PROJECT NO. RP-1

COMPREHENSIVE RESEARCH ON RICE

ANNUAL REPORT

January 1, 1977 - December 31, 1978

PROJECT TITLE: Weed Control in Rice

PROJECT LEADER AND PRINCIPAL UC INVESTIGATORS:

PROJECT LEADER: D. E. Bayer, Botany Department

PRINCIPAL UC INVESTIGATORS: Ernie Roncoroni, Staff Research Associate, Jack Williams, Farm Advisor and Marlin Brandon, Cooperative Extension Agronomist.

LEVEL of 1978 FUNDING: $17,500

OBJECTIVES AND EXPERIMENTS CONDUCTED BY LOCATION TO ACCOMPLISH OBJECTIVES:

Objective 1. To develop safe effective and economical weed control measures for rice production in California.

a. Evaluate new promising herbicides - U.C. Davis, Sutter County, and Bigg's.

b. Develop detailed procedures for the use of herbicides showing promise for controlling weeds under California rice growing conditions: - U.C. Davis and Sutter County.

c. Determine fate of these herbicides in the rice cultural environment. - U.C. Davis and Biggs.

d. Laboratory experiments to determine the behavior of herbicides in rice soils and water. - U.C. Davis.

e. Reporting of information to rice growers and other rice research workers.

Objective 2. Determine the time and extent of damage and yield loss caused by various infestations of weeds.

a. Weed competition experiments. - U.C. Davis and Yolo County.

b. Laboratory and greenhouse studies on the biology of certain rice weeds. - U.C. Davis.

## SUMMARY OF 1978 RESEARCH (MAJOR ACCOMPLISHMENTS) BY OBJECTIVES:

Objective 1

A timing study to evaluate bentazon (Basagran®), MCPA, triclopyr, 2,4,5-T, and 2,4,5-TP for the control of smallflowered umbrellaplant was established in Sutter County. The first application was made when the smallflowered umbrellaplant seedlings were 1 to 2 inches in height. First the flood water was drained from the field to expose the seedlings to the herbicide treatments. Reflooding did not occur for 36 hours after the herbicide application. The second application was made when the majority of smallflowered umbrellaplants were 6 inches tall. Prior to treatment the flood water was lowered to expose most of the weeds and held at this lowered level for 2 hours following treatment. When 20% of the smallflowered umbrellaplant had flowered the third application was made. The last application was made when a majority of the smallflowered umbrellaplants were in full flower.

Little or no control was obtained when the herbicides were applied at the third and fourth timings although bentazon and MCPA did produce leaf burn on the smallflowered umbrellaplant.

Early applications of bentazon, MCPA and triclopyr did provide control of the smallflowered umbrellaplant.

Early rice injury was noted with MCPA and triclopyr, but no injury resulted from the bentazon treatment.

A second study designed similar to the smallflowered umbrellaplant timing experiment was established at U.C. Davis to evaluate broadleaf and sedge weed control. Again only MCPA, bentazon and triclopyr showed any potential for broad spectrum control. The broadleaf rice weeds, red stem and arrowhead, were controlled at all timings, but once the smallflowered umbrellaplant and roughseeded bulrush reached the flowering stage little control was obtained.

Several new herbicides were evaluated for the control of barnyardgrass, sedges and broadleaf rice weeds.

Limited plot work was done using thiobencarb (Bolero®) and Drepamon® in anticipation of the time when they may receive an experimental or full labile. Thiobencarb and Drepamon® continue to show promise for the control of barnyardgrass under California rice growing conditions.

Molinate (Ordram®) which now has a new expanded rate labile was again evaluated at these higher rates and timings and in combinations with other herbicides registered for use in rice, combinations of molinate plus molinate and molinate plus bifenox (Modown®) gave excellent barnyardgrass control.

New formulatins of molinate granules were evaluated to determine if longer barnyardgrass control could be obtained. These new granular formulations did show an extended residual effect that may ultimately be useful in extending barnyardgrass control.

GCP-6137 was again evaluated for weed control in rice. GCP-6137 when applied early (approximately 2 weeks following planting) does provide good control of young broadleaf and sedge weeds with partial control of the barnyardgrass.

Several new herbicides were evaluated but because of rice injury or lack of weed control or a combination of both the future of these herbicides in California rice production look doubtful.

In co-operation with Dr. R.K. Webster, Department of Plant Pathology, the rice stem rot fungicide, Du-Ter® was evaluated for algae control. Application of 1 lb ai/A and .5 + .5 lb ai/A were made 14 days after planting and at mid-tillering of the rice. Water samples were collected prior to treatment and once each week following treatment to determine the effect on algae.

Although the initial control of algae was excellent it was limited because of the short residual life of Du-Ter® in the rice environment. When Du-Ter® was applied to established algae, in greenhouse and limited field studies, control was excellent.

Limited observations from our algae field trials suggest that southern naiad may also be controlled.

The major greenhouse studies were the evaluation of several herbicides for the control of river bulrush. Bentazon and triclopyr ester at 1.5 lb/A provided the best control. Several experiments to determine the activity of bentazon and MCPA on smallflowered umbrellaplant were again continued. Control appeared to be correlated with the percent of foliage actually covered with the herbicide and with the stage of growth. Prior to flowering appeared to be better than after flowering.

Screening trials using several new herbicides were conducted in the greenhouse to determine use rates and timing of applications for rice safety and weed control. Preliminary information on rates, timing, and species controlled were developed for using Du-Ter® . This information was used in establishing the field trials.

Laboratory results have confirmed field data that the rapid dissapation of molinate is a consequence of relatively weak soil adsorption, fast desorption, and rapid volatilization from water. Preplant incorporated treatments readily leached from the surface layer of soil resulting in a loss of herbicidal efficiency. Postflood applications of molinate in the flood water are lost by volitilization in a short period of time.

Objective 2

Competition between barnyardgrass and rice was evaluated on short stature rice. In general the same trends as developed earlier held for this variety. Competition was most severe during the early stages of the development of the rice plant with the most critical period being between 20 to 30 days after planting. However, competition after 30 days was more severe in the short stature variety than the standard variety. Data collected this year would suggest this was due to bigger and more vigorous barnyardgrass plants in the short stature rice presumably because of less competition for light.

The germination and growth habits of smallflowered umbrellaplant in the greenhouse and growth chamber was studied as it relates to susceptibility to MCPA. These data suggest that young plants are more easily controlled than more mature plants. However, coverage with the herbicide is a critical factor in determining degree of control.

## PUBLICATIONS OR REPORTS:

Bayer, D.E. 1977. Weed control in rice. Farm Advisor meeting.

Bayer, D.E., E. Roncoroni, J. Williams. 1978. 1978 Preliminary Rice Weed Control Report. Annual Report.

## CONCISE GENERAL SUMMARY OF CURRENT YEARS RESULTS:

Application timing of bentazon (Basagran®) or MCPA for small-flowered umbrellaplant and roughseeded bulrush control is very critical. Best results were obtained when a maximum of foliage was exposed to the herbicide and good coverage resulted from the application. Applications made before the plants have flowered provided best control.

The new expanded label for molinate (Ordram®) usage should allow better barnyardgrass control. By allowing higher rates and repeat applications, a longer perod of barnyardgrass control can be obtained.

Du-Ter® has shown promise for the control of algae but additional research is needed to integrate its use with the use for stem rot control and for label development and registration.