V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Food Safety

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources			40%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins			60%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	0.0	0.0	2.2	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
0	0	300508	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	439141	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	93155	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

While food safety is a component of many of the projects listed under Global Food Security and Hunger, we will report projects whose primary concern is food safety in this new NIFA mandated program. The primary activities in this program area involve food safety issues in management of processed fish and fish fillets in cold-water aquaculture operations and developing procedures for testing for and eradicating newly emerging water-borne bacteria that may enter the food supply.

Physiological processes in the rainbow trout affect 1) in the short term, changes in muscle food quality associated with variation in postmortem metabolism and 2) in the long term, changes in composition and texture associated with metabolism that supports a dominant process such as vitellogenesis. The effect of rigor state (pre-rigor, deep-rigor, and post-rigor), when fish are filleted, on raw and cooked fillet quality was evaluated. Pre-rigor fillets exhibited the highest pH ($P<0.05$), lowest cook loss ($P<0.05$), and the greatest cooked dimensional changes ($P<0.05$) of the three rigor states. These findings indicate that spawning induced changes should be considered when developing preharvest management strategies to optimize quality of fillets from fertile rainbow trout. Additional work is needed to 1) define the relationship between production parameters and fillet quality and 2)categorize and characterize trout fillet texture.

Another project assessed antibiotic resistance analysis (ARA) and rep-PCR fingerprint patterns of 600 Escherichia coli strains obtained from poultry and sheep raised using both organic and conventional production methods. There were significant differences in the ARA and rep-PCR fingerprints of E. coli under organic versus conventional production methods. E.coli persisted in the soil of the WVU Organic Farm rotational grazing areas for poultry. Compared with organic chickens, more conventional chicken isolates were resistant to ampicillin and cephalothin. All chickens harbored isolates that were resistant to rifampin, streptomycin and neomycin. Conventional and organic sheep isolates were primarily resistant to rifampin, as were isolates from baseline soil samples. We also examined 1200 E. coli. isolates from pasture-raised beef cattle and their persistence in pasture soils impacted by animal waste. There were strain differences related to animal source, with greater commonality within groups than between groups.

Organic methods of livestock production should reduce the potential for human acquisition of antibiotic resistant bacteria. We compared patterns of antibiotic resistance in fecal bacterial isolates obtained from organic and conventionally raised chickens and sheep, and from pasture-raised beef cattle. We also compared rep-PCR fingerprints obtained from these isolates. The long term goal is to develop ARA and rep-PCR based methods for microbial source tracking in soils and watersheds of northern WV. The presence of distinct E. coli strains among organically and conventionally reared chickens, from various experimental systems at the WVU farms in Morgantown, WV confirmed that distinct strains are obtained based on the production practice employed; which in turn affects populations and persistence of specific E. coli strains in soil and water. Diverse E. coli isolates from pasture-raised, winter-stocked beef cattle and the persistence of select strains in pasture soils also was observed.

2. Brief description of the target audience

The target audience for this program area includes the food processing industry, the aquacultural producers and marketers, regulators and policy makers.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA	{NO DATA	{NO DATA	{NO DATA
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2010

Plan:

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	5	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Publications

Year	Target	Actual
2010	{No Data Entered}	5

Output #2

Output Measure

- Professional Presentations

Year	Target	Actual
2010	{No Data Entered}	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Reduce exposure of consumers to antibiotic resistant bacteria.

Outcome #1

1. Outcome Measures

Reduce exposure of consumers to antibiotic resistant bacteria.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Use of antibiotics in animal production may lead to development of antibiotic resistant strains of bacteria. Organic methods of livestock production should reduce the potential for human acquisition of antibiotic resistant bacteria.

What has been done
One study compared patterns of antibiotic resistance in fecal bacterial isolates obtained from organic and conventionally raised chickens and sheep, and from pasture-raised beef cattle. We also compared rep-PCR fingerprints obtained from these isolates.

Results
The long term goal is to develop ARA and rep-PCR based methods for microbial source tracking in soils and watersheds of northern WV. The presence of distinct E. coli strains among organically and conventionally reared chickens, from various experimental systems at the WVU farms in Morgantown, WV confirmed that distinct strains are obtained based on the production practice employed; which in turn affects populations and persistence of specific E. coli strains in soil and water. Diverse E. coli isolates from pasture-raised, winter-stocked beef cattle and the persistence of select strains in pasture soils also was observed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Competing Programmatic Challenges

Brief Explanation

While food safety is part of many of our projects under Global Food Security and Hunger, it is expected that this area will remain a relatively small part of our research portfolio, given limited resources and competing programmatic challenges.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}