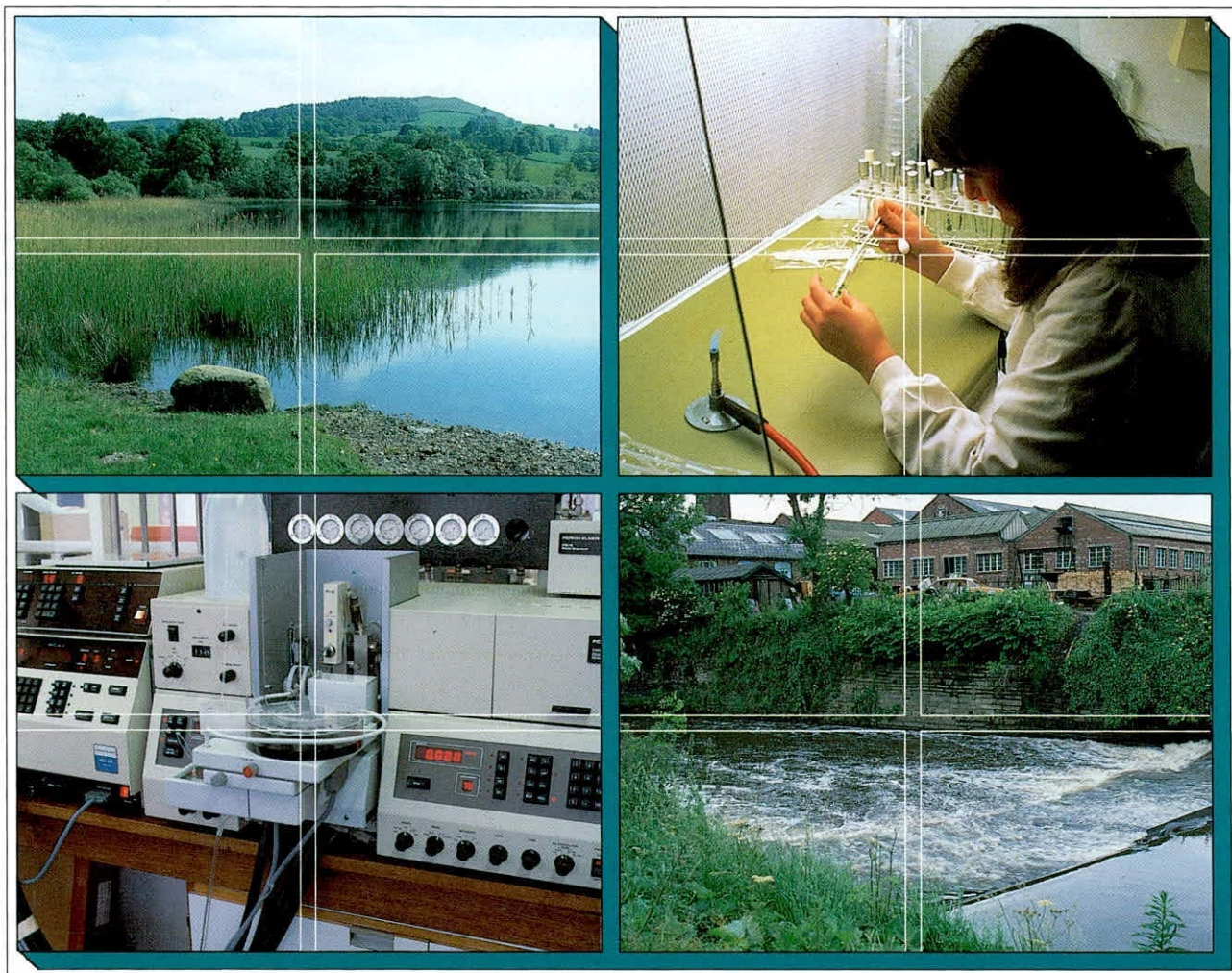




The occurrence of selected chemical pollutants (Simazine, Lindane and Permethrin) in river fish

Report of work up to December 1992

M. Ladle, PhD
I.S. Farr, BSc



INSTITUTE OF FRESHWATER ECOLOGY
River Laboratory, East Stoke, Wareham, Dorset BH20 6BB

Tel: 0929 462314
Fax: 0929 462180

The Occurrence of selected chemical pollutants (Simazine, Lindane, and Permethrin) in river fish

Report of first year's work July 1992

M. Ladle & I.S. Farr

Project leader:	M. Ladle
Report date:	January 1993
Report to:	Department of the Environment
IFE Report Ref:	RL/T11053p5/3
TFS Project No:	T11053p

This is an unpublished report and should not be cited without permission, which should be sought through the Director of the Institute of Freshwater Ecology in the first instance.

The Institute of Freshwater Ecology is part of the Terrestrial and Freshwater Sciences Directorate of the Natural Environment Research Council.

OBJECTIVES

The ultimate objectives are:

1. To review the known occurrence of Simazine, Lindane and Permethrin in river fish.
2. To analyse fish species and/or age groups selected on the basis of spatial and temporal occurrence in order to determine the concentrations and variability of Simazine, Lindane and Permethrin in river fish.
3. To assess the significance of river fish in the environmental cycling of pesticides and to make recommendations on the role of fish in setting water quality standards.

PROGRESS 1992

Work on this project commenced in July 1991.

LITERATURE SEARCH

In view of the poor progress in the first year of this contract the investigation of literature will continue through the forthcoming year. Papers are now being grouped under the following headings for ease of reference :-

Occurrence of pesticides in various species of fish

Sampling problems and occurrence of pesticides

Contamination and modification of the food of fishes

Tissue/organ accumulation

Uptake pathways/feeding

Toxicity

SELECTION OF SAMPLING SITES

Two possible sampling sites were selected on the basis of reported target pesticide inputs.

PRELIMINARY FISH SAMPLES ANALYSED

In the absence of firm information on the incidence and location of contaminated fish, samples were obtained and used to test analytical procedures and recovery efficiency as outlined in the previous report.

RIVER STOUR SAMPLES

The River Stour, downstream of Kidderminster, in the Severn-Trent NRA region has already been studied in the course of IFE research. It is known that target pesticide pollution occurs in this area. Permissions for sampling were obtained with the assistance of Drs North and Hickley of the Severn-Trent regional NRA. Samples of dace (a surface and mid-water, insect feeding species), roach (an omnivorous species taking food from the lower levels of the water column) and the gudgeon (a small bottom-feeding species) were obtained and a further sample will be taken in 1993. The fish have been identified, sexed, measured, weighed, aged, analysed for gut content and dissected for pesticide analysis.

In general terms the fish in the river Stour are small compared to those from many other rivers and it seems probable that they are exposed to many stresses other than those caused by pesticides in their food.

STATE OF ANALYSIS

Preparation and "clean up" of liver and muscle samples has been carried out. Even at this early stage, it is apparent that fish samples may not be homogeneous. Muscle samples from two of the specimens examined stained the extracts bright blue, indicative of the fact that all fish may not have been exposed to the same factors historically.

Analysis of fish samples from the River Stour has revealed that some of the larger dace and gudgeon examined contain detectable quantities of cis- and trans- permethrin and of Lindane. The smallest (youngest?) fish seem to be free of target pesticides.

FURTHER SAMPLES

The second site to be sampled will be the River Ray in the Thames NRA region. As mentioned in previous correspondence there have been recent reports of pesticide pollution in the river. Again permissions to sample have been sought with the cooperation of the fisheries officer Vaughan Lewis. Sampling from a reach downstream of Swindon sewage treatment plant is being postponed until the current batch of fish has been analysed.

It is unlikely that either of the above rivers is subject to large inputs of Simazine so a third site, on the River Nadder in Wiltshire, is being explored. The Nadder catchment is extensively used for growing maize and Simazine is used to treat pre-emergent weeds associated with the crop.