

**IUCN OTTER SPECIALIST GROUP BULLETIN
VOLUME 8 PAGES 20 - 21**

Citation: Mason, C & O'Sullivan, L. (1993) Relationships between PCBs in Otter Livers and Spraints from Gut and Environment. *IUCN Otter Spec. Group Bull.* 8: 20 - 21

**RELATIONSHIPS BETWEEN PCBs IN OTTER LIVERS AND SPRRAINTS
FROM GUT AND ENVIRONMENT**

Chris Mason¹ and Liam O'Sullivan²

¹*Department of Biology, University of Essex, Colchester, C04 3SQ, United Kingdom.*

²*Department of Zoology, University College, Cork, Ireland*

Abstract: Spraints from 29 otters found dead in south west Ireland during 1984 - 90 were analysed for PCBs, and the levels compared with those in the livers of the same animals. A strong correlation was found, indicating that spraints can be used to estimate PCB pollution burden in live otters.

PCBs measured in otter *Lutra lutra* spraints may derive from two sources, from unassimilated material from the gut or from material excreted in secretions from the anal gland. Otters assimilated 91,6 % of ingested PCBs in feeding experiments (Smit 1990), 8,4 % being passed through the gut with the spraints. Anal gland secretions of mustelids may be rich in PCBs (Larssen *et al.* 1990) but preliminary observations have suggested that the contribution of PCBs from anal glands to individual spraints is small relative to the contribution of the diet (M. Smit, *in litt.*). On this basis the PCBs measured in spraints largely reflect the last meal. Nevertheless with samples of both spraints and otters from a range of sites with differing contamination, one might expect an overall correlation between PCBs in spraints and in tissues. This theme is explored below.

METHODS

Of 33 otters found dead over the period 1984-90 in southwest Ireland, spraints were present in the rectums of 29. They were stored deep-frozen prior to analysis, as were the livers of the otters. In November and December 1991 207 spraints were collected from sites in southwest Ireland (mainly County Cork) and stored deep-frozen. Methods for sample preparation and analysis are given in Mason & O'Sullivan (1992) and O'Sullivan *et al.*, *in press*.

RESULTS

Detailed results of the analysis of otter livers are presented in Mason & O'Sullivan (1992). Of those otters whose rectums contained spraints, PCB concentrations in livers ranged from 0,18-1 23,2 mg kg⁻¹ lipid. PCB concentrations in the spraints ranged from 0,21 - 18,22 mg kg⁻¹ lipid. Although the ranges of concentrations of PCBs in livers and spraints are very different, the coefficients of variation are very similar (157 % for liver samples, 145 % for spraint samples).

PCB concentrations in liver tissue and rectum spraints are significantly correlated ($r = 0,68$, $P < 0.001$) and can be represented by the equation:-

$$\text{liver concentration} = 4,69 + 4,62 \text{ spraint concentration}$$

The mean PCB concentration in spraints from the rectum ($n = 29$) was 2,69 mg kg⁻¹ lipid, while the mean concentration in spraints from the environment ($n = 207$) was 1,45 mg kg⁻¹ lipid. An analysis on long-transformed data showed the differences in means not to be statistically significant ($F = 2.27$, $P > 0.05$).

DISCUSSION

That spraints from the rectum and from the environment had mean PCB concentrations which were not significantly different supports the view that PCBs in environmental spraint samples derive largely from the last meal i.e. that proportion of the total PCB ingested which is not absorbed through the gut wall. Spraints from the rectum could not have received PCB secreted from the anal gland.

The correlation between PCB levels in rectum spraints and livers shows that spraints can be used to assess the likely pollution burden of otters. Otters with high body burdens will be feeding in contaminated areas, which will be reflected in their diet and hence their spraints. It should be emphasized however, that, because otters have a diverse diet, even in contaminated sites, some of the prey will have low levels of contamination and spraints collected from a single site may have widely differing concentrations of PCBs, as indeed has been shown with otters themselves. As many spraints as practicable should therefore be analyzed from a site or region before the likely impact of PCBs on an otter population is assessed.

ACKNOWLEDGEMENTS - This work formed part of a study funded by the World Wide Fund for Nature. U.K.

REFERENCES

Larsson, P., Woin, P. & Knulst, J. (1990). Differences in uptake of persistent pollutants for predators feeding in aquatic and terrestrial habitats. *Holarctic Ecology* **13**: 149-155.

Mason, C.F. & O'Sullivan, W.M. (1992). Organochlorine pesticide residues and PCBs in otters (*Lutra lutra*) from Ireland. *Bulletin of Environmental Contamination and Toxicology* **48**: 387-393.

O'Sullivan, W.M., Macdonald, S.M. & Mason, C.F. (in press). Organochlorine pesticide residues and PCBs in otter spraints from southern Ireland. *Biology and Environment*.

Smit, M. (1990). De belasting van waterbodens en biotas (vis en otter) met Microverontreingen. Stichting Otterstation Nederland, Groningen.