



WSU EXTENSION

San Juan County

**Oak Knoll Aeration and Over-Seeding Trial
Soil Health Haney Test Results 2018 and 2019**

2018—Table 1. Mean \pm standard deviations (SD) for aeration treatments

Observation	No aeration	With aeration	<i>p</i>¹
pH, 1:1	6.22 \pm 0.07	6.24 \pm 0.07	0.71843
EC, mmhos/cm	0.03 \pm 0.03	0.03 \pm 0.02	0.9296
Sat. Paste EC, mmhos/cm	0.07 \pm 0.08	0.07 \pm 0.04	0.9444
Organic matter, %	5.79 \pm 1.87	6.68 \pm 1.41	0.16547
Total organic C, mg/kg	178 \pm 30.6	179 \pm 27.4	0.86320
Organic C, %	3.41 \pm 1.11	3.9 \pm 0.85	0.19598
POXC active carbon, mg/kg	726 \pm 87.9	744 \pm 127	0.7274
Total N, mg/kg	11.9 \pm 1.86	11.7 \pm 2.16	0.74918
Organic N, mg/kg	10.7 \pm 1.88	10.4 \pm 2.09	0.657977
Nitrate N, mg/kg	0.6 \pm 0.13	0.588 \pm 0.16	0.8780
Ammonium N, mg/kg	0.63 \pm 0.09	0.71 \pm 0.18	0.1803
Sand, %	71.6 \pm 8.73	71.9 \pm 7.08	0.921307
Silt, %	21.8 \pm 6.69	22 \pm 5.40	0.89947
Clay, %	6.62 \pm 2.39	6.12 \pm 2.23	0.54926
Avail. water hold. cap., in/ft	1.26 \pm 0.32	1.31 \pm 0.24	0.62817
CO ₂ -C, mg/kg	125 \pm 14.8	126 \pm 13.5	0.8911
Mineralizable N, lbs./acre	103 \pm 4.37	103 \pm 4.46	0.7379
Organic C:N	16.9 \pm 2.36	17.5 \pm 1.77	0.9195

¹The probability value associated with the treatment in the analysis of variance.

*For observations where a significant treatment effect ($p \leq 0.05$) was indicated, values are highlighted in bold and denoted with an asterisk.



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2018—Table 2. Mean \pm standard deviations (SD) for overseeding treatments

Observation	No seeding	With seeding	p^1
pH, 1:1	6.2 \pm 0.76	6.26 \pm 0.05	0.09573
EC, mmhos/cm	0.03 \pm 0.03	0.03 \pm 0.02	0.7912
Sat. Paste EC, mmhos/cm	0.08 \pm 0.08	0.07 \pm 0.04	0.7807
Organic matter, %	6.66 \pm 1.34	5.8 \pm 1.93	0.17645
Total organic C, mg/kg	172 \pm 24.2	185 \pm 31.7	0.04336*
Organic C, %	3.92 \pm 0.79	3.39 \pm 1.14	0.15795
POXC active carbon, mg/kg	740 \pm 103	730 \pm 116	0.8428
Total N, mg/kg	11.5 \pm 2.44	12.1 \pm 1.41	0.34847
Organic N, mg/kg	10.2 \pm 2.34	10.9 \pm 1.51	0.354932
Nitrate N, mg/kg	0.63 \pm 0.15	0.56 \pm 0.14	0.4501
Ammonium N, mg/kg	0.63 \pm 0.09	0.71 \pm 0.18	0.1803
Sand, %	73.2 \pm 5.52	70.2 \pm 9.53	0.253788
Silt, %	21.4 \pm 4.84	22.4 \pm 7.07	0.61576
Clay, %	5.38 \pm 0.92	7.38 \pm 2.77	0.03450*
Avail. water hold. cap., in/ft	1.27 \pm 0.20	1.3 \pm 0.35	0.80312
CO ₂ -C, mg/kg	126 \pm 11.5	124 \pm 16.3	0.8641
Mineralizable N, lbs./acre	103 \pm 3.66	103 \pm 5.04	0.7379
Organic C:N	17.1 \pm 2.36	17.2 \pm 1.83	0.9195

¹The probability value associated with the treatment in the analysis of variance.

*For observations where a significant treatment effect ($p \leq 0.05$) was indicated, values are highlighted in bold and denoted with an asterisk.



2019—Table 1. Mean \pm standard deviations (SD) for aeration treatments

Observation	No aeration	With aeration	p^1
pH, 1:1	6.25 \pm 0.11	6.21 \pm 0.14	0.6535
EC, mmhos/cm	0.16 \pm 0.03	0.2 \pm 0.03	0.017*†
Sat. Paste EC, mmhos/cm	0.42 \pm 0.07	0.52 \pm 0.07	0.014*†
Organic matter, %	5.54 \pm 1.17	5.87 \pm 1.01	0.5690
Total organic C, mg/kg	138 \pm 32.4	116 \pm 19.4	0.08919
Organic C, %	3.26 \pm 0.71	3.44 \pm 0.62	0.6225
POXC active carbon, mg/kg	780 \pm 69.9	795 \pm 55.1	0.7146
Total N, mg/kg	-	-	-
Without over-seeding	9.33 \pm 1.67	9.48 \pm 1.14	0.8051
With over-seeding	9.93 \pm 1.83	6.97 \pm 0.40	0.1285
Organic N, mg/kg	5.51 \pm 1.99	5.0 \pm 2.09	0.5744
Nitrate N, mg/kg	1.92 \pm 0.83	1.63 \pm 0.72	0.4635
Ammonium N, mg/kg	2.19 \pm 0.96	1.77 \pm 0.99	0.4740
Sand, %	72.2 \pm 5.20	72.7 \pm 3.99	0.62569
Silt, %	21.9 \pm 3.76	21.0 \pm 3.27	0.50214
Clay, %	5.88 \pm 1.96	6.29 \pm 1.50	0.8387
Avail. water hold. cap., in/ft	1.24 \pm 0.20	1.25 \pm 0.16	1.0
CO ₂ -C, mg/kg	85.2 \pm 18.9	90.1 \pm 16.3	0.5802
Mineralizable N, lbs/acre	86.2 \pm 9.48	89.1 \pm 7.95	0.4401
Organic C:N	31.0 \pm 20.6	29.3 \pm 18.9	0.8549

¹The probability value associated with the treatment in the analysis of variance.

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†Probability values calculated using PERMANOVA for distributions requiring non-parametric tests.



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2019—Table 2. Mean \pm standard deviations (SD) for overseeding treatments

Observation	No seeding	With seeding	p^1
pH, 1:1	6.26 \pm 0.11	6.20 \pm 0.13	0.4461
EC, mmhos/cm	0.18 \pm 0.04	0.18 \pm 0.02	1.000 [†]
Sat. Paste EC, mmhos/cm	0.47 \pm 0.12	0.46 \pm 0.05	0.930 [†]
Organic matter, %	5.52 \pm 1.01	5.89 \pm 1.20	0.5383
Total organic C, mg/kg	125 \pm 22.6	132 \pm 35.7	0.85396
Organic C, %	3.25 \pm 0.62	3.46 \pm 0.72	0.5697
POXC active carbon, mg/kg	783 \pm 72.8	791 \pm 51.5	0.8189
Total N, mg/kg	-	-	-
Without aeration	9.33 \pm 1.67	9.93 \pm 1.83	0.34287
With aeration	9.48 \pm 1.14	6.97 \pm 0.40	0.02068*
Organic N, mg/kg	5.78 \pm 1.52	4.70 \pm 2.39	0.3091
Nitrate N, mg/kg	1.84 \pm 0.89	1.73 \pm 0.66	0.7019
Ammonium N, mg/kg	1.79 \pm 0.95	2.23 \pm 0.99	0.5908
Sand, %	73.8 \pm 2.92	71.0 \pm 5.74	0.18533
Silt, %	20.4 \pm 1.77	22.7 \pm 4.54	0.14889
Clay, %	5.88 \pm 1.64	6.29 \pm 1.89	0.8387
Avail. water hold. cap., in/ft	1.19 \pm 0.12	1.30 \pm 0.22	0.18403
CO ₂ -C, mg/kg	89.5 \pm 14.7	85.1 \pm 20.8	0.3353
Mineralizable N, lbs./acre	88.8 \pm 7.25	86.3 \pm 10.4	0.2781
Organic C:N	24.0 \pm 11.9	37.3 \pm 24.1	0.3045

¹The probability value associated with the treatment in the analysis of variance.

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[†]Probability values calculated using PERMANOVA for distributions requiring non-parametric tests.



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Trial Methods

Fall 2017 - Aerated

5/7/18 – Over-seeded with Birds Foot Trefoil at 15 lbs per acre

7/13/18 - Sampled forage biomass and quality

9/11/18 - Sampled soil quality

Fall 2018 - Aerated

6/14/19 - Sampled forage biomass and quality

9/18/19 - Sampled soil quality

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