

# 1970 Project Report

## COMPREHENSIVE RESEARCH ON RICE

PROGRAM AREA: Engineering

PROJECT NUMBER & TITLE: 69-19 Stripper Harvesting of Rice

PROJECT LEADER: T. H. Burkhardt

PERSONNEL: M. L. Peterson, R. L. Sutton, R. F. Mrozek

### OBJECTIVES:

To investigate the agronomic and physical plant characteristics under a variety of cultural methods and field conditions using different varietal types which will aid in the development of a rice stripper concept. Emphasis will be placed on varietal types expected to be prominent in future years. To examine, develop and evaluate basic mechanisms for stripping rice grain from the plant. To establish parameters useful in defining design specifications adequately to permit the design and construction of a field rice stripper prototype.

### WORK IN PROGRESS:

Evaluation of data gathered on physical parameters of rice plants. These parameters include tensile strength of rice straw, head attachment, kernel attachment, and plant anchorage. Included in this study was the determination of plant and head length and bending strength of straw. This test was conducted on a number of rice varieties grown under various conditions (soils, moisture, fertilizer levels).

High speed photography is being used to examine the stripping action of a wire loop cylinder used in the field in the Fall of 1970. Data is being analyzed for tests of grain quality vs cylinder speed for the wire loop cylinder.

### EXPERIMENTS COMPLETED:

A rice stripping mechanism using wire loops mounted on an inclined continuous belt was constructed and evaluated. When rice was hand fed to the mechanism, all of the grain was removed from the straw. The unit had a high power requirement and a short belt life. The belt was replaced by a wire loop cylinder with an outside diameter of nine inches. This mechanism also had a draper arrangement to tip the rice plant into the machine and hold the plant against the stripping cylinder.

This configuration was field tested. Two major difficulties were encountered. The first problem was getting the plant into the stripping zone and the second was wrapping of the rice plant on the cylinder. The investigations were terminated on this machine in favor of the following stripping mechanism.

#### EXPERIMENTS COMPLETED (CONT.):

A rice stripper having three interchangeable stripping cylinders was constructed and tested. The three stripping cylinders were, a wire loop cylinder with an outside diameter of eighteen inches, and a large brush cylinder, fifteen inches O.D. This brush was comparable to a street sweeper brush. The third stripping cylinder was made with rubber covered angle iron bars of the type used in a conventional grain combine. This mechanism had a bat reel above and forward of the stripping cylinder to bend the rice over the stripping cylinder. Of the three stripping cylinders the wire loop was the most effective. The brush was partially successful but had a higher power requirement than the wire loop cylinder. The rubber covered angle iron bars were least effective in removing the grain.

When the wire loop cylinder was field tested it was quite successful in removing the grain from the straw. There was no wrapping problem with the large (18 inch O.D.) cylinder. There was a problem of getting the rice plant into the stripper mechanism, as well as collecting the grain.

This arrangement was considered successful as a stripping mechanism, however, more work needs to be done on introducing the grain into the machine. The problem of grain collecting after being stripped also needs more work.

#### WORK PLANNED:

Continuation of the development of the stripper harvester. As indicated in the section "experiments completed" more work must be done on feeding the rice plant to the stripping cylinder, and collecting the grain after it has been removed from the plant.

#### MAJOR ACCOMPLISHMENTS:

Collection of data on physical parameters of rice plants. Determination of feasibility of stripping rice. Evaluation of effectiveness of wire loops, a brush, and rubber covered bars as rice stripping devices.

#### EVALUATION OF PROJECT:

The first year's work on this project will yield valuable data on physical parameters of rice pertaining to stripper harvesting. This information is not completely processed at the present time but is well under way. The mechanisms studied indicated stripper harvesting of rice is possible. The present mechanism is successful in removing the grain from the plant. At this point the machine was not considered successful in introducing the grain to the stripping cylinder or collecting the grain after removal. These areas will require more study.

#### PUBLICATIONS OR REPORTS:

None