Annual Report of Plan of Work

Wisconsin Agricultural Experiment Station

College of Agricultural and Life Sciences
University of Wisconsin, Madison

Federal Fiscal Year 2004
Research Activities

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Certification: Margaret Dentine, Executive Director, Wisconsin Agricultural Experiment Station

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Foreword

Choice of reporting

The Wisconsin Agricultural Experiment Station, as an 1862 Land Grant Institution, has chosen to file a report on research activities for the Plan of Work at the University of Wisconsin (UW). University of Wisconsin-Extension will be reporting in a separate document on extension activities. Institutions involved with research work include the University of Wisconsin-Madison (College of Agricultural and Life Sciences, School of Veterinary Medicine, and School of Human Ecology) and the University of Wisconsin-Stevens Point. Programs included in this annual report of accomplishments are those funded by formula funds provided by Hatch Act, McIntire-Stennis Cooperative Forestry Research Program, and Animal Health and Disease Research Program.

Point of contact

All correspondence regarding this report should be directed to:

Dr. Margaret Dentine
Executive Director, Wisconsin Agricultural Experiment Station
College of Agricultural & Life Sciences
1450 Linden Drive
Madison, WI 53706-1562

Phone: (608) 262-2397
Fax: (608) 265-9534
Email: mrdentine@cals.wisc.edu

Additional sources of reporting

Reporting of project titles and objectives as well as human resources have been filed in the CRIS system at USDA by means of the AD-416 and AD-417s. Expenditure data and human resources have been filed with the USDA in the CRIS system by means of the AD-419s. Annual progress reports (including impacts) and final reports have been filed with the USDA-CRIS system using the AD-421s. Impact statements for FY04 have been filed by the Wisconsin Agricultural Experiment Station with the USDA-CSREES Impact database and are included here where appropriate.

Access to the CRIS system of reporting and search capabilities is available at
http://cris.csrees.usda.gov/

The original Plan of Work for Wisconsin's research activities was filed July 15, 1999 and is available in pdf format at

http://www.cals.wisc.edu/research/PlanofWork.pdf

Highlights of research, extension and education programs are available at the following websites or print copies have been included with this report

2004-2005 Science Report
Title: "Asking the Right Questions"
Selected stories at
http://www.cals.wisc.edu/sciencereport/index.html

CALS Quarterly - 2 issues included in Appendix A

News releases and stories:
http://news.cals.wisc.edu/stories/

Background

Structure

The Director of the Experiment Station is Dean Elton Aberle of the College of Agricultural and Life Sciences (CALS) who has designated an Executive Director, Margaret Dentine (Associate Dean, Research Division, CALS) to be responsible for research operations. An Associate Director, Kevin McSweeney is responsible for the McIntire-Stennis Program and other research involved in natural resources. The CALS Research Division is responsible for reviewing proposals, making funding decisions and administering grants in cooperation with the University of Wisconsin-Madison School of Veterinary Medicine, the University of Wisconsin-Madison School of Human Ecology, and the University of Wisconsin-Stevens Point College of Natural Resources.

CALS is composed of 21 departments with a large number of intra-college and inter-college centers, institutes and programs. CALS' mission is to improve the quality of life by discovering; critically analyzing and sharing knowledge in food and agriculture, the life sciences, natural resources and environmental stewardship, and rural community development and to offer strong, research-based education that is responsive to public needs and social, economic and environmental concerns. Additional information on the organization and personnel of UW-CALS is available on the college website at

http://www.cals.wisc.edu/

Within the College of Agricultural and Life Sciences, the Research Advisory Committee, a faculty committee of 10 members appointed by the Associate Dean for Research with ex-officio members of the Assistant Dean for Research and the Director of the School of Natural Resources meets regularly to discuss research issues. This committee recommends research

policy guiding distribution and use of formula funds and is the primary peer review committee for Hatch and McIntire-Stennis proposals. The committee recommends policies and procedures that have been implemented to distribute formula funds on a competitive process.

Operating Philosophy

The Wisconsin Experiment Station is committed to the concept of investigator-driven and peer-reviewed research activities. The general philosophy in allocating formula funds is to provide support for specific reviewed projects rather than to distribute block amounts to faculty or departments. At the University of Wisconsin, faculty appointments are funded with state appropriations thus releasing nearly all formula funding for project support. Expenditures are allowed under a series of guidelines annually reviewed by a faculty committee. Matching funds come primarily from state support of salaries for investigators and research staff.

Formula funds are distributed to approved projects with yearly budgets. Approximately 200 projects are funded with formula funds each year with budgets that include personnel (mainly graduate students) and supplies. Funding of capital equipment items, some of which may be shared by several projects, are prioritized by departments and funded in a separate exercise. Travel to multistate research meetings is provided for the official representative from a central pool of funds.

Integrated Research and Extension

Extension has its own Chancellor and is a separate "campus" within the University of Wisconsin System. CALS faculty with Extension specialist appointments are housed at the Madison campus with an annual Extension transfer of funding for portions of their appointments. These faculty are fully integrated into CALS departmental teaching and research programs and can apply for research project support under the formula-funded competitions listed above. County-based Extension faculty members are participants in research teams, but are not principal investigators for projects supported by formula funds. Thus the funding of integrated research-extension efforts is accomplished largely through salary support of Extension faculty and project support from competitive awards of research formula funds. In the following tables, the indication of integrated research/extension activities is based on projects where one or more of the principal investigators has an official extension appointment.

Multistate Research

We have adopted by reference the national Coordinated Multistate Research Framework for fulfillment of our obligations to the AREERA's multistate and multidisciplinary activities. More details are available on the WWW at

http://www.agnr.umd.edu/users/NERA/workshop/RPAFramework.html

Reporting of Station accomplishments and impacts from multi-state projects are included in federal filing of the SAES-422 reports on these projects available on the CRIS system. Listing of states cooperating on these projects have already been filed with USDA Partnership office following the peer and merit review and approval by the Regional Directors multistate

committees. In the following listings under the Goal headings, these projects are designated as multi-state and their regional project designations are given. Financial statements of expenditures are directly from the Wisconsin Station reports filed as AD-419s. The National Information Management and Support System (NIMSS) is a web-based application that will allow participants of Multistate Research Projects and Activities to submit proposals and reports online. Interested parties, stakeholders and cooperators can also query the System for relevant and timely information. More details are available on the WWW at http://nimss.umd.edu/.

Program Evolution

Programs in the Wisconsin Research Plan of Work are composed of a number of projects with individual review and reporting. Program duration may be extended for multiple years, but the contributing projects are a constantly shifting portfolio that can be quickly redirected. Projects are approved for periods of one to five years with the majority on a four-year cycle. Proposals for new projects require a discussion of the results from previous formula fund support, which is used as part of the criteria for ranking proposals and for evaluating the ability of the team to complete the research project successfully. Each year, approximately 25 percent of the research portfolio is shifted in new directions.

This process of continual re-examination of our portfolio allows us to address short-term, intermediate term and long-term issues. A small number of approved projects may be started at mid-year as new faculty members are hired or emerging problems trigger an early start at the discretion of the Associate Dean for Research. These processes ensure that projects are pertinent to the CSREES national goals and focus on current state research needs. In the project listing under the goals, projects that have been added to the portfolio are printed in bold to highlight the new additions since filing of last year's annual report. Projects that have been completed are no longer listed.

Research Activity in Support of National Goals and Themes

The five sections that follow relate a portion of the Wisconsin Agricultural Experiment Station research effort to the five national goals established by the U.S. Department of Agriculture for the national planning and reporting process. Between 500 and 600 research projects are underway in the College during the course of a year, ranging from the most basic of scientific studies to those that are highly applied. The reports that follow concentrate on those studies that are done as part of formula funded research (Hatch, McIntire-Stennis, and Animal Health). Most of these studies are of a more applied nature, and are significant sources of new science-based information for Wisconsin Cooperative Extension programs. Of the approximately $100 million in expenditures made through the College's Research Division, these formula funded research projects represent about $5 million of the total.

In using the nationally devised goals and themes as the reporting framework, it also should be noted that research projects frequently do not fit neatly and exclusively into one and only one category. In many instances, a research project relates to multiple goals and themes. These research projects are then listed in multiple goals. Research projects; like the agricultural, natural resource, and community issues they address; are frequently at the intersecting points of disciplines and interests. We view this interdisciplinary nature of our research efforts as a strength.

Of the studies selecting for reporting in this document, the largest number (118) relate to the goal of "An Agricultural System that is Highly Competitive in the Global Economy." This included 33 projects that were multistate interdisciplinary projects and 25 that were integrated research/extension projects. The concentration of projects in this goal area is expected for two reasons –1) the nature of the research funding sources being reported are directed toward such problem areas, and 2) the state's agricultural economy is large (between $5 billion and $6 billion cash farm receipts a year, with total economic impact near $20 billion a year) and dependent on new research knowledge to keep it competitive not only with international trade but with other regions of the United States producing similar food and fiber commodities. Among the research titles presented in this section are a broad array of studies that address the extreme breadth of Wisconsin agriculture. We have a highly diverse livestock and plant agriculture that stresses limited research resources to the limit.

The second largest number of research projects is reported under the goal of "Greater Harmony Between Agriculture and the Environment." There are 52 project reported here, with 8 of them being multistate interdisciplinary studies, and 10 integrated research/extension projects. Producing agricultural commodities in ways that are sustainable and protective of the natural resource base and the broader environment is one of the largest challenges facing Wisconsin farmers. The state's cash farm receipts derive overwhelmingly from livestock enterprises, with dairying being by far the most important. Managing livestock wastes and cycling them safely and productively through the various cropping systems is the most urgent challenge. Non-point pollution regulations are increasing from both the state and federal levels. A large number of studies in this reporting section relate to the handling of waste streams from livestock and other state industries. Beyond the waste stream challenge are many other environmental challenges

relating to proper use of chemical fertilizers and reduced pesticide use. Because Wisconsin has a huge tourist industry that relies heavily upon quality land, water, air, landscapes, and fish and wildlife populations, the impacts of environmental protection through proper agricultural production practices go well beyond agriculture.

Under the goal of "Enhanced Economic Opportunity and Quality of Life for American" there are a total of 22 projects reported – the third largest number under a goal heading. Two of these were multistate interdisciplinary projects, and 8 were integrated research/extension projects. Although most of these studies are reported under Objectives 5.1 (Increasing Capacity of Communities and Families to Enhance Their own Economic Well Being) and 5.2 (Increasing Capacity of Communities, Families and Individuals to Improve Their own Quality of Life), a project not assigned to a particular objective heading is noteworthy. This project is a north central regional project (NC-208) that looks at agricultural research funding trends and impacts of those trends on agenda. One of its major conclusions is that as public sources of research funding (particularly in the agricultural sector) experience no real growth or declines in terms of inflation corrected buying power, researchers turn increasingly to non-governmental (industry and other private sources) funding.

Under the goal of "A Healthy, Well Nourished Population" are reported 18 projects, and under the goal of "A Safe and Secure Food and Fiber System" are reported 11 projects. If this report covered College research projects beyond those funded with formula research funds, there would be a much larger number of projects with relevance to human nutrition. Over half of the federal competitive grant funding coming to the College is provided by the National Institutes of Health, and a large portion of those studies relate to human nutrition and health. The food safety issue is also of great importance to the College in spite of the small number of research projects reported here. Much of the food safety research is funded through the College's Food Research Institute, and nearly all of the Institute's funding derives from private sources. Again, because this report concentrates on formula funding sources, this privately funded research effort is not captured here.

Finally, this report does not attempt to sort all of the research activity into key reporting themes. Instead, examples of research impacts are offered, and relevant themes addressed by the examples are listed along with focus areas from the CSREES budget.

Goal 1. An Agricultural System that is Highly Competitive in the Global Economy.

Executive summary

Under this goal, there were 118 projects including 33 that were multistate interdisciplinary projects, 10 were McIntire-Stennis projects, 5 were Animal Health projects, and 25 were integrated research/extension projects. Although the largest number of projects under the goals are classified as Goal 1, many of these projects address other goals as well. For instance, one of the Hatch projects, WIS05237, "Molecular Biometry of Diabetes and Obesity: Modeling Biochemical Pathways Using Experimental Crosses" has relevance to Goal 3.1 (To Optimize the Health of Consumer by Improving the Quality of Diets, the Quality of Food, and the Number of Food Choices).

Wisconsin is committed to continually changing its portfolio of research. Use of more sophisticated analysis and molecular techniques has allowed agricultural and natural resources issues to be approached on a more basic science level. New understanding of the molecular basis of plant and animal systems can bring new strategies to improve performance, reduce risk, improve food quality and safety and preserve the environment. Stakeholders insist on a scientific basis for change and demand testing and evaluation of new varieties, management strategies and recommendations. Thirty-eight new projects have been added including those on nutriceuticals, grain composition, prion proteins, plant diseases, forest management, animal fertility, weed management, pasture systems, links of diabetes and obesity, and agricultural risk. Newly-added projects indicate that faculty are responding to stakeholder needs and new technologies.

Updated project list for FY04

New projects are printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Projects falling under multiple goals are listed in each.

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E
Goal 1: An Agriculture Production System that is Highly Competitive in the Global Economy								
	Objective 1.1: To Produce New and Value-Added Agricultural Products and Commodities							
WIS01599	Hartel, R. W.	Improvement of Thermal Processes for Foods (NC-136)	X	X				
WIS02229	Greaser, M. L.	Molecular Mechanisms Regulating Skeletal Muscle Growth and Differentiation (NC-131)	X	X				
WIS02366	Kosola, K. R.	Rootstock and Interstem Effects on Pome and Stone Fruit Trees (NC-140)	X	X				
WIS03843	Roper, T. R.	Multidisciplinary Evaluation of New Apple Cultivars (NE-183)	X	X			X	
WIS04438	Damodaran, S.	Thermodynamic Incompatibility and Phase Separation of Proteins at the Oil-Water Interface and its Effect on Emulsion Stability	X					
WIS04590	Sarmadi, M.	New Technologies for the Utilization of Textile Materials (S-1002)	X	X				
WIS04662	Amasino, R.	Identification and Characterization of Dwarfing Genes	X					
WIS04668	Lucey, J.	Understanding the Structure-Function Relationships That Control the Rheological and Sensory Properties of Stirred Type Yogurt	X					
WIS04787	**Parkin, K. L.**	**Identifying Potentially Anticarcinogenic Components in Common Vegetables**	X					
WIS04812	**Gunasekaran, S.**	**Management of Grain Quality and Security for World Markets (NC-213)**	X	X				
WIS04829	**Connelly, R. K.**	**Investigation of the Effect of Mixing Intensity of Dough Development and Rheological Property Measurement**	X					
WIS04837	**Borges, R.**	**Soybean Grain Composition and Yields as Affected by Crop Rotation, Tillage, and SCN**	X				X	
WIS05233	Yandell, B.	New Approaches to Analysis of Microarray Data: Epigenetic Control of Maize Endosperm Gene Expression as a Model	X					
		Total:	**228186**	**81850**	**0**	**0**	**23735**	**12.5**

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E
Objective 1.2: To Increase The Global Competitiveness of the U. S. Agricultural Production System								
WIS02229	Greaser, M. L.	Molecular Mechanisms Regulating Skeletal Muscle Growth and Differentiation (NC-131)	X	X				
WIS02366	Kosola, K. R.	Rootstock and Interstem Effects on Pome and Stone Fruit Trees (NC-140)	X	X				
WIS03094	Czuprynski, C. J.	Bovine Respiratory Disease: Risk Factors, Pathogens, Diagnosis and Management (NC-107)	X	X				
WIS03442	Stoltenberg, D. E.	Biological and Ecological Basis for Weed Management Decision Support Systems to Reduce Herbicide Use (NC-202)	X	X				
WIS03455	Wedberg, J. L.	Ecology and Management of European Corn Borer and Other Stalk-Boring Lepidoptera (NC-205)	X	X			X	
WIS03897	Nienhuis, J.	Genetic Improvement of Beans (Phaseolus Vulgaris L.) for Yield, Pest Resistance and Food Value (W-150)	X	X				
WIS03911	Bamberg, J. B.; Spooner, D. M.; Simon, P.	Introduction, Preservation, Classification, Distribution and Evaluation of Solanum Species(NRSP-6)	X	X				
WIS04265	Hogg, D. B; Grau, C. R.; Undersander, D. J.; Doll, J. D.; Wedberg, J. L.	Development of Pest Management Strategies for Forage Alfalfa Persistence (NC-226)	X	X			X	
WIS04299	Tracy, W. F.	Rust Resistance in Sweet Corn: Vegetative Phase Change and Sources of Resistance (NE-124)	X	X			X	
WIS04318	MacGuidwin, A. E.	Population Attrition of the Soybean Cyst Nematode in the Absence of a Host (NC-215)	X	X				
WIS04344	Combs, D.	Environmental and Economic Impacts of Nutrient Management on Dairy Forage Systems(NE-132)	X	X				
WIS04361	Rutledge, J. J.	Germ Cell and Embryo Development and Manipulation for the Improvement of Livestock(W-171)	X	X				
WIS04369	Raffa, K. F.	Interactions Among Bark Beetles, Pathogens, and Conifers in North American Forests (W187)	X	X				
WIS04422	Kaeppler, H. F.	Genetic Engineering of Oat with Transgenes Encoding Antifungal Proteins and Resistance Pathway Regulators for Improved Disease Resistance	X					
WIS04425	Kaeppler, S. M.	Genetic Analysis of Phosophorus Nutrition and Mycorrhizal Interactions in Maize	X					
WIS04426	Coors, J. G.	Corn Silage: Germplasm and Technology Development	X					
WIS04429	Barclay, S. L.	Genes Expressed During Infection by Cryptosporidium	X					
WIS04431	Fricke, P. M.	Methods of Improving Reproduction in Dairy Heifers	X				X	

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E
WIS04432	Grummer, R. R.	Elimination of the Transition Period to Enhance Dairy Cattle Health and Production	X				X	
WIS04441	Jiang, J.	Molecular Cytogenetics Analysis of the Potato Genome	X					
WIS04443	Vierstra, R. D.	Identification of Factors Responsible for Selective Protein Degradation in Plants	X					
WIS04446	Andrews, J. H.	The Colonization Pattern of Apple Leaves by Aureobasidium pullulans	X					
WIS04448	McManus, P. S.	Characterization of Agrobacterium spp. Isolated from Cranberry and Etiology of Cranberry Stem Gall	X				X	
WIS04452	Albrecht, R. M.	Colloidal Metal Particles for High Resolution Biological Labeling	X					
WIS04524	Kirkpatrick, B. W.	National Animal Genome Research (NRSP-8)	X	X				
WIS04528	Goodman, W. G.	A Genetic Analysis of a Juvenile Hormone Sensitive Mutant of Manduca Sexta	X					
WIS04529	Raffa, K. F.	Potential Roles of Symbiotic Fungi in the Population Dynamics of Bark Beetles			X			
WIS04535	Stanosz, G. R.	Sirococcus Shoot Blight of Conifers: Pathogen and Host Influences on Disease Development	X					
WIS04540	Silbernagel, J. M.	The Forest History and Spatial Patterning of American Indian and Euro-American Maple Sugaring Forests of the Upper Great Lakes Region			X			
WIS04543	Czuprynksi, C. J.	Cytokine-Mediated Enhancement of the Susceptibility of Bovine Leukocytes to Pasteurella Haemolytica Leukotoxin				X		
WIS04558	Keller, N. P.	Mycotoxins in Cereal Grains (NC-129)	X	X				
WIS04592	Kosola, K. R.	The Role of Soil Water Potential in Establishment of Cranberry Beds	X					
WIS04658	Osborn, T.	Developing a New Hybrid Breeding System for Alfalfa	X					
WIS04659	Escalante-Semerena, J.	Degradation of Trycarballyate, the Causative Agent of Grass Tetany in Ruminants	X					
WIS04660	Gourse, R.	Transcription Initiation Complexes in Diverse Bacteria	X					
WIS04661	Wasserman, K.	The Role of Ryea and Ryeb Small RNA Regulators in E. Coli	X					
WIS04662	Amasino, R.	Identification and Characterization of Dwarfing Genes	X					
WIS04663	Menon, A.	Phospholipid Flip-Flop in the Cell Membrane of Mycoplasma Bovis	X					
WIS04664	Martin, T.	Identifying Novel Chemical Inhibitors of Synaptic Neurotransmission with Potential Applications for Pesticide/Nematicide Development	X					
WIS04665	Sheffield, L.	Leptin Involvement in Mammary Development	X					
WIS04666	Wattiaux, M.	Dairy Cattle Diet Formulation on Performance, Nitrogen Utilization, Manure Excretion, and Potential Ammonia Loss to the Environment	X					

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WIS04670	Goodwin, E.	3'UTR Control of TRA-2MRNA Export as a Paradigm for Understanding Regulated Export of Specific MRNAs	X					
WIS04671	Patterson, S.	Genetic, Physiological, and Molecular Characterization of DAB4-1, A Cell Separation Mutant in Arabidopsis Thaliana	X					
WIS04673	Bent, A.	Discovery of Plant Genes that Mediate Disease Resistance	X					
WIS04682	Field, D.	Demographic Change and Landowner Behavior in the Pine Barrens of Wisconsin			X			
WIS04683	Gower, S.	Net Primary Production and Carbon Allocation Pattern of Terrestrial Ecosystems: Global Analysis of Environmental and Land Use Change Effects			X			
WIS04684	Lorimer, C.	Dynamics and Management of Multi-Cohort Northern Hardwood Forests: A New Ecosystem-Based Approach to Maintaining Diversity and Aesthetics			X			
WIS04685	Young, R.	High Performance Wood Composite Materials Through Activation Bonding			X			
WIS04689	Williamson, R.	Biology, Ecology, and Management of Linden Borer, A Serious Insect Pest of Shade Trees in Nurseries and Urban Landscapes in Wisconsin	X				X	
WIS04702	Tracy, W.	Conservation, Management, Enhancement, and Utilization of Plant Genetic Resources (NC-007)	X	X			X	
WIS04703	Palmer, R.	Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises (NC-1119)	X	X			X	
WIS04704	Armentano, L.	Metabolic Relationships in Supply of Nutrients for Lactating Cows (NC-1009)	X	X			X	
WIS04705	Mathews, N.	Landscape Ecology of Whitetailed Deer in Agro-Forest Ecosystems: A Cooperative Approach to Support Management (NC-1005)	X	X				
WIS04707	**Duke, S. H.**	**Regulation of Photosynthetic Processes (NC-1142)**	X	X			X	
WIS04708	Lehmkuhler, J.	Nutritional Strategies to Reduce Nutrient Excretion From Beef Animals	X				X	
WIS04718	Shook, G.	Genetic Selection and Crossbreeding to Enhance Reproduction and Survival of Dairy Cattle (S-1008)	X	X				
WIS04726	Thomas, M.	Understanding the Biosynthesis of the Broad-Spectrum Antibiotic Streptothricin	X					
WIS04729	Shoemaker, D.	Effects of Wolbachia on Host MTDNA Evolution	X					
WIS04734	Ruegg, P.	Mastitis Resistance to Enhance Dairy Food Safety (NE-1009)	X	X			X	
WIS04735	Wiltbank, M., Fricke, P.	Methods to Increase Reproductive Efficiency in Cattle (NC-1006)	X	X			X	

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WIS04736	Khatib, H.	Candidate Gene Approach for Identification of Genes Affecting Milk Production Traits in Dairy Cattle	X					
WIS04744	**Bockheim, J.**	**Soil Dynamics in Gaps of Old-Growth Northern Hardwood Ecosystems in the Upper Great Lakes Region**			X			
WIS04765	**Allen, C.**	**Understanding Bacterial Wilt Virulence from the Inside Out**	X					
WIS04767	**Charkowski, A. O.**	**Identification of Genes Unique to Highly Pathogenic Erwinia Carotovora Subsp. Carotovora**	X					
WIS04769	**Craig, E. A.**	**Understanding Cellular Factors Modulating the In Vivo Propagation of the Yeast Prion [RNQ+]**	X					
WIS04770	**Czuprynski, C. J.**	**Effect of Macrophage Receptors on Uptake, Phagosomal Fusion and Intracellular Fate of Mycobacterium Paratuberculosis**				X		
WIS04772	**Doebley, J.**	**Using Population Genetics to Identify Genes of Agronomic Importance in Maize**	X					
WIS04774	**Gianola, D.**	**Statistical Procedures for Genetic Evaluation of Susceptibility to Mastitis in Dairy Cattle**	X					
WIS04775	**Gunasekaran, S.**	**Evolution of Microstructural and Rheological Characteristics of Heat-Induced Globular Protein Gels**	X					
WIS04776	**Grau, C.**	**Eliminate Yield Loss Associated with Brown Stem Rot of Soybean**	X				X	
WIS04777	**Jung, G.**	**Mapping QTL for Dollar Spot Resistance in Bentgrass**	X				X	
WIS04778	**Kosola, K. R.**	**Plant and Soil Components of Nitrogen Cycling in Cranberry Beds - Does Dissolved Organic Nitrogen Play a Role?**	X					
WIS04779	**Krysan, P. J.**	**Genetic Analysis of Signal Transduction Pathways in Arabidopsis that Control Cytokinesis**	X					
WIS04780	**Lan, Q.**	**Functional Analysis of Sterol Carrier Protein-2 in Insect Model System**	X					
WIS04781	**Langston, N.**	**The History of Adaptive Management in Wisconsin Forestry**			X			
WIS04784	**Masson, P. H.**	**Molecular Genetic Analysis of Helical Growth in Arabidopsis Thaliana**	X					
WIS04786	**Parrish, J. J.**	**The Effect of Scrotal Insulation on Male Germ Cell Apoptosis**	X					
WIS04788	**Pelegri, F. J.**	**Expression and Function of the Fertility Factor Gene Deleted in Azoospermia (DAZ) in the Zebrafish**	X					
WIS04791	**Sussman, M. R.**	**Genetic Manipulation of Plasma Membrane Proteins Involved in Transport and Signal Transduction in Plants**	X					
WIS04792	**Reznikoff, W.**	**TN5 Transposase - Host Protein Interaction**	X					

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WIS04793	**Stoltenberg, D. E.**	**Early Detection of Neighbor Plants: The Role of Light Quality in Crop-Weed Interactions**	X					
WIS04794	**Talaat, A. M.**	**Genetic Analysis of the Virulence of Mycobacterium Avium Subspecies Paratuberculosis**				X		
WIS04795	**Thomas, D. L.**	**Effect of Feeding Level for Dairy Ewe Lambs During the Prepubertal Period on their Milk Production as Ewes**	X				X	
WIS04796	**Bussan, A. J.**	**Nutrient Trap Intercrops for Wisconsin Potato Production Systems**	X				X	
WIS04797	**Weigel, K.**	**Detecting Genes Related to Female Fertility, Maternal Calving Ease, Milk Fever, Component Percentages, and Somatic Cell Count in a Holstein**	X				X	
WIS04798	**Wickens, M.**	**MRNA Control in Arabidopsis**	X					
WIS04800	**Young, D.**	**A Survey of the Checkered Beetles in Wisconsin (Coleoptera:Cleridae) with Special Emphasis on Wisconsin's Forests**			X			
WIS04802	**Albrecht, K. A.**	**Improved Crop and Livestock Management for Protecting the Non-Galciated Upper Mississippi Valley (NC-1012)**	X	X				
WIS04806	**Jackson, R.**	**Re-Introduction of Native Prairie Grasses into Managed Pasture Ecosystems**	X					
WIS04813	**Kruse-Elliott, K.**	**Mechanisms of Swine Lung Diseases**				X		
WIS04814	**Collins, M. T.**	**Induction of Diagnostically Valuable Mycobacterium Paratuberculosis Protein Antigens**				X		
WIS04829	**Connelly, R. K.**	**Investigation of the Effect of Mixing Intensity of Dough Development and Rheological Property Measurement**	X					
WIS05231	Shaver, R.	Starch Properties of Corn and Utilization by Dairy Cattle	X				X	
WIS05233	Yandell, B.	New Approaches to Analysis of Microarray Data: Epigenetic Control of Maize Endosperm Gene Expression as a Model	X					
WIS05234	Handelsman, J.	The Trojan Horse and the Gypsy Moth: Harnessing Killer Plasmids for Targeted Study of Microbial Communities	X					
WIS05235	McManus, P.	Trojan Horse in the Orchard: A Novel Strategy to Combat Erwinia Amylovora, the Fire Blight Pathogen	X				X	
WIS05236	**Grau, C.; German, T.; Hogg, D.; Borges, R.**	**Dynamic Soybean Pest Management for Evolving Agricultural Technologies and Cropping Systems (S-1010)**	X	X			X	
WIS05237	**Yandell, B.; Attie, A.**	**Molecular Biometry of Diabetes and Obesity: Modeling Biochemical Pathways Using Experimental Crosses**	X					
		Total:	**2534243**	**690090**	**236162**	**115684**	**711919**	**174.1**

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E
		Objective 1.4: To Improve Decision-Making on Public Policy Related to Productivity and Global Competitiveness of the U. S. Agricultural Production System						
WIS04456	Buongiorno, J.	Effects of Economic Shocks, Trade Liberalization, and Recycling Policies on the Global Forest Sector			X			
WIS04559	Buttel, F. H.	Impact Analysis and Decision Strategies for Agricultural Research (NC-1003)	X	X				
WIS04654	Fortenbery, T. R	An Economic Analysis of Resource Mobility in Agriculture	X				X	
WIS04693	Bell, M.	Farm Family Success in Diversified Agriculture: A Comparative Study of Wisconsin Farm Families	X					
WIS04717	Kloppenburg, J.	Sustaining Local Food Systems in a Globalizing Environment: Forces, Responses, Impacts (NE-1012)	X	X				
WIS04748	Kleinman, D.	Where is the Social in the Regulation of Agricultural Biotechnology?	X					
WIS04918	**Chavas, J.**	**Agricultural Productivity Analysis Under Risk**	X					
		Total:	**81739**	**50389**	**32952**	**0**	**5153**	**7.6**
		Total Goal 1:	**2844168**	**822329**	**269114**	**115684**	**740807**	**194.2**

Impact Statements and Selected Results

Publications in refereed journals, books, and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects are reported as impacts on agriculture or natural resources. Some of the projects had funding from Hatch, McIntire-Stennis and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

Growing Farmers' Yields by Making Their Crops Compact

Key themes: Plant Genomics, Plant Production Efficiency
Focus areas: Advances in Biotechnology to Develop New Agricultural Products

The issue: For many crops, including corn, increases in yields come with varieties that thrive when planted at high density; this is especially important as space for agriculture becomes increasingly restricted. High-yield crops are usually compact, allowing them to grow close together without becoming long and spindly as they compete for light in a dense environment. Such high-yielding crops were the driving force behind yield gains from the Green Revolution of the 1960s and 1970s in many regions of the world. In order to create compact crop varieties, scientists must identify key genes that regulate gibberellins, the hormones that control a plant's size and shape.

What's been done: Biochemists at the University of Wisconsin-Madison randomly inserted a DNA sequence that contained enhancing factors into the *Arabidopsis* genome. *Arabidopsis* is a model plant used to study the function of crop plant genes. The random insertion either disrupted an existing gene sequence enough to cause a loss-of-function mutation or increased the function of an existing gene near the point of insertion. Using this technique, the researchers created over 100,000 activation-tagged strains, and identified mutants that were similar to the dwarf mutants that occur naturally when plants lack the ability to synthesize or detect the hormone gibberellin. The researchers have identified genes that appear to be directly involved in the degradation of gibberellin in *Arabidopsis*, and reproduced the dwarfing effect by activating the same genes in tobacco plants.

Impact: These dwarf genes are already being used in high value crops like petunias. The gene sequences have been deposited into gene banks and publications have resulted from the research. Higher-yield crops translate into increased efficiency for farmers. That means a potential for higher profits, and also the possibility of enhancing environmental quality by decreasing the amount of land under cultivation.

Funding: Wisconsin Hatch Project WIS04662, "Identification and Characterization of Dwarfing Genes", and a collaborative project with T.C. Osborn funded by USDA-CSREES, "Development of Genomic Tools and Resources for *Brassica oleracea.*"

Improving Yogurt's Texture Gives Consumers a More Appealing Product
Key themes: Adding Value to New and Old Agricultural Products, Food Handling
Focus areas: Biobased Products Program

The issue: When consumers open a container of yogurt and find a pool of milky liquid at the top they may assume that something is wrong with the product. Yogurt that has "whey-off" or other inconsistencies in texture is sometimes interpreted as spoiled, when in fact it is actually safe to eat. In order to make a consistent final product, yogurt makers sometimes add chemical stabilizers to control texture problems—however, using stabilizers is costly and may affect consumer perceptions of yogurt as a health food. In a broader sense, there may be a gap in knowledge base between producers in the United States and their counterparts in Europe, where yogurt is more widely consumed as a health food.

What's been done: Food scientists at the University of Wisconsin-Madison are exploring how processing steps as well as different starter cultures affect the final texture of yogurt. Factors such as heat treatment, incubation temperature, and fat and whey protein concentrations can all change the texture and consistency of the final yogurt product. For example, too high an incubation temperature can cause lumpy yogurt with a watery pool of whey at the top, while using too low a concentration of milk solids can lead to yogurt that does not hold together well.

Impact: Strengthening the yogurt market will also help milk producers: in 2002 more than 2100 million pounds of yogurt were made, a figure that has quadrupled in the past 20 years and has the potential to grow further. To help boost the knowledge base of American yogurtmakers, UW-Madison food scientists offer a three-day short course to help representatives from the yogurt and cultured dairy products industry improve processing methods. In the first year 35 students enrolled, and the course was so popular that the organizers plan to hold it every year. Developing ways to make yogurt without adding stabilizers will give yogurtmakers the opportunity to market yogurt as a health food in the future, an approach that has already proven very successful in Europe. Yogurt is an important source of calcium in the U.S. diet and a source of bacterial cultures that improve gastrointestinal health.

Funding: Wisconsin Hatch Project WIS04668, "Understanding the Structure-Function Relationships that Control the Rheological and Sensory Properties of Stirred-Type Yogurt," Wisconsin Hatch Project WIS04363, "Investigation Into Improving the Texture and Functionality of Fermented Milk Products," and state dairy industry support.

Meeting the Demand for Next Year's Dairy Herd
Key themes: Animal Production Efficiency, Agricultural Profitability
Focus Area: Advances in biotechnology to develop new agricultural products

Issue**:** There is constant turnover of the national dairy herd with cows averaging 2.5 lactations before they're culled. There is always a good market for replacement dairy heifers with high potential. Wisconsin has about 10 generations of artificial insemination behind most of its Holstein herd, so the genetics are good in these culled cows. Beef cow-calf operations are always looking for additional profit and selling high quality dairy replacements could improve their

finances. Unlike dairy cows, beef cows don't face intense milking demands for 300 days a year, and can easily gestate twin calves for sale thus increasing income further. With embryo transfer technology, those twin calves can be dairy breeds. Sexed semen makes induced twinning systems practical by avoiding mixed sex twins and producing more females for sale. Producing two female twins avoids freemartinism (when male and female cattle twins gestate together, the female is usually born a sterile freemartin). Another problem with seasonal breeding can also be helped with this technology. Pregnancy rates in artificially inseminated Florida dairy cows may drop to 5 percent in the summer heat. In order to ensure a sustainable milk supply, cows need to become pregnant year-round.

What's been done: Collaborating with the University of Illinois, CALS animal scientist Jack Rutledge is using sexed semen and ovaries harvested from culled Holstein cows to produce Holstein embryos. Improvements in laboratory procedures as a result of research mean Rutledge's lab can produce high-quality embryos for $35 each; the sexed semen is 95-percent reliable at producing offspring of the desired sex. After synchronizing the Illinois beef cows' estrous cycles, technicians took Wisconsin-made embryos to Illinois and transferred them to the cows. In a cooperative project with the University of Florida, CALS researchers evaluated the use of fresh, *in-vitro*-produced Holstein embryos in a large commercial herd near Miami to attempt to improve summer reproduction. Additional work with similar reproductive systems has been used to provide embryos for farmers in Vietnam to improve the genetics of dairy animals there.

Impact: Researchers transferred twin embryos to 400 Illinois beef cows and achieved a 40-percent pregnancy rate, with half of those pregnancies producing twins. In the Florida project, researchers observed a four-fold increase — from 5 percent to 20 percent — in the summer pregnancy rate of treated cows.

Funding: Hatch projects WIS04887 and WIS04361, "Germ Cell and Embryo Development and Manipulation for the Improvement of Livestock (part of multistate projects W-171 and W-1171) and an Agency for International Development grant.

Using Science to Manufacture Creamier Ice Cream that is Lower in Fat

Key themes: Food Quality, Adding Value to New and Old Agricultural Products
Focus areas: Scientific Basis for Optimal Health

The issue: The average American consumes 26.4 lbs/year of ice cream and other frozen dairy products (2002 ERS statistics), and most of those pounds are full-fat ice cream. Many Americans are overweight, and that trend is increasing. Dietary needs in the United States are much different than they were 100 years ago, and the food industry is attempting to adjust. Many of our processed foods were developed between the 1930s and the 1950s, when people's caloric intake was not as high as it is today. The food industry is moving to develop foods for the new millenium – traditional foods, "reformatted" to meet today's dietary needs with fewer calories and lower fat content.

What's been done: The structure of ice cream affects properties such as hardness and melting rate that in turn influences our perception of the ice cream. Food engineer Rich Hartel measures ice crystals, air cell sizes and fat globules and creates structural models of how ice cream melts

and how hard it is. He is examining how ice crystals form in ice cream mix during the first freezing step. A better understanding of crystal formation will help manufacturers keep crystals small, producing a creamier, smoother texture at lower fat contents.

Impact: Understanding food structures and their effects on properties (melting rate, hardness, smoothness) will allow food technologists to recommend changes in processing and formulation that will reduce fats in food. Understanding how ice crystals form and why they change and grow over time, and how sugars and stabilizers affect ice cream, will allow manufacturers to develop products with all the flavor and creaminess of full-fat ice creams, but less fat and fewer calories. Ice cream containing 6 percent fat that tastes like ice cream containing 12 percent fat would be a lot healthier for people. Hartel leads numerous short courses and workshops attended by industry scientists to further their knowledge about manufacturing ice cream. Hartel is co-author of the book, Ice Cream (6^{th} Edition), which has been called the bible of ice-cream manufacture. The book is used extensively by the ice cream industry and as a textbook.

Funding: Wisconsin Multistate Hatch project WIS01599, "Improvement of Thermal and Alternative Processes for Foods," a USDA-NRI competitive grant "Structure/functionality Relationships in Water-in-oil Emulsion Products," and financial support from the dairy industry.

Lessons from Nature: Mimicking Wind Damage Maintains Forest Biodiversity and Aesthetics

Key themes: Forest Resource Management, Biodiversity, Natural Resources Management, Forest Crops

Focus areas: Sustainability of Agriculture and Forestry

The issue: Forest harvesting methods that imitate natural disturbance can help preserve biological diversity by providing a range of habitat conditions to which native plants and animals are already adapted. While this principle is standard policy on most public lands, there is a lack of information about how to modify traditional harvesting practices. Consequently, this policy is not always put into practice: hardwood stands in the northeast and lake states are usually managed by clearcutting or light selective cutting, neither of which imitate natural disturbance. Furthermore, public controversy over clearcutting and its variants have stalled public land management for decades.

What's been done: UW-Madison forest ecologists determined that most natural hardwood stands are subjected to at least one moderately severe windstorm during the lifespan of the trees. The pattern of disturbance created by windstorms is much different than patterns created by clearcutting or traditional selective cutting: windstorms often leave 60 to 70 percent of the stand intact while creating some large openings, which certain plant and animal species need to survive. The scientists have developed harvest guidelines that mimic these patterns, and have also created a computer model to forecast how long it will take for a harvested or wind-damaged forest to recover its previous state. The researchers are also calculating sustainable rates of timber production under the new guidelines, and will make recommendations on harvest frequency.

Impact: These new management recommendations could help resolve the long-standing stalemate on public forest management. The new practices are scientifically defensible because they are based on natural disturbance patterns and frequency. They help preserve biological diversity by maintaining a wide variety of habitat conditions, including openings in the canopy and old-growth cover. In fact, they may help reverse the population declines of many migrant species of songbirds. The practices will be more economically viable than selective cutting, and also likely more acceptable to the public.

Funding: Wisconsin McIntire-Stennis Project WIS04684, "Dynamics and Management of Multi-cohort Northern Hardwood Forests: A New Ecosystem-based Approach to Maintaining Diversity and Aesthetics," and an award from the U.S. Forest Service.

Goal 2. A Safe and Secure Food and Fiber System.

Executive summary

Under this goal, there were 11 projects including 1 that was multistate, interdisciplinary projects, and 2 integrated research/extension projects. Wisconsin is committed to continually changing its portfolio of research.

Wisconsin has a strong livestock economy with the majority of milk producers selling milk for cheese manufacture and crops for export from Wisconsin. New products or uses for agricultural products are greatly desired. New projects include WIS04773, "Measurement of Local and National Impacts Associated with an Expanded Bio-Fuels Industry: An Economic Analysis". Food safety is an increasing concern of consumers and two new projects address some particular problems in dairy processing plants: WIS04771, "Generation of antifouling layers from high molecular weight liquid phase compounds under cold plasma conditions" and WIS04799, "Characterization of biofilm formation by *Bacillus cereus"*. Finally, two projects have been started this year that address prion proteins (such as CWD and diagnosis of Johne's disease).

Updated project list for FY04

New projects are printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Projects falling under multiple goals are listed in each.

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
Goal 2: A Safe and Secure Food and Fiber System								
Objective 2.1: To Improve Access to an Affordable, Healthful, and Culturally Relevant Food Supply								
WIS04357	Richards, M.	The Poultry Food System: A Farm to Table Model (S-292)	X	X				
WIS04654	Fortenbery, T. R.	An Economic Analysis of Resource Mobility in Agriculture	X				X	
WIS04773	**Fortenbery, T. R.**	**Measurement of Local and National Impacts Associated with an Expanded Bio-Fuels Industry: An Economics Analysis**	X				X	
		Total:	**50586**	**7387**	**0**	**0**	**32573**	**1.1**
Objective 2.2: To Improve Food Safety by Controlling or Eliminating Foodborne Risks								
WIS04530	Kaspar, C. W.	Regulation of DPS - A Key Acid Tolerance Protein in E. Coli 0157:H7	X					
WIS04660	Gourse, R.	Transcription Initiation Complexes in Diverse Bacteria	X					
WIS04667	Yu, J.	Genetic Studies of Fungal Asexual Sporulation Signaling Pathway	X					
WIS04726	Thomas, M.	Understanding the Biosynthesis of the Broad-Spectrum Antibiotic Streptothricin	X					
WIS04769	**Craig, E. A.**	**Understanding Cellular Factors Modulating the In Vivo Propagation of the Yeast Prion [RNQ+]**	X					
WIS04771	**Denes, F. S.**	**Generation of Antifouling Layers From High Molecular Weight Liquid Phase Compounds Under Cold Plasma Condition**	X					
WIS04799	**Wong, A.**	**Characterization of Biofilm Formation by Bacillus Cereus**	X					
WIS04814	**Collins, M. T.**	**Induction of Diagnostically Valuable Mycobacterium Paratuberculosis Protein Antigens**				X		
		Total:	**158449**	**0**	**0**	**13754**	**0**	**13.7**
		Total Goal 2:	**209035**	**7387**	**0**	**13754**	**32573**	**14.8**

Impact Statements and Selected Results

Publications in refereed journals, books, and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects have impacts on food processors and consumers. Some of the projects had funding from Hatch, McIntire-Stennis and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following project.

Scouring the Barnyard for a Deadly Pathogen
Key themes: Food Safety, Food Borne Pathogen Protection
Focus areas: Sustainability of Agriculture and Forestry

The issue: *E. coli* 0157:H7 is a particularly nasty pathogen that sickens about 75,000 and kills 50 people a year in the United States. In recent years the largest outbreaks have come from bacterium consumed in undercooked ground beef. One of the reasons *E. coli* 0157:H7 is so difficult to control is that it commonly occurs in barnyards and can pass from one cow to another through water sources contaminated by manure. While *E. coli* 0157:H7 in a cow's stomach poses no direct threat to humans, it can spread to meat during processing. This particular strain is acid-tolerant, a characteristic that increases the disease-causing ability.

What's been done: University of Wisconsin-Madison microbiologists are trying to determine how the survival characteristics of *E. coli* 0157:H7 influence its persistence in the intestinal tracts of cows. They found that inactivating specific stress-tolerance proteins makes the bacterium less able to tolerate the acidic environment of a gastrointestinal tract. The scientists continue to investigate the mechanism by which the stress-tolerance proteins convey protection from harsh environmental conditions and how strains differ in their regulation of these genes. Knowledge of how this particular strain can tolerate stomach acids could provide clues to help decrease persistence in meat and other foods.

Impact: Wisconsin produces millions of pounds of ground beef each year, mostly from dairy cattle. In addition to jeopardizing human health, outbreaks of *E. coli* 0157:H7 prompt meat recalls, which negatively affect beef producers. By determining how *E. coli* 0157:H7 is able to survive in a cow's stomach, UW-Madison microbiologists may be able to help stop the bacterium before it leaves the barnyard. Additionally, working with two Wisconsin slaughter facilities, investigators were able to show that downer cows have a more than 3 fold higher prevalence of *E. coli* 0157:H7 than normal cows. Avoidance of downer cows in the human meat supply could lower potential exposure to this strain.

Funding: Wisconsin Hatch project WIS04530, "Regulation of DPS – A Key Acid Tolerance Protein in E. coli 0157: H7" and a USDA NRI project, National Cattlemen's Beef Association and the University of Wisconsin Food Research Instititute.

Goal 3. A Healthy, Well Nourished Population.

Executive summary

Under this goal, there were 18 projects including 1 that was a multistate interdisciplinary project, and 2 that were integrated research/extension projects. Some projects listed under Goals 1 and 2 also have relevance for Goal 3. For instance, project WIS04787, "Identifying Potentially Anticarcinogenic Components in Common Vegetables" has implications for human health through improved nutrition but also may affect the vegetable producers and the success of their operations.

Wisconsin is committed to continually changing its portfolio of research. New projects this year include several focusing on emerging obesity issues (WIS04785, "Regulation of Stearoyl-COA Desaturase by Leptin"; WIS04790, "Time Course of Adaptation to a High Fat Diet with Exercise"; and WIS04834, "Assessment of Dietary Intake and Physical Activity and Their Associations to the Development of Obesity and Asthma in Early Childhood.) Another new project focuses on a cholesterol carrier protein with implications for modulating blood lipids.

Updated project list for FY04

New projects are printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Projects falling under multiple goals are listed in each.

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
Goal 3: Healthy, Well Nourished Population								
Objective 3.1: To Optimize The Health of Consumer By Improving the Quality of Diets, the Quality of Food, and the Number of Food Choices								
WIS03967	Nitzke, S. A.	Using Stages of Change Model to Promote Consumption of Grains, Vegetables and Fruits by Young Adults (NC-219)	X	X			X	
WIS04440	Eisenstein, R. S	Iron Regulation of Transferrin Synthesis & Secretion	X					
WIS04444	Groblewski, G. E	Calcium/Calmodulin Dependent Protein Kinase II and Digestive Exocrine Secretion	X					
WIS04525	Reed, J D.	Structure of Cranberry Proanthocyanidins That Protect Low Density Lipoproteins From CU2+ Induced Oxidation	X					
WIS04532	Goldman, I. L.	Biosynthesis fo Tocopherols (Vitamin E) and Relationship to Provitamin A Carotenoids in Carrot	X					
WIS04533	Tanumihardjo, S. A.	Development of 13C Stable Isotope Techniques to Assess Vitamin A Status and Carotenoid Bioavailability	X				X	
WIS04672	Ney, D.	Enterotrophic Effects of Insulin-Like Growth Factor-1 and Growth Hormorne During Parenternal Nutrition	X					
WIS04768	**Clagett-Dame, M.**	**Vitamin A and Brain Development**	X					
WIS04785	**Ntambi, J. M.**	**Regulation of Stearoyl-COA Desaturase by Leptin**	X					
WIS04787	**Parkin, K. L.**	**Identifying Potentially Anticarcinogenic Components in Common Vegetables**	X					
WIS04790	**Schoeller, D. A.**	**Time Course of Adaptation to a High Fat Diet with Exercise**	X					
WIS04834	**Lai, H.**	**Assessment of Dietary Intake and Physical Activity and their Associations to the Development of Obesity and Asthma During Early Childhood**	X					
WIS05237	**Yandell, B.; Attie, A.**	**Molecular Biometry of Diabetes and Obesity: Modeling Biochemical Pathways Using Experimental Crosses**	X					
		Total:	**386525**	**29239**	**0**	**0**	**74526**	**27.7**

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
Objective 3.2: To Promote Health, Safety, and Access to Quality Health Care								
WIS04433	Jeanne, R. L.	Mechanisms of Communication Yellowjacket Wasps	X					
WIS04526	Chambliss, G.	Degradation of Explosive Compounds by Bacteria	X					
WIS04527	Landick, R.	Recognition of Pause and Termination Regulatory Signals By Diverse Bacterial RNA Polymerases	X					
WIS04729	Shoemaker, D.	Effects of Wolbachia on Host MTDNA Evolution	X					
WIS04780	**Lan, Q.**	**Functional Analysis of Sterol Carrier Protein-2 in Insect Model System**	X					
		Total:	**110378**	**0**	**0**	**0**	**0**	**13.3**
		Total Goal 3:	**496903**	**29239**	**0**	**0**	**74526**	**41.0**

Impact Statements and Selected Results

Publications in refereed journals, books, and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects listed under other goals have impacts on human health and nutrition. Some of the projects had funding from Hatch, McIntire-Stennis, and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

Healthy Components in Your Food?

Key issues: Human Nutrition, Medicinal Plant, Nutriceuticals
Focus areas: Scientific Basis for Optimal Health

Issue: Proanthocyanidins are a diverse family of flavonoid plant chemicals, and cranberries are loaded with proanthocyanidins. Proanthocyanidin consumption is associated with decreased risk of cardiovascular disease and atherosclerosis in humans and promote urinary health. Urinary tract infections account for over 11 million clinic visits in the U.S. each year.
Proanthocyanidins don't break down easily, and chemically they are a widely varying group of molecules. This makes it difficult for scientists to study their structure/activity relationships, and limits research on their bioactivity. If food sources of proanthocyanidins vary in their health benefits, characterization of sources would help in nutritional choices and genetic improvements to crops. The food industry and the nutritional supplement industry are very interested in the qualities of proanthocyanidins.

What's been done: CALS animal scientist Jess Reed has shown that proanthocyanidins in cranberries associate with low-density lipoproteins, and inhibit their oxidation. Oxidation of LDLs is a causative factor in cardiovascular disease and atherosclerosis. Cranberries have hundreds of different proanthocyanidins, all varying in size and structure. Reed is working to determine the relationship between those features and their effects on LDLs. In studying proanthocyanidins' effects on cardiovascular disease and atherosclerosis, his lab uses techniques ranging from basic phytochemistry to an *in-vivo* pig model for studying cardiovascular disease to *in-vitro* studies using LDLs from pigs and phytochemicals from cranberries. Analysis of a Wisconsin-bred cranberry variety, HyRed showed differences in the types of proanthocyanidins in this highly colored variety.

Impacts: Results from this work will benefit the food and supplement industries and regulators and policymakers, as well as the general public. The cranberry industry wants to market cranberries as a healthy food using good research. Results from this study show variety-specific characteristics that may change the health value of fruits and vegetables.
FDA and FTC regulate health claims made by companies marketing nutritional supplements and functional foods, and data on proanthocyanidins are crucial to their regulatory efforts. The USDA is trying to develop a flavonoid database that will include proanthocyanidins.

Funding: NRI Competitive grants 2004-35503-14790 and 2002-35503-12297, Wisconsin Hatch project WIS04525, "Structure of Cranberry Proanthocynanidins that Protect Low Density Lipoproteins from CU2+ Induced Oxidation", Standard Process (a Wisconsin company in the supplement industry), and Ocean Spray Cranberries (a farmer cooperative).

Nutrient-Rich Colored Carrots Will Add More Than Eye-Appeal to Your Salad

Key themes: Human Nutrition, Nutraceuticals, Adding Value to New and Old Agricultural Products

Focus areas: Scientific Basis for Optimal Health

The issue: Vitamin A is an important nutrient that supports healthy vision, growth, reproduction and immune response. Most people should be able to get enough vitamin A by eating a balanced diet, including foods like eggs, milk, carrots and spinach. However, not everyone maintains a healthy diet—and poor eating habits can lead to vitamin A deficiency.

What's been done: University of Wisconsin-Madison nutritional scientists are developing more sensitive methods to determine whether a person lacks dietary vitamin A. The group is establishing effective stable isotope techniques to measure vitamin A levels within the body. They are also studying human uptake of lutein—a compound found in vegetables that helps eyesight—from dietary supplements, and have found that the body does not process lutein effectively when taken as a supplement pill. In a related project, they are investigating the nutritional merits of different colored specialty carrots. These carrots contain a host of compounds beneficial to human health, including antioxidants and vitamins.

Impact: A Wisconsin-based dietary supplement company has expressed interest in working with UW-Madison nutritional scientists on two different projects. The company wants to identify ways to deliver supplemental carotenoids (such as lutein, lycopene and beta-carotene) so that the body can absorb the compound more effectively, and also wants to investigate the nutritional merits of specialty red and purple carrots bred to have high levels of carotenoids, some of which provide vitamin A. A second organization wants to work with the group to evaluate genetically enhanced crops, including enriched rice and maize, to determine their value as vitamin A sources.

Funding: USDA-NRI Competitive Grant WIS04758, "Surrogate Measures of Vitamin A Status Using Validated Methods," Wisconsin Hatch Project WIS04533, "Development of 13C Stable Isotope Techniques to Assess Vitamin A Status and Carotenoid Bioavailability," a collaborative USDA-NRI Competitive Grant with the University of Iowa IOW-9700943, "New methods of Assessing Vitamin A Status," and a USDA Cooperative Agreement with ARS Scientists at University of Wisconsin entitled "Design and Assessment of Nutritionally Enhanced Carrots with Unusual Pigments."

Goal 4. Greater Harmony Between Agriculture and the Environment.

Executive summary

Under this goal, there were 52 projects including 8 that were multistate interdisciplinary projects, 7 were McIntire-Stennis projects, and 10 were integrated research/extension projects. Projects listed under Goal 1 have many aspects that address the interactions of agricultural production and protection of natural resources.

Wisconsin is committed to continually changing its portfolio of research. Rural areas are struggling with many land use issues including the conversion of farmland to housing and retail businesses. Stakeholder meetings have emphasized the need for research to support the decision-making of local county boards and townships particularly with respect to runoff from agricultural operations and developed land. Stakeholders are also encouraging us to look at wholistically at biological systems as part of management decisions and environmental impacts of policy changes. New projects include those on soil microbial communities and nutrient cycling, urban soil and runoff processes, managed pasture systems, and pest management within cropping systems.

Updated project list for FY04

New projects are printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Projects falling under multiple goals are listed in each.

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
Goal 4: Greater Harmony Between Agriculture and the Environment								
Objective 4.1: To Develop, Transfer, and Promote the Adoption of Efficient and Sustainable Agricultural, Forestry, and Other Resource Conservation Policies, Programs Technologies, and Practices that Ensure Ecosystems Integrity and Biodiversity								
WIS03879	Bundy, L. G.	Characterizing Nitrogen Mineralization and Availability in Crop Systems to Protect Water Resources (NC-218)	X	X			X	
WIS04450	Helmke, P. A.	Mineralization of Soil Organic Phosphorus by Phosphatase and Phytase and Its Relation to Plant Nutrition	X					
WIS04538	Barak, P. W.	Mining New Phosphorus Data From Old Soil Fertility Experiments	X					
WIS04539	Kruger, E. L.	Does Stomatal Closure Mediate Nitrogen Deprivation in Trees Exposed to Elevated Atmospheric CO2?	X					
WIS04592	Kosola, K. R.	The Role of Soil Water Potential in Establishment of Cranberry Beds	X					
WIS04606	Crooks, K. R.	Evaluating Landscape -Connectivity Through Radio-Telemetry and Simulation Modeling of Carnivore Movement	X					
WIS04607	Stone, B.	Urban Design and Ecosystem Stress: Quantifying the Relationship Between Development Design Standards and Impervious Land Cover in Madison, Wisconsin	X					
WIS04614	Balser, T. C.	Microbial Community Structure and Soil Carbon Cycling in Old-Growth and Managed Forests of the Southern Lake Superior Uplands	X					
WIS04655	Karthikeyan, K.G.	Fate of Phosphorus During Chemical Manure Treatment and Subsequent Land Disposal of Treated Solids	X					
WIS04675	Bleam, W.	Trace Metal Interactions with Soil Organic Matter: Defining the Role of Specific Ligands	X					
WIS04681	Ribic, C.	Predator Activity and its Relationship to Grassland Bird Nesting Success in an Agricultural Landscape	X					
WIS04744	**Bockheim, J.**	**Soil Dynamics in Gaps of Old-Growth Northern Hardwood Ecosystems in the Upper Great Lakes Region**			X			
WIS04753	**Stiles, C.**	**Evaluating the Influence of Slope Angle and Aspect in Soil-Landscape Development in the Driftless Area of Southwestern Wisconsin**	X					
WIS04766	**Balser, T. C.; Pedersen, J. A.**	**Role of Microbial Community Structure and Forest Management Practices in Soil Carbon Storage**			X			
WIS04778	**Kosola, K. R.**	**Plant and Soil Components of Nitrogen Cycling in Cranberry Beds - Does Dissolved Organic Nitrogen Play a Role?**	X					
WIS04782	**Lowery, B.**	**Carbon, Nitrogen, and Phosphorus Cycling in Eroded Soil Landscapes**	X				X	

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
WIS04800	**Young, D.**	**A Survey of the Checkered Beetles in Wisconsin (Coleoptera:Cleridae) with Special Emphasis on Wisconsin's Forests**			X			
WIS04802	**Albrecht, K. A.**	**Improved Crop and Livestock Management for Protecting the Non-Galciated Upper Mississippi Valley (NC-1012)**	X	X				
WIS04805	**Balster, N.**	**The Effect of Urban Compaction on Soil Structure and its Restoration with Prairie Vegetation**	X					
WIS04806	**Jackson, R.**	**Re-Introduction of Native Prairie Grasses into Managed Pasture Ecosystems**	X					
		Total:	**377035**	**51251**	**91824**	**0**	**80021**	**21.7**

Objective 4.2: To Develop, Transfer, and Promote Adoption of Efficient and Sustainable Agricultural, Forestry, and Other Resource Policies, Programs, Technologies, and Practices that Protect, Sustain, and Enhance Water, Soil, and Air Resources

WIS03601	MacGuidwin, A. E.	Biocontrol of Soil-and Residue-Borne Plant Pathogens (NC-125)	X	X				
WIS03910	Wedberg, J. L.; Wyman, J. A.	A National Agricultural Program to Clear Pest Control Agents for Minor Uses (NRSP-4)	X	X			X	
WIS04265	Hogg, D. B; Grau, C. R.; Undersander, D. J.; Doll, J. D.; Wedberg, J. L.	Development of Pest Management Strategies for Forage Alfalfa Persistence (NC-226)	X	X			X	
WIS04427	Goodrich-Blair, H.	Genetic and Biochemical Characterization of an Ant-Deterrent Produced by X. Nematophilus	X					
WIS04453	Mackay, D. S.	Distributed Parameter NonPoint Source Pollution Modeling in Nested Watersheds	X					
WIS04457	Lindroth, R. L.	Effects of Air Pollutants on Trophic Interactions			X			
WIS04534	Handelsman, J.	Microbial Communication in the Rhizosphere Community	X					
WIS04584	Luschei, E. C.	An On-Farm Assessment of Weed Management Decision Making Under Uncertainty	X					
WIS04595	Converse, J.; Karthikeyan, K. G.	Animal Manure and Waste Utilization, Treatment and Nuisance Avoidance for a Sustainable Agriculture (S-1000)	X	X			X	
WIS04655	Karthikeyan, K.G.	Fate of Phosphorus During Chemical Manure Treatment and Subsequent Land Disposal of Treated Solids	X					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
WIS04660	Gourse, R.	Transcription Initiation Complexes in Diverse Bacteria	X					
WIS04664	Martin, T.	Identifying Novel Chemical Inhibitors of Synaptic Neurotransmission with Potential Applications for Pesticide/Nematicide Development.	X					
WIS04683	Gower, S.	Net Primary Production and Carbon Allocation Pattern of Terrestrial Ecosystems: Global Analysis of Environmental and Land Use Change Effects			X			
WIS04689	Williamson, R.	Biology, Ecology, and Management of Linden Borer, A Serious Insect Pest of Shade Trees in Nurseries and Urban Landscapes in Wisconsin	X				X	
WIS04781	**Langston, N.**	**The History of Adaptive Management in Wisconsin Forestry**			X			
WIS04783	**Luschei, E. C.**	**Uncertainty and its Role in the Dynamics of Weed Populations**	X					
WIS04801	**Thompson, A.**	**Quantifying the Effectiveness of Infiltration Trenches on Reducing Runoff Temperature from Impervious Surfaces**	X					
WIS04833	**Gratton, C.**	**Ecological Linkages Between Natural and Agricultural Habitats Via Movement of Natural Enemies**	X					
WIS04837	**Borges, R.**	**Soybean Grain Composition and Yields as Affected by Crop Rotation, Tillage, and SCN**	X				X	
WIS05232	Stier, J.	Vegetable Buffer Strips for Reducing Contaminated Runoff from Urban Areas	X				X	
WIS05235	McManus, P.	Trojan Horse in the Orchard: A Novel Strategy to Combat Erwinia Amylovora, the Fire Blight Pathogen	X				X	
WIS05236	**Grau, C.; German, T.; Hogg, D.; Borges, R.**	**Dynamic Soybean Pest Management for Evolving Agricultural Technologies and Cropping Systems (S-1010)**	X	X			X	
		Total:	**407766**	**50708**	**75126**	**0**	**141444**	**28.3**

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
		Objective 4.3: To Improve Decision-Making on Public Policies Related to Agriculture and the Environment						
WIS04453	Mackay, D. S.	Distributed Parameter NonPoint Source Pollution Modeling in Nested Watersheds	X					
WIS04466	Hickey, W. J.	Soil Microbial Taxonomic and Functional Diversity as Affected by Land Use and Management (S-297)	X	X				
WIS04538	Barak, P. W.	Mining New Phosphorus Data From Old Soil Fertility Experiments	X					
WIS04621	Pedersen, J. A.	Sorption of Sulfonamide Antibiotics to Soils and Clay Minerals	X					
WIS04661	Wasserman, K.	The Role of Ryea and Ryeb Small RNA Regulators in E. Coli	X					
WIS04666	Wattiaux, M.	Dairy Cattle Diet Formulation on Performance, Nitrogen Utilization, Manure Nutrient Excretion, and Potential Ammonia Loss to the Environment	X					
WIS04693	Bell, M.	Farm Family Success in Diversified Agriculture: A Comparative Study of Wisconsin Family Farms	X					
WIS04748	Kleinman, D.	Where is the Social in the Regulation of Agricultural Biotechnology?	X					
WIS04789	**Provencher, W.**	**The Economic Effects of Rural Land Use Restrictions to Preserve Environmental Amenities**			X			
WIS04830	**Goeschl. T.**	**The Optimal Trade-Off Between Treatment and R & D Strategies in the Management of Pest and Pathogen Evolution**	X					
		Total:	**105287**	**2832**	**35428**	**0**	**0**	**9.8**
		Total Goal 4:	**890088**	**104791**	**202378**	**0**	**221465**	**59.8**

Impact Statements and Selected Results

Publications in refereed journals, books, and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects are listed in other goals but have impacts on agriculture or natural resources. Some of the projects had funding from Hatch, McIntire-Stennis, and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

When the Atmosphere Changes, What Happens to Insects?
Key themes: Air Quality, Forest Resource Management, Global change and Climate Change
Focus areas: Sustainability of Agriculture and Forestry

The issue: Most scientists agree that increased levels of both carbon dioxide and ground-level ozone are evidence that human activities are changing the earth's atmosphere. However, carbon dioxide and ozone have opposing effects on plant growth: carbon dioxide promotes growth, while ozone inhibits it. As the concentration of atmospheric gases continues to change, it remains to be seen how the forest ecosystem will respond. One area of particular interest is whether the impact of insects will change as carbon dioxide and ozone levels increase.

What's been done: Entomologists at the University of Wisconsin-Madison are researching the effects of air pollution on plant-insect interactions at the Free Air CO2 Enrichment facility near Rhinelander, Wis., where trees are fumigated with pollution treatments of carbon dioxide and ozone. In general, their research has indicated that insect populations will shift as the environment changes, but that the effects of climate change will vary among species. For example, the forest tent caterpillar—an insidious pest that recently defoliated 14 million acres of forest in the Great Lakes region—will become more of a threat as levels of ozone rise. The ozone weakens trees' natural defenses against the caterpillars and also negatively effects parasitic flies that help keep tent caterpillar populations under control.

Impact: This project and others like it were included in a series of state-of-the art regional reports about climate change by the Ecological Society of America and the Union of Concerned Scientists. The UW-Madison entomologists responsible for this work helped to write a recent volume on climate change in the Great Lakes region, published in April 2003, which offers an assessment of current conditions, predictions for the future and recommendations for management. The ensuing media attention to the report gave the issue of climate change—including the effects of climate change on insect populations—increased visibility. The scientists involved conducted state and national newspaper, radio and television interviews, met with policy makers, and participated in public forums both large and small.

Funding: Wisconsin Mcintire-Stennis Project WIS04457, "Effects of Air Pollutants on Trophic Interactions," Wisconsin Hatch Project WIS04898, "Impact of Air Pollutants on Forest Insect Communities," USDA-NRI Competitive Grant, "Ecological Consequences of Multiple Global Change Factors: CO2, O3 and Tree-insect Interaction," and the National Science Foundation.

Keeping Forests Safe from a Sneaky Insect Pest
Key themes: Invasive Species, Forest Resource Management
Focus areas: Invasive Species Program

The issue: Bark beetles cause great damage to North American forests every year. These insidious pests, which can kill thousands of trees in mass attacks over vast areas, were recently responsible for damaging 20 million hectares of forest in British Colombia in an ongoing outbreak and another 6 million hectares in Alaska. In Wisconsin, red pine—an important commercial species—is at risk from bark beetles.

What's been done: University of Wisconsin-Madison entomologists have partnered with the Wisconsin Department of Natural Resources, the Canadian Forest Service, and scientists at the University of Montana in a multi-faceted approach to the bark beetle problem. A healthy tree has natural defenses against bark beetles: the pests usually only succeed in attacking trees that are stressed (often by a fungal root infection introduced by root weevils), unless their population is high enough to overwhelm even healthy trees. The scientists are working with DNR officials to sever the root grafts of infected trees at test sites around southern and west central Wisconsin. This long-term project will determine whether it is possible to thwart the beetles by interrupting the fungal infection that stresses the tree. Researchers are also investigating whether the natural predators of the beetles can be used to control them.

Impact: Red pine accounts for almost thirty percent of all seedling species in Wisconsin nurseries. It plays a major role in the state's timber industry, representing more than forty percent of the total softwood production in the state, according to figures published in 2003. Reducing bark beetle damage to red pine and other species would increase industry profits in Wisconsin as well as nationally. From a conservation standpoint, western bark beetles have the potential to cause regional devastation, increasing the likelihood of forest fire.

Funding: Wisconsin-based Multistate McIntire-Stennis Project WIS04910, "Interactions Among Bark Beetles, Pathogens, and Conifers in North American Forests," and USDA-NRI Competitive Grants "Use of Microbial Symbionts in Host Finding by Natural Enemies of Bark Beetles" and "Net Effects of Ophiostomatoid Fungal Associates on Bark Beetle Reproduction."

Dairy Cattle Diet Formulation on Performance, Nitrogen Utilization, Manure Excretion, and Potential Ammonia Loss to the Environment
Key themes: Innovative Farming Techniques, Agricultural Waste Management, Nutrient Management
Focus areas: Sustainability of Agriculture and Forestry

Not all manures are created equal!

The issue: Better nutrient management can help dairy farmers save money as well as be better stewards of air and water quality. Livestock operations are the major source of ammonia release in the United States. Ammonia itself isn't a regulated pollutant. But ammonia reacts with other atmospheric chemicals, such as sulfites from power plants, and becomes a particulate pollutant.

CALS dairy systems management specialist Michel Wattiaux studies the importance of herd nutrition on nitrogen losses from dairy farms, which influence both air and water quality. All protein contains nitrogen, and nitrogen problems on dairy farms come in part from overfeeding protein to cows. Working from a producer perspective, Wattiaux aims to help farmers be more profitable by spending no more than necessary on protein supplements. When cows use protein efficiently, they release less nitrogen to the air and water.

What's been done: Working with the UW-Platteville Pioneer Dairy Farm (a part of the Wisconsin Agricultural Stewardship Initiative), Wattiaux monitored nitrogen use in a dairy herd fed either a typical Wisconsin dairy-cow diet containing 18.5 percent crude protein, or a diet that just meets National Research Council guidelines containing 17.5 percent crude protein. Throughout 2004, researchers tracked nitrogen consumed and measured the nitrogen excreted in manure. Milk production was the same for both groups, but cows on the higher protein diet excreted more nitrogen in manure.

Impacts: Wattiaux plans to apply the Platteville protocol on commercial dairy farms. If this protocol comes together, producers will be able to accurately predict the amount and composition of the manure produced by their herds, rather than using "one size fits all" book values. This will help farmers to better plan their nutrient management and manage manure more effectively, and also reduce their purchases of inorganic fertilizer. Wattiaux has published two journal articles discussing this work.

Funding: Wisconsin Hatch Projects WIS04666, "Dairy Cattle Diet Formulation on Performance, Nitrogen Utilization, Manure Nutrient Excretion and Potential Ammonia Loss to the Environment" and WIS04508, "Impact of Dairy Diet Formulation on Lactation, Nitrogen Utilization, Nutrient Excretion and Potential Ammonia Loss to the Environment," the Babcock Institute local dairy industries.

Agriculture and Landscape Level Management of Grassland Birds

Key themes: Land Use, Natural Resources Management, Riparian Management, Wetlands Restoration and Protection

Focus areas: Sustainability of Agriculture and Forestry

The issue: Grassland birds have undergone population declines in the last third of the 20th century that are steeper and more consistent than those of any other group of birds in North America. There have been few attempts to develop a plan for the conservation of grassland birds that integrate the plan into an active agricultural landscape. Sample and Mossman (1997) proposed the idea of managing for grassland birds at a landscape level by creating large-scale grassland management areas that would accommodate grassland birds while maintaining land in private ownership and in agricultural production wherever possible.

What's been done: A research group at the UW-Madison is evaluating the feasibility of landscape scale management of grassland birds in an agricultural landscape west of Madison, WI, in cooperation with The Wisconsin Chapter of the Nature Conservancy and The Wisconsin Department of Natural Resources. Research has been focused on Wisconsin grassland bird

species of management concern. Bird populations and productivity have been evaluated in continuously grazed pastures, Conservation Reserve Program (CRP) fields, hay fields, and prairie remnants. Bird species included meadowlarks, grasshopper sparrows, Henslows sparrow, and boblink. Predators of grassland birds have been identified in the fields as well as throughout the landscape using track stations and cameras. Movements of individual birds are being documented using radiotelemetry. There was no single habitat in which all grassland bird species of management concern were found, nor was there one habitat type that contained the highest densities of more than two of these species. A mixture of grassland habitats provided for all of the species that occurred in the study area. Bird productivity was highest in CRP fields followed by remnant prairie. The predators documented destroying nests include species that live in the grasslands, habitat generalists, and woodland-edge species that enter grasslands to forage. The predator species documented are not known to specialize on bird nests and probably depredate nests opportunistically.

Impact: Results indicate that a variety of habitat types are needed to accommodate grassland bird species. Therefore, management for grassland birds must be conducted at a landscape scale to be effective. Some predator studies suggest that managing habitat (e.g., increasing grassland size and extent) may be a more successful approach for improving grassland bird productivity. A new project involving the removal of tree rows to enlarge Conservation Reserve Program fields for the conservation of grassland birds is being started to investigate this idea. All of this work is being done through a partnership of management agencies, non-governmental organizations, and the University of Wisconsin-Madison.

Funding: Wisconsin Hatch projects WIS04681, “Predator Activity and its Relationship to Grassland Bird Nesting Success in an Agricultural Landscape"; WIS03942, "Effect of Rotational Grazing on the Terrestrial Bird Community in Riparian Zones of SW Wisconsin”; and WIS04483, “Monitoring and Managing Grassland Birds,” and funding from the Wisconsin Department of Natural Resources, Wisconsin Department of Natural Resources, U.S. Fish and Wildlife Service, and Nature Conservancy.

Goal 5. Enhanced Economic Opportunity and Quality of Life for Americans.

Executive summary

Under this goal, there were 22 projects including 2 that were multistate interdisciplinary projects, 1 McIntire-Stennis project and 8 that were integrated research/extension projects. Included among these projects are those addressing the public perceptions and consumer behavior, literacy and democracy, rural economies, and applications of statistical methods for interpreting data.

Wisconsin is committed to continually changing our portfolio of research. Meetings with our stakeholders have emphasized the importance of understanding rural community vitality. New projects include those on economic aspects of pest and pathogen management, adaptive forestry management, youth participation in communities, and statistical methodology for new molecular techniques. Newly added projects indicate that faculty are responding to these stakeholder needs.

Updated project list for FY04

New projects are printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Projects falling under multiple goals are listed in each.

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
Goal 5: Enhanced Economic Opportunity and Quality of Life for Americans								
Objective 5.1: To Increase the Capacity of Communities and Families to Enhance Their Own Economic Well-Being								
WIS03858	Jasper, C. R.; Goebel, K.	Family Businesses: Interaction in Work and Family Spheres (NE-167)	X	X				
WIS04520	Deller, S. C.	Modeling the Spatial Changes of Wisconsin's Rural Economy	X				X	
WIS04536	Voss, P. R.	Smart Growth Requires Smart Demography!	X				X	
WIS04537	Collins, J. L.	Changing Technology and Apparal Service Jobs in Rural Labor Markets	X					
WIS04654	Fortenbery, T. R.	An Economic Analysis of Resource Mobility in Agriculture	X				X	
WIS04693	Bell, M.	Farm Family Success in Diversified Agriculture: A Comparative Study of Wisconsin Family Farms	X					
WIS04725	Foltz, J.	University Agriculture Innovation Under Intellectual Property Rights	X				X	
WIS04830	**Goeschl. T.**	**The Optimal Trade-Off Between Treatment and R & D Strategies in the Management of Pest and Pathogen Evolution**	X					
		Total:	**148025**	**23486**	**0**	**0**	**85024**	**7.6**
Objective 5.2: To Increase the Capacity of Communities, Families, and Individuals to Improve Their Own Quality of Life								
WIS03972	Barham, B. L.	Impacts of Structural Change in the Dairy Industry (NE-177)	X				X	
WIS04522	Pingree, S.	Science Literacy, Science Information and the Internet	X				X	
WIS04607	Stone, B.	Urban Design and Ecosystem Stress: Quantifying the Relationship Between Development Design Standards and Impervious Land Cover in Madison, Wisconsin	X					
WIS04617	Thering, S.	Developing Indicators of Community Capacity and Documenting Community Capacity Benefits of Citizen Participation	X				X	
WIS04653	Deller, S.	Rural Communities, Rural Labor Markets, and Public Policy (NE-1011)	X	X			X	

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total F.T.E.
WIS04657	Gunther, A.	Mechanisms of the Hostile Media Perception in the Debate over GM Foods	X					
WIS04693	Bell, M.	Farm Family Success in Diversified Agriculture: A Comparative Study of Wisconsin Family Farms	X					
WIS04781	**Langston, N.**	**The History of Adaptive Management in Wisconsin Forestry**			X			
WIS04915	**Dennis, S. F., Jr.**	**Understanding Youth Participation in Community Planning and Environmental Stewardship**	X					
		Total	**138319**	**2127**	**10336**	**0**	**89207**	**8.7**

Objective 5.3: Not Assigned

WIS04674	Clayton, M.	Applications of Statistics to Agriculture: Analysis of Spatially Autocorrelated Categorical Data	X					
WIS04676	Zhu, J.	Analysis of Spatial Data Using Multi-Scale Statistical Models	X					
WIS04686	Nordheim, E.	Using Statistical Resampling Methologies to Provide Inference for Species Abundance and Measures of Similarity in Ecology	X					
WIS05233	Yandell, B.	New Approaches to Analysis of Microarray Data: Epigenetic Control of Maize Endosperm Gene Expression as a Model	X					
WIS05237	**Yandell, B.; Attie, A.**	**Molecular Biometry of Diabetes and Obesity: Modeling Biochemical Pathways Using Experimental Crosses**	X					
		Total:	**94513**	**0**	**0**	**0**	**0**	**4.3**
		Total Goal 5:	**380857**	**25613**	**10336**	**0**	**174231**	**20.6**
		Grand Total:	**4821051**	**989359**	**481828**	**129438**	**1243602**	**330.4**

Impact Statements and Selected Results

Publications in refereed journals, books, and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects are reported as impacts on agriculture or natural resources. Some of the projects had funding from Hatch, McIntire-Stennis, and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

Economic Impact and Roles of Migrant Farmworkers in Wisconsin Agriculture

Key themes: Managing Change in Agriculture, Community Development
Focus areas: Small Farms and Their Contributions to Local Economies

The issue: To function economically, many agricultural employers depend on migrant workers, and often report that they would go out of business if they could not hire these low-cost, seasonal workers. Yet the workers are unable to live adequately on minimum wage rates, with erratic paychecks that often depend on the weather. Migrant workers add significant value to the agricultural economy of the state. Knowing these values could help in formulating policy decisions and structuring wage systems that support migrant workers. The goal of the project was to study the economic impact of migrant agricultural workers to the broader economy of the state and the communities in which they work temporarily.

What's been done: Researchers in the Department of Rural Sociology determined the total dollar amount that migrants spend in WI from their wages; estimated the amount of federal funds (e.g., for health care, education, and employment-related services) that flow into local areas to provide services for migrants; and surveyed employers to determine what viable alternatives might exist to employing this temporary, reliable, and poverty-wage workforce. Researchers also examined what employers do to attract and keep their workforce. A survey of the activities of migrant workers revealed that Wisconsin-based migrant workers plant, weed, and harvest various vegetable crops; plant, trim, paint green and harvest Christmas trees and work in vegetable processing plants. To gather all of this information, researchers conducted a mail survey of agricultural producers and food processors who employ migrant workers, and 200 personal interviews with a sample of migrant workers to identify patterns of wage spending in Wisconsin.

Impact: The study determined the economic impact of funds in Wisconsin's economy generated by the employment of migrant farm workers in a single year: 2001. The employment of over 5,000 workers, the direct spending by and on migrants, and the indirect, or re-spending, resulted in about $14,856,000 of added income to Wisconsin businesses and residents, and the creation of 417 new jobs. The migrant workforce led to over $8,700,000 added to tax revenues for Wisconsin and local governments - mostly from federal grants. Further consideration of these figures will help in developing policy and wage systems that could support migrant workers in Wisconsin agriculture.

Funding: Wisconsin state project WIS04587, "Economic impact of migrant farmworkers in Wisconsin", and the Department of Rural Sociology Discretionary Fund.

Evaluation of Success of Multistate, Multi-institutional and Multidisciplinary Activities

The College of Agricultural and Life Sciences and indeed the entire UW-Madison campus place a high value upon faculty-driven, multistate, multi-institutional, and multidisciplinary activities. This traditional value has served science and the state well for many years. For the most part, UW Madison administrators take pride in breaking down barriers to multistate, multi-institutional, and multidisciplinary work so that faculty can form effective teams to address pressing problems and issues.

Interdisciplinary tradition and enthusiasm on the UW-Madison campus received recent reaffirmation in the creation of a faculty hiring strategy called "cluster hiring." This hiring strategy encourages and rewards creation of new faculty positions that are interdisciplinary, inter-college, and inter-departmental in nature. A recent example of a cluster is one where four faculty members were hired to address food safety problems, particularly those related to mycotoxin contamination. New faculty members have been hired in areas of mycotoxin biosynthesis, mycotoxin genomics, food microbiology and toxicology (surface coatings), and human medicine – all with a focus of reducing human health dangers posed by mycotoxin and other contaminants of foods. Similarly, cluster hires are underway in land use planning, structural biology, chemical biology, genomics, and a host of other areas across campus. Recent permission has been given for recruiting cluster hires in agroecology and symbiosis, which are likely to result in additional hires for College of Agricultural and Life Sciences.

Discussions under each of the goals previously presented in this report identify multistate, multi-institutional research projects, as well as those that have integrated research and extension objectives. Those data will not be cataloged again here. UW-Madison faculty members are heavily involved in North Central Regional research projects. Evaluation of multistate activities is done by the North Central Regional Experiment Station Directors at the midterm and end of each multistate project. Chairs and heads of departments are organized into fourteen North Central Administrative (NCA) committees. These committees meet annually and review proposals and midterm reports for multistate projects. Each project has an administrative advisor from the North Central region who also submits a written review at the same times. The North Central Multistate Review Committee meets three times a year to consider these reviews and make recommendations for new projects, continuing projects after midterm review, and terminating projects. Minutes of the meetings and review process are available on the NCRA website: http://www.wisc.edu/ncra/. Reviews and actions on NRSP projects are available on the NIMSS website: http://www.lgu.umd.edu/login.cfm

The UW-Madison College of Agricultural and Life Sciences participates in a UW System Consortium for Agricultural and Natural Resources Research, Extension, and Instruction. The purpose of the consortium is to conduct collaborative research among investigators at UW-Madison, UW-Platteville, UW-River Falls, and UW-Stevens Point, in addition to bringing better coordination to instructional and extension programs operated by the four Wisconsin

universities. The Midwest Poultry Science Undergraduate Center of Excellence is yet another example of multistate programming in the instructional area that has great value in offering students from a number of different institutions educational opportunities that otherwise would not be available to them. This program is organized through the UW-Madison. Multistate and multi-institutional programming in all three land grant functional areas (research, extension, and instruction) is a strategy that individual states and institutions adopt with increasing enthusiasm as budget constraints are imposed. New discussions on coordination of dairy production and Upper Mississippi watershed programs have been initiated in 2003.

User input and program response to that input is also referenced in each to the goals sections. It will not be repeated here, other than to stress that great amounts of energy are devoted to meeting with various user groups and incorporating their suggestions and needs into research and extension programming.

Serving the entire community

The Wisconsin Agricultural Experiment Station makes sincere efforts to serve the needs of consumers, minority populations, small landowners, alternative agriculture, and non-traditional clientele. Below lists a number of research projects that relate to these special client groups. Note that five of the following projects are multistate, multidisciplinary projects.

Projects serving underrepresented and minority populations:

Population	Project	Principal Investigator(s)	Title
Rural communities	WIS04653	Deller, S.	Rural Communities, Rural Labor Markets, And Public Policy (NE-1011)
Young adults	WIS03967	Nitzke, S.	Using Stages Of Change Model To Promote Consumption Of Grains, Vegetables And Fruits By Young Adults (NC-219)
Green industry producers	WIS04689	Williamson, R.	Biology, Ecology, And Management Of Linden Borer, A Serious Insect Pest Of Shade Trees In Nurseries And Urban Landscapes In Wisconsin
Small farms, organic agriculture, graziers	WIS03972	Barham, B.	Impacts Of Structural Change In The Dairy Industry (NE-177)
Native Americans	WIS04540	Silbernagel, J.	The Forest History And Spatial Patterning Of American Indian And Euro-American Maple Sugaring Forests Of The Upper Great Lakes Region
Families/women/ small business owners	WIS03858	Jasper, C.; Goebel, K.	Family Businesses: Interaction In Work And Family Spheres (NE-167)
Family farms – small and medium sized	WIS04693	Bell, M.	Farm Family Success In Diversified Agriculture: A Comparative Study Of Wisconsin Farm Families
Small growers, especially minority populations such as Hmong and Hispanic	WIS04717	Kloppenburg, J.	Sustaining Local Food Systems In A Globalizing Environment: Forces, Responses, Impacts (NE-1012)
Rural communities and minority populations	WIS04536	Voss, P.	Smart Growth Requires Smart Demography
Citizens including minority populations	WIS04617	Thering, S.	Developing Indicators Of Community Capacity And Documenting Community Capacity Benefits Of Citizen Participation
Green industry producers	WIS04777	Jung, G.	Mapping QTL for Dollar Spot Resistance in Bentgrass
Alternative forestry & small holders	WIS04781	Langston, N.	The History of Adaptive Management in Wisconsin Forestry
Small livestock farms	WIS04795	Thomas, D.	Effect of Feeding Level for Dairy Ewe Lams During the Prepubertal Period on Their Milk Production as Ewes
Graziers	WIS04806	Jackson, R.	Re-Introduction of Native Prairie Grasses into Managed Pasture Ecosystems

Populations genetically susceptible	WIS05237	Yandell, B., Attie, A.	Molecular Biometry of Diabetes and Obesity: Modeling Biochemical Pathways Using Experimental Crosses
Populations genetically susceptible Poor families & children	WIS04834	Lai, H.	Assessment of Dietary Intake and Physical Activity and Their Associations to the Development of Obesity and Asthma During Early Childhood
Rural economies	WIS04789	Provencher, W.	The Economic Effects of Rural Land Use Restrictions to Preserve Environmental Amenitites
Youth in communities	WIS04915	Dennis, S. Jr.	Understanding Youth Participation in Community Planning and Envirnomental Stewardship

Although formal evaluations have not been done to determine the effectiveness of these efforts, there is ample field experience and observations to support the contention that they do have significant impact on the problems and populations addressed. See earlier presented research impact statements.

Stakeholder groups include those from a wide diversity of backgrounds. For instance, members on the Board of Visitors; the College advisory committee; are recommended by chairs of departments and advisory groups for programs and centers. Current membership includes 5 women, owners of 9 family-owned businesses, and two minority representatives. Each year as members rotate, new nominations are solicited with a request to include diversity as a criteria for nomination.

Stakeholder input for the development and conduct of research relating to state needs has been accomplished in a tiered system. The College of Agricultural and Life Sciences has a central Advisory Board (CALS Board of Visitors) that meets twice a year with the Dean and Associate Deans. Members of this committee (see Appendix B for current list of members) are selected from a wide range of producer, industry, consumer, environmental groups, and state agencies. In addition to advisory groups, the Dean of CALS has been meeting with small groups of leaders representing Wisconsin organizations (see Appendix C) for roundtable discussions. These meetings include traditional and non-traditional stakeholders (invitees included in original Plan of Work).

Meeting Short, Intermediate and Long-term Needs

In the stakeholder process, it is clear that our stakeholders are concerned about immediate needs (e.g. nutrient management to meet new regulatory requirement) and longer-term issues (e.g. the sustainability of agricultural and natural resource systems). In proposals written by faculty for funding, a justification for how the project will meet the CSREES goals and the identified Wisconsin needs is required. In the review process, the reviewers are asked to specifically address how the proposal will meet the issues and needs for Wisconsin and the nation and to characterize the project as meeting short, intermediate or long-term needs. These reviews are used by the Faculty Review Panel in prioritizing projects. In fall 2004, a review of 50 projects at UW-Madison resulted in funding of 35 projects with 8 Hatch projects characterized as meeting short-term needs, 12 Hatch projects as intermediate, and 11 Hatch projects as long term. Two McIntire-Stennis projects were considered as meeting intermediate-term needs, and one Animal Health project was considered as meeting long-term needs. One additional Hatch project meeting intermediate-term needs was reported in 2003 and does not appear in this list. Administrative staff were involved in determining whether proposals met short, intermediate, and long term needs when discrepancies among reviewers were noted. This review process has been successful at identifying outstanding proposals ranging from very basic (usually longer-term impacts) to very applied (often short-term impacts). Under the featured projects described in each goal, note that short and long-term impacts have been described.

Stakeholder Input Process

The Dean and Associate Deans attend many meetings of organizations concerned with our research priorities. Faculty regularly attend national scientific conferences and are members of national and international scientific committees. Many attend national forums for research priority setting such as the FAIR 2002 (Food Animal Integrated Research Symposium) and CROPS 99 (Coalition for Research on Plant Systems). These national conferences include stakeholders and representatives from federal agencies. Many departments, centers, and institutes maintain advisory committees that meet periodically with researchers in the units. Additionally, faculty regularly attend events with agricultural, natural resource, and community service activities.

Wisconsin Cooperative Extension has developed 15 system and issue teams (comprised of University research and Extension professionals, other agency personnel, and producers) to develop educational programs directed at both farm and industry clientele. System teams conduct applied research and educational programming that address issues and problems specific to commodities (dairy, beef, swine, sheep, grain crops, forages, vegetable crops, fruit crops, and urban agriculture/horticulture). Issue teams deal with integrated issues across the agricultural systems (marketing and risk management, farm business management, nutrient management, land use and agriculture, food safety and quality, and new and emerging farm and agricultural markets). Principal investigators with Hatch, McIntire-Stennis, and Animal Health grants are members of both system and issue teams.

Implementation of research priorities in the formula funding process is accomplished through a compilation of the departments' research priorities based on their interactions with stakeholders. Department chairs were asked to provide a small number of research topics from each unit of CALS for use in annual Hatch and McIntire-Stennis calls for proposals. The Dean and Associate Deans assembled a list of common themes from this set that is included in this year's call for proposals. In 2001, a revised list of priorities was collected and issued with the call for proposals for 2005.

For the Animal Health process, every two years, the Association of American Veterinary Medical Colleges (AAVMC), with numerous co-sponsors, organizes a two-day listening conference entitled "Critical Issues in Animal Health Research Conference." Representatives from major and minor commodity groups present their positions on the most critical area for research investment. The Associate Dean of the School of Veterinary Medicine (SVM) attends and helps organize this national conference. The SVM has a Board of Visitors, which meets twice a year with SVM administration and faculty to provide input on critical research issues. Faculty reviewers of proposals annually attend a meeting of a variety of stakeholder groups such as the American Veterinary Medical Association, the National Pork Producers, the Bovine Practitioners Association, and the National Turkey Growers Association.

At UW-Stevens Point, concurrent with the distribution of request for proposals, members of the UWSP Forestry Advisory Committee were contacted and asked to submit priority areas of forestry-related research needs in Wisconsin. The committee consists of 21 members who are recognized as leaders in the forestry and conservation community in the State of Wisconsin.

CALS administrative activities for planning and input:

October 2004 April 2004	CALS Board of Visitors (advisory committee, see Appendix B for current members	CALS Executive Staff and Deans, Dept. chairs of departments
June 2004	All day administrative retreat	CALS Deans and chairs of departments
January 2005	CALS budget retreat	CALS Deans

Areas of Identified Research Need for Wisconsin

Meetings with stakeholders, such as those listed above, are utilized to identify research needs specific to Wisconsin. Faculty meet regularly with a number of college and departmental advisory groups, commodity organizations, state agencies, consumer groups, and private citizens. Input from these stakeholders and from those who are performing the research is used to help highlight areas of research need. Every other year, department chairs are asked to provide a small number of research topics from each unit of CALS for use in Hatch and McIntire-Stennis calls for proposals. The Dean and Associate Deans of the College of Agricultural and Life Sciences work on these needs to identify a set of goals for use in the Hatch and McIntire-Stennis call for proposals. Reviewers are provided theses priorities as is the Research Advisory Committee that ranks the proposals for funding. The following is a compilation of common themes identified and published in the UW-Madison Call for Proposals in summer 2004.

1. Mechanisms of pest and pathogen resistance and safe and effective control, with minimal effects on environmental quality and human health.
2. Effects of change in global climate, population pressures, or public policy on agricultural production, environmental resources, ecosystem management, and future land use.
3. Identification of socioeconomic forces that shape the viability of Wisconsin industries and employment including agriculture, forestry, wildlife management, recreation, and other land uses.
4. Research on food safety, nutritional health, environmental protection, and biotechnology and on providing information on dietary choices, lifestyle, and community decisions.
5. Sustainable agricultural and forestry production and processing systems that provide improved food safety and security, environmental protection, economically viable communities, and human well being. This need requires an understanding of basic life processes in order to manage biotic systems for human use.

Program Review Process

Hatch, McIntire-Stennis, and Animal Health funds are used for specific projects solicited in an annual call for proposals. Animal Health proposals are reviewed at the School of Veterinary Medicine; Hatch and McIntire-Stennis proposals are reviewed in CALS.

CALS process:
The following is published in the call for proposals as guidance to the scientists requesting Hatch or McIntire-Stennis funding. This process occurred in December of 2004 for 50 new proposals.

The Faculty Review Panel (FRP):
The Associate Dean for Research will choose members of the FRP in consultation with the Research Advisory Committee (RAC). Each proposal will be reviewed by two members of the FRP and at least two other (ad hoc) reviewers. The CALS Research Division, in consultation with RAC members, will make the identification of the ad hoc reviewers. Where possible, ad hoc reviewers will be CALS faculty, though other reviewers both on and off campus may be appointed as necessary. The critical criteria for selection of FRP members and ad hoc reviewers will be scientific excellence, appropriate disciplinary expertise, and overall balance. No member of the FRP will have a proposal under review.

Review Criteria for Reviewers:
Reviewers are asked to critique and evaluate proposals in a constructive way, identifying both the strengths and weaknesses of the proposal(s) reviewed. Reviews should be concise and include comments addressing each of the following criteria:

- *An evaluation of the scientific significance of the objectives and appropriateness of the research approach as indicated in the original Congressional Acts and CSREES Goals.*
- *A judgment of the potential usefulness to society of the research, in the short and/or long term. Problem solving is a key feature of the formula funding guidelines.*
- *An evaluation of the ability of the research team to accomplish the stated objectives and the match between the objectives and available resources. For teams with multiple investigators, please include a plan of coordination of the work across laboratories or departments.*

Review Process:

- *Copies of the proposal will be sent to two members of the Faculty Review Panel (FRP) and at least two ad hoc reviewers. Each reviewer will prepare a written critique of the proposal and rank the proposal from excellent to unacceptable. The reviews will be submitted to the CALS Research Division and recorded anonymously upon receipt. The two FRP reviewers will receive copies of all reviews (anonymity maintained) on which they are primary or secondary reviewers prior to the FRP meeting so they may be prepared to lead the discussion on the proposals assigned to them.*
- *A meeting will be held of FRP to discuss proposals. Prior to the meeting, copies of all reviews will be provided to FRP members.*
- *At the meeting, the primary reviewer will give a short description of the proposal, the principal investigator's background, and his/her own critique. The secondary reviewer will provide his/her own critique and raise any other points that have been overlooked. Where*

the FRP has insufficient expertise in the proposal area, an ad hoc reviewer may be brought in as primary or secondary discussant. Comments from ad hoc reviewers will be provided by the primary reviewer and confusing issued clarified.

- *An approximate placement will be made with respect to proposals as discussion takes place. Obviously this placement will involve some degree of reconsideration of previously placed proposals. Because of this process, an inappropriately negative external review will not condemn a proposal. At the end of the process, FRP members will go over the list and look for any inappropriate placement. The prioritized list will be forwarded to the Associate Dean for Research.*
- *The primary reviewer of each proposal will prepare a summary of the written review comments and FRP discussion. The summary and reviews from individual reviewers will be returned to applicants.*

The Research Advisory committee of CALS (10 faculty) approves the guidelines for Hatch proposals, review, and funding. The committee has changed the wording slightly from year to year, but no substantial change in the review process has occurred from the Plan of Work description submitted in July 1999.

SVM Process

Animal Health proposals are reviewed by a faculty committee appointed by James Tracy, Associate Dean for Research, UW-Madison School of Veterinary Medicine. Proposals for research grants from Animal Health Formula Funds are reviewed by the Research Committee of the School of Veterinary Medicine (SVM) in a dual peer review process. After receiving and reading all proposals, the Research Committee first meets to select two peer reviewers, experts in the area of each proposal. These experts are asked to comment both on the scientific merit as well as the relevancy to animal health and specifically to health of livestock in Wisconsin. The Associate Dean for Research of the School of Veterinary Medicine together with the Research Committee from the SVM reviews the overall portfolio of research projects sponsored by the Animal Health Formula Funds to make sure that the portfolio of projects is representative of the livestock health issues in Wisconsin.

UW–Stevens Point Process

The McIntire-Stennis Proposal Review Panel consists of five members, three from the College of Natural Resources and two from the forestry community in Wisconsin. Each review panel member is asked to rank the proposals using the following criteria: scientific and technical merit, ability of the principal investigators to perform the research potential for publishable results, and recommended research topics by the UWSP Forestry Advisory Committee. Decisions are made by the Christine Thomas, Interim Dean of the College of Natural Resources, UW-Stevens Point.

Integrated Research and Extension Activities

Our integrated research and extension activities are organized into projects that have been listed under the appropriate goals. Brief descriptions of activities on our Research Stations are included in Appendix D as examples of the integration.

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multistate Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution Wisconsin Agricultural Experiment Station, College of Agricultural & Life Sciences

State Wisconsin

Check one:
____ **Multistate Extension Activities**
_x_ **Integrated Activities (Hatch Act Funds)**
____ **Integrated Activities (Smith-Lever Act Funds)**

Actual Expenditures

Title of Planned Program/Activity	**FY 2004**
WI Integrated Research and Extension Projects Please see project lists under goals and example descriptions	26% of total Hatch spending
Total	$1,243,602

Margaret Dentine
Executive Director **Date**

Form CSREES-REPT (2/00)

Appendices

Appendix A –CALS Quarterly

CALS Quarterly (2 issues)

(Above articles are not included in electronic version, hard copy by separate mailing)

Appendix B – CALS Advisory Committee membership

CALS Board of Visitors. January 2005

Will Allen – Will is the Director of Growing Power, Milwaukee, and owns a 120-acre farm in Oak Creek, WI. Growing Power is a nationwide nonprofit organization and land trust supporting people from diverse backgrounds and the environments they live in through the development of Community Food Systems.

Juelene Sorensen Beck – Juelene is currently CEO, North American Association of Subway® Franchisees (NAASF).

Brad Biddick – Brad was born into a seed family. His Grandfather sold seed corn from their present day seed company (Trelay Seed Co.) in 1906. They have sold seed every year since.

Linda Bochert – Linda is a partner in the Land and Resources practice group of the law firm of Michael Best & Friedrich LLP.

Kitty Clark Cole – Kitty is an independent fundraising and marketing specialist who does consulting in Wisconsin and Michigan

Randall L. Dimond – Dr. Dimond is currently vice president and chief technical officer for Promega Corporation.

Louis A. Holland – Lou is the ***Managing Partner and Chief Investment Officer*** of Holland Capital Management, L.P.

Daphne R. Holterman –She operates a dairy farm and milk trucking company consisting of 565 milk cows and 1,200 acres.

William "Butch" Johnson – Butch is a businessman from northern Wisconsin. He owns three mills in Hayward, Ashland and Park Falls, which produce wood chips used in paper manufacturing.

Peter J. Kappelman – Pete, with his brother John, owns and operates a 400-cow family dairy farm near Two Rivers.

Frank Kotsonis – Dr. Kotsonis was corporate vice president of World Wide Regulatory Sciences (1995-2000) at the Monsanto Company, senior vice president of Preclinical and Clinical Research at the NutraSweet Company, director of toxicology at G.D.Searle, and adjunct professor of toxicology at the Philadelphia College of Pharmacy and Science. He retired after 23 years at Monsanto in May 2000.

Terry Kurth – Terry is the director of development for U.S. operations for a Weed Man lawn care investment group of which he is part. Terry also has ownership in five Christmas Décor franchises.

Mark Riechers – The Riechers family farms in the far southwestern corner of Wisconsin. They operate 830 acres in Lafayette County, marketing over 1,000 beef steers annually.

Russ Schuler – Russ is Chairman and co-founder of Wisconsin Business Bank.

Gary F. Sipiorski – Gary is the president of the Citizens State Bank of Loyal.

Frederick (Fritz) Usinger, IV – Fritz is President of Fred Usinger, Inc., of Milwaukee, Wis.

Deborah Van Dyk – Vice President, Industry & Regulatory Affairs at Schreiber Foods, Inc. Corporate Headquarters in Green Bay, Wisconsin.

Han F. Zoerb – Hans is Research manager in Cargill's Health and Food Technology Business Unit in both the U.S. and Europe.

Appendix C – 2004 Stakeholder Meetings with CALS Dean and/or Associate Dean(s)

Date	Event
January 6, 2004	AgSource Cooperative Annual Meeting
January 8, 2004	Ashland, Bayfield County Extension Committees
January 9, 2004	Central District Wisconsin Associated County Extension's Committee
January 12, 2004	Wisconsin Livestock and Meat Council
January 14, 2004	Iowa, Grant and Lafayette County Ag & Extension Committees
January 21, 2004	Wisconsin AgriBusiness Council Annual Meeting
January 27, 2004	Wiscosnin Potato and Vegetable Growers Association
January 28, 2004	Federal Agency Committee Meeting
February 10, 2004	Wisconsin Dept. of Agriculture, Trade, and Consumer Protection
February 17, 2004	Wisconsin Agribusiness Workshop
February 19, 2004	Dane County Agribusiness Delegation
February 20, 2004	Ashland, Bayfield County Extension Committees
February 28, 2004	Midwest Food Processor's Association Annual Meeting
Feb. 29-March 2, 2004	Wisconsin CARET Delegates
March 5, 2004	Integrated Crop and Pest Management Advisory Committee
March 7, 2004	Wisconsin Muck Farmer's Association
March 11, 2004	Midwest Poultry Consortium
March 15, 2004	Organic Agriculture Conference
April 3, 2004	Wisconsin Assosciation of Meat Processors
April 12, 2004	Wisconsin Farm Technology Days Board of Directors Meeting
April 13, 2004	National Pork Board Regionalization Discussion
May 6, 2004	Wisconsin Livestock Identification Consortium Board Meeting
May 7, 2004	Department of Agriculture, Trade, and Consumer Protection
May 13, 2004	Wisconsin Landscape Federation
May 20, 2004	Air Quality Workshop for Producers and Agency Personnel
June 19, 2004	Wisconsin Farm Bureau, Wisconsin Fed. Of Coops, Wisconsin Agribusiness Council, Wisconsin NFO
June 22, 2004	World Dairy Expo Board
June 22, 2004	Wisconsin Agriculture Stewardship Initiative Coordinating Council
June 30, 2004	Wisconsin Association of Ag. Educators
July 7, 2004	Wisconsin Livestock Industry Initiative
July 7, 2004	DATCP Livestock Task Force Meeting
July 20, 2004	Midwest Poultry Consortium Board of Directors
July 20, 2004	AgSource Board of Directors Meeting
July 22, 2004	Wisconsin AgriBusiness Council Annual Tour
July 27, 2004	Wiscosnin Turfgrass Association
July 30, 2004	Minitube International
August 19, 2004	Wisconsin Farm Technology Days Media Day
August 23, 2004	Ammonia Emissions Field Day for Producers and Agency Personnel
September 1, 2004	Arlington Field Day
September 2, 2004	Adams, Juneau County Extension Committees

September 10, 2004	Integrated Crop and Pest Management Advisory Committee.
September 17-20, 2004	American Society for Horticultural Science
September 20-22, 2004	Wisconsin Farm Technology Days
September 30, 2004	World Dairy Expo
October 12, 2004	Standard Process Co.
October 26, 2004	Wisconsin Livestock Industry Initiative
October 26, 2004	DATCP Livestock Task Force Meeting
October 26, 2004	Wisconsin Ag Stewardship Initiative Coordinating Council
October 27, 2004	Wisconsin Agricultural Stewardship Initiative
November 3-4, 2004	PDPW – Policy Summit
November 10, 2004	Wisconsin Livestock Identification Consortium Board of Directors
November 17, 2004	Wisconsin Farm Bureau, Wisconsin Agribusiness Council, Wisconsin NFO
December 1-2, 2004	Midwest Dairy Consortium
December 1, 2004	Wisconsin Animal Health Emergency Management System Meeting
December 4, 2004	Wisconsin NFO Board of Directors
December 5, 2005	Wisconsin Farm Bureau
December 6, 2004	Wisconsin Farm Bureau Federation annual Meeting
December 8, 2004	Department of Agriclture, Trade, and Consumer Protection Ag Board
December 10, 2004	World Dairy Expo Board
February 16, March 29, May 10, and December 15, 2004	Department of Agriculture, Trade, and Consumer Protection Secretary's Task Force on Agricultural Education Members – Representatives of Major Wisconsin Agriculture Industries, Agribusiness, Utilitites, K-12 Education Technical College System, Department of Public Instruction, Others
June 28, August 27, September 29, October 27, November 24, and December 15, 2004	Department of Agriculture, Trade, and Consumer Protection (DATCP) Secretary's Land Use Advisory Group Groups: Gathering Waters Conservancy (V. Elkin) Various Private Land Conservation Groups Numerous DATCP Staff June 28, 2004 – Included Vanderwall & Associates, M. Slavney

Appendix D - Agricultural Research Stations 2004 Schedule of Events

Date	Title	Location
April 7, 2004	Garden Recommendations	Ashland
April 21, 2004	Fresh Market Seminar	Arlington
May 1-2, 2004	Saddle and Sirloin Lamb Show	Arlington
May 6, 2004	Central Wisconsin Rural Youth Safety Day	Hancock
June 4, 2004	Dairyfest Mayor's Breakfast	Marshfield
June 12, 2004	Sauk County Dairy Breakfast	Dairy Forage
June 23, 2004	Hay Expo	Arlington
June 27, 2004	Waushara County June Dairy Breakfast	Hancock
June 29, 2004	Garden Flowers	Ashland
June 30, 2004	Agronomy/Soils Summer Field Day	Marshfield
July 1, 2004	Soybean Aphid Management Field Day	Lancaster
July 8, 2004	Statewide 4-H Plant Science Day	Hancock
July 9, 2004	Rhinelander Potato Grower Tour	Rhinelander
July 9-10, 2004	Wisconsin Beef Grazing School	Lancaster
July 13, 2004	Central Wisconsin Potato Field Day	Hancock
July 15, 2004	Field Crop Pest Management Field Day	Arlington
July 20, 2004	Garden Insect and Disease Identification and Control	Ashland
July 27, 2004	Wisconsin Turfgrass Summer Field Day	O.J. Noer
August 9, 2004	Fruits, Flowers, & Vegetables Twilight Tour	Hancock
August 12, 2004	Wisconsin Pickle Day	Hancock
August 13, 2004	Profitable Pastures for Southwest Wisconsin	Lancaster
August 17, 2004	Twilight Garden Meeting	Ashland
August 18, 2004	Vegetable/Horticulture Tour	Marshfield
August 18, 2004	Twilight Garden Tour	Spooner
August 19, 2004	Potato Growers Field Day	Spooner
August 21, 2004	Trial and Demonstration Garden-Horticulture	West Madison
August 28, 2004	Spooner Sheep Day	Spooner
September 1, 2004	Agronomy Field Day	Arlington
September 7, 2004	Beef Cow/Calf Field Day	Lancaster
September 12, 2004	Friends for International Students Picnic	Arlington
September 21, 2004	All About Potatoes	Ashland
September 26, 2004	Prairies Jubilee	Arlington
December 8, 2004	Arlington Dairy Day	Arlington

Additional information on Research Station activities:
http://www.cals.wisc.edu/research/stations/index.html