A Preliminary Report on the Ceredigion Coastal Otter Survey September 24-25th 2011

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Background

The Mammals in a Sustainable Environment (MISE) project is a partnership between Waterford Institute of Technology, Waterford County Council and the National Biodiversity Data Centre in Ireland and The Vincent Wildlife Trust, Countryside Council for Wales and Snowdonia National Park Authority in Wales. The project is part funded by the European Regional Development Fund under the Ireland-Wales Programme 2007-2013 (INTERREG IVA), with the aim of fostering community involvement in Wales and Ireland in mammal conservation. One of the ways in which this is being achieved is by providing a range of workshops where volunteers are trained in field skills for mammal surveying, and also through volunteer participation in field surveys. No prior knowledge or experience is necessary to take part and anyone who is interested in getting involved in mammal conservation and monitoring will be given help and training from expert mammal ecologists.

The Molecular Ecology Research Group at WIT have developed techniques for identifying mammals from non-invasively collected samples such as hair and scat or spraint (faeces). They will use these forensic DNA techniques to confirm the species of surveyed mammals from samples collected by volunteers, and also to provide further information on haplotypes, sex and genotypes of individual animals where possible.

Introduction

The Ceredigion Coastal Otter Survey took place across the weekend of 24th and 25th September 2011. On the Saturday 26 volunteers took part in a training day with otter ecologist, Geoff Liles at the Memorial Hall in New Quay. Geoff gave a talk on otter ecology and conservation and explained how and why the otter had declined dramatically across the whole of the UK in the second half of the 20th century, but was now recovering well since the ban of certain pesticides such as polychlorinated biphenyls (PCBs). In the second part of Geoff's talk he described otter survey methods and showed how and where to look for spraints and other field signs of otter presence.

In the afternoon we went out to 2 contrasting coastal sites for a practical training session on finding and collecting spraint. During the practical training session 17 spraint samples were collected from Cwmtydu and Aberaeron. Volunteers were then put into teams of two or more people and each team was allocated one or two selected 1km squares along the coast between Aberystwyth and Cardigan to survey the following day. Each team was given a survey pack containing maps of their survey squares, landowner contact details and access routes. They were also

provided with data sheets and sample collection bags each of which had a unique sample number.


Left: volunteers at Cwmtydu for the practical session of the training day. Right: smell is key to identifying otter spraint (Photos: Leanne Bird)

The survey

Method:

Landowner permission was obtained where necessary for all survey sites that could not be accessed by public footpath or roadway. Otters require fresh water both for drinking and for washing salt from their coats after swimming in salt water, so survey squares were selected where rivers entered the sea. Surveyors were asked to survey both the river and coast within their survey square(s) and to collect and record the location of all otter spraint.

Otter spraint can differ widely in appearance: three of the spraints we collected (photos: Leanne Bird)

Each collected spraint was individually bagged to avoid cross contamination, and either a GPS location recorded or a grid reference derived from Ordnance Survey 1:25000 maps of where each sample was collected.

Preliminary results

A total of 18 1km squares were surveyed, of which 13 had spraint present. The distribution of survey squares is shown in figure 1.

Figure 1. Distribution of survey squares along the Ceredigion coast

In total 76 spraints were collected and sent to WIT for analysis. A summary of the preliminary results is shown in table 1.

Table 1. Summary of species and sex identification from spraints collected

spraints	Species ID		Sex ID		Genotyping
76	Positive	60	Male	12	Conducted on 3 DNA preparations so far. Identified at least 3 individuals: 2 females, 1 male.
	Fail	16	Female	23	
			Undetermined	25	

The highest density of spraint was at Aberporth, but Aberarth and Aberaeron also had lots of signs of otter. A site by site breakdown of the number of spraints collected and results so far is shown in table 2.

Table 2. Preliminary results of spraint analysis by survey site

site	No. of spraints collected	No. confirmed as otter by DNA	No. sex typed	No. of spraint from males	No. of spraint from females
13 Aberarth	10	10	6	2	4
12 Gilfach yr halen	1	1	1	1	0
6 Penbryn	6	6	3	3	0
16 Llansantfraed	5	4	3	1	2
18 Aberystwyth	1	1	1	1	0
19 Aberystwyth	4	4	3	0	3
8 Cwmtydu	7	5	4	0	4
14 Aberaeron	10	9	6	1	5
5 Aberporth	22	16	7	1	6
17 Morfa	6	2	1	1	0
3 Mwnt	1	0	0	n/a	n/a
7 Llangrannog	2	0	0	n/a	n/a
12 Cardigan	1	0	0	n/a	n/a

Real time PCR is used to amplify DNA extracted from spraint and the number of cycles it takes to reach a critical threshold (known as the Ct) value provides a quantitative measure of how much DNA is present in the sample. The Ct values of each of the Ceredigion samples are shown in figure 2.

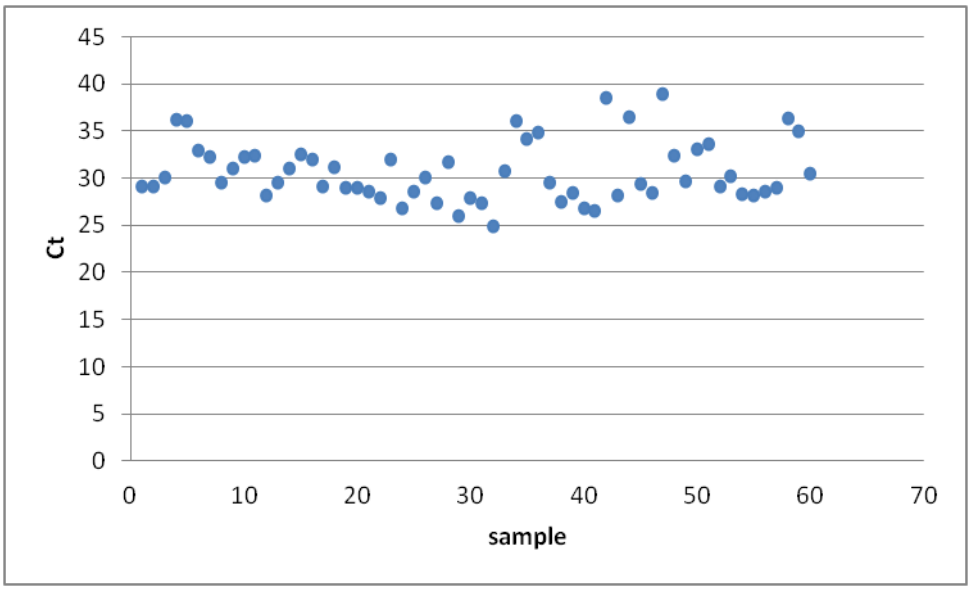

Figure 2. Ct values (from qPCR) of DNA extracted from Ceredigion spraint samples.

Discussion and future work

The training workshop was very well attended and proved to be successful by the high percentage of spraints that were correctly identified and collected by the surveyors following the training day. The majority (80%) of the spraints collected yielded sufficient DNA for successful species identification. Fewer were suitable for gender identification (35 samples) and it is anticipated that significantly fewer will be suitable for genotyping. WIT are currently working through the samples with the highest Ct (critical threshold) values for genotyping to individual. So far 3 individual animals have been identified – 2 females from [site 5] and 1 male from [site 14]. Previous work carried out by the MISE team at WIT on other mammal species, particularly pine marten, has shown that samples with the lowest Ct values have the highest success rate for genotyping, whilst those with a Ct value of around 28 or higher usually contain insufficient DNA for genotyping. From figure 2 it can be seen that almost half of the Ceredigion samples have a Ct value above 30. However, the method of genotyping is currently being optimised and the results will be reported as soon as they are available. This should also inform future surveys on how best to select spraint samples for collection in the field.

Acknowledgements

We would like to thank all of the volunteers who took part in the Ceredigion coastal otter survey weekend and hope that you will join us again on future surveys. Many thanks also to Geoff Liles of The Otter Consultancy for providing the practical survey training. Final DNA results and analysis will be available shortly.