

Plant Genome, Genetics, and Genetic Mechanisms

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V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant Genome, Genetics, and Genetic Mechanisms

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 | | | 100% | |
| | Total | | | 100% | |

V(C). Planned Program (Inputs)

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

| Year: 2007 | Extension | | Research | |
|---------------|-----------|------|----------|------|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 2.3 | 0.0 |
| Actual | 0.0 | 0.0 | 1.8 | 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 | 25383 | 0 |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| 0 | 0 | 390513 | 0 |
| 1862 All Other | 1890 All Other | 1862 All Other | 1890 All Other |
| 0 | 0 | 1933708 | 0 |

V(D). Planned Program (Activity)

1. Brief description of the Activity

The ultimate goal of this project is to examine the fundamental molecular mechanisms critical to plant production and associated agricultural practices. Investigators made progress toward this goal, through investigations of ammonia metabolism of *N. europaea*, as well as other ammonia oxidizers and nitrite oxidizers. Work was also done to develop a two-step, high throughput functional screen to identify type II effectors of Rhizobia; investigators have demonstrated success with this process. Another investigator is focused on understanding the gene expression patterns that are essential for reproductive success in corn. This research uses microarrays to characterize the transcripts of maize pollen and embryos at different stages of development and in different genetic backgrounds. Results were published in refereed articles and conference proceedings.

2. Brief description of the target audience

Policymakers, plant scientists, agricultural producers, environmentalists, public agencies, land managers, natural resource and weed control specialists, students, extension specialist/agents

V(E). Planned Program (Outputs)**1. Standard output measures****Target for the number of persons (contacts) reached through direct and indirect contact methods**

| | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|-------------|-----------------------------------|-------------------------------------|----------------------------------|------------------------------------|
| Year | Target | Target | Target | Target |
| Plan | 100 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 |

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

| | |
|-------------|---------------|
| Year | Target |
|-------------|---------------|

| | |
|--------------|---|
| Plan: | 0 |
|--------------|---|

| | |
|-------|---|
| 2007: | 0 |
|-------|---|

Patents listed**3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

| | Extension | Research | Total |
|-------------|------------------|-----------------|--------------|
| Plan | | | |
| 2007 | 0 | 4 | 4 |

V(F). State Defined Outputs**Output Target****Output #1****Output Measure**

SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

| Year | Target | Actual |
|-------------|---------------|---------------|
| 2007 | 4 | 4 |

Output #2**Output Measure**

CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF BACTERIA AND VIRUSES AND OTHER MICROORGANISMS - Comparative genomics studies will provide insights to the evolutionary history and the niche of nitrifying bacteria within microbial communities and the unique niches of different species of nitrifying bacteria. - Identify differences and similarities among nitrifying bacteria in mono- and co-cultures. - Determine the role of specific genes in the Fe metabolism of *N. europaea*. - Determine if specific genes are required for the obligate lithoautotrophic lifestyle and use metabolic flux analyses to model metabolism in *N. europaea* grown on different carbon sources.

- identify co-regulated gene sets by their function.

- further understand the interaction of antagonistic signaling pathways regulate the switch between embryogenesis and the maturation phase of maize embryo development.

| Year | Target | Actual |
|-------------|---------------|---------------|
| 2007 | 4 | 4 |

V(G). State Defined Outcomes

| O No. | Outcome Name |
|-------|--|
| 1 | Genes and genetic mechanisms determine sets of genes involved in processes critical to the functions of nitrifiers, including genes involved in mutualistic growth between ammonia and nitrite oxidizers, genes involved in Fe metabolism, and genes involved in autotrophy and lithotrophy. test two new hypotheses regarding the regulation of embryo maturation in cereals. answer fundamental questions regarding developmental timing, mechanisms of hormone interaction, and specificity of Rop function. Our results will be relevant to "cross-talk" in hormone signaling, an increasingly important topic in plant biology. |
| 2 | Knowledge contributes to: <ul style="list-style-type: none"> • understanding of the molecular underpinnings involved in the processes that combine to make up nitrification. • determining patterns of coordinated gene expression and hormone regulated expression. |
| 3 | In the long term: <ul style="list-style-type: none"> • Mitigate the effects of nitrifiers in agricultural soils and enhance their role in wastewater treatment by a thorough understanding of their metabolism. • Avoiding failure of seeds to mature properly results in significant gains of yield and quality. |

Outcome #1

1. Outcome Measures

Not reporting on this Outcome for this Annual Report

2. Associated Institution Types

3a. Outcome Type:

3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
|------|---------------------|--------|

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---------|----------------|
|---------|----------------|

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

Competing Public priorities

Competing Programmatic Challenges

Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

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}