



Dr. Jay W. Scott

Plant Breeding is Diverse and Strong at the University of Florida

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Part I. Breeding Efforts by Crop.

Department	Crop Group	Species/Use	PY	Releases in the past 5 years			
				Germplasm	Cultivar		
Agronomy	Turfgrass	Bermudagrass	0.20	0	1		
		Centipede/Carpentergrass	0.10	0	0		
		Zoysiagrass	0.20	0	2		
	Agronomic	Peanut	2.00	0	10		
		Silage Corn	0.05	0	1		
		Sugarcane	0.00 ^a	0	10		
	Forage Grass	Bahia	0.50	2	0		
	Forage Legume	Peanut/Soybean	0.15	0	2		
		Red Clover	0.70	1	1		
		White Clover	0.70	0	1		
Winter Forage	Oat	0.29	0	2			
	Ryegrass	0.30	3	17			
	Triticale	0.29	0	2			
	Wheat	0.00	0	3			
Environmental Horticulture	Ornamentals	Aglaonemas	0.33	0	0		
		Anthurium	0.33	0	0		
		Caladium	0.60	0	4		
		Coleus	0.30	0	14		
		Dieffenbachia	0.33	0	3		
		Gerberas	0.60	0	4		
		Lisianthus	0.30	0	16		
		Forestry	Forest Trees	Cottonwood	0.18	0	0
				Cypress	0.18	0	0
				Eucalyptus	0.18	0	0
Slash Pine	0.18			0	0		
Horticultural Science	Turfgrass	St. Augustinegrass	0.50	0	1		
		Paspalum	0.10	0	1		
	Fruit Crops	Blueberry	0.80	0	8		
		Citrus - processing	0.63	0	0		
		Citrus - rootstocks	0.75	0	0		
		Citrus - fresh	0.63	0	1		
		Muscadine	0.10	0	1		
		Stonefruit	0.70	0	11		
		Papaya	0.40	0	0		
		Strawberry	1.00	0	2		
	Vegetable Crops	Cucurbit	0.80	0	0		
		Lettuce	0.15	0	0		
		Sweet Corn	0.05	0	0		
		Tomato	1.00	9	4		
Totals			16.58	15	122		

^a Full PY UF/USDA breeder for sugarcane

Part II. Breeding efforts by activity.

Activity	Pys	%
a) Plant Breeding Research	3.95	21.7
b) Germplasm Enhancement	2.45	13.5
c) Cultivar Development	7.78	42.8
d) Biotechnology Research and Development	2.40	13.2
e) Plant Breeding Education	1.60	8.8
Total	18.18	100.0

Part III. Recent and current graduate student enrollment.

	Horticulture	Agronomy	Environmental Hort.	Total
A. Recent Graduates 2000-2006				
MS - Domestic	2	4	1	7
MS International	1	3	0	4
Total MS	3	7	1	11
PhD - Domestic	0	2	1	3
PhD - International	1	6	0	7
Total PhD	1	8	1	10
Grand Total MS and PhD	4	15	2	21
B. Current Students				
MS - Domestic	0	1	0	1
MS International	1	3	0	4
Total MS	1	4	0	5
PhD - Domestic	7	2	1	10
PhD - International	0	4	0	4
Total PhD	7	6	1	14
Grand Total MS and PhD	8	10	1	19



Figure 1. More information on plant breeding at the University of Florida can be found on our website <http://breeders.ifas.ufl.edu>.

Part IV. Job placement of recent graduates.

As shown in Part I and II UF/IFAS currently has 18.18 PY involved in plant breeding efforts and during the past five years scientists at UF/IFAS have released 137 new cultivars and germplasm. Since 1970, 98 Master of Science and 96 Ph.D. students received degrees in the UF/IFAS plant breeding program. Many of these students have gone on to fill productive and innovative plant breeding programs in the public and private sector in the USA and internationally. Examples of current positions of some UF/IFAS plant breeding graduates since 1996 are given below.

There is good demand for plant breeding students with much of this coming from the private sector. The demand seems to be the same over the last decade whereas it may have been less for some years in the 1990's. When public breeding jobs open applicant numbers are often less than 20, similar to plant pathology positions, whereas a molecular genetics position will often attract 80-100 applicants. It is not necessary for plant breeding students to have post-doctoral positions as is generally the case with molecular genetics Ph.D.s. This is good because conventional breeders do not usually have funding for post-doctoral breeders and if they do have funding it is often for someone to work on molecular markers. Employers generally want people with strong plant breeding skills and some experience in molecular techniques. This is primarily to interface with molecular groups at their companies as opposed to doing molecular work themselves.

Recent Graduates - Job placement:

Dr. Sylvia Brooks, Ph.D., 1996. Science teacher at Hawthorne High School.

Dr. Cheryl Emmons, Ph.D., 1996. Associate Professor of Biology at Alfred University in New York.

Dr. Roy Martens, Ph.D., 1996. Sugar beet breeder for Syngenta at Longmont, Colorado.

Dr. Rogerio Ritzinger, Ph.D., 1997. Breeder at Embrapa, Brazil.

Dr. Phillip Griffiths, Ph.D., 1998. Associate Professor of Horticulture at Cornell University located at the Geneva station. He conducts breeding and genetic studies on crucifers and beans as well as teaches breeding classes.

Dr. Courtney Webber, Ph.D., 1998. Associate Professor of Horticulture at Cornell University located at the Geneva station. He works on breeding and genetics of small fruits.

Dr. Liana Jank, Ph.D., 2001. Directs the tropical grass improvement program at CNPGC in Brazil focused on genetic improvement of guineagrass.

Mr. Nikolaos Georgelis, MS., 2002. Ph.D. student in Molecular Genetics at the University of Florida.

Dr. Bill Kazokis, Ph.D., 2003. Tomato breeder with Enza Zaden at their Bradenton, Florida station.

Mr. David Baquerizo, MS., 2005. Unknown private breeding company in Florida.

Mr. Les Padley, MS., 2005. Ph.D. student in Plant Breeding at the University of Florida.

Ms. Sarah Smith, MS., 2006. Ph.D. student in Plant Breeding at the University of Florida.

Mr. David Czarnecki, MS., 2006. Ph.D. student in Plant Breeding at the University of Florida.

Part V. Plant breeding course offerings at University of Florida.

The Program of Study for students in Plant Breeding and Genetics pursuing either the M.S. or Ph.D. degree will ultimately be determined by the student's supervisory committee. Specific requirements for the M.S. are a minimum of 30 credits at least 12 of which must be in the major field and no more than 6 of which are research credits for the M.S. degree. Requirements for the Ph.D. are a minimum of 90 credits of which up to 30 credits may be from a previously earned M.S. degree. A minor specialization at the M.S. level requires a minimum of 6 credits and at the Ph.D. level a minimum of 12 credits. The Plant Breeding and Genetics faculty have suggested the courses listed below as appropriate for the M.S. and Ph.D. degrees.

Undergraduate prerequisites:

Degree in the plant sciences with courses in genetics, plant physiology, and biochemistry.

Masters (Required):

- AGR 5321C Genetic Improvement of Plants (3 cr)
 - AGR 6325L Plant Breeding Techniques (1 cr)
 - STA 6166 Statistical Methods in Research I (3 cr)
 - STA 6167 Statistical Methods in Research II (3 cr)
- *or equivalent courses taken at other universities

Electives: Choose 2 courses from the following:

- AGR 5307 Molecular Genetics for Crop Improvement (2 cr)
- AGR 6311 Population and Quantitative Genetics (2 cr)
- AGR 6322 Advanced Plant Breeding (3 cr)
- AGR 6353 Cytogenetics (3 cr)
- PCB 6555 Quantitative Genetics (3 cr)
- FOR 6310 Forest Genetics and Tree Improvement (3 cr)
- HOS 6201 Breeding Perennial Cultivars (3 cr)
- HOS 6932 Genetics & Breeding of Vegetable Crops (3 cr)

Ph.D. (Required):

- AGR 5321C Genetic Improvement of Plants (3 cr)
 - AGR 6311 Population and Quantitative Genetics (2 cr)
 - AGR 6322 Advanced Plant Breeding (3 cr)
 - AGR 6353 Cytogenetics (3 cr)
 - AGR 6325L Plant Breeding Techniques (1 cr)
 - HOS 6201 Breeding Perennial Cultivars (3 cr)
 - HOS 6932 Genetics & Breeding of Vegetable Crops (3 cr)
 - STA 6166 Statistical Methods in Research I (3 cr)
 - STA 6167 Statistical Methods in Research II (3 cr)
- *or equivalent courses taken at other universities

Electives: Choose 3 courses from the following:

- AGR 5307 Molecular Genetics for Crop Improvement (2 cr)
- PCB 6555 Quantitative Genetics (3 cr)
- FOR 6310 Forest Genetics and Tree Improvement (3 cr)
- HOS 6231 Biochemical Genetics of Higher Plants (3 cr)
- PCB 5575 Ecological Genetics (3 cr)

Part VI. Institutional philosophy, strengths, weaknesses, future plans, other comments.

The University of Florida (UF) administration is committed to maintaining a strong plant breeding program with the intent of being a leader in the field, especially as breeding programs are being reduced at other public institutions in the US. Part of this emphasis is due to the organization and efforts of the UF plant breeders (See Figure 1). Recommendations of the plant breeders cut across department and research center boundaries and often receive favor. Furthermore, royalty income for cultivar releases help sustain the breeding programs in the face of reduced grant support for classical breeding. Another strength of plant breeding at UF is the diversity of crops that we work with (see Part I). Our students are exposed to a diverse array of crops when they take AGR 6325L and interact with the guest lecturers who teach them about breeding their respective crops. Another area of support often comes from growers of many of the crops in Florida who want to see programs continue. The geography of the Florida peninsula can be helpful to maintaining our breeding programs because the climate is unique and there are no border states to share the work load in breeding for our environment. Additionally, some crops have little private breeding activity so UF breeding is vital. However, some commodities that may be important internationally do not have large, organized grower groups in Florida so that grower pressure to keep breeding of those commodities is not strong.

One weakness at UF is that most of breeders are located at research centers and do not have teaching appointments. This makes it difficult to maintain a teaching curriculum. Additionally, there are relatively few graduate students and low enrollment in breeding classes makes it difficult to justify classes to administrators. This is especially problematic since most biotechnology students do not take plant breeding classes. It is sometimes difficult to find students interested in studying plant breeding because biotechnology has more allure. Funding for students is problematic in breeding programs. More funding of assistantships from private breeding companies may be necessary in the future.

On-campus teaching positions may be lost when retirements occur which will weaken the teaching program. Also, other breeding positions could be lost as faculty retire, weakening the overall plant breeding effort at UF. Lost faculty positions are usually due to funding shortages, although redirection of funds to other fields is problematic. Another threat is administrative change. The current supportive group could change to a less supportive group in the future.

