Section VII

Compact FY04 [i]

Department of Animal Science
College of Agricultural, Food and Environmental Sciences

Introduction

Animal Agriculture is at a critical point in Minnesota. Its future depends on its economic viability and on articulating state policy that promotes its environmental sustainable growth and development 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.

1. Short-Term Goal Statement, Introduction

Teaching

The Animal Science major will be effective on January 2004. Hence, FY04 reflects a state of transition from the Science in Agriculture and Animal Production majors to the Animal Science major. This change streamlines and simplifies our communication with current and prospective students by focusing on a major with three emphases and adequate options that better fit their career goals. Our goals are to maintain a competitive curriculum for the major, increase enrollment, increase retention and increase student credit hours over the levels achieved in FY03. Our FY04 Teaching Compact fully describes instructional investments needed to maintain a competitive curriculum.

Research

FY03 budgetary reductions significantly affected intramural faculty research support, resulting in a net reduction of research assistant positions and a transfer of technical assistant positions to non-recurring budgets generated by research grants and contracts. The goals for FY04 are to monitor the adjustments being made by each of our faculty during this transition year and to try to maintain competitiveness by bridging budgetary needs, as they become apparent, between grant awards with departmental financial reserves.

Extension

The goal for FY04 is to consolidate the organizational changes designed for the delivery of research based information to extension clientele. In the new model, our state extension specialists and Regional Extension Educators (REEs) are responsible for statewide extension planning and execution. We envision that much coordination will be necessary within and among livestock commodity extension program planning. Our goals are to develop pragmatic programs and to promote an environment where coordination and collaboration is achieved across the extension system.

[i] Prepared by F. Abel Ponce de León, Head

2. Key Strategic Initiatives (12-18 months)

2.1. Teaching. Development of new courses for the Companion Animal, Equine and Biotechnology options.

Companion animal option: The only course currently offered is the 2 credit ANSC 1403 Companion Animal Nutrition and Care which will be converted to a 3-credit course. Two other courses for this option need to be developed: CVM xxxx Animal Behavior (3 cr) and CVM xxxx Small Animal Management (4 cr). Coordination with the CVM Small Animal Clinical Science (SACS) department has been initiated to develop these last two courses.

Equine option: Two courses are now being offered from the Crookston Campus by ITV. While these courses are still offered, their viability and quality are in doubt. At this moment, the equine training summer session (3 cr), held at the Crookston Campus, is in limbo because it has not been offered in the last two years. Coordination with the Crookston campus will occur, however, if this fails the summer session course could be offered at the St. Paul campus using CVM horses. ANSC 3007 Equine Nutrition (3 cr), and ANSC xxxx Equine Physiology and Anatomy (4 cr), are under development.

Biotechnology option: A 3-credit ANSC 2221 Animal Biotechnology course is being developed.

Measurable outcomes: ($229.31/cr).

Financial plan: As presented in the table below, this plan should generate $ 34,890 new net tuition dollars.

Courses	Semester	# of students	Expenses $	Gross tuition income $	Net tuition income $
ANSC 1403 (3 cr)	Spring 04	~ 70	12,250 [1]	16,005 [4]	3,802
ANSC 2221 (3 cr)	Spring 04	~ 10	2,000 [2]	6,879	4,879
ANSC 3xxx Equine Physiology & Anatomy (4 cr)	Fall 04	~10	3,300 [2]	9,172	5,872
CVM Small Animal Mgmt (3 cr)	Spring 04	~ 40	0	6,879 [5]	6,879
CVM Animal Behavior (3 cr)	Fall 04	~ 40	0	6,879 [5]	6,879
ANSC 3007 Equine Nutrition (3 cr)	Fall 04	~ 10	300 [2]	6,879	6,579
Equine Summer Session (3 cr)	Summer 04	~ 10	6,000 [3]	6,000	0

[1] 1/4 TA support provided to Dr. Marshall Stern.
[2] Lab and course supplies
[3] Per-diem to CVM for horses
[4] Course added one credit, hence this reflects the gross income increase generated over FY03.
[5] Equivalent to 25% of the tuition generated by the course.

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: Three hundred-eighty F1 frozen embryos have been produced. F1 bulls for artificial insemination of contemporary unrelated cows are being produced.

Financial plan: A research proposal will be submitted to the USDA-NRI Tools and Reagents section to seek funding for the generation of the F1 x contemporary cow population and to cover heifer development and milk loss costs. We have initiated conversations with Ms. Carole J. Boos, CEO Milbank Community Foundation in South Dakota as potential collaborators for the generation of the QTL resource population.

2.2.2. Swine nutriomics resource population. Numerous studies have identified genetic loci with significant effects on growth, carcass composition and meat quality in both exotic and domestic pig breeds. We intend to use these proven approaches to identify QTL for these traits in a University of Minnesota "Nutriomics" resource population being reared at the Southern Research and Outreach Center (SROC) in Waseca. This population is based on a reciprocal backcross involving Duroc and Landrace boars and Yorkshire/Landrace crossbred sows, breeds central to U.S. pork production. We will collect growth and production records from these resource animals from wean to finish. In addition, carcass composition and meat quality traits will be collected at slaughter. Determination of phenotypic parameters in this population will provide important information about the magnitude of the variance in these traits in agriculturally relevant breeds, and will provide an invaluable resource for gene discovery and marker development. Finally, in collaboration with the Diabetes Institute for Immunology and Transplantation, we will phenotype these animals for suitability as islet-cell donors in pig to human xenotransplantation. With animal phenotypes and DNA in hand we will be positioned to request funds from the USDA NRI and NIH to identify the genes underlying observed variation in these traits.

Measurable outcomes: Currently, Our F1 population has been generated and we have begun the reciprocal backcross. In April-May (2004) 600 piglets will be born. In Nov-Dec (2004) the remaining 600 piglets will be born.

Financial plan: Minimum required investment to maintain and phenotype the Swine Nutriomics population is $124,750. Cargill is evaluating a grant proposal to support this project. In the event that Cargill reaches a negative decision we would like COAFES to consider providing support to finish develop the resource population as it would increase our competitiveness for USDA-NRI grant support.

2.2.3. 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 three years. At this point in time, no further support originating from soft funds is available to continue this core facility. What is available is functional and necessary if animal researchers are to continue to be competitive for federal grant support. **What is needed is the salary for one technical P&A position ($50,000.00 + fringe/year)** that would be responsible for maintaining and curating databases and bioinformatics software.

2.2.4. Opportunity. The Department of Animal Science and the Veterinary and Biomedical Sciences Department are discussing the renewal of a proposal for a faculty position in developmental biology in the area of molecular and cellular mechanisms of animal health. The position would have a reproductive emphasis 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. The position would fill a critical need for expertise in large animal reproductive and development biology to bridge the gap between stem cell science, which focuses on individual cells, and functional genomics of whole animals.

3. Undergraduate Enrollment Management

Goals and Enrollment Trends

By the end of FY04, it is envisioned that about 280 college undergraduate students will be enrolled in the Animal Science major. However, at this point, the number of students within various emphases and options is unknown. The following table summarizes our best estimate of student number increases for FY04 and FY05. It is envisioned that a steady increase of 20 students per year will continue through FY06 and FY07. By FY08 the number of students will be stable at 360.

Emphasis	Option	FY04	FY05	Total
Science/Pre-vet	Science	same	same	
	Biotechnology	+3	+4	+7
Production	Dairy	+2	+2	+4
	Beef*	0	0	
	Swine*	0	0	
	Poultry*	+1	+2	+3
	Sheep	0	0	0
	Equine	+8	+9	+17
	Companion Animal	+4	+5	+9
Industry	----	0	0	
Total		**+18**	**+22**	**+40**

* Unless we develop an aggressive recruitment program for the livestock and poultry options, student numbers will remain at the same level or decrease.

Management Team

Departmental Undergraduate Curriculum Committee
F. Abel Ponce de Leon, Head
Anthony Seykora, Director of Undergraduate Studies, Major coordinator

Coordinators: F. Abel Ponce de Leon, Science/Pre-Vet option; Douglas Foster, Biotechnology option and thesis requirement; Les Hansen, Dairy option; Alfredo DiCostanzo, Livestock options; Jacqueline Jacob, Poultry option; Marshall Stern, Companion Animal; Christie Malazdrewich, Equine option; Kim Reno, undergraduate program support staff (25% FTE); Sharon Thielen, undergraduate adviser and recruiter (100% FTE).

Undergraduate student advisers: Marshall Stern, Brian Crooker, Anthony Seykora, Les Hansen, Mohamed El Halawani, Gerald Shurson, Jacqueline Jacob, Marcia Hathaway, Christie Malazdrewich, Michael White, William Dayton, Douglas Foster, Jon Wheaton, F. Abel Ponce de León.

Challenges: The ANSC 1511 Food Animal Products for Consumers, a required course within the Animal Production and Animal Industries emphases lacks a permanent instructor. A part-time instructor has been hired to offer this course. However, it is uncertain whether we would be able to continue offering this course under this model.

In light of a possible faculty retirement, we need to develop a strategy to continue offering three other courses, ANSC 2012 Livestock and Carcass Evaluation, ANSC 2013 Beginning Livestock Evaluation, and ANSC 3142 Advanced Livestock Judging as part of the Animal Production and Animal Industries curriculum. We propose a M.S. level livestock specialist be hired as a Youth Development Professional to offer these three courses and provide support for the 4-H, FFA and summer camp livestock program. A hire in this position, to overlap duties with Dr. Jerry Hawton, would provide valuable continuity to this important aspect of our departmental mission.

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. Together with Dr. Ann Hill-Duin, COAFES Associate Dean for Academic Affairs, we are investigating the possibility of offering the ANSC 2301 Systemic Physiology course to CBS students. This could double the enrollment capacity of ANSC 2301 which is today at about 40 students. To be effective, the latter would require TA support.

Financial plan:

						APPROX. TUITION REVENUE*			
	STUDENTS					**COAFES tuition**	**25% other**		**75% other**
Year	**Fr**	**Jr**	**Sph**	**Sr**	**Total**	**$****	**colleges*****	**TOTAL**	**tuition$********
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. 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 (4-H, FFA, Minnesota Royal, Homecoming, Gopher Dairy camp, U kids' summer camp, and other educational activities).

4.1. Farm animal facilities capital investments urgently needed. Description of the capital investments are presented in Addendum 1.

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

4.2. 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. While the administrative restructuring has improved scheduling and reduced overtime hours, we are not reaching the level necessary to remain economically sustainable and viable. 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 4-H, FFA convention, MN Royal, Homecoming, etc.

4.3. Manure management. **Cost estimate not available**

A need to develop manure digester systems that are adequate for small to mid size dairy operations has been identified. Research to optimize digester systems for the latter kinds of operations is needed. Coupled with these needs, there is a need to identify alternatives to reduce the cost of St Paul campus manure removal which has significantly increased in the last few years. To this end, Dr. James Linn is heading a faculty interdepartmental committee focusing on the potential to implement a manure biodigester. The biodigester would produce methane fed to a micro turbine to generate electricity and heat. At the same time, the nitrogen value of the digested manure can still be captured as fertilizer after composting. Fully composted manure can also be a byproduct for sale to the horticultural industry. Currently, our collaboration with Xcel Energy has resulted in Xcel Energy financing a feasibility study for the manure digesters. Depending on results of this study, a proposal to the IREE and the Renewable Energy Funds Program will be submitted to develop the research infrastructure for the manure biodigester.

5. 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 DAS & Agron grads, exposes suburban children to Ag & its impact on their daily lives. Hands-on ed includes major MN lvstk species & crops.	Ongoing 8 years spring	1200 elementary students yearly		Minimal budget Donations Department
4-H (on & off campus, acad yr)	State & county dairy, livestock & poultry shows, workshops & competitions.	Ongoing over 15 yrs	unknown		4-H DAS
FFA (on & off campus, acad yr)	Dept's FFA Sci Fair Project judging livestock shows & competitions. Host over 600 in Oct. Poultry, Dairy & Livestock Invitational Judging Contests, & 250 at state convention in April.	Ongoing over 15 yrs	~900		FFA DAS
Twin City Farm Adv (on & off campus, summer)	Day camp for children to increase awareness of agriculture and interest in careers in Ag.	3 yrs – last offered 2001	450 elementary	4-H, Extension	DAS Registration fees
Kids U Farming Adv (on campus, summer)	Day camp for children to increase awareness of agriculture & learn about food animal industries.	Summer 2003	52 elementary	University Extension	Registration fees DAS
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 2003	74 Jr & Sr High	4-H FFA Gopher Dairy Club	DAS Gopher Dairy Club 4-H FFA

Extension Programs

FY04 extension programs are described in Addendum 2.

6. 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.

7. Budget and Financial Issues

03-04 Recap

	ALLOCATED FUNDS				OTHER FUNDS**			
CATEGORIES	O & M	AES	MES*	Farm animal facilities	Grants	Gifts	Revenue generating	TOTALS
Faculty salaries	$727,516	$1,051,171	$479,752		$81,984	$6,119		$2,346,542
Faculty fringe	$220,147	$298,172	$63,838		$16,915	$1,946		$601,018
RA salaries		$169,554			$31,900	$40,011		$241,465
RA fringe		$48,903			$29,053	$49,398		$127,354
Staff & UG student salaries	$71,395	$558,634	$37,519	$175,086	$61,425	$81,894	$45,510	$1,031,463
Staff & UG student fringe	$22,132	$38,043	$9,120	$23,812	$18,981	$25,387	$14,108	$151,583
SE&E	$29,503	$365,425	$11,761		$1,079,863	$390,033	$79,922	$1,956,507
Taxes	$98,856	$159,102	$5,403	$6,389				$269,750
TOTAL	**$1,169,549**	**$2,689,004**	**$607,393**	**$205,287**	**$1,320,121**	**$594,788**	**$139,540**	**$6,725,682**

* Includes $85,000 faculty salary & $14,980 faculty fringe from Federal MES funds identified as other category on recap.

** Does not include carry forward amounts on O&M, ICR and faculty set up accts.

TOTAL ALLOCATED	**$4,671,233**
TOTAL OTHER	**$2,054,449**
GRAND TOTAL	**$6,725,682**

Fiscal Year 04 Teaching Compact	**$141,822**
Additional funds for the AnSc 1511 course	**$6,000**