

**Supplementary Table 2.** Commercial hop yard year-specific responses of basal foliage removal and duration of fungicide applications on powdery mildew leaves on hop leaves and cones, yield, and cone quality factors in cultivar Zeus

Treatment <sup>ab</sup>		Disease <sup>c</sup>		Yield			Cone quality factors <sup>d</sup>		
Basal foliage removal	Last spray	AUDPCS	Cones (%)	Alpha-acids (%)	Cone yield (kg/string)	Alpha-acids yield (kg/string)	Dry matter (%)	Color (median)	Relative effect
2012									
1X	31 July	0.059	97.1	18.0	0.83	0.150	26.5	7.0	0.65 (0.57-0.72)
2X	31 July	0.054	95.3	18.2	0.91	0.166	26.7	6	0.55 (0.38-0.71)
3X	31 July	0.037	92.8	18.5	0.90	0.165	27.8	7	0.45 (0.27-0.65)
1X	28 Aug	0.053	90.7	18.3	0.85	0.154	26.4	7.0	0.65 (0.57-0.72)
2X	28 Aug	0.061	92.8	18.2	0.78	0.142	27.0	7	0.25 (0.14-0.48)
3X	28 Aug	0.043	88.9	17.9	0.95	0.170	27.7	7	0.45 (0.26-0.65)
<i>Model factor P-value</i>									
<i>Last spray</i>		0.732	0.001	0.736	0.547	0.360	0.954	0.180	
<i>Basal foliage removal</i>		0.123	0.042	0.985	0.098	0.054	0.028	0.023	
<i>Last spray*Basal</i>		0.694	0.354	0.307	0.075	0.063	0.866	0.174	
2013									
1X	31 July	0.045	85.0	17.3	0.84	0.146	23.8	7	0.63 (0.42-0.78)
2X	31 July	0.036	81.2	17.4	0.86	0.150	23.7	7	0.45 (0.35-0.55)
3X	31 July	0.014	78.6	17.7	0.71	0.127	24.0	7	0.37 (0.24-0.53)
1X	28 Aug	0.020	75.0	17.7	0.74	0.132	25.0	7	0.55 (0.29-0.78)
2X	28 Aug	0.024	76.3	17.7	0.73	0.129	24.6	7	0.45 (0.35-0.55)
3X	28 Aug	0.015	77.8	17.0	0.75	0.129	24.2	7	0.55 (0.29-0.78)
<i>Model factor P-value</i>									
<i>Last spray</i>		0.258	0.129	0.969	0.064	0.107	0.101	0.712	
<i>Basal foliage removal</i>		0.307	0.936	0.928	0.205	0.262	0.765	0.363	
<i>Last spray*Basal</i>		0.444	0.375	0.326	0.186	0.491	0.432	0.459	
2014									
1X	1 Aug	0.369	86.5	17.0	0.994	0.169	26.3	6	0.34 (0.18-0.59)
2X	1 Aug	0.362	80.3	17.2	0.951	0.163	26.2	6	0.32 (0.22-0.47)
3X	1 Aug	0.279	71.1	16.8	1.055	0.177	26.3	6	0.34 (0.18-0.59)
1X	28 Aug	0.317	70.0	17.5	0.932	0.163	25.4	7	0.62 (0.44-0.77)
2X	28 Aug	0.266	73.7	17.5	0.805	0.140	25.0	7	0.74 (0.53-0.86)
3X	28 Aug	0.369	86.5	17.0	0.994	0.169	26.3	7	0.62 (0.44-0.77)
<i>Model factor P-value</i>									
<i>Last spray</i>		0.322	0.106	0.120	0.027	0.047	0.001	<0.001	
<i>Basal foliage removal</i>		0.601	0.542	0.294	0.105	0.136	0.751	0.851	
<i>Last spray*Basal</i>		0.293	0.089	0.947	0.755	0.627	0.770	0.733	

- <sup>a</sup> Basal foliage was removed using carfentrazone once, twice, or three times late in the season. Plots received the same fungicide treatments up to 31 July/1 August. The last treatment in these plots was quinoxyfen. Plots treated with fungicides until 28 August received two additional applications of pyraclostrobin + boscalid.
- <sup>b</sup> Probability values of fixed factors for each experiment and variable are given in the corresponding column. Data were analyzed using a linear mixed model or by nonparametric methods (Shah and Madden 2004) for cone color.
- <sup>c</sup> AUDPCS: relative area under the disease progress curve of the incidence of leaves with powdery mildew.
- <sup>d</sup> Cone color was rated on a 1 to 10 ordinal scale, where 10 is the best possible color (see Twomey et al 2015). Relative effect is a nonparametric statistic that ranges from 0 to 1. Differences among treatments are inferred by non-overlap of the confidence intervals given parenthetically.