Compact 2005-2006
Department of Animal Science
College of Agricultural, Food and Environmental Sciences

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INTRODUCTION

Animal Agriculture is at a critical point in Minnesota. Its future depends on its economic viability and on articulating state policy that promotes an economically and environmentally sustainable growth for the benefit of present and future generations. The Department of Animal Science is facing significant challenges to maintain its competitiveness and provide the backbone research support needed in specific disciplines that are central to the vitality of the animal industries and rural communities. Our department is well positioned for research and teaching on nutrient cycling management, animal management and animal growth. We are weak in the areas of production systems, reproduction and genomics, while we are significantly weak in the areas of animal welfare and food safety. It is important that we maintain a critical mass of faculty in all of these areas if we are to remain competitive in research and education at state, national and international levels. Our research and extension work contribute directly to COAFES priorities of Enhancing Agricultural Systems, Promoting Improving Environmental Quality and Promoting Safe and Healthy Foods and indirectly to the Revitalizing MN Rural Communities priority.

1. Short-Term Goal Statement, Introduction.

Teaching. The Animal Science major is now implemented. Our goal is to contribute to the College overarching initiative of Exemplary Education by promoting a stimulating learning environment, maintaining a competitive curriculum, increasing enrollment, increasing retention over the levels achieved in FY05 and maintaining student credit hours. A course and teaching evaluation process was approved by faculty and is now being implemented. Our FY06 Teaching Compact fully describes instructional investments needed to maintain a competitive curriculum.

Research. Our goals are to provide support for development of signature research programs and to monitor the adjustments being made by faculty as they continue to transition to soft money support for their research programs. Assistance with departmental financial reserves might be necessary to bridge budgetary needs between grant awards.

Extension. Consolidation of organizational changes designed for the delivery of research-based information to extension clientele is being achieved. However, coordination is a continued need within and among livestock commodity extension program planning. Our goals are to evaluate programs that have been delivered and develop new programs in accordance with commodity needs. We will continue to promote an environment where coordination and collaboration is achieved across the extension system.

2. Key strategic initiatives (12-18 months):

2.1 Teaching. Monitor and evaluate new courses developed in FY04 and FY05 for the Companion Animal, Equine and Biotechnology options.

The following table shows the courses developed in FY04 and FY05 and that would be evaluated during FY06.

Measurable outcomes: ($229.31/cr)

Courses	Expenses Per FY	FY04 # of students	FY04 Net tuition	FY05 # of Students	FY05 Net tuition	FY06 # of students estimated	FY06 Net tuition
AnSc 3509 Animal Biotechnology (3cr) (S)	2,000[1]	**7**	2,815	~12	6,255	15	8,319
AnSc1403 Companion Animal Nutrition and Care (3cr) (S)	12,500[2]	74	4,469[3]	~69	3,322[3]	70	3,552[3]
VCS 4600 Small Animal and Equine Behavior (3cr) (F)	-	-	-	20	3,440[4]	30	5,160[4]
VCS 4606 Small Animal Mgmt (3cr) (S)	0	23	3,956	~21	3,612[4]	25	4,230[4]
AnSc 3007 (3cr) (S) Equine Nutrition	300[1]	-	-	14	9,331	20	13,459
AnSc 3052 (4cr) (F) Equine Anatomy & Physiology	3,300[1]	-	-	13	8,624	20	15,045
AnSc 3055 Horse Health Mgmt (2cr) (F)		-	-	-	-	20	9,172
VPM 3700 Equine Reproduction and Breeding Mgmt (2cr) (S)		-		~10	1,147[4]	20	2,294[4]
Total	18,100		11,240		35,731		61,231

[1]Lab and course supplies.
[2]1/4 TA support.
[3]Course added one credit after FY03. Since FY04 calculations are based on the added credit only.
[5]Equivalent to 25% of the tuition generated by the course.

Financial plan: In the above table we present the trends in student enrollment and new tuition dollars generated as a result of the new courses being offered for three new options within the Animal Science major. It is expected that this plan would generate $ 61,231of new net tuition for FY06. That is $ 25,500 above FY05.

Challenges: Development of the Companion Animal and Equine options are, to a certain extent, based on the teaching support provided by the Departments of Veterinary Clinical Science (VCS 4600 and VCS 4606) and Veterinary Population Medicine (VPM 3700). The partnership with these two departments in the College of Veterinary Medicine (CVM) is excellent and valuable. Both departments retain 75% of the tuition generated by the courses they offer for our major. Even though the enrollment in these courses is good and it is envision to grow, the level of tuition generated is not yet enough to cover the cost of a course coordinator to facilitate the work of the CVM faculty teaching these courses. Therefore, there is no incentive or the incentive is

very small for faculty to commit their time to teaching these courses. A bridge investment to hire a course coordinator is necessary, at least until the level of tuition generated is enough to cover the investment.

Opportunities:

Veterinary Technologist. Alternative career opportunities need to be developed for our graduating students. In this light we are investigating (conversations, market demand, etc) the possibility to develop a Veterinary Technologist option in collaboration with the VCS and VPM departments in the CVM and Ridgewater College. The Veterinary Technologist option would be based on a 4 year bachelors program and professional veterinary training in veterinary specialty areas where these professionals can assist veterinarians.

2.2 Research. We work in collaboration with several institutions across the North Central region. But, more importantly we work in partnership with our ROCs across the state.

2.2.1. Generation of a resource F2 Holstein population for the identification of genes controlling resistance and susceptibility to mastitis. One of the major issues in dairy is mastitis which is responsible for 2 billion dollars in milk and animal losses. For the past three years a group of faculty have been involved in developing a Holstein resource population based on the genetic differences that exist between the so called "Control Holstein group", a small herd that has been maintained unselected since 1964 at the University of Minnesota, and contemporary selected animals. The aim of this project is to conduct a genomics scan of F2 cows to identify quantitative trait loci associated with resistance and susceptibility to mastitis. Aspects of this project have been supported by a USDA CRADA contract and intramural support.

Measurable outcomes: 380 F1 frozen embryos have been produced. Five F1 bulls for artificial insemination of contemporary unrelated cows have been produced and about 5,000 semen straws have been cryopreserved. Two hundred F2 embryos will be collected and frozen during FY06.

Financial plan: The research proposal submitted to the USDA-NRI genomics section to seek funding for the generation of the F1 x contemporary cow population and to cover heifer development and milk loss costs was ranked medium priority and therefore did not get funded. We have an agreement with Milbank Community Foundation in South Dakota for collaboration and generation of the QTL resource population. The grant proposal will be resubmitted.

2.2.2. Animal Bioinformatics: Through leveraging financial support provided by the Animal Biotechnology Center, and funding from interested faculty, a core Animal Bioinformatics facility has been developed and maintained for the last four years. What is available is functional and necessary if animal researchers are to continue to be competitive for federal grant support. This past year COAFES (College and DAS) and CVM (College and VBS) provided (50:50) support to continue the hiring of a **one technical P&A position ($50,000.00 + fringe/year)** that is responsible for maintaining and curating databases and bioinformatics hardware. Continuation of this support is requested until a proposal for the creation of a Bioinformatics program is approved. The latter is a proposal that bases its financial sustainability for the first five years of the program on the use of the Microsoft class action compensation that would benefit the University.

2.2.3. Opportunities:

2.2.3.1. Alternative Animal Models for Human Diseases. Cystic fibrosis, diabetes and obesity are examples of complex genetic diseases with tremendous physiological consequences. Alternative animal models to the laboratory mouse are needed to dissect their complexity.

Technologies developed in the past decade (embryonic stem cell technology, reproductive technologies, animal cloning and gene knock outs and knock ins) coupled to genome sequencing support the use of pigs as an alternative animal model for the above mentioned human diseases and several others for which no suitable animal models exist. Pig physiology and organ sizes are remarkably similar to human making this animal model a choice for xenotransplants. A handful of researchers in the Medical School, CVM and COAFES (Animal Sciences) have initiated collaborative work in this area. The NIH has established a pig repository laboratory at the University of Missouri. This area of research is posed to grow and evolve in the next 25 years. The core group of researchers at the University of Minnesota requires infrastructure investments and a faculty position with emphasis in reproductive technologies related to embryo manipulation, fertilization, and embryogenesis, with translational relevance to animal cloning for improvement of food animals, development of unique animal models for agricultural and biomedical research and for human therapy, including xenotransplantation.

2.2.3.2 Animal waste processing and management. The use of animal waste for energy production through anaerobic and/or aerobic digestion is based on processes that are well known. However, these processes are not as efficient as they can potentially be. Modern technologies in genome engineering of microbes, remote sensing engineering technologies and equipment design promise the possibility to develop modular efficient bio-processing systems that could be utilized for energy production by small to medium size animal operations. The Departments of Animal Science and Biosystems & Agricultural Engineering will develop a proposal for a research and educational program in this area of expertise.

3. Undergraduate enrollment management.

Goals and enrollment trends. Our department is on target with the student enrollment plan originally proposed in the FY04 compact. The following table summarizes our student enrollment increases for FY04 and FY05 and estimates student number increases for FY06. It is envisioned that a steady increase of 20 students per year will continue through FY07. By FY08 the number of students will be stable at 360.

Emphasis	**Option**	**FY04**	**FY05**	**FY06 (estimates)**	**Total**
Sci/Pre-vet	Science	same	same	same	
	Biotechnology	+3	+4	+4	+11
Production	Dairy	+2	+2	+2	+6
	Beef*	0	0	0	
	Swine*	0	0	0	
	Poultry*	+1	+2	+1	+4
	Sheep	0	0	0	0
	Equine	+8	+9	+10	+27
	Companion Animal	+4	+5	+5	+14
Industry	----	0	0		
Total		+18	+22	+22	+62

Management team:
Departmental Undergraduate Curriculum Committee and Anthony Seykora, Director of Undergraduate Studies and Major coordinator.

Challenges: With the retirement of Dr. Jerry Hawton next June 2005, an instructor will be needed to offer three courses (AnSc 2012 Livestock and Carcass Evaluation, AnSc 2013 Beginning Livestock Evaluation, AnSc 3142 Advanced Livestock Judging) that are part of the Animal Production and Animal Industries curricula. Also, at this point in time, the AnSc 1511 Food Animal Products for Consumers course is being taught by a part time instructor. **We propose that an MS level livestock specialist be hired as a Youth Development Professional (50% teaching:50% extension)** to offer these courses and provide support for the 4H, FFA and summer camp livestock programs which are part of the St. Paul campus extension and outreach activities.

Opportunities: Animal physiology is an area of expertise that has undergone continued divestments in the Medical School, CVM and CBS. The latter follows a national trend and the concomitant reduction of students and expertise. Paradoxically, the post genomic era and its emphasis on functional genomics will require significant physiological expertise to explain the functional dynamics of body systems as a result of gene action or inaction. Therefore, we envision that physiologists will be in high demand in the near future. Our department has the largest group (4) of animal physiologists in the university system that constitutes a competitive core group of specialists. It is imperative that we develop, together with COAFES and other colleges a vision to maintain and promote a physiology program at the University of Minnesota.

Financial plan:

						APPROX. TUITION REVENUE*			
			Students			COAFES	25% other	COAFES	75% other
Year	Fr	Sph	Jr	Sr	Total	tuition $ **	colleges ***	TOTAL	tuition $****
04-05	20	-	-	-	20	$91,600	$11,450	$103,050	$34,350
05-06	20	20	-	-	40	$192,360	$22,900	$215,260	$68,700
06-07	20	20	20	-	60	$306,860	$27,480	$334,340	$82,440
07-08	20	20	20	20	80	$421,360	$32,060	$453,420	$96,180

* At $229.31/credit.
** ANSC courses and other COAFES courses.
*** Tuition to COAFES from courses taken in other colleges.
**** Tuition to other colleges from COAFES students taking their courses.

4. Graduate Student Management:

Goals and Trends. Our goal is to maintain a competitive graduate program. In the last 5 years, an average of 3 Ph.D. and 4 M.S. students had graduated each year. There were 30 degrees awarded in the 4 year period of 2000-2004. Placement is typically 100% with a distribution of approximately 2/3 into academic positions and 1/3 into industry positions for both Ph.D. and M.S. degrees. Mean graduate enrollment over the past 5 years has been 36 students (20 female/16 male). Current enrollment is 34 (23 M.S./11 Ph.D.; 15 female/19 male; 16 international/18 domestic). Applications for the Animal Sciences program summarized as a 5 year average: M.S. (15), Ph.D. (12), Acceptance rate for: M.S. (7.5), Ph.D. (5.5). During the 5 year period, GRE scores of applicants averaged about 490 Verbal, 630 Quantitative, and 590 Analytical.

Proposed Changes. Restructuring of graduate courses is in process. For example, instead of offering two separate courses in Concepts and Developments in Nutrition of Swine or Ruminants, a course entitled Concepts and Developments in Animal Nutrition is being offered with ten students registered that have interest in either swine, ruminants or poultry. Other changes include a course that will encompass two semesters with 7 week blocks addressing

Advanced Animal Nutrition I (Fundamental Nutrition, Bioenergetics), and Advanced Animal Nutrition II (Protein Metabolism and Integrated Tissue Metabolism).
Financial Status and Issues. A major issue is the continual and marked increase in tuition and fringe benefits. This situation creates a competitive advantage for hiring hire post-docs instead of offering opportunities for graduate student training.

5. Personnel Management.

Faculty. One faculty retirement will occur by the end of FY05. We described in Item 3 above a P&A Instructor position required to cover the teaching and extension activities provided by the retiring faculty. A faculty position with expertise in cell signaling and reproductive technologies is needed and described in items 2.2.3.1. and 3 above.

6. Public engagement initiatives.

Name of Program	Brief description	Years offered	# of students	UM Links	Funding
Ag Awareness on campus acad yr	3 day event organized by An Sci & Agron grads, exposes suburban children to Ag & its impact on their daily lives. Hands-on ed includes major MN lvstk species & crops.	Ongoing 9 years spring	1200 elementary students yearly		Minimal budget Donations Department
4H on & off campus acad yr	State & county dairy, livestock & poultry shows, workshops & competitions	Ongoing over 15 yrs	unknown		4H Dept. of Animal Science
FFA on & off campus acad yr	Dept's FFA Sci Fair Project judging lvstk shows & competitions. Host over 600 in Oct -Poultry, Dairy & Lvstk Invitational Judging Contests & 250 at April state convention	Ongoing over 15 yrs	~900		FFA Dept. of Animal Science
Kids U Farming Adventures on campus summer	Day camp for children to increase awareness of agriculture & learn about food animal industries	Summer Since 2003	52 elementary	University Extension	Registration fees Dept. of Animal Science
Gopher Dairy Camp on campus summer	Day camp for 4-H and FFA youth. Youth completing grades 6-11. Dairy judging, workshops, Showmanship, the Gopher Gold Auction	Summer since 2003.	74 Jr & Sr High	4-H FFA Gopher Dairy Club	Dept. of Animal Science Gopher Dairy Club 4H FFA

7. Statement on diversity goals. The Department of Animal Science is committed to promoting the principles of equal opportunity, affirmative action, and multiculturalism where all individuals are valued, respected, and unobstructed in their pursuit of excellence. As part of our commitment, the Department of Animal Science emphasizes recruiting faculty, professional and academic employees and graduate students from culturally diverse ethnic backgrounds.
Indicators of progress: Our faculty workforce has a "number to goal" of 1.9 for females and 0.6 for minorities. We have actively sought females and minorities in our recruiting methods. Four of the last five faculty hires were females and one was a minority. The Department's 6 P&A employees consist of 2 (33%) females and 5 (83%) minorities. The Department's graduate student program has 29 students 14 females (48%) and 11 (38%) minorities.

8. Budget and financial issues

04-05 Recap

	ALLOCATED FUNDS				OTHER FUNDS***			
CATEGORIES	**O & M***	**AES**	**MES**	**Farm ** Animal Facilities**	**Grants**	**Gifts**	**Revenue Generating**	**TOTALS**
Faculty Salaries	$748,842	$1,032,773	$492,152	$4,724	$48,824	$6,435		$2,333,752
Faculty Fringe	$235,280	$290,469	$75,359	$877	$8,639	$2,111		$612,735
RA Salaries		$233,386			$65,276	$35,280		$333,942
RA Fringe		$101,466			$21,020	$41,860		$164,346
Staff & UG student Salaries	$81,370	$503,363	$39,000	$158,219	$88,535	$53,224	$42,621	$966,332
Staff & UG student Fringe	$26,445	$47,006	$9,750	$19,106	$32,768	$17,298	$13,852	$166,225
SE&E	$28,244	$335,874	$6,936		$802,009	$247,928	$275,690	$1696,682
Taxes	$114,363	$197,338	$5,550	$7,986				$325,237
TOTAL	**$1,234,544**	**$2,744,675**	**$628,747**	**$190,912**	**$1,067,173**	**$404,136**	**$332,163**	**$6,602.350**

*** Includes salary and fringe for Farm animal attendants for the portion that is paid off O&M funds.**
**** Does not include carry forward or expenses from the actual barn accounts.**
****Does not include carry forward amounts on O&M. Grants column includes ICR funds and AES faculty set-up dollars.**

TOTAL ALLOCATED	**$4,798.878**
TOTAL OTHER	**$1.803.472**
GRAND TOTAL	**$6,602.350**

Fiscal Year 05 Teaching Compact $130,000

9. Facilities issues: The St. Paul campus farm animal facilities continue to be a financial challenge despite the administrative re-structuring and reduction of animal units. In essence, the facilities were developed as teaching/research facilities, not production facilities and therefore are inefficient and labor intensive. With the reduction of research dollars originating from commodity associations, facilities are primarily dedicated to teaching and youth development events (4H, FFA, Minnesota Royal, Homecoming, Gopher Dairy camp, U kids' summer camp and other educational activities).

9.1 Farm animal facilities capital investments urgently needed: Description of the capital investments were presented in an addendum with the FY05 compact. Re-distribution of space allocation at the farm animal facilities has been discussed and a plan for utilization of the Poultry facility and Sheep barn have been developed and submitted to the college. There is urgency to correct ventilation and drainage problems in the Swine facility.

St. Paul Campus	**$322,550**
Rosemount UMORE Park	**$210,000**

9.2. Increase in recurring base budget for animal facilities in St. Paul. $50,000

Animals are managed 24/7 through out the year. Most animal birthing occurs in the afternoon or overnight and milking starts at 2:30 AM until 4:00 AM and is repeated early in the afternoon 365 days in the year. These two activities alone create an increase in overtime hours and the difficulty of finding, within the urban enclave, farm animal attendants that would adapt to the hours imposed by the operations. I suggest, since the presence of animals on campus is perceived by everyone as an attractive recruitment tool, this request of support be considered as part of a recruitment/retention and teaching investment. Farm animal facilities and operation provide significant support for important events like 4H, FFA convention, MN Royal, Homecoming, etc.

9.3 Manure Management. Under research initiatives we described above an initiative for **Animal waste processing and management** which we believe will be, in time, an alternative to reduce the cost of St. Paul campus manure removal which has significantly increased in the last few years.