

COMPREHENSIVE RESEARCH ON RICE

ANNUAL REPORT

January 1, 1977 - December 31, 1977

I. PROJECT NUMBER ACCORDING TO PROGRAM AREA AND PROJECT TITLE: RP-1 Weed
Control in Rice

II. PROJECT LEADER AND PRINCIPAL U.C. INVESTIGATORS:

Project Leader: David E. Bayer, Botany Department

Principal U.C. Investigators: Ernie Roncoroni, Staff Research Associate,
Jack Williams, Ken Mueller, Carl Wick, Farm Advisors, and Marlin Brandon,
Extension Agronomist.

III. LEVEL OF 1977 FUNDING: \$16,925

IV. OBJECTIVES ACCORDING TO 1977 PROPOSALS AND EXPERIMENTS BY LOCATION CON-
DUCTED TO ACCOMPLISH THESE OBJECTIVES:

Objective I. To develop safe, effective and economical weed control mea-
sures for rice production in California.

1. Primary screening trials to evaluate new herbicides -- U.C. Davis
2. Experiments to develop detailed application procedures for the safe
use of herbicides showing promise for controlling weeds under Cali-
fornia rice growing conditions -- U.C. Davis, Colusa, Sutter, and
Yolo Counties.
3. Determine fate of these herbicides in the rice culture environment --
Colusa County, U.C. Davis.
4. Laboratory and greenhouse experiments to determine the behavior of
herbicides in rice plants and rice soils -- U.C. Davis.
5. Reporting of information to rice growers and other rice research
workers -- U.C. Davis

Objective II. Determine the time and extent of damage and yield loss
caused by various infestations of weeds.

1. Weed competition experiments -- U.C. Davis, Yolo County.
2. Laboratory and greenhouse studies on the biology of certain rice
weeds -- U.C. Davis

V. SUMMARY OF CURRENT YEAR'S WORK (MAJOR ACCOMPLISHMENTS) BY OBJECTIVE:

Objective I.

The herbicides that showed promise for the control of barnyardgrass, sedges and some broadleaf rice weeds in 1976 were again evaluated. Both Dowco 356 and MV-687 gave good weed control but rice injury was evident and severe stand reduction was present at the higher rates. Dow-4021 provided good broadleaf and sedge control when applied 30 to 50 days postflood.

Of the new herbicides that were evaluated in our primary screening trials San-310H applied preflood and early postflood gave excellent barnyardgrass control and did show activity on some broadleaf and sedge plants. Further evaluation of this herbicide will be done in the greenhouse and field plots at UC Davis. Several other herbicides gave excellent weed control but caused some injury to the rice when applied to water seeded rice.

Drepamon again looked very promising for the control of barnyardgrass but only limited work was done because the future of this herbicide is not certain.

Further study of GCP-6137 applied early postflood provided good barnyardgrass control and gave some control of roughseed bulrush, small flowered umbrellaplant, redstem and arrowhead. Later applications of GCP-6137 for broadleaf and sedge control gave good control of the sedge plants and redstem with limited activity on arrowhead.

Benthicarb (Bolero®) continues to be a promising herbicide for the control of barnyardgrass and sprangletop under California conditions. Further work on small plots will be very limited until this herbicide becomes registered for use in rice in California. Once benthicarb receives an experimental or full label follow-up work will be done in evaluating large grower applied field plots.

Bentazon (Basagran®) a herbicide used for the control of broadleaf weed and sedges was again evaluated. A timing study to evaluate small flowered umbrellaplant control was established. Treatments were applied to small flowered umbrellaplants at different growth stages. The first application was made before the sedge plants were above the flood water level and the last treatment was made after the plants had flowered. Best results were shown to be when the application was made at the time when the small flowered umbrellaplants were at their maximum height but before flowering. Treatments made with the addition of a non-phytotoxic oil gave better control than without oil. Little or no control was obtained when the majority of plants were still below the water level or when the majority of plants had flowered.

Combinations of molinate plus other herbicides for the control of rice weeds were evaluated. When the herbicides were applied at the same time as molinate severe rice injury was noted in most treatments. Limited rice phytotoxicity and excellent barnyardgrass control was achieved when the herbicides used in combination with molinate were applied 14 days after the molinate treatment. Herbicides that were used in combination with molinate were Machete®, Ronstar®, Treflan®, Modown® and TOK®.

The major greenhouse studies were on the evaluation of different types of bentazon and molinate granules for weed control in rice. The most effective granular formulations were selected and were evaluated in the field last year or will be this coming season. Bifenox (Modown®) was shown to be taken-up very readily by the roots of rice plants. Applications of this herbicide made to water-sown rice must be made after the rice plants are well rooted if injury is to be avoided.

Timing of application of bentazon and the influence of additives to the spray solution was developed for small flowered umbrellaplant and was further checked out in field trials this season. The best time of application appears to be after the plant has developed maximum foliage but before it has flowered. This work will be followed-up with MCPA. Similar studies are underway using river bulrush.

Objective II.

Competition between barnyardgrass and water sown rice in California is the most severe during the first 3 to 4 weeks of development of the rice plant. When barnyardgrass was introduced into a clean field barnyardgrass had its greatest effect the longer it competed with the rice although again the first 3 weeks was most critical. Although there was a continual reduction in rice yield with increasing barnyardgrass plants, 2 plants per square meter (approximately one square yard) reduced rice yields approximately 10 percent.

VI. PUBLICATIONS OR REPORTS.

Bayer, D.E. 1977. Weed Control in Rice. Farm Advisor Winter Rice Meetings.

VII. CONCISE GENERAL SUMMARY OF CURRENT YEAR'S RESULTS.

Several new herbicides are being developed that have the potential of controlling barnyardgrass and several other weed problems. Much research still must be done before they are registered for use in rice. Considerable research has gone into helping develop an expanded label for the use of molinate (Ordram®) in California.

The persistent barnyardgrass problem does not appear to be one of resistance to molinate. Rather it appears that the present formulations of molinate do not have the residual life necessary to control the barnyardgrass over the period of time during which germination will occur.

Although bentazon (Basagran®) is less injurious to the rice plant than MCPA, timing of application for the control of small flowered umbrellaplant appears to be very critical. Best time to apply bentazon is after the small flowered umbrellaplant has developed maximum foliage but before it has flowered. The addition of an additive such as non-phytotoxic oil will enhance weed control without seriously injuring the rice.