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ASSESSMENT OF POLLUTION RISK FOR THE REMAINING OTTER POPULATIONS IN LOWER SAXONY, WEST GERMANY

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Because very little was known about hazards to West German otters due to toxic water-borne contaminants the Campaign for Otter Protection (Aktion Fishotterschutz e.V.) initiated a study having two objectives:

- to assess the pollution risk for the remaining West German otter populations in Lower Saxony (see Figure 1), thus following the recommendations of the IUCN Otter Specialist Group that an assessment of pollution risk is an essential part of any otter conservation program;
- to contribute further data to the continuing discussion on the interrelation between otter decline in Europe and the contamination of its habitats with persistent organochlorines and heavy metals, respectively.

Few waters in the county of Schleswig-Holstein have been examined for organochlorines. Apart from a small spot east of Hamburg all areas in the F.R.G. with extant otter populations have been taken into consideration.

As a first step an appropriate (methodical concept had to be found.

With only small populations left in low densities, there was little chance of otters being found dead for analysis, or that sufficient spraints could be found in a reasonable time (see POPPEN, 1985; PRAUSER, 1985). The following possibilities were therefore considered :

- to calculate the daily pollutant intake of otters via prey and - subsequently
- estimate the average individual body burden within the population of concern (simulation model), or
- to survey the "otter-available" contamination of relevant freshwaters by using a suitable fish species as biological monitor (baseline study)

The latter was judged to he the most promising.

A. Heavy Metals

Roach Liver was analysed for Cd and Pb, muscle tissue for Hg.

Apart from Cd in roach fro some waters in the Lüneburger Heide (see Figure 1), all residues correspond with the usual background contamination of West German freshwaters, i.e. they are hardly to "normally" polluted. The ranges of concentrations were:

0.02	- 0.04	mg/kg	fresh wt.	(0.09	- 0.17	mg/kg	dry wt.)	for	Pb
< 0.01	- 0.04	mg/kg	fresh wt.	(0.01	- 0.17	mg/kg	dry wt.)	for	Cd
< 0.04	- 0.23	mg/kg	fresh wt.					for	Hg

Using the multiple comparison of means after Tukey - for baseline studies a very valuable statistical tool, I think - significant regional differences wer found for Cd and Hg. Fish from freshwaters in teh north-west were least contaminated, fish from freshwaters in the south-east showed the highest concentrations. The spatial distribution pattern could he explained by an interaction of :

- a continuous airborne pollutant inflow (the extent of emissions being dependent on the position of sources) and
- the availability of metals to fish, influenced mainly by
- the trophic conditions within the particular water system and
- the physico-chemical properties of the different metals within freshwater ecosystems.

However, the high to very high Cd-concentrations in roach liver from the three Lüneburger Heide streams showing 0.11; 0.15; 0.3 mg/kg fw (0.51; 0.60; 1.2 mg/kg dw) can be explained, assuming that the poor sandy soils within the catchment area are highly acidified. In that case the high Cd concentrations could be an alarming sign for a beginning of acidification of these waters. (There is further evidence from other studies.) What this would mean for otters doesn't need further explanation. Thus it is strongly recommended to keep an eye on the problem of water acidification which in Germany (and not only there) has seriously been neglected so far.

As far as direct toxic effects are concerned I doubt very much that heavy metals other than mercury can affect the survival of otherwise healthy otter populations, because Cd and Pb are hardly available for animals living on a diet that is absolutely dominated by fish. Mecury, however, doesn't seem to be a problem in the remaining West German otter-habitats.

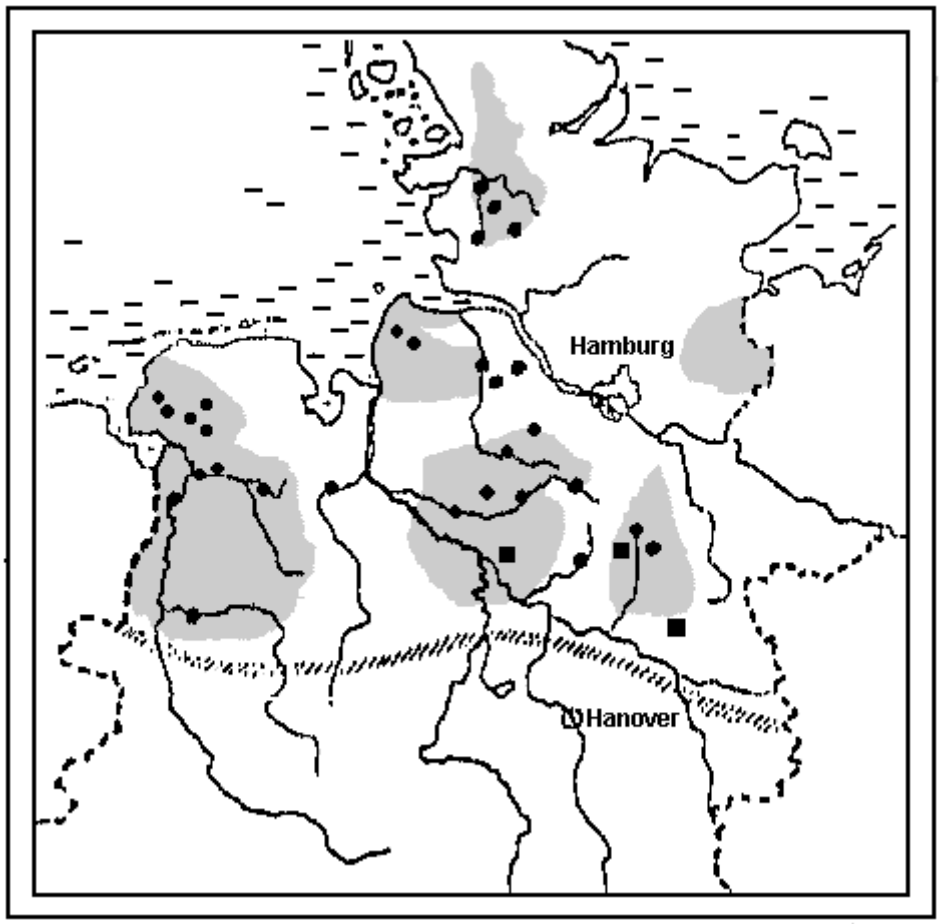

Figure 1: Distribution of the otter (Lutra lutra) in West Germany (after POPPEN, 1985) and sampling sites of roach (dots and squares). The squares indicate sites where roach with a high Cd-contamination were caught (see text). The stroked line marks the present distribution limit to the south

B. Organochlorines

Muscle tissue was analysed for PCB, DDT and metabolites (-DDT) hexachlorocyclohexane-isomers (HCH), hexachlorobenzene (HCB) and octachlorostyrene (OCS). For financial limitations mixed samples had to be used for organochlorine analyses. To get an idea about variability, some fish samples from selected sites were analysed once again as single samples. Conclusions on regional differences of contamination, however, cannot be drawn, although - as a tendency - fish from freshwaters in the west seem to be less contaminated than those from sites in the east. If this was true, it most likely was due to different trophic condition of the waters (compare findings on heavy metals).

Compared with data from other West German freshwaters all residues are at the low edge of the concentration range that is typical for roach in this country. Concentrations (given in mg/kg extractable fat, all mixed samples) ranged from:

1	- 5	mg/kg	for	PCB	(few exceptions showed higher concentrations up to 26 mg/kg)
0.1	- 0.7	mg/kg	for	∑-DDT	
n. det.	- 0.2	mg/kg	for	Lindane	α and β were not detect.
n.det	- 0.2	mg/kg	for	HCB	(being almost ubiquitous)
n.det.			for	OCS	

But there is no reason to feel relieved.

To come to an adequate interpretation in terms of risk for otters it is essential to refer to data from areas where both otters and roach have been analysed. Yet such a comparison is only possible with Swedish data. As there is strong evidence that the dramatic otter decline in the south of Sweden is - at least partly - caused by PCB (see OLSSON & SANDEGREN, 1983), the residues of roach from south Swedish waters can be used as a reference level suggesting a high risk for otter populations. In the Environmental Monitoring Programme of the National Swedish Environmental Protection Board (started in 1980) roach are regularly checked for PCB (and DDT). The PCB-concentrations (means over several years, based on extr. fat) in roach muscle tissue are (after ODSJÖ & OLSSON, 1987):

- 0.9 mg/kg and 1.2 mg/kg, respectively, in the very south of Sweden
- 0.3 mg/kg for roach from two sampling sites somewhat higher in the north (longitude roughly that of Stockholm).

As analytical methods have been intercalibrated beforehand the Swedish data can be directly compared to ours. This means :

- Otters in the F.R.G. today are restricted to freshwaters that compared to West German standards - show a low PCB-contamination (a finding that in itself is interesting enough).
- Still these low concentrations are highly alarming, because they reflect the southern Swedish PCB situation of the seventies (as can be extrapolated from Swedish long-term studies, see ODSJÖ & OLSSON, 1987) and represent a pollution level that can be regarded as seriously affecting the survival of otter populations.

Thus - among other things - the governments of Lower Saxony and Schleswig-Holstein are urged to counteract the otter decline and reduce additional stress factors. Further habitat destruction must be stopped. A rapid and effective improvement of the remaining wetlands harbouring otters has to be realised as soon as possible. Once the environment is polluted with highly persistent substances like PCB the degree of contamination can only be monitored. Habitat improvements, on the contrary, can be started at once. For the otter to have a chance to .survive in the F.R.G. action has to be taken at once. To reinforce otter populations with captive-bred animals, however, would not be a good idea at all under the given circumstances.

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