TABLE OF CONTENTS

9/15/78

TECHNICAL METOLACHLOR

F. Effects Assessment - Other Non-Target Organisms

1. Toxicity to Birds

   a. Effects of Single Oral Doses of Metolachlor (LD50)(163.71-1)

   b. Effects of Metolachlor in the Diet (LC50)(163.71-4)

2. Toxicity to Wild Mammals

   a. Acute Toxicity Studies in Mammals (163.71-3)

3. Toxicity to Fish

   a. Acute Toxicity (LC50) in Fish (163.72-1)

   b. Embryo and Life-Cycle Studies (163.72-4)

4. Toxicity to Aquatic Invertebrates

   a. Acute Toxicity to Aquatic Invertebrates (163.72-2)

5. Toxicity to Non-Target Plants

   a. Applicability of Data on Target Plants to Non-Target Plants

   b. Data on Treated Crops

   c. Data on Exposed Non-Target Plants

6. Mode of Action of Metolachlor

7. Effects Assessment

   a. Birds

   b. Wild Mammals

   c. Fish

d. Aquatic invertebrates

e. Plants

8. Data Gaps

9. Labeling Requirements

10. Bibliography

Effects of Single Oral Doses (LD50)(163.71-1) of Metolachlor

The minimum data required to establish oral toxicity in avian species are results from tests on one avian species; either a wild waterfowl (preferably the Mallard) or an upland game bird (preferably the Bobwhite or other native quail, or the Ring-necked Pheasant). The species selected shall be the same as one selected for testing the effects of metolachlor in the diet (LC50).

Data on the effects of single oral doses of metolachlor to avian wildlife are reported by Fink (1976); the acute LD50 for Mallards (Anas platyrhynchos) was calculated from given cumulative mortality data to be 4640 (3000-7200, 95% confidence limits) mg/kg.

Due to several deviations of test procedures from the re-proposed guidelines, gross errors in the orignal statistical analysis and discrepancies in body weights and efficiency of feed utilization, this study gives data about the acute oral toxicity to avian wildlife that can be regarded as only supplemental and does not meet the registration requirement for this toxicity data. (See Data Evaluation Record for a detailed review of this study.)

Effects of Metolachlor in the Diet (LC50) (163.71-2)

The minimum data required on effects of metolachlor in the diet on avian species are results from tests on two avian species, one species of wild waterfowl (preferably the mallard duck) and one species of upland game bird

(preferably the bobwhite or other native quail, or the ring-necked pheasant).

Data on the effects of metolachlor in the diet to avian wildlife are reported by Fink on the mallard (Anas platyrhynchos) (1974a) and the bobwhite quail (colinus virginianus) (1974a). The 5-day dietary LC50 (with 3 days observation) for both species was greater than 10,000ppm.

These studies are sufficient to meet the registration requirement for this toxicity data.

Effects of Metolachlor on Reproduction (163.71-4)

An avian reproduction study (using technical metolachlor on mallards or bobwhite quail is required to support registration of formulated (metolachlor) products if either: 1) it is persistent, 2) it is stored or accumulated in plant or animal tissues, 3) it is used repeatedly or continuously or 4) there is any other test information indicating potential adverse effects on avian reproduction. Because metolachlor is persistent under certain conditions and is stored in plant and rotational crop tissue, a study of its effects on avian reproduction using mallards or bobwhite quail is required. (See Environmental Fate for more details.)

TOXICITY TO WILD MAMMALS

Acute Toxicity Studies in Mammals (163.71-3)

Data on acute toxicity to wild mammals are required to support the registration of a formulated product when the proposed use pattern of the pesticide indicates that wild mammals may be exposed to the pesticide and the toxicity data required pursuant to Subpart F are not sufficient for assessment of the potential hazard to wild mammals. Thisdata is not required because the data on laboratory animals are generally acceptable in this case. (See Human and Domestic Animal Effects for this data.)

The minimum data required for establishing the acute toxicity of metolachlor in fish are results from tests on one coldwater species (preferably rainbow trout) and one warmwater species (preferably bluegill).

Data on the acute toxicity of technical metolachlor to fish is contained in two studies conducted by Sachesse and Ullman (1974b) and Buccafusco (1978).

The data by Sachesse and Ullman are not adequate to establish the 96-hour LC50 to rainbow trout due to various deviations from proposed recommended protocol. Buccafusco demonstrated a 96-hour LC50 at 95% confidence limits of 3.9 (3.3-4.6)ppm. The acceptable rainbow trout study indicates metolachlor is moderately toxic to cold water fish.

Sachesse and Ullman tested four species of warm water fish to determine their respective 96-hour LC50's to metolachlor.

Species	96-Hour LC50 (ppm)	95% Confidence Limits
Crucian Carp (Carassius carasius)	4.9	3.6 - 6.8
Channel Catfish (Ictaluris punctatus)	4.9	3.6 - 6.8
Bluegill (Lepomis macrochirus)	15.0	*
Guppy (Lebistes reticulatus)	8.6	7.4 - 10.5

Buccafusco derived a bluegill 96-hour 9650 at 95% confidence limits of 10 (8.6 - 12)ppm. The acute LC50 data from both studies are adequate to establish that metolachlor is moderately toxic to warmwater fish.

On the basis of available acute toxicity information no precautionary labeling regarding hazards to fish is required.

Embryolarvae and Life-Cycle Studies of Fish and Aquatic Invertebrates (163.72-4)

Embryolarvae or life-cycle tests (or both) are required to support the registration of a formulated product if the pesticide product is used in or is expected to transport to water from the intended use site, and if the following considerations apply:

(1) Fish embryolarvae or invertebrate life-cycle test (IV) if the pesticide is intended for broad use such that it is likely to be present in water continuously, regardless of properties.

The fish life-cycle study will substitute for the required embryolarvae and

or aquatic invertebrate life-cycle studies for the following reasons:

(1) A chronic fish study was previously agreeded to (May 20, 1970). The study is now in progress and the results are expected in to EPA by November of 1978. This study had been requested prior to:

(a) satisfactory "state of the art" success with the fish embryolarvae bioassay

(b) results of the acute 48-hour Daphnia study showing Daphnia to be more resistant to metolachlor than fish.

However, based upon the significance testing the most sensitive species, a fish embryolarvae or life-cycle study is more appropriate than an invertebrate life-cycle study.

TOXICITY TO AQUATIC INVERTEBRATES

Acute Toxicity to Aquatic Invertebrates (163.72-2)

The minimum data required to establish the acute toxicity of metolachlor in aquatic invertebrates is evaluation of the compoun on one invertebrate.

Data are available on the acute toxicity of technical metolachlor in the water flea (Daphnia magna Straus) (Vilkas 1976). The 48-hour no-effect level was 5.6ppm. The 48-hour LC50 at 95% confidence limits is 25.1 (21.6-29.2)ppm indicating metolachlor is slightly toxic to aquatic invertebrates.

This information satisfies the requirements for datas on acute toxicity in aquatic invertebrates.

No precautionary labeling regarding aquatic invertebrates is required.

EFFECTS ASSESSMENT

The Ecological Effects Branch recognizes that fish and wildlife (non-target organisms) are exposed to effluent resulting from the manufacturing process of technical metolachlor. A hazard assessment is not performed, but rather Ecological Effects data is available to EPA officials responsible for issuing a discharge permit.

DATA GAPS

The following studies utilizing the technical metolachlor are required to assess the hazard associated with the use of formulated products:

(1) The avian acute oral LD50 for one species of waterfowl (preferablly the mallard) or one species of upland game bird (preferably the bobwhite or other native quail, or the ring-necked pheasant) (163.71-1).

(2) Avian reproduction studies on bobwhite quail and mallard ducks.

(3) A freshwater fish (fathead minnow, preferably) life-cycle test.

LABEL REQUIREMENTS

In order to reduce the amount of metolachlor reaching aquatic sites during the manufacturing of metolachlor, the following precautionary labeling is required:

"Do not discharge into lakes, streams, ponds, or public waters unless in accordance with an NPDES permit. For guidance contact your Regional Office of the EPA."

BIBLIOGRAPHY

Buccafusco, Robert J., 1978. Acute Toxicity of CGA-24705 to Bluegill Sunfish (Lepomis macrochirus). Report # BW-78-6-181).

Buccafusco, Robert J., 1978. Acute Toxicity of CGA-24705 to Rainbow Trout (Salmo gairdneri). Report #BW-78-6-186. EG & G - Wareham, Mass. 23439

Fink, R. (1974a) Eight-Day Dietary LC50 -- Mallard Ducks Technical CGA-24705: Project No. 108-111. Received Sep 26, 1974 under 5G1553. (Unpublished report Truslow Farm Inc. for CIBA-GEIGY Corp., Greensboro, N.C.; CDL:112840-O)

Fink, R. (1974b) Eight-Day Dietary LC50 -- Bobwhite Quail Technical CGA-24705: Project No. 108-111. Received Sep 26, 1974 under 5G1553. (Unpublished report Truslow Farm Inc. for CIBA-GEIGY Corp., Greensboro, N.C.; CDL:112840-P)

Fink, R. (1976) Acute Oral LD50 - Mallard Duck: CGA-24705 Technical: Final Report. Received Nove 23, 1976 under 100-587. (Unpublished report prepared by Truslow Farm Inc. for CIBA-GEIGY Corp., Greensboro, N.C.; CDL:226955-D)

Sachsse, K.; Ullman, L. (1974b) Acute Toxicity to Rainbow Trout, Crucian Carp, Channel Catfish, Bluegill, and Guppy of Technical CGA-24705: Project No. Siss 3516. Received Sep 26, 1974 under 5G1553. (Unpublished report prepared by CIBA-GEIGY Ltd., Basle, Switzerland; that includes a cable from CIBA-GEIGY Corp., Greensboro, N.C. on fish name change; CDL:112840-N)

Vilkas, A.G. (1976) Acute Toxicity of CGA-24705 Technical to the Water Flea Daphnia magna. Received Nov 23, 1976 under 100-587. (Unpublished report

prepared by Aquatic Environmental Sciences, Union Carbide Corp. for CIBA-GEIGY Corp., Greensboro, N.C.; CDL:226955-C)