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1970-71 Report
COMPREHENSIVE RESEARCH ON RICE
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PROGRAM AREA Engineering

PROJECT NUMBER & TITLE 70-21 Increasing Efficiency and Reducing Contamination of Chemical Application to Rice

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Note: This report also covers work done under RP-4, funded for 1971-72.

OBJECTIVES

1. Examine in detail all known techniques of producing controlled drop size sprays, specifically to try and reduce the small drops (under 100 micron diameter) that are the principle contribution to aerial transport of such materials as MCP and propanil.
2. Greater evaluation and correlation of wind patterns, turbulence characteristics and utilization of favorable weather conditions for application needs to be made with the objective of making possible practicable means to identify these conditions and get aircraft operators and farmers to use them.
3. Develop more accurate and effective dry granular materials spreading by aircraft.

WORK IN PROGRESS

1. We continued laboratory studies on the LTN (low turbulence nozzle) nozzle and constructed 5 prototype units which are now available for field tests. Also laboratory (wind tunnel) studies were run on the new foam producing nozzles used to reduce drift of pesticide chemicals, and one set of tests were made on the electrostatic spray system (EGD, Electro Gas Dynamics Corporation).
2. Field tests were run on a new version (3 deck needles) of the Microfoil boom on a Pawnee aircraft. These tests indicated poor drift control and re-affirmation of the limitation of

the Microfoil to ground equipment or to aircraft (helicopters) flying under 60 mph.

3. Further field tests were run on the effectiveness of MCPA application with the Microfoil spray system. Evidence of good weed control was re-affirmed in rice plot areas around Sacramento Metro Airport.
4. Because of the ineffective drift control with the Microfoil on the Pawnee fixed wing aircraft the proposed large scale tests using propanil were postponed until our new model LTN system could be developed.
5. Work was continued on granular applications; several new spreaders of the centrifugal type were checked for swath width and uniformity.
6. Air monitoring data from the propanil studies of 1969 and 1970 has been further evaluated and a paper is in preparation on this work indicating: (a) the extent of aerial transport, and (b) the amount in relation to susceptible crops.

EXPERIMENTS COMPLETED

Tests on the Microfoil boom for fixed wing aircraft show conclusively that this device does not control aerial drift any more effectively than the California State Department of Agriculture recommended jet nozzle used for 2,4-D and MCPA applications in hazardous areas. Thus, we have stopped any further work on this device.

WORK PLANNED

1. Field testing will be done, as soon as weather permits, on our controlled drop size LTN nozzle with a transducer powered diaphragm. Work to date, with the above nozzle on a fixed wing aircraft, offers continued promise for effective drift control. If drift control can be shown, we plan to do a large scale propanil application in 1972.
2. Further field drift tests and weed control effectiveness studies (in cooperation with Dr. Bayer) will be made using the foam nozzle system introduced by Velsicol Corporation this past year, which offers another means for reducing aerial drift. Further tests on the EGD electrostatic device may be run depending on availability of a new unit. The first tests show the present system is not effective for drift control.
3. Further field tests will be run on granular applications of insecticides and herbicides as well as for fertilizers. A working prototype of the New Zealand spreader will be tested on an aircraft this season, time and funds permitting.

MAJOR ACCOMPLISHMENTS

Testing of our new LTN controlled spray system in the wind tunnel and construction of 5 prototype units to be used in 1972 season for field tests.

IMMEDIATELY APPLICABLE RESEARCH RESULTS

None.

EVALUATION OF PROJECT

If success continues on the LTN nozzle system it can be a major contribution to aircraft spray application of all chemicals and particularly to use of such materials as 2,4-D, MCPA, and propanil as widely used for rice weed control. Further studies on granular application will aid in reducing costs by increasing the uniformity and effectiveness of the granular pesticides.

PUBLICATIONS OR REPORTS

1. Confining Aerial Applications to Treated Fields--A Realistic Goal. Akesson, Norman B., Stephen E. Wilce, and Wesley E. Yates. Agrichemical Age, Vol. 14 (12):11, 13, 14, December 1971.
2. Machines and Techniques for Applying Pest Control Materials to Rice. Akesson, Norman B. FAO meeting of experts on rice production and processing, Paramaribo, Surinam, September 1971. FAO publication AGS:MRP/71/111-2.
3. Atomization Control to Confine Sprays to Treated Fields. Akesson, Norman B., Stephen E. Wilce, and Wesley E. Yates. ASAE Paper 71-662, December 1971.