



On-Farm Evaluation of New and Released Tobacco Varieties for Relative Resistance to Black Shank for Potential Use in Georgia and Florida in 2021, 2022 and 2023



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ABSTRACT:

Black shank is a soil borne disease of tobacco and requires an infested site for proper study. In some years the occurrence of black shank in specific fields and after the use of certain varieties has been costly to the yield and quality of tobacco harvested. Varieties growers have counted on for resistance according to evaluations in other area have not performed well under Georgia conditions. Loss of resources at the University of Georgia (both people and funding) have limited our data base and there are now a number of varieties and potential releases that have not been tested for black shank resistance on Georgia farms. Variety evaluations require two resources that the University of Georgia does not have; 1. Suitable sized infested fields, 2. Adequate technical support. A few Georgia tobacco growers have these resources, ie. infested land and equipment to grow tobacco and are willing to work with Extension to obtain Georgia-based information on variety disease resistance.

In 2021, 2022 and 2023 ten randomized complete block design plots replicated four times in each location were established in fields with a history of significant occurrence of black shank in previous plantings. Eight to ten varieties have been included in each year to provide comparison of varieties with known black shank resistance levels to the level of disease development in new or unreleased varieties. No fungicide was applied to any of these plots for control of black shank as might normally have been recommended. One-row plots contained 100 plants which were evaluated by county extension agents for black shank development every four weeks during the season. In spite of the location of these trials in fields known to have had black shank losses the number of plants which were infected and exhibited symptoms of black shank were very low.

METHODS:

Transplants for the black shank variety evaluation tests are produced in a commercial tobacco greenhouse from seed acquired from the normal seed companies that make seed available to growers. Varieties chosen are included because of their known susceptibility to black shank or their relative high resistance to the disease. Plants receive the standard fertility, pest management and clipping of the adjacent plants meant for sale to contracting growers.

Field sites for conducting the on-farm research plots are selected in consultation with the grower, the county Extension agent and the state specialist with a discussion of previous cropping and disease history. Field preparation is completed by the individual cooperating grower with the exception of any fungicides which might provide some control of black shank.

Transplants are transported to the selected fields by the state specialist where county Extension agents place trays of plants on the transplanter unit to insure that one row plots of 125 plants are planted according to the plot plan resulting in a replicated and randomized plot. Plot rows are cut back to 100 live plants after two weeks. (Figure 1.)

Three of the tobacco variety black shank evaluations plots have been installed in three cooperating counties across the tobacco production area of Georgia during each of the years 2021, 2022 and 2023. Plant disease development and death of each plant were recorded following the establishment of 100 living plant plot rows at two weeks after transplanting and at four week intervals for the remainder of the season. (Figure 2.) Mapping results in a history of growth or disease development of every plant in the plot. County agents receive training and test kits that are suitable for use in the field to verify visual symptoms of diseases.

CONCLUSIONS:

- After conducting 10 Tobacco Variety Black Shank Evaluation plots over three years in multiple locations each year and planted in locations known to have caused disease and death of tobacco plants in recent years there is no dataset that is helpful in ranking lines for which relative black shank resistance is not known.
- Limited number of plants in any of the ten plots of any resistance expectation showed symptoms of black shank. In one case root knot nematodes were present and no nematicide was used. In two other cases repeated excessive rainfall caused root suffocation and then black shank symptoms even in varieties expected to have the highest resistance. (Figure 3.)
- During the same time period of 2021, 2022 and 2023 black shank has not been widespread across the Georgia production area and by itself has not caused significant yield losses.
- Georgia and Florida growers have been attentive to the need to rotate fields and farms for tobacco production. They have used varieties which have been categorized as having high to very high resistance to black shank and suitable for planting in Georgia and Florida.
- High percentages of the Georgia and Florida crop have been treated with Orondis Gold, Presidio and Ridomil in sequential applications as precautionary treatments where black shank pressure was unknown or known to have caused losses in previous crops.

2021 Varieties	Expected BS Resistance	2022 Varieties	Expected BS Resistance	2023 Varieties	Expected BS Resistance
PXH 22	M	GL 365	M-H	CC 603	H
PXH 54	L-M	K 326	L	GL 365	M-H
PXH 94	L	NC 960	H-VH	K 326	L
PVH 1600	M	NC 986	H	NC 960	H-VH
NC 960	H-VH	NC 991	H	NC 986	L-M
NC 1226	H-VH	NC 993	H	NC 987	L-M
GL 395	M-H	NC 994	H	NC 989	L-M
K 326	L	NC 996	H	NC 1226	H-VH
		NC 1226	H-VH	PVH 1600	M
		PVH 1600	M	PVH 1920	M
<u>Cooperating Growers / Agents</u>		<u>Cooperating Growers / Agents</u>		<u>Cooperating Growers / Agents</u>	
S. Corbett / J. Shealey		S. Corbett / J. Shealey		S. Corbett / J. Shealey	
L. Vickers / B. Reeves		M. Tucker / T. Barnes		M. Tucker / T. Barnes	
J. Anderson / Z. Williams		Holland Farms / R. Greene		Holland Farms / R. Greene	
M. Tucker / T. Barnes					



Figure 1. Agents prepare to change varieties.



Figure 2. Agents evaluate plants after two weeks



Figure 3. Anderson plot, 2021, varieties exhibit maturity, black shank resistance, and water damaged root systems.