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Notes on the technique of the otter field survey

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Data (2083 sites visited) collected during the otter *Lutra lutra* (Linnaeus, 1758) survey of Poland in 1991–1994 were used to evaluate some of the factors affecting the efficiency of the technique. The success in detecting otter signs was found to be significantly affected by the presence of "spraintable" bridges and other potential sprainting sites on the banks. Decreased efficiency of the technique was noted in specific habitats, eg large rivers, canals surrounded by open fields or meadows, and any aquatic habitats with few potential sprainting sites on the banks. It is suggested that modifications: spot checks at additional bridges and extended searches of river banks, could be used to improve the reliability of the survey in areas with low numbers of otter signs.

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Introduction

The standard field survey method, based on the search for otter *Lutra lutra* (Linnaeus, 1758) signs, has been succesfully used in many European countries (for references see Macdonald and Mason 1994). The survey is usually carried out based on the system of 10 × 10 km square grid, where around 6 sites are visited in each square (Lenton *et al.* 1980). The basic assumption of this method is that the 600 m-long walk along the waterside is enough to find spraints (excrements) or tracks of otters inhabiting an area (Macdonald 1983). Finding otter signs indicates the presence of these animals (positive sites), whereas the absence of signs at a series of sites (negative sites) enables to state, with high probability, that otters do not occur in the area, eg along one river.

The national otter survey undertaken in Poland in 1991–1994 was based on the modified standard method, with one site visited in each 10 × 10 km square (Brzeziński *et al.* 1996). Numerous data (2083 sites visited) collected in various habitats enabled us to critically assess the method used and evaluate some of the factors affecting the efficiency of the search.

Otter signs under bridges

At most sites we began the search for otter signs under a bridge. To supplement the main survey we performed spot checks under additional bridges (see Lenton *et al.* 1980). In most of those 10 × 10 km squares which were negative after the initial search, 1–3 spot checks were conducted. There were two reasons for choosing the bridges: the first one was the ease of approaching the river, the second – the longevity of otter signs under the bridge cover. Otter spraints remain on the banks from several days to several weeks but in sheltered places they can exist as long as 12 months (Jenkins and Burrows 1980, Macdonald and Mason 1988).

During our studies otter signs were found under bridges in 56.9% of all positive sites. It should be mentioned, however, that not all bridges were suitable for the survey. Bridges which had boulders, natural banks, wooden or concrete ledges underneath were frequently used by otters as sprainting places. Bridges which had none of these features did not offer good sites for sprainting. Bridges on large rivers provided places for marking which did not differ from the other sections of the bank (ie had similiar vegetation cover) and were rarely used by otters. On rivers up to 5 m wide 70% of otter signs were found under the bridges, whereas on rivers wider than 60 m none were found (Fig. 1).

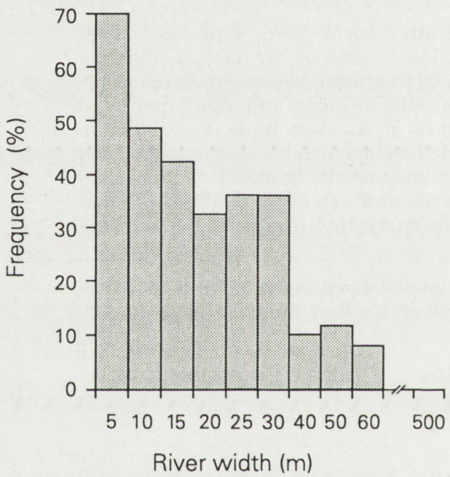

Fig. 1. Percentage of otter signs found under bridges in relation to varying river width.

The abundance of proper ("spraintable") bridges increases the probability of detecting otter presence in a 10 × 10 km square. In fact bridges seem to be the only places to find otter spraints or tracks in habitats such as irrigation canals, drains, and chanalized rivers, or habitats where low banks were covered with dense riparian vegetation. Also in the case of lakes otter signs were easiest to find under small bridges on little tributaries or canals connecting two lakes.

Type of the river bank

The ease of detection of otter signs, measured by the distance of the search, depends on the density of these signs on the river banks. Some authors discussed whether spraint densities could be related to habitat quality, otter numbers or activity (Macdonald and Mason 1983, Jefferies 1986, Kruuk *et al.* 1986, Kruuk and Conroy 1987, Mason and Macdonald 1987). Macdonald (1983) noted that presence of potential sprainting sites may effect numbers of spraints detected, however, not enough attention was paid to this problem. In theory otters may defecate at any place on the bank, but usually most of the signs are left in prominent sites. Also the probability of finding otter spraints in unexposed places is much lower than on easily visible logs, stones or sandy heaps. Only in a few habitats, such as mountain rivers, are the number of potential sprainting sites (in this case boulders and stones) practically unlimited, so the otters may defecate in any part of their range. In most habitats, however, the distribution of conspicuous sites may result in the selective marking of particular sections of the river bank. In this case results of the survey could be dependent on the encountering of conspicuous sites within the distance searched.

In our field study we described the presence of potential sprainting sites on the banks surveyed in 3 categories: "0" – < 1 site/100 m, "+" – 1–10 sites/100 m, and "++" – > 10 sites/100 m. We found that among negative records, there were significantly more banks of "0" category (29.0%), than among positive records (17.6%) ($p < 0.001$, $G = 16.4$, G-test). Thus, it seems that the success of finding otter tracks or spraints may be significantly affected by the type of river banks, ie presence of exposed sites accessible to the researcher. Evaluation of the field survey in England has shown that the technique was least efficient in areas with a low frequency of sprainting sites (Lenton *et al.* 1980).

Otter signs and the size of the river

Previously published data show that the majority of signs (about 70–80%) was always found within the first 200 m of the search (for review see Mason and Macdonald 1986, 1987). In the Bieszczady Mts (Poland) it was 87% (Brzeziński 1991). In the national survey of Poland 90.3% of the otter signs were found within the first 200 m (including signs found under bridges at the beginning of the search). Our data showed, however, that the otter signs were easier to find on small rivers (93% signs found within first 200 m) than on rivers over 30 m wide (70%) ($p < 0.025$, $G = 5.08$, G-test). Even when the findings under bridges (more efficient on small rivers; Fig. 1), were excluded, significant differences between the average distance of the search on small and large rivers were noted (Fig. 2). Extending the search in 92 cases revealed proportionally more positive sites on large (over 30 m wide) rivers compared to small ones (37.9% and 22.2%), however, due to small sample size these differences were not statistically significant ($p > 0.05$, $G = 2.42$, G-test).

Above observations indicate that the survey technique is slightly less effective on large rivers. During the national survey in Lithuania, Baranauskas and Mickevicius (1995) also detected lower sprainting activity of otters on the large compared to the small rivers. Difficulties in detecting otter signs on banks of large

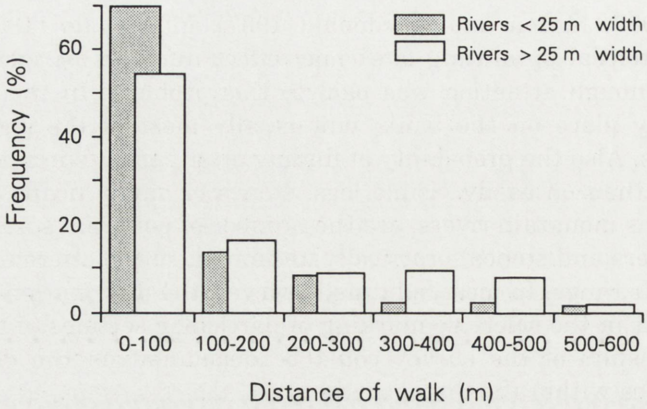

Fig. 2. Percentage of positive sites within 600 m distance on small rivers (< 25 m width) and large rivers (> 25 m width); findings under bridges excluded.

rivers could be explained by lower densities or by decreased activity of otters in these habitats. Such differences in habitat utilisation by otters were recorded on streams of different size in Scotland (Kruuk *et al.* 1993). However, in Belarus Sidorovich (1991) showed that the otter densities on large lowland rivers are higher than on the small ones. Other factors that decrease the chance of detecting otter signs such as flat and wide river banks, fluctuations of the water level, and increased human activity along large rivers must be also considered.

Conclusions

Experience gained during the field census in Poland supports previous suggestions concerning the critical interpretation of data collected with this method (Macdonald 1990). Both for areas with almost 100% of positive sites and those with a lower number of otter signs, results of the survey would not change much had the distance searched been reduced to 200 metres. For example, in the Mazury catchment (100% of positive sites) and the upper Odra catchment (42.2% of positive sites), 96.6% and 95.8% of otter signs were recorded within the first 200 m. However, a comparison of the ease of detection of otter signs (expressed by the distance of the search) in various catchment areas revealed some important differences. In the catchments with low numbers of positive sites relatively more signs were found under bridges than in those areas where the otter was very common. This can be explained by the fact that lowest percentages of positive sites were recorded in catchments where river banks were often transformed and lacked good sprainting sites. In this case banks under bridges seem to be the best places to spraint. The second important difference emerges among highland and lowland catchments. In the San catchment, for example, where rivers flow mostly through the mountains and uplands, the percentage of otter signs recorded under bridges was the lowest (32.4% of all positive sites). In contrast, in all the lowland catchments more than 50% of otter signs were recorded under bridges. We believe this was due to high numbers of potential sprainting sites (ie boulders, stones) on the banks of the mountain rivers.

For some habitats with lower numbers of otter signs we were aware of not being able to record every otter presence. In several studies extending the search over 600 m resulted in an increase in the number of positive sites of about 6–12% (Mason and Macdonald 1987). Such a method bias means that, for example, about 25–50 of 430 negative sites recorded in the national survey of Poland could be wrongly classified. In some cases the method bias seems obvious, eg single negative site surrounded by numerous positive sites (with similar habitats) on the same water course indicates failure of detecting the signs rather than the absence of otters. The very first evaluations of the survey technique showed that it was adequate for studying otter distribution but was not sufficiently detailed to identify every stretch of river used by the animals (Crawford *et al.* 1979, Green and Green 1980).

Several authors have shown that success in detecting otter signs could be influenced by factors such as habitat type, otter density, season, weather, and human activity (Lenton *et al.* 1980, Jefferies 1986, Macdonald and Mason 1987, Macdonald 1990). We would like to point out that standard survey method bias may depend on some habitat components which are unrelated to otter densities and habitat quality. Critical evaluation of data collected during the field survey in Poland shows that success in detecting otter signs may be significantly affected by the presence of spraintable bridges and other potential sprainting sites on the banks. We noted decreased efficiency of the technique in specific habitats, eg large rivers, canals surrounded by open fields or meadows, and any aquatic habitats with banks difficult to access. Survey of several sites in a single 10 × 10 km square (the approach used to survey areas in size of eg England – Lenton *et al.* 1980 or Denmark – Madsen and Nielsen 1986) improves the chances of recording otter presence. However, if only one site is surveyd in each 10 × 10 km square (the approach used to survey large areas, eg Poland, this study) it is necessary to maximize the probability of finding otter signs. To improve the reliability of the survey in areas with low numbers of otter signs we used spot checks at additional bridges and extended searches of river banks. The latter modification produced only a small number of positive results in Scotland (Green and Green 1980) but was efficient in our study: 25 positive sites which would otherwise have been missed were produced in 92 surveys of 1000 m.

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References

Baranauskas K. and Mickevicius E. 1995. The new data on the otters in Lithuania. Lutreola 5: 11–14.

Brzeziński M. 1991. Distribution of the river otter *Lutra lutra* L. in the Bieszczady Mountains. Przegląd zoologiczny 35: 397–406. [In Polish with English summary]

Brzeziński M., Romanowski J., Cygan J. P. and Pabin B. 1996. Otter *Lutra lutra* distribution in Poland. Acta Theriologica 41: 112–126.

Crawford A., Jones A. and McNulty J. 1979. Otter survey of Wales 1977–78. Society for the Promotion of Nature Conservation / Nature Conservation Council, London: 1–70.

Green J. and Green R. 1980. Otter survey of Scotland 1977–79. Wincent Wildlife Trust, London: 1–46.

Jefferies D. J. 1986. The value of otter *Lutra lutra* surveying using spraints: an analysis of its successes and problems in Britain. Journal of Otter Trust 1: 25–32.

Jenkins D. and Burrows G. O. 1980. Ecology of otters in northern Scotland. III. The use of feaces as indicators of otter (*Lutra lutra*) density and distribution. Journal of Animal Ecology 49: 755–774.

Kruuk H., Carss D. N., Conroy J. V. H. and Durbin L. 1993. Otter (*Lutra lutra* L.) numbers and fish productivity in rivers in north-east Scotland. Symposia of zoological Society of London 65: 171–191.

Kruuk H. and Conroy J. V. H. 1987. Surveing otter *Lutra lutra* populations: a discussion of problems with spraints. Biological Conservation 41: 179–183.

Kruuk H., Conroy J. V. H., Glimmerveen U. and Ouwerkerk E. J. 1986. The use of spraints to survey populations of otters *Lutra lutra*. Biological Conservation 35: 187–194.

Lenton E. J., Chanin P. R. F. and Jefferies D. J. 1980. Otter survey of England 1977–79. Nature Conservancy Council, London: 1–75.

Macdonald S. M. 1983. The status of the otter in the British Isles. Mammal Review 13: 11–23.

Macdonald S. M. 1990. Surveys. [In: Otters; an action plan for their conservation. P. Foster-Turley, S. Macdonald and C. Mason, eds]. IUCN Species Survival Commision, Gland: 8–10.

Macdonald S. M. and Mason C. F. 1983. Some factors influencing distribution of otters (*Lutra lutra*). Mammal Review 13: 1–10.

Macdonald S. M. and Mason C. F. 1987. Seasonal marking in an otter population. Acta Theriologica 32: 449–462.

Macdonald S. M. and Mason C. F. 1988. Observations on an otter population in decline. Acta Theriologica 33: 415–434.

Macdonald S. M. and Mason C. F. 1994. Status and conservation needs of the otter (*Lutra lutra*) in the western Palaearctic. Nature and Environment 67: 1–54

Madsen A. B. and Nielsen C. E. 1986. The occurrence of Otter (*Lutra lutra* L.) in Denmark 1984–86. Flora og Fauna 92: 60–62. [In Danish with English summary]

Mason C. F. and Macdonald S. M. 1986. Otters: ecology and conservation. Cambridge University Press, Cambridge: 1–236.

Mason C. F. and Macdonald S. M. 1987. The use of spraints for surveying the otter *Lutra lutra* populations: an evaluation. Biological Conservation 41: 167–177.

Sidorovich V. E. 1991. Structure, reproductive status and dynamics of the otter population in Byelorussia. Acta Theriologica 36: 153–161.

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