

Efficacy of XYLPHI-PD™ for the Reduction of Pierce's Disease in Vineyards: 2020 Field Trial Results



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INTRODUCTION

XYLPHI-PD™ is a novel biological treatment for Pierce's Disease (PD), appropriate for use in organic production (OMRI-listed). This break-through technology was developed specifically for viticulture and involves injection into the trunks and cordons of vines. XYLPHI-PD contains a cocktail of viral bacteriophages (bacteria-killing viruses) that enter and destroy *Xylella fastidiosa* bacteria that cause PD. Bacteriophage are viruses that selectively infect bacteria and do not infect the eukaryotic cells of plants or animals. The product requires only minimal PPE and has no REI when used in accordance with the label Directions for Use. Multiple university and commercial studies have assessed the efficacy of XYLPHI-PD for the treatment or prevention of PD in vineyards, when used in accordance with label Directions for Use. Three research initiatives are described here.

MATERIALS AND METHODS

Study 1: A 2-year, multi-location, commercial (Wilbur-Ellis) field study in Sonoma County CA evaluated XYLPHI-PD efficacy against endemic PD across 4 sites and 2 production seasons.¹ In 2019, vines were randomly assigned to either of 2 groups:

- Control (untreated): n=200 (50/site);
- XYLPHI-PD: 3 treatments (Jun/Jul/Aug); n=200 (50/site).

All vines were assessed for PD visually (chlorosis) and by PCR. A continuation of the same study protocol was followed in 2020.

Study 2: A 3-year field study was conducted at a major organic winery in Sonoma County CA (Ridge, Lytton Springs; Dry Creek).² In 2018, 165 vines negative for *X. fastidiosa* by PCR (healthy) were randomly assigned to 2 treatment groups:

- Control (buffer-injected): 3 treatments, n=94;
- XYLPHI-PD: 3 treatments (May-Aug, varied by year), n=71.

The same vines were similarly managed in 2019 and 2020. Fruit yields at harvest in 2020 were compared for the 2 groups.

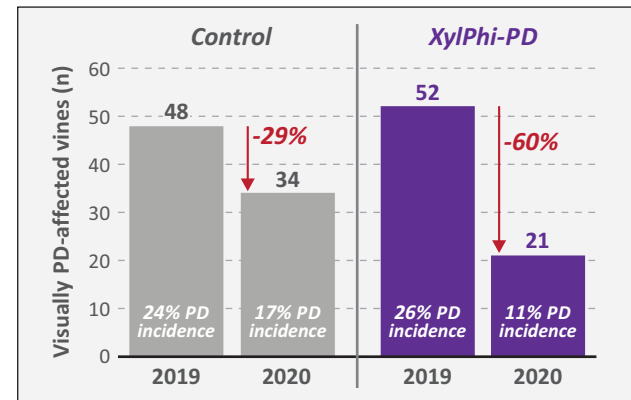


FIGURE 1: Vines showing visual signs of PD; summary of 4 sites in Sonoma County, CA (Study 1).

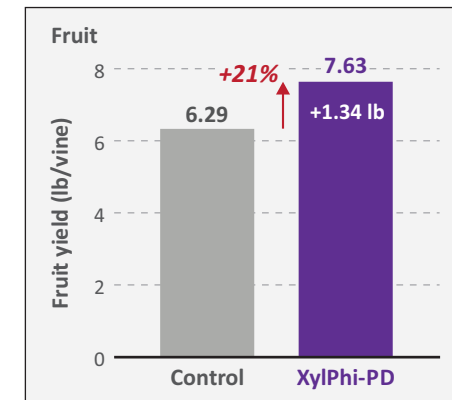


FIGURE 2: Average 2020 fruit yield (lb) for vines PCR-negative for *X. fastidiosa* in 2017, Sonoma County, CA (Study 2).

Study 3: A study at a Sonoma County CA winery checked for any differences in wine quality or characteristics during wine-making for fruit from vines treated with XYLPHI-PD vs buffer-injected controls.³

RESULTS

Study 1: Vines treated with XYLPHI-PD for 2 years (2020 data) demonstrated 60% year-over-year reduction in visual PD incidence, compared to only a 29% year-over-year reduction in non-treated controls (Figure 1). PCR results were similar.

Study 2: Vines treated with XYLPHI-PD for 3 years produced 1.34 lb (+21%) more fruit/vine in 2020 than controls (Figure 2).

Study 3: No differences were detected in initial or finished wine parameters between premium commercial wines derived from vines treated with XYLPHI-PD vs non-treated vines (Table 1).

Table 1 – Absence of XYLPHI-PD impacts on wine characteristics (Study 3).*

Item	Control	XYLPHI-PD
<i>Initial analysis (harvest)</i>		
Brix	22.8	22.8
Titrateable acidity (g/L)	5.91	6.09
pH	3.62	3.56
Initial malate	3175	3164
<i>Finished wine analysis (bottling)</i>		
pH	3.69	3.67
Titrateable acidity (g/L)	6.30	6.23
Volatile acidity (g/100 mL)	0.0444	0.0390
Malic acid (mg/L)	227	125
Residual sugar (mg/L)	107	101
Alcohol (%)	11.3	11.4
SO ₂ (added; mg/L)	0.312 (225 ppm)	0.323 (105 ppm)
Scorpion test	negative	negative

*Procedures: 800 lb/group crush/destem, 35 ppm SO₂ added at crusher; native fermentation in 75-gallon fermentors, no additions besides SO₂; pressed after 10 days and barrelled for natural malolactic (ML) conversion; racked from wooden 53-gallon barrels to 15-gallon stainless steel drums to finish ML; finished ML (200 mg/L malic acid), and 60 ppm SO₂ added.

CONCLUSIONS

XYLPHI-PD is a targeted and cost-effective strategy for effectively protecting valuable vineyards against PD when used in accordance with the label Directions for Use.

- Multi-season XYLPHI-PD use reduced year-to-year PD incidence by 60% compared to non-treated controls in a 4-site field study.
- Multi-season use of XYLPHI-PD for prevention of PD helped maintain optimal fruit yield in a 3-year field study.
- XYLPHI-PD treatment did not impact or interfere with any wine-making parameters.