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Table 3. Survival of selected flue-cured tobacco varieties in 2017 on-farm tests in black shank-infested fields in Virginia.

Variety	Ph_p Gene	% Healthy Plants				Black Shank Yield Index[1]
		Mecklenburg-1	Mecklenburg-2	Brunswick	Average	
CC 1063	-	100	95	100	98	101
SP 225	+	97	98	99	98	.
PVH 1452	+	99	98	97	98	96
PVH 1600	+	97	97	98	97	95
GL 395	-	96	99	97	97	92
NC 925	-	97	99	95	97	98
PVH 1920	+	97	97	97	97	.
NC 938	-	99	96	95	97	99
K 346	-	99	95	95	96	89
CC 143	-	93	96	96	95	98
CC 37	+	93	94	95	94	91
CC 33	-	88	97	95	93	93
NC 299	-	96	93	87	92	95
NC 196	+	94	84	95	91	96
PVH 2254	-	95	97	73	88	90
PVH 2275	+	97	73	86	85	84

[1] Yield indexes for Black Shank (race 1) = yield index without black shank (from the 2010-2017 Virginia OVT tests at the Southern Piedmont AREC, Blackstone) multiplied by the average proportional survival from the three on-farm black shank resistance tests conducted in Virginia in 2017.

Table 4. Flue-cured tobacco variety reactions to Black Shank.

Varieties with the *Php* gene[1]:	% Survival (Race 1)[2]	Relative Yield Index[3] Black Shank (Race 1)	Relative Yield Index[3] No Black Shank
SP 225	88	77	.
NC 196	67	71	105
PVH 1452	69	68	98
CC 67	63	59	94
CC 700	58	58	99
PVH 1600[4]	58	57	98
CC 37	53	51	97
NC 71	47	50	107
GF 318	45	47	103
NC 299	44	45	103
NC 72	38	39	103
NC 297	35	36	103
CC 27	34	36	104
PVH 2275	11	11	99
Varieties without the *Php* gene[1]			
NC 938[4]	89	90	102
NC 925	83	84	101
CC 1063	84	83	99
CC 143	79	82	103
K 346	82	76	93
NC 606	69	68	99
CC 33	66	66	100
GL 395	64	60	95
CC 13	48	50	103
PVH 2254	48	49	102
GL 26H[4]	44	46	106
PVH 2110	43	46	108
CC 35	40	44	111
K 326	32	34	107
PVH 2310	25	25	103

[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 and 2017 by Clemson and by 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 2010-2017 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.*

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

Varieties with the *Php* gene[1]:	% Survival[2] 2010,2012-2017	Relative Yield Index[3] With Granville Wilt	Relative Yield Index[3] No Granville Wilt
CC 37	80	78	97
CC 27	74	77	104
CC 67	78	73	94
PVH 1452	68	67	98
NC 196	54	57	105
PVH 2275[4]	57	56	99
NC 297	55	56	103
GF 318	53	54	103
NC 72[4]	52	54	103
NC 299	50	52	103
CC 700	48	48	99
PVH 1600[4]	47	46	98
PVH 1118	45	45	100
NC 71[4]	36	38	107
Varieties without the Php gene[1]			
NC 606	74	73	99
CC 1063[4]	70	69	99
K 346	70	65	93
GL 939[4]	69	65	95
CC 143[4]	61	63	103
CC 33	62	62	100
NC 938[4]	56	57	102
PVH 2110	52	56	108
GL 395[4]	58	55	95
CC 13	53	55	103
GL 26H[4]	52	55	106
PVH 2254[4]	54	55	102
NC 925[4]	47	48	101
K 326	37	39	107
PVH 2310	36	37	103
CC 35	19	21	111

[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 soil fumigation. Results are averages from 5 field experiments conducted in 2010 and 2012-2017 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 2010-2017 Virginia OVT tests at the Southern Piedmont AREC, Blackstone. Yield indexes for "with Granville Wilt" = yield index without Granville wilt multiplied by average % Survival.

[4] *Ratings based on limited data available.*

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Table 5. Performance of selected flue-cured tobacco varieties in 2017 Virginia Tech on-farm tests for resistance to Granville Wilt.

	% Healthy Plants					
Variety	Baskerville-1	Alberta	Dolphin	Baskerville-2	4-test Average	Granville Wilt Yield Index 1
PVH 1452	98	97	96	92	95	94
PVH 1600	95	97	93	96	95	93
CC 1063	99	95	91	95	95	94
NC 938	96	96	96	90	94	96
NC 196	98	98	88	90	93	98
PVH 2254	98	94	89	90	93	95
CC 37	93	96	95	87	93	90
CC 27	95	93	93	89	92	96
PVH 1920	96	97	91	83	92	.
NC 299	96	90	92	87	91	94
CC 143	96	93	90	79	90	92
CC 33	96	85	86	76	86	86
GL 395	94	88	76	80	84	83
CC 13	98	90	76	72	84	86
NC 925	99	83	61	81	81	82
K 394	71	63	30	53	54	54

[1] Yield Index with Granville Wilt = proportion of plants surviving for each variety multiplied by the relative yield for that cultivar in the 2010-2017 Virginia OVT tests at the Southern Piedmont AREC, Blackstone.

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Table 8. Tobacco disease resistance in selected flue-cured tobacco varieties available in 2018.

	Resistance Rating[1]			Nematodes			
	Black Shank			Root-Knot			Tobacco
Variety	*Ph* gene (race 0 only)[2]	Race 1	Granville Wilt	*M. incognita*	Other species[3]	Tobacco Cyst	Mosaic Virus
CC 13	-	48	53	**+**	**+**	-	-
CC 27	**+**	34	74	**+**	-	**+**	**+**
CC 33	-	66	62	**+**	**+**	-	-
CC 35	-	40	19	**+**	**+**	-	-
CC 37	**+**	53	80	**+**	**+**	**+**	**+**
CC 67	**+**	63	78	**+**	-	**+**	**+**
CC 143	-	79	61	+	-	-	-
CC 700	**+**	58	48	**+**	-	**+**	-
CC 1063	-	84	70	+	-	-	-
GF 318	**+**	45	53	**+**	-	**+**	-
GL 26H[4]	-	44	52	+	-	-	+
GL 395	-	64	58	+	-	-	-
K 326	-	32	37	**+**	-	-	-
K 346	-	82	70	**+**	-	-	-
NC 71	**+**	47	36				
NC 72	**+**	38	52	**+**	-	**+**	-
NC 196	**+**	67	54	**+**	-	**+**	-
NC 297	**+**	35	55	**+**	-	**+**	**+**
NC 299	**+**	44	50	**+**	-	**+**	-
NC 606	-	69	74	**+**	-	-	-
NC 925	-	83	47	+	-	-	-
NC 938[4]	-	89	56	+	-	-	-
PVH 1118[4]	**+**	61	45	**+**	-	**+**	-
PVH 1452	**+**	69	68	**+**	-	**+**	-
PVH 1600[4]	+	58	47	+	-	+	-
PVH 2110	-	43	52	**+**	-	-	-
PVH 2254[4]	-	48	54	+	-	-	+
PVH 2275	**+**	11	57	**+**	**+**	**+**	**+**
PVH 2310	-	25	36	+	-	-	**+**

[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.*