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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL RESEARCH LABORATORY
SABINE ISLAND
GULF BREEZE, FLORIDA 32561

February 17, 1981

SUBJECT: Results of Pesticide Testing by the Experimental
Environments Branch, ERL, Gulf Breeze

FROM: Jack I. Lowe *Jack I. Lowe*
Chief, Experimental Environments Branch

THRU: Dr. Henry Enos *Henry F. Enos*
Director, ERL, Gulf Breeze

TO: Mr. Clayton Bushong *R. Steiner 5/12/81*
Chief, Ecological Effects Branch, OPTS (TS-769C)

The attached data are summaries and abstracts of research which we have conducted in the areas of Methods Development and Effects Assessment. Pesticides used in most of these studies were selected on the basis of communications with your staff. Most of these data will be published in scientific journals or reports at a later date, and must go through our manuscript clearance/peer review process.

These materials are being supplied to you at the request of Dr. Henry F. Enos, the Laboratory Director, in anticipation of, and in preparation for, the upcoming program review to be held March 10-11. These are selected materials intended to provide a background for discussion. Greater detail or a more comprehensive review of these materials can be provided upon request.

A summary of the attachments follows:

- Annex A: Acute Toxicity, Bioconcentration, and Persistence of AC 222,705, Benthocarb, Chlorpyrifos, Fenvalerate, Methyl Parathion, and Permethrin in the Estuarine Environment (summary of manuscript in editorial review).
- Annex B: Acute Static Toxicity Tests.
- Annex C: Chronic Toxicity Tests with Estuarine Fishes.
- Annex D: Methods Development with Estuarine Fishes.
- Annex E: Methods Development in Determining Chronic Effects of Toxicants on Marine Invertebrates.

Annex F: Effects of Fenvalerate on Field- and Laboratory-developed Estuarine Benthic Communities.

Annex G: Effects of Dursban on Laboratory-developed Estuarine Benthic Communities.

Annex H: A Flow-through System for Exposure of Seagrass to Pollutants (abstract of manuscript in editorial review).

Annex I: A Sand Filtration/Activated Carbon Treatment System for Removal of Pesticide Residues from Flowing Aquatic Toxicity Tests (abstract of manuscript in editorial review).

Annex J: Acephate, Aldicarb, Carbophenothion, DEF, EPN, Ethoprop, Methyl Parathion, and Phorate: Their Acute and Chronic Toxicity, Bioconcentration Potential, and Persistence as Related to Marine Environments. (Cover page of special report on subject pesticides, approximately 120 pages. Final draft being typed.)

Attachments - 10

cc: Allan Hirsch (RD-682) w/o attachments
William Murray (RD-682) w/o attachments
Darwin Wright (RD-682) w/o attachments
Peter McGrath (TS-769C) w/o attachments

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ACUTE STATIC TOXICITY TESTS

FY 79-80

Patrick W. Borthwick

Static testing to estimate the acute toxicity of pesticides to estuarine and marine animals continued in FY 79-80. In addition to "cookbook" static tests with laboratory reared, uniform aged sheepshead minnows (Cyprinodon variegatus) and mysid shrimp (Mysidopsis bahia), we have successfully tested laboratory spawned embryos of the Eastern oyster (Crassostrea virginica), the stone crab (Menippe mercenaria), and fry of the Atlantic silversides (Menidia menidia). Variable success in static tests with wild-caught pink shrimp (Penaeus duorarum) and pinfish (Lagodon rhomboides) support the decision to replace them with other test species for static testing. Also, the ASTM 48-hr EC50 tests with oyster larvae were not sensitive to the pesticides tested, and may not be as valuable as the flow-through 96-hr acute shell deposition test with adult oysters. Conversely, static test results with stone crab larvae and silversides have been promising.

Periodically we conduct tests with new species to seek and identify additional test organisms based on availability, importance, sensitivity to pesticides, and potential for rearing and culture. The goal is to develop static tests for representatives of major phyla emphasizing early life-stages and animals of small size.

This progress report summarizes data in tabular form on:

1. Static acute toxicity test results on seven OPP pesticides.
2. Toxicity and deactivation tests with marine-grade creosote.
3. Results to date on two OPP pesticides (AC 217,300 and AC 222,705).

Special attention should be paid to the high toxicity of the three synthetic pyrethroids ambush, pydrin, and payoff (AC 222,705). Amdro (AC 217,300) does not seem to be acutely toxic at or below the limits of solubility in seawater (50 ppb), consequently derivation of 96-hr LC50's may not be feasible.

NOTE: Data in this summary are not yet published and should not be cited.

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Table Progress summary (February 4, 1981) of acute static toxicity tests with 7 OPP pesticides to 4 species estuarine animals. Values are 96-hr LC50's (95% confidence interval) or *48-hr EC50 (based on abnormal development) expressed in units of parts per billion (micrograms/liter).

OPP Pesticide	*Crassostrea virginica <2-hr. larvae	Mysidopsis bahia 1-day juveniles	Menippe mercenaria zoea larvae	Cyprinodon variegatus 28-day fry
Ambush	>1,000	0.046(0.032-0.056)	0.018(0.010-0.032)	88.4(81.7-95.5)
Bolero	1,000<X<10,000	370(317-433)	--	>1,000
Bux	--	1.0 by graphical interpolation	--	46(41-51)
Dursban	1,991(1,505-2,809)	0.056(0.032-0.100)	--	270(235-309)
Fentrifanil	--	0.01<X<0.10	--	9(8-10)
Larvin	--	263(229-299)	--	>1,000
Pydrin	>1,000	0.021(0.019-0.024)	--	120.9(95.9-149.3)

NOTE: No testing is planned for bolstar. No further static tests are planned for bux or fentrifanil.

Greater than (>) values are the result of confirmatory tests.

Ranges (<X<) indicate results of range-finder tests.