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Results of
Fungicide Evaluations

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Final Report
November 1983

TO : Industry Cooperators
 FROM: Dave Rosenberger
 DATE: November 14, 1983

The following pages contain summaries of our 1983 fungicide tests on tree fruits:

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The Cortland terminal leaf data (Page 4) includes a 19 August rating for "total leaves" and "last 8 leaves". Comparing these ratings provides some insight concerning where scab infections occurred. Where the percentage leaf infection is higher for total leaves than for last 8 leaves (e.g. Captan), infections occurred more frequently on earlier leaves, possibly during the latter part of the primary scab season. Where infection was greater on the last 8 leaves (e.g. UBI A-815 3.3 oz) late season infections predominated. Late season infections were mostly under-leaf scab. Although under-leaf lesions occurred on all leaf positions, infection was heaviest on the last 8 leaves where fungicide protection was lacking.

The prune black knot data is a brief summary of final results of a 1981 trial to evaluate RPARED fungicides (benomyl, captan, zineb) and alternatives. A manuscript detailing this trial is being submitted for publication in PLANT DISEASE.

I wish to thank all who contributed to our research effort by supplying information, ideas, chemical products and grants-in-aide. We appreciate your support. Please feel free to call if you have any further questions concerning trials reported here.

I will be on vacation and sabbatical leave from December 19, 1983 through mid August of 1984. My research technician, Mr. Frederick "Fritz" Meyer will be conducting our usual round of fungicide tests during 1984. Fritz has been doing these tests for 10 years and during the past few season has done all the ratings and much of the spraying. Thus, Fritz is well qualified to carry on our fungicide work. I plan to return for one week in March (probably March 5-9) to help finalize our plans for the 1984 tests. Please feel free to contact Fritz concerning products to be tested in 1984, or contact me prior to Dec. 16 or during my return visit in March. As most of you know, we can test only a limited number of compounds each year and we try to organize our trials to get the most meaningful treatment comparisons rather than assigning treatments on a first-come first-served basis.

Best wishes for the coming Holiday Season.

da

1983 Apple Scab and Cedar Apple Rust
Infection Periods and Fungicide Application Dates
Hudson Valley Laboratory, Highland, NY

Spray dates	McIntosh growth stage	Cumm. % scab spores discharged	Wetting periods				Potential Infection periods		Cedar apple rust placed in Rome trees
			Start Date	Hrs. duration	Avg temp	Inches rain	Mills chart	Cedar apple rust	
4/27	GT (4/12)	0.5% (4/6)	4/18 1800	38	35	.77 ^v	-	-	4/28
	H16	3.9% (4/11) 8.3% (4/21)	4/24 0500	53	45	2.14	H	-	
5/5	King bloom Full bloom	12.6% (4/28)	4/30 0030	10.5	56	0.10	L	-	Yes
			5/1 1900	14	55	.07	L	-	Yes
			5/3 0400	9	67	.10	L	-	Yes
5/18	Petal fall (75%)	27.0% (5/9) ^w	5/8 1800	15	49	.49	L	M	Yes
			5/15 0300	29	58	.45	H	H	Yes
5/28	5-7 terminal lvs. (6/1)	40.4% (5/18)	5/16 1100	21	43	.38	-	L-M	Yes
			5/19 2200	16	58	.14	M	H	Yes
			5/21 2200	11	59	Tr	L	M	Yes
			5/22 1900	17	64	.84	M	H	Yes
			5/23 2300	13	65	.05	M	H	Yes
			5/26 1900	37	59	1.39	H	H	Yes
6/8	5-7 terminal lvs. (6/1)	73.9% (5/25)	5/29 0700	31	67	.34	H	H	Yes
			5/30 1800	18	71	1.08	H	H	Yes
6/23	5-7 terminal lvs. (6/1)	82.6% (5/31)	5/31 1500	19	62	.07	H	H	Yes
			6/3 2200	13	68	1.16	M	H	Yes
6/23	5-7 terminal lvs. (6/1)	89.0% (6/6)	6/6 2100	14	70	.84	M ^y	H	Yes
			6/27 1930	35	72	1.90	-	H	-
6/23	5-7 terminal lvs. (6/1)	89.0% (6/6)	7/5 1500	17	74	.08	-	M	-
			7/15 1630	4	82	.13	-	-	-

Spray dates	McIntosh growth stage	Cumm. % scab spores discharged	Wetting periods			Inches rain	Potential infection periods		Cedar apple rust inoculum placed in Rome trees
			Start Date	Time	Hrs. duration		Avg temp	Mill's chart	
7/19			7/21	2230	4	70	-	-	
			7/24	0600	26	69	-	-	
			7/25	2300	10	63	-	H	
			7/31	0000	10	73	-	M	
			8/1	0100	8	72	-	M	
			8/1	1400	17	72	-	M	
			8/4	0600	5	73	-	H	
			8/4	1900	14	72	-	-	
			8/5	1800	16	71	-	H	
			8/6	1400	3	82	-	H	
			8/6	2200	11	69	-	-	
			8/7	2300	9	69	-	M	
			8/11	0500	37	65	-	M	
			8/18	0700	7	72	-	H	
			8/18	2200	12	63	-	L	
							-	H	

^vRain & melted snow.

^wScab lesions visible on early leaves (5/9/83).

^xQuince rust inoculum also placed in Romes.

^yLast primary infection period.

APPLE (Malus domestica 'McIntosh', 'Cortland', 'Paulared', 'Rome Beauty', 'Golden Delicious')

Scab; Venturia inaequalis

Cedar apple rust; Gymnosporangium juniperi-virginianae

Frogeye leafspot; Physalospora obtusa

Powdery mildew; Podosphaera leucotricha

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EVALUATION OF STEROL-INHIBITING FUNGICIDES FOR APPLE DISEASE CONTROL, 1983.

Fungicides were evaluated in a block of McIntosh/M.7a planted in 1980 and in a second block containing 4 cultivars on M.26 rootstock planted in 1978. Treatments were replicated 4 times using single-tree plots in the McIntosh block and 4-tree plots (containing one tree of each cultivar) in the M.26 block except that Paulared trees were present in only 3 replicates. Fungicides were sprayed to runoff (ca 2805 liters/ha or 400 gal/A) using a handgun at 2758-3448 kPa (400-500 psi). Spray dates for the M.26 orchard and corresponding McIntosh growth stages were Apr 27 (1-cm green), May 5 (king bloom), 18 (75% petal fall), 28, Jun 8, 23, Jul 19, Aug 5, and 23. The McIntosh orchard was sprayed the same days except the PF spray was applied May 17, the Aug 23 spray was omitted, and all the McIntosh plots except checks and Vanguard & Topsin M were switched to Captan 50W 120g (1 lb) for cover sprays Jun 23, Jul 19, and Aug 5. Our objective was to apply sprays during the primary scab season on a postinfection basis with a minimum of 10 days between sprays to determine if the fungicides would adequately control disease when applied on an extended schedule. The first and third (M.26 orchard) sprays were applied 77 hrs after the start of severe infection periods and the second 51 hrs after a light infection. Subsequent infection periods were too numerous and closely grouped to pinpoint postinfection timing. Moderate infection periods occurred May 22-23 and Jun 3 midway between spray dates. Six severe, five moderate, and 5 light primary Mill's infection periods occurred from Apr 24 to Jun 7 with most of the moderate and severe infection periods after May 15. Only two secondary infection periods and 5.6 cm rain occurred Jun 7-Jul 21, but 4 rains and 7 dew periods provided wetting periods long enough for moderate-severe scab infection periods Jul 24 to Aug 18. Cedar branches containing cedar apple rust galls and quince rust cankers were placed in each Rome Beauty tree in the M.26 orchard on Apr 28, May 9 and 19, but rust disease pressure was light and most infection occurred after petal fall. Data was collected from 20 clusters per tree on Jun 2 (Cortland) and 7 (McIntosh); from all leaves on 20 terminals per tree on Jul 14 (Paulared), Aug 16 (Rome) and 25 (Golden Delicious), and from 100 fruit per tree in Sep and Oct.

Frogeye leafspot was not controlled by Baycor, Bayleton, or UBI A-815 except when Captan was included in the treatment. Cluster-leaf scab resulted primarily from the Apr 24 infection period and control reflects the effectiveness of a 72 hr post-infection spray. (Mean temperature from start of the infection period to application of sprays was 7.3C). Except for Bayleton, all materials provided good control of primary scab on Cortland terminal leaves (Jun 15 rating). However, severe under-leaf scab developed in early August and was effectively controlled in the M.26 orchard only by Baycor, DPX H6573, Captan following Funginex, and the combinations of UBI A-815 and Captan. Only underleaf scab was counted in the Sep 1 McIntosh terminal leaf ratings and results show the Captan and Vanguard-Topsin M cover sprays were effective. Cedar apple rust was effectively controlled by Baycor, Bayleton, and DPX H6573. Rust infections on fruit were rare even in control plots because the major infection periods occurred after fruit were no longer susceptible. Golden Delicious fruit from trees treated with Baycor or Funginex at 78 ml/100 liters had more russet than other treatments, but on other varieties all treatments resulted in good fruit finish.

1983 Apple Fungicide Trial: Hudson Valley Laboratory
 Table 2: Cluster and Terminal Leaf Ratings for Cortlands: M.26 Orchard

Treatment and rate of formulated materials/100 liters (100 gal) ^w	% Cortland cluster leaves infected ^x		% Cortland term. lvs. with scab ^x		Lesions /infected leafy			
	frog-eye		19 August					
	15 June	total lvs.	15 June	last 8 lvs.				
1. Check	8.7	d	18.5	f	99.0	g	2.8	bc
2. Captan 50W 120g (1 lb)	1.8	atc	9.6	de	14.8	bc	99.7	g
3. Dikar 77W 240g (2 lb)	1.3	ab	9.5	de	10.3	abc	6.3	abc
4. Baycor 50W 30g (4 oz) after May 28: 180g (1.5 lb)	5.5	cd	5.3	cd	9.3	abc	10.9	c
5. DPX H6573 40%L after May 29: 15g (2 oz)	0.7	a	Tr ^z	a	2.7	a	2.0	ab
6. Funginex 18.2%EC 4.9ml (0.625 fl oz) 78ml (10 fl oz) after May 28:	2.6	abc	4.1	bc	13.6	bc	4.8	abc
7. Funginex 18.2%EC 47ml (6 fl oz) & Captan 50W 120g (1 lb) after May 28:	1.3	ab	5.9	cd	7.5	abc	3.3	abc
8. Bayleton 50W 3.75g (0.5 oz)	5.0	bcd	9.8	de	85.1	f	89.3	f
9. Bayleton 50W 3.75g (0.5 oz) & Captan 50W 120g (1 lb)	0.8	a	14.5	ef	21.2	cd	9.8	bc
10. UBI A-815 30W 50g (6.7 oz)	4.8	bcd	3.0	bc	35.0	de	29.8	d
11. UBI A-815 30W 25g (3.3 oz)	10.4	d	2.5	bc	40.1	e	54.1	e
12. UBI A-815 30W 25g (3.3 oz) & Captan 50W 120g (1 lb)	0.4	a	1.8	b	3.8	ab	1.8	ab
113. UBI A-815 30W 12.5g (1.7 oz) & Captan 50W 120g (1 lb)	0.5	a	5.3	cd	5.0	ab	1.0	a

Numbers within columns followed by same letter are not significantly different (DMRT P = 0.05).
^wSprays were applied April 27 (tight cluster), May 5 (pink), 17 (bloom), 28 (petal fall), June 6, 23, July 19, and August 5 and 23.
^xData collected from 20 clusters per tree.
^yData collected from 10 terminals per tree on August 25.
^zTr 0.05% infected.

1983 Apple Fungicide Trial: Hudson Valley Laboratory
 Table 3: Terminal Leaf Scab and Cedar Apple Rust: M.26 Orchard

Treatment and rate of formulated materials/100 liters (100 gal) ^w	% Terminal leaves infected with apple scab ^x		% Terminal leaves infected with cedar apple rust ^x		% Pauleared terminal lvs. with mildew ^x
	Rome	Golden Del.	Rome	Golden Del.	
1. Check					
2. Captan 50W 120g (1 lb)	99.9	h	19.8	f	10.4 c
3. Dikar 77W 240g (2 lb)	24.4	ef	12.4	de	8.6 c
4. Baycor 50W 30g (4 oz)	20.0	def	1.5	b	Tr a
5. DPX H6573 40%L	3.4	ab	0	a	0.7 a
6. Funginex 18.2%EC	0.4	a	0	a	1.3 a
78ml (10 fl oz) after May 28:					2.3 abc
7. Funginex 18.2%EC	15.5	cde	9.1	cde	0.5 ab
47ml (6 fl oz) & Captan 50W 120g (1 lb) after May 28:					0.2 a
8. Bayleton 50W 3.75g (0.5 oz)	6.5	bc	15.1	ef	1.7 b
9. Bayleton 50W 3.75g (0.5 oz) & Captan 50W 120g (1 lb)	93.9	g	0	a	0 a
10. UBI A-815 30W 50g (6.7 oz)	25.7	ef	0	a	1.1 a
11. UBI A-815 30W 25g (3.3 oz)	20.7	def	1.7	b	1.2 a
12. UBI A-815 30W 25g (3.3 oz) & Captan 50W 120g (1 lb)	32.3	f	8.3	cd	Tr a
13. UBI A-815 30W 12.5g (1.7 oz) & Captan 50W 120g (1 lb)	9.7	bcd	6.5	c	0.3 a
78ml (10 fl oz) after May 28:					1.3 a
Numbers within columns followed by same letter are not significantly different (DMRT P = 0.05).			6.3	c	0.7 ab
Sprays were applied April 27 (tight cluster), May 5 (pink), 17 (bloom), 28 (petal fall), June 6, 23, July 19, and August 5 and 23.					1.9 ab

^wData collected from 20 terminals per tree on 14 July (Pauleared), 16 August (Rome), and 25 August (Golden Delicious).
^xSprays were applied April 27 (tight cluster), May 5 (pink), 17 (bloom), 28 (petal fall), June 6, 23, July 19, and August 5 and 23.

1983 Apple Fungicide Trial: Hudson Valley Laboratory
 Table 4: Results of Fruit Evaluations for Apple Scab and Russeting

Treatment and rate of formulated materials/100 liters (100 gal) ^w	% fruit with apple scab ^x						Golden Delicious russet rating ^y
	Paulared	Cortland	Rome Beauty	Golden Delicious			
1. Check	72.7	d					
2. Captan 50W 120g (1 lb).....	1.6	ab	99.6	e	99.1	e	-
3. Dikar 77W 240g (2 lb).....			5.1	bc	3.3	c	0.20
after May 28: 180g (1.5 lb).	1.7	ab	2.5	abc	0.5	ab	0.32
4. Baycor 50W 30g (4 oz).....			0.3	ab	0	a	0.42
after May 28: 15g (2 oz) ...	0.22	a	0	a	0	a	0.26
5. DPX H6573 40%L 4.9ml (0.625 fl oz)	0	a					
6. Funginex 18.2%EC 78ml (10 fl oz)							
after May 28: Polyram 80W 180g (1.5 lb)....	0	a	2.6	abc	0.9	abc	0.48
7. Funginex 18.2%EC 47ml (6 fl oz) & Captan 50W 120g (1 lb) after May 28:							
Captan 50W 180g (1.5 lb).....	9.8	bc					
8. Bayleton 50W 3.75g (0.5 oz)....	20.9	c	0.6	ab	Tr	a	0.02
9. Bayleton 50W 3.75g (0.5 oz) & Captan 50W 120g (1 lb).....			77.4	e	92.8	d	
10. UBI A-815 30W 50g (6.7 oz)....	0	a	7.9	c	2.7	bc	0.03
11. UBI A-815 30W 25g (3.3 oz)....	1.0	ab	0	a	0.3	ab	0.20
12. UBI A-815 30W 25g (3.3 oz) & Captan 50W 120g (1 lb).....	0.2	a	3.6	abc	2.2	bc	
13. UBI A-815 30W 12.5g (1.7 oz) & Captan 50W 120g (1 lb).....	0.6	ab	0.4	ab	Tr	a	
& Captan 50W 120g (1 lb).....	0.7	ab	2.3	abc	0.1	a	

Numbers within columns followed by the same letter are not significantly different (DMRT P = 0.05). The arcsin transformation was used for all statistical analyses.
^wSprays were applied April 27 (tight cluster), May 5 (pink), 17 (bloom), 28 (petal fall), June 6, 23, July 19; and August 5 and 23.
^xFruit evaluations based on all available fruit (Paulared) or on 100 randomly selected fruit/tree harvested Aug 23 (Paulared), Sep 23 (Cortland), Sep 28 (Rome Beauty), and Oct 10 (Golden Delicious).
^yRated 0-4: 0= no russet, 1= very slight, 2= slight, 3= moderate russeting.

1983 Apple Fungicide Trial: Hudson Valley Laboratory
Apple Scab Rating in The McIntosh Block

Treatment and rate of formulated material/100 liters (100 gal) ^w	% McIntosh leaves with scab ^x						% McIntosh fruit with scab ^z			
	Cluster leaves	Terminal leaves								
		Jun 17	Jul 22	Sep 17						
Check	14.7	d	49.2	c	72.9	d	95.9	d	100.0	b
Captan 50W 240g (2 lb)	4.2	c	0.1	a	0.4	b	0.2	abc	0.5	a
Captan 50W 120g (1 lb)	3.4	bc	2.0	b	1.7	c	1.3	c	0.4	a
Vanguard 10W 19g (2.5 oz)	0.7	a	0	a	0.3	ab	0.9	bc	Tr	a
Vanguard 10W 11g (1.5 oz)	0.6	a	0	a	Tr	ab	0.3	abc	2.8	a
Vanguard 10W 11g (1.5 oz) & Captan 50W 120g (1 lb)	1.0	ab	0.1	a	0	a	Tr	a	0	a
Vanguard 10W 11g (1.5 oz) & Topsin M 70W 15g (2 oz)	0.7	a	0	a	0.1	ab	0.1	ab	0.4	a
Rubigan 1EC 12ml (1.5 fl oz) ..	0.4	a	Tr	a	Tr	ab	0.4	abc	0	a
Rubigan 1EC 12ml (1.5 fl oz) & Captan 50W 120g (1 lb)	0.5	a	Tr	a	0.1	ab	0.6	abc	0	a

Numbers within columns followed by the same letter are not significantly different (DMRT P = 0.05).

^wSprays were applied April 27 (tight cluster), May 5 (10% bloom), 17 (early petal fall) 28, and June 8. All plots except checks and Topsin M plus Vanguard received Captan 50W 120g (1 lb) on June 23, July 19, and August 5. Sprays of Topsin M plus Vanguard were continued through the three cover sprays.

^xData collected from 20 clusters or 20 terminals/tree.

^yOnly underleaf scab was counted on September 1.

^zData collected from all available fruit (10 to 80/tree) on Sep 19.

EVALUATION OF BRAVO 500 AND DIFOLATAN SAT TREATMENTS, 1983: Two rates of Bravo 500 and two formulations of Difolatan were applied at the green-tip stage on April 12 to mature apple trees on M.2 rootstocks. Treatments were replicated 4 times in a randomized block design with 2 trees of each of eight varieties in each plot (16-tree plots). Sprays were applied to runoff using a handgun at 2758 kPa (400 psi). On May 28, the combination of Rubigan 1E 23 ml/100 liters (3 fl oz/100 gal) and Manzate 200 80W 180g/100 liters (1.5 lb/100 gal) was applied to the north one-half (8 trees) of each of the plots including the checks. The south half of each plot was not sprayed until June 10 when a second Rubigan plus Manzate 200 spray was also applied to the north plots. McIntosh bud stages and dates were 1-cm green April 27, king bloom May 5, full bloom May 8, petal fall May 20. Eleven primary scab infection periods (with 17.6 cm rain) were recorded from April 12 to May 28, and an additional 5 infection periods (with 8.9 cm rain) occurred between May 29 and June 10. On June 2, 25 fruiting clusters per tree from a single McIntosh and Cortland tree in each SAT plot were evaluated for cluster leaf and fruit, infections, and all leaves on terminals developing from the clusters were also evaluated. Final ratings were made July 22 by evaluating 100 fruit per tree and all leaves on 20 terminals per tree.

Cluster leaf scab developed primarily from one 53 hr - 7.2C infection period April 21 although three light infection periods April 30-May 3 may have contributed slightly. Few significant differences were detected among the four SAT treatments in the evaluations of plots resprayed on May 28, but evaluations of fruit scab on McIntosh and Delicious trees not resprayed until June 10 suggest Difolatan 4F may be slightly more persistent than the other SAT treatments. Leaf and fruit ratings made on June 2 reflect scab development through petal fall but would not include infections which occurred after May 20-22 because the later infections had not yet developed symptoms. Comparison of the McIntosh fruit ratings for June 2 and July 22 shows only a small amount of fruit scab developed after June 2 in plots sprayed May 28. Application of the Rubigan-Manzate 200 on May 28 apparently provided kickback action to stop fruit infections which occurred during two moderate and one heavy scab infection period between May 22 and 26; otherwise a larger increase in fruit scab would have occurred between the June 2 and July 22 ratings. Application of Rubigan at normal petal fall about May 20 might have resulted in significantly less scab than we observed following our May 28 spray, but our results probably reflect the amount of scab to which would have developed if a contact fungicide had been applied on May 22 when most growers applied petal fall sprays. The SAT fungicides were under severe scab disease pressure in this trial because of the heavy inoculum pressure in the orchard, the extensive rainfall between green tip and petal fall, and the extended bloom period. Comparison of rust infections for the plots first sprayed May 28 and those not sprayed until June 10 shows most rust developed late in the season and rust pressure prior to petal fall was very light.

Field Trial with SAT Fungicides: Hudson Valley Laboratory
 Table 5 Evaluation of Apple Scab and Cedar Apple Rust: Entomology Orchard (West)

SAT Treatment and rate of formulated materials/100 liters (100 gal)	% Cortland cluster lvs. with frogeye		% Cluster lvs. with scab		% McIntosh term. lvs. with scab 2 June		% Fruit with scab 2 June	
	McIntosh	Cortland	McIntosh	Cortland	McIntosh	Cortland	McIntosh	Cortland
Check	53.5 a	20.8 b	19.5 b	20.8 b	27.0 b	19.2 c	5.2 b	5.2 b
Bravo 500 500ml (2 qt)	37.1 a	2.4 a	5.6 a	2.4 a	9.4 a	4.3 b	1.4 a	1.4 a
Bravo 500 1000ml (4 qt)	46.2 a	4.1 a	5.0 a	4.1 a	10.0 a	1.4 ab	0.1 a	0.1 a
Difolatan 4F 1250ml (5 qt)	38.9 a	5.7 a	5.6 a	5.7 a	7.3 a	0.8 a	1.6 ab	1.6 ab
Difolatan 80 Sprills 749g (6.25 lb)	35.1 a	5.3 a	6.2 a	5.3 a	10.4 a	2.9 ab	0.4 a	0.4 a

SAT treatment and rate of formulated materials/100 liters (100 gal)	% apple scab in McIntosh and Delicious 22 July		% Golden Delicious terminal leaves with cedar apple rust	
	SAT followed by 28 May spray		SAT -- 5/28	
	McIntosh	Delicious	fruit	fruit
Check	39.8 b	23.1 b	44.4 b	86.2 c
Bravo 500 500ml (2 qt)	14.8 a	5.1 a	7.3 a	34.5 b
Bravo 500 1000ml (4 qt)	15.6 a	5.1 a	6.4 a	20.0 ab
Difolatan 4F 1250ml (5 qt)	17.5 a	4.2 a	1.8 a	13.1 a
Difolatan 80 Sprills 749g (6.25 lb)	11.8 a	0.9 a	3.4 a	19.1 ab
			98.5 c	93.8 c
			65.3 b	50.0 b
			58.7 ab	38.4 ab
			36.4 a	23.7 a
			53.5 ab	35.4 ab

SAT treatment and rate of formulated materials/100 liters (100 gal)	% Apple scab in Golden Delicious 22 July		% Golden Delicious terminal leaves with cedar apple rust	
	SAT -- 5/28 spray		SAT -- 6/10 spray	
	term. lvs.	fruit	term. lvs.	fruit
Check	5.7 a	14.0 b	42.5 b	34.4 b
Bravo 500 500ml (2 qt)	5.4 a	2.0 a	19.9 a	1.9 a
Bravo 500 1000ml (4 qt)	5.0 a	0.5 a	18.5 a	3.6 a
Difolatan 4F 1250ml (5 qt)	2.6 a	0.2 a	28.9 ab	2.3 a
Difolatan 80 Sprills 749g (6.25 lb)	5.4 a	0 a	16.2 a	2.9 a
			0.8 b	19.5 a
			Tr a	10.5 a
			Tr a	19.2 a
			0.1 ab	12.3 a
			Tr a	18.3 a

Numbers within columns followed by the same letters are not significantly different (DMRT, P = 0.05).
 SAT treatments applied 12 April.

APPLE POWDERY MILDEW CONTROL WITH BAYLETON IN A COMMERCIAL BLOCK OF MATURE CORTLAND TREES: A 6.8 ha (17 A) block of mature Cortland apple trees on standard rootstock was subdivided into four plots to test effectiveness of Bayleton 50W in various spray-timing programs. Mildew was extremely severe in the block the previous year. All sprays were applied by a commercial grower using an Agtec sprayer set to deliver 187 liters of spray per hectare (20 gal/A). Captan was used for scab control throughout the season and was combined with Bayleton in all mildew sprays. Treatments were evaluated July 27 by counting the number of mildew infected leaves on each of 20 terminals for four trees in each plot. The effect of Bayleton on terminals with primary mildew was evaluated by counting the number of primary infections visible on the lower two meters of a tree in a carefully-timed, 45-second count. Counts were made for 10 trees in each plot.

Results (below) show the tight-cluster spray of Bayleton had little effect in reducing mildew infection whereas the bloom spray resulted in a large reduction of both visible primary infections and percent leaves infected. Presumably, fewer primary infections were visible where the bloom spray was applied because Bayleton eradicated some of the primary infections. Many of the terminals with primary infections included in our counts had some healthy leaves where the progression of infection had been arrested. In the plots receiving the bloom spray, most mildew was evident at the ends of terminals indicating an additional spray (or sprays) should have been applied after June 14. Incidence of mildew was higher in the tops of trees than in the lower portion where our counts were made; the low-volume sprayer apparently did not provide adequate coverage in the tops of the trees.

	Differences in Bayleton spray programs ^x		% leaves infected with mildew July 27	No. of primary infections per tree observed in 45 seconds
	TC	Bloom		
Plot 1	-	-	39.0 ± 4.2	6.5 ± 3.3
Plot 2	-	X	9.1 ± 3.8	3.7 ± 2.5
Plot 3	X	X	10.9 ± 1.9	4.3 ± 1.5
Plot 4	X	-	23.1 ± 4.8	9.6 ± 2.9

^x Bayleton 50W was applied to all plots at 210g/ha (3 oz/A) on May 4 (pink), and at 105g/ha (1.5 oz/A) on May 25 (petal fall) and June 1 and 14. The tight cluster spray was applied April 30 at 105g/ha and the bloom spray May 14 at 210g/ha.

EVALUATION OF RIDOMIL FOR CONTROL OF CROWN ROT ON APPLE TREES, 1982-1983: An unusual outbreak of crown rot occurred in Hudson Valley apple orchards during 1982. The most immediate and severe effects were noted on 1-5 yr-old tree which developed purple foliage through all or parts of the crown in September. The crown areas of affected trees showed typical crown rot symptoms from the soil line to depths of 4-8 inches. Affected orchards included trees on M26, M7, and M9 as well as the highly susceptible MM106, and infections were not limited to trees in poorly drained sites. Our best guess is that extremely dry conditions during March and April, 1982, predisposed trees to infection during an unusually wet June. Phytophthora has not been indisputably proven to be the cause of the crown rot problem, but symptoms are typical of Phytophthora infections.

Three orchards were selected for trials with Ridomil 2E starting in Fall of 1982:

Trial	Variety/Rootstock	Year planted	Application dates		Number of trees	
					treated	controls
I	Jonamac/M7a	1980	9/29/82	5/5/83	56	64
II	Delicious/M9/Alnarp 2	1978	10/13/82	5/2/83	10	10
IIIa	Empire/MM106	1979	10/26/82	5/2/83	35	35
IIIb	Tydemans' Early/MM106	1979	10/26/82	5/2/83	35	35

Treatments were made by mixing 1 qt of Ridomil 2E in 100 gallons of water and pouring 1 qt of the mixed solution around the crown of each tree. Untreated trees in alternate rows were used as controls. The orchard used for Trial I was most typical of the orchards first affected in 1982. No crown rot symptoms were observed during 1980 and 1981, but 17 control trees and 16 treated trees showed distinct foliage and crown symptoms in fall of 1982. Orchards used for Trials II and III were more poorly drained sites and some trees in these sites showed symptoms of Phytophthora infection prior to 1982.

Plots were evaluated in late September 1983 by visually rating treated and control trees. Visual ratings showed no difference between treated and untreated trees. In Trial I, some trees died in both treated and untreated plots and some trees showing slight symptoms in 1982 recovered in both plots. Trees showing no symptoms in 1982 remained symptomless through 1983 in both plots. In Trials II and III, no differences were apparent between treated and untreated trees.

These trials suggest many trees with above-ground symptoms of crown rot recover without treatments when conditions no longer favor disease development. Trees with severe foliar symptoms were in many cases already girdled prior to treatment. In orchards where poor drainage favors chronic root disease problems (as in Trial III), tree response is not visually detectable in one years time. Possibly treated trees in chronically-infected orchards would show more response to Ridomil in long-term (3-5 year) studies.

Portions of these trials were conducted by Warren Smith, Ulster County Extension Fruit Agent, and by Mary Concklin, Columbia County Extension Fruit Agent.

Table 1. Effectiveness of various black-knot fungicide programs applied to Stanley prunes in 1981, effect of black knot infection on yield, and estimated crop-loss values expected for average New York prune orchards under the same black knot disease pressure and fungicide programs.

Material and rate per 100 liters (100 gal)	Mean number of infections per tree	% of 1981 limb length		Mean 1982 yield g/m of limb	Estimated 3- yr crop loss resulting from single-year's infection ^x (\$/A)
		Infected with knot	Lost by removing knots		
1. Check	1416 c	52.3 e	100.0 d	0.2 d	4900
2. Captan 50W 240g (2 lb)	228 a	14.2 bc	71.3 b	29.5 ab	2691
3. Benlate 50W 30g (4 oz)					
& Captan 50W 120g (1 lb)	465 ab	20.1 c	91.1 c	14.1 c	3517
4. Zineb 75W 240g (2 lb) prebloom					
Zineb 75W 120g (1 lb)					
& Captan 50W 120g (1 lb)	80 a	4.5 a	38.4 a	33.6 a	1328
5. Topsin M 4F 87.5 ml (11.2 fl. oz)	772 b	36.0 d	99.6 d	0.9 d	4396
6. Carbamate 76W 240g (2 lb) prebloom					
Carbamate 76W 120g (1 lb)					
& Kolospray 81W 360g (3 lb)	239 a	13.5 b	64.9 b	20.1 bc	2479
7. Dichlone 50W 30g (4 oz) ^y	282	7.2	42.8	23.7	3865

Means within columns followed by the same letter are not significantly different (BET, $P \leq 0.05$).

^wDetermined by counting and measuring individual knots and using average knot length to estimate the number of infections where knots stroma coalesced on severely infected limbs.

^xEstimated crop-loss value for average New York State prune orchards under similar disease pressure and fungicide programs as determined from extensive computations including a regression equation relating yield to tree size and infection level, average yield/tree in New York, and carry-over effect of black knot on yield.

^yNot included in analysis because Dichlone was tested on only two instead of 4 trees.