PEAR (*Pyrus communis* 'Bartlett', 'Bosc')
Fabraea fruit and leaf spot: *Fabraea maculata*
Sooty blotch and flyspeck; species complex
Fruit decay; *Botryosphaeria obtusa, B. dothidea*

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Evaluation of New Fungicides for Controlling Fabraea Leaf Spot on Pears, 2012.

Fungicides were compared for their effectiveness for controlling Fabraea leaf and fruit spot on pears in a research orchard where this disease had defoliated trees in August of 2011. The trees in the test block had been planted in 1974 with 9 feet between trees and 20 ft between rows. The trees have been pruned annually so as to limit tree height to ca. 10 ft. Treatments were replicated four times in 4-tree plots that contained two trees of each cultivar. Bosc is more susceptible to this disease than Bartlett. Mancozeb is very effective against Fabraea leaf spot, so during the early part of the season the trees were protected with Manzate Pro-Stick at 3 lb/A applied at roughly 7-day intervals until all seven applications allowed on the label had been used. We then initiated the test treatments, applying them six times at approximately 14-day intervals (see details in the footnotes of Table 1). The early-season mancozeb sprays were applied with an airblast sprayer set to deliver 70 gallons of spray solution per acre. Test treatments were applied to drip using a handgun and a tractor-mounted PTO-driven high-pressure sprayer set at 250 psi. Pear growth stages for Bartlett were as follows: 19 March – swollen bud; 26 Mar –green cluster; 2 Apr –white bud; 9 Apr– first bloom; 16 Apr –full bloom; 23 Apr – fruit set. Spring and early summer were relatively dry, slowing the development of the leaf spot disease progression, but control trees showed considerable disease by mid-June. Fabraea spores can be disseminated by pear psylla, so we maintained excellent control of pear psylla by using two applications of Agrimek (20 fl oz/A) plus Biocover MLT oil (1 gal/A) applied on 26 Apr and 21 May. When psylla began to appear later in the season, trees were treated with Delegate (4.5 oz oz/A) plus Asana (14 fl oz/A) plus LI-700 (16 fl oz/100 gal) on 15 Jun. Danitol 2.4EC (20 fl oz/A) plus LI-700 (16 fl oz/100 gal) was applied on 2 and 14 Aug and to control late-season stink bugs.

Table 1. Effects of treatments on foliar infections on Bosc pear trees.

Fungicides and rates per acre [z] (rate/A divided by 3 = rate/100 gal)	Visual whole-tree disease ratings (Bosc)[y] 16 Jul	27 Jul	13 Aug	Grand means for 3 dates [w]	Foliar ratings on Bosc [x] % leaves infected 29 Aug	% defoliation 29 Aug	20 Sep
1. Untreated control	1.06 c	1.19 c	1.38 c	1.21 c	95.5 e	54.7 c	55.7 b
2. Flint 50WDF 2.5 oz [z]	0.25 ab	0.06 a	0.44 ab	0.25 a	46.0 bc	17.4 a	18.5 a
3. Fontelis 1.67SC 14 oz + Flint 2.0 oz [z]	0.31 ab	0.06 a	0.56 b	0.31 a	61.3 cd	21.8 a	26.1 a
4. Merivon 4.17SC 4 fl oz [z]	0.31 ab	0.50 b	0.63 b	0.48 ab	32.3 ab	23.0 ab	24.1 a
5. Syllit FL 3.4SC 16 fl oz [z]	0.19 a	0.25 ab	0.13 a	0.19 a	18.3 a	20.8 a	28.5 a
6. Inspire Super 2.85EW 12 fl oz [z]	0.56 b	0.63 b	1.25 c	0.81 bc	74.5 d	34.2 b	46.9 b

[z] All plots were sprayed with Manzate Pro-Stick 3 lb/A + LI-700 6 fl oz/100 gal using an airblast sprayer on 7, 13, 20 and 26 April and on 4, 13, and 21 May. Treatments listed above were applied on 1 & 15 Jun, 3 & 17 Jul, and 1 & 16 Aug. All treatments were applied in combination with the surfactant LI-700 used at the rate of 8 fl oz/100 gal.

[y] Ratings based on four observations per plot (both sides of each of 2 trees) using a scale of 0 = no disease evident, 1 = a few spots or infection loci visible, and 2 = extensive leaf spotting evident.

[x] Based on counting all nodes and leaves on 10 shoots on both Bosc trees in each plot. Percent leaves infected was determined by adding infected leaves and empty nodes because defoliation was attributable to disease.

[w] Grand mean from repeated measures analysis across three dates. *P*-values for effects of treatment, date, and the treatment*date interaction were <0.001, <0.001 and 0.080, respectively.

[v] From evaluation of 60 fruit/plot or all available fruit if <60; lowest fruit count was 17, mean for all plots was 48.

[u] Means followed by the same letter do not differ significantly ($P \leq 0.05$, Fishers Protected LSD).

The severe defoliation during late summer in 2011 caused trees in this block to produce relatively few flowers in 2012, and fruit set was further reduced by several spring frosts. Therefore, the number of fruit available for evaluation was limited and some trees had no fruit. None of the treatments provided complete disease control, perhaps because the accumulated rainfall between fungicide application on 1 and 15 Jun and 3 Jul totaled 3.0 and 2.5 inches, respectively, and fungicide protection was presumably exhausted after two inches of rain. Had we shortened these two spray intervals so as to reapply fungicides after 2 inches of accumulated rainfall, we might have averted some of the disease that showed up in even the best treatments as the season progressed.

During the first of three sequential evaluations of disease on Bosc trees during summer, the control plots had significantly more infections than any of the other treatments by 16 Jun, and those differences persisted through the summer except that disease incidence in the Inspire Super plots gradually increased until, by 13 Aug, it was no better than the control trees that were left unsprayed during summer. Neither Merivon (Trt 4) nor Fontelis plus Flint (Trt 3) performed better than Flint alone (Trt 2), so the SDHI fungicides do not appear to boost activity compared to the strobilurin Flint used alone. Inspire Super was less effective for protection foliage than Flint or Syllit for many of the evaluations reported in Table 1. Syllit used at the maximum label rate was as effective as Flint. Syllit provides a different chemistry group that can be used in rotations during summer to control Fabraea leaf spot.

Table 2. Effects of treatments on disease incidence on Bosc and Bartlett fruit.

	Fruit (%) infected with Fabraea:				Bartlett fruit (%) on 22 Aug with[x]		
	Bosc on 4 Sep[y]		Bartlett on 22 Aug[x]				
Fungicides and rates/acre[z] (rate/A divided by 3 = rate/100 gal)	Any infection	>5 spots per fruit	Any infection	>5 spots per fruit	Sooty blotch or flyspeck	Fruit decays	No disease
1. Untreated control	95.2 b	60.8 b	81.4 b[w]	25.3 b	42.0	4.3	14.2 b
2. Flint 2.5 oz[z]	18.5 a	0.0 a	11.0 a	4.9 a	21.6	0.7	68.4 a
3. Fontelis 14 oz + Flint 2.0 oz[z]	28.1 a	10.1 a	6.5 a	5.0 a	23.3	1.2	71.1 a
4. Merivon 4 fl oz[z]	23.8 a	1.6 a	7.2 a	0.4 a	14.3	2.3	75.8 a
5. Syllit FL 48 fl oz[z]	0.0 a	0.0 a	6.0 a	1.9 a	29.2	0.8	64.2 a
6. Inspire Super 12 fl oz[z]	16.1[v]	3.2	4.2 a	3.8 a	43.4	0.0	54.7 a
P values	0.002	0.001	<0.001	0.009	0.160	0.113	<0.001

[z] See footnote on Table 1 for details for fungicide applications and timing.

[y] From evaluation of 60 Bosc fruit/plot or all available fruit if <60. Fruit counts were low due to spring frost. Only 16 of the 24 plots had fruit, and those plots averaged only 29 fruit/plot. Numbers of plots with fruit and total fruit from those plots were as follows: Trt 1— 3 plots, total of 21 fruit; Trt 2— 3 plots, 118 fruit; Trt 3— 4 plots, 142 fruit; Trt 4— 3 plots, 77 fruit; Trt 5— 2 plots, 80 fruit; Trt 6— 1 plot 31 fruit. Because data was available for a varying number of replicates for each treatment, data were analyzed using a completely random design. Trt 6 was not included in the analysis because data were available from only plot.

[x] From evaluation of 60 Bartlett fruit/plot or all available fruit if <60; lowest fruit count was 17, mean across all plots was 48.

[w] Means followed by the same letter do not differ significantly ($P \leq 0.05$) as determined using Fisher's Protected LDS.

[v] Because of a large number of Bosc didn't have any fruit several treatments were missing reps, therefore treatments were analyzed as completely random. Treatment 6 had only one rep and was not included in the statistical analysis.