

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Global Food Security and Hunger- formerly Competitive and Sustainable Agricultural Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms				19%
202	Plant Genetic Resources				18%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants				10%
204	Plant Product Quality and Utility (Preharvest)				3%
211	Insects, Mites, and Other Arthropods Affecting Plants				7%
212	Pathogens and Nematodes Affecting Plants				10%
302	Nutrient Utilization in Animals				33%
	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
Plan	0.0	0.0	0.0	0.0
Actual	0.0	0.0	0.0	7.0

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	0	1104590
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	763406
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

Research efforts have focused on: aquaculture, genetic mapping and field trials of several vegetables. Feeding trials using two protein levels and three fat levels were conducted to look at effects on the growth and performance of rainbow trout. [Eya]

In an effort to develop DNA markers and map respective genetic populations for crops that include peppers, watermelon, melon, bittergourd, squash and pumpkins, progenies have been characterized and combined with the favorable alleles that can produce larger fruit size with enhanced quality and resistance in melons and watermelons. [Padma, Reddy]

Biomass traits in plants are the basis for selection of bioenergy and harvest index to improve yield parameters in various crop plants. Whole genome sequence and genome wide genetic maps are not yet available in many useful crop plants that can be exploited for bioenergy or to improve yields by understanding source sink relationships at molecular levels of vegetative traits and reproductive traits. Arabidopsis can be a unique model to clone genes of interest for growth and prproductive traits. [Reddy, Padma]

Continued work on tomato breeding included selecting advanced lines for organoleptic traits, plant habit, early ripening, and late blight molecular markers. Variety trials for tomatoes, peppers (sweet and hot), cucumbers and specialty melons were conducted. [Liedl]

2. Brief description of the target audience

Aquaculture - Feed manufacturers, federal agencies (ARS) involved in rainbow trout breeding, and rainbow trout farmers.

Plant Genomics - Horticulturalists, plant genetics researchers, plant breeders, graduate and undergraduate students, high school students and teachers, farmers/growers, germplasm curators, extension specialists and agents.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	300	450	0	0
Actual	250	325	40	100

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	0	1	
Actual	1	6	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Scientific publications and/or presentations

Year	Target	Actual
2010	4	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase profitability of vegetable and tomato crops(%)
2	Genetic maps and genes for vegetable crops(#)
3	Increased small farm profitability(%)
4	Increase profitability of aquaculture operations(%)
5	Reduce nitrogen and phosphorus in discharge water(%)
6	Lower aquaculture feed costs(%)

Outcome #1

1. Outcome Measures

Increase profitability of vegetable and tomato crops(%)

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Genetic maps and genes for vegetable crops(#)

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

DNA markers and genetic maps for identifying nutraceutical, pest and disease resistance, yield and quality traits are indispensable tools for crop improvement. This knowledge will be immensely useful for plant breeders and geneticists. Farmers and consumers will get benefitted from the products with resistance and other value added traits.

What has been done

In this program, our goal was to develop DNA markers for the crops including peppers, watermelon, melon, bittergaurd, squash, pumpkins, and tomato and map them in respective genetic populations. When mapped these markers, we identified markers linked to various traits including yield, fruit qualities and disease resistance in watermelon, melon and peppers.

Results

We have characterized progenies combined with the favorable alleles that can produce larger fruit size with enhanced quality and resistance in melons, watermelons, and tomato. We used genomics to further decipher natural variation for biomass related traits as well as source sink relationships by understanding gene networks in vegetative traits vs. reproductive traits.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources

Outcome #3

1. Outcome Measures

Increased small farm profitability(%)

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Increase profitability of aquaculture operations(%)

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Reduce nitrogen and phosphorus in discharge water(%)

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Lower aquaculture feed costs(%)

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Government Regulations

Brief Explanation

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

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

Evaluation Results

Key Items of Evaluation