SARE Project LS94-57

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The University of Georgia

College of Agricultural and Environmental Sciences
Georgia Agricultural Experiment Stations

Small Grain, Canola, and Forages Field Day

April 13, 1995

Southwest Georgia Branch Experiment Station

Stan R. Jones, Superintendent

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Georgia Agricultural Experiment Stations, College of Agriculture and Environmental Sciences

Project summaries compiled by
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New Farm Products and SARE/ACE Project L94-57

NOTICE OF RELEASE OF MOREY SOFT RED WINTER WHEAT

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The University of Georgia Agricultural Experiment Station in cooperation with the Florida Agricultural Experiment Station announces the release of Morey, a new high-yielding soft red winter wheat cultivar. It was named to honor Dr. D. D. Morey, former small grain breeder at the Coastal Plain Experiment Station.

Morey was derived from a single cross made in 1985 at the University of Florida: FL8172-G116/'Florida 303'. FL8172-G116 is a sister line to 'FL 304'. Morey was tested experimentally as GA 85238-C5-AB5-4. Individual spike selections were made in the F_2, F_3, F_4, and F_5 generations at Tifton, GA. Morey was selected as an F_5 headrow in 1990. Morey was evaluated for agronomic performance as GA 85238 in nursery plots in 1991, state trials at six locations in 1992 and 1993, and in the Uniform Southern Soft Red Winter Wheat Nursery at about 30 locations in 1992 and 1993.

Morey is very early maturing cultivar in the Southeast. It has medium height at maturity, is white-chaffed, awned, and characterized by good straw strength with high yield potential and good test weight. It is about 5 days earlier in maturity and 8 cm shorter than Florida 304, and has excellent lodging resistance. Milling and baking quality characteristics of Morey are rated acceptable for soft red winter wheat use by the USDA-Soft Wheat Quality Laboratory, Wooster, OH.

Morey is resistant to the biotypes E, G, M, and O of Hessian fly present in Georgia and Florida, and resistant to current races of leaf rust and powdery mildew.

Breeder seed of Morey will be maintained by the Georgia Agricultural Experiment Station. The Foundation class of seed of Morey will be made available to seed growers in Georgia by the Georgia Seed Development Commission in 1995.

Table 1. Average yield performance of Morey and check cultivars in South Georgia evaluation trials over 3 years (1992-1994) at 3 locations.

Entry	Location: Tifton	Plains	Midville	Average
Morey	49.5a	62.9a	61.5b	58.0a
GA Stuckey	48.5a	63.7a	62.8ab	58.4a
GA Andy	47.2a	64.3a	67.0a	59.5a

Table 2. Agronomic characteristics of Morey and selected cultivars over 2 years (1993 and 1994) at 3 locations.

Entry	Test Wt.	Lodging	Date Headed	Leaf Rust	Hessian fly	
	lb/bu	%			%	no.
Morey	55.4	18a	4/3	0a	1.1a	0.01a
GA Stuckey	55.5	24a	4/4	1a	0.0a	0.0a
GA Andy	55.7	12a	4/3	5b	0.0a	0.0a

NOTICE OF RELEASE OF GA-DOZIER SOFT RED WINTER WHEAT

Jerry W. Johnson, Barry M. Cunfer, G. David Buntin,
John J. Roberts, and Daniel Bland

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The University of Georgia Agricultural Experiment Station in cooperation with the USDA-ARS announces the release of GA-Dozier, a new high-yielding soft red winter wheat cultivar. It was named to honor Hugh Dozier, the former research assistant for the breeding program at the Georgia Station, Griffin, for over 25 years.

GA-Dozier was derived from a single cross in 1984: 'Saluda'/'Coker 797'. Individual spike selections were made in the F2, F3, F4, and F5 generations at Griffin, GA. GA-Dozier is the progeny of five rows bulked together after selection from 100 head rows in the F7 generation. GA-Dozier was evaluated for agronomic performance as GA 84438 in nursery plots in 1990 and 1991, state trials at five locations in 1992 thru 1994, and in the Uniform Southern Soft Red Winter Wheat Nursery at about 30 locations in 1993.

GA-Dozier is late-maturing, has short height at maturity, is white-chaffed, awned, and is characterized by excellent straw strength with high yield potential and high test weight. Milling and baking quality characteristics of GA-Dozier are rated as excellent for soft red winter wheat use by the USDA-Soft Wheat Quality Laboratory, Wooster, OH.

GA-Dozier is resistant to biotypes E, G, M, and O of Hessian fly present in Georgia, and resistant to current races of leaf rust and powdery mildew.

Breeder seed of GA-Dozier will be maintained by the Georgia Agricultural Experiment Station. The Foundation class of seed of GA-Dozier will be made available to seed growers in Georgia by the Georgia Seed Development Commission in 1995.

Table 1. Average yield performance of GA-Dozier and check cultivars over 3 years (1992-1994) at five locations.

Entry	Location					Average
	Tifton	Plains	Midville	Griffin	Calhoun	
GA Dozier	56.5b	69.6a	64.1b	95.0a	66.3b	70.3b
GA Gore	55.6b	66.1b	62.6b	87.2b	64.4b	67.2b
C 9835	59.7a	69.9a	74.0a	97.9a	75.1a	75.3a

Table 2. Average performance of GA-Dozier and check cultivars over 2 years (1993-1994) at four locations.

Entry	Test Wt. lbs/bu	Lodging %	Date Headed	Leaf Rust	Powdery Mildew
GA Dozier	59.3	8	4/20	1a	0a
GA Gore	56.0	25	4/12	7b	1a
C 9835	56.5	12	4/15	9b	7b

NOTICE OF RELEASE OF GA-STUCKEY SOFT RED WINTER WHEAT

Jerry W. Johnson, Barry M. Cunfer, G. David Buntin, John J. Roberts, and Daniel Bland

Departments of Crop and Soil Sciences, Plant Pathology, Entomology, USDA-ARS, and Crop and Soil Sciences, Georgia Station, University of Georgia, Griffin

The University of Georgia Agricultural Experiment Station in cooperation with the USDA-ARS announces the release of GA-Stuckey, a new high-yielding soft red winter wheat cultivar. It was named to honor Dr. H. D. Stuckey, the former Resident Director of the Georgia Experiment Station, Griffin.

GA-Stuckey was derived from a double cross in 1983: MD 73055/GA 73-1-2-5//'Coker 797'/'Caldwell'. Individual head selections were made in the F2, F3, F4, and F5 generations at Griffin, GA. GA-Stuckey is the progeny of five rows bulked together after selection from 100 head rows in the F7 generation. GA-Stuckey was evaluated for agronomic performance as GA 83228 in nursery plots in 1990 and 1991, state trials at five locations in 1992 through 1994, and in the Uniform Southern Soft Red Winter Wheat Nursery at about 30 locations in 1993.

GA-Stuckey is early-maturing and has short height at maturity. It is white-chaffed, awnless, and characterized by intermediate straw strength with high yield potential. It is one day later than GA-Andy in maturity and has similar test weight. Milling and baking quality characteristics of GA-Stuckey are rated as excellent for soft red winter wheat use by the USDA-Soft Wheat Quality Laboratory, Wooster, OH.

GA-Stuckey is resistant to biotypes E, G, M, and O of Hessian fly present in Georgia, and resistant to current races of leaf rust and powdery mildew.

Breeder seed of GA-Stuckey will be maintained by the Georgia Agricultural Experiment Station. The Foundation class of seed of GA-Stuckey will be made available to seed growers in Georgia by the Georgia Seed Development Commission in 1995.

Table 1. Average performance of GA-Stuckey and check cultivars at Plains, GA in 1989.

Entry	Grain Yield Bu/A	Test Wt. lbs/bu	Quality Score	Leaf Rust	Powdery Mildew
GA 83228	67.3ab	56	C	0	1
FL 303	52.5c	57	A	0	3
GA 100	75.2a	56	B	1	2

Table 2. Average yield performance of GA-Stuckey and check cultivars in Georgia's evaluation trials over 2 years (1993-1994) at three locations.

	Location			
Entry	Tifton	Plains	Midville	Average
GA Stuckey	41.3b	56.7a	58.2b	52.1a
GA Andy	41.1b	56.3a	65.9a	54.4a
FL 304	51.2a	54.9a	56.9b	54.3a

Table 3. Average performance of GA-Stuckey and three cultivars in the Uniform Southern Wheat Nursery (29 locations in 1993).

Entry	Grain Yield (Bu/A)	Test Wt. (Lbs/Bu)	Date Headed	Lodging	Powdery Mildew	Leaf Rust
GA Stuckey	62.0ab	54.9	106.6	2	0a	1a
FL 302	58.5bc	53.8	109.4	1	2a	7b
Saluda	54.5c	56.3	110.3	3	7b	6b
C 9835	65.8a	55.4	109.4		3a	1a

INTEGRATED MANAGEMENT OF WHEAT DISEASES BY BREEDING FOR RESISTANCE AND SEED TREATMENTS

Barry M. Cunfer

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Resistance to glume blotch and other diseases. Cultivars with a high level of resistance to *Stagonospora nodorum*, cause of leaf and glume blotch have been difficult to breed because resistance is typically controlled by a large number of genes. Several wheat lines have been selected in greenhouse and field tests over the past four years which exhibit outstanding resistance to glume blotch. The lines are resistant to leaf rust and most have excellent resistance to powdery mildew. Some lines already have been used as parents in our breeding program. These lines also have good agronomic characteristics and have been included in the advanced and elite breeding material of the Georgia wheat program in recent years. These lines are being evaluated again this year at Griffin and Plains under heavy disease pressure from powdery mildew, leaf rust, and *S. nodorum*. The best lines may be released for use as germplasm.

Seed treatments for control of smuts and leaf diseases. Baytan fungicide (triadimenol) was labelled for wheat several years ago. In 1994 Dividend (difenoconazole) received a label for wheat. Current restrictions prevent its use in doublecropping. Both fungicides are systemic and both provide superior control of smuts than Vitavax (carboxin). Both Baytan and Dividend also suppress powdery mildew, leaf rust, and *S. nodorum*. Several cultivars susceptible to these diseases treated with Baytan at the Southwest Branch Station this year show the suppression of powdery mildew and leaf rust. Both fungicides should be considered as an alternative to Vitavax. At present both of these materials cost more than Vitavax.

Research aimed at combining crop rotation, use of seed treatments, and disease resistant cultivars to delay the development of septoria leaf and glume blotch is being coducted at Plains. Colonization of the middle and lower leaves is about 5-10% at the time of heading on resistant lines without seed treatment, wheras suceptible lines may have 25-50% colonization by the fungus. Fungicide seed treatment reduces colonization further. Because disease progresses more slowly on resistant lines, disease is less severe on upper leaves and heads by the end of the season. This integrated approach to disease management can result in higher test weight and increased yield.

SARE/ACE project on management of diseases and pests in doublecrop farming systems. A four-year crop rotation project using doublecropping and conservation tillage systems was begun at Plains in 1994. The project is funded by a grant from the USDA Sustainable Agriculture Research and Education program. Ten scientists with UGA and USDA are cooperating on the project. A demonstration plot of the project also is planted on the farm of Greg Speir on Cowpen Road near Plains. The objective is to find alternative cropping sequences to continuous wheat-soybeans that minimize diseases and insect pests and which are profitable and sustainable. Twelve rotational sequences have been established which incorporate canola and rye along with wheat as a winter crop and pearl millet as an alternative to soybeans as a summer crop.

Take-all root rot becomes a serious problem in wheat when wheat-soybeans are planted three or more years in a row. The take-all fungus was added to the soil in all plots in November, 1994. Severe stunting is evident in the plots now. The effect of the crop rotations on take-all in the next three years will be monitored. Recent research indicates that canola can suppress the take-all fungus. Therefore the effect of rotations with canola will be observed. The plots were also inoculated with soybean debris infested with the stem canker fungus. The effect of crop rotation on this disease over several years will be studied. Various other diseases and insect pests of canola and pearl millet will be investigated for the effects of the different rotation combinations.

SMALL GRAINS VARIETY TRIALS

Anton Coy and Paul Raymer

Crop and Soil Sciences, University of Georgia, Coastal Plain and Georgia Stations

The small grain variety evaluation study at Plains is part of a five location statewide testing system that provides a head to head comparison of commercially available and experimental small grain varieties. This is a fee-based service of the University of Georgia which is intended to aid Georgia farmers and agricultural interests in the selection of small grain varieties. It also provides small grain breeders with a means of introducing prospective new varieties. Similar tests are conducted at Tifton and Midville in the Coastal Plain and at Griffin and Calhoun in the Piedmont and Limestone Valley regions, respectively.

The 1994-95 test at Plains consists of 31 wheat, 13 barley and 13 oat varieties. It was planted November 15, 1994 and received fertilizer application as recommended in Soil Test Handbook for Georgia. The tests follow a 1994 peanut crop and received 300 lbs/ac 3-18-9 and 60# N as 34-0-0 preplant. It was topdressed on February 23, 1995 with 40 lb N as 34-0-0.

Grain yield, bushel weight and various agronomic information such as heading date, plant height, lodging, and winter survival are reported annually along with 2 and 3 year summaries in the Georgia Agricultural

Experiment Stations Research Report, Small Grain Performance Tests.

The research report is available through the Georgia Cooperative Extension Service. It also includes such information as varietal characteristics, varietal reactions to disease and insect pests, recommended cultural practices, and a list of varieties recommended for planting in the Georgia.

In order for a small grain variety to be placed on the recommended list, it must have performed well for a period of usually three years and have been agreed on by a team of agronomists, plant breeders and plant pathologists who have observed its performance in Georgia. Recommendations are made on a statewide, regional or special use basis. Recommendations are based on Georgia Agricultural Experiment Station research but do not imply endorsement of specific brands or seed suppliers.

The wheat performance at Plains from the 1993-94 report is included on the following page as an example of the type of information resulting from this test.

Plains, Georgia:
Wheat Grain Performance, 1993-94

Brand-Variety	Yield[1] 1994	2-Year Average	3-Year Average	Test Weight	Height	Lodg.	Winter Surv.	Head Date	Septoria notorum[2] 5-11	Leaf Rust[3] 5-11
	--------bu/acre--------			lb/bu	in	%	%	mo/day	%	%
Coker 9134	75.6	72.9	74.2	58.0	36	10	100	04/09	3	10
UGA - 84386-1-11-5-4	73.8	.	.	56.8	36	2	100	04/06	4	30
Pioneer 2566	73.1	68.9	.	58.3	34	0	100	04/07	1	10
UGA 84386-1	72.7	62.5	.	56.0	33	0	100	04/09	2	100
UGA - 84386-1-16-1-1	71.2	.	.	56.7	32	0	100	04/07	2	100
UGA - 86346-2-3-2-1	71.1	.	.	57.9	32	3	100	04/09	3	0
UGA 84414-2-1-5-2	70.1	64.9	.	60.0	34	1	100	04/10	2	2
Andy	69.9	56.3	64.3	58.2	32	3	100	04/01	1	0
Pioneer - XW 522	69.9	.	.	58.5	29	0	100	04/03	1	10
UGA 85238-C5-AB5-4 (Morey)	69.7	56.2	62.9	57.5	32	0	100	03/30	3	0
UGA - 851035-1-5-5-3	69.7	.	.	58.5	35	11	100	04/09	1	1
UGA - 841227-2-2-2-8	69.3	.	.	60.2	32	1	100	04/09	1	20
UGA - 84415-4-4-5-3-6	69.0	.	.	59.4	32	0	100	04/10	1	20
UGA 831585-2	68.3	60.6	.	59.8	34	0	100	04/12	2	60
SC 850559	68.2	56.6	.	57.6	34	1	100	04/03	2	0
UGA 83484-2-2-1	68.1	65.3	.	60.2	32	25	100	04/07	1	0
UGA 84438-4-4 (GA-Dozier)	68.0	63.2	69.6	59.7	32	0	100	04/12	1	5
Bayles	67.1	58.7	66.1	55.1	34	5	100	04/06	4	100
UGA 83228-4-1 (GA-Stuckey)	66.5	56.7	63.7	58.2	28	43	100	04/01	4	0
Florida 304	66.2	54.9	58.2	59.4	35	4	100	04/01	5	0
Wakefield	66.1	.	.	56.1	36	4	100	04/10	1	100
Pioneer - XW 523	66.1	.	.	58.1	34	0	100	04/08	1	90
UGA 90078-I	66.0	56.3	.	60.3	31	0	100	03/30	3	20
UGA 85240-6	65.1	61.6	.	57.8	28	15	100	04/03	2	0
UGA 84200-7	64.9	61.9	.	57.0	34	0	100	04/12	3	0
Gore	64.6	63.3	66.1	57.9	31	0	100	04/01	1	0
Agripro Savannah	64.4	57.4	60.2	58.4	31	10	100	04/02	1	0
NK-Coker 9835	64.4	59.1	69.9	57.1	30	0	100	04/09	1	10
AgraTech ATW270	63.9	.	.	57.5	32	3	100	03/28	5	0
VA Jackson	63.8	63.7	.	57.3	35	6	100	04/09	0	100
Georgia 100	63.6	57.1	64.5	56.4	30	1	100	04/06	1	90
Pioneer 2684	63.3	62.0	.	60.5	32	0	100	04/03	2	0
UGA - 861160-1-4-4-1	63.2	.	.	59.2	35	0	100	04/12	1	100
Madison	63.1	56.2	62.7	58.0	32	14	100	04/02	1	70
UGA - 861160-1-4-1-8	61.2	.	.	58.3	35	0	100	04/09	3	100
AR 26413B	52.1	39.8	.	56.8	33	0	100	04/10	0	100
Average	67.0[4]	59.8	65.2	58.1	32	4	100	04/06	2	35
LSD at 10% level	4.6	3.7	N.S.[5]	1.2	1	7	-	01		
Std. Err. of Entry Mean	1.9	1.6	1.4	0.5	1	3	-	01		

1. Yields calculated as 60 pounds per bushel at 13.5% moisture.
2. Ratings for glume blotch of the head on 5-11: 0=No disease to 9=100% susceptable.
3. Leaf rust rating on flag leaves.
4. C. V. = 5.8%, and df fpr EMS = 102.
5. The F-test indicated no statistical differences at the alpha = 0.10 probability level; therefore, an LSD value was not calculated.

Planted: November 17, 1993.
Harvested: May 22, 1994.
Seeding Rate: 1.5 bu/acre.
Soil Type: Faceville sandy loam.
Soil Test: P = Medium, K = Medium, and pH = 6.1.
Fertilization: Preplant: 0 lb N, 0 lb P_2O_5, and 0 lb K_2O/acre.
Topdress: 80 lb N/acre.
Management: Disked, chiseled and rototilled.
Previous Crop: Peanut.

Test conducted by A. E. Coy and R. B. Bennett.

CANOLA VARIETY TRIALS

Paul Raymer and Anton Coy

Crop and Soil Sciences, University of Georgia and Coastal Plain Stations

The Southwest Branch Station at Plains is one of five locations utilized for canola research and variety development. Canola variety evaluation trials are conducted annually at this station as part of our statewide canola variety testing system. The variety testing program provides growers and the seed industry with an unbiased comparison of the agronomic performance of commercially available varieties and experimental lines. This information should prove useful to potential growers as an aid in selecting the best performing varieties for planting on their farms.

The 1994-95 Plains variety trials include a state trial with 27 entries, a 24 entry trial to evaluate advanced lines from The University of Georgia breeding program, and three other trials evaluating superior edible oil canola breeding lines. These trials were planted on October 20 following peanut harvest and received 300 lb/acre 3-18-9 and 60 lb/acre N as 34-0-0 prior to planting. All trials were topdressed on February 7 with 80 lb/acre N as 34-0-0.

Seed yield, oil content, test weight and other agronomic characters such as bloom date, maturity date, plant height, lodging, and winter survival are reported annually along with 2 and 3-year yield summaries in the Georgia Agricultural Experiment Stations Research Report, Canola Performance Tests. This research report is available through the Georgia Cooperative Extension Service and College of Agriculture Experiment Stations.

Results of the canola trials conducted at Plains during 1993-94 are included on the following page as an example of the type of information generated by these trials.

Plains, Georgia:
Canola Variety Trial, 1993-94

Company or Brand Name	Variety	Yield[1] 1994	2-Year Average	3-Year Average	Test Wt	Bloom	Maturity	Plant Ht	Lodging[2]	Survival
		-----lb/acre-----			lb/bu	date	date	in	rating	%
Spring Types										
NSW Ag	BLN 586	2875	.	.	50.7	02/28	05/09	45	1.0	100
Hungnong	HN 9332	2814	.	.	48.6	03/11	05/09	49	1.0	100
Ameri-Can	Iris	2733	3007	2909	49.7	03/07	05/08	39	1.0	100
Hungnong	HN 9331	2704	.	.	49.6	03/12	05/09	47	1.0	100
Ameri-Can	Bingo	2678	2913	2843	50.9	03/05	05/08	39	1.0	100
UGA	188-25B	2669	3021	.	49.3	03/07	05/08	45	1.0	100
UGA	518-88	2664	.	.	50.2	03/04	05/08	45	1.0	100
Ameri-Can	A112	2633	2952	3100	49.7	03/01	05/06	30	1.0	100
Hungnong	HN 090-91	2607	3005	.	51.1	03/09	05/09	45	1.0	100
Hungnong	HN 120-91	2526	3471	.	50.1	03/12	05/11	50	1.0	100
AG-Seed	Oscar	2439	.	.	51.2	02/27	05/07	32	1.0	100
AG-Seed	Dunkeld	2438	.	.	50.1	02/26	05/07	32	1.0	100
UGA	188-20B	2394	2969	3074	50.5	03/01	05/07	42	1.0	100
Cargill	Printol	2382	2760	2847	46.1	03/08	05/08	42	1.0	100
UGA	518-27	2355	.	.	49.7	03/07	05/11	51	1.0	100
UGA	518-108	2341	.	.	50.8	03/03	05/09	48	1.0	100
Average		2578[3]	3012	2955	49.9	03/05	05/08	42	1.0	100
LSD at 10% Level		233			0.6	02	01	3	-	-
Std. Err. of Entry Mean		95			0.3	01	01	1	-	-

1. Yields calculated as 50 lb/bu at 8.5% moisture.
2. Lodging rating: 1 = no lodging to 5 = all plants down.
3. C.V. = 7.4% and df for EMS = 42.

Planted: October 27, 1993
Harvested: May 23, 1994
Seeding Rate: 5 lbs/acre in 7-inch rows
Soil Type: Faceville sandy loam
Soil Test: P = medium, K = medium, and pH = 6.1.
Fertilization: Preplant: 12 lb N, 72 lb P_2O_5, and 36 lb K_2O/acre.
Topdress: 120 lb N/acre.
Management: Disked, chiseled and rototilled to prepare seedbed.
Previous Crop: Peanut.

Test conducted by A. E. Coy and R. B. Bennett.

EXPANDING THE PLANTING WINDOW FOR CANOLA IN THE SOUTHERN COASTAL PLAIN

Gary J. Gascho and Paul L. Raymer

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Development of the canola industry is being limited by the window for best planting times for good stand establishment in the Southern Coastal Plain. Our previous studies have shown that the best planting date for the spring-types to attain maximum yield in the region is approximately 10 October (Raymer et al., unpublished data). Planting later than 15 November has significantly reduced yield. However, the best economics for the crop are obtained when it is doublecropped with a primary "summer crop". Demonstrations in 1992-93 indicated that canola can be much more profitable for the farmer than wheat (Woodruff and Given, 1993), which is the primary "winter crop" in the region. The primary summer crops in the area are peanut, cotton and soybean, which have harvest dates from September to late October. It is difficult to get farmers to plant canola at a timing which will result in high yield and profit. Planted acreage can also be limited by the timing of market prices in the region. For example, in the fall of 1993 price of canola in the region was less than $5/bu until after the best planting dates were past. Then the price suddenly increased to the point where farmers were assured of profit from a good crop. Some planted later than 15 November, but with current cultivars and recommended practices plant vigor appeared to be poor and yields were less than optimum. Expansion of the window of opportunity for planting by selecting for cultivars with improved seedling vigor or improving seedling growth through improved early nutrition appear to be fruitful avenues of research to solve the problem.

Canola is a viable profitable crop in the Coastal Plain when it is doublecropped with a summer crop. Improving stand establishment and seedling growth prior to the time that growth is greatly inhibited due to low temperatures will increase yield. Selecting cultivars for these traits and providing optimum early nutrition appear to be the most hopeful approaches for rapid establishment following late planting. Providing data to justify a longer planting window will open planting options and enhance the establishment of canola in the Southern Coastal Plain.

RESEARCH OBJECTIVES:

Expand the window of opportunity for seeding canola by:

1. Selection of cultivars with rapid germination and high seedling vigor under sub-optimal temperatures and
2. Improving seedling vigor by improving seedling nutrition.

ANNUAL WINTER FORAGES PERFORMANCE TESTS

Anton Coy and Paul Raymer

Crop and Soil Sciences, University of Georgia, Coastal Plain and Georgia Stations

The winter forage performance tests at Plains are a part of a three location statewide testing program conducted on a fee basis to compare the forage production capabilities commercially available and experimental varieties of small grains and ryegrass. Similar tests are conducted at Tifton and Griffin.

The plots are harvested at approximately 4-week intervals using a flail type harvester. Dry forage yields are reported by harvest date along with seasonal totals and 2-year average yields in the Georgia Agricultural Research Report, <u>Small Grain Performance Tests</u>. The report is available through the Georgia Cooperative Extension Service and is published annually prior to planting time.

The 1994-95 tests at Plains were planted October 20, 1994 following peanuts and consists of 24 ryegrass, 9 oat, 14 wheat and 14 rye varieties. Preplant fertilizer was 300 lb/acre 3-18-9 and 60 lb N/acre as 34-0-0. First harvest date was December 14, 1994 and 40 lb N/acre topdress have been applied after each cutting.

The rye forage performance at Plains from the 1993-94 report is included on the following page as an example of the information to be derived from this test.

Plains, Georgia:
Rye Forage Performance, 1993-94

Brand-Variety	Dry Matter Yield: Harvest Date 02-02-94	2-16-94	3-07-94	4-01-94	4-25-94	Season Totals 1994	2-Yr Avg	Cold Damage[1]
	lb/acre							%
Noble - Bates	1459	1264	2200	2744	1361	9028	.	0
Noble - NF 73	1623	1318	2102	2494	1274	8810	.	0
Florida Seed Winter Blend II	2037	926	1819	2418	1231	8429	.	0
Barr Seed Co. Graze King	958	1220	2450	2810	958	8396	.	0
Wrens Abruzzi	2243	1154	1612	1993	1372	8374	6997	0
GAT WLC7	1993	1329	1841	2146	1056	8364	7057	0
Elbon	1340	1231	2134	2483	1166	8352	7113	0
Gurley GI-87	1013	1100	2331	2766	1122	8331	.	0
Noble - Oklon	1623	1242	2091	2287	1068	8309	.	0
Pennington Wintergrazer 70	1895	1166	1939	2189	1111	8298	7158	0
Florida Seed Graze Master	2276	948	1601	2276	1133	8233	.	0
Winter King	882	1274	2265	2570	1242	8233	7180	0
Barr Seed Co. Barr Grazer	1503	1078	2058	2494	1056	8189	.	0
Bonel	1078	1068	2255	2603	1176	8179	7153	0
Noble - NF 109	1209	1198	2058	2418	1274	8157	.	0
Maton	752	1067	2331	2788	1122	8059	7288	0
FLA 402	1753	1089	1775	2058	1383	8058	.	0
FLA FL8727-L1	2701	556	1296	1612	1002	7166	5764	0
Average	1574	1124	2009	2397	1173	8276[2]	6964	0
LSD at 10% Level	177	180	80	175	174	373		
Std. Err. of Entry Mean	74	76	34	74	74	158		

1. Rated as percent of foliage damaged by low temperature.
2. C.V. = 3.8%, and df for EMS = 51.

Planted: October 22, 1993.
Seeding Rate: 2.5 bu/acre.
Soil Type: Greenville sandy clay loam.
Soil Test: P = Low, K = Medium, and pH = 6.1.
Fertilization: Preplant: 59 lb N, 54 lb P_2O_5, and 27 lb K_2O/acre.
Topdress: 20 lb N/acre on January 11, 1993, and 40 lb N/acre after 1st, 2nd, 3rd, and 4th harvests.
Management: Moldboard plowed and rototilled.
Previous Crop: Summer fallow.

Test conducted by A. E. Coy and R. B. Bennett.

APHID CONTROL WITH INSECTICIDES IN CANOLA

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Canola (*Brassica napus*) has been grown as a winter crop for a number of years in southern Georgia. The primary insect problem on canola in this area is a complex of aphids. The main species are the turnip aphid (*Lipaphis erysimi*), green peach aphid (*Myzus persicae*), and cabbage aphid (*Brevicoryne brassicae*). Winged aphids typically invade fall-planted canola soon after plant emergence. Aphids feed on the buds and lower leaf surfaces in the rosette stage, but move to the apical terminals flower buds when stem elongation occurs in the spring. In the spring, aphids feed on terminal flower buds and can reach enormous numbers during flowering. Aphids disperse from canola after flowering ceases. Aphid injury to rosettes causes leaf cupping and reduces vegetative growth and plant size. It also reduces canola cold tolerance thereby increasing winter kill. Injury during flowering delays flowering, causes flower abortion, and prevents pod and seed development. The turnip and green peach aphids occur from planting through flowering whereas the cabbage aphids occurs mostly during flowering. Currently, aphid transmitted viruses are not a major problem in canola in Georgia. The efficacy of various insecticide treatments were evaluated for control of aphids in canola at the

Southwest Branch Experiment Station in 1993/1994. Plots were planted on October 27, 1993 with 6 lb/acre of 'Bingo' canola seed. Plots measured 10 x 20 ft, and treatments were arranged in a randomized complete block design with 6 replications. All seed were treated with Captan 400D at 2 fl oz/CWT. The insecticide Gaucho 480FS was evaluated as a seed treatment at 16, 20, 24 and 32 fl oz/CWT. Other treatments were foliar-applied at 42 days after planting with a backpack sprayer. Foliar treatments were dimethoate at 0.25 and 0.5 lb (AI)/acre, Thiodan 3E at 1.0 lb (AI)/acre, methyl parathion at 0.5 lb (AI)/acre and Asana XL at 0.04 lb (AI)/acre. Aphids were counted periodically throughout the season, and plots were harvested with a small plot combine on May 24, 1994.

Figure 1 shows the numbers turnip and green peach aphids in the untreated, Gaucho-treated and foliar-insecticide treatments. All rates of Gaucho seed treatment controlled aphid numbers for more than 119 days after planting. Likewise, all foliar applied insecticides controlled aphids for 77 days after application and were similar in efficacy. Despite good aphid control, grain yield and test weight were not significantly different between treatments in this test (data not shown). Currently only Thiodan and methyl parathion are registered for aphid control in canola.

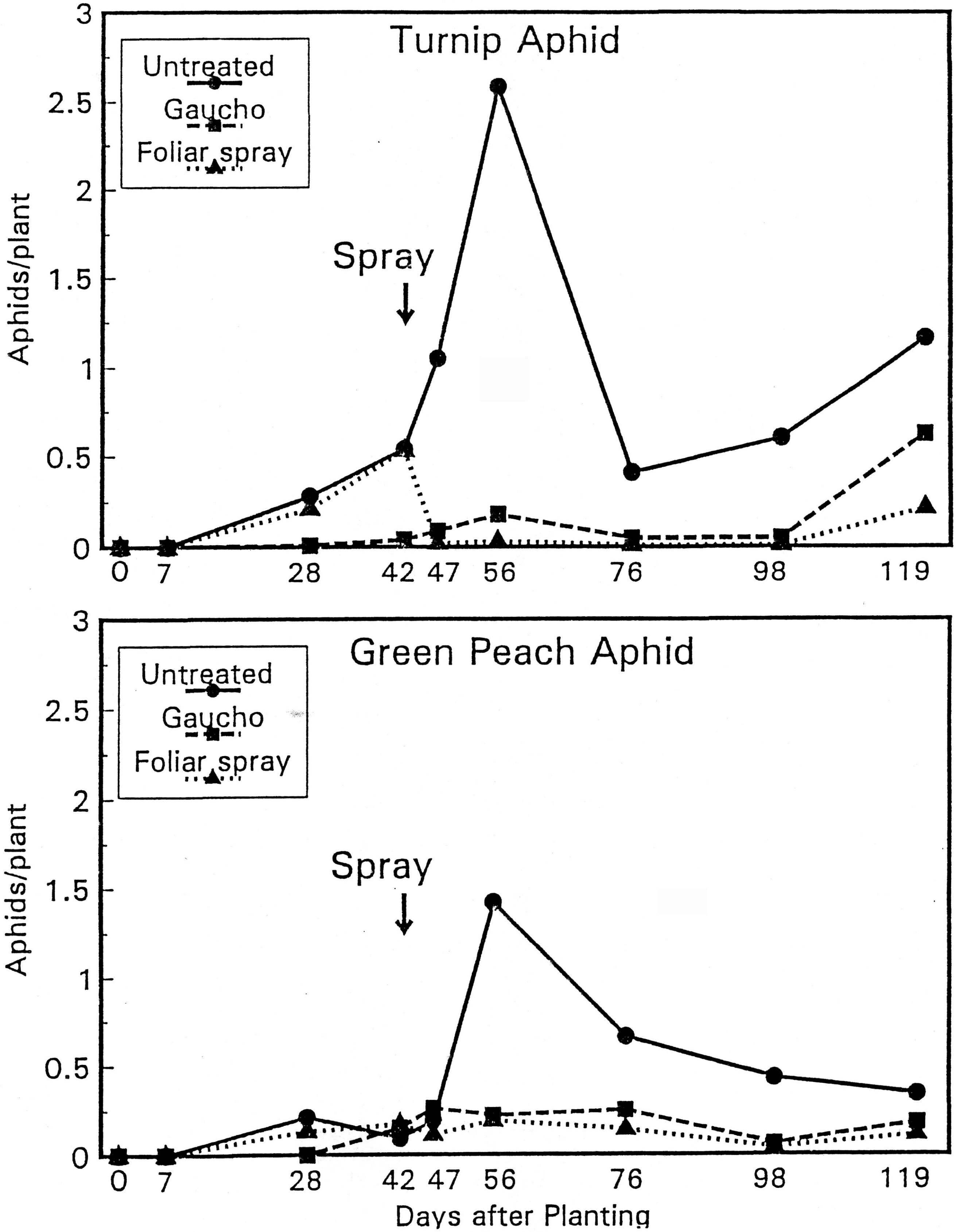

Figure 1. Effect of Gaucho seed treatments and foliar-applied insecticides on populations of turnip and green peach aphids in canola at Plains, GA in 1993/1994. Plant date was October 27, 1993.

EVALUATION OF GAUCHO SEED TREATMENTS FOR APHID AND HESSIAN FLY CONTROL IN WINTER WHEAT

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The primary insect pests of winter wheat in Georgia are the Hessian fly (*Mayetiola destructor*) and aphids (oat-bird cherry aphid, greenbug, corn leaf aphid, and English grain aphid). The Hessian fly caused severe damage to wheat in the 1980's, but widespread use of resistant varieties has greatly reduced losses from this insect. Nevertheless, effective insecticides are still needed to use on high-yielding but susceptible varieties. Insecticides also will be needed if resistance fails in current resistant varieties. The Hessian fly has 4 to 6 generations per season. The larvae feed inside the whorl and kill infested tillers. Larvae also will feed on elongating plants where they weaken and stunt these stems causing fewer and smaller seed production. Because of almost continuous fly activity in the winter, delaying planting to avoid infestations is not effective in southern Georgia. Hessian fly can be controlled in the fall by using systemic granular insecticides, DiSyston or Thimet (phorate), applied in-furrow at planting.

Several species of aphids also commonly infest winter wheat in Georgia. Except for the greenbug, aphids generally cause little direct injury to wheat. However, aphids transmit barley yellow dwarf virus which can substantially reduce wheat plant growth and yield. Gaucho insecticide has been found to be an effective systemic insecticide against aphids and other insects in other crops. This study evaluated the efficacy of Gaucho seed treatments for aphid and Hessian fly control in wheat.

The study was conducted at the Southwest Branch Experiment Station in 1993/1994. Seed of a Hessian fly-susceptible cultivar, 'Savannah' was treated with Gaucho at 0.5 and 1.0 fl oz/CWT. Treatments included 100% treated seed and 50% mixtures of treated and untreated seed to achieve combined rates of 0.5, 0.75 and 1.0 fl oz/CWT. A treatment of DiSyston 15G at 1.0 lb (AI)/acre was included as a standard. Two treatments of a resistant cultivar, 'Coker 9835' that were untreated and treated with Gaucho also were included. Plots measured 10 X 20 ft and were planted on November 12, 1993. Treatments were arranged in a randomized complete block design with 5 replications. Aphids and Hessian fly populations were sampled periodically and all plots were harvested with a small-plot combine on May 24, 1994.

Aphid and Hessian fly populations were very low throughout Georgia in 1993/1994. Gaucho treated plots generally had fewer aphids and Hessian flies than untreated plots in the fall, but populations were too low for consistent significant differences. Grain yield and test weight also were not significantly different between insecticide treatments within each cultivar. This study is being repeated the 1994/1995 season.

SURVEY OF INSECTS ASSOCIATED WITH GRAIN LUPIN

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Forty years ago blue lupin was widely grown as a winter cover crop and green manure for cotton. This lupin was high in alkaloid content and was not suitable for grain production. White lupin (*Lupinus albus*) varieties (such as 'Tiftwhite-78') with low alkaloid content have been developed and are grown commercially for grain production in Australia, Europe and other parts of the world. Grain lupin is being studied as an annual winter crop for the southeastern U.S. Lupin is a high protein grain crop generally similar to soybean that can be directly fed to ruminant livestock without having to be processed before feeding. Additionally, the crop is a legume and does not require nitrogen fertilization. However, the seed must be inoculated before planting. Lupin acts as green manure adding large amounts of nitrogen to the soil that can be used by subsequent summer crop. Currently, the grain is roughly valued at three-quarters the price of soybean. Production practices generally are similar to those used for soybean.

USDA agronomists at Auburn University are leading the development of new varieties with improved winter hardiness, yield potential and disease resistance. Because lupin typically has been grown as a cover crop, little is known about the insects associated with the crop especially during seed filling. I am surveying the insect associated with 'Lunoble' white lupin at the Southwest Branch Experiment Station. Seed were planted in 30 inch rows on October 27 using planter units with seed plates for corn. Seven seed were planted per foot of row (=70 lb seed/acre) at a depth of 3/4 to 1 inch. Fertilization was based on recommendations for soybeans. Thus far the only pest insect of any importance that has been collected is the lupin maggot (*Delia lupinus*). This fly is related to the seed-corn maggot and onion maggot. Lupin maggot feeds primarily on lupin and related wild species. In the fall, larvae feed on seeds in the soil damaging the growing point of or killing seedlings. In the spring larvae also can be found feeding in stem terminals and developing seed pods. Unless controlled with plant resistance or insecticides, lupin maggot could potentially be a limiting factor in lupin production in Georgia.

NO-TILLAGE CORN PRODUCTION WITH WINTER COVER CROPS

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No-tillage saves soil, moisture, time and money, and can be used to produce many crops profitably. When used together with no-tillage, winter cover crops provide increased winter soil coverage for erosion control, and additional residue mulch in summer for moisture conservation. In addition, small grain cover crops (such as wheat and rye) conserve residual soil nitrate from leaching during winter and protect groundwater quality. Legume winter cover crops (such as crimson clover and hairy vetch) take nitrogen from the air and reduce the amount of N fertilizer required to produce the summer cash crop.

A no-tillage test was established at Plains in the fall of 1984 to examine corn and grain sorghum response to N fertilizer when various winter cover crops are used. The only soil disturbance this test has received in more than 10 years has come from coulters and disk openers used to plant summer and winter crops. Since the test's beginning, crimson clover, hairy vetch, wheat and fallow have been used as winter covers. In the fall of 1989, rye was added, replacing bigflower vetch. To assess the effect of the different winter covers on corn's fertilizer N requirement, nitrogen rates of 0, 25, 50, 100, and 200 lbs N/acre (as 34-0-0) were applied to corn that followed the winter covers.

Results from the 1994 corn growing season illustrate that good corn grain yields are possible in the upper Coastal Plain with long-term no-tillage (see Figure 1). Maximum grain yields in 1994 following all winter covers ranged between 164 and 179 bu/acre. Figure 1 also shows that the clover and vetch plots receiving no N fertilizer in 1994 produced corn grain yields equivalent to yields produced with 50 to 75 lbs N/acre following wheat, rye and fallow.

Since 1992, this test has also been used as a site for evaluating the pre-sidedress soil nitrate test (PSNT) in Georgia. In the Northeast and Midwestern parts of the country, the PSNT is widely used on corn fields that have a recent history of manure application or legume production, situations where the amount of N available to corn can be highly variable. While the University currently recommends that fertilizer N rates for corn be cut back by 80 to 100 lbs N/acre following legume winter cover crops, year-to-year and location-to-location variability in legume cover stand and growth may require that N management for corn following winter legumes be more site-specific.

The PSNT is done by measuring the concentration of nitrate-N in the 0- to 12-inch soil depth when corn is 6 to 12 inches tall (about 6 weeks after planting), and is used to decide whether corn should be sidedressed with N fertilizer. Figure 2 shows the results of the 3-year PSNT evaluation at Plains. While the PSNT appears useful for guiding sidedress N decisions in Georgia tests where broiler litter was applied before planting, refinements to the PSNT appear necessary before the test can be used confidently to make specific sidedress N recommendations for corn following legume winter cover crops. This PSNT evaluation at Plains will conclude after the 1995 growing season.

Figure 1. Fertilizer N rate vs. Grain yield

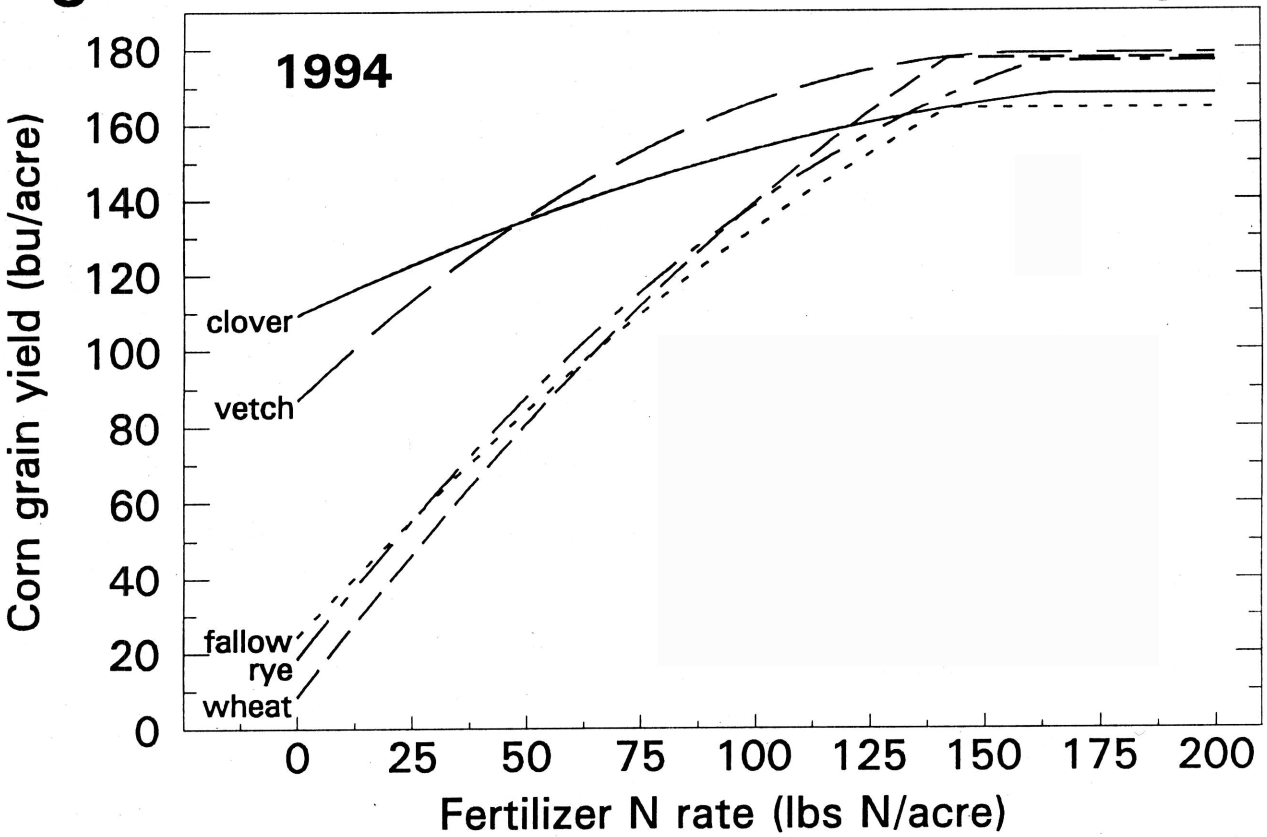

Figure 2. Pre-sidedress soil nitrate test (PSNT) for Corn