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SUMMARY OF HISTOPATHOLOGICAL EXAMINATIONS OF FATHEAD MINNOW (Pimephales promelas) EXPOSED TO 78.02 FOR 30 DAYS.

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RESEARCH REPORT

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ST. PAUL, MINNESOTA

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SUBMITTED BY
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INTRODUCTION

An "egg and fry test" was conducted between June 3 and July 6, 1978 (Bionomics Report #BW-78-8-263, August, 1978) to assess the sub-lethal effects of 14C-78.02 on fathead minnows (Pimephales promelas). Effects on egg hatchability and on survival and growth of fry were measured. To further investigate possible effects due to exposure to 14C-78.02, histopathological examinations of exposed fish were also performed. The results of these examinations are reported here.

MATERIALS AND METHODS

Upon termination of the egg and fry study, five fish from each replicate of the high 14C-78.02 concentration (1.9 mg/ℓ, measured) were preserved in 10% buffered formalin and sent to the Environmental Pathology Laboratories, Inc., Carolina, Rhode Island. Control fish were also examined.

The fish were examined for gross lesions, and sagital sections were prepared by a pathologist. Fish were placed with identifying numbers into processing cassetts, dehydrated, cleared and infiltrated on an Auto-technicon tissue processor using the method of the Armed Forces Institute of Pathology. The fish were then placed in a vacuum oven and subsequently embedded in parrafin. All blocks were sectioned at 6 microns: one

slide was prepared from each block and stained with hematoxylin and eosin. Special staining procedures such as PAS, Trichrome and Acid Fast were used occasionally when requested by the pathologist. All blocks were sealed with paraffin and stored.

Slides were labeled, boxed and delivered with all work sheets to the pathologist for examination. Two slides were prepared from each fish. Tissues processed and examined included but were not limited to; gill, thymus, liver, spleen, heart, gonad, kidney, foregut, hindgut, olfactory mucosa (nares), brain, ear, skin, muscle, pancreas and pharyngeal mucosa.

RESULTS

A summary of the examination of each fish is reported in Table 1. Only those tissues which were missing or contained demonstrable change are listed:

The only tissue changes observed in fish in the study were fatty change of the liver of fish from both groups and autolysis of several parts of the digestive tract of fish from the control. The condition of the livers was consistent with that seen in healthy fathead minnows.

In several fish it was obvious that only the deep portion of the

affected organs were autolysed while the more superficial areas were well preserved. This autolysis appears to be the result of poor generation of fixative.

Based on these data, it is concluded that 30 days exposure to a measured 14C-78.02 concentration of 1.9 mg/ℓ did not cause any significant, demonstrable, tissue changes in 30 day old fathead minnow fry.

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Table 1 -- Histopathological examination of fathead minnow (Pimephales promelas) exposed 30 days to 1.9 mg/ℓ measured 78.02 and control water.

Fish #	Sex	Organ Condition	Missing Tissue
1.9 mg/ℓ 78.02			
1	male	fatty change in liver[a] II	none
2	male	fatty change in liver II	none
3	female	fatty change in liver II	ear, thymus
4	unknown	fatty change in liver II	gonad
5	female	normal	ear
6	male	fatty change in liver II	nares
7	male	fatty change in liver II	spleen
8	male	fatty change in liver II	none
9	unknown	normal	gonad
10	female	fatty change in liver I	thymus, spleen
Control			
1	unknown	fatty change in liver II	gonad
2	unknown	bacterial gill disease fatty change in liver II autolysis in pharynx, stomach, intestine, and pancreas	gonad
3	unknown	fatty change in liver II autolysis in pharynx	gonad, nares
4	female	fatty change in liver II autolysis in intestine	spleen

Table 1 (continued)

Fish	Sex	Organ Condition	Missing Tissue
Control			
5	unknown	fatty change in liver II autolysis in pharynx, intestine, and pancreas	nares, spleen gonad
6	male	fatty change in liver I autolysis in pharynx, stomach, and intestine	none
7	female	fatty change in liver II autolysis in pharynx, stomach, and intestine	nares
8	unknown	fatty change in liver I autolysis in pharynx, stomach, and intestine	spleen, nares and gonad
9	unknown	fatty change in liver II autolysis in pharynx, stomach, intestine, and pancreas	nares, gonad
10	unknown	autolysis in pharynx, stomach, and intestine	spleen, gonad

[a] Lesions graded as follows:

I = minimal
II = moderate
III = marked
IV = severe