

## **Federal Funding of Agricultural Plant Science by Cooperative State Research, Education, and Extension Service (CSREES)**

Project completed by Dr. Bill Randle, Department of Horticulture, University of Georgia, for Phase II of the ESCOP/ACOP Leadership Developmental Training Program, Class 14, 2004-2005.

As local and state revenue continues to shrink, plant science departments are under ever increasing pressure to write proposals and secure grants from extramural sources. Among the various funding sources, the Federal government was selected as the test subject for this project. As part of the USDA, CSREES provides funds for agricultural research in categories established by the Secretary of Agriculture. The intent of the project was to investigate federal funding patterns by CSREES and determine how successful State agricultural colleges were in obtaining grants for plant science research. In addition, this project attempted to provide insight into expertise necessary to successfully compete for these grants, and how faculties need to be structured to be competitive. A final part of this project was to determine the mechanism by which investigative categories were set and funding priorities determined.

### **Objectives:**

To investigate the recent funding patterns for agricultural plant science research by the federal government to determine:

1. The success rate of agricultural departments in competing for these grants
2. The expertise needed by faculty to successfully compete for these grants
3. The mechanism by which funding priorities are set and dollars allocated for plant science research for agricultural crops.

### **Process:**

Seven categories of funding from the CSREES were selected for investigation. These categories were chosen as likely subject areas for proposals submitted by a plant scientist and included:

- Plant Developmental Processes
- Plant Environmental Adaptation
- Plant Biochemistry
- Managed Ecosystems
- Plant Genetic Mechanisms
- Food Quality, Value
- Plant Microbe Associations

Three other categories were looked into but are not included in this report because of sporadic funding or because the category was newly initiated. These categories were Crops at Risk, Integrated Organic Program, and Functional Genomics. The Functional Genomics program instituted in 2004 was impressive because of the large amount of money dedicated to a single category (\$7-8 million annually, with the average grant being \$875,000).

From the CSREES website, abstracts of funding projects in each category were downloaded and read to determine:

- research objective and approach taken
- skills required to do the research
- research institution and type of department receiving the award
- amount of the award
- plant material used in the investigation

Information was then recorded and sorted by year, institution, whether or not the institution was a Land Grant University, if the awarded unit was within an Agricultural College, the dollar amount of the award. It became very apparent that additional information needed to be collected on whether or not the research took a molecular genetics approach and if the plant model system, Arabidopsis, was used. Data were summarized by individual years and for the three-year period. Number of grants awarded and the average dollar value of a grant in each of the categories were also tabulated. When appropriate, data were graphed, otherwise the data is presented in tabular form.

To determine how categories were established and priorities set for each category, information on the CSREES website was read. The information is contained in S1150, Agricultural Research, Extension, and Education Reform Act of 1998. In addition, National Program Leaders for the different categories were interviewed by phone.

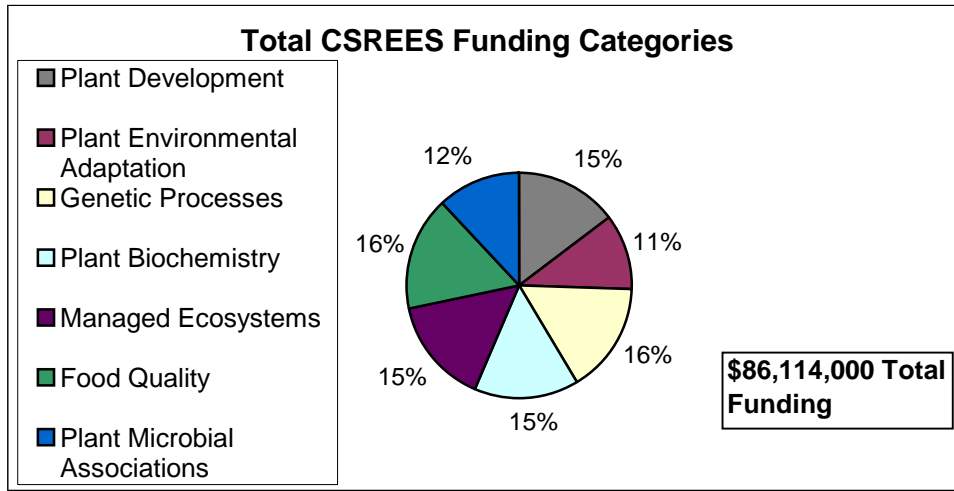
Questions asked included:

- How and when was the investigative category established?
- How are the research priorities established?
- How are Land-Grant institutions included in the decision making process?
- How important is the advisory board in the decision making process?
- How much of a role do the National Program Leaders play in the decision making process?
- How often are priorities reviewed or established?

**Results:**

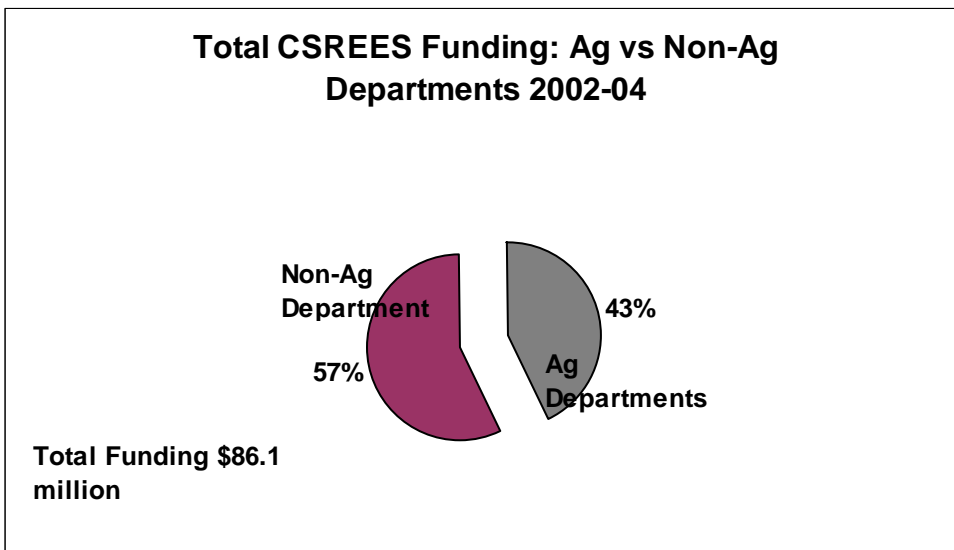
A total of \$86.1 million was allocated to the seven funding categories by CSREES for plant science research over the three-year period of 2002-2004 (Figure 1). Funding was more or less equally distributed among the categories although there is a 31% funding difference between the highest funded categories (Food Quality, Value and Genetic Processes) and the lowest funded category (Plant Environmental Adaptation). Funding within categories ranged from \$9.4 million to \$14.2 million.

Figure 1. Funding for plant science research by CSREES for 2002-2004.



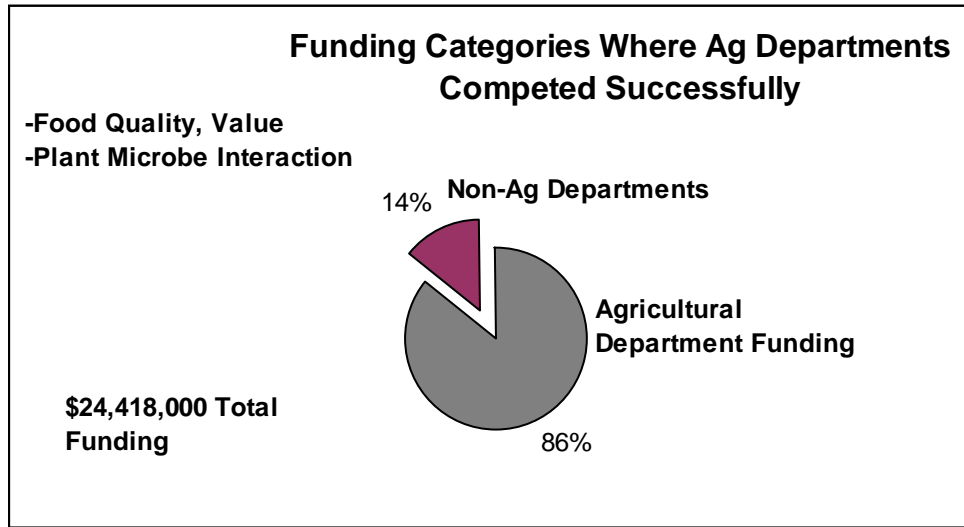
Of the total dollars allocated, \$36.7 million (43%) went to agricultural departments/units within Land-Grant institutions while \$49.4 million (57%) went to departments/units outside Colleges of Agriculture (Figure 2). However, funding to agricultural departments varied significantly depending on the category (Tables 2-8).

Figure 2. CSREES funding awarded to agriculture and non-agriculture units.



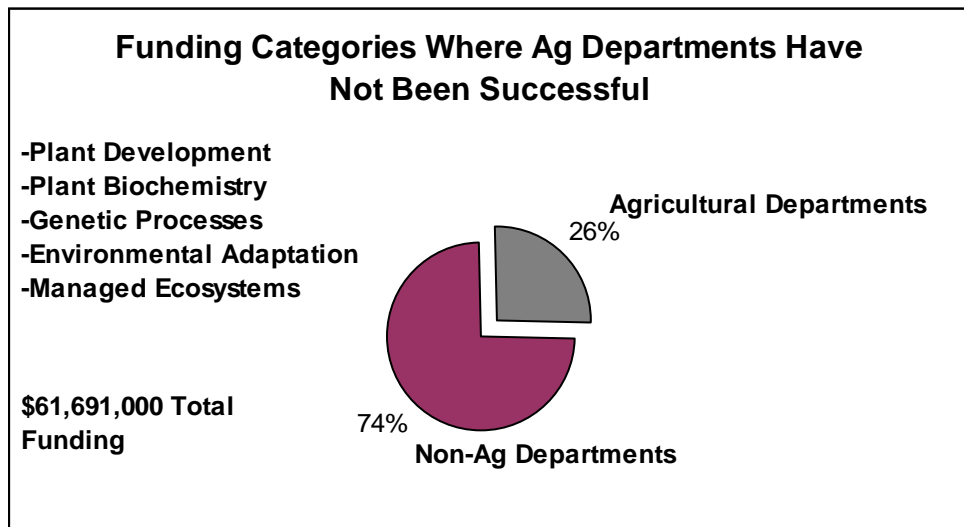
In two of the seven funded categories, agricultural departments/units were very successful at competing for the available dollars (Plant Microbial Interactions and Food Quality, Value). In these two categories agricultural departments received 86% of the money awarded (Figure 3). This, however, represents only 24.2% of the total money allocated for plant science research by CSREES in the seven categories reviewed. Plant Pathology departments were mainly competitive for the Plant Microbe Interaction category and Food Science Departments competed well for the Food Quality, Value category.

Figure 3. Categories where agriculture departments were successful in competing for CSREES funding in the plant sciences.



Agricultural departments/units were unsuccessful in competing for the available dollars in five of the seven funded categories. These were Plant Development, Plant

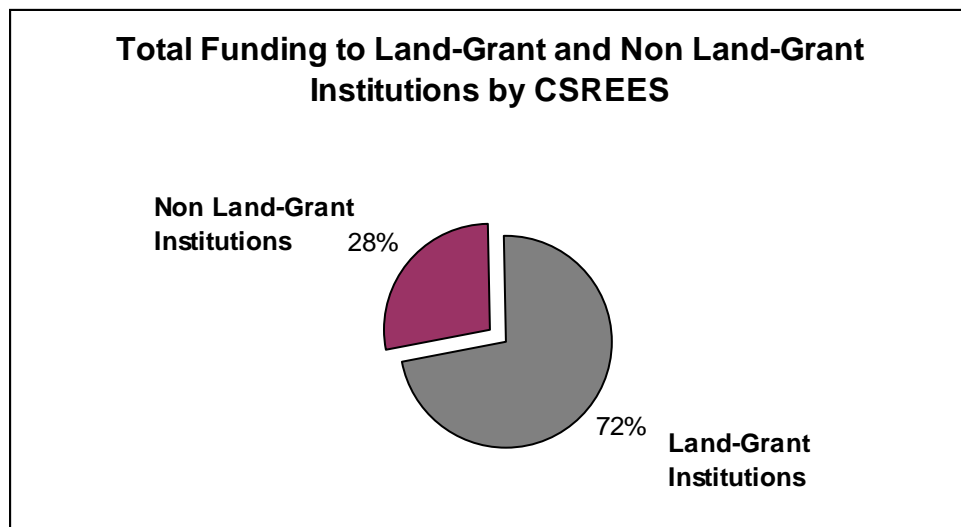
Figure 4. Categories where agriculture departments were not successful in competing for CSREES funding in the plant sciences.



Biochemistry, Genetic Processes, Environmental Adaptation, and Managed Ecosystems, where agricultural departments received 26% of the money awarded in these categories (Figure 4). This represented 18.4% of the total money allocated for plant science research by CSREES in the seven categories reviewed. Agricultural departments had a difficult time competing for money in the Plant Biochemistry category where they only accounted for 8% of the money allocated over the three-year period. In the other categories listed in this section, a little over 20% of the total funds allocated went to agricultural departments. The research focus in these categories generally had a very “basic” approach to their research philosophy and priorities, similar to what you would find in a Plant Biology department.

While most of the funding went to Land-Grant Institutions even though agricultural departments were not very successful in competing for the dollars, a significant amount of research was allocated to non Land-Grant Institutions (Figure 5). Examples of non Land Grant Institutions that received funding include: Dartmouth, City College of New York, University of Chicago, Allegany College, UCLA, Indiana University, and University of Washington. The question is raised, “Are non Land-Grant institutions really addressing the significant questions related to agricultural plant science problems in the US?” The amount of funding that went to non Land-Grant institutions also varied significantly depending on the research category. In the category Plant Developmental Process, 45% of the funding went to non Land-Grant Institutions over the three-year period, while non Land-Grant institutions only received 7% of the allocated funds in the Food Quality, Value category.

Figure 5. Funding to Land-Grant Institutions compared to Other Institutions by CSREES



In addition, if we look at the funding allocated to Land-Grant Institutions and factor out the percentage of funding that went to agricultural departments, we would find that agricultural departments received 59.4% the dollars allocated.

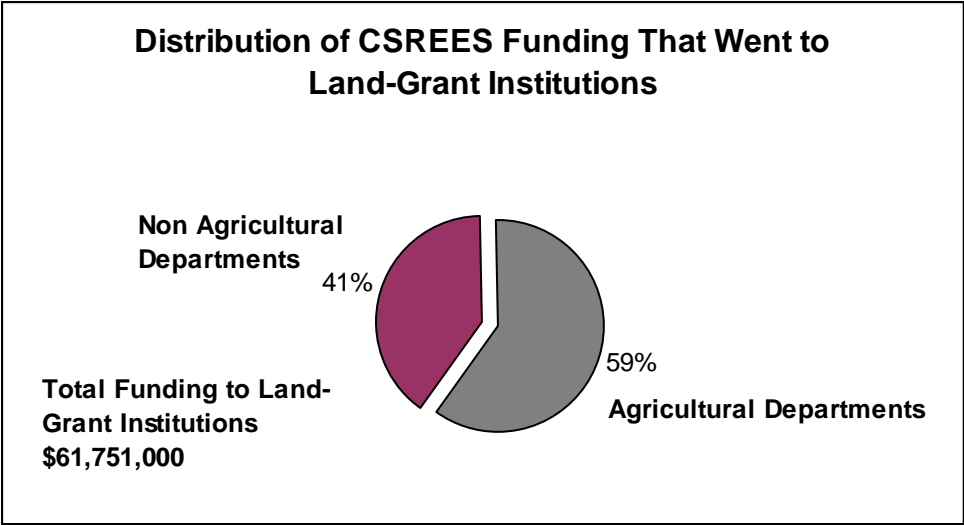


Figure 6. CSREES funding distribution within a Land-Grant Institution for plant science research.

*Research focus:*

As each research category was investigated it became apparent that a molecular genetic approach was being funded at a high frequency in five of the seven categories (Figure 7). Those categories included: Plant Microbial Associations, Plant Biochemistry, Plant Environmental Adaptation, Plant Development and Plant Genetic Processes. While a molecular approach was apparent with Plant Genetic Processes, it was difficult to understand why genetic mechanism were so highly important in the other categories. If we were to look at the percentage of funding that went to research containing a molecular genetic approach, we would find that nearly 91% of the funding went to the molecular genetic approach (Figure 8). Categories that did not have a molecular genetic approach were Food Quality, Value and Managed Ecosystems.

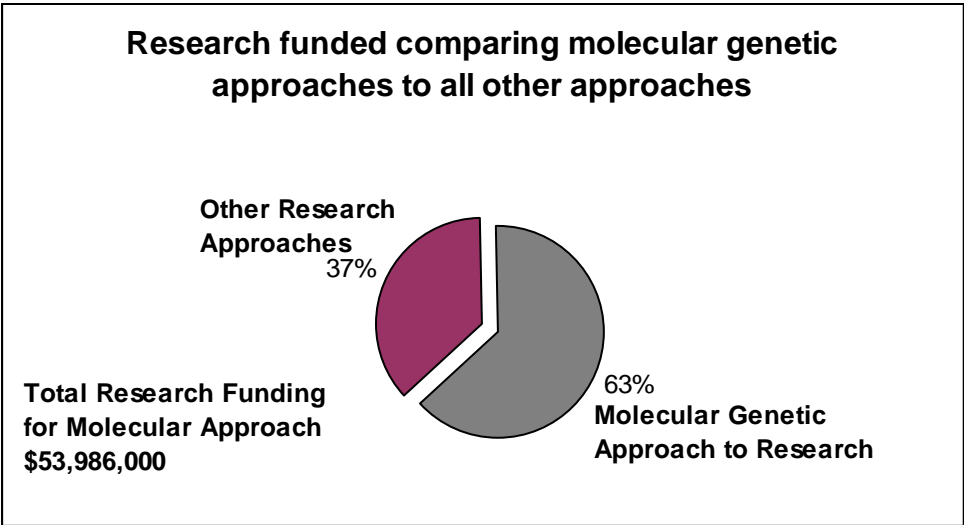
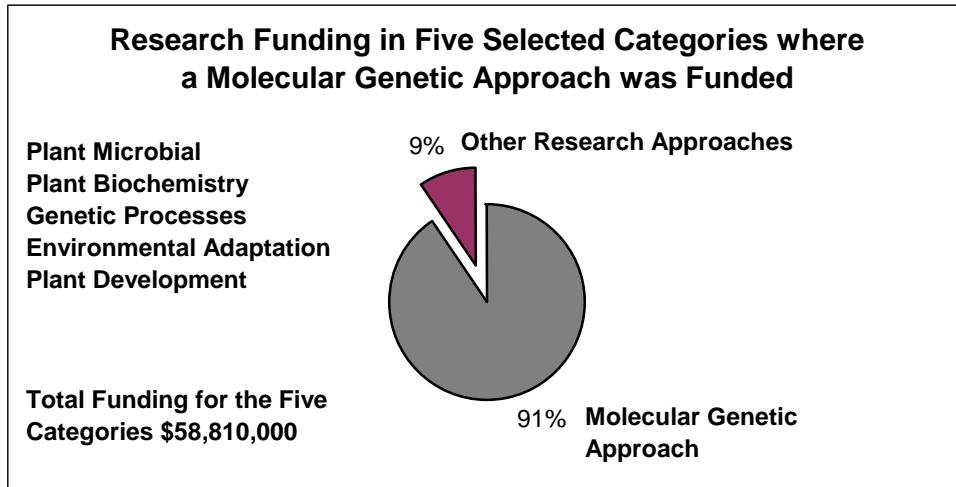
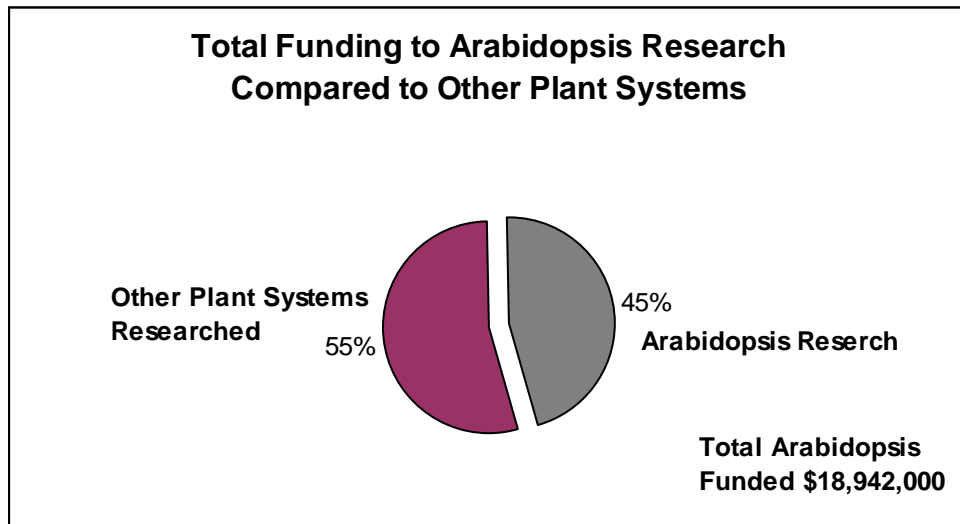


Figure 8. CSREES funding for plant science that went to a molecular genetic approach in five of the seven categories investigated.



Arabidopsis is becoming the most widely used “model” system for studying the genetic control of different processes in plants. The theory is that what is learned in the model system can be applied to crop plants. Approximately 45% of the molecular genetic funding went to research using the model system Arabidopsis (Figure 9). Cotton and maize were the two most widely used plant systems in the “other” category, although a significant amount of funding went to investigating green algae.

Figure 9. Research that took a molecular genetic approach using either Arabidopsis or some other plant as the studied system.



*Tables of funding trends:*

The next seven pages of this report contain funding trends from each of the seven categories investigated for the plant sciences.

## Federal Funding of Agricultural Plant Science by CSREES

### Category: Plant Developmental Processes, National Research Initiative

2002-04 75 grants funded; average grant \$182,000

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$12,673,000	
Ag Departments	\$2,715,000	21.4%
<b>Non-Ag Department</b>	<b>\$9,958,000</b>	<b>78.6%</b>
Non-Land Grant University	\$5,708,000	45.0%
<i><b>Molecular Genetic Approach</b></i>	<i><b>\$12,139,000</b></i>	<i><b>95.8%</b></i>
Arabidopsis Research	\$6,905,000	54.5%

Year 2004 16 grants funded; average grant \$257,000

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$4,117,000	
Ag Departments	\$1,295,000	31.4%
<b>Non-Ag Department</b>	<b>\$2,822,000</b>	<b>68.6%</b>
Non-Land Grant University	\$1,471,000	35.7%
<i><b>Molecular Genetic Approach</b></i>	<i><b>\$4,007,000</b></i>	<i><b>97.3%</b></i>
Arabidopsis Research	\$2,607,000	63.3%

Year 2003 31 grants funded; average grant \$147,000

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$4,574,000	
Ag Departments	\$ 980,000	21.4%
<b>Non-Ag Department</b>	<b>\$3,594,000</b>	<b>78.6%</b>
Non-Land Grant University	\$2,585,000	56.5%
<i><b>Molecular Genetic Approach</b></i>	<i><b>\$4,424,000</b></i>	<i><b>96.7%</b></i>
Arabidopsis Research	\$1,880,000	41.1%

Year 2002 28 grants funded; average grant \$142,214

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$3,982,000	
Ag Departments	\$ 440,000	11.1%
<b>Non-Ag Department</b>	<b>\$3,542,000</b>	<b>88.9%</b>
Non-Land Grant University	\$1,652,000	41.5%
<i><b>Molecular Genetic Approach</b></i>	<i><b>\$3,708,000</b></i>	<i><b>93.1%</b></i>
Arabidopsis Research	\$2,418,000	60.7%

UGA received one grant, Forestry

## Federal Funding of Agricultural Plant Science by CSREES

### Category: Plant Environmental Adaptation, National Research Initiative

2002-04 50 grants funded; average grant \$199,495

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$9,357,000	
Ag Departments	\$2,234,000	23.9%
<b>Non-Ag Department</b>	<b>\$7,123,000</b>	<b>76.1%</b>
Non-Land Grant University	\$3,092,000	33.0%
<b><i>Molecular Genetic Approach</i></b>	<b>\$7,735,000</b>	<b>82.7%</b>
Arabidopsis Research	\$3,189,000	34.1%

Year 2004 12 grants funded; average grant \$287,750

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$3,453,000	
Ag Departments	\$1,012,000	29.3%
<b>Non-Ag Department</b>	<b>\$2,441,000</b>	<b>70.7%</b>
Non-Land Grant University	\$ 565,000	16.4%
<b><i>Molecular Genetic Approach</i></b>	<b>\$2,912,000</b>	<b>84.3%</b>
Arabidopsis Research	\$ 930,000	26.9%

Year 2003 19 grants funded; average grant \$162,157

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$3,081,000	
Ag Departments	\$ 535,000	17.4%
<b>Non-Ag Department</b>	<b>\$2,546,000</b>	<b>82.6%</b>
Non-Land Grant University	\$1,655,000	53.7%
<b><i>Molecular Genetic Approach</i></b>	<b>\$2,250,000</b>	<b>73.0%</b>
Arabidopsis Research	\$ 920,000	29.9%

Year 2002 19 grants funded; average grant \$148,579

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$2,823,000	
Ag Departments	\$ 687,000	24.3%
<b>Non-Ag Department</b>	<b>\$2,136,000</b>	<b>75.7%</b>
Non-Land Grant University	\$ 872,000	30.9%
<b><i>Molecular Genetic Approach</i></b>	<b>\$2,573,000</b>	<b>91.1%</b>
Arabidopsis Research	\$1,339,000	47.4%

UGA received one grant, Forestry

## Federal Funding of Agricultural Plant Science by CSREES

### Category: Plant Biochemistry, National Research Initiative

2002-04 74 grants funded; average grant \$186,197

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$13,056,000	
Ag Departments	\$1,043,000	8.0%
<b>Non-Ag Department</b>	<b>\$12,013,000</b>	<b>92.0%</b>
Non-Land Grant University	\$5,334,000	40.8%
<b><i>Molecular Genetic Approach</i></b>	<b><i>\$10,849,000</i></b>	<b><i>83.1%</i></b>
Arabidopsis Research	\$4,390,000	33.6%

Year 2004 16 grants funded; average grant \$257,000

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$3,216,000	
Ag Departments	\$ 390,000	12.1%
<b>Non-Ag Department</b>	<b>\$2,826,000</b>	<b>87.9%</b>
Non-Land Grant University	\$1,824,000	56.7%
<b><i>Molecular Genetic Approach</i></b>	<b><i>\$2,555,000</i></b>	<b><i>79.4%</i></b>
Arabidopsis Research	\$ 545,000	16.7%

Year 2003 26 grants funded; average grant \$167,730

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$4,361,000	
Ag Departments	\$ 327,000	7.5%
<b>Non-Ag Department</b>	<b>\$4,034,000</b>	<b>92.5%</b>
Non-Land Grant University	\$1,390,000	31.9%
<b><i>Molecular Genetic Approach</i></b>	<b><i>\$3,635,000</i></b>	<b><i>83.3%</i></b>
Arabidopsis Research	\$1,755,000	40.0%

Year 2002 34 grants funded; average grant \$161,147

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$5,479,000	
Ag Departments	\$ 326,000	5.9%
<b>Non-Ag Department</b>	<b>\$5,153,000</b>	<b>94.1%</b>
Non-Land Grant University	\$2,120,000	38.7%
<b><i>Molecular Genetic Approach</i></b>	<b><i>\$4,659,000</i></b>	<b><i>85.0%</i></b>
Arabidopsis Research	\$2,090,000	38.1%

UGA received two grants, Complex Carbohydrate Center Scientists

## Federal Funding of Agricultural Plant Science by CSREES

### Category: Managed Ecosystems, National Research Initiative

2002-04 52 grants funded; average grant \$253,503

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$13,063,000	
Ag Departments	\$4,189,000	32.0%
<b>Non-Ag Department</b>	<b>\$8,874,000</b>	<b>68.0%</b>
Non-Land Grant University	\$4,236,000	32.0%
<i>Molecular Genetic Approach</i>	\$	0%
Arabidopsis Research	\$	0%

Year 2004 10 grants funded; average grant \$288,300

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$2,883,000	
Ag Departments	\$2,052,000	71.2%
<b>Non-Ag Department</b>	<b>\$ 831,000</b>	<b>28.8%</b>
Non-Land Grant University	\$ 545,000	18.9%
<i>Molecular Genetic Approach</i>	\$	0%
Arabidopsis Research	\$	0%

Year 2003 26 grants funded; average grant \$262,461

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$6,824,000	
Ag Departments	\$2,072,000	30.0%
<b>Non-Ag Department</b>	<b>\$4,752,000</b>	<b>70.0%</b>
Non-Land Grant University	\$ 2,166,000	31.7%
<i>Molecular Genetic Approach</i>	\$	0%
Arabidopsis Research	\$	0%

Year 2002 16 grants funded; average grant \$209,750

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$3,356,000	
Ag Departments	\$ 65,000	2%
<b>Non-Ag Department</b>	<b>\$3,291,000</b>	<b>98.0%</b>
Non-Land Grant University	\$1,525,000	45.0%
<i>Molecular Genetic Approach</i>	\$	0%
Arabidopsis Research	\$	0%

## Federal Funding of Agricultural Plant Science by CSREES

### Category: Plant Genetic Mechanisms, National Research Initiative

2002-04 68 grants funded; average grant \$220,003

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$13,547,000	
Ag Departments	\$5,634,000	41.6%
<b>Non-Ag Department</b>	<b>\$7,913,000</b>	<b>58.4%</b>
Non-Land Grant University	\$2,686,000	19.8%
<b><i>Molecular Genetic Approach</i></b>	<b><i>\$13,547,000</i></b>	<b><i>100%</i></b>
Arabidopsis Research	\$4,458,000	32.9%

Year 2004 14 grants funded; average grant \$303,785

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$4,253,000	
Ag Departments	\$1,521,000	35.8%
<b>Non-Ag Department</b>	<b>\$2,732,000</b>	<b>64.2%</b>
Non-Land Grant University	\$ 485,000	11.4%
<b><i>Molecular Genetic Approach</i></b>	<b><i>\$4,253,000</i></b>	<b><i>100%</i></b>
Arabidopsis Research	\$1,250,000	29.4%

Year 2003 21 grants funded; average grant \$205,380

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$4,313,000	
Ag Departments	\$2,095,000	48.6%
<b>Non-Ag Department</b>	<b>\$2,218,000</b>	<b>51.4%</b>
Non-Land Grant University	\$1,023,000	23.8%
<b><i>Molecular Genetic Approach</i></b>	<b><i>\$4,313,000</i></b>	<b><i>100%</i></b>
Arabidopsis Research	\$1,460,000	33.8%

Year 2002 33 grants funded; average grant \$150,939

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$4,981,000	
Ag Departments	\$2,018,000	40.5%
<b>Non-Ag Department</b>	<b>\$2,963,000</b>	<b>59.5%</b>
Non-Land Grant University	\$1,178,000	23.6%
<b><i>Molecular Genetic Approach</i></b>	<b><i>\$4,981,000</i></b>	<b><i>100%</i></b>
Arabidopsis Research	\$1,748,000	35.1%

UGA received 3 grants, two from Ag Departments

## Federal Funding of Agricultural Plant Science by CSREES

### Category: Food Quality, Value, National Research Initiative

2002-04 78 grants funded; average grant \$181,898

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$14,236,000	
Ag Departments	\$13,189,000	92.6%
<b>Non-Ag Department</b>	<b>\$</b>	<b>0%</b>
Non-Land Grant University	\$1,047,000	7.3%
<b><i>Molecular Genetic Approach</i></b>	<b>\$ 699,000</b>	<b>4.9%</b>

Year 2004 16 grants funded; average grant \$257,000

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$5,879,000	
Ag Departments	\$5,278,000	90.0%
<b>Non-Ag Department</b>	<b>\$</b>	<b>0%</b>
Non-Land Grant University	\$ 601,000	10%
<b><i>Molecular Genetic Approach</i></b>	<b>\$ 222,000</b>	<b>3.8%</b>

Year 2003 22 grants funded; average grant \$184,000

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$4,048,000	
Ag Departments	\$3,948,000	97.5%
<b>Non-Ag Department</b>	<b>\$</b>	<b>0%</b>
Non-Land Grant University	\$ 100,000	2.5%
<b><i>Molecular Genetic Approach</i></b>	<b>\$ 90,000</b>	<b>2.2%</b>

Year 2002 26 grants funded; average grant \$165,730

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$4,309,000	
Ag Departments	\$3,963,000	92.0%
<b>Non-Ag Department</b>	<b>\$</b>	<b>0%</b>
Non-Land Grant University	\$ 346,000	8.0%
<b><i>Molecular Genetic Approach</i></b>	<b>\$ 387,000</b>	<b>9.0%</b>

## Federal Funding of Agricultural Plant Science by CSREES

### Category: Plant Microbe Associations, National Research Initiative

2003+05 46 grants funded; average grant \$226,425

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$10,182,000	
Ag Departments	\$7,700,000	75.6%
<b>Non-Ag Department</b>	<b>\$2,482,000</b>	<b>24.4%</b>
Non-Land Grant University	\$2,260,000	22.2%
<i>Molecular Genetic Approach</i>	<i>\$ 9,052,000</i>	<i>88.9%</i>

Year 2005 20 grants funded; average grant \$265,350

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$5,307,000	
Ag Departments	\$4,465,000	84.1%
<b>Non-Ag Department</b>	<b>\$ 842,000</b>	<b>15.9%</b>
Non-Land Grant University	\$1,138,000	21.4%
<i>Molecular Genetic Approach</i>	<i>\$4,512,000</i>	<i>85.0%</i>

Year 2003 26 grants funded; average grant \$187,500

<u>Category</u>	<u>\$ Funded</u>	<u>% Total</u>
Total Allocated	\$4,875,000	
Ag Departments	\$3,235,000	66.4%
<b>Non-Ag Department</b>	<b>\$1,640,000</b>	<b>33.6%</b>
Non-Land Grant University	\$1,125,000	23.1%
<i>Molecular Genetic Approach</i>	<i>\$4,540,000</i>	<i>93.1%</i>

## *Setting Priorities for Plant Science Research by the CSREES*

The Secretary of Agriculture ultimately sets research priorities funded by the CSREES. According to S.1150, the “*Secretary shall solicit and consider input and recommendations from persons who conduct or use agricultural research, extension, or education*”. It does not specifically state how the Secretary goes about obtaining input or recommendations to establish the research priorities.

It is the responsibility of the 1862, 1890, and 1994 institutions to “*establish and implement a process for obtaining input from persons who conduct or use agricultural research, extension, or education concerning the use of the funds*”. It is unclear the frequency at which input is collected by the different land-grant institutions.

The managing principles by which these activities are accomplished includes where:

1. Agricultural research, extension, and education functions are integrated to better link research to technology transfer and information dissemination.
2. Regional and multistate programs are encouraged to address relevant issues of common concern and to better leverage scarce resources.
3. Agricultural research, extension, and education objectives are achieved through multi-institutional and multifunctional approaches at “*facilities and institutions best equipped to achieve those objectives.*”

From their website, CSREES requests comments regarding all RFA from any interested party which are in turn considered in the development of the next RFA for the program, as applicable. The dates for the comments are posted with the RFA’s and an address and email is provided on the website ([www.csrees.usda.gov/business/reporting/stakeholder.html](http://www.csrees.usda.gov/business/reporting/stakeholder.html)). Therefore, there appears to be a mechanism for individual or institutions to help direct the Secretary of Agriculture in setting research priorities and categories. *However, I am not sure this is being exploited by Land-Grant institutions because of the frequency at which non-agricultural departments are obtaining funding.*

The Secretary also established procedures for the scientific peer review of funded grants, and does this in consultation with an “Advisory Board”. The Advisory Board reviews on an annual basis, the:

1. Relevance of the priorities established for funding.
2. Adequacy of the funding.

The advisory board is a thirty-one (31) member body representing specific areas of expertise or affiliation. Members serve 3-year staggered appointments so that every year approximately one-third of the total 31 members are appointed. Members are nominated but it is unclear who is eligible to nominate a member.

*Faculty Expertise Needed to Compete for CSREES Funds in the Plant Sciences:*

With the current awards being made in the seven categories investigated for this report, it is apparent that a significant number of faculty in plant science departments need possess molecular genetic skills in order to be competitive for CSREES funds. Clearly, 91% of the funded research in five of the seven categories, and 63% overall, took a molecular genetic approach in their proposals. In addition, a newly funded category, Functional Genomics, has proposed budgets of between \$7-8 million and further emphasizes the focus of CSREES to fund molecular genetic research at a high level. Whether this approach and philosophy will continue or would be compatible with state agricultural needs should be addresses and assessed by the upper administration of land-grant institutions and CSREES. The proportion of molecular genetic faculty to “traditional” faculty depends on the level the institution want to compete for these funds. As an example, the University of Arizona Plant Science Department has competed well for CSREES funds and of their 29 faculty involved in plant science research on the Tucson campus, 22 take a molecular genetic approach to their research. A brief look at other funding agencies revealed a strong molecular genetic approach to funded research.

At the minimum, each department should have 2-3 molecular genetic faculty for every 10 departmental faculty. In addition to conducting their own research program, these faculty could advise and act as the “expert” needed for more traditional faculty to write grants for CSREES funds that address state agricultural concerns, yet still contain a molecular aspect to the proposals. When molecular genetic faculty are brought into a department, they should be fully integrated so as to fully facilitate cooperation among all scientists addressing agricultural concerns of the state. Faculty with applied research foci will not be successful in competing for funds made available through CSREES in the current system.

Faculty with a strong chemistry or biochemistry background and approach would be a secondary group of skills needed to compete for CSREES funds in the plant sciences. A strong background in the plant sciences, or in agricultural production does not seem to be as important and the approach skills.

The real question is whether or not the categories and priorities set by CSREES address the current and long-term agricultural concerns in the U.S. It is difficult to believe that U.S. agricultural concerns are being addressed when 57% of the overall funding went to non-agricultural departments, and 74% in 5 of the 7 categories. There appears to be a strong disconnect between the land-grant institutions and the people setting the research priorities, funding categories and merit review. Further investigation needs to determine how greater input can be made from land-grant institutions to improve the funding success to agricultural departments. It should be emphasized that the faculty at land-grant institutions are well trained, engaged, and competent to address the needs of agricultural clientele. As such, they should compete well for funds related to agricultural plant science, but don't.