

2017 Flue-Cured Tobacco Production Guide: Disease Chapter – Disease Resistance Tables

Table 3. Performance of selected flue-cured tobacco varieties in a black shank-infested field in Brunswick County, VA in 2016.

Variety	<i>Ph_p</i> Gene ¹	% Healthy Plants				
		7 June	7 July	8 Aug	7 Sept	22 Sept
K 346	-	100	100	100	99	99
GL 395	-	100	100	98	99	98
SP 225	+	100	100	100	99	98
NC 925	-	100	100	96	95	98
PVH 1452	+	100	99	99	98	98
CC 33	-	100	99	98	98	97
CC 143	-	100	99	94	96	96
NC 606	-	100	100	96	95	94
CC 1063	-	99	99	94	96	94
PVH 1920		100	97	96	95	93
GL 939	-	100	97	91	94	93
NC 299	+	100	99	83	83	80
PVH 1600		100	96	83	81	78
NC 196	+	100	97	76	78	74
K 730		99	97	77	78	70
PVH 2275	+	100	88	51	40	34

¹The *Ph_p* gene provides very high resistance to race 0 of the black shank pathogen, but no resistance to race 1. Resistance to race 1 arises from multiple other genes that are currently being investigated.



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Table 4. Reactions of flue-cured tobacco varieties to Black Shank.

Varieties with the <i>Php</i> gene ¹ :	% Survival (Race 1) ²	Disease-Yield Index ³	
		Black Shank (Race 1)	No Black Shank
PVH 1452	69	68	99
NC 196	64	68	106
SP 220	64	61	95
PVH 1118	59	59	99
CC 67	60	58	97
CC 700	50	51	101
CC 37	50	50	100
GF 318	43	45	105
NC 299	43	45	103
PVH 1600⁴	44	43	97
NC 72	34	35	104
CC 27	32	34	107
NC 297	30	31	102
NC 92	23	23	99
PVH 2275	10	9	99
<u>Varieties without the <i>Php</i> gene¹</u>			
NC 938⁴	86	87	101
CC 1063 ⁴	83	84	101
NC 925 ⁴	82	82	101
CC 143 ⁴	76	79	104
K 346	82	75	93
NC 606	69	68	99
CC 33	62	63	102
GL 395 ⁴	67	63	95
GL 328⁴	43	53	105
PVH 2254⁴	51	51	100
CC 13	47	48	103
PVH 2110	43	47	108
CC 35	42	46	111
K 326	31	34	107
PVH 2310 ⁴	31	32	104

¹ Varieties with the *Php* gene possess very high resistance to race 0 of the black shank pathogen. Resistance to race 0 in varieties without the *Php* gene is similar to or higher than that to race 1.

² Average % Survival near 2nd harvest without a soil fungicide. Results are averages from 10 field experiments conducted in 2010-2015 by Clemson and North Carolina State Universities as part of the Regional Flue-Cured Tobacco Variety Evaluation Program.

³ Relative Yield Index = yield of each cultivar relative to the yield of all other cultivars in the experiment(s). Yield indexes for “No Black Shank” = average relative yield from the 2010-2015 Virginia OVT tests conducted at the Southern Piedmont AREC, Blackstone. Yield indexes for “Black Shank (race 1)” = yield index without black shank multiplied by the average proportional survival near 2nd harvest.

⁴ Ratings based on limited data available. **Varieties in bold are new for the 2017 growing season.**

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Table 5. Performance of selected flue-cured tobacco varieties in 2016 Virginia Tech on-farm tests for resistance to Granville Wilt.

Variety	% Healthy Plants				4-test	Granville
	Baskerville-1	Alberta	Dolphin	Baskerville-2	Average	Wilt Yield Index
CC 1063	98.0	95.8	94.5	84.6	93	93
CC 143	88.8	96.2	83.1	81.8	87	90
PVH 1920	97.0	89.7	91.4	78.1	89	89
PVH 1452	85.8	96.5	91.8	84.0	90	88
NC 196	92.6	90.8	80.8	63.9	82	86
PVH 1600	99.1	94.1	83.5	75.2	88	85
CC 37	93.5	94.4	85.6	62.9	84	82
NC 299	90.1	88.9	73.9	53.4	77	79
GL 939	96.4	92.8	80.7	59.6	82	78
NC 925	85.8	81.7	70.5	67.4	76	77
GL 395	92.5	76.7	79.0	67.3	79	76
PVH 2254	90.1	87.7	93.1	32.4	76	76
K 730	91.2	78.8	80.8	23.5	69	65
K 394	69.5	29.2	28.9	49.6	44	44

¹ Granville Wilt Yield Index = proportion of plants surviving for each variety multiplied by the relative yield for that variety in the 2010-2016 Virginia OVT tests at the Southern Piedmont AREC, Blackstone.

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Table 6. Reactions of flue-cured tobacco varieties to Granville Wilt.

Varieties with the <i>Php</i> gene ¹ :	% Survival ² 2010,2012-2016	2010-2016 Yield Index ³	
		With Granville Wilt	No Granville Wilt
CC 37	82	81	98
CC 27	76	80	106
CC 67	79	76	96
PVH 1452	74	72	98
NC 196	59	62	105
NC 297 ⁴	60	61	102
NC 291 ⁴	58	60	104
NC 72 ⁴	58	60	103
PVH 2275	58	58	99
NC 299	57	58	103
GF 318	56	58	104
CC 700	52	51	100
PVH 1118	45	44	99
PVH 1600⁴	42	41	97
NC 71 ⁴	41	44	107
<u>Varieties without the <i>Php</i> gene¹</u>			
NC 606	76	75	99
CC 1063	71	71	100
K 346	73	68	93
GL 939 ⁴	69	65	95
CC 143 ⁴	64	67	104
CC 33	66	66	101
GL 395	63	61	96
NC 938⁴	60	61	101
CC 13	54	56	104
GL 328⁴	53	56	105
PVH 2110	50	54	108
PVH 2254⁴	53	52	100
NC 925 ⁴	49	50	101
K 326	39	41	107
PVH 2310	39	40	103
CC 35	21	23	111

¹Varieties with the *Php* gene possess very high resistance to race 0 of the black shank pathogen.

Resistance to race 0 in varieties without the *Php* gene is similar to or higher than that to race 1.

²Average % Survival near 2nd harvest without soil fumigation. Results are averages from 5 field experiments conducted in 2010 and 2012-2016 by Clemson University as part of the Regional Flue-Cured Tobacco Variety Evaluation Program.

³ Relative Yield Index = yield of each cultivar relative to the yield of all other cultivars in the experiment(s). Yield indexes for “No Granville Wilt” = average relative yield from the 2010-2016 Virginia OVT tests at the Southern Piedmont AREC, Blackstone. Yield indexes for “with Granville Wilt” = yield index without black shank multiplied by average % Survival.

⁴ Ratings based on limited data available. **Varieties in bold are new for the 2017 growing season.**

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Table 8. Tobacco disease resistance possessed by selected flue-cured tobacco varieties available in 2017.

Variety	Resistance Rating ¹			Nematodes			Tobacco Mosaic Virus
	Black Shank		Granville Wilt	Root-Knot		Tobacco Cyst	
	<i>Ph</i> gene (race 0 only) ²	Race 1		<i>M. incognita</i>	Other species ³		
CC 13	-	48	62	+	+	-	-
CC 27	+	34	85	+	-	+	+
CC 33	-	63	73	+	+	-	-
CC 35	-	47	23	+	+	-	-
CC 37	+	48	83	+	+	+	+
CC 67	+	58	81	+	-	+	+
CC 143 ⁴	-	78	78	+	-	-	-
CC 700	+	55	57	+	-	+	-
CC 1063	-	81	74	+	-	-	-
GF 318	+	44	68	+	-	+	-
GL 328⁴	-	43	53	+	-	-	+
GL 395	-	59	66	+	-	-	-
K 326	-	32	46	+	-	-	-
K 346	-	74	74	+	-	-	-
NC 72	+	39	75	+	-	+	-
NC 196	+	67	70	+	-	+	-
NC 297 ⁴	+	32	62	+	-	+	+
NC 299	+	43	68	+	-	+	-
NC 606	-	68	80	+	-	-	-
NC 925 ⁴	-	82	58	+	-	-	-
NC 938⁴	-	86	60	+	-	-	-
PVH 1118	+	62	52	+	-	+	-
PVH 1452	+	66	79	+	-	+	-
PVH 1600⁴	+	44	42	+	-	+	-
PVH 2110	-	44	63	+	-	-	-
PVH 2254⁴	-	51	53	+	-	-	+
PVH 2275	+	10	68	+	+	+	+
PVH 2310	-	26	44	+	-	-	+
SP 168	+	68	68	+	-	+	-
SP 220	+	65	80	+	-	+	-
SP 225	+	77	70	+	-	+	-
SP 227	+	72	85	+	-	+	-
SP 236	-	77	62	+	-	-	-

¹ Resistance rating = average % plants still alive near 2nd harvest, without a soil fungicide or fumigant. See Tables 3 and 4 for more detailed information.

² Varieties with the *Php* gene are almost immune to race 0 of the black shank pathogen; resistance to race 0 without the *Php* gene is at least as high as resistance to race 1.

³ “Other species” of root-knot nematode include *Meloidogyne arenaria* (peanut root-knot nematode) or *M. javanica* (Javanese root-knot nematode). These other species are now common in Virginia.

⁴ Ratings based on limited data available. **Varieties in bold are new for the 2017 growing season.**