

Post mortem studies of otters (*Lutra lutra*) found dead in England and Wales: health and ecotoxicology

Summary SC010064/SC010065/SS

UK otter populations are healthy and continue to expand across England and Wales. This is the main finding of a series of studies carried out by the Environment Agency over the last fifteen years. Post-mortems carried out on over 950 otters between 1992 and 2003 looked at the overall health of otters, factors affecting their survival, the levels of man-made chemicals in wild otters and the impacts these have on otter populations. The results suggest that one of the factors behind this recovery may be decreasing levels of organochlorine pesticides in the environment.

Post-mortems were carried out on 341 otters found dead in southwest and southern England from 1996-2003 and on 609 dead otters found in Wales and the rest of England from 1992 to 2003. Liver samples were taken and analysed by the Environment Agency for a range of pollutants including organochlorine compounds (OCs), polychlorinated biphenyls (PCBs) and heavy metals.

Analyses showed that most otters are killed in winter, and more males are killed on the roads than females. Most were in excellent condition, though a small number (particularly orphaned or abandoned young) were suffering from infections, ill health or starvation.

Road traffic accidents are a significant cause of otter mortality, the major concern being the number of breeding females killed. Results from national surveys show that otters are expanding their range and it is unlikely that the numbers killed are having a significant impact on the population as a whole. However, accident hotspots (where several otters have been killed at one site), continue to be identified and remedial action taken to reduce further casualties.

Many of the adults had serious bite wounds, almost certainly due to fighting other otters. Such injuries have become more common recently, especially in the southwest, as populations have increased. Some young otters were killed by dogs, and there were several instances of aggressive encounters with mink.

Evidence of infection was found in a small number of otters. These included lung infections, severe streptococcal infections following injury, and several tooth abscesses. In some cases otters were seriously ill prior to being killed by traffic; in a few cases death occurred as a direct result of the infection. Although the otters examined carried a variety of parasites, most were harmless, apart from a tiny fluke that affects their gall bladder and bile ducts. This parasite arrived in England recently, possibly in fish introduced from Eastern Europe.

Liver analysis revealed that otters from southwest and southern England showed a significant decline in levels of organochlorine chemicals over time; this is attributed to their progressive withdrawal from 1962 and ban by 1989. However, this decline was not mirrored in otters from elsewhere.

Pollutant concentrations were higher in adult males than in adult females, and some of the highest levels occurred in juveniles. This almost certainly results from the excretion of these compounds by females to their young during pregnancy and lactation. Evidence suggests that OCs and PCBs accumulate with age in males, while in females an initial increase is followed by a decline in concentration following sexual maturity.

The impacts of OCs on wildlife are well documented. It is known that they interfere with vitamin A metabolism, which can lead to a number of conditions, including reproductive abnormalities. One of the most important aspects of this work was to examine not only the level of pollutants in otters, but also whether these levels were linked to any physiological effects. Therefore vitamin A levels in 100 otters from southwest and southern England were analysed between 1996 and 2000. Almost half had vitamin A levels below the normal threshold for domestic animals and 14 were critically low.

Although low vitamin A levels were recorded from otters with relatively high OC levels, the correlation was not statistically significant. Considerable variation

in the vitamin A levels between individual otters, and significant differences between age classes and sexes, make interpretation difficult.

In otters from southwest and southern England, almost 30% of otters collected between 1996 and 1999 had retinal dysplasia, a distorted retina in the eye. This condition is linked to low Vitamin A levels during development. Concentrations of the OC dieldrin were over three times higher in otters with this abnormality than in otters with normal eyes. Dieldrin and compounds related to DDT were also correlated with a shorter baculum (penis bone) in juvenile males.

Detailed analyses of the otters from southwest and southern England also showed that the weight of otter thyroid glands is positively correlated with levels of the DDT derivative ppDDE in the liver, and with overall size of the animal. Significantly thyroid glands have decreased in size over the study period, which correlates with the decline in levels of DDT in the environment.

Very few studies of the impacts of man-made chemicals on wild mammals have been carried out. There is a growing interest in endocrine disruption, and this study has identified some physiological impacts on otters as a consequence of exposure to OCs. However, it demonstrates the difficulties of attributing cause and effect in wild populations, and emphasises the importance of long-term surveillance.

If OCs were the cause of the population crash in the latter half of the 20th century, declining environmental OC levels may explain the otter's recovery and continued expansion. Apart from OCs this study has not identified any man-made chemicals that currently pose a threat to otters; but the number of chemicals examined is comparatively small.

Routine screening of the population has established that otters are healthy and do not carry infectious disease of significance to man. The potential effect of the introduced bile fluke gives cause for concern and further investigations are being carried out. This project is continuing, and the analysis of otter samples will be extended to include some of the newer, bioaccumulating chemicals found in the environment.

This Summary relates to information from Projects SC010064 and SC010065 reported in the following outputs:-

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