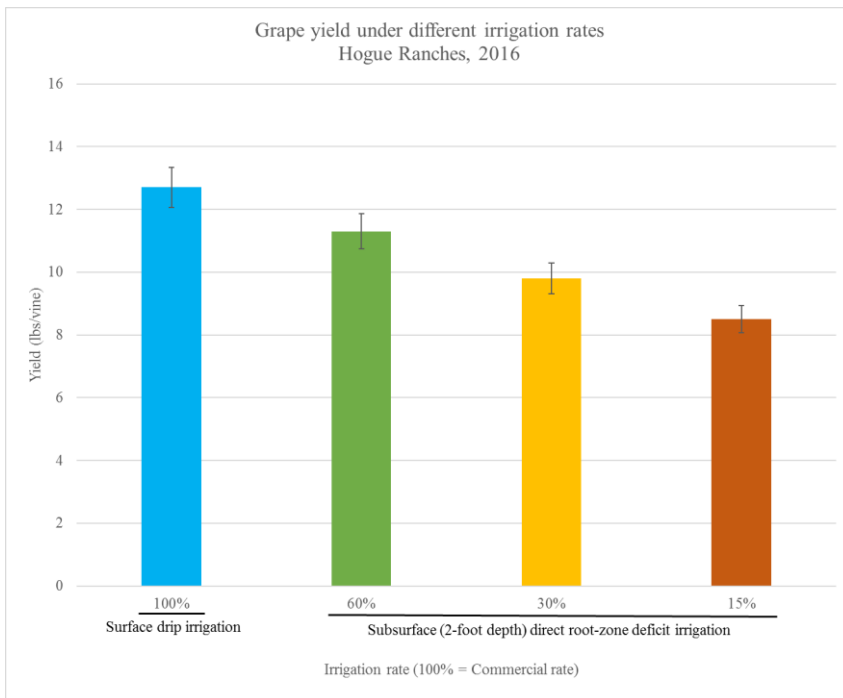


Enhancing Wine Grape Production through Subsurface Direct Root-Zone (DRZ) Irrigation

Field Day in Hogue Ranches Vineyard (Chardonnay), Prosser, WA
June 15, 2017



***Hypothesis:** Water delivered directly into the middle and lower root-zone through vertical tubes will not only save amounts of water otherwise lost to evaporation or weeds, but also help improve water use efficiency and grape quality in Pacific Northwest vineyards.*

Figure 1 Grape yield at Hogue Ranches vineyard in 2016. We defined commercial irrigation rate under surface drip irrigation as 100%, followed by 60%, 30%, 15% under subsurface DRZ irrigation.

Table 1 Grape yield, yield percentage, and water use efficiency (WUE) under different irrigation rates

Method	Irrigation Rate	Yield (lbs/vine)	Yield Percentage	WUE
Surface	100%	12.7	100%	1.00
	60%	11.3	88.98%	1.48
Subsurface	30%	9.8	77.17%	2.57
	15%	8.5	66.93%	4.46

WUE = Ratio of grape yield under subsurface irrigation to grape yield under surface irrigation by same amount of water use

Table 2 Grape quality analysis

	Irrigation rate	Titrateable acidity (g/L)	pH	Brix (degree)
Surface	100%	7.6	3.29	21.1
	60%	7.1	3.31	21.6
Subsurface	30%	6.9	3.32	22.3
	15%	5.8	3.44	22.6

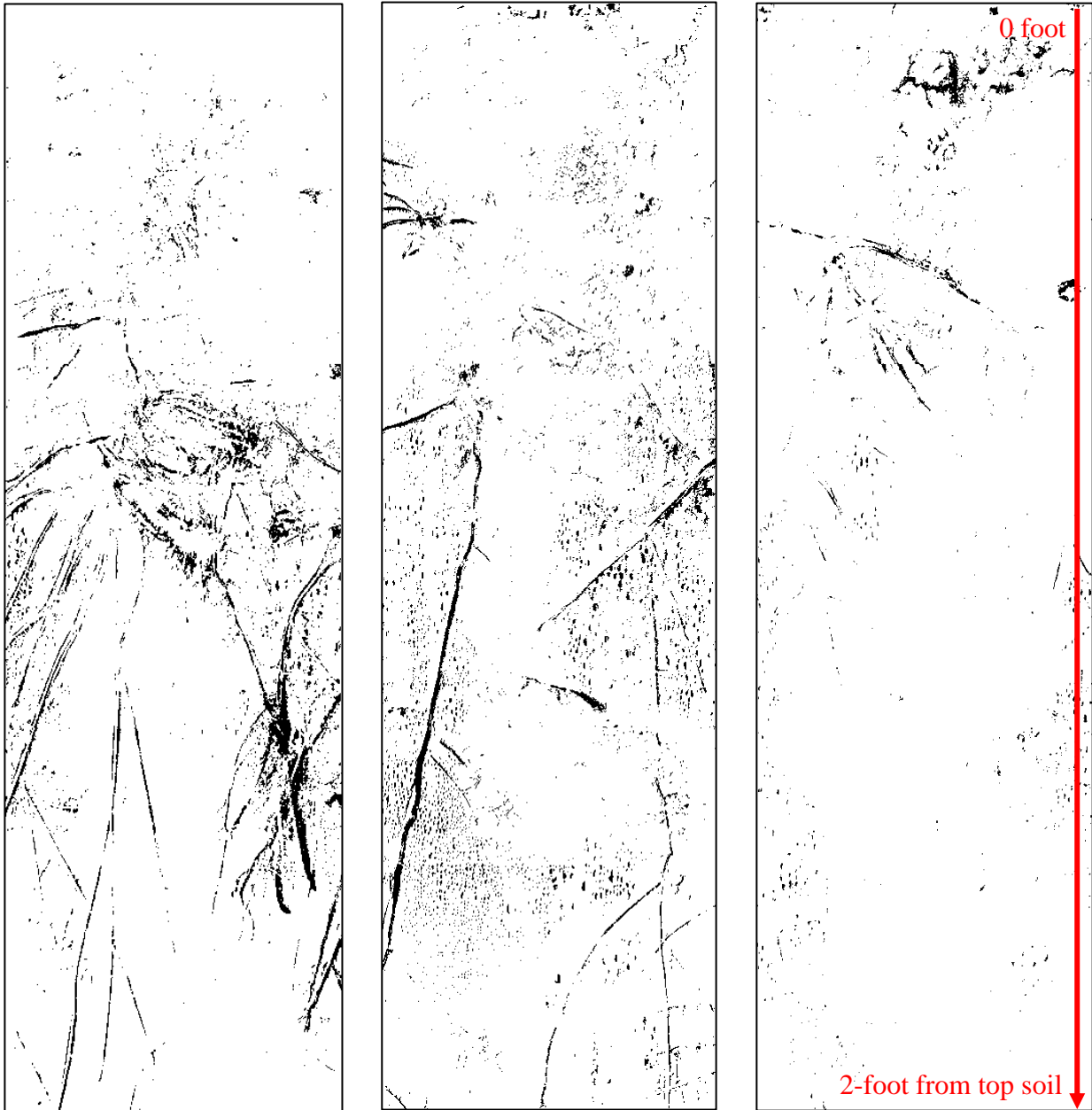


Figure 2 Images of root distribution under different irrigation depths at 60% irrigation rate by subsurface DRZ irrigation. Irrigation depths are: 1-foot (left image), 2-foot (middle image), and 3-foot (right image) from top soil. Range of these images is from 0 to 2-foot deep.

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