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## RESIDUES OF p,p'-DDE IN LAKE TROUT IN LITTLE MOOSE LAKE IN NEW YORK STATE

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## ABSTRACT

Residues of p,p'-DDE were found in lake trout sampled in 1993 from Little Moose Lake located remotely in the Adirondack region of New York State. Length accounted for 81% of the variation in p,p'-DDE concentration when the data was fit to an exponential model. The presence of p,p'-DDE in the fish was believed due to its long persistence in the aquatic environment following applications of DDT in the 1950s for control of black flies and mosquitoes.

## INTRODUCTION

In earlier studies, residues of p,p'-DDE were found in Cayuga Lake trout (*Salvelinus namaycush*) in New York State resulting from past agricultural use of p,p'-DDT as an insecticide (Gutenmann et al. 1992; Wozolek et al. 1979; Bache et al. 1971). It was of interest to determine possible residues of the compound in lake trout from water located remotely from agricultural areas. In the work reported here, lake trout were taken from Little Moose Lake near Old Forge, New York for analysis of p,p'-DDE.

## EXPERIMENTAL

Lake trout were netted from Little Moose Lake in November and December of 1993. This lake is about 4 km southeast of Old Forge in the Adirondack region of New York State and cottages and campsites are located there. After recording their length and sex, the fish were decapitated, eviscerated and the remainder ground in a food processor. The ground fish material was freeze dried and a 5-gram subsample was Soxhlet extracted with hexane for 6 hours. After isolation of p,p'-DDE on a Florisil column (Mills et al. 1972), determination of the compound was made by the gas chromatographic method described by the U.S. Food and Drug Administration (US FDA 1971).

## RESULTS AND DISCUSSION

The lengths and sex of the lake trout and their corresponding concentrations (ppm, dry weight) of p,p'-DDE are given in Table 1. The concentration of p,p'-DDE in the fish as a function of their length are shown graphically in Figure 1. Length accounts for 81% of the variation in p,p'-DDE concentration when the data are fit to an exponential model.

$$p,p'-DDE = 0.178e^{0.031 \text{ length}}$$

Relations between age and PCBs (Youngs et al. 1972) and between age and residues of DDT (Bache et al. 1979) have been shown to be significant. It is expected that length would show significance as well since length and age in many fish populations are correlated. Age in the Little Moose Lake population of lake trout is not easily determined since growth is slow and life span is long. The presence of p,p'-DDE in the lake trout may have been due to aerial applications or fogging operations involving DDT for control of black flies and mosquitoes in the 1950s and long-term persistence and cycling of DDT residues in the aquatic environment.

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Table 1. Concentration of p,p'-DDE in the lake trout.

Fish length (cm)	Sex	p,p'-DDE (ppm, dry wt)
24.1	J*	0.45
24.6	J	0.29
26.3	J	0.46
44.5	M	0.96
45.7	F	0.75
46.2	F	0.59
47.5	M	0.60
48.3	F	0.94
48.8	M	0.64
50.8	F	0.72
55.4	M	1.35
55.9	M	1.13
75.4	F	1.77

\*Juvenile

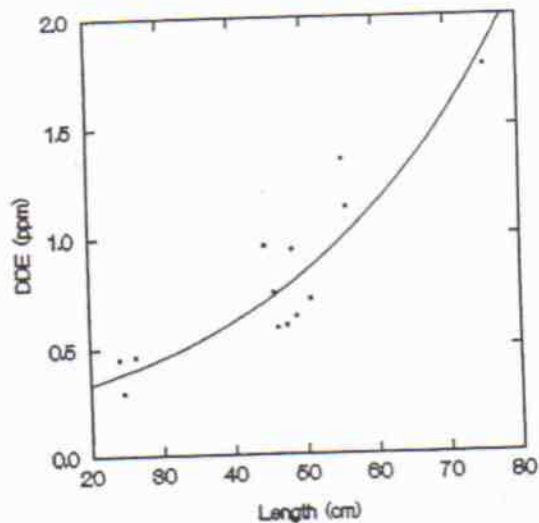


Fig 1. Concentration of p,p'-DDE in the lake trout as a function of their length.

## REFERENCES

1. Bache CA, Gutenmann WH, Lisk DJ (1971) *Science* 172:951-952
2. Bache CA, Serum JW, Youngs WD, Lisk DJ (1972) *Science* 177:1191-1192
3. Gutenmann WH, Ebel JG, Jr., Kuntz HT, Yourstone KS, Lisk DJ (1992) *Arch Environ Contam Toxicol* 22:452-455
4. Mills P, Bong B, Kamps L, Burke J (1972) *J Assoc Offic Anal Chem* 55(1):39-43
5. US Food and Drug Administration (1971) *Pesticide analytical manual: Vol 1*, Washington, DC
6. Wszolek PC, Lisk DJ, Wachs T, Youngs WD (1979) *Environ Sci Technol* 13(10):1269-1272
7. Youngs WD, Gutenmann WH, Lisk DJ (1972) *Environ Sci Technol* 6(5):451-452