

**ANNUAL REPORT
COMPREHENSIVE RESEARCH ON RICE
January 1, 1999 -December 1, 1999**

PROJECT TITLE: Rice Straw Utilization by Cattle

PROJECT LEADER:

PRINCIPAL UC INVESTIGATORS

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COOPERATORS:

Henry Smith, Smith Ranch, Browns Valley, Ca
CSU, Chico College of Agriculture Farm
J BAR D LTD.
New Holland & Beeler Tractor

LEVEL OF 1999 FUNDING:

**OBJECTIVES AND EXPERIMENTS CONDUCTED BY LOCATION TO
ACCOMPLISH OBJECTIVES:**

OBJECTIVE 1. - Rice Haylage Demonstration

Research Demonstration Design

A field of M202 variety rice was baled by a New Holland Silage Round Baler behind the harvester in the District 10 area, outside of Marysville on October 11, 1999. The harvester cut above the water line of the rice plant. The target moisture was 50% or greater. Forty (40) bales of rice aftermath was produced. The bales were randomly split between those treated with and without inoculate. The inoculate from J BAR D Ltd. included:

Straw Saver

Guaranteed Analysis:

Crude Protein	Min 6%
Crude Fat	Min 3%
Crude Fiber	Max 16%
Ash	Max 15%

Ingredients:

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Wheat bran, *Saccharomyces cerevesiae*, Manganese proteinate, Copper proteinate, Iron proteinate, Cobalt sulfate and Zinc proteinate.

Application

Swather

Sudan Hay 5#/ton

Rice Straw 5#/ton

Bale at 18-20% moisture

Baler

18-20% apply 2#

21-22 % apply 3#

23-24% apply 4#

The bales will be labeled in the field with latex paint. The bales will be hauled out of the field to the ranch headquarter by forklift and wrapped six times onsite within two hours of baling and stored there.

Sampling and Analysis

Samples were taken of each bale on the day of processing with a Penn State hay probe. The bales will be sampled again thirty days post baling. Special tape will be used to cover the holes made in the wrapping when sampling. All samples will be frozen and submitted to A&L Laboratory of Modesto, California for the following analysis for determination of:

moisture
protein
crude fiber
ash
crude fat
TDN

The difference between these two sets of samples will be attributed to the ensilage process. Samples were also taken from bales with and without inoculated to determine the impact of its treatment on forage quality. Samples were also submitted to the University of California, Davis Animal Science Department for In vitro digestion analysis.

Eight randomly selected bales (four inoculate treated and four untreated) will have thermistors (stowaways) inserted into the bale to monitor temperature during the thirty-day fermentation period. The data will be recorded every hour.

Animal Evaluation

The haylage will be hauled from the rice field and fed December through February to adult non lactating beef cows as one of three varied rations haylage inoculated, haylage not inoculated, and a comparison dry matter ration input such as Almond Shell. Animals will be compared for consumption and weight gain/loss between groups. Fecal samples will be submitted to the Texas A&M GAIN Lab for nitrogen retention and digestion coefficient analysis using next day air.

Operations of the Demonstration

Forty bales were made at Keith Davis rice operations in Yuba County. The New Holland Equipment Corporation provided the rental of a wrapper and haylage baler for the demonstration. The J Bar D Ltd. and New Holland coordinated on the temporary attachment of the inoculate applicator to the baler. The rice straw was baled right behind the harvester at 45 to 60% moisture. The bales will be stored and wrapped at the rice field. Rodent control was performed onsite to prevent damage to the wrapping. The bales will be transported approximately twenty miles to the Smith Ranch and placed directly into feeders after transport.

OBJECTIVE 2. - Rice Silage Demonstration

Research Demonstration Design

A field south of Chico of M 204 variety rice straw was chopped behind the harvester on October 18, 1999. The harvester cut above the water line of the rice plant. The moisture was 50% or greater. Forty tons of rice aftermath silage was produced. The silage was randomly split between those treated with and without inoculate. The green straw was hauled six miles to the CSU-Chico farm and placed and compacted in two separate storage facilities.

Sampling and Analysis

Samples were taken of each load of silage on the day of chopping. The pit will be sampled again thirty days post chopping. All samples will be frozen and submitted to A&L Laboratory of Modesto, California for the following analysis:

Day of chopping nutritional value

<u>Moisture</u>					Avg.
Treated	55.17	50.2	52.34		52.57
Untreated	53.4				

Protein

Treated	2.49	2.46	1.76	2.23
Untreated	1.78			

Crude Fiber

Treated	14.77	17.98	16.66	16.47
Untreated	16.89			

Total Digestible Nutrients

Treated	19.6	21.93	21.13	20.8
Untreated	20.56			

Ash

Treated	7.71	8.54	8.33	8.19
Untreated	8.18			

Post treatment data will be available in two weeks.

The difference between these two sets of samples will be attributed to the ensilage process. Samples will also be taken from the pit with and without inoculated to determine the impact of its treatment on forage quality. Samples will also be submitted to the University of California, Davis Animal Science Department for In vitro digestion analysis.

A cross section of the pit will have thermistors (five stowaways/treatment) inserted into them to monitor temperature during the thirty-day fermentation period. The data will be recorded every hour.

Animal Evaluation

The silage will be fed to 30 replacement heifers as a dry matter component to one of two varied rations silage inoculated and silage not inoculated at the CSU-Chico Farm. Animals will be compared for consumption and weight gain/loss between groups. Fecal samples will be submitted to the Texas A&M GAIN Lab for nitrogen retention and digestion coefficient analysis using next day air.

Operations of the Demonstration

Forty tons will be made at Scott Wright's rice operations in on the M&T Ranch in Chico. A private contractor (Dan Luis Custom Farming) was hired to chop and transport the material to the CSUC farm. The J Bar D Ltd. place their inoculate on the rice silage as it was placed.

Straw Saver application was 5 pounds/ton

Guaranteed Analysis:

Crude Protein	Min 6%
Crude Fat	Min 3%
Crude Fiber	Max 16%
Ash	Max 15%

Ingredients:

Wheat bran, Saccharomyces cerevesiae, Manganese proteinate, Copper proteinate, Iron proteinate, Cobalt sulfate and Zinc proteinate.

The CSUC farm staff placed and compacted the straw.

Objective 3. - Rice Straw Variety and Fertility impacts on Rice Straw Quality

Akita straw was collected at 2 sites in Butte and Sutter Counties. The plots had six different nitrogen treatments.

Treatment	Basal	PI	Heading
1	0	0	0
2	60	0	0
3	80	0	0
4	40	40	0
5	100	0	0
6	50	50	0

Rice straw was collected from a research plot at the Rice Research Field Station. The plots involved

8 varieties, 6 fertility treatments, 4 replications. The varieties were M202, M205, M402, L204, L205, S102, Calmati 201, Calihikari.

The rice straw was submitted to the UC DANR laboratory for the following nutritive analysis: Protein, Silica, Acid Detergent Fiber.

Objective 4. - Rice Straw Labeled Restrictions with Herbicides and Pesticides

A student intern was hired to review label restrictions of Rice Herbicides and Pesticides for feeding rice straw to livestock. Each company was contacted to verify the labeled restriction and review the publication outlining the findings.

SUMMARY OF 1999 RESEARCH (MAJOR ACCOMPLISHMENTS) BY OBJECTIVE:

PUBLICATIONS OR REPORTS:

Educational Outreach

The Farm Advisors office scheduled and conducted in coordination with Buck Beeler Tractor a field demonstration for growers interested in the haylage process on October 11, 1999. A Farm Advisor newsletter article will be developed in February 2000, summarizing the results of the haylage forage value and costs of production. The animal performance data will also be reported in the February Farm Advisor Newsletter. The Newsletter coverage will be to Rice and Livestock Producers in Sutter, Yuba, and Butte Counties. The information will be provided to other farm advisors in Yolo, Sacramento, Colusa, Glenn, and Tehama Counties. The CSUC professors and UCCE Farm Advisors will coordinate the extension of information at Beef Day in February 12, 2000. Popular

press publications will be developed and submitted to the following: Capital Press, Ag Alert, California Cattlemen's Magazine and local daily newspapers.

During the project, it became apparent that there was a concern regarding the use of rice straw as livestock feed without review of the herbicide and pesticide labels for withdrawal and use information. Even though this was not set up as an original objective, we felt that it was important to complete this work as a part of this project to make sure that the use of rice straw for livestock feed conformed to the label restrictions. Thus, the following three page publication was put together.

Restrictions in Rice Straw Used for Livestock Feed

By

Heather Dye, Jack Williams, and Glenn Nader

Recent interest in utilizing rice straw for feed has introduced questions about the types of chemicals applied to rice and any feeding restrictions. Some rice pesticide labels do limit or prohibit straw use for livestock. They range from an eight-week withdrawal time to not using the feed for livestock. The rice grain is approved for consumption, but due to the absence of data on straw many chemicals are not approved. Both sellers and buyers need to be aware of these label restrictions. The labels are the governing documents for the legal use of agricultural products. The chart on the following page summarizes the present label statements for grazing and feeding rice straw. Rice pesticides that are not included do not contain statements restricting use of straw for livestock.

The chemical companies have been contacted to determine the reason for the label restrictions. The results are as follows:

6 lb. Sodium Chlorate (Helena)

Results pending from the EPA

Defol 5 and 6w (Drexel)

This restriction is carried over from an earlier label and further research needs to be done on the 14 day restriction.

Harvest Aid Liquid (Wilbur-Ellis)

A representative said that the desiccant should not be a problem because it will have already been absorbed and reacted within the weeds and gone within the 14 day restriction period.

Furadan 5G (FMC)

Rice straw from crops receiving a pre-flood or pre-plant application may be fed to

livestock. If postflood/postplant treatment has been made, do not use straw for food or feed. Residue studies have not been conducted on the postflood/postplant treatments.

Glyphosate (Honcho, Rattler, Roundup, Glyfos)

The labeled eight-week prohibited use of feeding rice straw after application of glyphosate is due to an absence of metabolic and residue studies. There are no known direct toxicological affects of glyphosate. Roundup Ultra is labeled for use on alfalfa, to be applied prior to the last cutting and before rotation to another crop. Alfalfa treated as such, can be fed after 36 hours. There is one indirect toxicological affect of Roundup being applied to quackgrass. The plant creates allopathic compounds that last while the tissue is still green.

Prowl (Cyanamid)

Metabolic and residue studies have not been conducted. There are no known toxicological affects of feeding rice straw that has been treated with Prowl.

Whip (AgroEvo)

Metabolic and residue studies have not been conducted. There are no known toxicological affects of feeding rice straw that has been treated with Whip.

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Rice Chemical Labels				
16-Aug-99				
	Trade Name	Active Ingredient	Company	Use Restrictions for Livestock
<u>Desiccants</u>				
	6 lb. Sodium Chlorate	sodium chlorate	Helena	Don't graze treated fields or feed treated straw or crop residues within 14 days after application.
	Defol 5	sodium chlorate	Drexel	Don't graze treated fields or feed treated straw or crop residues within 14 days after application.
	Defol 6W	sodium chlorate	Drexel	Don't graze treated fields or feed treated straw or crop residues within 14 days after application.
	Harvest Aid Liquid	sodium chlorate	Wilbur-Ellis	Don't graze treated fields or feed treated straw or crop residues within 14 days after application.
<u>Insecticides</u>				
	*Furadan 5G	carbofuran	FMC Corp.	Don't use straw for food or feed if postplant treatment has been made.
<u>Herbicides</u>				
	Glyfos	glyphosate	Cheminova	Don't harvest or feed treated vegetation for 8 weeks following application
	Honcho	glyphosate	Monsanto	Don't harvest or feed treated vegetation for 8 weeks following application
	Rattler	glyphosate	Monsanto	Don't harvest or feed treated vegetation for 8 weeks following application
	Roundup Original	glyphosate	Monsanto	Don't harvest or feed treated vegetation for 8 weeks following application
	Roundup Custom	glyphosate	Monsanto	Don't harvest or feed treated vegetation for 8 weeks following application
	Roundup Ultra	glyphosate	Monsanto	Don't harvest or feed treated vegetation for 8 weeks following application
	(Roundup Ultra)			spot treatment, The rice straw and stubble from the treated area, including a 25 foot buffer zone on all sides, shall not be used for grazing, animal bedding, or any feed purposes.
	Prowl	pendimethalin	Cyanamid	Don't bale or use rice straw from treated fields for feed or bedding.
	Whip	fenoxaprop	AgroEvo	Don't graze or feed rice straw to livestock
* Discontinued in California by August 31, 1999				

GENERAL SUMMARY OF CURRENT YEAR'S RESULTS:

This year's work provided further encouragement that the silage process improves the animal intakes of rice straw. The animal performance, nutritional quality changes due to silage treatment, and the costs are still pending completion of the animal feeding and laboratory analysis. This year the field operation of the round bale silage provided a superior feed product when compared to the convention pit method. The herbicide restriction publication has given growers a clear guideline for the use as livestock feed. There is a high degree variability of straw nutritional quality. The pending results of additional study work conducted with Cass Mutters on the partitioning of nitrogen by different application dates and amounts on varieties should illustrate if they are a major reason for the variability in rice straw quality.