

2003 Alfalfa Report

R.F. Spitaleri, M. Collins, G.D. Lacefield, B. Sleugh, and P.C. Vincelli

Introduction

Alfalfa (*Medicago sativa*) has historically been the highest yielding, highest quality forage legume grown in Kentucky. It forms the basis of Kentucky's cash hay enterprise and is an important component in dairy, horse, beef, and sheep diets. Choosing a good alfalfa variety is a key step in establishing a stand of alfalfa. The choice of variety can impact yield, thickness of stand, and persistence of alfalfa stands.

This report provides current yield data on alfalfa varieties included in yield trials in Kentucky, as well as guidelines for selecting alfalfa varieties.

Considerations in Selecting an Alfalfa Variety

Local Adaptation and Persistence. High yields in variety tests over a range of years and locations are the best indication that a variety is locally adapted and persistent. Several varieties are adapted for use in Kentucky as determined from results in this report.

Winter-Hardiness. Each variety has a fall dormancy rating that ranges from 1 (very dormant) to 9 (nondormant). In general, varieties with lower dormancy ratings take more warm weather in the spring to initiate growth, and they stop growing sooner in the fall. This growth habit can, but does not necessarily, reduce annual yields compared to less dormant varieties. Generally, alfalfa should have a fall dormancy rating of 2 to 5 and have good winter survival to yield well in Kentucky. Varieties with ratings of 6 and above are not winter-hardy under Kentucky conditions.

Disease and Pest Resistance. In Kentucky, producers should use varieties that have at least a moderate resistance (MR) rating to phytophthora root rot (PRR), anthracnose (An), bacterial wilt (Bw), and fusarium wilt (Fw), as well as a resistance (R) rating to aphanomyces root rot (APH). Kentucky research indicates that aphanomyces root rot is a widespread problem in the state during stand establishment and that resistance is beneficial, particularly in soils also infested with phytophthora root rot.

Phytophthora root rot is a fungal disease associated with poorly drained soils or excessive rainfall. This disease causes yellowish- to reddish-brown areas on roots and crowns that eventually become black and rotten. The top growth of infected plants appears stunted and yellow.

Anthracnose, also caused by a fungus, attacks the stems of alfalfa, preventing water flow to the rest of the shoot and causing sudden wilting. These wilted shoots have a characteristic

“shepherd's crook” appearance. Anthracnose can also cause a bluish-black crown rot. Bacterial wilt and fusarium wilt are infections of the water-conducting tissues of alfalfa roots and do not cause any noticeable root rot. These diseases prevent water flow to leaves, resulting in wilting of shoots and the eventual death of infected plants. Roots infected with bacterial wilt often have a yellowish-brown discoloration of the inner woody cylinder of the taproot. Fusarium infection can be recognized by brown to red streaks in the inner woody cylinder of the taproot.

Aphanomyces root rot is another fungal disease associated with poorly drained soils or excessive rainfall. Affected seedlings will be stunted but remain upright, unlike those with symptoms of damping off. In established plants, root symptoms are not as well defined as those for phytophthora root rot, but brown lesions on the taproot indicate where lateral roots were destroyed. This disease can be associated with phytophthora root rot, and together they may form a root disease complex. Aphanomyces root rot is known to affect new seedlings in Kentucky, but it is still unclear how it affects established alfalfa. In years with overly cool and wet spring weather, alfalfa stands have suffered great damage due to aphanomyces when planted with varieties that are susceptible to this disease.

Although certain alfalfa varieties are reported to have some resistance to sclerotinia crown and stem rot, research at the University of Kentucky has shown that these varieties often perform poorly against the disease under Kentucky conditions.

Seed Quality. Buy high-quality seed that is high in germination and purity and free from weed seed. Buy certified seed or proprietary seed of an improved variety. An improved variety is one that has performed well in independent trials, such as those that are reported in this publication or others like it. Other information on the label will include the test date, which must be within the previous nine months, the level of germination, and other crop and weed seed. Order seed well in advance of planting time to assure that it will be available when needed.

Description of the Tests

Alfalfa variety tests were established at Lexington (2000 and 2002), Bowling Green (1998 and 2003), and Princeton (2001) as part of the Forage Variety Testing Program. The soils at most locations are well suited to alfalfa because they are generally well-drained silt loams (Maury, Pembroke, and Crider at Lexington, Bowling Green, and Princeton, respectively). Eden Shale has a Nicholson silt loam soil. The Bowling Green tests are on soils that are naturally infested with both phytophthora and aphanomyces root rot pathogens.

Plots were 5 by 15 feet in a randomized complete block design with four replications. In each test, 20 pounds of seed per acre were planted into a prepared seedbed using a disk drill. Plots were harvested with a sickle-type forage plot harvester. First cuttings in the seedling year were delayed to allow the alfalfa to completely reach maturity as indicated by full bloom. Otherwise, harvests were taken when the alfalfa was in the bud to early flower stage. Fresh weight samples were taken at each harvest to calculate percent dry matter production. Management of all tests for establishment, fertility, pest control, and harvest management was according to University of Kentucky Cooperative Extension Service recommendations. Pests (weeds and insects) were controlled so that they would not limit yield or persistence.

Results and Discussion

Weather data for Bowling Green, Lexington, and Princeton are presented in Table 1. All locations experienced excellent rainfall amount and frequency during the spring, summer, and fall of 2003.

Yield data (on a dry matter basis) for all tests are reported in Tables 2 through 6. Varieties are listed in order from highest to lowest total production (for the life of the test). Experimental varieties are listed separately at the bottom of the tables and are not available commercially. Yields are given by cutting for 2003 and by year for each prior year of production.

Statistical analyses were performed on all alfalfa yield data (including experimentals) to determine if the apparent differences are truly due to variety. Varieties not significantly different from the highest numerical value in a column are marked with an asterisk (*). To determine if two varieties are truly different, compare the difference between the two varieties to the Least Significant Difference (LSD) at the bottom of the column. If the difference is equal to or greater than the LSD, the varieties are truly different when grown under the conditions at a given location. The Coefficient of Variation (CV), which is a measure of the variability of the data, is included for each column of means. Low variability is desirable, and increased variability within a study results in higher CVs and larger LSDs.

Table 7 summarizes information about fall dormancy, disease resistance, and yield performance across years and locations for all the varieties currently included in the tests discussed in this report. Varieties are listed in alphabetical order with the experimental varieties at the bottom. Remember that experimental varieties are not available for farm use, while commercial varieties can be purchased through dealerships. In Table 11, shaded areas indicate that the variety was not in that particular test (labeled at the top of the column), while white or unshaded blocks mean that the variety was in the test. A single asterisk (*) means that the variety was not significantly different from the top-yielding variety based on the 5% LSD. It is best to choose a variety that has performed well over several years and locations as indicated by the asterisks.

Summary

Consistent production of high yields of alfalfa is the result of good variety selection along with the implementation of good management techniques. For further information about alfalfa management, refer to these College of Agriculture publications, available at the local county Extension office:

- AGR-76 Alfalfa: The Queen of the Forage Crops
- AGR-107 Alfalfa: Quality Means Profits
- AGR-64 Establishing Forage Crops
- AGR-90 Inoculation of Forage Legumes
- AGR-18 Grain and Forage Crop Guide for Kentucky
- AGR-1 Lime and Fertilizer Recommendations
- AGR-148 Weed Control Strategies for Alfalfa and Other Forage Legume Crops
- ENT-17 Insect Management Recommendations for Field Crops and Livestock
- PPA-10d Kentucky Plant Disease Management Guide for Forage Legumes
- PPA-28 Alfalfa Varieties: Relative Disease Resistance and Winter Hardiness
- AGR-137 Alfalfa Hay: Quality Makes the Difference

Table 1. Temperature and rainfall at Bowling Green, Lexington, and Princeton in 2003.

	Bowling Green				Lexington				Princeton			
	Temp		Rainfall		Temp		Rainfall		Temp		Rainfall	
	°F	DEP	IN	DEP	°F	DEP	IN	DEP	°F	DEP	IN	DEP
JAN	32	-2	1.62	-2.20	26	-5	0.96	-1.90	31	-3	2.19	-1.61
FEB	36	-2	5.93	+1.80	32	-3	3.59	+0.38	35	-3	7.45	+3.02
MAR	51	+5	1.15	-3.95	47	+3	2.09	-2.31	50	+3	2.46	-2.48
APR	60	+3	5.69	+1.37	57	+2	3.14	-0.74	60	+1	6.99	+2.19
MAY	66	0	5.01	+0.07	63	-1	6.68	+2.21	67	0	4.81	-0.15
JUN	71	-4	8.92	+4.75	69	-3	4.85	+1.19	71	-4	5.05	+1.20
JUL	77	-1	4.41	-0.33	74	-2	2.68	-2.32	79	+1	4.75	+0.46
AUG	77	0	3.03	-0.48	75	0	5.26	+1.33	79	+2	2.05	-1.96
SEP	68	-2	6.89	+3.17	65	-3	4.22	+1.02	69	-2	6.17	+2.84
OCT	59	+1	1.43	-1.59	56	-1	1.61	-0.96	60	+1	3.73	+0.68
NOV	52	+6	5.18	+0.75	50	+5	4.63	+1.24	53	+6	5.85	+1.22
Total			49.26	+3.36			39.71	-0.86			51.50	+5.41

DEP is departure from the long-term average for that location.

Table 2. Dry matter yields (tons/acre) of alfalfa varieties sown April 26, 2000, at Lexington, Kentucky.

Variety	Total 2000	Total 2001	Total 2002	2003 Harvests				Total 2003	4-yr Total
				May 3	Jun 23	Aug 15	Sep 15		
Commercial Varieties—Available for Farm Use									
Pioneer 53h81	1.87	8.58	4.38	1.34	1.33	1.28	0.61	4.57	19.41*
Magnum V-wet	1.64	8.63	4.52	1.39	1.42	1.13	0.67	4.60	19.40*
Geneva	1.54	8.29	4.49	1.45	1.62	1.10	0.67	4.84	19.17*
Triplecrown	1.61	8.65	4.35	1.39	1.35	1.18	0.59	4.50	19.12*
ValuePlus1	1.47	8.37	4.51	1.43	1.50	1.11	0.71	4.75	19.09*
Magnum V	1.62	8.41	4.34	1.47	1.40	1.17	0.67	4.70	19.07*
5312	1.57	8.22	4.48	1.34	1.33	1.15	0.59	4.42	18.69*
Amerigraze 401+Z	1.70	8.53	4.12	1.33	1.25	1.04	0.63	4.23	18.59*
Pioneer 53h81treat	1.91	8.21	4.25	1.23	1.21	1.15	0.57	4.16	18.53*
54v54	1.49	8.08	4.31	1.34	1.33	1.13	0.57	4.37	18.25*
Abilene+Z	1.62	8.15	4.16	1.33	1.27	1.05	0.59	4.24	18.17
Rushmore	1.75	8.16	3.96	1.26	1.28	1.13	0.52	4.19	18.06
Arc	1.80	8.35	3.93	1.22	1.07	1.06	0.46	3.81	17.90
ZH9840htreat	1.74	7.90	3.89	1.19	1.30	1.15	0.59	4.23	17.76
Saranac AR	1.43	7.69	4.04	1.16	1.20	1.16	0.55	4.07	17.24
Experimental Varieties									
4m74	1.52	8.46	4.79	1.54	1.58	1.07	0.66	4.85	19.62*
ZC9854a	1.58	8.72	4.67	1.41	1.39	1.10	0.71	4.61	19.58*
ZG9840	1.69	8.76	4.47	1.33	1.40	1.22	0.66	4.61	19.53*
ZH9840h	1.72	8.21	3.88	1.21	1.28	1.28	0.62	4.39	18.20
Mean	1.65	8.33	4.29	1.33	1.34	1.14	0.61	4.43	18.70
CV,%	12.38	6.15	6.83	8.05	9.23	10.79	9.24	6.06	5.31
LSD, 0.05	0.29	0.72	0.42	0.15	0.18	0.17	0.08	0.38	1.41

* Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Variety	Total 2001	Total 2002	2003 Harvests				Total 2003	3-yr Total
			May 16	Jun 19	Jul 30	Sep 24		
Commercial Varieties—Available for Farm Use								
TripleCrown	4.83	6.93	2.34	2.56	1.51	1.25	7.66	19.41*
Hybridforce-400	4.85	6.63	2.50	2.54	1.40	1.42	7.86	19.34*
Geneva	4.76	6.55	2.41	2.62	1.49	1.33	7.85	19.17*
RewardII	4.91	6.82	2.33	2.34	1.31	1.23	7.21	18.94*
FK421	4.95	6.51	2.26	2.39	1.40	1.30	7.34	18.80*
WL342	4.53	6.45	2.41	2.78	1.33	1.27	7.79	18.77*
DK140	4.80	6.66	2.01	2.57	1.42	1.24	7.24	18.70*
Certified Arc	4.99	6.40	2.37	2.29	1.24	1.15	7.03	18.43*
Ameristand 403T	4.70	6.52	2.22	2.49	1.25	1.22	7.19	18.41*
Pegasus	4.49	6.61	2.26	2.54	1.30	1.20	7.31	18.41*
54V54	4.57	6.35	2.46	2.43	1.32	1.21	7.42	18.34*
Saranac AR	4.53	6.53	2.02	2.42	1.30	1.22	6.97	18.03
Experimental Varieties								
BY421	5.25	7.01	2.40	2.58	1.50	1.44	7.93	20.19*
FG4M76	4.85	7.15	2.44	2.69	1.56	1.40	8.09	20.09*
SX1002A	4.86	6.94	2.10	2.54	1.28	1.21	7.13	18.93*
SX1001A	4.64	6.92	2.07	2.35	1.22	1.19	6.82	18.38*
SX1004A	4.91	6.53	2.00	2.43	1.26	1.20	6.90	18.34*
SX1003A	4.71	6.64	2.25	2.37	1.21	1.15	6.98	18.33*
SX1005A	4.90	6.52	2.08	2.14	1.16	1.11	6.49	17.91
Mean	4.79	6.67	2.26	2.48	1.34	1.25	7.33	18.79
CV, %	10.13	7.93	9.08	11.21	10.22	12.39	7.53	7.06
LSD, 0.05	0.69	0.75	0.29	0.39	0.19	0.22	0.78	1.88

* Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Variety	Total 2002	2003 Harvests				Total 2003	2-yr Total
		May 13	Jun 20	Aug 4	Sep 15		
Commercial Varieties—Available for Farm Use							
4m76	1.25	1.67	1.46	0.82	0.79	4.75	6.00*
GH744	1.33	1.55	1.47	0.84	0.77	4.62	5.95*
Garst 6420	1.32	1.52	1.30	0.77	0.76	4.34	5.66*
WL338SR	1.41	1.54	1.35	0.69	0.66	4.25	5.65*
WL327	1.37	1.41	1.33	0.79	0.72	4.25	5.62*
WL319HQ	1.19	1.49	1.41	0.73	0.71	4.33	5.53*
Geneva	1.06	1.52	1.42	0.75	0.77	4.47	5.53*
Buffalo	1.21	1.42	1.23	0.79	0.66	4.09	5.30
54v54	1.23	1.47	1.24	0.71	0.63	4.06	5.28
Vernal	1.16	1.50	1.20	0.69	0.69	4.08	5.25
DK140	1.14	1.47	1.21	0.66	0.73	4.08	5.22
Saranac AR	1.25	1.47	1.07	0.66	0.62	3.83	5.08
Arc	1.08	1.47	1.05	0.69	0.78	4.00	5.08
Experimental Variety							
DU202	1.35	1.29	1.22	0.71	0.80	4.02	5.38*
Mean	1.24	1.48	1.28	0.74	0.72	4.22	5.47
CV, %	14.56	8.25	11.95	14.10	11.41	8.93	8.44
LSD, 0.05	0.26	0.18	0.22	0.15	0.12	0.54	0.66

* Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 5. Dry matter yields (tons/acre) of alfalfa varieties planted April 23, 2003, at Bowling Green, Kentucky.

Variety	2003 Harvest	Total Yield
	Sep 25	
Commercial Varieties—Available for Farm Use		
FSG 406	1.84	1.84*
Arc	1.8	1.80*
6530	1.79	1.79*
WL 357 HQ	1.75	1.75*
Saranac AR	1.75	1.75*
54v56	1.75	1.75*
6400 HT	1.74	1.74*
5-Star	1.73	1.73*
Regal	1.71	1.71*
Evermore	1.71	1.71*
Feast+EV	1.67	1.67*
FSG 505	1.62	1.62
Reward II	1.59	1.59
Experimental Varieties		
GA-3-01	2.00	2.00*
GA-4-01	1.74	1.74*
GA-2-01	1.73	1.73*
GA-1-01	1.65	1.65
Mean	1.74	1.74
CV, %	13.41	13.41
LSD, 0.05	0.33	0.33

* Not significantly different from the highest value in the column, based on the 0.05 LSD.

Table 6. Dry matter yields (tons/acre) of alfalfa varieties sown May 14, 1998, at Bowling Green, Kentucky.

Variety	Total 1998	Total 1999	Total 2000	Total 2001	Total 2002	2003 Harvests				Total 2003	Total Yield
						May 23	Jul 3	Aug 5	Sep 25		
Commercial Varieties—Available for Farm Use											
Pasture+	0.29	4.83	5.24	6.27	4.35	1.34	1.12	0.81	0.73	4.01	24.98*
DK 141	0.37	4.86	5.46	6.28	4.04	1.28	1.06	0.69	0.79	3.82	24.83*
ABT 350	0.32	4.54	4.96	6.37	4.34	1.20	1.05	0.78	0.72	3.75	24.27*
DK 140	0.39	4.77	5.54	5.45	4.30	1.26	1.07	0.67	0.74	3.73	24.19*
Emperor	0.30	4.50	4.87	6.17	4.20	1.32	1.11	0.73	0.81	3.96	24.00*
ABT 400 SCL	0.30	4.52	5.02	6.11	4.02	1.43	1.01	0.72	0.75	3.91	23.88*
Cimmaron 3i	0.33	4.70	5.23	5.82	3.92	1.28	0.99	0.68	0.71	3.66	23.66*
Geneva	0.29	4.53	4.89	5.95	4.14	1.12	0.99	0.70	0.77	3.58	23.38*
WL 326 GZ	0.28	4.42	4.99	6.01	3.95	1.31	1.00	0.70	0.72	3.74	23.37*
Choice	0.27	4.49	4.90	6.03	4.06	1.22	1.00	0.62	0.75	3.59	23.35*
Baralfa 54	0.25	4.28	4.81	5.75	3.95	1.26	0.96	0.64	0.70	3.56	22.60
ProGro	0.23	4.02	5.14	5.98	3.75	1.17	0.88	0.56	0.74	3.35	22.46
Stellar	0.21	4.10	4.72	5.71	3.85	1.17	1.00	0.68	0.66	3.52	22.11
Saranac AR	0.26	3.87	4.86	5.49	3.61	1.27	0.98	0.60	0.74	3.58	21.67
Vernal	0.20	3.65	4.62	5.80	3.95	1.10	0.91	0.66	0.70	3.37	21.59
Certified Arc	0.19	3.91	4.71	5.85	3.88	1.09	0.90	0.48	0.56	3.03	21.56
GoldPlus	0.28	4.15	4.62	5.30	3.78	1.14	0.99	0.58	0.70	3.41	21.55
Experimental Varieties											
ZC9750A	0.25	4.35	5.01	6.26	4.23	1.38	1.07	0.72	0.77	3.95	24.05*
ZC9751A	0.23	4.39	5.03	6.10	4.26	1.22	1.08	0.72	0.78	3.80	23.82*
C416	0.41	4.64	4.97	6.02	3.97	1.25	1.05	0.74	0.74	3.77	23.78*
ZC9651	0.33	4.34	5.27	5.82	3.95	1.27	1.09	0.68	0.78	3.83	23.55*
ZC9650	0.27	4.19	4.77	6.00	4.13	1.27	1.09	0.72	0.68	3.76	23.11*
ZG9640	0.19	4.19	4.62	5.93	4.17	1.33	1.09	0.75	0.75	3.92	23.00*
A9503	0.23	4.39	4.98	5.57	4.05	1.34	0.97	0.66	0.72	3.69	22.91*
ZG9641	0.32	4.27	4.61	5.91	4.00	1.18	1.00	0.68	0.77	3.63	22.75*
Mean	0.28	4.35	4.82	5.92	4.03	1.25	1.02	0.68	0.73	3.68	23.22
CV, %	36.17	11.09	6.43	10.53	7.94	14.59	8.38	14.27	14.04	8.54	6.90
LSD, 0.05	0.14	0.68	0.44	0.88	0.45	0.26	0.12	0.14	0.15	0.44	2.26

* Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 7. Characterization and performance of alfalfa varieties across years and locations.

Variety	Variety Characteristics ¹						Lexington						Bowling Green ²					Princeton			
	Disease Resistance ³						2000 ⁴				2002		1998			2003	2001				
	FD ⁵	Bw	Fw	An	PRR	APH	00	01	02	03	02	03	99	00	01	02	03	03	01	02	03
Commercial Varieties—Available for Farm Use																					
4m76	4.7	HR	HR	R	HR	R					*	*									
5312	3	HR	HR	HR	HR	HR		*	*	*	*										
53H81	3	HR	HR	HR	R	HR	*	*	*	*											
54V54	4	HR	HR	HR	HR	HR		*	*	*	*								*		*
5-Star	5	R	HR	R	R	R												*			
ABT 350	3	HR	HR	HR	HR	HR							*		*	*	*				
ABT 400SCL	4	HR	HR	HR	HR	HR								*	*	*					
Abilene+Z	5	HR	HR	HR	HR	R	*	*	*												
Amerigraze401+Z	4	HR	HR	HR	HR	R	*	*	*	*											
Ameristand 403T	4	HR	HR	HR	HR	HR													*	*	*
Arc	4	LR	MR	HR	-	-	*	*							*			*	*	*	*
Baralfa 54	-	R	HR	HR	HR	HR							*		*	*					
Buffalo A	-	-	-	-	-	-				*											
Choice	4	HR	R	R	HR	R							*		*	*	*				
Cimarron 3i	4	HR	HR	HR	HR	MR							*	*	*	*	*				
DK140	4	HR	HR	HR	HR	HR							*	*	*	*	*		*	*	*
DK141	4	HR	HR	HR	HR	H							*	*	*	*	*				
Emperor	4	HR	HR	HR	HR	HR							*		*	*	*				
Evermore	5	HR	HR	HR	HR	HR												*			
Feast+EV																		*			
FK 421	4	HR	H	H	H	H													*	*	*
FSG 406	4	HR	HR	HR	HR	HR												*			
FSG 505	5	HR	HR	HR	HR	R															
Garst 6420	4	HR	HR		HR	R					*	*									
Geneva	4	HR	HR	HR	HR	HR		*	*	*	*	*	*	*	*	*	*		*	*	*
GH 744	3.6	HR	HR	HR	HR	MR					*	*									
GoldPlus	4	HR	HR	HR	HR	R									*						
Hybridforce-400	4	HR	HR	R	HR	MR													*	*	*
Magnum V	4	HR	HR	R	HR	MR	*	*	*	*											
Magnum V - Wet	3	HR	HR	R	HR	R	*	*	*	*											
Pasture Plus	3	HR	HR	R	HR	MR							*	*	*	*	*				
Pegasus	4	HR	HR	HR	HR	R														*	*
ProGro	4	HR	HR	R	HR	MR								*	*						
Regal	5	HR	HR	R	HR	MR												*			
Reward II	4	HR	HR	R	HR	R													*	*	*
Rushmore	4	HR	HR	HR	HR	HR	*	*													
Saranac AR	4	MR	R	HR	LR	-			*		*				*			*		*	
Stellar	4	HR	HR	HR	HR	LR									*						
Triple Crown	4	HR	HR	HR	HR	HR		*	*	*									*	*	*
ValuePlus 1	4	HR	HR	HR	HR	R		*	*	*											
Vernal	2	R	MR	—	—	—					*				*	*					
WL319HQ	3	HR	HR	HR	HR	HR					*	*									
WL326GZ	4	HR	HR	HR	HR	HR							*		*	*	*				
WL327	4	HR	HR	HR	HR	R					*	*									
WL 338SR	4	HR	HR	HR	HR	HR					*	*									
WL 342	4	HR	HR	HR	HR	HR														*	*
WL 357 HQ	5	HR	HR	HR	HR	HR												*			

Table 7. Characterization and performance of alfalfa varieties across years and locations.

Variety	Variety Characteristics ¹						Lexington						Bowling Green ²					Princeton			
	FD ⁵	Disease Resistance ³					2000 ⁴			2002			1998			2003	2001				
		Bw	Fw	An	PRR	APH	00	01	02	03	02	03	99	00	01	02	03	03	01	02	03
Experimental Varieties																					
4m74	4	HR	HR	HR	HR	HR		*	*	*											
BY 421		HR	HR	R	HR	R												*	*	*	
C416	4	HR	HR	HR	HR	HR							*		*	*	*				
DU 202	4	HR	HR	HR	HR	R					*	*									
FG 4M76	5	HR	HR	R	HR	R												*	*	*	
GA-1-01	4	HR	HR	R	HR	R															
GA-984	5	HR	HR	R	HR	HR												*			
GA-3-01	6	HR	HR	HR	HR	MR												*			
GA-4-01	6	HR	HR	HR	HR	MR												*			
SX1001A																			*	*	*
SX1002A																			*	*	*
SX1003A																			*	*	*
SX1004A																			*	*	*
SX1005A																			*	*	
ZC9650	-	-	-	-	-	-							*		*	*	*				
ZC9651	5	-	-	-	-	-							*	*	*	*	*				
ZC9750A	-	-	-	-	-	-							*		*	*	*				
ZC9751A	-	-	-	-	-	-							*		*	*	*				
ZC9854a	5	HR	HR	HR	HR	HR		*	*	*											
ZG9640	-	-	-	-	-	-							*		*	*	*				
ZG9641	-	-	-	-	-	-							*		*	*	*				
ZG9840	4	HR	HR	HR	HR	HR	*	*	*	*											
ZH9840H	4	HR	HR	HR	HR	HR	*	*													
ZH9841H	-	-	-	-	-	-									*	*	*				

¹ Variety characteristics: FD=fall dormancy, Bw=bacterial wilt, Fw=fusarium wilt, An=anthracnose, PRR=phytophthora root rot, APH=aphanomyces root rot.

² The Bowling Green test is on soil infested with phytophthora and aphanomyces root rots.

³ Disease resistance: S=susceptible, LR=low resistance, MR=moderate resistance, R=resistance, HR=high resistance.

⁴ Establishment year.

⁵ Fall dormancy: 1=Spedor 3, 2=Vernal, 3=Ranger, 4=Saranac, 5=DuPuits.

Shaded boxes indicate that the variety was not in the test.

Open boxes indicate the variety was in the test but yielded significantly less than the top-ranked variety in the test.

* Not significantly different from the top-ranked variety in the test.

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