

Breeding and Biotechnology

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V(A). Planned Program (Summary)

1. Name of the Planned Program

Breeding and Biotechnology

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 | | 20% | | 20% |
| 202 | Plant Genetic Resources | | 30% | | 30% |
| 203 | Plant Biological Efficiency and Abiotic Stresses Affecting Plants | | 30% | | 30% |
| 211 | Insects, Mites, and Other Arthropods Affecting Plants | | 20% | | 20% |
| | Total | | 100% | | 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 | 0.1 | 0.0 | 2.1 |
| Actual | 0.0 | 0.1 | 0.0 | 1.5 |

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

| Extension | | Research | |
|---------------------|----------------|----------------|----------------|
| Smith-Lever 3b & 3c | 1890 Extension | Hatch | Evans-Allen |
| | 3123 | 0 | 168232 |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| 0 | 0 | 0 | 139720 |
| 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

- Established an efficient regeneration system in cowpea(southernpea) for transferring insect resistant genes
- Evaluation of high yielding, disease and insect resistant varieties of southernpea for production and marketing as fresh peas

2. Brief description of the target audience

Small-Farm, limited resource farmers

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 | 50 | 75 | 25 | 50 |
| 2007 | 50 | 75 | 25 | 50 |

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

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

| | |
|--------------|---|
| Plan: | 1 |
|--------------|---|

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

Patents listed

None

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

| | Extension | Research | Total |
|-------------|------------------|-----------------|--------------|
| Plan | | | |
| 2007 | 0 | 1 | 1 |

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

Production of improved cowpea cultivars that resist biotic and abiotic stresses. Publications in reviewed journals.

| Year | Target | Actual |
|-------------|-------------------|---------------|
| 2007 | {No Data Entered} | 1 |

V(G). State Defined Outcomes

| O No. | Outcome Name |
|--------------|---|
| 1 | Production of disease and insect resistant southernpeas |

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.)

Brief Explanation

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

1. Evaluation Studies Planned

After Only (post program)

During (during program)

Evaluation Results

1. Selecting fresh-market southern pea varieties most appropriate for mechanical harvesting. Seven varieties, Early Scarlet, Quick Pick, Top Pick, Pinkeye, Empire, Epic, Encore and Mississippi Pinkeye were selected on qualitative traits important for mechanical harvesting of fresh cowpeas. The characteristics included are synchrony of pod maturity, pod placement above the plant canopy, and appropriate canopy height for easier mechanical harvesting. Varieties were also selected on fresh-pod color as the main consumer preference trait. These findings have narrowed down the number of candidate varieties allowing for more focused, detailed evaluation studies and mechanical harvest testing of the selected few varieties.

2. Determining optimum staggered-planting interval(s) feasible to increase harvest window of fresh pea varieties. Eight established erect plant-type varieties of fresh pea were planted at weekly intervals for five weeks, creating experimental harvest intervals of 1,2,3,4 weeks. Preliminary findings were that i). current varieties do not differ sufficiently (7 days or longer) in maturity to allow possibilities same-time planting of two or more varieties differing in maturity periods to create sufficiently staggered harvest period(s). ii). Planting intervals of 2 or more weeks apart showed minimum (7 plus days) harvest intervals sought in all eight varieties. iii). Planting intervals of one week produced inadequate or inconsistent results and varied with the variety.

3. An efficient regeneration system has been established in cowpea through shoot meristem. Shoot meristems were isolated from embryos that were precultured for 3-5 days on Murashige and Skoog (MS) medium containing 8.9 μM benzylaminopurine (BA). The isolated shoot meristems were cultured on MS medium containing 0.89 μM BA. After 3-4 wks, multiple shoots were separated from the explant and cultured on half-strength MS medium for elongation and rooting. More than 90% of the regenerants formed roots. The rooted plantlets were transferred first to peat pellets and subsequently to the greenhouse. The plants were allowed to flower and set seed. The efficiency of regeneration in all four cultivars ranged from 76-87%, demonstrating a significant improvement over the published protocols (1-32%).

Key Items of Evaluation