THE UNIVERSITY OF GEORGIA
COLLEGE OF AGRICULTURAL & ENVIRONMENTAL SCIENCES

Tobacco Research Report

2011

2011 Tobacco Research Report

(Summary Report of 2011 Data)

Edited by Stephen W. Mullis

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Acknowledgements

The tobacco research team would like to express appreciation to the following for their contributions to this research:

Altria Client Services-Philip Morris USA
FMC. Corp
Syngenta
Du Pont
Dow Agrisciences
Bayer CropScience
Valent
McClean Ag
Philip Morris International
Georgia Agricultural Commodity Commission for Tobacco
Tobacco Education and Research Council

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Foreword

I have always appreciated the unique attributes of tobacco. As a child growing up in southern Maryland, I topped tobacco in the fields and worked in the stripping house. During the early part of my academic career, I had the opportunity to study nutrient losses from tobacco and the impact on water quality of the Chesapeake Bay. My perspective and appreciation of the crop continued to expand during this time. Tobacco is still the only crop I have worked with where "one plant" is important and makes a difference. I consider tobacco to be the king of all Southern crops.

My position as dean of the University of Georgia College of Agricultural and Environmental Sciences has allowed me to learn about a different way of production and curing, but my fascination with tobacco has only increased. I am pleased that our college continues to support the tobacco industry through identifying and treating old and new diseases, developing new soil amendments to test, and creating new ways of controlling growth.

This report is a summary of the help our college provides and includes a collection of results and interpretations from studies conducted by several of our research scientists at the University of Georgia. We hope you find this information useful and invite you to visit our research farms and see this research first-hand.

J. Scott Angle
Dean and Director
College of Agricultural and Environmental Sciences
University of Georgia

Introduction

Both the U.S. and world economies have faced serious challenges in recent years. Agriculture is also adapting to a new economic reality with much greater input costs and wild swings in commodity prices. Like other agricultural enterprises, the tobacco industry has experienced a great deal of change in recent years and continues to evolve. Many challenges exist, including those associated with plant disease, soil fertility, insects, changing markets and global competition, all of which impact profitability. It is the mission of the University of Georgia College of Agricultural and Environmental Sciences to conduct research and education programs that provide science-based information for growers to make informed decisions and enhance profitability.

There is a long history of tobacco research and Extension programming at the University of Georgia Tifton Campus. Dedicated scientists and staff work diligently to deliver the technical information needed by the tobacco industry. Partnerships and financial support from the Georgia Tobacco Commission and from the tobacco industry have helped provide resources necessary to conduct research into issues facing this industry. This report contains the most recent results of tobacco programs at the University of Georgia. We hope you find the information in this report useful in moving the tobacco industry forward.

Joe W. West
Assistant Dean - University of Georgia Tifton Campus
UGA College of Agricultural and Environmental Sciences

Flue Cured Tobacco Variety Evaluation in Georgia

S.S. LaHue, C.E. Troxell and J.M. Moore

Introduction

Tobacco varieties play a pivotal role in yield and quality improvement programs. A vital part of any breeding program is the appropriate testing and evaluation of new tobacco varieties. Important characteristics of these varieties are yield, disease resistance, desirable plant qualities, ease of handling and market acceptability. For a variety to be recommended it must be superlative in one or more areas and contain a balance of the remainder of the factors. For instance, a variety that has an excellent yield and poor disease resistance or that yields well and has poor cured quality is unacceptable. Moreover, every growing season presents these varieties with new challenges that require documentation so growers can make informed decisions. As a result, Regional Variety Tests are conducted to obtain data on yield, disease resistance and quality as judged by physical appearance and chemical analysis. These tests consist of a small plot test followed by a farm test where desirable varieties from the small plot test are grown in larger plots and receive additional evaluation. Once this information is analyzed, the desirable varieties and breeding lines advance to the Official Variety Test for further evaluation under growing and marketing conditions in Georgia.

As in previous years, we have included data from the Regional Farm Test so that when varieties are selected from this test, University of Georgia Cooperative Extension agents will have an additional data set to use in making recommendations to growers.

Materials and Methods

The 2011 Official Variety Test and Regional Small Plot Test consisted of 29 and 26 entries, respectively, while the Farm Test had 16 entries. These tests were conducted at the University of Georgia Bowen Farm on Ocilla loamy coarse sand. All transplants were treated with Actigard (1 oz./100,000 cells) and imidacloprid (0.8 oz. Admire Pro/1,000 plants) for *Tomato spotted wilt virus* (TSWV) and followed with one field spray (April 26) of Actigard applied at 0.5 oz./A at the first sign of TSWV symptoms in non-treated border rows. The Regional Small Plot Test and the Official Variety Test were mechanically transplanted on April 4. The Regional Farm Test followed on April 6. All tests were transplanted with 22-24 plants per field plot and replicated three times. Fertilization consisted of 6 lbs./A of 9-45-15 in the transplant water, 500 lbs./A of 6-6-18 at first cultivation, 600 lbs./A 6-6-18 at second cultivation, and an additional 163 lbs./A of 15.5-0-0 at lay-by for a total of 91 lbs./A of nitrogen.

Cultural practices, harvesting and curing procedures were uniformly applied and followed current University of Georgia recommendations. Data collected included plant stand, yield in lbs./A, value/A in dollars, dollars per hundred weight, grade index, number of leaves per plant, plant height in inches, days to flower and percent TSWV. In addition, leaf chemistry determinations consisted of total alkaloids, total soluble sugars and the ratio of sugar to total alkaloids.

Results and Discussion

The 2011 Official Variety Test and Regional Farm Test produced good yields and quality through an exceptionally hot and dry growing season. The hot, dry weather and extensive irrigation caused some variability in maturity in the tests between replications and varieties. The test benefitted from the application of Telone II at the recommended rate in October 2010 with good soil conditions, which kept nematode pressure to a minimum. A field spray of Actigard combined with the standard tray drench treatment and light disease pressure resulted in a test average of 2.5% TSWV-symptomatic plants. Twelve irrigations during the growing season totaling 8.85 inches supplemented lack of rain in mid-May and June. Overall, the tests received 12.1 inches of rainfall over the 20-week test period.

In the Official Variety Test, yield ranged from 2,154 lbs./A for NC 2326 to 3,639 lbs./A for NC 196. Value of released varieties ranged from $2,249/A for NC 2326 to $5,372/A for K 326. Prices varied with NC 92 at $88/cwt at the low end while K 326, at $173, had the best price per cwt for the released varieties.

Grade index was also variable and ranged from 50 for NC 92 to 89 for K 326. Plant heights averaged in the mid- to upper thirties while leaf numbers per plant were between 17 and 20. Most flowering dates averaged 10 or more days later than NC 2326, which was at 64 days. Leaf chemistry was good with sugars averaging in the middle to upper teens and alkaloids generally below 3.2. The Official Variety Test data are displayed in Table 1. Two- and three-year averages for selected varieties are found in Table 2.

The 2011 Regional Farm Test yielded and graded well with less variability than the other tests. In the Farm Test (Table 3), NC 2326 had the lowest yield at 2,070 lbs./A. NCEX 34 yielded the highest at 3,772 lbs./A. Value ranged from $2,674/A for NC 2326 to $6,079/A for GLEX 328. However, GF 157 and ULT 123 graded the best, bringing in $167/cwt and having a grade index of 86. The lowest, NC 2326, had a respectable grade index of 67 with a price of $129/cwt. ULT 123 had the best leaf chemistry with low alkaloids (1.76%) and good sugars (15.6). Generally, leaf chemistry was similar to the Official Variety Test, with sugars in the low to mid-teens and alkaloids generally below 2.6.

Acknowledgments
The authors would like to thank the Georgia Agricultural Commodity Commission for Tobacco for financial support. Also, thanks to Katie Summers, Kari Giddens, Adam Mitchell, Corey Glisson and Drew Paulk for technical assistance.

Table 1. Yield, Value, Price Index, Grade Index and Agronomic Characteristics of Released Varieties Evaluated in the 2011 Official Flue-Cured Variety Test at the University of Georgia, Tifton, Ga.

Variety	Yield (lb/A)	Value ($/A)	Price[1] Index ($/cwt)	Grade[2] Index	Number Leaves/ Plant	Plant Height (in)	Days to Flower	Total Alkaloids (%)	Reducing Sugars (%)	Ratio RS/TA
NC 2326	2154	2249	105	53	17	34.2	64	2.56	13.8	5.37
NC 95	2725	4417	162	82	18	38.3	73	2.67	14.1	5.27
K 326	3075	5372	173	89	18	35.1	75	2.31	13.5	5.87
K 346	3114	3166	101	55	18	34.7	78	2.61	14.5	5.56
K 399	3231	4019	122	66	20	34.8	74	2.41	18.0	7.45
NC 71	3345	4387	131	70	18	35.2	78	2.43	15.1	6.22
NC 72	3228	3562	111	62	19	36.3	79	2.67	13.9	5.22
NC 92	3564	3155	88	50	21	40.1	80	3.19	14.5	4.54
NC 196	3639	4405	121	65	20	38.9	80	2.77	16.4	5.94
NC 291	3554	4619	128	69	20	36.2	74	2.89	16.1	5.58
NC 297	3321	4094	124	67	19	35.3	79	3.15	16.2	5.16
NC 299	3289	4000	121	67	19	37.0	82	2.85	15.8	5.54
NC 471	3211	4267	134	72	19	39.8	78	2.71	15.2	5.62
CC 27	3262	3892	120	64	18	36.1	72	2.82	13.0	4.62
CC 37	3581	3998	112	61	19	39.6	79	2.15	17.4	8.06
CC 65	3369	3216	94	54	20	42.1	79	2.62	15.4	5.89
CC 67	2939	3386	111	61	18	37.1	75	1.93	18.7	9.71
CC 700	3355	4409	131	69	20	37.3	73	3.15	14.9	4.72
PVH 1596	3277	4030	124	68	19	35.7	76	3.18	13.7	4.31
PVH 1452	3474	4201	121	65	20	37.1	75	2.69	16.5	6.14
PVH 2277	3367	5182	154	79	19	39.1	71	2.17	17.7	8.15

Table 1. Yield, Value, Price Index, Grade Index and Agronomic Characteristics of Released Varieties Evaluated in the 2011 Official Flue-Cured Variety Test at the University of Georgia, Tifton, Ga. *(continued)*

Variety	Yield (lb/A)	Value ($/A)	Price[1] Index ($/cwt)	Grade[2] Index	Number Leaves/ Plant	Plant Height (in)	Days to Flower	Total Alkaloids (%)	Reducing Sugars (%)	Ratio RS/TA
Speight 168	3498	4426	125	67	19	36.7	76	1.96	16.6	8.47
Speight 225	3155	4155	132	71	18	36.5	77	2.34	15.8	6.77
Speight 227	3398	4102	118	64	20	37.1	79	2.08	14.8	7.12
Speight 236	3007	3464	111	61	19	35.5	79	2.21	16.7	7.56
GL 338	3274	3875	118	54	18	35.8	72	2.70	16.8	6.22
GL 368	2951	3010	98	70	19	38.3	79	2.51	15.9	6.33
GL 395	3301	4314	129	70	20	37.9	79	2.39	15.1	6.31
GF 318	3632	4808	134	53	19	36.7	75	2.30	18.6	8.11
LSD@0.05	616.3	1500.4	32.6	14.5						

[1]Price Index based on two year average (2010-2011) prices for U.S. government grades.
[2]Numerical values ranging from 1-99 for flue-cured tobacco based on equivalent government grades - higher the number, higher the grade.

Table 2. Comparison of Certain Characteristics for Released Varieties Evaluated in the 2011 Official Flue-Cured Tobacco Variety Test at the University of Georgia, Tifton, Ga.

Variety	Yield (lb/A)	Value ($/A)	Price[1] Index ($/cwt)	Grade[2] Index	Number Leaves/ Plant	Plant Height (in)	Days to Flower	Total Alkaloids (%)	Reducing Sugars (%)	Ratio RS/TA
3-Year Average (2008, 2010 and 2011)										
NC 2326	2407	2786	116	59	18	37	66	3.19	12.5	4.25
NC 95	2741	3857	141	72	19	39	75	3.04	14.5	4.91
K 326	3206	5053	157	78	21	38	79	2.62	15.0	4.95
K 346	3051	4173	136	69	21	36	76	2.55	14.0	5.48
NC 71	3360	4825	144	72	20	35	75	2.54	15.3	6.06
NC 72	3262	4445	137	70	21	38	75	2.87	13.8	4.87
NC 92	3345	4247	127	65	20	40	77	2.85	15.3	5.45
NC 196	3436	4878	143	73	21	40	79	2.33	16.3	7.12
NC 291	3367	4594	136	71	20	36	76	2.95	14.6	5.03
NC 297	3211	4563	142	71	20	38	76	2.70	16.0	6.02
NC 299	2994	4259	143	72	20	38	80	2.57	16.2	6.38
CC 27	3252	4295	133	68	21	39	73	2.52	14.1	5.70
CC 37	3361	4288	129	66	18	40	78	2.55	15.2	6.17
CC 700	3164	4522	142	72	20	38	75	2.82	15.5	5.53
Speight 168	3298	4605	141	71	19	37	75	2.40	15.5	6.65
Speight 225	3051	4477	147	74	19	38	75	2.51	15.1	6.02
Speight 227	3408	4808	140	71	20	38	77	2.55	15.0	6.03
Speight 236	3102	4308	137	70	20	38	76	2.73	16.0	6.03

Table 2. Comparison of Certain Characteristics for Released Varieties Evaluated in the 2011 Official Flue-Cured Tobacco Variety Test at the University of Georgia, Tifton, Ga. *(continued)*

Variety	Yield (lb/A)	Value ($/A)	Price[1] Index ($/cwt)	Grade[2] Index	Number Leaves/ Plant	Plant Height (in)	Days to Flower	Total Alkaloids (%)	Reducing Sugars (%)	Ratio RS/TA
2-Year Average (2010 and 2011)										
NC 2326	2278	2931	127	64	18	36	66	2.51	12.8	5.08
NC 95	2452	3707	150	75	19	39	77	2.68	15.1	5.62
K 326	2892	4618	158	80	19	36	78	2.63	14.2	5.48
K 346	2808	3529	128	67	18	36	75	2.52	14.4	5.72
K 399	2892	4017	140	72	19	35	77	2.35	17.8	7.54
NC 71	2950	4123	141	73	19	35	77	2.40	15.2	6.34
NC 72	3068	3981	132	69	19	38	77	2.63	14.1	5.36
NC 92	3140	3482	114	61	20	40	77	2.77	14.5	5.37
NC 196	3213	4473	142	72	20	40	80	2.48	16.4	6.72
NC 291	3131	4254	135	71	19	35	76	2.75	15.5	5.65
NC 297	2877	3853	136	70	19	36	78	2.74	16.1	6.02
NC 299	2838	3841	138	71	19	37	82	2.50	15.6	6.32
NC 471	3101	4507	146	75	20	41	78	2.49	15.0	6.04
CC 27	3081	3945	129	67	20	38	74	2.48	13.8	5.69
CC 37	3319	4195	128	67	16	40	79	2.27	16.2	7.15
CC 67	2703	3480	128	67	18	36	76	2.12	17.3	8.29
CC 700	3031	4192	139	71	19	38	75	2.94	15.7	5.40
PVH 1596	2973	4119	141	73	19	37	75	2.69	15.3	6.02
PVH 1452	3286	4501	138	71	19	38	74	2.64	15.4	5.85
PVH 2277	2851	4477	158	79	19	37	75	2.36	17.8	7.59
Speight 168	3139	4314	139	71	18	36	76	2.27	15.8	7.13

Table 2. Comparison of Certain Characteristics for Released Varieties Evaluated in the 2011 Official Flue-Cured Tobacco Variety Test at the University of Georgia, Tifton, Ga. ***(continued)***

	2 Year Average (2010 and 2011)									
Speight 225	2808	4011	144	74	18	37	78	2.44	15.4	6.33
Speight 227	3142	4206	134	69	19	36	79	2.58	14.3	5.80
Speight 236	2912	3772	128	67	19	37	75	2.70	16.4	6.30
GL 338	3044	4067	135	64	18	37	70	2.70	15.9	5.90
GL 368	2791	3590	128	74	18	38	76	2.75	15.8	5.81
GF 318	3398	4826	144	64	20	40	76	2.67	17.8	6.87

[1]Price Index based on two-year average (2010-2011) prices for U.S. government grades.
[2]Numerical values ranging from 1-99 for flue-cured tobacco based on equivalent grades - higher the number, higher the grade.

Table 3. Yield, Value, Price Index, Grade Index and Agronomic Characteristics of Varieties Evaluated in the 2011 Regional Farm Test at the University of Georgia, Tifton, Ga.

Variety	Yield (lb/A)	Value ($/A)	Price[1] Index ($/cwt)	Grade[2] Index	Number Leaves/ Plant	Plant Height (in)	Days to Flower	Total Alkaloids (%)	Reducing Sugars (%)	Ratio RS/TA
NC 2326	2070	2674	129	67	17	34.6	64	2.56	13.8	5.37
NC 95	3390	4876	144	74	19	41.1	73	2.67	14.1	5.27
K 326	3161	5236	164	85	19	36.5	75	2.31	13.5	5.87
XP 254	3275	5229	165	86	19	40.0	75	1.84	15.8	8.61
CC 1063	3685	5969	162	84	19	38.6	70	2.80	12.7	4.53
GLEX 328	3720	6079	163	84	19	38.9	76	1.99	15.2	7.61
CU 136	3722	5823	157	81	19	39.5	70	2.18	14.5	6.64
GLEX 362	2766	4405	159	84	18	35.9	73	2.40	12.8	5.34
NCEX 34	3772	5798	155	81	19	39.3	72	2.00	14.0	7.01
ULT 123	3590	6000	167	86	19	38.9	73	1.76	15.6	8.86
PXH 1	3336	5035	150	78	20	39.1	77	1.93	13.6	7.08
RJR 901	3176	4933	155	82	19	38.3	73	2.39	11.3	4.73
NCTG 156	3345	5500	164	85	18	34.3	69	2.07	13.8	6.64
GF 157	2920	4901	167	86	18	37.3	70	2.17	11.1	5.13
NC EX 24	3502	5338	153	80	18	39.9	74	1.91	13.7	7.18
ULT 143	3580	5889	164	85	18	38.0	71	2.24	14.5	6.45
LSD@0.05	571.1	1105.8	16.9	7.53						

[1]Price Index based on two-year average (2010-2011) prices for U.S. government grades.
[2]Numerical values ranging from 1-99 for flue-cured tobacco based on equivalent grades - higher the number, higher the grade.
[3] No Data; this entry was chemically topped with sucker control materials.

Survey of Weeds as Hosts of *Tomato spotted wilt virus* (TSWV) in the Farmscape of Southern Georgia

S.W. Mullis, A.S. Csinos and R.D. Gitaitis

Introduction

Tomato spotted wilt virus has been one of the most devastating diseases in the Georgia agricultural community for the last two decades. Georgia, north Florida and southern South Carolina continue to be the tobacco areas that are the hardest hit by the disease; however, small pockets in North Carolina and Kentucky have also reported high losses. This virus has been variable in its infection patterns and observations have indicated that wild plant hosts may play a vital role in TSWV disease epidemiology.

The fact that TSWV is transmitted by a small, ubiquitous insect called thrips makes detection and management of the disease complicated. Viruses have traditionally been difficult to manage since we do not have materials that kill viruses in a living plant. Control of the major thrips vectors (*Frankliniella fusc*a and *Frankliniella occidentalis*) is not possible primarily because of the pervasive nature of the insects and their mobility from neighboring vegetation. Thus, the level of disease in tobacco is controlled primarily by the dynamics of thrips populations and level of infection of weed hosts. These weeds may serve as reservoirs for the virus as well as reproductive hosts for the known thrips vectors of the disease.

TSWV is a distinctive disease that threatens the livelihood of all tobacco growers in north Florida, Georgia and South Carolina. In addition, evidence is mounting that the disease is moving north and could become a major problem in North Carolina. Major efforts need to be initiated to first be able to predict outbreaks, and second to be able to develop management programs to reduce losses from the disease.

A study of the weeds surrounding tobacco fields was begun in 2002 with 10 locations in southern Georgia being sampled on a monthly basis to determine levels of TSWV naturally occurring in the wild plants. More than 90,000 plants have been sampled over the past 10 years of this study to garner an un-derstanding of the general levels of the virus in the farmscape.

Materials and Methods

The sample areas include the Bowen Farm, Blackshank Farm and Blackshank nurseries in the Tifton, Ga., area. Atkinson, Berrien, Burke, Coffee and Tattnall counties are additional areas under study at this time. A total of 990 plants are screened on a monthly basis for TSWV using Double Antibody Sandwich-Enzyme Linked Immunosorbent Assay (DAS-ELISA) from commercially available kits (Agdia, Elkhart, Ind.). The plants chosen were identified in the first three-year phase of the study as susceptible to the virus and commonly infected with TSWV.

Results to Date

TSWV impacts increased dramatically in 2005 and leveled off in 2006. Where statewide incidence of TSWV in 2003 was at relatively low levels (>6%), 2006 saw similar numbers to 2004 and 2005 with yield losses of about 18% and 44% of all plants showing TSWV. Levels of TSWV at our experimental site at the Bowen Farm, CPES-Tifton, Ga., remained higher than the surrounding areas, as expected, at around 45% in 2009 through 2011.

Currently, we are in the ninth year of the overall study of the weed host survey. This study originally started in February 2002, and as of December 2011, 91,223 samples have been collected from all locations. Samples are collected from six sites every month.

In summary, for 2006-2011, TSWV levels in the weeds remained low (1.32%) during the winter, increasing dramatically to 14.76% during the spring and remaining relatively level throughout the summer months. Fall saw an increase (14.83%) before the levels dropped to negligible for the winter months of November and December. April (16.1%) and June (20.01%) had the highest incidences of TSWV during the year. Overall, 2011 had a slight increase in TSWV infections in the weeds, and this corresponds to the increase in the TSWV seen in tobacco during the 2011 growing season.

These levels correspond to the levels seen throughout the study. One of the main observations is the dramatic increase in weed infection levels during the late spring and fall. This has been a consistent feature of this study even during the years when levels have spiked higher or been markedly lower. The environmental observations have indicated that there may be an association of the higher incidences of TSWV infections and moderate conditions. Adverse weather -- either colder winters or warmer summers -- along with increased rainfall patterns may have a depressing effect on the levels on infection seen during the corresponding season. There also seems to be an effect regarding the changeover period of weed species seen from one season to the next.

The higher infection levels observed during the fall preceding the spring growing period corresponds favorably to a higher incidence of TSWV at the Bowen Farm. Conversely, the infection levels seen immediately preceding the tobacco growing cycle inversely corresponded to the infection levels seen in the field.

Significance of Accomplishments

These studies' findings seem to validate the importance of weeds as natural reservoirs for tospoviruses. These data will allow us to hone the study in the future to further understand the relationship of TSWV levels in weeds with the TSWV levels in tobacco fields. We may be able to elicit an early indication of TSWV incidence in an upcoming growing season by understanding the relationship of winter weed infection levels with spring and summer crop TSWV incidence.

The relationship emerging between the weed infection levels and the corresponding growing seasons is a potential tool in the management of TSWV. The establishment of an early indicator of the TSWV pressure during a growing season would be extremely valuable in determining what chemical, cultural or other management practices need to be utilized to lessen the effect that TSWV may impart on a season's tobacco crop. This host study has shown that environment, geography and host species all play a part in the epidemiology of TSWV and they all may be used as a disease indicator model.

Relationship to Programs in Neighboring States

Studies and observations have shown that our location is the epicenter of TSWV. Due to the high disease pressure at our locations, we are able to observe in detail the interactions of TSWV and the farmscape. This information is important to the region due to the devastating losses that have been attributed to TSWV. Neighboring states can use the information gathered in south Georgia to mitigate possible TSWV losses in their crops.

Acknowledgements

The authors want to thank Altria for their support of this valuable study.

Evaluation of New Oomycete Chemicals for Control of *Phytophthora nicotianae* on Tobacco
Black Shank Farm 2011

A.S. Csinos, L.L. Hickman and U. Hargett

Introduction
Tobacco Black Shank continues to be a serious disease of tobacco in Georgia. As one of the most important diseases of tobacco production it has become increasingly important to find effective products for control. This test evaluates several oomycete chemicals in a disease nursery with both Race 0 and Race 1 of *Phytophthora nicotianae* (Ppn).

Methods and Materials
The study was located at the Black Shank Farm, CPES, Tifton, Ga., in a field with a history of Black Shank in tobacco. The plot design was a randomized complete block consisting of single row plots and replicated five times. Each plot was 32 feet long with an average of 23 plants per test plot.

On January 25, tobacco variety K-326 was seeded in the greenhouse in 242 cell flats. The field was prepared on March 28 by disc harrowing the area. Fertilizer 4-8-12 @ 500 lbs./A was broadcast in plot areas and tilled in on April 4. On April 8, applications of Lorsban 2 qt./A + Enclosure 1.5 gal./A + Prowl 1 qt./A were made. Materials were incorporated into the soil and plots were sub-soiled and bedded.

Tobacco variety K-326 transplants (seeded on January 25) were treated in the greenhouse on April 6 with Admire Pro at 1 fl. oz./1,000 plants and Actigard 50WG @ 4 grams/7,000 plants. Both materials were tank mixed. Plants were pre-wet with materials being washed in after spraying.

Tobacco was transplanted on April 8 on 48-inch-wide rows with an 18-inch plant spacing.

At-plant treatments were applied on April 8. First cultivation treatments were applied on April 29 and lay-by treatments were applied on May 19.

Cultivation and side-dress fertilizer were as follows: 150 lbs./A of 15.5-0-0 calcium nitrate on April 15 and 25 and May 9 and 18.

Additional pesticide applications on tobacco were applied as follows: Lannate 1.5 pt/A on May 3, 9 and 25; orthene 1 lb./A on June 3, 9, 12 and 27 and July 7 and 15; and Actigard 50 WG at 0.5 oz./A in a 12-inch band, one nozzle over row in 10.35 GPA H2O on May 5 and 25.

Tobacco was topped and suckered on June 18 and again on June 24. Fair 85 at 2 gal./A was applied on June 21. Flupro at 0.5 gal./A was tank mixed with MH-30 at 2 gal./A on June 27 and July 7.

Stand counts were conducted every two weeks, noting percent disease from TSWV and Black Shank. A base count was recorded on April 22 to determine the number of plants per plot. Tobacco plots were also scouted for signs of phytotoxicity.

Vigor ratings were done on a 1-10 scale with 10 equaling vigorous and healthy plants and 1 equaling poor vigor plants. Ratings were conducted on May 3 and 23.

Height measurements were conducted on May 23. Plants were measured individually from the soil level to the tip of the longest leaf and recorded in centimeters.

Harvests were conducted on July 1, 14 and 28. Harvests were done by collecting one-third of the plant leaves at one time and weighing each plot in pounds.

Total rainfall recorded at the Black Shank Farm during this period (March through August 2009) was 16.88 inches.

Summary
Disease pressure was relatively high, with the non-treated plots having 67% dead plants. Vigor ratings were high for all test materials with a range of 7.0 to 8.6.

Height measurements for plots were fairly uniform across the test, ranging from 56.6 to 63.7 centimeters.

The percent of plants infected by Black Shank (*Phytophthora nicotianae*) ranged from a high of 67% for the non-treated to a low of 5.9% for the material Presidio. Both Presidio and Dupont QGU42 had low disease levels and high yields. Percent *Tomato spotted wilt virus* (TSWV) was low across the test, ranging from 0.8% to 7.2%. The standard, Ridomil Gold, did not perform well, with 46% disease and a yield of only 644 lbs./A.

Acknowledgments
The authors would like to thank Philip Morris International for financial support. Thanks are also extended to Holly Hickey, Seth Dale and Chance Anderson for their technical support.

Evaluation of New Oomycete Chemicals for Control of *Phytophthora nicotianae* on Tobacco
University of Georgia - CPES Tifton - Black Shank Farm 2011

Table 1. Plant Vigor, Percent Black Shank, Percent *Tomato spotted wilt virus* and Dry Weight Yield

Treatment[1]	Product Rate	Application Schedule	Vigor[2]	Height Measurement[3]	% Death by Black Shank[4]	% Symptomatic TSWV[5]	Dry Weight Yield[6]
1. Ranman (cyazofmid)	5.0oz/A	At Plant, at 1st cultivation and At Layby	8.0a	59.8a	20.5bc	2.4ab	630.2bc
2. Zampro (ametoctradin+ dimethylmorph)	10.0oz/A 14.0oz/A (At Layby)	At Plant, at 1st cultivation and At Layby (14.0oz/A)	8.0a	60.4a	51.4a	5.7ab	825.4bc
3. Revus (mandipropamid)	10.0oz/A	At Plant, at 1st cultivation and At Layby	7.8ab	56.6a	11.6c	6.5ab	1244.6b
4. Presidio (fluopicolide)	4oz/A	At Plant, at 1st cultivation and At Layby	8.6a	59.6a	5.9c	0.8b	2198.6a
5. Ridomil Gold 4 SL (mefenoxam)	1pt/A	At Plant, at 1st cultivation and At Layby	7.9ab	63.5a	46.4ab	3.3ab	644.0bc
6. Dupont QGU42	19.2oz/A	At Plant, at 1st cultivation and At Layby	8.6a	63.7a	8.1c	7.2a	1976.6a
7. Reason (fenamidone)	15.0oz/A	At Plant, at 1st cultivation and At Layby	8.0a	63.2a	7.0c	0.9b	803.1bc
8. Non-treated Control	N/A	N/A	7.0b	56.8a	67.0a	3.0ab	307.3c

[1]Data are means of five replications. Means in the same column followed by the same letter are not different (P = 0.05) according to Fisher's LSD test. No letters signifies non-significant difference.

[2]Vigor was done a 1-10 scale, with 10 = live and healthy plants and 1 = dead plants, on May 11 and June 9.

[3] Height measurements were done in centimeters from the soil level to the tip of the longest leaf on May 23.

[4]Percent Death by Black Shank was calculated by subtracting the final number of harvest plants from the original base count. The number of plants flagged with TSWV was subtracted from that total to get the number of plants killed by Black Shank. That number was then divided by the original base count and multiplied by 100.

[5] Percent TSWV-symptomatic plants was calculated by using stand counts that were made from April 22 to June 30, with TSWV being flagged every week.

[6] Dry weight yield was calculated by multiplying green weight totals of tobacco by .15. Pounds per acre were calculated by multiplying the dry weight conversion per plot by 7,260 divided by the base stand count.

Regional Chemical Sucker Control Test

S.S. LaHue, C.E. Troxell and J.M. Moore

Introduction

Tobacco growers in Georgia extensively use chemical growth regulators to control sucker growth. These materials are an essential component of the production process because they increase yield and reduce labor costs. The need for more effective materials and methods continues because of the necessity of reducing residues, specifically maleic hydrazide (MH). Some foreign markets require maleic hydrazide residues of 80 ppm or less. Since exports are a major outlet for the Georgia crop, MH residues above 100 ppm must be reduced.

The tobacco season has lengthened because currently-used cultivars benefit from irrigation and higher nitrogen use. Moreover, the incidence of *Tomato spotted wilt virus* (TSWV) has increased in Georgia, causing additional sucker pressure and difficulty in control due to variability in stands and flowering. The use of dinitroanalines (DNA) in combination with maleic hydrazide have shown success in controlling suckers over the lengthened season while a third or even fourth contact has dealt with the variable stand due to TSWV. These problems can be managed while reducing MH residues.

The purpose of this year's study is to report the effectiveness of some new combinations and formulations of existing materials used in combination (sequential) with fatty alcohols (a contact) and the potassium salt of maleic hydrazide (a systemic) with and without the added benefit of dinitroanalines. In addition, spray hoods were evaluated for the possibility of reducing residues while enhancing control. These treatments are compared with topped but not suckered and the standard treatment (for 2011) of three contacts followed by the recommended rate of maleic hydrazide in a tank mix with one of the dinitroanalines. Each treatment was analyzed with respect to agronomic characteristics and chemical properties of the cured leaf.

Materials and Methods

The field experiment was conducted at the University of Georgia Tifton Campus Bowen Farm. All cultural practices, harvesting and curing procedures were uniformly applied and followed current University of Georgia recommendations. Fertilization consisted of 6 lbs./A of 9-45-15 in the transplant water, 500 lbs./A of 6-6-18 at first cultivation, 600 lbs./A of 6-6-18 at second cultivation, and an additional 163 lbs./A of 15.5-0-0 at lay-by for a total of 91.5 lbs./A of nitrogen. Plots consisted of two rows of 30 plants each. Ten uniform plants were sampled from each plot for sucker data. The test involved four replications randomized with 16 sucker control treatments as follows:

1. <u>TNS - Topped Not Suckered.</u>

2. <u>Sucker Plucker/Sucker Plucker/Sucker Plucker/(Sucker Stuff + Prime +)</u>. Three treatments of the contact Sucker Plucker (Drexel Chemical Company) at 4% solution then 5% solution were applied three to five days apart followed in five to seven days by a third 5% solution. Five to seven days later a tank mix of Sucker Stuff (2.25 lbs. ai./gal.) (Drexel Chemical Company) potassium maleic hydrazide was applied at the labeled rate of 1.0 gal./A and Prime + (Syngenta Corporation) at 0.5 gal./A. Each application utilized a standard three-nozzle configuration (TG3-TG5-TG3) applying 50 gal./A at 20 psi.

3. <u>Sucker Plucker/Sucker Plucker/Sucker Plucker/(Sucker Stuff + Prime +)</u>. Three treatments of contact were applied as in Treatment 2 followed by a tank mix of Sucker Stuff and Prime + as in Treatment 2. All applications were applied as in Treatment 2, except sprayer hoods (Agri-Supply #78424) were installed.

4. <u>Sucker Plucker/Sucker Plucker/Sucker Plucker/Sucker Plucker</u>. Four treatments of Sucker Plucker were applied at 4% then 5% three to five days apart followed in five to seven days with two additional treatments of contact at a 5% solution. Each application utilized a standard three-nozzle configuration (TG3-TG5-TG3) applying 50 gal./A at 20 psi.

5. <u>Sucker Plucker/Sucker Plucker/Sucker Plucker/Sucker Plucker</u>. Identical to Treatment 4 combination of applications except sprayer hoods were installed.

6. Sucker Plucker/Sucker Plucker/Sucker Plucker/Sucker Plucker. Identical to Treatment 4 combination of applications except each spray utilized a three-nozzle configuration (TX12-TG3-TX12) applying 35 gal./A at 30 psi.

7. Sucker Plucker/Sucker Plucker/Sucker Plucker/Sucker Plucker. Identical to Treatment 6 combination of applications except sprayer hoods were installed.

8. Sucker Plucker/Sucker Plucker/Sucker Plucker/Prime +. Three treatments of the contact Sucker Plucker were applied at 4% then 5% three to five days apart followed in five to seven days by a third application of Sucker Plucker. A fourth application consisting of Prime + (2011 formulation) at 0.5 gal./A was applied five to seven days later. Each application utilized a standard three-nozzle configuration (TG3-TG5-TG3) applying 50 gal./A at 20 psi.

9. Sucker Plucker/Sucker Plucker/Sucker Plucker/Prime +. Identical to Treatment 8 applications with sprayer hoods installed.

10. Sucker Plucker/Sucker Plucker/Sucker Plucker/Sucker Stuff. Three treatments of the contact Sucker Plucker were applied at 4% then 5 % three to five days apart followed in five to seven days by a third application of Sucker Plucker at 5%. A fourth application consisting of Sucker Stuff at 1.0 gal./A was applied five to seven days later. Each application utilized a standard three-nozzle configuration (TG3-TG5-TG3) applying 50 gal./A at 20 psi.

11. Sucker Plucker/Sucker Plucker/Sucker Plucker/Sucker Stuff. Identical to Treatment 10 applications with sprayer hoods installed.

12. Sucker Plucker/Sucker Plucker/Sucker Plucker/Prime +. Three treatments of the contact Sucker Plucker were applied at 4% then 5% three to five days apart followed in five to seven days by a third application of Sucker Plucker at 5%. A fourth application consisting of Prime + (commercial formulation) at 0.5 gal./A was applied five to seven days later. Each application utilized a standard three-nozzle configuration (TG3-TG5-TG3) applying 50 gal./A at 20 psi.

13. Sucker Plucker/Sucker Plucker/Sucker Plucker/Prime +/Sucker Stuff. Three treatments of the contact Sucker Plucker were applied at 4% then 5% three to five days apart followed in five to seven days by a third application of Sucker Plucker at 5%. A fourth application consisting of Prime + at 0.5 gal./A was applied five to seven days later. The last application consisted of Sucker Stuff at 1.0 gal./A applied after first harvest. Each application utilized a standard three-nozzle configuration (TG3-TG5-TG3), applying 50 gal./A at 20 psi with sprayer hoods installed.

14. Sucker Plucker/Sucker Plucker/Sucker Plucker/Prime +/Sucker Stuff. Three treatments of the contact Sucker Plucker were applied at 4% then 5% three to five days apart followed in five to seven days by a third application of Sucker Plucker at 5%. A fourth application consisting of Prime + at 0.5 gal./A was applied five to seven days later. The last application consisted of Sucker Stuff at 0.67 gal./A and was applied after first harvest. Each application utilized a standard three-nozzle configuration (TG3-TG5-TG3), applying 50 gal./A at 20 psi with sprayer hoods installed.

15. Sucker Plucker/Sucker Plucker/Sucker Plucker/Prime +/Sucker Stuff. Three treatments of the contact Sucker Plucker were applied at 4% then 5% three to five days apart followed in five to seven days by a third application of Sucker Plucker at 5%. A fourth application consisting of Prime + at 0.5 gal./A was applied after first harvest. Finally, the last application consisted of Sucker Stuff at 0.33 gal./A and was applied after first harvest. Each application utilized a standard three-nozzle configuration (TG3-TG5-TG3), applying 50 gal./A at 20 psi with sprayer hoods installed.

16. Sucker Plucker/Sucker Plucker/Sucker Plucker/Drexalin Plus. Three treatments of the contact Sucker Plucker were applied at 4% then 5% three to five days apart followed in five to seven days by a third application of Sucker Plucker at 5%. A fourth application consisting of Drexalin Plus (Drexel Chemical Company) at 0.5 gal./A was applied five to seven days later. Each application utilized a standard three-nozzle configuration (TG3-TG5-TG3), applying 50 gal./A at 20 psi.

Results and Discussion

Due to historically high TSWV incidence at the Bowen Farm location, c.v. K 326 was treated in the greenhouse with labeled rates of Actigard and Admire for TSWV suppression and transplanted on March 28. Cool and cloudy conditions followed transplanting, slowing initial growth. TSWV counts indicated an infection rate below 4% in the test. Generally, the crop was free of disease with a near perfect plant stand.

The first contact was applied on June 19, the second on June 24, and a third set of contacts was applied on June 30. The fourth application occurred on July 6. The final application for treatments 13, 14 and 15 occurred on July 11. The final harvest was on August 18, with the test concluding after the suckers were pulled, counted and weighed off 10 plants from each plot on August 19.

The 2011 growing season was notable for its extended record-breaking heat and dry conditions. As a result, the test was irrigated 12 times, which delivered a much-needed 8.85 inches of water. However, the test lacked uniform growth due to the extensive use of irrigation, which was unable to provide enough water to the field edges.

For 2011, yield and quality data varied between treatments and replications. Test yields were average with the TNS Treatment 1 having the lowest yield at 2,349 lbs./A. Treatment 12 yielded the highest at 3,339 lbs./A. Treatment 4 had the highest value, bringing in $3,873/A. Treatment 1 brought in $3,096/A compared to the lowest of $2,935/A for Treatment 14. The price and grade indices were low to average for all treatments and varied significantly between treatments due to the hot, dry season.

Sucker data was good with sucker numbers per plant low, with a mean value of one or less for all chemical treatments that incorporated MH. Green weight per plant was much higher and percent control was lower for treatments that used contact only. The treatments that incorporated contacts followed by a DNA had better control, with Treatment 12 the poorest. Among the three DNA products tested, the Drexaline Plus was less efficacious and resulted in a slightly lower control than the others. Finally, percent control was excellent (>99%) for all chemical treatments with MH. Even Treatment 15 with a third of the normal rate of MH provided 100% control. Therefore, spreading out the spray applications and lowering MH rates can provide adequate control and should reduce MH residues. Generally, the spray hoods did not seem to provide additional control over the standard nozzle configuration; however, the hoods did enhance control with the 35 GPA rate of spray, increasing control from 82.5% to 89.5%. In addition, the spray hoods reduced plant injury, which was higher this year because of the hot conditions. As yet, there is no data relating the use of sprayer hoods to MH residues.

Acknowledgments

The authors would like to thank the Georgia Agricultural Commodity Commission for Tobacco for financial support. Also, thanks to Katie Summers, Kari Giddens, Adam Mitchell, Corey Glisson and Drew Paulk for technical assistance.

Table 1. 2011 Regional Tobacco Growth Regulator Test -- Effects of Advanced Growth Regulating Material on Sucker Growth, Cured Leaf Yields and Value of Flue-Cured Tobacco.

Treatments	Sucker Growth					Cured Leaf			
	% Control	Green Wt./ Plant (g)	No./ Plant	Green Wt./ Sucker (g)	Plant Injury[2]	Yield (lbs/A)	Value ($/A)	Price Index[3] ($/cwt)	Grade Index[4]
1. Topped-Not-Suckered	0.0	543.7	3.4	158.7	0	2349	3096	132	70
2. CONTACTS[1]/(SUCKER STUFF & PRIME+ 1.0 GPA & 0.5 GPA) 50 GPA	100.0	0.0	0.0	0.0	2	3296	3090	93	53
3. CONTACTS /(SUCKER STUFF & PRIME+ 1.0 GPA & 0.5 GPA) With SPRAY HOODS	100.0	0.0	0.0	0.0	1	3043	3408	112	62
4. CONTACTS / SUCKER PLUCKER (2.5 GPA) 50 GPA	88.3	103.2	2.0	51.6	2	3091	3873	126	69
5 CONTACTS / SUCKER PLUCKER (2.5 GPA) 50 GPA With SPRAY HOODS	87.4	110.5	1.9	57.4	1	3004	3347	111	63
6 CONTACTS / SUCKER PLUCKER (2.5 GPA)35 GPA	82.5	154.4	2.8	55.1	1	3141	3199	102	57
7 CONTACTS / SUCKER PLUCKER(2.5 GPA) 35 GPA With SPRAY HOODS	89.5	92.6	1.6	59.7	1	3072	3635	118	65
8 CONTACTS / PRIME+ (2011 FORMULATION 0.5 GPA) 50 GPA	96.6	30.2	0.4	80.5	2	3230	3056	93	55
9 CONTACTS/ PRIME+ (2011 FORMULATION 0.5 GPA) 50 GPA With SPRAY HOODS	96.3	32.9	0.6	57.2	1	3262	3215	99	56

Table 1. 2011 Regional Tobacco Growth Regulator Test -- Effects of Advanced Growth Regulating Material on Sucker Growth, Cured Leaf Yields and Value of Flue-Cured Tobacco (*continued*).

	Treatments	Sucker Growth					Cured Leaf			
		% Control	Green Wt./ Plant (g)	No./ Plant	Green Wt./ Sucker (g)	Plant Injury[2]	Yield (lbs/A)	Value ($/A)	Price Index[3] ($/cwt)	Grade Index[4]
10	CONTACTS / (SUCKER STUFF 1.0 GPA) 50 GPA	99.9	1.3	0.0	50.0	2	3262	3432	105	59
11	CONTACTS / (SUCKER STUFF 1.0 GPA) 50 GPA With SPRAY HOODS	100.0	0.0	0.0	0.0	1	3210	3077	96	54
12	CONTACTS / (PRIME+ 0.5 GPA) 50 GPA	99.8	2.0	0.2	13.0	2	3339	3361	101	57
13	CONTACTS / (PRIME+ 0.5GPA) / (SUCKER STUFF 1.0 GPA) 50 GPA With SPRAY HOODS	99.5	4.2	0.1	33.2	1	3334	3234	97	56
14	CONTACTS / (PRIME+ 0.5GPA) / (SUCKER STUFF 0.67 GPA) 50 GPA With SPRAY HOODS	100.0	0.0	0.0	0.0	1	3297	2935	89	52
15	CONTACTS / (PRIME+ 0.5GPA) / (SUCKER STUFF 0.33 GPA) 50 GPA With SPRAY HOODS	100.0	0.0	0.0	0.0	1	3151	3344	106	61
16	CONTACTS / (DREXALIN PLUS 0.5 GPA) 50 GPA	92.3	67.4	0.6	117.1	2	3220	3147	97	57
	LSD-0.05						232.9	570.3	16.9	8.2

[1]All treatments received three contact applications with Sucker Plucker at 4%, 5% and 5% (2.0 GPA, 2.5 GPA and 2.5 GPA).
[2]Injury rating on a scale of 0-10 with 0 = no damage and 10 = plant killed.
[3]Price Index based on two-year average (2010-2011) prices for U.S. government grades.
[4]Grade Index is a 1-99 rating based on government grade. High ratings are best.
*Mention of a trade name does not constitute a guarantee or warranty of a product by the University of Georgia and does not imply its approval to the exclusion of other products.

Evaluation of Nematicides for Control of Peanut Root-Knot Nematode on Tobacco 2011 University of Georgia, CPES - Bowen Farm - Tifton, Ga.

A.S. Csinos, L.L. Hickman and S.S. LaHue

Introduction

Nematicides for tobacco production are very limited. With the increase in cost and shortage of Telone II other nematicides for tobacco must be evaluated. This trial evaluates potential nematicides in an area infested with *Meloidogyne arenaria*, peanut root-knot nematode.

Methods and Materials

This trial was conducted at the Bowen Farm-CPES, Tifton, Ga., in a field with a history of corn, peanuts, tobacco and soybean production. The trial was set up in a field with a strong population of *Meloidogyne arenaria* nematodes. The trial was set up in a randomized complete block design (RCBD) with six replications. Each plot was 30 feet long with 44-inch-wide beds with 10-foot alleys.

Crop maintenance was achieved by using University of Georgia Cooperative Extension recommendations for the control of weeds, suckers and insects. Chemicals used for maintenance of the crop were Orthene 97 at 0.5 lbs./A for insect control, Prowl 3.3EC at 2 pts./A for weed control, and Royal MH-30 Extra at 1.5 gal./A for sucker control.

Total rainfall recorded at the Bowen Farm during this period (March through August 2011) was 14.49 inches. The field trial was supplemented with additional irrigation as required.

Greenhouse and Field Treatments

On March 21, pre-plant fumigants Vapam and Telone II were applied to trial plots.

Treatment 2, Telone II, was injected into soil approximately 12-14 inches using a subsoil bedder with two shanks spaced 12 inches apart. Beds were immediately tilled and sealed using concrete drag.

Treatment 3, Devgen (2 qt./A), was applied as a pre-plant incorporated treatment using a CO_2 sprayer with one TX-12 tip/row with a 50-mesh ball check screen. Tips were angled and sprayed in a 16-inch band at the rate of 30 PSI. Devgen plots also received additional applications at two weeks post-plant (April 28) and four weeks post-plant (May 12).

Temik, Treatment 4, was applied as a broadcast at a rate of 20 lbs./A.

Treatment 5, MANA MCW-2, was applied using a CO_2 sprayer with one TX-12 tip/row with a 50-mesh ball check screen. Tips were angled and sprayed in a 12-inch band at the rate of 30 PSI for 22.0 gal. H_2O per acre.

Material D-EXP, Treatment 7 and Treatment 8, was applied as a pre-plant incorporated treatment using a CO_2 sprayer with one TX-12 tip/row with a 50-mesh ball check screen. Tips were angled and sprayed in a 16-inch band at the rate of 30 PSI. Treatment 7 received an additional application at three weeks post-plant on May 5.

Treatment 6, Vapam (metham sodium), was injected into soil approximately 10-12 inches using a fumigation rig with four shanks spaced 12 inches apart and the soil was sealed using a ring roller. All plots received 0.5 inch of irrigation after fumigant applications to provide a water seal.

Tobacco transplants were treated in the greenhouse on April 13 with Admire Pro at 1 fl. oz./1,000 plants and Actigard 50WG at 4 grams/7,000 plants. Both materials were tank mixed. Plants were pre-wet, with materials being washed in after spraying.

Tobacco variety K394 was transplanted on April 14 on 44-inch-wide rows with an 18-inch plant spacing.

On April 13, pre-plant incorporated materials of Devgen, MANA, D-EXP and Temik were applied to trial plots.

Field Trial Data

A stand count was conducted on April 29 to establish a base count. Stand counts were conducted thereafter every two weeks beginning May 12 and ending July 6 to monitor any loss of plants.

Vigor ratings were conducted on April 29 (two weeks post-plant), May 12 (four weeks post-plant) and May 25 (six weeks post-plant). Plant vigor was rated on a scale of 1-10, with 10 representing live and healthy plants and 1 representing dead plants.

Height measurements were conducted on May 25. Plants were measured individually from the soil level to the tip of the longest leaf and recorded in centimeters.

Harvests were conducted on July 8 and 20 and August 4. Harvests were done by collecting one-third of the plant leaves at one time and weighing each plot in pounds.

A mid-season root gall rating was conducted on June 20 on three plants per plot using the Zeck's scale of 0-10, whereby 0 = no galls, 1 = very few small galls, 2 = numerous small galls, 3 = numerous small galls of which some are grown together, 4 = numerous small and some large galls, 5 = 25% of roots severely galled, 6 = 50% of roots severely galled, 7 = 75% of roots severely galled, 8 = no healthy roots, but plant is still green, 9 = roots rotting and plants dying, and 10 = plants and roots dead. A second root gall rating was conducted following the final harvest on August 23, rating 10 plants per plot utilizing the same scale.

Nematode soil samples were pulled from plots on March 21 (prior to planting and soil treatment) and again on August 25 (at final harvest). Eight to 10 cores of soil, 2.5 cm. in diameter by 25 cm. deep, were collected from each plot randomly. Nematodes were extracted from a 200-cm3 soil sub-sample using a centrifugal sugar flotation technique.

Summary

Nematode pressure in this trial was high and root-knot nematode damage and yields were reflected in that high pressure. Most treatments increased vigor over the control plots, but height measurements showed no significant differences among treatments.

Yields ranged from a low of 1,350 lbs./A to a high of 2,859.5 lbs./A.

The fumigants Vapam (metham sodium) and Telone II performed the best. The new contact materials did not perform as well as they had in the past.

2011 Nematicides for the Control of Peanut Root-Knot Nematode
UGA-CPES-Bowen Farm - Tifton, Ga.

Table 1. Plant Vigor, Plant Height and Dry Weight Yield of Tobacco Variety K 394

Treatment[1]	Rate/Application Schedule	Vigor Ratings (1-10 scale)[2]				Height Measurements[3] (centimeters)	Dry Weight Yield[4] (pounds per acre)
		29 April	12 May	25 May	Average Vigor (0-10 Scale)		
1. Non-treated	N/A	8.5 c	8.0 d	7.3 c	7.9 d	35.9 a	1634.1 bc
2. Telone II	6 gal/A	9.6 a	10.0 a	9.6 a	9.7 a	35.9 a	2641.0 a
3. Devgen	2 qt/A + 2qt/A 2wks PP + 2qt/A 4wks PP	8.5 c	8.8 c	8.8 b	8.7 c	35.2 a	1350.0 c
4. Temik	20 lb/A	9.0 bc	9.1 bc	9.3 ab	9.1 b	36.1 a	1995.6 b
5. MANA	3.31 lbs/A	9.3 ab	9.3 bc	9.6 a	9.4 ab	33.0 a	1953.5 b
6. VAPAM	37.5 gal/A	9.3 ab	9.5 ab	9.6 a	9.5 ab	37.4 a	2859.5 a
7. D-EXP	0.75 lba.i./A PPI + 0.75lbai/A 3wksPP	9.8 a	9.3 bc	9.8 a	9.6 a	34.9 a	1873.3 b
8. D-EXP	0.75lbai/A PPI	9.5 ab	9.5 ab	9.3 ab	9.4 ab	32.9 a	1669.8 bc

[1] Data are means of six replications. Means in the same column followed by the same letter are not different (P=0.05) according to Fishers LSD. No letters indicate non-significant difference.

[2] Vigor was done on a scale of 1-10 with 10 = live and healthy plants and 1 = dead plants and an average was taken of vigor. Ratings were conducted on April 29 and May 12 and 25.

[3] Height measurements were conducted by measuring each plant from the base of the plant to the tip of the longest leaf. Measurements were taken in centimeters on May 25.

[4] Dry weight yield was calculated by multiplying green weight totals of tobacco by 0.20. Pounds per acre were calculated by multiplying dry weight conversion per plot by 7,260 divided by the base stand count.

2011 Nematicides for the Control of Peanut Root-Knot Nematode
UGA-CPES-Bowen Farm - Tifton, Ga.

Table 2. Nematode Root Gall Ratings and Number of Plant Parasitic Nematodes

Treatment[1]	Rate/Application Schedule	Root Gall Ratings[2] (Zecks Scale 0-10)		Number of *Melodogyne sp.* per 200cc soil[2]	
		Mid season	At final harvest	Pre-plant	At final harvest
1. Non-treated	N/A	3.1 ab	6.7 a	88.3 a	288.3 a
2. Telone II	6 gal/A	0.3 d	1.7 c	5.0 d	98.3 ab
3. Devgen	2 qt/A + 2qt/A 2wks PP + 2qt/A 4wks PP	4.0 a	7.7 a	56.6 b	118.3 ab
4. Temik	20 lb/A	1.6 cd	4.1 b	25.0 cd	176.7 ab
5. MANA	3.31 lbs/A	2.8 ab	6.5 a	33.3 bc	158.3 ab
6. VAPAM	37.5 gal/A	1.0 d	1.1 c	10.0 cd	15.0 b
7. D-EXP	0.75 lba.i./A PPI + 0.75lbai/A 3wksPP	2.2 bc	6.25 a	36.6 bc	15.0 b
8. D-EXP	0.75 lba.i./A PPI	3.3 ab	6.7 a	36.6 bc	83.3 ab

1. Data are means of five replications. Means in the same column followed by the same letter are not different (P=0.05) according to Fishers LSD.
2. Gall ratings were done on a scale of 0-10 with 10 = dead plants and roots and 0 = no galls and a healthy plant. An average was taken of the gall ratings on June 20 (mid-season), rating three plants per plot and again on August 23 (at final harvest) rating 10 plants per plot.
3. At-planting soil samples were collected on March 3 for Root Knot Nematode (*Meloidogyne sp.*). Final harvest soil samples were collected on August 22.

2011 Evaluation of Tobacco Cultivars for Resistance to Root-Knot Nematode University of Georgia, CPES - Bowen Farm - Tifton, Ga.

A.S. Csinos, L.L. Hickman and S.S. LaHue

Introduction

Peanut Root-Knot Nematode (*Meloidogyne arenaria*) and Southern Root-Knot Nematode (*Meloidogyne incognita*) are important pests of tobacco and are commonly found in south Georgia soils. Susceptibility of tobacco to root-knot nematodes is high and can result in both quality losses and yield losses. Nematicides for tobacco production are very limited. With the increase in cost and shortage of Telone II, other means of nematode management in tobacco must be considered. This trial evaluates selected tobacco varieties for tolerance to root-knot nematode in an area infested with *Meloidogyne arenaria*, peanut root-knot nematode.

Methods and Materials

This trial was conducted at the Bowen Farm-CPES, Tifton, Ga., in a field with a history of corn, peanuts, tobacco and soybean production. The trial was set up in a field with a strong population of *Meloidogyne arenaria* nematodes. The trial was set up in a randomized complete block design (RCBD) with six replications. Each plot was 37 feet long, with 44-inch-wide beds with 10-foot alleys.

Crop maintenance was achieved by using University of Georgia Cooperative Extension recommendations for the control of weeds, suckers and insects. Chemicals used for maintenance of the crop were Orthene 97 at 0.5 lbs./A for insect control, Prowl 3.3EC at 2 pts./A for weed control, and Royal MH-30 Extra at 1.5 gal./A for sucker control.

Total rainfall recorded at the Bowen Farm during this period (March through August 2011) was 14.49 inches. The field trial was supplemented with additional irrigation as required.

Greenhouse seedlings of eight selected tobacco varieties were planted in field trial plots on April 1.

Field Trial Data

A stand count was conducted on April 29 to establish a base count. Stand counts were conducted thereafter every two weeks beginning May 12 and ending July 6 to monitor any loss of plants.

Vigor ratings were conducted on May 12 (four weeks post-plant) and May 25 (six weeks post-plant). Plant vigor was rated on a scale of 1-10, with 10 representing live and healthy plants and 1 representing dead plants.

Height measurements were conducted on May 25. Plants were measured individually from the soil level to the tip of the longest leaf and recorded in centimeters.

Harvests were conducted on July 8 and 20, and August 4. Harvests were done by collecting one-third of the plant leaves at one time and weighing each plot in pounds.

A mid-season root gall rating was conducted on June 21 on three plants per plot using the Zeck's scale of 0-10, whereby 0 = no galls, 1 = very few small galls, 2 = numerous small galls, 3 = numerous small galls of which some are grown together, 4 = numerous small and some large galls, 5 = 25% of roots severely galled, 6 = 50% of roots severely galled, 7 = 75% of roots severely galled, 8 = no healthy roots, but plant is still green, 9 = roots rotting and plants dying, and 10 = plants and roots dead. A second root gall rating was conducted following the final harvest on August 23, rating 10 plants per plot utilizing the same scale.

Nematode soil samples were pulled from plots on March 3 (prior to planting) and again on August 22 (at final harvest). Eight to 10 cores of soil, 2.5 cm. in diameter by 25 cm. deep, were collected from each plot randomly. Nematodes were extracted from 200-cm3 soil sub-samples using a centrifugal sugar flotation technique.

Summary

Plant vigor was high across the trial and ranged from a high of 9.8 to a low of 7.9 in K394, which is a nematode-susceptible cultivar. Height measurements ranged from a high of 51.8 centimeters in CC37 to a low of 34.4 centimeters in K394. Cultivars CC37 and CC65 both were significantly taller than the NC71 standard.

Yields ranged from a high of 2,602 lbs./A for variety CC35 to a low of 910 lbs./A for variety K394.

Several of the Cross Creek tobacco varieties outperformed the NC71 standard in the heavily infested nematode area in the absence of a nematicide.

2011 Evaluation of Tobacco Cultivars for Resistance to Root-Knot Nematode
UGA-CPES-Bowen Farm - Tifton, Ga.

Table1. Plant Vigor, Plant Height and Dry Weight Yield

Tobacco Variety[1]	Vigor Ratings (1-10 scale) [2]			Height Measurements[3] (centimeters)	Dry Weight Yield[4] (pounds per acre)
	10 May	25 May	Average Vigor		
1. K394	8.0 c	7.8 d	7.9 d	34.4 d	910.4 d
2. CC13	8.4 bc	8.0 d	8.2 cd	47.0 abc	2022.9 ab
3. CC33	8.6 bc	8.8 c	8.7 bc	43.9 a-d	2461.2 ab
4. CC35	9.0 ab	9.2 bc	9.1 b	45.5 a-d	2602.6 a
5. CC37	9.2 ab	9.2 bc	9.2 ab	51.8 a	1886.9 bc
6. CC65	9.6 a	10.0 a	9.8 a	51.5 ab	2296.6 ab
7. NC71	9.0 ab	9.6 ab	9.3 ab	37.9 cd	1324.5 cd
8. K326	8.4 bc	9.0 bc	8.7 bc	39.5 bcd	1013.3 d

[1] Data are means of five replications. Means in the same column followed by the same letter are not different (P=0.05) according to Fishers LSD. No letters indicate non-significant difference.
[2] Vigor was done on a scale of 1-10 with 10 = live and healthy plants and 1 = dead plants and an average was taken of vigor. Ratings were conducted on May 10 and 25.
[3] Height measurements were conducted by measuring each plant from the base of the plant to the tip of the longest leaf. Measurements were taken in centimeters on May 25.
[4] Dry weight yields were calculated by multiplying green weight totals of tobacco by 0.20. Pounds per acre were calculated by multiplying dry weight conversion per plot by 7,260 divided by the base stand count.

2011 Evaluation of Tobacco Cultivars For Resistance to Root Knot Nematode
UGA-CPES-Bowen Farm- Tifton, Georgia

Table 2. Nematode Root Gall Ratings and Number of Plant Parasitic Nematodes

Tobacco Variety[1]	Root Gall Ratings[2] (Zecks Scale 0-10)		Number of *Melodogyne sp.* per 200cc soil[2]	
	Mid-season	At final harvest	Pre-plant	At final harvest
1. K394	5.5 a	9.6 a	102.00 ab	164.0 ab
2. CC13	4.4 abc	7.0 b	112.0 ab	65.6 ab
3. CC33	3.2 bcd	7.0 b	146.0 ab	148.6 ab
4. CC35	2.0 d	7.2 b	50.0 b	106.6 ab
5. CC37	3.8 a-d	7.3 b	68.0 ab	184.6 a
6. CC65	2.4 cd	5.5 b	198.0 a	71.0 ab
7. NC71	5.4 a	6.8 b	102.0 ab	45.4 b
8. K326	4.6 ab	6.8 b	73.8 ab	54.2 b

1. Data are means of five replications. Means in the same column followed by the same letter are not different (P=0.05) according to Fishers LSD.
2. Gall ratings were done on a scale of 0-10 with 10 = dead plants and roots and 0 = no galls and a healthy plant. An average was taken of the gall ratings on June 21 (mid-season), rating three plants per plot, and again on August 23 (at final harvest), rating 10 plants per plot.
3. At-planting soil samples were collected on March 3 for Root-Knot Nematode (*Meloidogyne sp.*). Final harvest soil samples were collected on August 22.

Planting Date, Float House and Field Application of ASM for TSWV Management Bowen Farm - Tifton, Ga. 2011

A.S. Csinos, L.L. Hickman, S. LaHue, S.W. Mullis and R. Srinivasan

Introduction

Tomato spotted wilt virus on tobacco is a serious problem in Georgia. Currently there are no tobacco cultivars that provide any specific resistances to TSWV; however, there are other means available that may help to manage the disease.

Applications of Admire Pro and Actigard are current standard recommendations in the float house. Some positive influence over the control of TSWV has been shown in past studies by applying Actigard to plants in the field after transplant. There is also evidence that planting date may have significant influence on TSWV incidence and severity.

This trial evaluates combinations of field and greenhouse applications of Actigard and Admire Pro as well as different planting dates.

Methods and Materials

The study was located at the Bowen Farm, CPES, Tifton, Ga., in a field with a crop rotation history of cotton, peanuts, soybeans, assorted vegetables and tobacco. The area was prepared using all current University of Georgia Cooperative Extension recommendations. The plot design was a randomized complete block design (RCBD) consisting of single-row plots replicated five times. Each plot was 37 feet long with 10-foot alleys between repetitions. Three separate trial areas were set up to represent three separate planting dates.

On January 17, 2009, variety NC-71 was seeded into 242-cell flats.

Tobacco transplants were treated in the greenhouse with a pre-plant treatment of Actigard 50WG and Admire Pro. The two materials were tank mixed and sprayed on in 200 ml of water per flat then washed in with 0.25 inch of water. Actigard 50WG was applied at 2 g ai./7,000 plants. Admire Pro greenhouse treatments were applied at 1 oz./1,000 plants. Transplants were transplanted after greenhouse treatments were applied in plots on 44-inch rows with a 22-inch plant spacing. An average of 20 plants per test plot were planted.

Field treatments were applied beginning when the first symptom of TSWV was detected during field scouting. Field treatments were applied using a CO2 sprayer with one TX-12 tip/row with a 50-mesh ball check screen. Tips were angled at plants and sprayed in a 12-inch band at the rate of 40 PSI for 10.0 gal. H2O per acre. All treatments were mixed in 3 liters of water unless otherwise noted. All field applications of Actigard 50WG were made at ½ oz./A (1.1 g Actigard 50WG in 3 liters of water).

Tobacco plots were scouted weekly to determine TSWV disease incidence and percentage of infection in non-treated versus treated plots.

Following the final harvest, root samples were collected from 10 plants per plot and an ELISA test was performed to determine TSWV incidence. The screen for TSWV was accomplished by the use of Double Antibody Sandwich-Enzyme Linked Immunosorbent Assay (DAS-ELISA) alkaline phosphase antisera kits (Agdia, Inc. Elkhart, IN). Samples of 1.0 gram were subjected to DAS-ELISA, and any sample eliciting an absorbance reading (A405) of three times the average plus two standard deviations of a healthy negative control were considered positive results.

Crop maintenance was achieved by using University of Georgia Cooperative Extension recommendations for the control of weeds, suckers and insects. Chemicals used for maintenance of the crop were Orthene 97 at 0.5 lbs./A for insect control, Prowl 3.3EC at 2 pts./A for weed control, and Royal NH-30 Extra at 1.5 gal./A for sucker control.

Individual information for each of the three trials is detailed as follows:

Trial 1

Tobacco transplants were treated in the greenhouse with a pre-plant treatment of Actigard 50WG and Admire Pro on March 25. Tobacco was transplanted into field plots on March 29.

Stand counts were conducted beginning April 5, with a final stand count being done on June 15.

One height measurement was conducted on May 19. Plants were measured in centimeters from the base of the plant to the tip of the longest leaf.

Two vigor ratings were conducted on a 1-10 scale, with 10 equaling vigorous healthy plants and 1 equaling poor vigor plants. Vigor ratings were conducted on April 26 and May 17.

Harvests were conducted on June 5 and 19, and on August 3. Harvests were done by collecting one-third of the plant leaves at one time and weighing each plot separately in pounds.

The first symptom field treatment was applied on April 27. A second field treatment one week later was applied on May 6, and the third treatment two weeks after the first symptom was applied on May 12.

Trial 2

Tobacco transplants were treated in the greenhouse with a pre-plant treatment of Actigard 50WG and Admire Pro on April 12. Tobacco was transplanted into field plots on April 14.

Stand counts were conducted beginning April 27, with a final stand count being done on June 15.

One height measurement was conducted on May 19. Plants were measured in centimeters from the base of the plant to the tip of the longest leaf.

Two vigor ratings were conducted on a 1-10 scale, with 10 equaling vigorous healthy plants and 1 equaling poor vigor plants. Vigor ratings were conducted on May 12 and June 2.

Harvests were conducted on June 5 and 19, and on August 3. Harvests were done by collecting one-third of the plant leaves at one time and weighing each plot separately in pounds.

The first symptom field treatment was applied on May 6. A second field treatment one week later was applied on May 12, and the third treatment two weeks after the first symptom was applied on May 18.

Trial 3

Tobacco transplants were treated in the greenhouse with a pre-plant treatment of Actigard 50WG and Admire Pro on April 25. Tobacco was transplanted into field plots on April 26.

Stand counts were conducted beginning May 10, with a final stand count being done on June 22.

One height measurement was conducted on May 7. Plants were measured in centimeters from the base of the plant to the tip of the longest leaf.

Two vigor ratings were conducted on a 1-10 scale, with 10 equaling vigorous healthy plants and 1 equaling poor vigor plants. Vigor ratings were conducted on May 24 and June 7.

Harvests were conducted on June 19, and August 3 and 15. Harvests were done by collecting one-third of the plant leaves at one time and weighing each plot separately in pounds.

The first symptom field treatment was applied on May 23. A second field treatment one week later was applied on May 31, and the third treatment two weeks after the first symptom was applied on June 6.

Summary

A low to moderate level of TSWV occurred in this trial, ranging from a low of 0% to a high of 26%. Vigor ratings were high for most plots within the non-treated. Those treated with Actigard in the float house tended to have a lower vigor. Height measurements in the first planting were fairly uniform across the plots. As the planting date moved toward the middle and then the end of April, significant reductions in plant height occurred, especially with those receiving Actigard applications in the float house.

There was significant change in environmental factors consisting of high heat and arid conditions during the last half of April. These conditions severely affected plant growth in the Actigard float house treatments.

TSWV in Planting Date 1 ranged from a low of 14% to a high of 25% with no significant differences among treatments. ELISA positive TSWV ranged from 7% to 29%.

In Planting Date 2, TSWV ranged from 5.6% to 26% and ELISA levels tended to correlate with symptomatic TSWV levels.

In Planting Date 3, TSWV ranged from 0% to 11% with similar reductions in ELISA positive results.

Yield in Planting Date 1 ranged from 2,580 lbs./A to 2,790 lbs./A across the test with no significant differences.

In Planting Date 2, yield ranged from 2,803 lbs./A to 3,248 lbs./A with no significant difference among treatments.

In Planting Date 3, yield ranged from 2,902 lbs./A to 4,199 lbs./A with yield reductions in plots treated with Actigard in the float house. These yield reductions were a result of stunting of the plants treated with Actigard in the float water along with the adverse conditions (hot, dry weather) that were encountered in late April.

Acknowledgments

The authors would like to thank the Georgia Agricultural Commodity Commission for Tobacco and Philip Morris International for their support of this work. Thanks are also extended to Holly Hickey, Seth Dale and Chance Anderson for their assistance.

Planting Date and Application Effects of Actigard and Admire Pro Field and Greenhouse Treatments on Tobacco
Bowen Farm - Tifton, Ga., 2011

Table 1. Plant growth and vigor rating of tobacco.

Treatment List[1]		Trial 1 Plant Date: March 29		Trial 2 Plant Date: April 14		Trial 3 Plant Date: April 26	
Greenhouse Application[2]	Field Application[2]	Height Measurement[3]	Vigor[4]	Height Measurement[3]	Vigor[4]	Height Measurement[3]	Vigor[4]
1. No treatment	No treatment	51.5 a	8.6 ab	38.9 ab	8.0 b	76.6 a	7.0 b
2. Admire Pro	No treatment	50.0 ab	9.3 a	40.0 a	9.1 a	62.9 a	8.0 a
3. Admire Pro and Actigard	No treatment	49.5 ab	9.2 ab	36.4 bc	8.9 a	34.1 b	8.4 a
4. None	Actigard + 1 week + 1 week	49.9 ab	8.9 ab	40.0 a	9.0 a	68.2 a	8.1 a
5. Admire Pro	Actigard + 1 week + 1 week	49.8 b	9.2 ab	38.8 ab	9.0 a	62.5 a	8.3 a
6. Admire Pro and Actigard	Actigard + 1 week + 1 week	47.4 b	8.3 b	34.9 c	8.7 a	38.1 b	7.8 a

[1] Data are means of five replications. Means in same column followed by the same letter are not significantly different (P=0.05) according to Fisher's LSD test.

[2] Treatments consisted of greenhouse applications, followed by field applications applied beginning when the first symptom of TSWV was identified through scouting control plots. Treatments 4, 5 and 6 received an additional application 1 week and 2 weeks afterward, according to the treatment list.

[3] Height measurements were done in inches from the soil level to the tip of the longest leaf. One height measurement was conducted on each trial.

[4] Vigor ratings were done on a 1-10 scale with 10 = live and healthy plants and 1 = dead plants.

Planting Date and Application Effects of Actigard and Admire Pro Field and Greenhouse Treatments on Tobacco Bowen Farm - Tifton, Ga., 2011

Table 2. Percent TSWV and percent TSWV positive plants as identified through ELISA testing of tobacco root samples

Treatment List[1]		Trial 1 Plant Date: March 29		Trial 2 Plant Date: April 14		Trial 3 Plant Date: April 26		Percent TSWV for All Planting Dates
Greenhouse Application[2]	Field Application[2]	Percent TSWV[3]	Percent ELISA[4]	Percent TSWV[3]	Percent ELISA[4]	Percent TSWV[3]	Percent ELISA[4]	
1. No treatment	No treatment	20.5 a	21.4 ab	21.1 a	14.8 ab	11.3 a	4.0 a	**Plant Date 1** 17.2 a
2. Admire Pro	No treatment	22.6 a	17.8 ab	25.7 a	10.3 ab	6.6 ab	4.0 a	
3. Admire Pro and Actigard	No treatment	19.9 a	6.6 b	12.6 ab	25.0 a	0.0 b	7.1 a	**Plant Date2** 15.2 a
4. None	Actigard + 1 week + 1 week	25.2 a	11.5 ab	15.8 ab	22.2 a	4.3 b	3.7 a	
5. Admire Pro	Actigard + 1 week + 1 week	14.0 a	17.8 ab	12.6 ab	14.8 ab	3.3 b	0.0 a	**Plant Date 3** 4.4 b
6. Admire Pro and Actigard	Actigard + 1 week + 1 week	17.7 a	28.5 a	5.6 b	5.6 b	2.2 b	7.4 a	

[1] Data are means of five replications. Means in the same column followed by the same letter are not significantly different (P=0.05) according to Fisher's LSD test.

[2] Treatments consisted of greenhouse applications, followed by field applications applied beginning when the first symptom of TSWV was identified through scouting control plots. Treatments 4, 5 and 6 received an additional application 1 week and 2 weeks afterward, according to the treatment list.

[3] Percent TSWV was calculated by using stand counts where tobacco plants that exhibited symptoms of TSWV were recorded and flagged every seven days.

[6] Final harvest testing was completed after final harvest of each trial. Ten root samples were collected per plot. ELISA testing was performed in the lab using double antibody sandwich-enzyme linked immunosorbent assay (DAS-ELISA) alkaline phosphatase antisera kits. ELISA test results are percent positive plants.

Planting Date and Application Effects of Actigard and Admire Pro Field and Greenhouse Treatments on Tobacco
Bowen Farm - Tifton, Ga., 2011

Table3. Dry weight yield of tobacco in pounds per acre

Treatment List[1]		Dry Weight Yield[3]		
Greenhouse Application[2]	Field Application[2]	**Trial 1 Plant Date: March 29**	**Trial 2 Plant Date: April 14**	**Trial 3 Plant Date: April 26**
1. No treatment	No treatment	2692.4 a	2831.9 a	4141.9 a
2. Admire Pro	No treatment	2579.6 a	2803.0 a	4409.5 a
3. Admire Pro and Actigard	No treatment	2771.2 a	2845.7 a	2902.3 b
4. None	Actigard + 1 week + 1 week	2790.5 a	3007.2 a	4199.8 a
5. Admire Pro	Actigard + 1 week + 1 week	2586.8 a	3107.5 a	4058.6 a
6. Admire Pro and Actigard	Actigard + 1 week + 1 week	2711.6 a	3247.7 a	3257.5 b

1 Data are means of five replications. Means in the same column followed by the same letter are not significantly different (P=0.05) according to Fisher's LSD test.

2 Treatments consisted of greenhouse applications, followed by field applications applied beginning when the first symptom of TSWV was identified through scouting control plots. Treatments 4, 5 and 6 received an additional application 1 week and 2 weeks afterward, according to the treatment list.

3 Dry weight yield was calculated by multiplying green weight totals by 0.15. Pounds per acre were calculated by multiplying dry weight conversion per plot by 6,491 divided by the base stand count. Tobacco was planted in 44-inch rows, with 22 inches between plants, which equals 6,491 plants/A.

Evaluation of Tobacco lines for Resistance to TSWV in Georgia
Johnson Selected Variety Tobacco Trial

2011 Bowen Farm, Tifton, Ga.

A.S. Csinos, L.L. Hickman, S. LaHue and R. Srinivasan

Introduction

Tomato spotted wilt virus continues to be of great concern to Georgia tobacco producers. This study evaluates tobacco cultivars that have been selected for insect resistance and have demonstrated resistance to TSWV in the greenhouse.

Methods and Materials

The study was located at the Bowen Farm CPES, Tifton, Ga., in a field with a history of crops such as corn, soybeans, peanuts, tobacco and assorted vegetables. The area was prepared using all current University of Georgia Cooperative Extension recommendations.

The plot design was a randomized split block design replicated five times. Each plot consisted of one row of transplants that had been treated (Treatment B) in the greenhouse with Actigard and Admire Pro and one row that had been planted with transplants that received no greenhouse treatments (Treatment A). Each plot was 37 feet long with 10-foot alleys between repetitions.

On January 17, 14 selected tobacco varieties were seeded into 242-cell trays.

The tobacco transplants designated as Treatment B were treated in the greenhouse with a pre-plant treatment of Actigard 50 WG and Admire Pro on March 28. The two materials were tank mixed and sprayed on plants in 200 ml of water per flat then rinsed in with 0.25 inch of water. Actigard 50 WG was applied at 2g ai/7,000 plants. Admire Pro greenhouse treatments were applied at 10 oz./1,000 plants. The test was transplanted on March 29 on 44-inch row spacing with 20 inches in row space. An average of 22 plants per row were planted.

Crop maintenance was achieved by using University of Georgia Cooperative Extension recommendations for the control of weeds, suckers and insects. Chemicals used for maintenance of the crop were Orthene 97 at 0.5 lbs./A for insect control, Prowl 3.3 EC at 2 pts./A for weed control, and Royal MH-30 Extra at 1.5 gal./A for sucker control.

Tobacco plots were scouted weekly to determine TSWV disease incidence and percentage of infection in non-treated versus treated plots. Stand counts were conducted beginning April 13, with a final stand count being done on June 16.

A height measurement was conducted on May 19. Plants were measured in centimeters from the base of the plant to the tip of the longest leaf.

Two vigor ratings were conducted on a 1-10 scale with 10 equaling vigorous healthy plants and 1 equaling poor vigor plants. Vigor ratings were conducted on May 17 and June 7.

Three harvests were conducted on July 5 and 19, and on August 2. Harvests were done by collecting one-third of the plant leaves at one time and weighing each plot separately in pounds.

Summary

Vigor in the trial was moderate, with ratings ranging from a high of 7.7 to a low of 5.5. Treated plants tended to be less vigorous than the non-treated plants. Height measurements tended to be consistent across the trial, ranging from a high of 57 centimeters to a low of 49 centimeters. Some differences were detected among treatments.

Yield of plots ranged from a low of 2,312 lbs./A to a high of 2,984 lbs./A, with few differences among cultivars.

Levels of symptomatic TSWV ranged from a low of 8.1% to a high of 28.6% across the trial. Treated plants tended to have more symptomatic plants, although yield tended to be higher in the treated plots.

Acknowledgments

The authors would like to thank the Georgia Agricultural Commodity Commission for Tobacco for their support of this work. Thanks are also extended to Holly Hickey, Seth Dale and Chance Anderson for their assistance.

Johnson Variety Trial, University of Georgia-CPES, Bowen Farm - Tifton, Ga., 2011

Table 1. Plant Vigor, Plant Height, Dry Weight Yield and Percent TSWV results

Variety[1]	Vigor Ratings[2]		Height Measurements[3]		Dry Weight Yield[4] (lbs/A)		% TSWV Symptomatic[5]	
	A Non-treated	B Treated	A Non-treated	B Treated	A Non-treated	B Treated	A Non-treated	B Treated
1. H-1	7.7 a	7.3 ab	56.6 a	54.1 abc	2654.1 ab	2808.9 abc	12.8 b	12.0 cd
2.H-2	7.7 a	7.2 abc	50.8 ab	52.5 abc	2509.8 ab	2554.8 bcd	15.4 b	20.6 a-d
3.H-3	7.5 a	7.5 ab	53.8 ab	52.7 abc	2732.4 ab	2983.8 a	10.7 b	16.3 a-d
4.H-4	7.3 a	6.3 cde	51.9 ab	48.5 c	2744.9 ab	2859.5 ab	13.9 b	20.5 a-d
5.H-5	7.1 ab	6.7 a-d	56.4 ab	54.0 abc	2633.9 ab	2789.0 abc	11.1 b	14.8 bcd
6.H-6	6.9 ab	5.6 e	55.2 ab	56.2 a	2796.3 a	2785.6 abc	12.5 b	19.2 a-d
7.H-7	6.3 a	5.9 de	56.1 ab	53.3 abc	2744.0 ab	2945.3 ab	13.4 b	12.8 cd
8.H-8	7.0 ab	6.0 de	55.8 ab	54.5 ab	2506.2 ab	2435.5 cd	20.7 ab	22.8 a-c
9.H-9	7.4 a	7.1 abc	54.1 ab	51.0 abc	2453.0 b	2683.8 a-d	17.8 ab	19.5 a-d
10.H-10	6.3 a	5.5 e	51.1 ab	51.6 abc	2689.6 ab	2573.9 bcd	15.7 b	8.1 d
11.H-11	7.0 ab	5.9 de	53.7 ab	52.1 abc	2476.5 b	2593.1 a-d	15.1 b	26.4 ab
12.H-12	7.3 a	6.6 bcd	50.8 ab	50.4 bc	2726.7 ab	2539.2 bcd	18.1 ab	16.0 bcd
13. NC71	6.9 ab	6.6 bcd	49.7 b	48.8 c	2489.3 ab	2619.2 a-d	20.5 ab	29.2 a
14. K-326	7.4 a	7.6 a	52.4 ab	52.8 abc	2766.2 ab	2311.7 d	28.6 a	18.6 a-d

[1] Data are means of five replications. Means in same column followed by the same letter are not significantly different (P=0.05) according to Fisher's LSD test. Each plot was two rows, one row treated with Actigard and Admire and one row non-treated.
[2] Vigor ratings were done on a 1-10 scale with 10 = live and healthy plants and 1 = dead plants on May 17 and June 7.
[3] Height measurements were done in inches from the soil level to the tip of the longest leaf. One height measurement was conducted on May 19.
[4] Dry weight yield was calculated by multiplying green weight totals by 0.15. Pounds per acre were calculated by multiplying dry weight conversion per plot by 6,491 divided by the base stand count. Tobacco was planted in 44-inch rows, with 22 inches between plants, which equals 6,491 plants/A.
[5] Percent TSWV was calculated by using stand counts that were made from April 15 through June 18, with TSWV being recorded and flagged every seven days.

Special Bulletin 63-5 **Reviewed December 2014**