass-fed dog faeces. More training is needed to test if the dog will ignore carcass fed dog samples in a blanco line-up without the presence of a wolf sample.

Acknowledgements :

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