

**Table 3.1a.** Soil nutrient results at a depth of 6 inches for Black Cat (2017-2020) from grazed and ungrazed treatments<sup>1</sup>

Variable	2017		2018		2019		2020		SE <sup>2</sup>	P – Value <sup>3</sup>
	Grazed	Ungrazed	Grazed	Ungrazed	Grazed	Ungrazed	Grazed	Ungrazed		
pH	7.87	7.85	7.95	7.88	7.83	7.83	7.87	7.83	1.14	0.45
OM <sup>4</sup> , %	6.50	6.42	4.98	5.32	5.73	5.92	6.23	6.18	0.85	0.36
Salts, mmhos/cm	0.51	0.54	0.55	0.66	0.51	0.55	0.47	0.52	0.08	0.29
Nitrate-N, mg/kg	18.67	21.91	29.00	45.08	17.83	22.75	20.42	23.92	3.60	0.15
P-Olsen <sup>5</sup> , mg/kg	10.50	10.50	10.33	12.50	9.33	11.83	15.83	15.33	1.74	0.58
K, %	1.73	1.58	1.85	2.22	2.55	2.50	2.70	2.78	0.32	0.27
Ca, %	88.83	89.17	87.68	88.25	85.42	85.98	85.82	84.70	12.55	0.04
Mg, %	9.18	8.83	10.03	9.10	11.63	11.17	11.10	12.27	1.50	0.09
Na, %	0.30	0.33	0.42	0.45	0.38	0.38	0.35	0.37	0.05	0.35
Total N, %	0.33	0.33	0.29	0.32	0.28	0.29	0.32	0.31	0.04	0.75
CEC <sup>6</sup> , meq/100mg	32.75	32.32	31.75	32.92	29.60	29.75	29.03	28.75	4.47	<0.01
S, mg/kg	14.00	14.17	16.83	17.83	11.50	11.33	9.17	8.50	1.86	<0.01
NH <sub>4</sub> , mg/kg	3.18	3.30	5.12	5.20	3.67	2.97	1.97	1.97	0.49	<0.01

<sup>1</sup>Grazed and ungrazed plots were randomly placed at each of the farms with six 1-m<sup>2</sup>enclosures (UNGRAZE) and six 1-m<sup>2</sup> plots (GRAZE) in the grazed treatments.

<sup>2</sup>Pooled standard error of the means presented.

<sup>3</sup>P – value of grazed vs. ungrazed treatments.

<sup>4</sup>Organic matter

<sup>5</sup>Extractable phosphorus

<sup>6</sup>Cation exchange capacity

**Table 3.1b.** Soil nutrient results at a depth of 6 inches for 13 Mile (2017-2020) from grazed and ungrazed treatments<sup>1</sup>

Variable	2017		2018		2019		2020		SE <sup>2</sup>	P – Value <sup>3</sup>
	Grazed	Ungrazed	Grazed	Ungrazed	Grazed	Ungrazed	Grazed	Ungrazed		
pH	7.15	7.22	7.53	7.45	7.35	7.08	7.27	7.02	1.15	0.23
OM <sup>4</sup> , %	8.25	7.42	6.45	6.93	6.50	6.50	7.51	6.77	0.99	0.23
Salts, mmhos/cm	0.38	0.35	0.38	0.38	0.43	0.39	0.51	0.44	0.07	0.08
Nitrate-N, mg/kg	2.58	1.92	33.83	33.75	27.19	37.63	39.50	34.00	3.65	<0.01
P-Olsen <sup>5</sup> , mg/kg	19.00	16.67	18.17	18.67	25.25	25.63	33.00	21.83	1.40	0.04
K, %	3.83	3.72	3.12	3.42	4.42	4.00	7.70	4.68	0.57	0.93
Ca, %	82.57	81.82	83.13	83.35	81.57	81.70	77.62	80.15	12.31	0.95
Mg, %	13.17	14.12	13.33	12.70	13.65	13.87	14.33	14.72	1.52	0.22
Na, %	0.48	0.43	0.52	0.55	0.42	0.42	0.37	0.40	0.04	0.35
Total N, %	0.38	0.32	0.29	0.31	0.30	0.38	0.41	0.38	0.05	<0.01
CEC <sup>6</sup> , meq/100mg	21.78	22.00	21.87	21.28	21.02	19.63	20.12	19.57	4.89	0.89
S, mg/kg	12.00	14.00	11.00	12.17	10.33	11.50	13.33	10.83	2.05	<0.01
NH <sub>4</sub> , mg/kg	3.85	3.78	5.08	5.07	2.16	1.91	1.98	2.08	0.41	0.92

<sup>1</sup>Grazed and ungrazed plots were randomly placed at each of the farms with six 1-m<sup>2</sup> exclosures (UNGRAZE) and six 1-m<sup>2</sup> plots (GRAZE) in the grazed treatments.

<sup>2</sup>Pooled standard error of the means presented.

<sup>3</sup>P – value of grazed vs. ungrazed treatments.

<sup>4</sup>Organic matter

<sup>5</sup>Extractable phosphorus

<sup>6</sup>Cation exchange capacity

**Table 3.1c.** Soil nutrient results at a depth of 6 inches for Strike (2017-2020) from grazed and ungrazed treatments<sup>1</sup>

Variable	2017		2018		2019		2020		SE <sup>2</sup>	P – Value <sup>3</sup>
	Grazed	Ungrazed	Grazed	Ungrazed	Grazed	Ungrazed	Grazed	Ungrazed		
pH	7.98	7.88	7.97	7.90	7.95	7.87	7.82	7.93	1.05	0.89
OM <sup>4</sup> , %	6.77	7.37	6.85	6.77	6.65	6.67	6.93	6.73	1.04	0.95
Salts, mmhos/cm	0.44	0.50	0.38	0.41	0.46	0.42	0.48	0.53	0.06	0.28
Nitrate-N, mg/kg	17.83	18.83	14.50	21.67	25.67	25.75	34.08	44.93	3.80	0.08
P-Olsen <sup>5</sup> , mg/kg	9.00	8.50	8.67	11.17	9.67	10.50	11.17	8.33	3.27	0.92
K, %	4.20	4.05	3.62	3.82	3.88	4.05	4.60	3.13	0.63	0.65
Ca, %	84.62	85.23	85.32	85.27	85.23	85.68	84.75	86.07	11.76	0.11
Mg, %	10.93	10.50	10.80	10.60	10.62	10.00	10.37	10.52	1.98	0.19
Na, %	0.25	0.23	0.27	0.35	0.30	0.30	0.22	0.22	0.06	0.67
Total N, %	0.37	0.38	0.35	0.35	0.38	0.38	0.41	0.38	0.05	<0.01
CEC <sup>6</sup> , meq/100mg	32.10	32.40	32.65	32.83	33.93	34.35	33.32	34.90	3.02	0.23
S, mg/kg	12.67	11.67	10.00	7.86	17.33	17.17	20.67	20.67	2.29	<0.01
NH <sub>4</sub> , mg/kg	3.73	2.62	5.52	4.67	1.70	1.60	1.27	1.24	0.47	<0.01

<sup>1</sup>Grazed and ungrazed plots were randomly placed at each of the farms with six 1-m<sup>2</sup> exclosures (UNGRAZE) and six 1-m<sup>2</sup> plots (GRAZE) in the grazed treatments.

<sup>2</sup>Pooled standard error of the means presented.

<sup>3</sup>P – value of grazed vs. ungrazed treatments.

<sup>4</sup>Organic matter

<sup>5</sup>Extractable phosphorus

<sup>6</sup>Cation exchange capacity

**Table 4.1a.** Biomass and forage composition for 13 Mile Farms (2017-2020)<sup>1</sup>

Variable	2017		2018		2019		2020	
	Pregraze	Grazed	Pregrazed	Grazed	Pregrazed	Grazed	Pregrazed	Grazed
ADF, % DM <sup>2</sup>	43.40	47.47	-	38.63	-	47.80	-	32.23
NDF, % DM <sup>3</sup>	50.40	55.13	-	47.40	-	53.57	-	38.83
CP, % DM <sup>4</sup>	8.33	6.98	-	12.00	-	10.62	-	9.37
DM, % <sup>5</sup>	53.11	90.20	-	34.53	-	77.85	-	62.43
Production, kg · ha <sup>-1</sup>	941.74	443.13	-	444.83	-	369.19	-	300.67

<sup>1</sup> Three biomass samples were randomly collected using a 1-m<sup>2</sup> clipping frame before and after grazing.

<sup>2</sup> Acid Detergent Fiber

<sup>3</sup> Neutral Detergent Fiber

<sup>4</sup> Crude Protein

<sup>5</sup> Dry Matter

**Table 4.1b.** Biomass and forage composition for Black Cat Farms (2017-2020)<sup>1</sup>

Variable	2017		2018		2019		2020	
	Pregraze	Grazed	Pregrazed	Grazed	Pregrazed	Grazed	Pregrazed	Grazed
ADF, % DM <sup>2</sup>	44.83	54.20	49.52	54.20	54.20	-	-	-
NDF, % DM <sup>3</sup>	65.17	75.98	70.57	75.97	75.97	-	-	-
CP, % DM <sup>4</sup>	4.92	2.97	1.58	1.20	2.62	-	-	-
DM, % <sup>5</sup>	96.86	97.59	53.88	47.32	73.94	-	-	-
Production, kg · ha <sup>-1</sup>	941.74	444.95	444.83	284.13	369.07	-	-	-

<sup>1</sup> Three biomass samples were randomly collected using a 1-m<sup>2</sup> clipping frame before and after grazing.

<sup>2</sup> Acid Detergent Fiber

<sup>3</sup> Neutral Detergent Fiber

<sup>4</sup> Crude Protein

<sup>5</sup> Dry Matter

**Table 4.1c.** Biomass and forage composition for Strike Farms (2017-2020)<sup>1</sup>

Variable	2017		2018		2019		2020	
	Pregraze	Grazed	Pregrazed	Grazed	Pregrazed	Grazed	Pregrazed	Grazed
ADF, % DM <sup>2</sup>	35.00	46.07	32.50	42.97	36.00	41.83	-	-
NDF, % DM <sup>3</sup>	51.43	66.23	49.03	56.13	47.87	61.50	-	-
CP, % DM <sup>4</sup>	13.48	7.80	16.58	10.60	12.79	9.65	-	-
DM, % <sup>5</sup>	72.92	96.68	21.27	31.26	50.00	40.98	-	-
Production, kg · ha <sup>-1</sup>	544.71	192.91	899.62	823.13	1127.17	706.58	-	-

<sup>1</sup> Three biomass samples were randomly collected using a 1-m<sup>2</sup> clipping frame before and after grazing.

<sup>2</sup> Acid Detergent Fiber

<sup>3</sup> Neutral Detergent Fiber

<sup>4</sup> Crude Protein

<sup>5</sup> Dry Matter

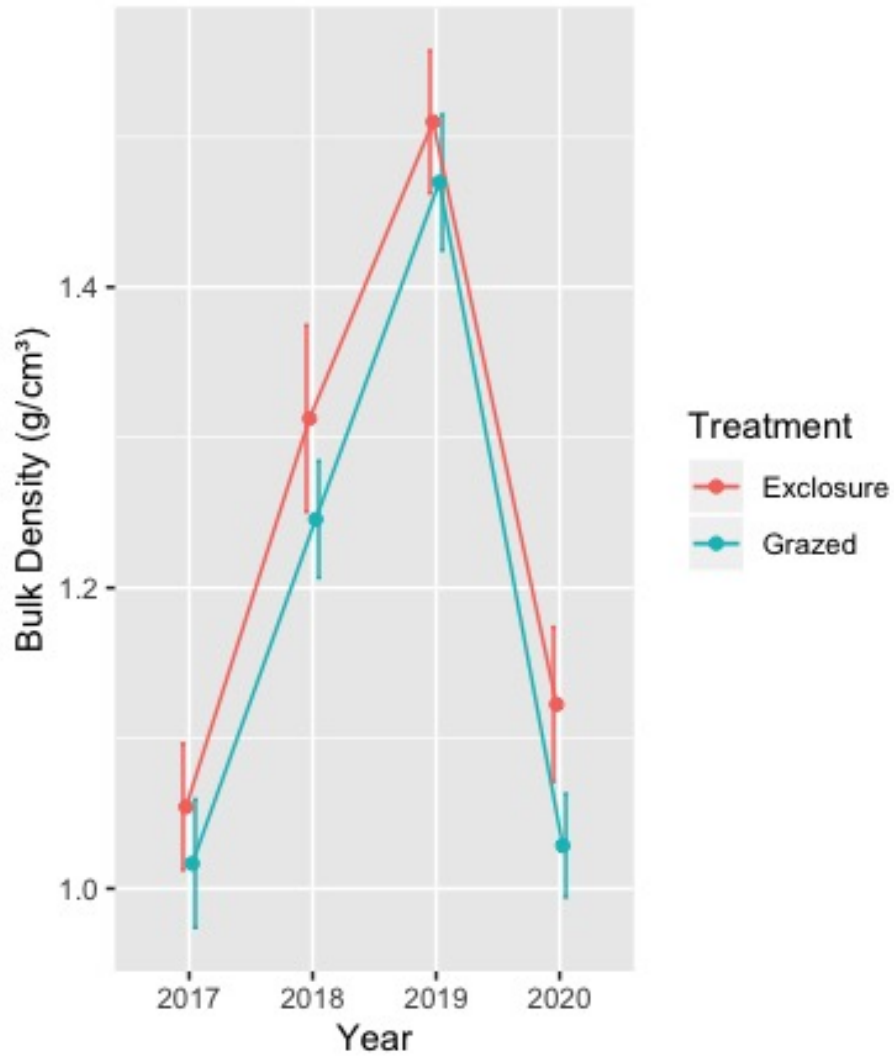


Figure 2.1a. Strike Farms bulk density ( $\text{g/cm}^3$ ) averages at 0-6 inches with grazed and exclosure (un-grazed) treatments

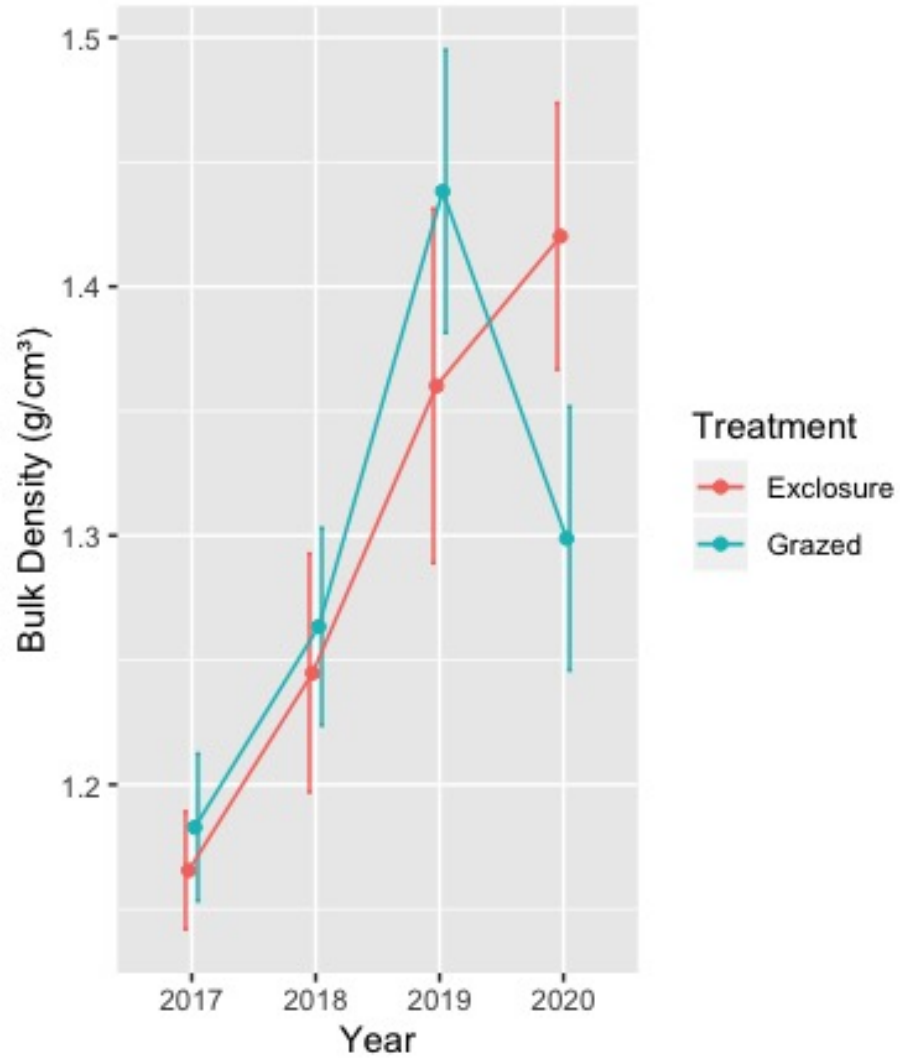


Figure 2.1b.13 Mile Lamb and Wool bulk density ( $\text{g/cm}^3$ ) averages at 0-6 inches with grazed and exclosure (un-grazed) treatments



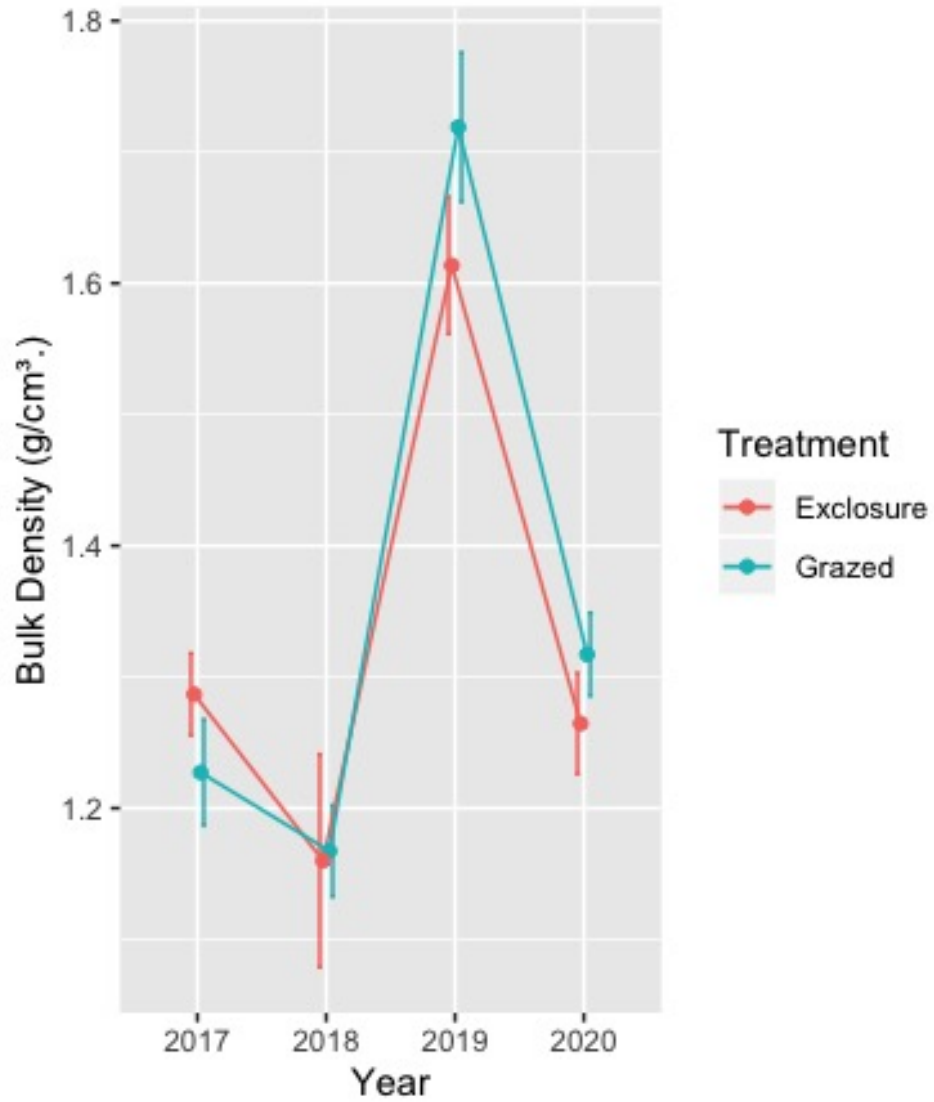


Figure 2.1c. Black Cat Farm bulk density averages at 0-6 inches with grazed and exclosure (un-grazed) treatments

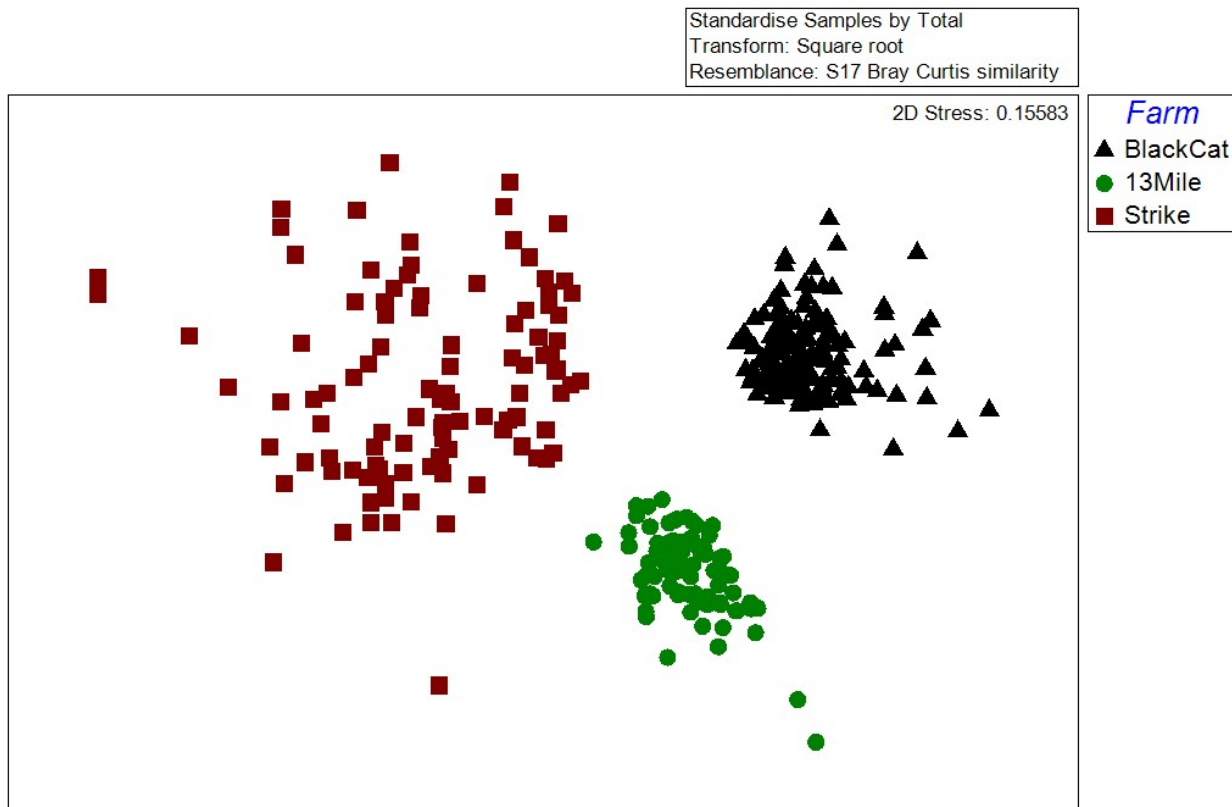


Figure 3.1a. Bray-Curtis similarity index showing beta diversity of soil microbial communities among farms

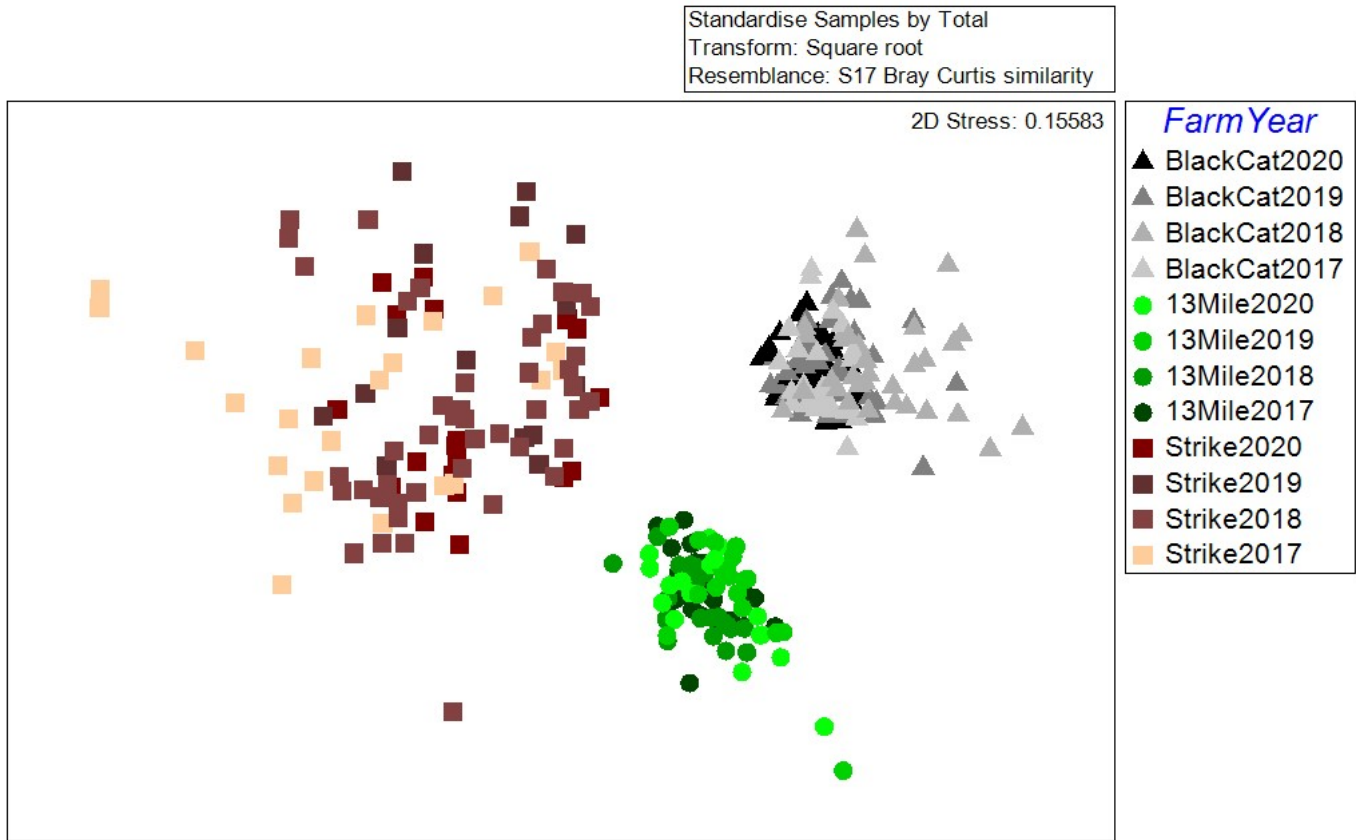


Figure 3.1b. Bray-Curtis similarity index showing beta diversity of soil microbial communities comparing farm x year

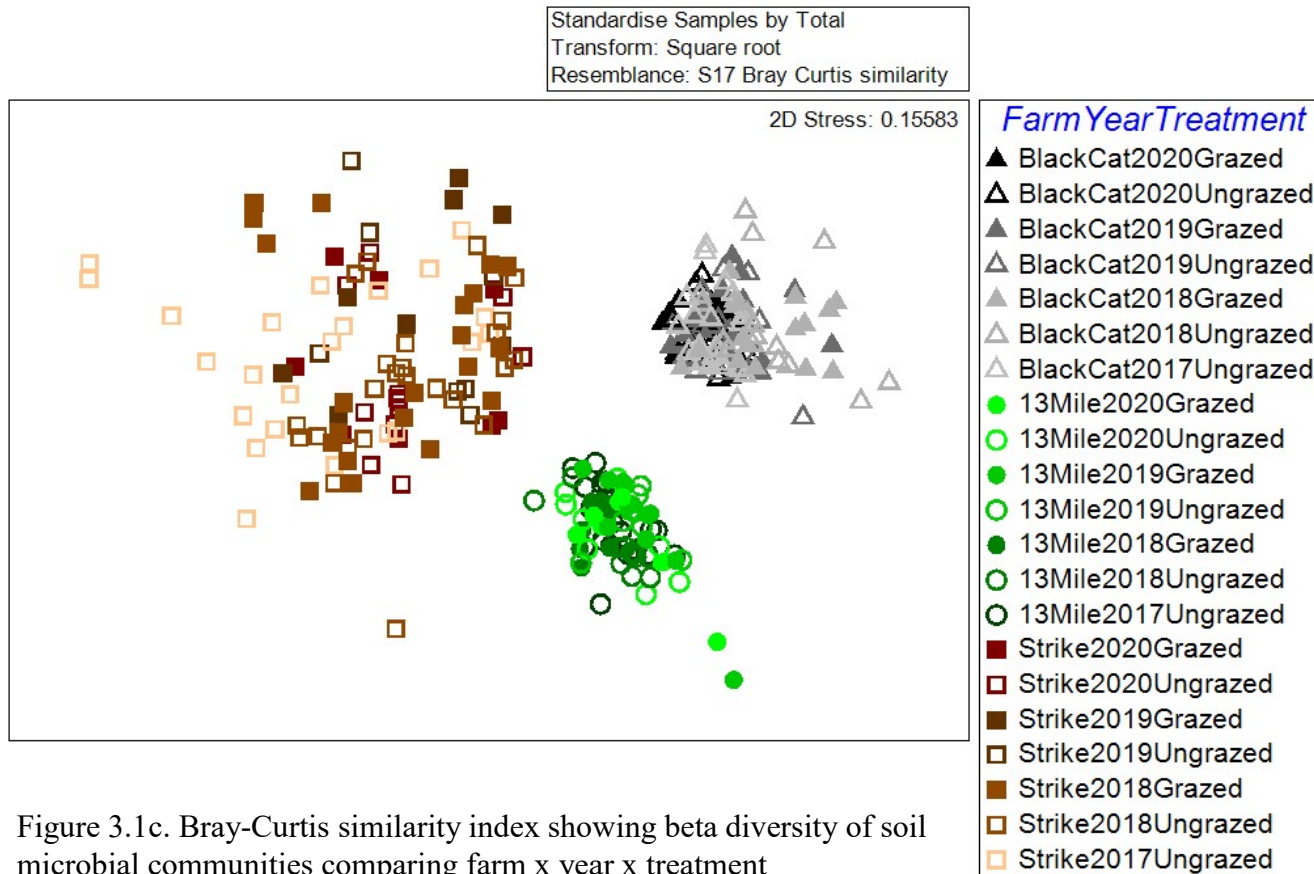


Figure 3.1c. Bray-Curtis similarity index showing beta diversity of soil microbial communities comparing farm x year x treatment