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ORGANOCHLORINE RESIDUES IN HARP SEAL PUPS

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Introduction

An earlier report¹ on the occurrence of organochlorine residues in seals of various species was presented at the 1969 meeting of the ICES Fisheries Improvement Committee. This report indicated the concentrations of the common pesticide residues dieldrin, DDT and its two degradation products DDE and TDE in samples of blubber taken from both sides of the Atlantic and in the Baltic, but with the techniques then available no assessment of the industrially-used polychlorinated biphenyls (PCB's) was possible. At the F.A.O.² Conference on Marine Pollution in Rome in December 1970 a further report² included determinations of PCB residues as well as those of pesticide origin, and described an improved method of analysis enabling the PCB residues to be separated from most pesticide residues.

In the 1970 report, it was indicated that samples from the Gulf of St. Lawrence were usually high in DDT residues, with somewhat lower PCB concentrations. Pups generally contained lower concentrations than their mothers. At the 1969 ICES meeting, it was suggested by the Marine Mammals Committee that an examination of harp seal pups for organochlorine residues might reveal differences in the level of contamination in different sampling areas which could be correlated with differences in the quality of pelts. During 1970, samples of blubber from harp seal pups were obtained, and the results of the analyses of these samples are presented in this report.

Sampling Areas

Five to seven pups ("whitecoats") or juveniles ("beaters") of the harp seal (Pagophilus groenlandicus) were taken from each of four well-separated areas, viz. the Gulf of St. Lawrence (S. of Amherst Island), the Newfoundland-Labrador coast, the area of Jan Mayen Island and in the Barents Sea, from mid-March to mid-April of 1970. The Gulf seals were sampled by Dr. D.E. Sergeant of the Fisheries Research Board of Canada, and the others by Mr. T. Øritsland of the Fisheries Directorate, Bergen, Norway. All pups were recently weaned.

Preservation and Analysis of Samples

The blubber samples were preserved in dilute aqueous formalin before despatch to the laboratory at Pitlochry for analysis. The analytical procedure was that described earlier². The percentage of extractable lipid in the blubber samples was determined by evaporating the solvent from an aliquot of the extract from a known weight of blubber.

Discussion of the Analyses

The results of the analyses are presented in Table 1. In all instances the dieldrin concentrations were only just above the level of detection for this type of sample, and were similar to, or slightly lower than, samples of adult seal blubber examined from areas other than the coast of the United Kingdom. The individual values of the other residues showed relatively little variation within any one group of samples, and the mean values obtained from the four areas have been summarised in Table 2.

The high percentage of lipid extracted from the samples indicates that all specimens were in good physical condition. The only values which are significantly above those of the Arctic region are the total DDT and PCB concentrations in the samples from the Gulf of St. Lawrence, an area, which receives, or has in the past received, a significant amount of DDT from forest spraying. Adult grey seals in this area were found to have much higher DDT and PCB concentrations than ringed seals from the Arctic². Earlier analyses¹ of a few harp seals taken in 1967 had suggested that this species contained less contamination than grey seals in the same area.

The general level of contamination of the harp seal pups discussed in this report is very low, and seems unlikely to be responsible for any changes in the quality of the pelts. If such changes can be confirmed, other contaminants such as mercury, well-known to be concentrated in hair, and also cumulative in seals, would justify examination.

References

1. Holden, A. V. 1969 Organochlorine residues in seals. ICES, C.M. Fisheries Improvement Committee, Doc. No. E:22 (mimeo).
2. Holden, A. V. 1970 Monitoring organochlorine contamination of the marine environment by the analyses of residues in seals. FAO Technical Conference on Marine Pollution, Rome, Italy, 1970. Paper No. FIR:MP/70/E-63.

TABLE 1

Analyses of Pups of Harp Seal for Organochlorine Residues.

Serial No.	Date	Location	Description	Sex	Blubber No.	Concentrations in p.p.m.						
						Dieldrin	DDE	TDE	DDT	Total DDT	PCB	% Lipid
236/7	16.3.70	Gulf of		?		0.1	1.1	0.2	0.6	1.9	1.4	76
8	"	St. Lawrence	White-coats,	?		0.1	1.8	0.2	1.0	3.0	2.0	91
9	"	7 mi. S. of	loose-haired	?		0.1	1.5	0.3	1.1	2.9	2.2	82
10	"	Amherst I.		?		0.1	2.7	0.2	0.9	3.6	3.1	87
11	"			?		0.3	2.5	1.0	2.4	5.9	6.8	88
12	"			?		0.1	2.4	0.5	1.3	4.2	5.5	83
13	"			?		0.2	1.1	0.2	0.9	2.2	2.7	82
236/14	27.3.70	Newfoundland/		M	577	0.1	0.4	0.1	0.5	1.0	1.5	61
15	"	Labrador	Juveniles	F	824	0.1	0.4	0.1	0.4	0.9	1.0	73
16	28.3.70	approx.	nearly "Beaters"	F	853	0.1	1.1	0.1	0.7	1.9	1.2	82
17	29.3.70	53°30'N		M	707	0.2	0.9	0.2	0.7	1.6	1.7	89
18	1.4.70	55°30'W		F	522	0.1	0.5	0.1	0.6	1.2	1.1	90
19	"	"		M	845	<0.1	0.2	<0.1	0.1	0.3	0.7	84
236/20	13.4.70	Jan Mayen		?	941	0.1	0.5	0.1	0.3	0.9	2.0	91
21	"	area	White-coats,	?	630	0.1	0.4	<0.1	0.2	0.6	1.5	84
22	"	72°21'N	loose-haired	?	587	0.1	0.5	0.1	0.3	0.9	1.3	82
23	"	00°42'E		?	683	0.1	0.6	0.1	0.4	1.1	1.5	79
24	"			?	1039	0.1	0.3	<0.1	0.1	0.4	1.4	74
25	"			?	648	0.1	0.4	0.1	0.3	0.8	1.5	88
26	"			?	719	0.1	0.8	0.1	0.5	1.4	1.4	87
236/27	12.4.70	Barents Sea		?	571	0.2	1.2	0.3	0.8	2.3	2.4	89
28	"	area	Juveniles,	?	640	0.3	1.5	0.3	0.9	2.7	2.6	85
29	"	68°55'N	"beaters"	?	617	0.1	0.7	0.1	0.4	1.2	1.3	91
30	"	42°12'E		?	771	0.2	0.8	0.1	0.3	1.2	1.4	84
31	"			?	725	0.2	0.5	0.2	0.4	1.1	1.0	82

TABLE 2

Mean Concentrations of Residues in Harp Seal Pups from
Four Sampling Areas.

<u>Area</u>	<u>Dieldrin</u>	<u>Total DDT</u>	<u>PCB</u>	<u>% Lipid</u>
Gulf of St. Lawrence	0.1	3.4	3.4	84
Newfoundland/Labrador	0.1	1.2	1.2	80
Jan Mayen	0.1	0.9	1.5	84
Barents Sea	0.2	1.7	1.7	86