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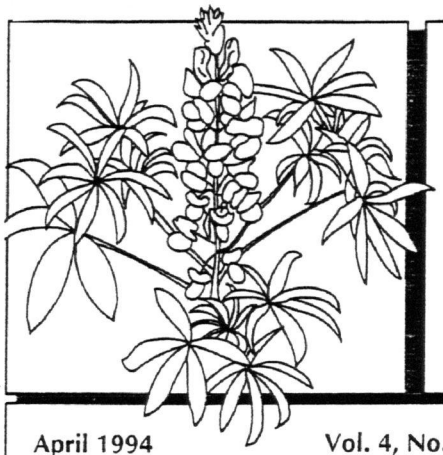

LUPIN NEWS

April 1994 Vol. 4, No. 1 Newsletter of the North American Lupin Association

IN THIS ISSUE

LUPIN NEWS is a newsletter of the North American Lupin Association, published semi-annually. Its new editor is Wayne Reeves. We welcome comments and/or contributions in the form of research reports, essays, and letters, as well as information on upcoming events, or new and interesting publications. Please send contributions to:

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National Soil Dynamics Lab
Box 3439
Auburn, AL 36831-3439

International Lupin Conference to be Held in California

by Greg Mullins
Alabama Agricultural Experiment Station and Auburn University

The 1996 International Lupin Association meeting is scheduled to be held in the United States. To select the location for the meeting, our president appointed a preliminary planning committee and placed a call for proposals of potential meeting places in the fall of 1993. The committee members were: Tom Gallenberg (Wolf River Valley Seeds; Chairperson), Gene Aksland (Resource Seeds, Inc.), Bill Clapham (USDA-ARS), Mary McNiven (Univ. of Prince Edward Island), and Greg Mullins (Auburn University). Two proposals were received and reviewed by the committee. The proposed sites included Auburn University which was submitted by Edzard Van Santen (Auburn University), and the Asilomar Conference Center (Pacific Grove, California), which was submitted by Barbara Bentley (State Univ. of New York).

Both proposals were very good and, after much deliberation, the consensus of the committee was to accept the California location. **Thus, the 1996 International Lupin Association meeting will be held at the Asilomar Conference Center in Pacific Grove, California.** The meeting will be held in mid- to late April of 1996. Asilomar is operated by the California State Park System and is located on the Monterey Peninsula, overlooking the Pacific Ocean. It includes 105 acres of forest and dune, as well as historic

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Lupin Silage vs. Corn Silage for Lactating Dairy Cows

by John C. Lin, Pete Moss*, Edzard van Santen**, and Wayne Reeves****
** Auburn University Animal & Dairy Sciences Dept;*
*** Auburn University Agronomy & Soils Dept;*
**** USDA-ARS National Soil Dynamics Laboratory*

The ability of lupin to fix soil nitrogen is beneficial in rotation with crops such as small grains and corn which require substantial nitrogen. However, lupin seed harvest may unduly delay planting of the second crop. Ensiling the whole plant for use in beef or dairy cattle rations would allow earlier removal of the lupin. The high protein content (18%) and dry matter yields of lupin plants indicate that lupin plants will ensile satisfactorily under laboratory silo conditions. The data included herein are from a brief study which was conducted to see if dairy cattle will consume lupin silage and to compare lupin versus corn silage diets.

Lupin (*Lupinus albus* L.) silage was cut from experiment plots at full pod stage and wilted for 48 hours before chopping. Silage was placed in eight 50-gallon metal drums (~250 kg silage/barrel) lined with polyethylene bags

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Lupin Silage vs. Corn Silage

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and packed firmly by trampling to ensure removal of air. The bags were sealed and a double layer of polyethylene was placed over each drum to ensure an air-tight seal. The drums were stored upright within a storage shed for 5½ months. Corn silage was ensiled in a conventional manner in an upright concrete stave silo.

Composition of the two silages are shown in Table 1. The lupin silage had greater crude protein (CP) than corn silage, but fiber content was also very high, which resulted in much lower energy in the lupin silage. This is also shown with lower IVDMD values for the lupin silage. The acetic acid content was higher, but lactic acid content of lupin silage was similar to reported values for corn silage. A low concentration of butyric acid is desirable for good silage, and butyric acid concentration of lupin silage in this study was less than 0.1%.

Table 1.
Chemical composition of corn and lupin silages

	Corn Silage	Lupin Silage
Dry Matter (%)	36.0	34.8
ADF (% DM)	28.0	50.0
NDF (% DM)	51.0	60.0
Crude Protein (% DM)	7.5	12.5
Acetic acid (% DM)	0.20*	1.37
Lactic acid (% DM)	4.70*	4.07
IVDMD (% DM)	75.0	55.6
NE-l (Mcal/kg)	1.61	0.58
TDN (%)	70.0	49.0

* As reported by Rude et al., 1993.

Four early-lactation Holstein cows in a Latin-square design of two 10-day periods were fed total mixed rations (TMR) based on isonitrogenous (18.4%) and isocaloric (1.64 Mcal/kg) by variation of corn grain and the protein mineral mix. However, actual protein and energy values were higher than calculated values, and energy values were calculated from ADF (Table 2). For NE-l, the corn silage formula was used to calculate values, despite this being a mixed ration and lupin being a legume.

Cows were maintain in tie stalls except for milking and two hours per day of exercise in an outside dry-lot. Cows were fed *ad libitum* twice daily with daily weighbacks. Milk weights were recorded and weekly milk samples taken for fat and protein analyses.

Due to the lack of a lupin silage supply, production data are limited but are favorable (Table 3). Dry matter intake (DMI) and milk yields were not different for the two diets. The DMI of lupin TMR was numerically greater than that for corn silage, but the limited data affected analyses. This could have been due to the high grain corn content used to bring energy into balance with corn silage. The milk fat content from cows fed rations containing lupin silage are lower (3.83%) than those fed corn silage (4.17%), but not enough to cause major differences in the 3.5% fat-corrected milk. Higher grain content could have caused the lower butterfat content. No difference in milk protein was observed.

There were no differences in average daily gain (ADG), or body score between silages. However, cows on corn silage lost weight, whereas those on lupin silage gained weight. A longer time period could have caused more differences in BW, milk production, or other factors.

It must be kept in mind that this was a very brief study with very few cows. No differences were significant and any real differences would be difficult to detect with the limited data. However, the

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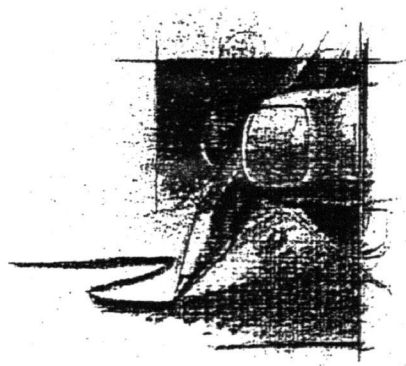
Table 2.
Composition of total mixed rations fed lactating cows

	Corn Silage TMR (%DM)	Lupin Silage TMR (%DM)
Alfalfa hay	9.39	9.55
Corn silage	38.73	—
Lupin silage	—	18.45
Protein/mineral mix	27.94	22.78
Cracked corn	22.09	47.23
Selenium & vitamin	0.20	0.20
Megalac	1.17	1.21
Blood meal	0.57	0.59
Nutrient Content, analyses		
CP	18.9	19.2
ADF	14.9	17.2
NDF	28.2	27.7
DM	60.1	70.5
NE-l* (Mcal/kg)	1.74	1.72

* Calculated from ADF values.

REEVES TO EDIT NEWSLETTER

Dr. Wayne Reeves is the new editor of the *Lupin News* beginning with this issue. Wayne is a researcher at the USDA-ARS National Soil Dynamics Lab, and conducts research on cropping systems and soil erosion control, and on plants which contribute to sustainable agriculture, including lupin. Future letters or article contributions should be given to Wayne at the address on Page 1.



KEEP THOSE LETTERS AND ARTICLES COMING!

We look forward to publishing your letters and articles in the upcoming *Lupin News*, which will be published in December. Send pertinent items to Wayne Reeves by September 1.

USDA Lupin Germplasm Collection

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plasm performed at the recipient's location. A request for seed can be facilitated a number of ways. People usually write or call me at:

Chuck Simon
USDA/ARS-Plant Introduction
59 Johnson Hall
Washington State University
Pullman, WA 99164-6420
Phone: (509) 335-3878
Fax: (509) 335-6654

By far the biggest challenge in formulating a seed order is knowing what to request. One tool that can often be of assistance is the Germplasm Resources Information Network (GRIN). GRIN is a computer network that can be accessed by modem. With some effort, databases of any genus can be queried for characteristics of interest. The current GRIN system (GRIN II) has not been particularly popular with many people because access to the information can be cumbersome until a fairly steep learning curve is mastered. The new version has an entirely different interface, and promises to be much more user-friendly. A recently developed resource that is proving to be very popular among users is PC-GRIN. PC-GRIN is a standalone microcomputer program that does many of the more basic functions of the mainframe version. PC-GRIN is currently available for DOS and Windows platforms and will probably be avialable for Mactintosh before this article is printed. PC-GRIN can be requested at no charge from:

Dr. Quinn Sinnott
USDA/ARS
National Germplasm
Resources Laboratory
4th Floor, Building 003, BARC-West
10300 Baltimore Avenue
Beltsville, MD 20705-2350
Phone: (301) 504-6072
FTS: 8-964-6072

Be sure to list all the genera in which you're interested.

The important caveat to this discussion is that a query of the lupin germplasm collection will reveal little information about particular accessions in most cases. As the availability statistics I mentioned above will attest, until very recently, lupins have been a rather low priority within the system. I was hired in March 1993, and in early May I attended the lupin symposium in Alabama. I learned there that this collection deserved more attention and have initiated an effort to bring it "up to speed." Historically, though, few notes have been taken on accessions in our collection, which means that little is in the GRIN system on lupin accessions. In that regard, I would like to make two proposals. First, anyone who receives material from us is requested to provide us with any interesting information they observe about that accession. Usually, if this information is not already in GRIN, we will see that it is entered. Since GRIN has little lupin data, nearly anything you can tell us will be useful. Your contributions will be referenced in the system. Please help us build the database for our other users. Consult the database to see what types of information are pertinent.

Second, data collection and entry on lines we grow for increase has been limited due to labor constraints. In the future, we intend to focus more resources on the evaluation of the lupin collection, but this would be greatly accelerated by additional support through enhanced special Crop Advisory Committee (CAC) activities in lupin. In 1994, the cool season food legume CAC meeting is being held jointly with the American Society of Agronomy (ASA) meeting in Seattle. I would like to urge any lupin workers attending ASA to also attend the CAC meeting so that lupin is represented. CAC recommendations can have considerable impact on germplasm activities.

One final proposition I would like to make to readers of this article is that they consider lines they've been using for possible inclusion in the USDA collection (if they're not already in it). Since it is clear that activity with this genus is increasing, it is desirable that germplasm available to workers be expanded. I can promise that lupin will receive greater attention in the Plant Introduction system in the future, and that your contributions will be processed appropriately so that other workers may benefit.

LUPIN DATABASE OFFERED

A database which includes over 4500 entries on lupin was developed over the past three years in cooperation with scientists from the Soviet Union. It is now available at cost from the Center for Alternative Plant and Animal Products in either disk or printed form. Entries include titles, authors, and many abstracts, and will be of use if you're involved in lupin research or wish to learn more about lupin.

Disk Version

Includes database and EndNotes demo disk and instructions for installation. Specify 3.5" or 5.25" disk ($40).

Printed Copy Version

About 400 pages arranged by subject area ($60).

Dual Version

Both disk and printed copy ($90).

Contact:
Chris Hanson
Center for Alternative Plant
and Animal Products
340 Alderman Hall
University of Minnesota
St Paul MN 55108.
612/624-4217

NALA Officer and Board of Director Candidates

William M. (Bill) Clapham is Research Leader/Location Coordinator at USDA-Agricultural Research Service's (ARS) Northeastern Plant, Soil and Water Laboratory, Orono, Maine. His lupin research interests focus on thermosensitivity, morphology, growth and development. He is currently working on the mechanism of temperature induced responses during seed maturation and early seedling development. He has developed methodology to quantify degree of thermosensitivity in lupin germplasm.

Richard Leep is Professor and Extension Agronomist with the Crop and Soil Sciences Department at Michigan State University. His research interest in lupin focuses upon lupin crop management for sustainable production in Michigan. Leep's research includes variety development, evaluation of weed control systems, and planting and seeding rates. Leep believes lupin could become an important crop in the Upper Midwest by providing a source of on-farm grown protein for livestock as well as a rotational crop to contribute residual nitrogen for successive crops.

Mary McNiven is Associate Professor of Animal Science at the Atlantic Veterinary College, Prince Edward Island, Canada. She has been working in the area of lupin utilization in animal diets for six years and has evaluated lupin in feeding trials with swine, poultry, dairy, and beef cattle. Her laboratory has developed a simplified method for determining lupin alkaloid levels.

Wayne Reeves is a Research Agronomist with USDA-ARS's National Soil Dynamics Laboratory in Auburn, Alabama. Reeves strongly believes that lupin has a future in sustainable cropping systems in the southern United States. He is investigating the role of lupin in double-cropping systems in relation to nitrogen cycling, residue management and associated soil quality, and rotational responses of succeeding crops.

Edzard van Santen is Associate Professor, Forage Breeding and Genetics, in the Agronomy & Soils Department, Auburn University, Alabama. His lupin research focuses on cultivar development. Since 1990, he is co-project leader of the collaborative project between the Alabama Agricultural Experiment Station, USDA-ARS, and the Alabama Cooperative Extension Service entitled "Developing the Potential of Lupin as a Grain and Silage Crop for the Southeastern United States."

Paul Mask is Associate Professor and Extension Grain Specialist, Agronomy & Soils Department, Auburn University, Alabama. Paul's extension interests in lupin focus on its role as a feed grain and silage in new cropping systems for Alabama. He plans to test the sustainability of cropping systems utilizing lupin with on-farm studies.

Blaine Schatz is Associate Agronomist and directs the field crops research effort in the area of field crop evaluation and crop management at North Dakota State University's Research Center in Carrington, North Dakota. His current research efforts with lupin include extensive cultivar evaluation, crop rotation, plant density and weed control studies. He is presently leading a statewide project that is hoping to expand the commercialization and awareness of lupin through a series of on-farm demonstration plantings.

Dan Putnam is Research Agronomist and Extension Specialist in alfalfa and forage crops in the Department of Agronomy and Range Science, University of California, Davis. He has an abiding interest in alternative crops, and is currently working with other interested faculty to form an Alternative Crops Workgroup at the University of California. He has published a number of studies on lupin, including work on nitrogen fixation, irrigation, vernalization and other agronomic research. Putnam believes we have not fully explored the potential of lupin and sustained effort is needed in the long-term to develop the crop.

Gene Aksland is a lupin breeder with Resource Seeds, Inc., Visalia, California. He has been breeding lupin for 15 years in Resource Seed's long-term development program. He has bred lupin for all regions of the United States, Canada, and Europe. He will soon register a spring line in Canada and will apply for plant variety protection on a lupin line for the Upper Midwest.

Tom Gallenberg is President, Wolf River Valley Seeds. He has been actively involved with the commercial development of seed and feed production, and in the marketing of lupin, primarily spring types, in North America since 1984.

Greg Mullins is an Associate Professor of Agronomy at Auburn University, Auburn, Alabama. He has been conducting soil fertility studies with lupin for the past 4 years. His interests focus on development of methods to evaluate the nutritional status of lupin and to determine the nutritional requirements of lupin, especially phosphorus, when grown on acid Coastal Plain soils of the Southern United States.

Patricia Rayas-Duarte is Assistant Professor at North Dakota State University, Department of Cereal Science, Fargo, North Dakota. Her research focuses on utilization of alternative crops and durum wheat. Her research interests include the carbohydrate composition of white lupin (*Lupinus albus*), manufacturing quality of pasta containing lupin and taste evaluation of lupin products, using panels to test sweet lupin breeder lines in order to develop products with less detectable aftertaste.

Lupin Silage vs. Corn Silage

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Table 3.
Milk yield and composition, feed intake, and body weight changes of lactating dairy cows fed either corn or lupin silages

	Corn Silage TMR	Lupin Silage TMR
Yields (kg/d)		
Milk	35.8	36.4
3.5%-FCM	39.7	38.3
Milk composition (%)		
Fat	4.17	3.83
Protein	3.30	3.23
Body weight changes (kg/d)	-1.01	0.41
Body score	1.63	1.75
Dry matter intake (kg/d)	26.2	27.9

major purpose of this study was to determine if cows will consume lupin silage. Based upon these data, lupin silage is accepted satisfactorily by dairy cattle. Earlier harvesting could improve lupin silage quality (lower fiber, higher energy) and allow less interference of the effect of extra grain. Additional studies on long-term effects of lupin silage are planned to explore its potential.