**Milestone 1.5 Conduct a ferret body odour longevity trial to determine how long odour lasts, and therefore how often it needs to be refreshed in the field.**

*Progress report to Hawke's Bay Regional Council*

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*Landcare Research*

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**Introduction**

Patrick Garvey's PhD identified ferret body odour as a potentially long-lasting lure for predator control. Patrick is currently conducting a project for the BioHeritage National Science Challenge that aims to produce a synthetic version of this odour. In the meantime, ferret odour lures using bedding material from ferrets housed in cages is being used operationally. HBRC field staff need to know how long this odour lasts in the field so they know when to replenish it. We are currently running a chemical assay trial at Landcare Research's Lincoln facility to determine the amount of odour compounds remaining on bedding material at various time intervals up to 12 months. Here we present preliminary results from part of the dataset.

**Objective**

Determine the decay function for ferret body odour over a 12-month period.

**Methods**

We placed 5 x 5 cm pieces of ferret odour-impregnated towel inside small plastic pottles placed inside Holden traps to simulate use by HBRC staff in DOC 200 and 250 traps. We drilled holes in the sides and top of each pottle. Beginning on 24th January 2017, we deployed 100 pottles inside traps in two vegetation types: 60 in open grass and 40 among trees, at the Lincoln site.

We are assaying odour from 5 replicates (3 randomly chosen from grass, and 2 from trees) at the following intervals:

- After 1 day (5 samples)
- Weekly for 6 weeks (30 samples)
- Fortnightly for 2 months (20 samples)
- Monthly for 8 months (45 samples)

We are also maintaining 40 samples in a controlled lab environment (20 degrees, constant temperature and humidity), and assaying odour from two replicates during each of the above sampling times. This controls for seasonal effects.

In addition to this sampling regime, we are also assaying odour from old towel samples used at the Lake Opouahi Kiwi Creche. We took 10 random towels from the 90 samples sent to us by HBRC staff, and assayed them for ferret odour. These were deployed in the crèche on 18 Jan 2016 and retrieved 7 Dec 2016, so they represent samples that have been in the field for nearly 12 months.

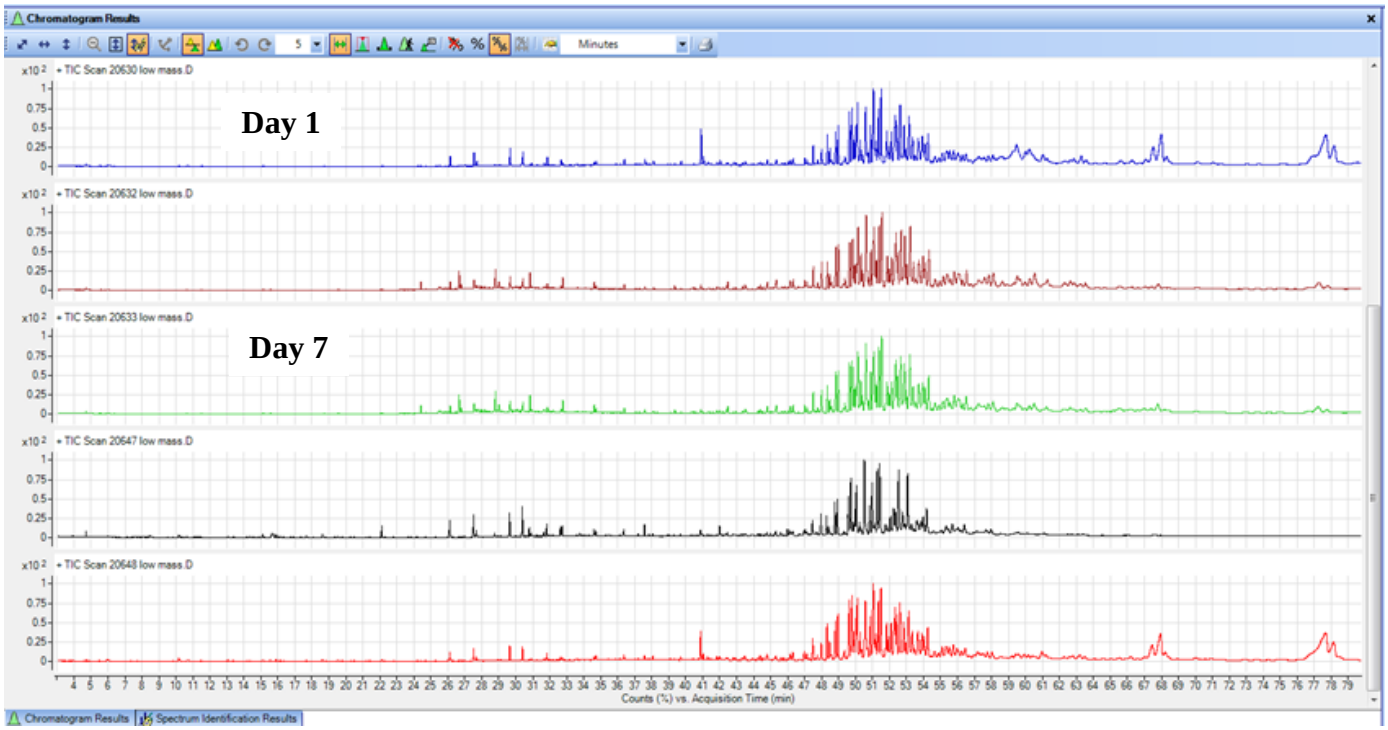
The odour extraction process involves taking 2g pieces of towel (i.e., the approximate weight of towels used by HBRC) in duplicate, prewashing them in a 50ml glass centrifuge tube, and adding 25mL of 1:1:1 hexane:acetone:DCM. Samples are left in the fridge overnight followed by 1 hour of sonication at 30 degrees, and 1 hour of horizontal shaking. They are then placed in the fridge to equilibrate for 48 hours. Samples are removed from the fridge, and 5 ml filtered through a 0.45µm PTFE filter. These are split into two fractions;

one for analysis, and one for archiving in the minus 20 degree freezer. One duplicate sample from each batch is taken in addition to a solvent and matrix blank. An aliquot is filtered and injected directly on a mass spectrometer. Each sample is scanned for 50-300 Atomic Mass Units (AMU).

**Results**

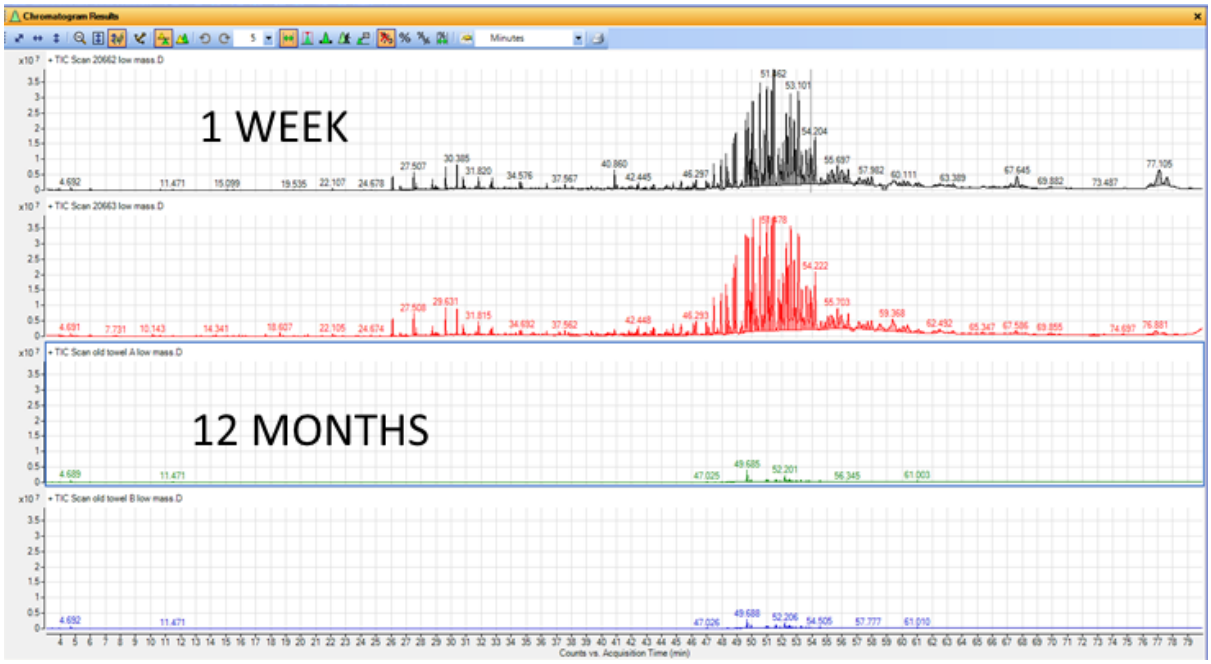
*Decay over 7 days*

Below are the chromatograms (graphs showing the amount of each odour component) for two Day 1 samples and three Day 7 samples. The larger the peak, the greater the amount of that particular component in the sample. As the value on the x-axes increases, odour components increase in molecular weight and decline in volatility. Odour does not appear to have diminished over the course of a week. Most of the odour components are approximately $C_{20}$ and higher, with molecular weight greater than 300 AMU. There was greater variability between samples observed for lower molecular weight components.



*One week vs 12 month samples*

The figure below compares the chromatographs of 1 week samples versus 12 month samples from the Lake Opouahi Kiwi Creche. Significantly less odour material was present in the crèche samples, although there were still detectible compounds, especially those of higher molecular weight. If predators are still finding the old samples attractive, it is likely these heavier components are attracting them.




At the end of the trial, we will quantify the loss of odour over time by calculating the areas under the appropriate peaks.

Whilst not shown here, there appears to be high variation in the amounts of odour between towel samples taken on the same day. Some of the towels were very grubby, while others were quite clean. While development of an artificial lure will eliminate this problem in the long term, current odour collection can be improved by rubbing towels over the ferrets prior to removal and ensuring towels are placed flat in nest sacks to avoid getting bunched up. Development of a visual scale for estimating percentage of the cloth soiled and relating this to the chromatograph results could be useful for estimating longevity in the field. Samples analysed by Patrick Garvey, showed differences in volatile odour compounds between the sexes, and between individuals within a sex.

**Conclusion**

As expected, there has been no discernible loss of odour over one week, and very low amounts of odour remaining on 12 month samples taken from the Lake Opouahi Kiwi Creche. The fact that some heavier components could still be detected in the old samples is encouraging. Indeed, HBRC staff could still smell ferret on these samples suggesting they may still have some attraction to predators. However, heavier compounds that remain after a year are usually only detectable if the nose is in contact or almost touching the towel. Even though

compounds may still be present, their low volatility may mean they are of limited use as a lure.

Results from the synthetic lure research, in conjunction with the longevity trial, will help inform how frequently lures need to be replaced. The longevity trial has identified different decay rates for a suite of compounds, but it may be that just one or a few of these compounds attract stoats. The synthetic lure research will use pen trials to identify which compounds provoke attraction, and by linking this to the longevity trial, we can accurately assess of how long the lure remains attractive in the field.