AID 1020-25 (10-70)

PD-AAL-897-A1

REPORT U-446

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PROJECT APPRAISAL REPORT (PAR)

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1. PROJECT NO.	2. PAR FOR PERIOD:	3. COUNTRY	4. PAR SERIAL NO.
	6/1/74 TO 9/30/75	Semi Arid Regions of Middle East	6p

5. PROJECT TITLE

Improvement of the Nutritional Quality and Productivity of Barley for Semi Arid Regions

6. PROJECT DURATION: Began FY 74 Ends FY 77	7. DATE LATEST PROP	8. DATE LATEST PIP	9. DATE PRIOR PAR
	Project Statement		None

10. U.S. FUNDING	a. Cumulative Obligation Thru Prior FY: $ 350,000	b. Current FY Estimated Budget: $ 250,000	c. Estimated Budget to completion After Current FY: $ 300,000

11. KEY ACTION AGENTS (Contractor, Participating Agency or Voluntary Agency)

a. NAME	b. CONTRACT, PASA OR VOL. AG. NO.
Montana State University	Contract
Bozeman, Montana	

I. NEW ACTIONS PROPOSED AND REQUESTED AS A RESULT OF THIS EVALUATION

A. ACTION (X) USAID	A. ACTION (X) AID/W	A. ACTION (X) HOST	B. LIST OF ACTIONS	C. PROPOSED ACTION COMPLETION DATE
			I. For AID/W: None	
			II. For Montana State University: None	

D. REPLANNING REQUIRES REVISED OR NEW: ☐ PROP ☐ PIP ☐ PRO AG ☐ PIO/T ☐ PIO/C ☐ PIO/P — Project Statement

E. DATE OF MISSION REVIEW: Nov. 23, 1975

PROJECT MANAGER: TYPED NAME, SIGNED INITIALS AND DATE: Edward J. Rice-Edward J. Rice, 2/9/75

MISSION DIRECTOR: TYPED NAME, SIGNED INITIALS AND DATE: Leon F. Vosseler 2/13/76

TA/AGR, GBBaird

Submiss ı Date: November 24, 1975

PROJECT SUMMARY

Major Type of Activity:	Food Crops Production
Project Title:	Improvement of the Nutritional Quality and Productivity of Barley for Semiarid Regions
Contractor:	Montana State University Bozeman, Montana 59715
Contract Coordinator: Title:	Dr. L. P. Carter Associate Dean of Agriculture
Contract Number:	AID/ta-C-1094
Project Duration:	3/25/74 - 3/24/77
Duration of this PAR:	6/1/74 - 9/30/75
Funding:	Total 900,000
TA/AGR Project Manager:	Dr. Edward Rice

Purpose: The purpose of this project is to develop barleys of superior protein content and quality, high yield, and improved agronomic characteristics for the semi arid regions of the world.

Barley is grown at more northerly latitudes, at higher elevations; and further into the desert than any other cereal grain. The wide ecological range of barley can be seen in the fact that it is grown from the equatorial latitudes to north of the arctic circle and from below sea level to the highest mountain ranges. Because of its adaptability to cooler and drier regions, barley improvement and development can assure the production of food and feed of superior nutritional quality in these marginal areas where other cereals are no longer adapted.

Description of Activity: A survey of the important barley producing areas of Turkey, Egypt, Lebanon and Tunisia was done in April 1974 by R. F. Eslick and E. L. Sharp of Montana State University to determine the major genetically - controlled factors limiting production and to collect related germ plasm for use in the improvement program. These objectives were accomplished. In addition,

collection of representative diseases were made at all locations and these are being isolated and increased for pathogenicity studies as outlined in the AID proposal.

Screening of the world collection of barleys for high lysine was begun. A bioassay specific for lysine has been developed that appears to be accurate and inexpensive but does require a very skilled technician.

Research was begun on protein fractionation and characterization of proteins found in barley. Preliminary results are included.

In rat feeding trials it was determined that the percentage of amylopectin in Compana barley starch had no measurable effect on rat growth or digestible energy. The waxy gene in Compana had no significant effect on the nutritive value when fed in isonitrogenous - isocaloric whole barley diets to rats as measured by growth, feed efficiency, protein efficiency ratio, digestible nitrogen, retained nitrogen or digestible energy. Three pairs of the Glacier and Compana isogenes were analyzed for proximate principals and amino acid composition. The high-amylose Glacier contained significantly more of certain essential and nonessential amino acids than did the normal Glacier.

Travels, observations and discussions have strengthened the conviction that systems of breeding based on "male sterile facilitated recurrent selection" are probably the most satisfactory approach to use for satisfying the objectives of this project.

One set of 2-row and one set of 6-row varieties of barley have been selected for crossing to male steriles to establish some narrow, gene base populations. Also a new winter habit population based on the world collection of winter barleys is in progress.

Since the initiation of this project one "new" high lysine gene has been identified. Eleven verified high lysine sources are being crossed to study protein inheritance.

In studies on the relationship of soil fertility and protein content and lysine stability, it was found that protein content of barley may be increased somewhat, especially with additions of N fertilizer and to a lesser degree with P, but the lysine levels in the protein are not readily influenced by N, P or K fertilizers, even at rather high rates of application.

Study of rates of radiation reflection from light vs. dark green barley lines indicate that light color may have considerable potential for reducing the heat load imposed upon plant canopies under semi arid conditions.

Sixty eight accessions of barley are being evaluated for day length sensitivity to determine which barley lines flower independently of day length and therefore could furnish genes for day length insensitivity for the breeding program.

Studies were initiated to study the influence of leaf area on water use efficiency.

Techniques for increase of inoculum, inoculation and best environments for symptom expression for inoculated plants have been largely determined. Selected cultures of specific disease organisms have been preserved by lyophilization for use in later evaluations.

A working relationship with CIMMYT has been established. Dr. Enrique Rodriguez and Dr. Gerald Kingma visited Montana State University in January to become familiar with this research effort and to discuss possible links with their barley breeding program. Professor Eslick spent some time at Obregon, Mexico observing their barley improvement effort in March following the Contractors Meeting at Mississippi State University.

A workshop on "Improvement of Productivity and Nutritive Value of Barley for Semi Arid Regions" is being planned for May of 1976. This workshop will be jointly sponsored with ALAD (or ICARDA) and is tentatively scheduled to be held in Lebanon. Participating in this workshop will be the people involved with barley improvement in the LDCs of the Middle East and North Africa. It is anticipated the LDC nationals and appropriate staff from CIMMYT, ALAD and other centers will be invited.*

Regular seminars have been held at Montana State University involving co-workers on this project and visiting scientists. These seminars have served to keep participants informed regarding the overall objectives and progress of the project.

Evaluation: Contractor is moving ahead rapidly. Progress reports are well written and timely. Results to date are extremely satisfactory and the project appears to be completely on track. This is due to the fact that Montana State University has a highly competent and energetic staff with abundant competence in the field of barley improvement and allied areas of research. The objectives are clearly understood by the Contractor. Full achievement of the objectives appears to be obtainable. The Contractor's progress and performance are excellent.

*The recent outbreak of civil hostilities in Lebanon will force a change of venue or postponement of this workshop.

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JULY 1973 EDITION
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UNITED STATES GOVERNMENT

Memorandum

CIL

file CF KPAH-2

TO : See Distribution

DATE: February 10, 1976

FROM : TA/AGR, Leon F. Hesser LFH

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SUBJECT: Project Appraisal Report (PAR) - Improvement of the Nutritional Quality and Productivity of Barley for Semiarid Regions - Montana State

Attached is a copy of the recent project appraisal report that was developed for the project with Montana State University titled "Improvement of the Nutrition Quality and Productivity of Barley for Semiarid Regions" under AID contract. The report summarizes the work being done on the project and covers the areas being explored for further study.

It is distributed for your information.

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AID Ref Center -2
Montana State University, REslick/ELSharp

November 23, 1975

Project Appraisal Report (PAR) - Improvement of the Nutritional Quality and Productivity of Barley for Semiarid Regions - Montana State

A list of the participants at the above PAR review follows.

Dr. Edward J. Rice, TA/AGR/CP - AID
Dr. Lark Carter, Associate Dean of Agriculture, MSU
Dr. Robert F. Eslick, Professor of Barley Genetics, MSU
Dr. Hyden Ferguson, Professor of Soil Physics, MSU
Ms. Susan Johnson, Research Associate, Barley High Lysine Screening, MSU
Dr. Eugene L. Sharp, Head of Plant Pathology Dept, MSU
Dr. Walt Newman, Professor of Animal and Range Science, MSU