

Efficacy of Captan, Mertect 340F, and Scholar for preventing stem-end blue mold in apples, 2001-02.

The objective of this experiment was to determine if postharvest fungicide treatments could be used to prevent stem-end infection of Empire apples during controlled atmosphere (CA) storage. Treatments were replicated four times using 25 fruit per replicate in a randomized block design. For each replication, all of the fruit were harvested from a single tree, thereby allowing experimental error attributable to tree-to-tree variations in fruit susceptibility to be isolated in the blocking factor. Apples were harvested, treated, and packed for storage on 1 Oct. Mean fruit firmness at harvest was 18.4 lb and the mean starch index was 3.4 on a scale of 1 (immature) to 8 (fully mature) as determined using the index chart developed by Blaupied and Silsby [1992, *Predicting Harvest Date Windows for Apples*. Cornell Cooperative Ext. Information Bull. 221, 12 pages]. Non-wounded fruit were inoculated and treated simultaneously by dipping fruit for 30 seconds into treatment solutions that contained 50,000 conidia/ml from a benzimidazole-resistant isolate of *P. expansum* (P-301). The inoculum was prepared by washing conidia from 7-day old cultures of *P. expansum* that were grown on potato-dextrose agar. The spore density was determined using a hemacytometer and appropriate volumes of the spore suspension were then added to each treatment tank. Following treatment, fruit were allowed to dry for 2 hr. They were then placed on spring cushion trays, packed into fiberboard boxes, and transported to CA storage. Fruit were held at ambient outdoor temperatures (55-70° F) from the time that they were treated until they were placed into a commercial CA room 30 hr later. A Hobo temperature recorder was included in one box of packed fruit and showed that the temperature of the packed fruit finally dropped below 40° F on 5 Oct (96 hr after packing) and stabilized at 34.9° F by 10 Oct. CA conditions (< 5% oxygen) were established by 7 Oct and were maintained until the room was opened on 30 May. Mean oxygen level in the room was 1.5%. Carbon dioxide levels in the CA room were adjusted to 0.5-1.0% from 8 Oct until 27 Dec and were maintained at 1-2% thereafter. Fruit were transported back to the Hudson Valley Lab on 5 Jun and warmed to 43° F during transport. Fruit were then held in air storage at 34° F, were evaluated for stem-end decay and for evidence of *Penicillium* sporulating on stems on 6 and 26 Jun, and finally were held at 60-70° F for another 7 days prior to the last evaluation on 3 Jul.

Incidence of stem-end decay remained relatively low over all three evaluation dates, but larger numbers of fruit had sporulating *Penicillium* on their stems. Fruit with stem-end decay nearly always had *Penicillium* sporulating on the stems, so the means shown for percentages of fruit with sporulation on the stems include the decayed fruit as well as non-decayed fruit with stem infections. Mertect 340F had no effect on decay development because the inoculum was from a benzimidazole-resistant isolate of *P. expansum*. By 26 Jun, fruit treated with Captan had significantly less stem-end decay than either of the control treatments, but Captan failed to control decay development after fruit were moved to warmer temperatures for the last week of storage. Scholar provided near-perfect control of stem infections. Although a few fruit from the Scholar treatment were reported with sporulation on stems for the 6 Jun observation date, the evidence of sporulation was so slight (or misidentified) as to be overlooked in subsequent evaluations.

Material and rate of formulated product per 100 gal	% fruit with <i>Penicillium</i> sporulating on the stem			% fruit with stem-end decay		
	6 Jun	26 Jun	3 Jul	6 Jun	26 Jun	3 Jul
Control without DPA*	16.0 b**	24.0 b	26.0 b	6.0	11.0 c	12.0 b
Control	19.0 b	32.0 b	34.0 b	4.0	8.0 c	8.0 b
Captan 50W 2.5 lb	10.0 ab	16.0 b	19.0 b	2.0	2.0 ab	5.0 b
Mertect 340F 16 fl oz	14.0 b	27.0 b	28.0 b	4.0	6.0 bc	9.0 b
Scholar 50W 8 oz	2.0 a	0.0 a	0.0 a	0.0	0.0 a	0.0 a
P- value	0.028	<0.001	<0.001	0.139	0.001	0.002

*Shield Liquid DPA (diphenylamine) at 1000 ppm (80 fl oz/100 gal) was included in all treatments except 'Control without DPA.'

** Within columns, means followed by the same small letter do not differ significantly ($P \leq 0.05$) as determined using Fisher's Protected LSD applied to arc-sine transformed data. Arithmetic means are shown in the table.