

ANNUAL REPORT
COMPREHENSIVE RESEARCH ON RICE
January 1, 1990 - December 31, 1990

PROJECT TITLE: Development of an Expert System for California Rice

PROJECT LEADER: Richard E. Plant and James E. Hill,
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PRINCIPAL UC INVESTIGATORS: Julie Young, Staff Research Associate, UCD; J. G. Real, Research Assistant, UCD; Farm Advisors, S. C. Scardaci (Colusa), D. Snell (Fresno), B. L. Weir (Merced), C. M. Wick (Butte), and J. F. Williams (Sutter/Yuba).

LEVEL OF 1990 FUNDING: \$14,072

OBJECTIVES AND EXPERIMENTS CONDUCTED BY LOCATION TO ACCOMPLISH OBJECTIVES:

The overall objective of this project is to develop an expert decision support system for California rice management. The specific objectives in this project are:

I. To develop a CALEX/Rice integrated expert decision support system. Organize a development effort patterned after the structure that successfully developed CALEX/Cotton.

II. Develop a crop management module for CALEX/Rice which includes variety, fertility, water and other information for aiding crop management decisions.

SUMMARY OF 1990 RESEARCH (MAJOR ACCOMPLISHMENTS BY OBJECTIVE):

Objective I

A Development Team consisting of J. Hill, R. Plant, J. Young, S. Roberts, J. Real, S. Scardaci, J. Williams and C. Wick was organized. This team met formally to develop the prototype variety selection module and has discussed knowledge bases for

the pest management, fertility management and other components of the overall expert system.

Objective II

The basic integrated crop management expert system shell for CALEX/Rice has been programmed. A module for herbicide selection based on the similar module in CALEX/Cotton has been completed. This module is based on a table of efficacy of rice herbicides developed by D. Bayer and J. Hill. The module permits the user to select the best herbicide or combination of herbicides for a given weed problem, and to see which weeds are best controlled by a given herbicide. Work is nearly completed on a variety description and selection module. This module will provide information on the principal characteristics of varieties and rank them based on grower's needs, such as maturity (hence planting date cutoff, appropriate growing region, etc.), grain type and other important attributes or limitations. These expert system modules will be distributed to rice farm advisors for preliminary evaluation.

The following is a demonstration of the weed management module. The images are downloaded directly from the computer screen. The user selects "PEST MANAGEMENT" from the main menu and is presented with a menu that looks like this:

PEST MANAGEMENT	
1>	Weeds
2>	Insects: Rice seed midge, Rice water weevil, Armyworms
3>	Crustaceans: Tadpole shrimp, Crayfish
4>	Diseases: Stemrot, Aggregate sheath spot
5>	Vertebrates: Rats, Birds (blackbirds, waterfowl)
6>	Select field
7>	Change the CALEX date

Enter number OR ↑ ↓ and ENTER:

Next the user selects "weeds" and gets a menu that looks like this:

- SELECTION**

 - 1> WEED IDENTIFICATION
 - 2> HERBICIDE TABLE
 - 3> HERBICDS FOR A WEED
 - 4> WEED LIST BY HERBCD
 - 5> RESTRICTIONS

Selection or ESC :

If the user selects "HERBICIDE TABLE" he is given an opportunity to select the weeds he wants to control in the following menu:

- Rice Weeds**

 - <✓> barnyardgrass
 - < > bearded sprangletop
 - < > blunt spikerush
 - <✓> burhead
 - < > Ca. arrowhead
 - < > cattail, seedling
 - < > cattail, establsh
 - < > chara
 - <✓> common waterplantain
 - < > ducksalad
 - < > filamentous algae
 - <✓> Gregg's arrowhead
 - < > knotgrass
 - ↑ ↓ for more

Selections then ESC :

As shown, the user has selected barnyardgrass, burhead, common waterplantain, and Gregg's arrowhead. The following table is then displayed:

Current field: RICE91 7/5/90 F1: HELP F3: CALC ESC: EXIT

Rice Herbicides

Ratings: 5 = Excellent, 4 = Very good, 3 = Good, 2 = Partial, 1 = No control

	Ordram	Bolero	Propanl	MCPA	Endothl	Cusulft	Londax
barnyardgrass	5	5	5	1	1	1	3
burhead	1	1	4	5	1	1	5
common waterplantain	1	1	4	5	1	1	5
Gregg's arrowhead	1	1	3	3	1	1	2

Press any key to continue

The user can at this point hit the F2 function key to obtain more information about any of the herbicides. An information screen then pops up showing application method, water management, crop injury, and restrictions. The user can also pop up an information screen describing any of the weeds. Finally, the user can rank the herbicides from best to worst

for the weed spectrum selected. The ranking for these weeds is as shown:

	barnydg	burhead	c-plntn	G-arwhd
Propanl	5	4	4	3
Londax	3	5	5	2
MCPA	1	5	5	3
Ordram	5	1	1	1
Bolero	5	1	1	1
Endothl	1	1	1	1
Cusulft	1	1	1	1

Press any key to continue

PUBLICATIONS OR REPORTS:

None

CONCISE GENERAL SUMMARY OF CURRENT YEAR'S RESULTS:

The project leaders and principal investigators have organized a Development Team consisting of several knowledgeable rice scientists and advisors. The basic integrated crop management expert system shell for CALEX/Rice has been programmed. A module for herbicide selection based on the similar module in CALEX/Cotton has been completed. Work is nearly completed on a variety selection module. The prototype expert system will be distributed to rice farm advisors for their preliminary evaluation of the modules.