

Evaluation of protectant fungicide programs for management of apple scab in a DMI-resistant orchard, 2002.

Trials were conducted in a 27-year-old orchard of McIntosh and Cortland on MM.106 rootstock in Geneva, NY. Trees were planted in alternation within rows such that individual plots consisted of two trees, one McIntosh and one Cortland. Treatments were arranged in a randomized complete block design with four replications. All treatments were applied to drip using a handgun and high-pressure pump. Cover sprays were applied with an airblast sprayer at 3X concentration. Ascospore release was monitored from 15 Apr through 25 May with a Burkard spore trap to estimate disease pressure. Ascospore counts were summarized in daily increments; six major release events were identified. For each of these six events the following information is given: date of event, hours of leaf wetness and the average temperature during that period, amount of precipitation, percent of the total seasonal ascospore released for that period, and cumulative ascospore release. Individual leaf wetness periods were added together if separated by a drying period less than 24 hr. The events occurred: (1) 29-30 Apr, 20 hr, 40° F, 0.66 in., 22.5%, 22.5%; (2) 2 May, 7 hr, 46° F, 0.11 in., 16.6%, 40.3%; (3) 7 May, 5 hr, 57° F, 0.04 in., 5.8%, 47.2%; (4) 9 May, 4 hr, 52° F, 0.36 in., 12.3%, 59.7%; (5) 12-14 May, 56 hr, 44° F, 2.04 in., 31.6%, 91%; and (6) 16-18 May, 18 hr, 45° F, 0.33 in., 7.9%, 99.5%. A significant release/infection event may have occurred on 13 Apr (just prior to green tip for that orchard), however, the Burkard trap was not in place at the time. Apple scab incidence (presence/absence) was evaluated on McIntosh trees only by examining all leaves on 25 clusters per tree on 3 Jun and on the first 10 fully expanded leaves (i.e., oldest leaves) on each of 10 terminal branches on 16 Aug. One hundred fruit per tree were examined for the presence or absence of scab on the same dates. Data were transformed using arcsin transformation. Transformed data were analyzed using ANOVA. Treatment means were separated using Fisher’s Protected LSD test.

Disease pressure was higher than normal during primary scab season due to frequent rain events. Moreover, the period between pink and petal fall lasted nearly 3 weeks due to unusually cool temperatures. Almost all treatments provided greater than 95% control of cluster leaf scab. The same level of control was not achieved on fruit rated at the same time. This difference can be attributed to ontogenic resistance conferred to cluster leaves prior to the infection event that occurred between bloom and petal fall (12-14 May) where, presumably, the early fruit infections happened. Nonetheless, captan treatments (Captan and MANA131) generally provided better control than mancozeb treatments (Dithane and Penncozeb). However, the 2 lb rate of mancozeb was not included this trial. Even under the relatively dry conditions experienced this summer, secondary scab was not controlled with the standard cover spray program as seen with the very high level of late fruit and terminal leaf infection. In this orchard, it is obvious that excellent to good disease control early in the season is not sufficient to warrant extending spray intervals for cover sprays as is often recommended.

	% Foliar scab [% control]		% Fruit scab [% control]	
	Cluster leaves	Terminal	Early fruit	Late Fruit
	3 Jun	16 Aug	3 Jun	16 Aug
Captan 50WP 2 lb1-7	0.2 c [99]	93.5 b [6]	18.5 ef [80]	41.0 ef [59]
Captan 50WP 2 lb1-7	1.7 bc [97]	90.0 b [10]	24.3 de [74]	49.3 ef [51]
Captan 80WDG 1.25 lb1-7	0.9 bc [98]	89.5 b [10]	16.3 ef [82]	34.5 f [66]
Captan 50WP 1 lb1-7	0.6 bc [99]	95.3 ab [4]	12.3 ef [87]	51.5 ef [49]
MANA 131 1.25 lb1-7	1.1 bc [98]	90.5 b [9]	10.3 f [89]	31.8 f [68]
MANA 131 0.625 lb1-7	2.2 bc [96]	95.0 ab [5]	22.0 de [76]	61.0 de [39]
Dithane RSNT 75DF 1 lb1-7	1.8 bc [97]	95.8 ab [4]	57.5 c [38]	75.5 cd [25]
Penncozeb 75DF 1 lb1-7	4.3 b [92]	91.3 b [8]	37.0 d [60]	72.8 cd [27]
Dithane RSNT 75DF 1 lb1, 2				
Scala 400SC 3.43 fl oz3, 4, 5				
Scala 400SC 2.28 fl oz + Nova 40W 0.83 oz6, 7	4.0 bc [93]	92.8 b [7]	58.0 c [37]	90.0 bc [10]
Dithane RSNT 75DF 1 lb1, 2				
Scala 400SC 2.28 fl oz3, 4, 5				
Scala 400SC 1.71 fl oz + Nova 40W 0.83 oz6, 7	1.5 bc [97]	96.3 ab [3]	79.0 b [15]	96.2 ab [4]
Dithane RSNT 75DF 1 lb1				
Vanguard 75WG 1.67 oz2, 3				
Dithane RSNT 75DF 1 lb4-7	5.7 b [90]	97.0 ab [3]	36.3 d [61]	84.0 c [16]
Untreated check	54.3 a	99.5 a	93.1 a	100.0 a

* Mean disease incidence values from four replicate plots per treatment are shown. Means within a column not followed by a common letter are significantly different.

** Timing designations are as follows: #1 = 16 Apr (1/2-inch green); #2 = 18 Apr (tight cluster); #3 = 24 Apr (pink); #4 = 1 May (extended pink), #5 = 7 May (bloom); #6 = 16 May (petal fall); and #7 = 23 May (first cover). Unless otherwise noted, five (#8-#12) additional cover sprays of Topsin M 70WSB (3 oz/100gal) + Captan 50W (1 lb/100gal) were applied on 7, 20 Jun; 3, 18 Jul; and 1 Aug; respectively.