

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

ANIMAL SCIENCES

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	25%		15%	
302	Nutrient Utilization in Animals	20%		10%	
305	Animal Physiological Processes	15%		20%	
306	Environmental Stress in Animals	15%		20%	
311	Animal Diseases	25%		35%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Actual Paid Professional	0.5	0.0	1.5	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
72096	0	305732	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
72096	0	305732	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Campylobacter Vaccine for Poultry Targets Human Foodborne Illness

Issue

Campylobacter is the second most common cause of human foodborne diarrheal illness in the United States, causing an estimated 1.3 million cases annually and resulting in health care costs of somewhere between \$800 million to \$5.6 billion per year. The handling and consumption of poultry is considered to be the most significant risk factor in transmission of the bacteria to humans. The U.S. has the largest broiler chicken industry in the world, producing approximately 8.41 billion broiler chickens in 2012. Chicken consumption surpasses both beef and pork consumption. In 2011, the USDA implemented new performance standards for Campylobacter on chicken carcasses at processing establishments. These standards allow no more than eight positive Campylobacter samples in a 51-sample set. To date, there is no vaccine available to industry to reduce the numbers of Campylobacter in poultry and intervention strategies remain insufficient.

What has been done?

Funded by the USDA, faculty and graduate students in the UA School of Comparative and Biomedical Sciences, along with Dr. Roy Curtiss' team at ASU, have developed a new poultry vaccine using an attenuated strain of Salmonella to express Campylobacter proteins in chick intestines. The vaccine reduces the number of Campylobacter cells within the intestine, so ultimately less Campylobacter is transferred to humans and therefore significantly fewer foodborne illnesses will occur. The vaccination process is simple; it is easy to produce and safe. The Salmonella is engineered to live long enough to stimulate antibody production, is attenuated so it cannot produce disease in chicks or humans, and dies before the chicks are harvested. The goal is to halt the contamination before it spreads and survives on raw chicken sold in stores. The researchers are working with the UA's Tech Launch Arizona to partner with industry to further develop the vaccine to meet the needs of industry. Poultry vaccine studies are continuing to align with these goals.

Impacts are reported in Report Overview

Cooling Cows to Increase Milk Production

Issue

Heat stress during the warmest months causes decreases in milk yield, increases in disease incidence and also increases in maintenance costs per cow. Research has shown that compared to winter months, dairy cows in Arizona produced 8.8 pounds less milk per cow per day during the summer months. At the same time, on-farm milk production has the greatest opportunity to affect the carbon footprint of a gallon of milk because dairy operations represent 80 to 95% of the dairy industry's carbon footprint, and 75% of its electricity and fuel use. Cows readily seek shade to reduce solar heat load during periods of high ambient temperature. Typically, auxiliary cooling systems are oriented to maximize cooling for shaded cows. However, when a shade structure is oriented north-south, stationary fan and mister cooling systems are unable to track shade as the sun's angle shifts throughout the day, and thus can become ineffective.

What has been done?

The FlipFan Dairy Cooling System (Schaefer Ventilation Equipment, Sauk Rapids, MN) employs fans and misters that follow shade and compensate for wind speed by rotating on a horizontal axis. A study involving 144 lactating Holstein cows on a commercial dairy in Arizona were cooled by a fixed system comprised of stationary fans and misters acting as control or the adjustable FlipFan operated for 16.5

hours per day. Core body temperatures of 64 cows (4 pens/treatment; 8 cows/pen; 6 d) and lying behavior of 144 cows (4 pens/treatment; 18 cows/pen; 5 d) were collected. In a second experiment, isothermal maps were developed using a fixed system of thermal data loggers arranged in the shaded areas of the pens at different times of day and were analyzed for differences in the temperature-humidity index (THI) achieved by each cooling treatment.

Impacts reported in Report Overview

2. Brief description of the target audience

Commodity groups, state agencies, pest management advisors, pesticide applicators, youth, ag ventures program. Plans are underway to attempt to include non-traditional audiences.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1300	3000	559	1500

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2013
 Actual: 1

Patents listed

Targeted Cryptosporidium Biocides

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	22	25	47

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Effectiveness of the research program will be based on publications, external grant support, and integration into existing extension programs.

Year	Actual
2013	0

Output #2

Output Measure

- Number of individuals gaining knowledge by participating in educational programs, such as range livestock nutrition workshops.

Year	Actual
2013	254

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of farmers adopting more sustainable and profitable large scale dairy production practices.
2	Adoption of more profitable breeds of cattle for arid land conditions.

Outcome #1

1. Outcome Measures

Number of farmers adopting more sustainable and profitable large scale dairy production practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	432

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
311	Animal Diseases

Outcome #2

1. Outcome Measures

Adoption of more profitable breeds of cattle for arid land conditions.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations

Brief Explanation

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V(I). Planned Program (Evaluation Studies)

Evaluation Results

All programs are currently in the process of being evaluated for existing areas to preserve, protect, or enhance, as well as areas to discontinue or modify. We are beginning the process to seek further input from stakeholders, advisory committees, and focus groups utilizing needs assessments with the assistance and expertise of an Evaluation Specialist [to be hired]. Plans are also underway to seek input from non-traditional audiences. See State DefinedOutcomes.

Key Items of Evaluation