Annual Report of Plan of Work

Wisconsin Agricultural Experiment Station

College of Agricultural and Life Sciences
University of Wisconsin, Madison

Federal Fiscal Year 2002
Research Activities

Filed March 3, 2003

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

Table of Contents

Annual Report of Plan of Work
Wisconsin Agricultural Experiment Station

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 FY02 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

2002-2003 Science Report - Appendix A
Title: "Education at Work"
Selected stories at
http://www.cals.wisc.edu/sciencereport/index.html

CALS Quarterly - 2 issues included in Appendix A

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

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 12 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 multi-state 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 Multi-state 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://www.lgu.umd.edu/login.cfm

Program Evolution

Programs in the Wisconsin Research Plan of Work were 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 have been 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. Although some multi-state projects have been continuing for more than 10 years, revised proposals are required for review and approval at least every 5 years. Each year, approximately 25 percent of the research portfolios are 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 (131) relate to the goal of "An Agricultural System that is Highly Competitive in the Global Economy." This included 32 projects that were multi-state interdisciplinary projects and 28 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 47 project reported here, with 10 of them being multi-state, interdisciplinary studies, and 11 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 21 projects reported – the third largest number under a goal heading. Five of these were multi-state, interdisciplinary projects, and 5 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 16 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. About 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 131 projects including 32 that were multistate interdisciplinary projects, 11 were McIntire-Stennis projects, 5 were Animal Health projects and 28 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 McIntire-Stennis projects, WIS04505, "Cooperation among Woodland Owners: A Case Study of Organizational Forms and Participant Motivations" has relevance to Goal 4.3 (To improve decision-making on public policies related to agriculture and the environment).

Wisconsin is committed to continually changing its portfolio of research. Twenty-six new projects have been added including those on global economics, price risk management for dairies, whey flavor and processing, coatings for food processing to avoid pathogens, robotic milking, DNA vaccines, and pests of conifers. Meetings with our stakeholders have emphasized the needs of the green industry, alternatives to antibiotics and chemical controls, rural development, alternative crops and agricultural product economics. Newly added projects indicate that faculty are responding to stakeholder needs and new technologies.

Updated project list for FY02

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 Formula Funds	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					
WIS03843	Roper, T. R.	MULTIDISCIPLINARY EVALUATION OF NEW APPLE CULTIVARS (NE-183)	X	X			X		
WIS04165	Young, R. A.	ENHANCED UTILIZATION OF WOOD FIBERS AND POLYMERS THROUGH PLASMA MODIFICATION			X				
WIS04178	Osborn, T.	ALFALFA POPULATION IMPROVEMENT USING NOVEL GERM PLASMA	X						
WIS04239	Claus, J. R.	INHIBITION OF THE PINK DEFECT IN COOKED, UNCURED POULTRY PRODUCTS	X						
WIS04291	Gunasekaran, S.	RHEOLOGIC AND THERMAL PROPERTIES OF MIXED BIPOLYMERS GEL SYSTEMS	X						
WIS04302	Thomas, D. L.	COMPARISON OF EAST FRIESIAN AND LACAUNE DAIRY SHEEP	X				X		
WIS04304	Attie, A. D.	BIOCHEMISTRY AND GENETICS OF INSULIN RESISTANCE AND DIABETES	X						
WIS04363	Lucey, J. A.	INVESTIGATION INTO IMPROVING THE TEXTURE AND FUNCTIONALITY OF FERMENTED MILK PRODUCTS	X						
WIS04394	Plhak, L. C.	IMMUNOCHEMICAL APPROACH FOR THE STUDY OF PLANT LIGNANS	X						
WIS04438	Damodaran, S.	THERMODYNAMIC INCOMPATIBILITY AND PHASE SEPARATION OF PROTEINS AT THE OIL-WATER INTERFACE AND ITS EFFECT ON EMULSION STABILITY	X						
WIS04512	Richards, M. P.	INVESTIGATION INTO INHIBITION OF HEMOGLOBIN-MEDIATED LIPID OXIDATION IN COOKED AND UNCOOKED MUSCLE FOODS	X						
WIS05227	Cropp, R. A.	ADOPTION OF ALFALFA BIOFARMING TO ENHANCE RURAL ECONOMIC DEVELOPMENT	X				X		
WIS04507	**Denes, F. S.**	**Generation Of Antifouling Layers From High Molecular Weight Liquid Phases Compounds Under Cold Plasma Conditions**	X						
WIS04523	**Casler, M. D.**	**The Genetics Of Cell Wall Concentration In Relation To Nutritional Value Of Smooth Bromegrass**	X						
WIS04531	**Bleecker, A. B.**	**Mechanism Of Action Of 1-Methyl Cyclopropene (Mcp), A Potent Inhibitor Of Ethylene Responses In Plants**	X						

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	Total F.T.E
WIS04590	**Sarmadi, M.**	**New Technologies For The Utilization Of Textile Materials**	**X**	**X**					
WIS04596	**Rankin, S. A.**	**Process Variables That Influence Whey Flavor And Function**	**X**				**X**		
		Total:	**$526,682**	**$96,349**	**$27,110**	**$0**	**$103,455**	**$553,792**	**31.9**

Objective 1.2: To Increase The Global Competitiveness of the U. S. Agricultural Production System

WIS00726	Bitgood, J. J.	ADVANCED TECHNOLOGIES FOR THE GENETIC IMPROVEMENT OF POULTRY (NC-168)	**X**	**X**					
WIS01892	Palmer, R. W.	MANAGEMENT SYSTEMS FOR IMPROVED DECISION MAKING AND PROFITABILITY OF DAIRY HERDS (NC-119)	**X**	**X**			**X**		
WIS02229	Greaser, M. L.	MOLECULAR MECHANISMS REGULATING SKELETAL MUSCLE GROWTH AND DIFFERENTIATION (NC-131)	**X**	**X**					
WIS02363	Wiltbank, M. C.	METHODS TO INCREASE REPRODUCTIVE EFFICIENCY IN CATTLE (NC-113)	**X**	**X**					
WIS02366	Roper, T. R.	ROOTSTOCK AND INTERSTEM EFFECTS ON POME AND STONE FRUIT TREES (NC-140)	**X**	**X**			**X**		
WIS03094	Czuprynski, C. J.	BOVINE RESPIRATORY DISEASE: RISK FACTORS, PATHOGENS, DIAGNOSIS AND MANAGEMENT (NC-107)	**X**	**X**					
WIS03113	Tracy, W. F.	PLANT GERMPLASM AND INFORMATION MANAGEMENT AND UTILIZATION (NC-7)	**X**	**X**					
WIS03170	Armentano, L. E.	METABOLIC RELATIONSHIPS IN SUPPLY OF NUTRIENTS FOR LACTATING COWS (NC-185)	**X**	**X**			**X**		
WIS03204	Duke, S. H.	REGULATION OF PHOTOSYNTHETIC PROCESSES (NC-142)	**X**	**X**			**X**		
WIS03270	Albrecht, K. A.	FORAGE PROTEIN CHARACTERIZATION AND UTILIZATION FOR CATTLE (NC-189)	**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**		
WIS03648	Dentine, M. R.	GENETIC IMPROVEMENT OF CATTLE USING MOLECULAR GENETIC INFORMATION (NC-209)	**X**	**X**					
WIS03717	Palta, J. P.	FREEZE DAMAGE AND PROTECTION OF FRUIT AND NUT CROPS (W-130)	**X**	**X**					
WIS03897	Maxwell, D. P.; Nienhuis, J.	GENETIC IMPROVEMENT OF BEANS (PHASEOLUS VULGARIS L.) FOR YIELD, DISEASE RESISTANCE AND FOOD VALUE (W-150)	**X**	**X**					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	Total F.T.E
WIS03911	Bamberg, J. B.; Spooner, D. M.; Simon, P.	INTRODUCTION, PRESERVATION, CLASSIFICATION, DISTRIBUTION AND EVALUATION OF SOLANUM SPECIES (NRSP-6)	X	X					
WIS03987	Darien, B. J.; Backstrom, L.	PRIMING AND CHANGE IN RESPIRATORY TRACT OF PIGS AFTER EXPOSURE TO DUST, ENDOTOXIN AND B-1,3-GLUCAN				X			
WIS04018	Lauer, J. G.	IMPROVEMENT OF SOYBEAN PRODUCTION EFFICIENCY IN A REDUCED-TILLAGE ENVIRONMENT	X				X		
WIS04045	Bockheim, J. G.	SOIL ACIDIFICATION, BASE-CATION CYCLING, AND SUSTAINABILITY OF NORTHERN MESIC FOREST ECOSYSTEMS	X						
WIS04130	Shook, G. E.; Weigel, K. A.	GENETIC ENHANCEMENT OF HEALTH AND SURVIVAL FOR DAIRY CATTLE (S-284)	X	X					
WIS04167	Lorimer, C.	MANAGEMENT OF EASTERN HEMLOCK FORESTS BY SINGLE TREE AND GROUP SELECTION METHODS			X				
WIS04169	Bockheim, J.; David, C.	TIMBER HARVEST IN A SOIL COMPACTION AND ASPEN GROWTH IN THE UPPER GREAT LAKES REGION			X				
WIS04177	Lauer, J.	IMPROVEMENT OF SILAGE YIELD AND QUALITY IN WISCONSIN CORN PRODUCTION SYSTEMS	X				X		
WIS04180	Gianola, D.	BAYESIAN ANALYSIS OF LONGITUDINAL MODELS FOR PRODUCTION, DISEASE AND PROLIFICACY DATA IN ANIMAL BREEDING	X						
WIS04181	Wentworth, B.	REPRODUCTIVE EFFICIENCY OF TURKEYS (S-285)	X	X					
WIS04183	Gourse, R.	PROMOTER IDENTIFICATION AND CHARACTERIZATION IN DIVERSE BACTERIA	X						
WIS04184	Reznikoff, W.	C-TERMINAL ANALYSIS OF TRANSPOSON TN5 TRANSPOSASE	X						
WIS04185	Amasino, R.	MODIFICATION OF FLOWERING TIME IN HIGHER PLANTS	X						
WIS04186	Sheffield, L.	CELL SIGNALING IN MAMMARY GLAND DEVELOPMENT	X						
WIS04190	Stier, J.	MECHANISMS OF COLD TOLERANCE IN TURFGRASSES	X				X		
WIS04194	Clayton, M.	APPLICATION OF STATISTICS TO AGRICULTURE: ANALYSIS OF SPATIALLY AUTOCORRELATED CATEGORICAL DATA	X						
WIS04241	Benevenga, N.	QUANTITATIVE ASPECTS OF LYSINE METABOLISM IN THE PIG	X						
WIS04244	Grau, C. R.	ENDOPHYTIC MICROORGANISMS AND LATENT PATHOGENS AS POSSIBLE AGENTS MODIFYING SOYBEAN HEALTH AND PRODUCTIVITY	X				X		

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	Total F.T.E
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		
WIS04279	Doebley, J.	MOLECULAR-GENETICS OF PLANT ARCHITECTURE IN MAIZE	X						
WIS04290	Bohnhoff, D. R.	LOAD DISTRIBUTION IN METAL-CLAD WOOD-FRAME DIAPHRAGMS	X						
WIS04292	Shinners, K. J.	INTEGRATION OF HAY AND FORAGE EQUIPMENT INTO SITE SPECIFIC FARMING SYSTEMS	X						
WIS04294	Splitter, G.	BRUCELLA GENES INDUCED OR SUPPRESSED WITH INTRACELLULAR INVASION	X						
WIS04297	Boerboom, C. M.	VARIABLES INFLUENCING WEED INTERFERENCE ON CORN AND SOYBEAN YIELD	X				X		
WIS04298	Stoltenberg, D. E.	ECOPHYSIOLOGICAL CHARACTERIZATION AND MODELLING OF WEED-CROP COMMUNITIES	X						
WIS04299	Tracy, W. F.	RUST RESISTANCE IN SWEET CORN: VEGETATIVE PHASE CHANGE AND SOURCES OF RESISTANCE (NE-124)	X	X					
WIS04300	Triplett, E. W.	ANALYSIS OF A TRIFOLITOXIN RESISTANCE MECHANISM CONFERRED BY RHIZOBIUM	X						
WIS04301	Parrish, J.	EFFECT OF SCROTAL INSULATION ON THE ABILITY OF BOVINE SPERM TO PENETRATE AND ACTIVATE OCCYTES, AND SUPPORT EMBRYO DEVELOPMENT	X						
WIS04302	Thomas, D. L.	COMPARISON OF EAST FRIESIAN AND LACAUNE DAIRY SHEEP	X				X		
WIS04303	Downs, D. M.	THE ROLE OF YgfF IN THE METABOLISM OF SALMONELLA TYPHIMURIUM	X						
WIS04305	Clagett-Dame, M.	VITAMIN A AND SYMPATHETIC NEURONAL DEVELOPMENT	X						
WIS04308	Culbertson, M. R.	ROLE OF mRNA DECAY IN GENE EXPRESSION	X						
WIS04309	Laughon, A. S.	CIS-ELEMENT SELECTION: A TOOL FOR FUNCTIONAL GENOMICS	X						
WIS04310	Masson, P. H.	CHARACTERIZATION OF AN *ARABIDOPSIS THALIANA* GENE INVOLVED IN ROOT AND SHOOT MORPHOGENESIS	X						
WIS04312	Susman, M.R.	GENETIC MANIPULATION OF PLASMA MEMBRANE PROTEINS INVOLVED IN MINERAL TRANSPORT	X						
WIS04316	German, T. L.	EXPLOITING THE SPECIFICITY OF TOSPOVIRUS-THRIPS INTERACTIONS TO CONTROL VIRUS DISEASE AND INSECT DAMAGE	X						

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	Total F.T.E
WIS04318	MacGuidwin, A. E.	POPULATION ATTRITION OF THE SOYBEAN CYST NEMATODE IN THE ABSENCE OF A HOST (NC-215)	X	X					
WIS04322	Karasov, W. H.	HYDROPHILIC TOXIN ABSORPTION BY MAMMALS AND ITS MODULATION	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 (W-187)	X	X					
WIS04384	Ruegg, P. L.	BEHAVIORAL AND HEALTH EFFECTS OF TAIL DOCKING IN DAIRY COWS	X				X		
WIS04388	Barnes, D. M.	DIETARY REGULATION OF THE MULTIDRUG RESISTANCE GENE PRODUCT, P-GLYCOPROTEIN	X						
WIS04400	Silbernagel, J. M.	PLANT-POLLINATOR LANDSCAPES: BUMBLEBEE FORAGING PATTERNS WITHIN SPATIALLY-HETEROGENEOUS NATURAL BOGS AND CULTIVATED CRANBERRY BOGS	X						
WIS04406	Jung, G.	FINGERPRINTING OF CREEPING AND COLONIAL BENTGRASS CULTIVARS USING SCAR MARKERS	X				X		
WIS04407	Bent, A. F.	NEW METHODS FOR MOLECULAR GENETIC MANIPULATION OF SOYBEAN	X						
WIS04409	Patterson, S. E.	GENETIC AND MOLECULAR CHARACTERIZATION OF JL-2, A CELL SEP. MUTANT IN ARABIDOPSIS THALIANA REGULARING FLORAL ORGAN ABSCISSION & POD SHATTER	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						
WIS04428	Forest, K.	STRUCTURE-FUNCTION STUDY OF VIRULENCE FACTOR REGULATOR FROM PSEUDOMONAS AERUGINOSA	X						
WIS04429	Barclay, S. L.	GENES EXPRESSED DURING INFECTION BY CRYPTOSPORIDIUM	X						
WIS04430	Bednarek, S. Y.	CHARACTERIZATION OF ARABIDOPSIS DYNAMIN-LIKE PROTEINS	X						

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	Total F.T.E
WIS04431	Fricke, P. M.	METHODS OF IMPROVING REPRODUCTION IN DAIRY HEIFERS	X				X		
WIS04432	Grummer, R. R.	ELIMINATION OF THE TRANSITION PERIOD TO ENHANCE DAIRY CATTLE HEALTH AND PRODUCTION	X						
WIS04435	Williamson, R. C.	EFFORTS OF CULTURAL MANIPULATIONS & HOST-PLANT SELECTION: ALTERNATIVE APPROACH FOR CONTROL OF BLACK CUTWORMS ON GOLF COURSE PUTTING GREENS	X				X		
WIS04436	Strand, M. R.	STRUCTURE-FUNCTION STUDIES ON PLASMATOCYTE SPREADING PEPTIDE	X						
WIS04441	Jiang, J.	MOLECULAR CYTOGENETICS ANALYSIS OF THE POTATO GENOME	X						
WIS04442	Jull, L. G.	EFFECT OF DEICING CHEMICALS ON WOODY ORNAMENTAL PLANTS	X				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						
WIS04447	Allen, C.	CHARACTERIZING BACTERIAL WILT VIRULENCE GENE EXPRESSION IN THE PLANT HOST	X						
WIS04448	McManus, P. S.	CHARACTERIZATION OF AGROBACTERIUM SPP. ISOLATED FROM CRANBERRY AND ETIOLOGY OF CRANBERRY AND ETIOLOGY OF CRANBERRY STEM GALL	X				X		
WIS04451	Kung. K. S.	QUANTIFYING THE SOIL PORE SPECTRUM TO MINIMIZE CHEMICAL LEACHING THROUGH FIELD-SCALE PREFERENTIAL FLOWS PATHS	X						
WIS04452	Albrecht, R. M.	COLLOIDAL METAL PARTICLES FOR HIGH RESOLUTION BIOLOGICAL LABELING	X						
WIS04455	Ginther, O. J.	FUNCTIONAL TWO-WAY COUPLING BETWEEN FSH AND FOLLICLES	X						
WIS04486	Hogg, D. B.; Wedberg, J. L.; Grau, C. R.; German, T. L.; Wyman, J. A.; Boerboom, C. M.	NC-502 SOYBEAN APHID: A NEW PEST OF SOYBEAN PRODUCTION (NC-502)	X	X			X		
WIS04489	Goodwin, E. B.	ANALYSIS OF NUCLEAR EXPORT OF TRA-1 IN C. ELEGANS	X						
WIS04500	Lunn, D. P.	DEVELOPMENT OF ATTENUATED SALMONELLA AND MODIFIED VACCINIA ANKARA AS VECTORS FOR EQUINE INFLUENZA DNA VACCINATION				X			
WIS04503	Radeloff, V. C.	LANDSCAPE FRAGMENTATION DUE TO CHANGES IN ROAD DENSITY IN NORTHWESTERN WISCONSIN FROM 1938 TO 1992			X				

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	Total F.T.E
WIS04505	Rickenbach, M. G.	COOPERATION AMONG WOODLAND OWNERS: A CASE STUDY OF ORGANIZATIONAL FORMS AND PARTICIPANT MOTIVATIONS			X				
WIS04508	Wattiaux, M. A.	IMPACT OF DAIRY DIET FORMULATION ON LACTATION, NITROGEN UTLILIZATION, NUTRIENT EXCRETION AND POTENTIAL AMMONIA LOSS TO THE ENVIRONMENT	X						
WIS04521	**Reinemann, D. J.**	**Investigation Of Robotic Milking System Performance**	X				X		
WIS04524	**Kirkpatrick, B. W.**	**National Animal Genome Research**	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				
WIS04541	**Lane, M. B.**	**Democratic Planning At Multiple Scales In Plural Societies: Natural Resource Governance In Wisconsin**	X						
WIS04542	**Splitter, G. A.**	**Gene Enhancement Of Dna Vaccines**				X			
WIS04543	**Czuprynksi, C. J.**	**Cytokine-Mediated Enhancement Of The Susceptibility Of Bovine Leukocytes To Pasteurella Haemolytica Leukotoxin**				X			
WIS04544	**Santschi, E. M.**	**Bacterial Adhesion To Equine Bone And Cartilage; Effect Of Surface, Fluid Environment And Selected Antibacterial Strategies**				X			
WIS04553	**Haney, A.**	**Evaluating Comparative Effect Of White-Tailed Deer And Pennsylvania Sedge On Restoration Responses In Degraded Midwest Oak Savannas**			X				
WIS04554	**Morshidi, M.**	**Assessment Of Selected Hybrid Poplar Genotypes For Phytoremediation Of Atrazine Contaminted Soil**			X				
WIS04555	**Thomas, C.**	**The Status Of Black Bear Research In Northwestern Wisconsin Forests**			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						
WIS04600	**Weigel, K. A.**	**Genetic Improvement Of Dairy Cow Longevity Using Survival Analysis Methodology**	X				X		
WIS04605	**Charkowski, A. O.**	**Genetic Exploration Of The Diversity And Evolution Of Pectobacterium Pathogenesis**	X						
		Total:	**$2,602,195**	**$647,635**	**$259,322**	**$126,286**	**$615,213**	**$2,987,803**	**212.9**

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	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							
WIS04288	Chavas, J. P.	A DYNAMIC ANALYSIS OF ASSET PRICES IN AGRICULTURE	X						
WIS04302	Thomas, D. L.	COMPARISON OF EAST FRIESIAN AND LACAUNE DAIRY SHEEP	X				X		
WIS04423	Fortenbery, T. R	DEVELOPMENT OF BASIS FORECASTING TOOLS FOR WISCONSIN AGRICULTURAL MARKETS	X				X		
WIS04456	Buongiorno, J.	EFFECTS OF ECONOMIC SHOCKS, TRADE LIBERALIZATION, AND RECYCLING POLICIES ON THE GLOBAL FOREST SECTOR			X				
WIS04519	**Cropp, R. A.**	**Characterization Of Markets And Implications Of Price Risk Management For The Wisconsin Dairy Industry**	X				X		
WIS04559	**Buttel, F. H.**	**Impact Analysis And Decision Strategies For Agricultural Research (Nc-1003)**	X	X					
WIS04586	**Stiegert, K. W.**	**Understanding Foreign Direct Investment In An Expandable Global Economic Arena**	X				X		
WIS04589	**Zeuli, K.**	**The Implications Of Dairy Cooperative Mergers And Vertical Integration On Member Benefits**	X				X		
		Total:	**$141,084**	**$24,567**	**$29,530**	**$0**	**$89,612**	**$170,614**	**10.6**
		Total Goal 1:	**$3,269,961**	**$768,551**	**$315,962**	**$126,286**	**$808,280**	**$3,712,209**	**255.4**

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.

Surveying Johne's Disease

Key themes: Animal genomics, Animal health
Focus area: Scientific basis for optimal health

The issue: Johne's is a slowly developing, incurable disease caused by a chronic intestinal infection. The infection interferes with an animal's ability to absorb nutrients from food. The disease is also called paratuberculosis (after *Mycobacterium paratuberculosis*, the bacterium that causes the infection). Animals become infected as calves from contact with adult cows that have Johne's disease. The disease develops gradually over a period of two to five years and the signs can be subtle. Often animals are culled because of low production, but sometimes the cause of that low production is Johne's disease. Meanwhile, calves on the farm continue to become infected. The Wisconsin Department of Agriculture estimates that Wisconsin dairy farmers lose $54 million annually in lost milk production and reduced slaughter weight; nationally, the toll exceeds $200 million.

What's been done: Wisconsin researchers are investigating the genetic basis of susceptibility to Johne's disease. Using tools of molecular genetics, the researchers are genotyping the daughters of 12 prominent Holstein bulls, located in herds throughout the country for differences in genes that may be related to disease resistance. The bulls were selected because they have large numbers of daughters – up to 50,000 – in production in herds on the Dairy Herd Improvement program. The bulls themselves are not diseased. The researchers are contacting herds that have five or more daughters of the 12 bulls (about 10 to 15 percent of DHI herds). "So far, we've tested close to 4,000 cows. We want to test 6,000 more to reach a total of 10,000. We have a long way to go, but continued good cooperation form producers will help us get there. The more cows we test, the more genes we'll be able to discover," Shook says. "We have identified more than 220 disease-positive cows; most of these were not previously known by the producer to be infected. The information allowed producers to take action appropriate to their situation to prevent the spread of disease to uninfected animals. The project hasn't gathered enough samples yet to be conclusive, but Shook has already noticed one intriguing result: Prevalence of the disease among bulls' daughters ranges from a low of less than 2 percent to a high of nearly 12 percent. If these differences stand up through additional testing, we'll have some interesting and valuable comparisons to explain," he says.

The impact: The research project will pay for the disease testing – a $25 benefit for each cow tested. In addition, for every project cow tested, producers can select another non-project cow

for a free test. Test results are returned to producers for use in controlling the disease in their own hers. If bulls with susceptibility genes (or resistance genes) are identified, artificial insemination companies could screen bulls to lower the probability of their daughters becoming infected.

Funding: The USDA Initiative for Future Agriculture and Food Systems, National Association of Animal Breeders, and Hatch grants #5223 "Genetic Resistance to Paratuberculosis in Dairy Cattle" and #4718 (multistate project S-1008) "Genetic Selection and Crossbreeding to Enhance Reproduction and Survival of Dairy Cattle."

More information:
http://www.cals.wisc.edu/media/news/11_02/johne%27s_survey.html

Minimizing Traffic over Alfalfa Fields

Key themes: Agricultural profitability, rangeland/pasture management
Focus areas: Sustainability of agriculture and forestry

The issue: Alfalfa is Wisconsin's most important forage crop and the primary building block for feeding the state's dairy industry. State farmers harvest 3.2 million acres of alfalfa forage each year. However, both scientists and growers have noted that alfalfa production may differ dramatically from one area of a field to another. Some of the variability results from soil fertility, soil moisture level, insects and plant diseases. Wisconsin forage scientists suspected that soil compaction and injured plants, which result from wheel traffic over the fields, also may contribute to production decreases. Growers harvest the crop three or four times a year with heavy equipment and also may drive across alfalfa fields when working in adjacent fields.

What's been done: In 2000, a team of UW-Madison extension forage agronomists set up trials to evaluate the effect of wheel traffic on 20 alfalfa varieties and experimental lines at one site near Madison, Wisconsin and a second site near Napier, Iowa. Results from the first three years show that wheel traffic from the harvesting equipment that farmers typically employ reduced yields to 26 to 87 percent of the yields on control plots with no wheel traffic. Some varieties yielded as much as one ton per acre less with wheel traffic than similar yielding varieties without wheel traffic. The team is continuing the study to better understand the conditions that determine the extent to which wheel traffic alters alfalfa production.

Impact: Wisconsin growers produce more than 9 million tons of alfalfa forage per year. At $60 per ton, the crop's statewide value is $540 million. If minimizing wheel traffic led to one-half a ton more alfalfa per acre, the value of the increased production would be $30 per acre. And if all growers could realize this increase in production on the state's 3.2 million-plus acres, it would increase the value of the state's alfalfa forage crop by $96 million dollars.

Funding: Wisconsin Hatch project#4265 and multistate project NC-226, "Development of pest management strategies for forage alfalfa persistence", U.S. Dept. of Interior and State of Wisconsin.

More information at http://www.cals.wisc.edu/media/news/04_02/alfalfa_traffic.html

Bacteria May Decrease Need for Fertilizer on Corn

Key themes: Innovative farming techniques, plant production efficiency, nutrient management
Focus areas: sustainability of agriculture

The Issue: Corn is Wisconsin's major field crop. State farmers harvest about 3 million acres on average each year. The crop is a heavy user of nitrogen fertilizer. State Extension specialists recommend that the optimal application is 160 pounds of nitrogen per acre. At a cost for chemical fertilizer of 25 cents per pound, that amounts to an annual cost of about $40 per acre. Corn that requires little if any nitrogen fertilizer could save Wisconsin farmers millions of dollars in production costs each year while reducing environmental and health problems associated with too much nitrogen entering surface and ground water. Corn that needs no external source of nitrogen has been a long-term goal of agricultural researchers for nearly a century.

What's been done: After Brazilian scientists discovered two bacteria that can live inside sugar cane and produce all the nitrogen the crop needs, University of Wisconsin-Madison scientists began a systematic search for bacteria that live inside corn plants and can capture nitrogen from the atmosphere. The team evaluated 23 bacterial strains including several from Brazil and Egypt. UW-Madison researchers also isolated nitrogen-capturing strains from corn and switch grass plants growing on nitrogen-poor soils in Wisconsin. After greenhouse tests and early field trials in Wisconsin, the researchers identified seven trains that were most promising. Those strains included two of the bacteria originally identified from sugar cane and five that the team isolated in Wisconsin. During 2000, the researchers conducted field trials with five elite corn hybrids at the College's Arlington and Lancaster Agricultural Research Stations, as well as at sites in Iowa, Illinois, Nebraska and Indiana. The results showed that the bacteria increased yields an average of 5 to 10 percent. Since corn varieties also vary in their ability to take advantage of these bacterial relationships, identification of several genetic regions allowing increased nitrogen utilization have also been mapped.

Impact: The discovery may lead to a new product for farmers -- seed corn that comes coated with growth-enhancing bacteria. The scientists have applied for a patent on four of the bacterial strains through the Wisconsin Alumni Research Foundation. Several companies have expressed an interest in licensing the technology. The researchers hope that strains will be test marketed within a few years. The new seed would have the potential to save farmers the money they spend on nitrogen fertilizer without harming corn yields. The seed may also help farmers develop effective nutrient management plans and lessen environmental damage associated with excess nitrogen in soil and water.

Funding: Hatch project #5219, " Enhancing mineral nutrient availability in maize: microbial associations and genetic optimized intake", Cargill, Inc. and the Consortium for Plant Biotechnology Research.

More information:
http://www.cals.wisc.edu/media/news/01_02/corn_bacteria.html

The Worldly Potato

Key themes: Plant germplasm, sustainable agriculture
Focus areas: Sustainability of agriculture and forestry

The issue: Potatoes are the leading vegetable crop in the world. Potato germplasm varies in suitability for climates, disease resistance, product qualities and productivity. Use of naturally-occurring genetic variation may reduce pesticide use, increase efficiency, and allow production in more extreme conditions.

What's been done: U.S. collections of germplasm are stored, classified, distributed, and evaluated at the USDA-ARS Potato Genebank located at the University of Wisconsin Peninsular Agricultural Research Station at Sturgeon Bay, WI. The station is sufficiently separated from commercial potato growers to minimize the potential for pathogen transmission and allows entry of potato varieties from all over the world. Evaluations for new traits such as resistance to emerging disease are done along with seed increases, germination tests, and field evaluations. Yearly, about 75 new items are added to the collection. New collaborations with other germplasm banks have been initiated including Russia and Peru.

Impact: In 2002, over 5700 germplasm units were sent freely to 116 cooperators world wide including industry and academics. Use of DNA markers has allowed measures of diversity to manage the collection and inform the users of genetic distance. The germplasm is the source of over 100 publications yearly and forms a resource for nearly all U.S. potato breeding programs. An atlas of wild potatoes was published this year in cooperation with other genebanks. Seven new publications came from researchers at the genebank in 2002 in the areas of genetic diversity for potato.

Funding: USDA-ARS and multistate project #WIS03911 (NSRP-6), "Introduction, Preservations, Classification, Distribution and Evaluation of Solanum Species."

Dairy Sheep Research Helps Make Wisconsin the Leader in a Niche Industry

Key Themes: Animal genomics, Niche market, Small farm viability, Diversified/alternative agriculture
Focus areas: Small farms and their contributions to local economies

The issue: With farm income from dairying at historically low levels, Wisconsin farmers are searching for alternative, more profitable farm enterprises. This resourcefulness has made Wisconsin the nation's leading producer of sheep milk for cheese. The industry has plenty of room to grow. The United States imports more than 70 million pounds of sheep cheese each year, but produces only about half a million pounds. State cheese makers have seen an increased interest in sheep milk cheese, but Wisconsin producers can't yet supply enough milk to meet the demand. To benefit from this multi-million dollar market, the state's dairy sheep farmers needed ways to increase production and work with cheese makers to develop sheep cheeses for U.S. markets.

What's been done: To improve milk production, a UW-Madison animal scientist evaluated dairy sheep breeds from Europe. Specialized breeds and crosses of the dairy breeds with domestic

meat/wool breeds can double milk production compared to domestic breeds without substantially increasing producers' costs. Cheese scientists at the Wisconsin Center for Dairy Research (CDR) created new blended sheep-cow milk cheeses and discovered that sheep milk can be frozen and stored for up to one year without destabilizing. The CDR also offers short courses that teach cheese makers how to handle sheep milk.

Impact: The University of Wisconsin Center for Cooperatives helped the Wisconsin Sheep Dairy Cooperative form a strategic plan to expand their market opportunities. The cooperative marketed about 420,000 pounds of milk this year—up from 50,000 pounds in 1996—an increase in returns of about a quarter of a million dollars. In comparison, the same amount of cow milk would bring about $50,000. The cooperative sees a great deal of room for growth, according to its president. New lines of blended sheep-cow milk cheeses—value-added products for Wisconsin's traditional dairy industry—are a good way for sheep milk to get into the market. Genetics results were reported at the 7th Great Lakes Sheep Symposium and the 50th celebration of the Spooner Agricultural Research Station.

Funding: Hatch project #4302, "Comparison of East Friesian and Lacuane Dairy Sheep" and Hatch project #4034, "Development of the Process Technology for Improved Sheep Milk Products", US Department of Agriculture and the State of Wisconsin.

Proceedings of 7th Great Lakes Sheep Symposium:
http://www.uwex.edu/ces/animalscience/sheep/

News story on UW partnership with sheep cooperative:
http://www.cals.wisc.edu/media/news/08_02/dairy_sheep_research.html

Wisconsin Research Helps Dairy Processors Expand Yogurt Markets

Key themes: Niche market, Food quality
Focus areas: Adding value to new and old agricultural products

The issue: Expanding to new markets is a challenge for producers in every industry. In the U. S. dairy industry, yogurt is presented to consumers mostly as a sweet treat. However, producers might position yogurt as a health food, as is done in Europe and Japan. Before yogurt can enter U.S. health food markets, producers must find a way to reduce added ingredients. Additives increase costs and may decrease consumer perception of yogurt as a health food. U.S. producers currently add stabilizers to reduce surface whey—the pool of liquid sometimes found floating atop yogurt—because consumers may mistakenly think the presence of whey means the yogurt is spoiled.

What's been done: To eliminate the problem of surface whey without using additives, UW-Madison food scientists are studying its causes. In laboratory experiments, the researchers identified certain manufacturing conditions that cause the gel to be less stable and more prone to forming whey. The researchers found that instead of adding stabilizers, yogurt makers can reduce gel defects by lowering the incubation temperature from 113 degrees Fahrenheit to 104 degrees, They also developed simple tests that yogurt makers can use to monitor gel quality and determine how their manufacturing and fermenting processes affect gel texture.

Impacts: When researchers presented their findings at the dairy industry's annual Cultured Products Forum in Milwaukee, company representatives were interested and receptive to the idea of exploring new ways to improve their current yogurt manufacturing practices. If the new processing techniques are widely adopted in the industry, processing costs could decrease significantly, and consumer demand for an improved product would increase. Together, these benefits could mean millions of additional dollars for dairy farmers and processors, and also bring consumers a better, more appealing dairy product. Five publications on the structural relationships in yogurts were published as well as numerous presentations.

Funding: Hatch project #4363, "Investigation Into Improving The Texture and Functionality of Fermented Milk Products", and Hatch project #4668 "Understanding the Structure-Function Relationships that Control the Rheological and Sensory Properties of Stirred-Type Yogurt", the Wisconsin Milk Marketing Board and the State of Wisconsin.

News story on yogurt improvements
http://www.cals.wisc.edu/media/news/12_02/improving_yogurt.html

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

Executive summary

Under this goal, there were 11 projects including 4 that were multistate, interdisciplinary projects, and 2 integrated research/extension project. 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 export from Wisconsin. A number of specialty cheese plants, small meat processors, and fresh market vegetable and fruit producers must address food safety concerns. New diagnostic tests such as those under study in project #4031, "Rapid Detection of Salmonella by Flow Cytometry" will be especially important to producers and consumers. Milk producers have indicated that their most pressing problems are support of the milk price and federal marketing structure in light of international pressures. Project #4174, "Analysis of Interregional Impacts of Changes in U.S. and World Dairy Policy on the Wisconsin and U.S. Dairy Sectors" and new project #4519, "Characterization of Markets and Implications of Price Risk Management for the Wisconsin Dairy Industry" are projects that address this issue. Recent outbreaks of E.coli 0157:H7, including one on campus, have shown the need for understanding the growth conditions of this pathogen. A new project #4530, "Regulation of DPS – a Key Acid Tolerance Protein in E.coli 0157:H7" will address growth of this pathogen.

Updated project list for FY02

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 Formula Funds	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									
WIS04051	Kloppenburg, J. R.; Stevenson, G. W.	COMMODITIES, CONSUMERS, AND COMMUNITIES: LOCAL FOOD SYSTEMS IN A GLOBALIZING ENVIRONMENT (NE-185)	X	X					
WIS04089	Gould, B. W.	FOOD DEMAND, NUTRITION AND CONSUMER BEHAVIOR (S-278)	X	X					
WIS04174	Cox, T.	ANALYSIS OF THE INTERREGIONAL IMPACTS OF CHANGES IN U.S. AND WORLD DAIRY POLICY ON THE WISCONSIN AND U.S. DAIRY SECTORS	X						
WIS04227	Gunasekaran, S.	MARKETING AND DELIVERY OF QUALITY CEREALS AND OILSEEDS (NC-213)	X	X					
WIS04357	Walters, B. S.	THE POULTRY FOOD SYSTEM: A FARM TO TABLE MODEL (S-292)	X	X					
WIS04424	Jesse, E. V.	SUPPORTING THE UNDERSTANDING AND USE OF DAIRY PRICE RISK MANAGEMENT TOOLS	X				X		
WIS04519	**Cropp, R. A.**	**Characterization Of Markets And Implications Of Price Risk Management For The Wisconsin Dairy Industry**	X				X		
WIS04586	**Stiegert, K. W.**	**Understanding Foreign Direct Investment In An Expanding Global Economic Arena**	X				X		
		Total:	**$113,159**	**$36,827**	**$0**	**$0**	**$46,041**	**$113,159**	**7.1**
Objective 2.2: To Improve Food Safety by Controlling or Eliminating Foodborne Risks									
WIS04188	Wong, A.	GENOTYPIC DIVERSITY IN HEMOLYSIN BL, A DIARRHEAL ENTEROTOXIN FROM BACILLUS CEREUS	X						
WIS04490	Yu, J.	GENETICS OF FUNGAL GROWTH, SPORULATION, AND MYCOTOXIN PRODUCTION	X						
WIS04530	**Kaspar, C. W.**	**Regulation Of DPS – A Key Acid Tolerance Protein In E. Coli 0157:H7**	X						
		Total:	**$90,007**	**$0**	**$0**	**$0**	**$0**	**$90,007**	**9.9**
		Total Goal 2:	**$203,166**	**$36,827**	**$0**	**$0**	**$46,041**	**$203,166**	**17.0**

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 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.

Farm Fresh Atlas Connects Consumers with Sustainable Agriculture

Key themes: Organic agriculture, Small farm viability, urban gardening, grazing
Focus areas: Small farms and their contribution to local economies

The issue: Sustainable agricultural practices, which include organic farming, are a small but growing part of Wisconsin's overall agricultural industry. Sustainable agriculture farmers use practices such as cover cropping, composting, crop rotations, management intensive rotational grazing and integrated pest management to grow crops and raise animals in an environmentally friendly manner. Some consumers believe fresh, locally grown produce is healthier and contains more vitamins and nutrients than produce shipped across country. However, since these farmers only sell locally, their markets are limited. Consumers need to be more aware of their options for buying sustainably grown food, including purchasing directly from farmers and patronizing businesses that offer locally grown food.

What's been done: The UW Center for Integrated Agricultural Systems (CIAS) partnered with a nonprofit organization in Madison, to create the *Farm Fresh Atlas 2002*. The *Atlas* is a first-of-its-kind directory to help the 400,000-plus consumers in Dane County find sustainable agriculture growers from across the state that sell locally The atlas also helps consumers find restaurants that use sustainable, locally grown foods, as well as farmers' markets and cooperatives that offer locally grown produce, meats and cheeses. The *Atlas* was made available at local food cooperatives and health food stores, public libraries and at farmers' markets. Several local farmers helped design the *Atlas*, which was initiated in response to a request from state farmers. About 50 farmers and 10 businesses purchased a listing for a nominal fee.

An institutional program to encourage school food programs to consider purchase from local growers has also been instituted. Researchers at the Center for Integrated Agricultural Systems talked with dining center directors at 28 Wisconsin colleges to learn more about the barriers to local food purchase and identify potential solutions. Each spring, a UW-Madison program in campus dining centers drew attention to the benefits of Wisconsin-raised food with a dinner featuring locally grown products. This "Regional Seasonal Dinner" has been attended by more than 400 people including students, farmers, professors, and CALS administrators. The participants agreed that UW-Madison can and should serve more food from local farms.

Impacts: Food dollars spent on locally grown produce are likely to stay in Wisconsin's economy, where they will create jobs and small business opportunities. Of the 30,000 copies of

the 2002 *Atlas* originally printed, only 500 remain. CIAS staff report that about half of the farmers who had a listing in the 2002 *Atlas* said that it was valuable to their business and wanted to have a listing in the upcoming 2003 *Atlas*. The CIAS staff already has enough new requests to at least match the size of the 2002 *Atlas*. Wider use of the atlas will help farmers find better, more profitable outlets for their locally marketed foods, and also help consumers find producers who can provide them with the sustainably grown food they prefer.

Funding: Wisconsin Hatch project #4051 and multistate project NE-185, "Commodities, Consumers and Communities: Local Food Systems in a Globalizing Environment", Kellogg Foundation and State of Wisconsin.

Additional information on institutional programs:
http://www.cals.wisc.edu/media/news/07_00/colleges_food.html
http://www.wisc.edu/cias/research/institut.html

Additional information on the Food Atlas
http://www.cals.wisc.edu/media/news/05_02/farm_fresh_atlas.html

Food Atlas is included in this report as Appendix G

Goal 3. A Healthy, Well Nourished Population.

Executive summary

Under this goal, there were 16 projects including 2 that were multistate interdisciplinary projects, 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 #4241, "Quantitative Aspects Lysine Metabolism in the Pig" examines the limiting amino acid in a non-ruminant and has applications to human nutrition especially for infants and children. Project #4422, "Genetic Engineering of Oat with Transgenes Encoding Antifungal Proteins and Resistance Pathway Regulators for Improving Disease Resistance" and #4558, "Mycotoxins in Cereal Grains" have implications for human food safety.

Wisconsin is committed to continually changing its portfolio of research. Producers have been very enthusiastic about research that quantifies the health aspects of foods and identifies strains with particularly beneficial effects. One new project #4525, "Structure of Cranberry Proanthocyanidins that Protect Low Density Lipoproteins from CU2+ Induced Oxidation" will look at a common Wisconsin crop to understand some of the health benefits of cranberry consumption.

Updated project list for FY02

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 Formula Funds	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									
WIS02656	Elson, C. E.	ROLE OF N-3/N-6 POLYUNSATURATED FATTY ACIDS IN HEALTH MAINTENANCE (NC-167)	X	X					
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		
WIS04192	Ney, D.	ANABOLIC EFFECTS OF INSULIN-LIKE GROWTH FACTOR-I AND GROWTH HORMONE DURING PARENTERAL NUTRITION	X						
WIS04193	Schoeller, D.	EFFECTS OF EXERCISE ON THE UTILIZATION OF DIETARY FAT	X						
WIS04304	Attie, A. D.	BIOCHEMISTRY AND GENETICS OF INSULIN RESISTANCE AND DIABETES	X						
WIS04306	Ntambi, J. M.	CONJUGATED LINOLEIC ACID (cla) IN FAT CELL DIFFERENTIATION AND METABOLISM	X						
WIS04315	Smith, S. M.	FUNCTIONS OF VITAMIN A IN CARDIAC DEVELOPMENT AND FUNCTION	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 Of 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		
		Total:	**$298,847**	**$12,671**	**$0**	**$0**	**$50,751**	**$298,847**	**28.2**

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	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						
WIS04487	Lan, Q.	ISOLATION OF CUTICLE PROTEIN GENES FROM MOSQUITO, AEDES AEGYPTI	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						
		Total:	**$101,330**	**$0**	**$0**	**$0**	**$0**	**$101,330**	**9.6**
		Total Goal 3:	**$400,177**	**$12,671**	**$0**	**$0**	**$50,751**	**$400,177**	**37.8**

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 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.

Locating Genes Responsible for Diabetes and Obesity

Key issues: Human nutrition, Human health
Focus areas: Modifying food intake behavior

The issue: Type II diabetes and obesity are both increasing alarmingly in the U.S. population. At least some of the susceptibility to one or both of these conditions may be genetic. Even if the condition is purely due to environment and lifestyle, treatment options may differ for those with differing genetic susceptibility.

What's been done: This study works with crosses of two lines of mice that differ for obesity and susceptibility to diabetes. Using molecular markers, scientists have been mapping the chromosomal location of genes that can distinguish those that are more or less susceptible. Interestingly, one locus, which contains a single gene, appears to be able to differentiate much of the basis for susceptibility. Researchers are looking at the gene itself for clues to the biochemical basis for this action as well as looking at differences in gene expression. Those animals showing more disease susceptibility appear to have hyperexcitable insulin secretion pattern.

The impact: Three scientific papers outlining the disease susceptibility and two book chapters have been published. A patent disclosure has been submitted to the Wisconsin Alumni Research Foundation and licensing arrangements are being negotiated.

Funding: Wisconsin Hatch project #4304, "Biochemistry and Genetics of Insulin Resistance and Diabetes" and National Institutes of Health.

Goal 4. Greater Harmony between Agriculture and the Environment.

Executive summary

Under this goal, there were 47 projects including 10 that were multistate interdisciplinary projects, 5 were McIntire-Stennis projects, 1 Animal Health project, and 11 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. Two new projects have been added in areas of land use planning and rural urban interfaces: #4541, "Democratic Planning at Multiple Scales in Plural Societies: Natural Resource Governance in Wisconsin: and #4607, "Urban Desing and Ecosystem Stress: Quantifying the Relationship between Development Design Standards and Impervious Land Cover in Madison, Wisconsin." Newly added projects indicate that faculty are responding to these stakeholder needs.

Updated project list for FY02

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 Formula Funds	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									
WIS02846	Lowery, B.	IMPACT OF ACCELERATED EROSION ON SOIL PROPERTIES AND PRODUCTIVITY (NC-174)	X	X			X		
WIS03879	Bundy, L. G.	CHARACTERIZING NITROGEN MINERALIZATION AND AVAILABILITY IN CROP SYSTEMS TO PROTECT WATER RESOURCES (NC-218)	X	X			X		
WIS04300	Triplett, E.W.	ANALYSIS OF A TRIFOLITOXIN RESISTANCE MECHANISM CONFERRED BY RHIZOBIUM	X						
WIS04450	Helmke, P. A.	MINERALIZATION OF SOIL ORGANIC PHOSPHORUS BY PHOSPHATASE AND PHYTASE AND ITS RELATION TO PLANT NUTRITION	X						
WIS04451	Kung, K. S.	QUANTIFYING THE SOIL PORE SPECTRUM TO MINIMIZE CHEMICAL LEACHING THROUGH FIELD-SCALE PREFERENTIAL FLOWS PATHS	X						
WIS04454	Nordheim, E. V.	THE DEVELOPMENT OF STATISTICAL METHODS FOR COMPARING SPECIES ABUNDANCE CURVES AND ASSESSING SPECIES RELATIONSHIPS	X						
WIS04492	Karthikeyan, K. G.	ORGANIC SOLIDS AND PHOSPHORUS REMOVAL FROM ANIMAL MANURE USING CHEMICAL TREATMENT	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 Tress Exposed To Elevated Atmospheric Co2?**	X						
WIS04541	**Lane, M. B.**	**Democratic Planning At Multiple Scales In Plural Societies: Natural Resource Governance In Wisconsin**	X						
WIS04555	**Thomas, C.**	**The Status Of Black Bear Research In Northwestern Wisconsin Forests**			X				
WIS04592	**Kosola, K. R.**	**The Role Of Soil Water Potential In Establishment Of Cranberry Beds**	X						

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	Total F.T.E.
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**						
WIS05228	**Cooperband, L.; MacGuidwin, A.; Goodman, R.; Stevenson, W.; Staub J.**	**Vegetable Production With Raw Or Composted Paper Mill Sludge: Effects On Soil Quality In Wisconsin's Central Sands**	**X**				**X**		
		Total:	**$280,436**	**$51,287**	**$9,911**	**$0**	**$113,736**	**$290,347**	**19.6**

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	Goodman. R. M.	BIOCONTROL OF SOIL-BORNE PLANT PATHOGENS (NC-125)	**X**	**X**					
WIS03910	Wedberg, J. L.	A NATIONAL AGRICULTURAL PROGRAM TO CLEAR PEST CONTROL AGENTS FOR MINOR USES (NRSP04)	**X**	**X**			**X**		
WIS04166	McCown, B.	DEFINITION AND APPLICATION OF PEST RESISTANCE MECHANISMS IN THE TREE GENUS BETULA			**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**		
WIS04307	Wyman, J. A.	BIOLOGICAL REGULATION OF APHID POPULATIONS IN WISCONSIN POTATOES	**X**				**X**		
WIS04317	Goodman, R. M.	ANALYSIS OF MICROBIOTA ASSOCIATED WITH PLANT ROOTS IN COMPOST-AMENDED FARM SOIL	**X**						

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	Total F.T.E.
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				
WIS04472	Bozek, M.	EVALUATING STRUCTURAL LINKAGES BETWEEN RIPARIAN AREAS AND LITTORAL ZONES: DEVELOPMENT OF DENDROCHRONOLOGICAL RIPARIAN LAND USE MODEL			X				
WIS04486	Hogg, D. B.; Wedberg, J. L.; Grau, C. R.; German, T. L.; Wyman, J. A.; Boerboom, C. M.	NC-502 SOYBEAN APHID: A NEW PEST OF SOYBEAN PRODUCTION (NC-502)	X	X			X		
WIS04492	Karthikeyan, K. G.	ORGANIC SOLIDS AND PHOSPHORUS REMOVAL FROM ANIMAL MANURE USING CHEMICAL TREATMENT	X						
WIS05224	Shepard, R. L.; Madison, F.	AN EVALUATION OF NUTRIENT MANAGEMENT PLANNING IN WISCONSIN	X				X		
WIS04534	**Handelsman, J.**	**Microbial Communication In The Rhizosphere Community**	X						
WIS04541	**Lane, M. B.**	**Democratic Planning At Multiple Scales In Plural Societies: Natural Resource Governance In Wisconsin**	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**	X	X			X		
		Total:	**$277,087**	**$57,582**	**$79,359**	**$0**	**$123,496**	**$356,446**	**26.2**

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	Total F.T.E.
	Objective 4.3: To Improve Decision-Making on Public Policies Related to Agriculture and the Environment								
WIS03987	Darien, B. J.; Backstrom, L.	PRIMING AND CHANGE IN RESPIRATORY TRACT OF PIGS AFTER EXPOSURE TO DUST, ENDOTOXIN AND B-1, 3-GLUCAN				X			
WIS04048	Bleam, W. F.	OXIDATION AND REDUCTION PROCESSES IN SOILS AFFECTING THE SOLUBILITY OF CHROMIUM AND MERCURY.	X						
WIS04051	Kloppenburg, J. R.; Stevenson, G. W.	COMMODITIES, CONSUMERS, AND COMMUNITIES: LOCAL FOOD SYSTEMS IN A GLOBALIZING ENVIRONMENT (NE-185)	X	X					
WIS04105	Shepard, R. L.	ENVIRONMENTAL INFORMATION SOURCES PREFERENCES OF AGRICULTURAL PRODUCERS	X				X		
WIS04196	Field, D. R.	CREATING A SOCIAL-DEMOGRAPHIC LAYER FOR LANDSCAPE SCALE ANALYSIS IN UPPER MISSISSIPPI RIVER FLYWAY	X						
WIS04289	Hickey, W. J.	MICROBIOLOGICAL AND BIO-PHYSICAL FACTORS CONTROLLING BIOAVAILABILITY AND BIODEGREDATION OF POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)	X						
WIS04321	Provencher, R. W.	THE ECONOMIC VALUE OF PRESERVING NATURAL AMENITIES IN REMOTE AREAS: LAKE SHORE			X				
WIS04451	Kung, K. S.	QUANTIFYING THE SOIL PORE SPECTRUM TO MINIMIZE CHEMICAL LEACHING THROUGH FIELD-SCALE PREFERENTIAL FLOWS PATHS	X						
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					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	Total F.T.E.
WIS04485	Wolkowski, R. P.	INTEGRATING BIOPHYSICAL FUNCTIONS OF RIPARIAN SYSTEMS WITH MANAGEMENT PRACTICES AND POLICIES (NC-230)	X	X			X		
WIS04538	**Barak, P. W.**	**Mining New Phosphorus Data From Old Soil Fertility Experiments**	X						
WIS04541	**Lane, M. B.**	**Democratic Planning At Multiple Scales In Plural Societies: Natural Resource Governance In Wisconsin**	X						
WIS04621	**Pedersen, J. A.**	**Sorption Of Sulfonamide Antibiotics To Soils And Clay Minerals**	X						
		Total:	**$178,632**	**$16,595**	**$11,717**	**$15,614**	**$22,844**	**$205,963**	**13.5**
		Total Goal 4:	**$736,155**	**$125,464**	**$100,987**	**$15,614**	**$260,076**	**$852,756**	**59.3**

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.

Nutrient Management Planning Reduces Nutrient Loading on Wisconsin Farmland

Key issues: Nutrient management, Riparian management, Water quality
Focus areas: Water quality

The issue: Nutrient management planning is promoted as a tool to help farmers optimize their use of on-farm (e.g., manure) and purchased nutrients (fertilizer) while reducing adverse impacts of their farming operations on the environment (e.g., water pollution). However, relatively little is known about why some farmers adopt nutrient management plans (NMPs) and others don't, and whether the plans promote desired results.

What's being done: The research used on-farm interviews with a mix of farmers with NMPs and without NMPs in multiple Wisconsin watersheds to determine farm management practices, perceptions toward nutrient management activities and NMPs, and impacts associated with NMPs. Over the course of the project, interviews were conducted with farmers in three Wisconsin watersheds; interviews were also conducted to determine behavioral outcomes associated with educational programs addressing development of nutrient management plans. For the comparative watersheds, analyses are based upon 127 farmers (a cross-watershed response rate of 90%); fifty-three percent (53%) of the farmers have NMPs and the rest do not.

Impact: Results indicate that having an NMP does make a difference in nutrient application rates; manure application rates and distribution are affected the most. Farmers with plans apply an average of 124 lbs/A of nitrogen (including commercial sources, manure, and legume nitrogen) for their corn crops, while farmers without plans apply an average of 168 lbs/A; the difference is statistically significant. Farmers without plans indicate strong concerns about issues that are not problematic for farmers who actually have plans.

Results from this project have had a direct impact in improving the quality of teaching materials and methods used in UW-Extension's Nutrient Management Education and Farmer Training Program. The research made local educational programs better by helping county Agricultural Agents and agency staff better understand farmer concerns and obstacles to implementing their nutrient management plans. Data from the research was used by local educators to target the landowners who needed the information most. Overall, the research data was used by a collaborative team that brought together the Wisconsin Discovery Farm Initiative (http://www.discoveryfarms.org/), UW-Extension county Agricultural Agents and USDA's Natural Resources Conservation Service (NRCS). In a partnership that featured university expertise and agency staff, farmers in 18 Wisconsin counties were reached in 2002. The

program helped 299 farmers implement their nutrient management plans. Results of working directly with those farmers include: 50-percent calibrated their manure spreaders within one-year of training; and 90-percent of the farmers in the program implemented some or all of their nutrient management plan.

Funding: Wisconsin Hatch Project #WIS05224: "An Evaluation of Nutrient Management Planning in Wisconsin", USDA-NRCS and State of Wisconsin.

More information on the Discovery Farm Program:
http://www.discoveryfarms.org/

Soybean Aphid: A New and Exotic Pest of Soybean Production

Key themes: Emerging infectious diseases, Invasive species, Plant health, Integrated pest management

Focus areas: Improved pest control and Food Quality and Protection Act implementation

The issue: When something goes wrong with the soybean crop, it affects the pocketbooks of many Wisconsin farmers. Soybeans are the second leading cash crop in the state. The Wisconsin Department of Agriculture, Trade and Consumer Protection projects that growers will harvest more than 55 million bushels of beans. At $5.10 a bushel, the harvest value of that crop would be $280 million if the beans were of good quality. The soybean aphid is an exotic insect that is a potentially serious pest of soybean production, both directly and as a vector of pathogenic viruses, in Wisconsin and the U.S. The aphid may also affect the fresh string bean crop where Wisconsin is on the leading producers of processing vegetables. The soybean aphid, which was first found in North America in 2000, expanded its range within and beyond Wisconsin during both the 2001 and 2002 growing seasons. Losses from the soybean aphid or from the disease it might carry could have a very large economic effect on Wisconsin producers.

What's been done: Field experiments revealed that soybean aphid is able to colonize and reproduce on legumes other than soybean, most notably red clover and crimson clover and that it is capable of transmitting soybean mosaic virus and alfalfa mosaic virus. Investigations of the effect of planting date on soybean aphid population dynamics showed that during 2001 planting date played a prominent role in aphid dynamics: Soybean aphids built up to higher densities with later planting date, plus the timing of peak aphid numbers was delayed with successive planting dates, and aphids on the early planting did not undergo the rapid population growth observed for the two later plantings. During 2002, aphid densities were substantially lower than in 2001, and planting date had no measurable effect on aphid phenology or density. Experiments were conducted to assess the potential of the exotic multicolored Asian lady beetle as a predator of the soybean aphid and to assess the potential of this predator-prey relationship for soybean aphid management. *Aphelinus albipodus*, a soybean aphid parasitoid native to Europe and Asia, was released in a soybean field to explore the potential for permanently establishing this natural enemy as a means for controlling aphid populations.

The viral epidemic hit Wisconsin snap bean growers in August and September the past two years. Losses in snap bean yield and quality were high in late-planted fields. Wisconsin's snap bean production decreased 14 percent between 2000 and 2001 even though the acreage harvested increased by 3 percent. A team of researchers in the College of Agricultural and Life Sciences is

trying to unravel the mystery behind the disease and how snap beans become infected. The researchers have been meeting with farmers and the canning industry, which needs a steady supply of the crop. This summer, UW researchers will survey all snap bean areas in the state and expect to analyze more than 17,000 plants for viruses. The soybean aphid is likely responsible for the rapid spread of the snap bean problem. In order to combat diseases through plant genetic resistance, almost 50 snap bean varieties will be screened at the West Madison Agricultural Research Station this summer.

The impact:: Within a very short period of time much has been learned about a potentially devastating pest. Already, it is clear that carefully managing planting date can help manage aphid populations. Initial research on the role of existing natural enemies in regulating aphid numbers; and efforts to establish an exotic parasitoid to control soybean aphid shows promise for developing additional management tools for aphid population control. The research findings have been rapidly disseminated to growers and dealers through targeted extension activities.

Funding: Wisconsin Hatch Project # WIS04486 and multistate project NC-502 :"Soybean Aphid: A New Pest of Soybean Production." Wisconsin Soybean Board, Wisconsin Potato and Vegetable Growers and the State of Wisconsin.

Additional information on the soybean aphid:
http://www.cals.wisc.edu/media/news/08_00/soybean_aphid.html

Additional information on disease carried by aphids:
http://www.cals.wisc.edu/media/news/04_02/snap_bean_disease.html

Additional information on soybean health and management:
http://www.plantpath.wisc.edu/soyhealth/index.htm

How Do Insects and Air Pollution Interact and Affect Forest Health?

Key themes: Global change and climate change
Focus areas: Sustainability of agriculture and forestry

The issue: Although insects and air pollution (elevated carbon dioxide and ozone) both affect forest health, little is known about how they interact. With global and climate changes, there is a pressing need to understand how gaseous pollutants impact biologically interdependent systems, in this case trees, herbivorous insects and natural enemies (parasatoids) of those insects.

What's been done: Research is being conducted at the Free Air CO2 Enrichment (FACE) facility near Rhinelander, Wisconsin, where northern deciduous trees are being fumigated with pollution treatments Studies assess the effects of the pollutants on chemical composition of birch, aspen, as well as ground flora such as red clover. Changes in leaf quality are being assessed by feeding trials with forest tent caterpillars and aphids. Effects of the air pollutants on natural enemies of the herbivorous insects are being assessed by bioassays with parasitoids.

Impacts: Trophic (e.g., plant-herbivore-parasitoid) interactions play major roles in the dynamics of forest ecosystems. Shifts in the nature of these dynamics under future climates may have serious consequences for forest health. This research provides the first information about the

potential for CO2 and O3 to affect natural populations of herbivores and their natural enemies, and the impacts of changes in herbivore performance on the productivity of their host plants. For a variety of insects, these results indicate that both top-down (e.g., predation, parasitism) as well as bottom-up (plant quality) effects on herbivores must be considered when addressing the impacts of atmospheric quality on forest communities. Moreover, the aphid studies also demonstrate that the performance of individual insects (e.g., growth and developmental rates) cannot be reliably scaled-up to predict population responses, as factors such as competition and population regulation by natural enemies must also be taken into account. Management systems to control pests will use the results of this study to suggest strategies to improve forest ecosystems.

Funding: Wisconsin McIntire-Stennis project #WIS04457, "Effects Of Air Pollutants On Trophic Interactions" and National Science Foundation.
More information on the FACE facility:
http://oden.nrri.umn.edu/factsii/

Wisconsin Potato Growers Team with Environmentalists

Key Themes: Adding value to new and old agricultural products, Integrated pest management
Focus Areas: Improved pest control and FQPA implementation

The Issue: Many people want food that has been grown in ways that protect wildlife and the environment, and reduce growers' reliance on pesticides. Although the market for such products is expanding, growers generally lack the tools needed to produce a commercial crop successfully under farm conditions. To encourage farmers, the World Wildlife Fund supports Protected Harvest, an independent, non-profit organization, which certifies that food has been produced under strict growing standards. If Wisconsin potato growers could meet those environmental standards, the World Wildlife Fund would allow the growers to use its panda logo and the "Healthy Grown" label in marketing their crop.

What's been done: For more than 20 years, Wisconsin potato growers have worked closely with UW-Madison researchers and extension specialists who developed an intensive research-based program for managing pests. The program emphasizes monitoring and avoiding pesticides -- especially the most environmentally harmful ones. By implementing many of these methods, Wisconsin potato growers reduced their pesticide use by 500,000 pounds between 1997 and 1999. However, statewide reductions wouldn't satisfy consumers, who wanted to know that the bags of potatoes they buy were grown in an environmentally sensitive way. To achieve that goal, the Wisconsin program then began working with individual growers. It hired an entomologist to help growers with the tasks of applying the intensive and sophisticated pest management techniques on their farms. Those techniques included scouting and spot treating pests, using predictive models that identify when and where pests would be most problematic, intensive crop rotations, adoption of newer, less toxic pesticides, and extra record keeping.

Impact: Wisconsin growers lead the nation in adoption of innovative strategies to reduce reliance on pesticides. The Healthy Grown brand resulted from a major program to label potatoes that are grown in an environmentally sensitive way. In 2000, 15 growers found they could meet the strict standards. In 2001, 17 Wisconsin growers produced the first crop of Healthy Grown potatoes on

9,000 acres. Other growers have since joined the program. The acreage increased to 10,000 in 2002 and bags of the potatoes began appearing in Whole Foods and IGA stores in Wisconsin. The bags carried the familiar panda logo of the World Wildlife Fund.

The Healthy Grown brand sells for $1 to $1.50 more per hundredweight than the average sale price in Wisconsin of $7.20 per hundredweight during 2002. The increase amounts to 10 or 5 cents more for consumers on a 10-pound bag of potatoes. However, consumers get the choice to buy a product that was produced in a way that was healthier for the environment. It also gives consumers a chance to reward growers for their investment of time and money to reduce environmental impacts. With potato yields in Wisconsin between 300 and 400 hundredweight per acre, the healthy grown crop should give individual growers an extra $300 per acre and give the growers a collective price premium of $3 million.

August 1st and 2nd, 2002, an Eco-potato tour was organized to educate citizens about the program. Seventy-five participants, including some from outside the U.S. attended the tour and discussions of how the program worked. Destinations on the tour included growers in the program, a processing plant, a local wildlife preserve and the University of Wisconsin Agricultural Research Station at Hancock, WI.

Funding: Hatch projects #4307, "Biological Regulation of Aphic Populations in Wisconsin Potatoes", and #3910, multistate project NRSP-4, "A National Agricultural Program to Clear Pest Control Agents for Minor Uses" and the State of Wisconsin Nutrient and Pest Management Program, Joyce Foundation, World Wildlife Fund and the Wisconsin Potato and Vegetable Growers Association.

- See Appendix E for a brochure on the Healthy Grown Program

See http://ipcm.wisc.edu/bioipm/, the Website for the Healthy Grown Program.

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

Executive summary

Under this goal, there were 21 projects including 5 that were multistate, interdisciplinary projects, 3 McIntire-Stennis projects and 5 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 differences in attitudes between those who feel well informed and those who still have questions. Two new projects have been added in the last year in this area: #4522, "Science Literacy, Science Information, and the Internet" and #4536, "Smart Growth Requires Smart Demography." Both projects emphasize the importance of information in modern society. Newly added projects indicate that faculty are responding to these stakeholder needs.

Updated project list for FY02

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 Formula Funds	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					
WIS03974	Douthitt, R.	PRIVATE STRATEGIES, PUBLIC POLICIES, AND FOOD SYSTEM PERFORMANCE (NE-165)	X	X					
WIS04098	Deller, S. C.	RURAL ECONOMIC DEVELOPMENT: ALTERNATIVES IN THE NEW COMPETITIVE ENVIRONMENT (NE-162)	X	X			X		
WIS04321	Provencher, R. W.	THE ECONOMIC VALUE OF PRESERVING NATURAL AMENITIES IN REMOTE AREAS: LAKE SHORE			X				
WIS04437	Zepeda, L.	CHILD LABOR ALLOCATION AND WORK SAFETY ON WISCONSIN DAIRY FARMS	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 Apparel Service Jobs In Rural Labor Markets**	X						
WIS04579	**Bowe, S. A.**	**Adding Value: Environmentally Certified Secondary Wood Products**			X				
		Total:	**$106,087**	**$27,554**	**$39,454**	**$0**	**$52,795**	**$145,541**	**8.1**
Objective 5.2: To Increase the Capacity of Communities, Families, and Individuals to Improve Their Own Quality of Life									
WIS03972	Barbam, B. L.	IMPACTS OF STRUCTURAL CHANGE IN THE DAIRY INDUSTRY (NE-177)	X	X			X		
WIS04170	Ray, R. O.	INTENTIONS AND OUTCOMES: EDUCATION AND LEARNING IN STATE AND NATIONAL FORESTS IN WISCONSIN			X				
WIS04282	Loew, P. A.	TRIBAL NEWSPAPERS & SOVEREIGNTY: A FRAMEWORK FOR UNDERSTANDING ATTITUDES ABOUT NATURAL RESOURCES IN WISCONSIN	X				X		

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch Total (Regular & Multistate)	Hatch Multistate	McIntire/ Stennis	Animal Health	Extension Activity	Total Formula Funds	Total F.T.E.
WIS04296	Hitchon, J. C.	COSTLY CHARITY OR SMART STRATEGY? IMPACT ON CONSUMERS AND MANAGERS OF ADVERTISING WITH A SOCIAL DIMENSION	X						
WIS04370	Lee, M.	RURAL RESTRUCTURING: CAUSES AND CONSEQUENCES OF GLOBALIZED AGRICULTURAL AND NATURAL RESOURCE SYSTEMS	X	X					
WIS04437	Zepeda, L.	CHILD LABOR ALLOCATION AND WORK SAFETY ON WISCONSIN DAIRY FARMS	X						
WIS04474	Kleinman, D. L.	CITIZENSHIP AND THE KNOWLEDGE ECONOMY	X						
WIS04522	**Pingree, S.**	**Science Literacy, Science Information And The Internet**	X				X		
WIS04541	**Lane, M. B.**	**Democratic Planning At Multiple Scales In Plural Societies: Natural Resource Governance In Wisconsin**	X						
WIS04607	**Stone, B.**	**Urban Design And Ecosystem Stress: Quantifying The Relationship Between Development Design Standards And Impervious Land Cover In Madison, Wisconsin**	X						
		Total:	**$111,932**	**$25,476**	**$26,904**	**$0**	**$54,553**	**$138,836**	**8.1**

Objective 5.3: Not Assigned

WIS04194	Clayton, M.	APPLICATION OF STATISTICS TO AGRICULTURE: ANALYSIS OF SPATIALLY AUTOCORRELATED CATEGORICAL DATA	X						
WIS04497	Zhu, J.	ANALYSIS OF SPATIAL DATA USING MULTI-SCALE STATISTICAL MODEL	X						
		Total:	**$37,602**	**$0**	**$0**	**$0**	**$0**	**$37,602**	**1.6**
		Total Goal 5:	**$255,621**	**$53,030**	**$66,358**	**$0**	**$107,348**	**$321,979**	**17.8**
		Grand Total:	**$4,865,080**	**$996,543**	**$483,307**	**$141,900**	**$1,272,496**	**$5,490,287**	**387.30**

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.

Rethinking Dairyland

Key themes: Agricultural profitability, Impact of change on rural communities
Focus areas: Small farms and their contributions to local economies

The issue: Dairy farming has a profound impact on the Wisconsin economy. On farm and dairy processing jobs provided about 2.6 percent of all employment for 1.9 billions dollars of income in 1999. Industrial sales from farms and processors of dairy products accounted for 1.3 percent of total industrial sales. But these figures are only part of the effect of dairy farming on the economy. Farm jobs create need for goods and services, construction and rural amenities.

What's been done: Agricultural economists have worked on tracking the links between the dairy industry and the rest of the Wisconsin economy. A software package was used to create a social accounting matrix for Wisconsin. The model used 486 business sectors and 17 governmental and institutional groups. Three levels of economic activity were utilized including on-farm, off-farm and combinations of activities in the two realms.

The impact: A publication series has been written and posted on the website below that addresses the current and future dairy situations for Wisconsin. This site provides background for policy makers at the state and federal level to understand the potential for change to affect Wisconsin dairies. The impact includes the multiplier effect that results in dairying affecting about 5.1 percent of all employment in Wisconsin and about 5.7 billion dollars of income to households. About 5.9 percent of total industrial sales can be traced to dairy operations. All dairying contributes in excess of 1 billion dollars of federal taxes and 688 million dollars of state and local tax revenues.

Funding: Wisconsin Hatch project #4424, " Supporting the Understanding and Use of Dairy Price Risk Management Tools", Wisconsin Hatch project #4098 and multistate project NE-162, "Rural Economic Development: Alternatives in the New Competitive Environment", and the State of Wisconsin.

More information and publications on change in the Wisconsin dairy industry:
http://www.aae.wisc.edu/www/pub/dairyland/

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 for 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 press down.

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 three of the following projects are multistate, multidisciplinary projects.

Projects serving underrepresented and minority populations:

Population	Project	Principal Investigator(s)	Title
Non-traditional farms	WIS05227	Cropp, R. A. leading an interdisciplinary team	ADOPTION OF ALFALFA BIOFORAMING TO ENHANCE RURAL ECONOMIC DEVELOPMENT
Young adults	WIS03967	Nitzke, S. A.	USING STAGES OF CHANGE MODEL TO PROMOTE CONSUMPTION OF GRAINS, VEGETABLES AND FRUITS BY YOUNG ADULTS (NC-219)
Urban horticulture	WIS04442	Jull, L.G.	EFFECT OF DEICING CHEMICALS ON WOODY ORNAMENTAL PLANTS
Sustainable agriculture/organic producers	WIS04051	Kloppenburg, J. R.; Stevenson, G. W.	COMMODITIES, CONSUMERS, AND COMMUNITIES: LOCAL FOOD SYSTEMS IN A GLOBALIZING ENVIRONMENT (NE-185)
Organic producers	WIS04317	Goodman, R. M.	ANALYSIS OF MICROBIOTA ASSOCIATED WITH PLANT ROOTS IN COMPOST-AMENDED FARM SOIL
Children	WIS04437	Zepeda, L.	CHILD LABOR ALLOCATION AND WORK SAFETY ON WISCONSIN DAIRY FARMS
Native Americans	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
Citizen involvement in government	WIS04541	Lane, M. B.	DEMOCRATIC PLANNING AT MULTIPLE SCALES IN PLURAL SOCIETIES: NATURAL RESOURCE GOVERNANCE IN WISCONSIN
Native Americans	WIS04282	Loew, P. A.	TRIBAL NEWSPAPERS & SOVEREIGNTY: A FRAMEWORK FOR UNDERSTANDING ATTITUDES ABOUT NATURAL RESOURCES IN WISCONSIN
Families/ small business owners	WIS03858	Jasper, C. R.; Goebel, K.	FAMILY BUSINESSES: INTERACTION IN WORK AND FAMILY SPHERES (NE-167)
Sustainable agriculture	WIS04595	Converse, J.; Karthikeyan, K. G.	ANIMAL MANURE AND WASTE UTILIZATION, TREATMENT AND NUISANCE AVOIDANCE FOR A

			SUSTAINABLE AGRICULTURE
Small woodlot owners	WIS04505	Rickenbach, M. G.	COOPERATION AMONG WOODLAND OWNERS: A CASE STUDY OF ORGANIZATIONAL FORMS AND PARTICIPANT MOTIVATIONS
Sustainable forestry	WIS04579	Bowe, S. A.	ADDING VALUE: ENVIRONMENTALLY CERTIFIED SECONDARY WOOD PRODUCTS

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 Input Process

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).

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 2002.

For the Animal Health process, every two years, the Association of American Veterinary Medical Colleges (AAVMC), with numerous co-sponsors, organize 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:

November 2002 April 2002	CALS Board of Visitors (advisory committee, see Appendix B for current members	CALS Executive Staff and Deans, Dept. chairs of departments
May 2002	All day administrative retreat	CALS Deans and chairs of departments
December 2002	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 2002.

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 November of 2002 for 62 new proposals. One additional call for proposals was made in Spring 2002 for scientists requesting multistate research funding. A similar review process was done for multistate funding with the smaller subset of proposals already approved through the regional Experiment Station director's processes in March 2002.

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 (12 faculty including representation of the School of Human Ecology) 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 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 Victor Phillips, 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 2002**
WI Integrated Research and Extension Projects Please see project lists under goals and example descriptions	
Total	1,272,496.00

Margaret Dentine
Executive Director **Date**

Form CSREES-REPT (2/00)

Appendices

Appendix A – Science Report & CALS Quarterly

Science Report
Additional news stories and electronic version of Science Report available at
http://www.cals.wisc.edu/

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 2003

Ms. Juelene Beck (‘05)
Douwe Egbert’s Coffee Systems

Dr. James R. Behnke (‘04)
Retired, Advisor to the CEO
Pillsbury Corporation

Ms. Linda Bochert (‘06)
Michael Best & Friedrich
Environmental Law Firm

Mr. Steve Braunginn (’03)
Urban League of Greater Madison, Inc.

Ms. Kitty Clark Cole (’05)
Independent Fundraiser and Marketing Specialist

Ms. Margaret Dohnalek (‘04)
Abbott Laboratories International
Nutritional Products

Mr. Gordon Foss (’04)
Badgerland Farm Credit Services

Dr. Robert Horsch (’04)
Monsanto Company

Dr. Peter Huettl (’04)
Applied Sciences, Inc.

Mr. Pete Kappleman (’04)
Dairy Farmer

Mr. Terry Kurth (’05)
Midwest Lawn Care

Mr. John Mommsen (‘05)
Lazy A Ranch

Mr. Bliss Nicholson (’04)
The Bruce Company

Mr. Rod Nilsestuen (’04)
Secretary, Wisconsin Department of Agriculture, Trade, and Consumer Protection

Mr. Doug Quick (’04)
Lakeside Foods

Mr. Roger Ripley (’04)
Accelerated Genetics

Mr. Gary Siporski (’05)
Citizens State Bank of Loyal

Mr. Tom Strachota (’04)
Dairyland Seed Company, Inc.

Appendix C – 2002 Stakeholder Meetings with CALS Dean and/or Associate Dean(s)

January 10	Ben Miller and Galen Fountain, staff of Senator Kohl
January 15	Bob Karls, Wisconsin Soybean Marketing Board
	Bob Oleson, Wisconsin Corm Promotion Board, Inc.
January 17	Wisconsin Fertilizer, Aglime & Pest Management Conference
January 17	Wisconsin Pork Producer's Taste of Elegance
January 18	Wisconsin Fertilizer & Research Council Luncheon
January 30	Ag Day at the Capital
February 8	Dan Poulson, Wisconsin Farm Bureau Federation
	John Manske, Bill Oemichen, Wis. Federation of Coops
	Ron Statz, National Farmers Organization
	Carl O'Connor & Rick Klemme
April 2	Dairy 2020 Council Meeting
April 13	Wisconsin Association of Meat Processors Convention & Meat Product Show
May 2	Wisconsin Livestock & Meat Council Meeting and Wisconsin Meat Industry Hall of Fame Luncheon
May 31	Marshfield Dairy Breakfast
June 10	Agriculture Coalition at Farm Bureau
June 18	Farm Bureau Dinner
June 26	Wisconsin Milk Marketing Board Meeting
July 3	Wisconsin Farm Bureau Federation Breakfast
July 15	Dan Vogel, Wisconsin Livestock and Meat Council
July 17	Shelly Meyer, Julie Gabris et al, Professional Dairy Producers of Wisconsin
August 5	Tom Lochner, Wisconsin Cranberry Board, Inc.
	Michael Carter, Wisconsin Potato & Vegetable Growers Association
	Ron Kuehn
August 14	Wisconsin Pork Producers Association Board Meeting
August 22	Independent Professional Seedsmen Association
September 6	Dan Poulson, Wisconsin Farm Bureau Federation
September 7	Dairyland Seeds 95th Anniversary Open House
October 2	Bob Karls and other member of the Board of Wisconsin Soybean Marketing Board
October 9	Wisconsin Livestock & Meat Council
October 18	Shelly Meyer, Julie Gabris et al, Professional Dairy Producers of Wisconsin
November 6	Biotechnology Fall Conference
November 13	Annual Meeting of Farmers Cooperative
November 22	Rural Health Issues Forum
December 9	Wisconsin Farm Bureau Federation Meeting and Awards Banquet

Appendix D - Agricultural Research Stations 2002 Schedule of Events

March 23	Maple Sugaring in Wisconsin	Kemp
April 5	On Farm Composting Workshop	West Madison
April 28	Association of Women in Agriculture Farm Breakfast	West Madison
April 30	How to Have a Successful Garden	Ashland
May 17-18	Meet the Spring Migrants Bird Program	Kemp
May 22	Tomatoes: From Seed to Plate	Ashland
May 31	Dairyfest Breakfast	Marshfield
June 5	Hybrid Poplar Tour	Spooner
June 17	Fishing for Walleye	Kemp
June 27	Weed Science Field Day	Arlington
July 12	Amphibians & Reptiles	Kemp
July 12	Rhinelander Potato Grower Field Day	Rhinelander
July 13	Beautiful Bats	Kemp
July 16	Central Wisconsin Potato Field Day	Hancock
July 17	Northeast Wisconsin Potato Field Day	Antigo, Langlade Co. Airport
July 22	State 4H Livestock Contest	Arlington
July 23	Butterflies	Kemp
July 24	Crop Diagnostic Training	Arlington
August 10	50th Spooner Sheep Day	Spooner
August 12	Fruits, Vegetables, Flowers Twilight Tour	Hancock
August 13	Wisconsin Nursery Association Summer Field Day	West Madison
August 13	Wisconsin Turfgrass Association Summer Field Day	O.J. Noer
August 17	West Madison Horticultural Field Day	West Madison
August 21	Spooner Potato Tour	Spooner
August 22	Spooner Potato Tour	Spooner
August 26	Basic Wildlife Identification	Kemp
August 27	Fall Garden Twilight Meeting	Ashland
August 28	Whitetail Deer – Ecology & Issues	Kemp
August 28	Twilight Garden Tour	Spooner
September 5	Agronomy Field Day	Arlington
September 8	Friends of International Students Picnic	Arlington
September 14	Beef Grazing School	Arlington
September 17	The Wonderful World of the Potato	Ashland
September 21	Prairies Jubilee	Arlington
October 29	Grape Pruning Workshop	Spooner
October 30	Fall Grape Pruning Workshop	Ashland
December 5	Dairy Day	Marshfield
December 11	Arlington Dairy Day	Arlington

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

Appendix E - Healthy Grown Program

Healthy Grown Program

(Above article is not included in electronic version, hard copy by separate mailing)

Appendix F - Discovery Farms

Discovery Farms

(Above article is not included in electronic version, hard copy by separate mailing)

Appendix G - Food Atlas

Food Atlas

(Above article is not included in electronic version, hard copy by separate mailing)