



**Annual Report to NE-183 – 1999 Disease Planting
Massachusetts Agriculture Experiment Station
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**Leaf Count for Scab, Cedar Apple Rust, Frog-eye,
and Powdery Mildew
2 July 2002, UMass Cold Spring Orchard, Belchertown, MA**

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Five replicates of twenty-one apple cultivars, including many new numbered varieties, were planted in 1999 at the UMass Cold Spring Orchard as part of a wide-scale study (NE-183) to evaluate these cultivars for disease susceptibility. (Similar plantings have been established to evaluate horticultural characteristics.)

On the first and second of July 2002, six terminals on each of the 105 trees were examined for the presence or absence of symptoms of four diseases: scab, cedar apple rust, frog-eye leafspot, and powdery mildew. For scab, rust, and frog-eye the number of leaves containing lesions were determined and calculated as a percentage of total leaves in each terminal. Mildew was scored as a percentage of the six terminals on each tree that had any leaves with mildew.

There was less scab this year (Table 1), with the highest mean percent leaves infected at 11% for 'Mcintosh' and the next two highest means at 7.0% in 'Hampshire' and 'Silken' cultivars. Four of the cultivars had an average less than 1% ('Pinova', 'Zestar', 'BC 8S 26-50', and 'Golden Delicious') and seven cultivars had no scab lesions at all ('Coop 29', 'Coop 39', 'CQR 10Y17', 'NJ 109', 'NY 65707-19', 'NY 75907-49', and 'Coop 25'). There were also differences between replicates, with higher means in the replicates at either end of the block.

There were two cultivars that had more leaves infected with cedar apple rust (Table 2) at 3.4 and 3.1% ('CQR 10T17' and 'Silken'). The rest of the cultivars were not significantly different, ranging from 0 to 3.0 % leaves infected. Four cultivars, 'NY 79507-72', 'Delblush', 'R. Macintosh', and 'Coop 25', did not have any cedar apple rust lesions.

Frog-eye leafspot incidence was highest in cultivars 'Zestar' and 'CQR 12T50' with average percent leaves infected of 12% and 10% respectively (Table 3). These were followed by 'NY 65707-19', 'NY 75907-49', and 'Coop 29' with averages of 7.4%, 6.1%, and 5.7%. The rest of the cultivars ranged from an average of 1.5 to 4.2% leaves infected. One of the replicates, at the end of the block bordering woods, had more leafspot than the other replicates.

Powdery mildew incidence was high during this year's count (Table 4). The cultivars with the most mildew were: 'CQT 10T17' (43%), 'NJ 90' (37%), 'Coop 29' (33%), and 'Coop 25' (33%). Seven cultivars had averages between 17% and 23% ('Runkle', 'Golden Delicious', 'Delblush', 'Silken', 'Hampshire', 'NJ 109', and 'NY75907-49' in descending order). The rest were 13% or below, with the lowest average of 3.4% for 'NY 65707-19'. There was a lot of variation between replicates in mildew infection. The replicates in the middle, 3 and 4, with means of 33 and 30% were greater than the others. Replicate 1 was also greater than reps 5 and 2.

Fruit Evaluation for Scab, Cedar Apple Rust, Flyspeck, Sooty blotch, and Summer Rots August-October 2002

Five replicates of twenty-one apple cultivars, including many new numbered varieties, were planted in 1999 at the UMASS Orchard as part of a wide-scale study (NE 183) to evaluate these cultivars for disease susceptibility. Over several dates from 30 August through 27 September 2002, the fruit on the 105 trees were counted, examined for the presence or absence of disease symptoms, photographed, and harvested. ANOVA and Tukey's HSD tests were performed on square root-transformed data because of the abundance of zeros. The arcsin transformation was also used.

The cultivar with the most scab-infected fruit was 'R. Macintosh' at 11%. This was significantly higher than all other cultivars. 'Silken', 'Zestar', and 'NJ90' all had 2% scab-infected fruit, but this was not significantly higher than the remainder of the cultivars which had 0% infected fruit. There were no differences between replicates.

- No cedar apple rust lesions were observed on the fruit.
- Six cultivars had flyspeck: 'Ambrosia' and 'NY65707-19' had 2% infected fruit, and the others had <1%. None of the differences were significant at the 5% probability level.
- Two cultivars had sooty-blotch symptoms: 'Ambrosia' had 3% infection and 'Golden Delicious' had 0.3% infection. There were no differences among treatments.
- Two cultivars had summer rot symptoms: 'Silken' had 2% fruit with rot and 'NJ90' had 0.3% fruit with rot. There were no differences among cultivars.

Table 1: 2002 NE 183 July count for scab (1999 Planting)

Treatment F=8.6 p=0.00 Rep F=11.8 p=0.00

<i>Cultivar name</i>	<i>By Treatment</i>		<i>By Rep</i>	
	<i>Treatment #</i>	<i>Mean %</i>	<i>Rep #</i>	<i>Mean %</i>
	<i>leaves infected</i>		<i>leaves infected</i>	
R. Macintosh	23	11 a*	2	3.3 a
Hampshire	6	7.0 a	5	2.8 a
Silken	20	7.0 a b	1	2.7 a
NJ 90	9	4.1 b	4	0.7 b
Ambrosia	2	3.4 b	3	0.6 b
Delblush	13	3.3 b		
Jubilee Fuji	7	1.9 b		
Runkle	12	1.0 b		
Pinova	17	0.78 b		
Zestar	8	0.63 b		
BC 8S 26-50	14	0.61 b		
Golden Delicious	1	0.49 b		
Coop 29	3	0.0 b		
Coop 39	4	0.0 b		
CQR 10T17	5	0.0 b		
NJ 109	10	0.0 b		
NY 79507-72	11	0.0 b		
CQR 12T50	16	0.0 b		
NY 65707-19	18	0.0 b		
NY 75907-49	19	0.0 b		
Coop 25	24	0.0 b		

*Means in each column followed by the same letter are not significantly different at the 5% probability level (Tukey's HSD test).

Table 2: 2002 NE 183 July count for cedar apple rust (1999 Planting)

Treatment F=8.5 p=0.00 Rep not significant

<i>Cultivar Name</i>	<i>Treatment #</i>	<i>Mean % leaves infected</i>	
CQR 10T17	5	3.4 a*	
Silken	20	3.1 a	
CQR 12T50	16	3.0	b
Ambrosia	2	2.9	b
NJ109	10	1.8	b
Pinova	17	1.7	b
Coop 39	4	1.3	b
NY 75907-49	19	0.67	b
BC 8S 26-50	14	0.65	b
Golden Delicious	1	0.60	b
Runkle	12	0.53	b
NY 65707-19	18	0.43	b
Hampshire	6	0.33	b
Coop 29	3	0.26	b
NJ 90	9	0.22	b
Jubilee Fuji	7	0.18	b
NY 79507-72	11	0.0	b
Delblush	13	0.0	b
R. Macintosh	23	0.0	b
Coop 25	24	0.0	b

*Means in each column followed by the same letter are not significantly different at the 5% probability level (Tukey's HSD test).

Table 3: 2002 NE 183 July Count for frog-eye leafspot (1999 Planting)

Treatment F=7.2 p=0.000 Rep F=6.1 p=0.00

<i>Cultivar Name</i>	<i>By Treatment</i>			<i>By Rep</i>		
	<i>Treatment #</i>	<i>Mean %</i>		<i>Rep #</i>	<i>Mean %</i>	
		<i>leaves infected</i>			<i>leaves infected</i>	
Zestar	8	12	a*	5	4.7	a
CQR 12T50	16	10	a b	2	3.9	b
NY 65707-19	18	7.0	a b c	1	3.6	b
NY 75907-49	19	6.1	b c d	3	3.5	b
Coop 29	3	5.7	b c d	4	3.2	b
Ambrosia	2	4.2	c d			
NJ 109	10	4.0	c d			
R. Macintosh	23	3.9	c d			
Jubilee Fuji	7	3.5	c d			
CQR 10T17	5	3.2	c d			
Coop 39	4	3.1	c d			
NY 78507-72	11	3.1	c d			
BC 8S 26-50	14	2.8	c d			
Hampshire	6	2.6	c d			
Runkle	12	2.4	c d			
Delblush	13	2.1	c d			
Golden Delicious	1	2.0	c d			
Pinova	17	1.9	d			
Coop 25	24	1.6	d			
Silken	20	1.5	d			
NJ 90	9	1.5	d			

*Means in each column followed by the same letter are not significantly different at the 5% probability level (Tukey's HSD test).

Table 4: 2002 NE 183 July count for powdery mildew (1999 Planting)

Treatment F=8.5 p=0.00 Rep F=57.1 p=0.00

<i>Cultivar Name</i>	<i>By Treatment</i>			<i>By Rep</i>		
	<i>Treatment #</i>	<i>Mean %</i>		<i>Rep #</i>	<i>Mean %</i>	
		<i>terminals infected</i>			<i>terminals infected</i>	
CQR 10T17	5	43	a*	3	33.3	a
NJ 90	9	37	a b	4	30.1	a
Coop 29	3	33	a b c	1	14.4	b
Coop 25	24	33	a b c d	5	4.7	c
Runkle	12	23	b c d	2	3.2	c
Golden Delicious	1	21	b c d e			
Delblush	13	20	b c d e			
Silken	20	20	b c d e			
Hampshire	6	17	c d e			
NJ 109	10	17	c d e			
NY 75907-49	19	17	c d e			
CQR 12T50	16	13	d e			
Pinova	17	13	d e			
Coop 39	4	13	d e			
Ambrosia	2	10	d e			
NY 79507-72	11	8.5	e			
BC 8S 25-33	14	6.8	e			
Jubilee Fuji	7	6.6	e			
Zestar	8	6.6	e			
R. Macintosh	23	6.6	e			
NY 65707-19	18	3.4	e			

*Means in each column followed by the same letter are not significantly different at the 5% probability level (Tukey's HSD test).