

Table 4. Conditional average treatment effect (CATE) estimated by subgroups for important variables used in generalized random forest models for predicting the number of pesticide active constituents applied for suppression of powdery mildew and the annual costs incurred by Oregon hop growers during 2014 to 2017^a

	Annual Cost (USD)			Active Constituents		
Variables	CATE (95% CI)	F-statistic	P-value	CATE (95% CI)	F-statistic	P-value
Pruning thoroughness						
1	471.22 (-184.39 – 1126.83)	1.77	0.18	15.2 (8.49 - 21.91)	26.92	<0.001
2	-15.47 (-996.49 – 965.53)			15.07 (6.59 - 23.54)		
3	1018.78 (-909.65 – 2947.21)			17.59 (5.14 - 30.03)		
4	1371.96 (-476.83 – 3220.76)			2.86 (-10.64 - 16.37)		
5	552.95 (-133.02 – 1238.93)			21.99 (1.12 - 42.86)		
Susceptibility to V6 strains						
0	2183.03 (694.09 – 3672.07)	29.27	<0.001	27.51 (15.55 - 39.48)	62.89	<0.001
1	317.49 (-286.71 – 921.69)			18.42 (11.25 - 25.58)		
2	836.27 (-932.54 – 2605.1)			21.9 (4.68 - 39.12)		
3	577.23 (-41.26 – 1195.74)			17.73 (10.07 - 25.39)		
4	659.97 (-613.56 – 1933.51)			10.19 (-7.5 - 27.87)		
5	-1356.82 (-9491.92 – 6778.28)			21.95 (-28.19 - 72.09)		
Susceptibility to non-V6 strains						
0	576.56 (-420.82 – 1573.96)	5.84	0.01	13.08 (5.7 - 20.47)	75.15	<0.001
1	373.67 (-226.83 – 974.18)			18.46 (11.22 - 25.7)		
2	1187.12 (-612.39 – 2986.62)			20.21 (-3.52 - 43.95)		
3	577.23 (-41.26 – 1195.74)			17.73 (10.07 - 25.39)		
4	914.76 (-1627.76 – 3457.28)			14.98 (-22.93 - 52.89)		
Initial Strain						
Unknown	606.73 (254.44 – 959.03)	86.32	<0.001	18.61 (15.05 - 22.18)	45.27	<0.001

Non-V6-virulent	175.87 (-1673.29 – 2025.03)			0.08 (-57.05 - 57.2)		
V6-virulent	766.15 (-691.53 – 2223.85)			16.92 (6.7 - 27.15)		
Network centrality						
Non-R6-cultivars May-June						
0	795.65 (260.06 – 1331.25)	373.6	<0.001	17.52 (10.09 - 24.95)	61.95	<0.001
1	-1150.17 (-4128.23 – 1827.88)			7.21 (-7.41 - 21.82)		
Non-R6-cultivars June-July						
0	725.65 (193.66 – 1257.65)	447.1	<0.001	19.05 (13.16 - 24.93)	83.13	<0.001
1	1143.81 (-3288.79 – 5576.41)			-11.38 (-56.24 - 33.48)		
Quadrant						
Northeast	916.02 (-1232.34 – 3064.4)	75.08	<0.001	4.22 (-19.44 - 27.89)	129.95	<0.001
Northwest	624.85 (49.54 – 1200.16)			15.2 (7.35 - 23.05)		
Southeast	288.86 (-405.93 – 983.66)			24.4 (11.52 - 37.27)		
Grower						
1	456.83 (-406.23 – 1319.92)	23.52	<0.001	26.59 (5.4 - 47.79)	44.27	<0.001
2	183.06 (-4138.13 – 4504.26)			1.96 (-45.01 - 48.94)		
3	-1093.72 (-3126.28 – 938.85)			0.42 (-16.65 - 17.48)		
4	829.69 (178.88 – 1480.5)			19.13 (2.83 - 35.44)		
5	2159.56 (1065.97 – 3253.15)			7.29 (-6.07 - 20.65)		
6	753.86 (-25.45 – 1533.19)			25.9 (18.17 - 33.63)		
7	76.29 (-654.89 – 807.48)			16.16 (10.11 - 22.21)		
8	2407.88 (1213.4 – 3602.37)			39.66 (24.93 - 54.39)		
9	504.92 (-781.29 – 1791.13)			3.14 (-9.15 - 15.44)		
Year						
2014	112.80 (-1134.62 – 1360.24)	107.7	<0.001	8.82 (-16.28 - 33.93)	32.60	<0.001
2015	1016.6 (582.90 – 1450.3)			21.11 (15.67 - 26.55)		
2016	353.26 (-367.53 – 1074.07)			15.9 (7.12 - 24.68)		
2017	882.46 (-595.94 – 2360.88)			18.13 (8.1 - 28.16)		

^a Conditional average treatment effect is the difference in response variables, annual cost or the number of active constituents, conditional on whether a hop yard had powdery mildew or not (the treatment variable) given a set of covariates.