

1 This is wrong:  
2 soil-ph/2020-03-12-hatch-final-data-merged/output-rmd/rsq-permanova-plot-ph-wisc-spoon-1.png  
3 The adonis function has ordered input (for some reason), even when adding factors to the model.

```
## Biom + Metadata

# Intall:
# BiocManager::install("phyloseq")
# Load libraries
library(phyloseq)
#library(dada2)
library(ggplot2)
library(RColorBrewer)
library(vegan)

# Here we'll load in the microbial data.

# Import sequence processing table and check it out
# How many sequences were retained at each step?
track = readRDS("../2020-03-12-hatch-final-data-merged/reads/track.rds")
track
```

	##	input	filtered	denoised	tabled	nonchim
4	##					
5	## 001-K1-0-17_S1_	182876	113727	95159	95159	89297
6	## 002-K1-17-45_S2_	81260	51682	42307	42307	41748
7	## 003-K1-45-60_S3_	55300	27171	20888	20888	20171
8	## 004-K2-Muck_S4_	108860	71520	57380	57380	53443
9	## 005-K3-0-15_S5_	135686	71730	54482	54482	51936
10	## 006-K3-15-35_S6_	107464	37348	23576	23576	23486
11	## 007-K3-35-50_S7_	115786	78875	65044	65044	62650
12	## 008-K4-0-15_S8_	100152	19285	8619	8619	8556
13	## 009-K4-15-30_S9_	57577	35582	29993	29993	29051
14	## 010-K4-30-50_S10_	93763	46765	38406	38406	37402
15	## 011-R1-0-27_S11_	128413	40030	21838	21838	21737
16	## 012-R1-27-50_S12_	108524	67801	57776	57776	56713
17	## 013-R1-50-70_S13_	101327	44743	37288	37288	36691
18	## 014-R2-0-30_S14_	98020	50303	34370	34370	33980
19	## 015-R2-30-45_S15_	144651	83427	67939	67939	66910
20	## 016-R2-45-60_S16_	130070	34111	25167	25167	25018
21	## 017-R2-60-100_S17_	107756	58066	49565	49565	47991
22	## 018-R3-0-20_S18_	79325	34393	20386	20386	20326
23	## 019-R3-20-30_S19_	101494	43254	33039	33039	32370
24	## 020-M1-0-31_S20_	81090	44031	28164	28164	28059
25	## 021-M1-31-50_S21_	123202	32323	19729	19729	19466
26	## 022-M1-50-70_S22_	115300	58825	50270	50270	48700
27	## 023-M2-0-24_S23_	69786	37765	25211	25211	25211
28	## 024-M2-24-38_S24_	66500	4392	1360	1360	1360
29	## 025-M2-38-55_S25_	72317	11461	6401	6401	6401
30	## 026-M3-0-15_S26_	93907	58097	44706	44706	43995
31	## 027-M3-15-30_S27_	113189	69066	58961	58961	55617
32	## 028-S-0-30_S28_	84651	45676	33139	33139	32957
33	## 029-S-30-60_S29_	93210	60904	51755	51755	49984
34	## 030-H1-0-30_S30_	90750	46239	27822	27822	27668
35	## 031-H1-30-40_S31_	86567	30139	17938	17938	17938

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36	## 032-H1-40-60_S32_	105640	67558	59240	59240	57478
37	## 033-H2-0-30_S33_	87099	16339	6348	6348	6348
38	## 034-H2-30-60_S34_	83980	49334	41732	41732	40567
39	## 035-A249-0-35_S35_	171995	99802	78097	78097	76177
40	## 036-A249-35-60_S36_	150886	31831	20121	20121	19889
41	## 037-A341-0-33_S37_	85427	58108	43652	43652	42498
42	## 038-A341-33-55_S38_	152238	37509	22947	22947	22729
43	## 039-A341-55-75_S39_	136405	86536	70615	70615	66543
44	## 040-A341-75-85_S40_	136079	73684	61036	61036	57498
45	## 041-L2-0-23_S41_	159454	43258	23094	23094	23094
46	## 042-L2-23-45_S42_	122710	65865	49028	49028	47069
47	## 043-L3-0-12_S43_	86274	17177	8855	8855	8855
48	## 044-L3-12-20_S44_	132616	73576	55701	55701	55220
49	## 045-L3-20-40_S45_	80337	50489	40351	40351	39803
50	## 046-L4-0-10_S46_	99581	22005	9226	9226	9171
51	## 047-L4-10-20_S47_	91215	50684	32790	32790	31661
52	## 048-L4-20-40_S48_	119412	50107	33518	33518	32534
53	## 049-W3-Compost_S49_	180030	78201	58381	58381	52148
54	## 050-W4-0-28_S50_	104694	18856	9956	9956	9956
55	## 051-W4-28-45_S51_	247394	151323	128651	128651	119735
56	## 052-W4-45-55_S52_	115897	75634	62731	62731	61321
57	## 053-W5-0-35_S53_	103001	54100	37307	37307	36937
58	## 054-W5-35-65_S54_	105301	69483	54655	54655	51766
59	## 055-W7-0-15_S55_	89996	48631	33299	33299	32938
60	## 056-W7-15-30_S56_	66065	21643	13343	13343	13343
61	## 057-P1-0-30_S57_	89999	57426	41822	41822	41207
62	## 058-P1-30-45_S58_	109185	15843	8812	8812	8812
63	## 059-P1-45-55_S59_	92847	61590	51573	51573	50559
64	## 060-P2-0-20_S60_	107565	53905	36050	36050	35670
65	## 061-P2-20-45_S61_	176157	42505	23826	23826	23486
66	## 062-P2-45-55_S62_	136875	73794	57793	57793	55732
67	## 063-P4-0-25_S63_	146085	56463	34722	34722	34268
68	## 064-P4-25-35_S64_	153343	95555	73081	73081	68963
69	## 065-P4-35-50_S65_	120945	69145	50362	50362	48655
70	## 181-Sp11-Cr31-0-20_S66_	107462	27633	10675	10675	10675
71	## 182-Sp11-Cr32-0-16_S67_	88842	21116	7352	7352	7352
72	## 183-Sp11-Cr33-0-20_S68_	48207	17300	6739	6739	6739
73	## 184-Sp12-Cr34-0-16_S69_	91437	57258	37259	37259	37078
74	## 185-Sp12-Cr35-0-18_S70_	102991	61552	39530	39530	38480
75	## 186-Sp12-Cr36-0-20_S71_	74281	17619	6050	6050	6050
76	## 187-Sp13-Cr37-0-20_S72_	87916	35459	16580	16580	16570
77	## 188-Sp13-Cr38-0-20_S73_	92749	48058	30511	30511	30290
78	## 189-Sp13-Cr39-0-19_S74_	120274	64100	43911	43911	43536
79	## 190-Sp14-Cr40-0-17_S75_	147563	19324	7700	7700	7700
80	## 191-Sp14-Cr41-0-18_S76_	123615	76067	58444	58444	57514
81	## 192-Sp14-Cr42-0-20_S77_	95005	57765	40490	40490	40337
82	## 193-Sp15-Cr43-0-18_S78_	117756	55650	40950	40950	40238
83	## 194-Sp15-Cr44-0-17_S79_	144523	84487	71381	71381	68362
84	## 195-Sp15-Cr45-0-20_S80_	108008	49459	32985	32985	32567
85	## 196-Sp16-Cr46-0-20_S81_	82746	25675	8942	8942	8942
86	## 197-Sp16-Cr47-0-17_S82_	107765	64753	42508	42508	42356
87	## 198-Sp16-Cr48-0-20_S83_	115552	33125	14483	14483	14483
88	## 199-Sp17-Cr49-0-20_S84_	120659	64605	52183	52183	50940
89	## 200-Sp17-Cr50-0-18_S85_	161957	82546	62933	62933	59863

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90 ## 201-Sp17-Cr51-0-18_S86_ 109479 10752 4159 4159 4159
91 ## 202-Sp18-Cr52-0-18_S87_ 113065 72492 49565 49565 49262
92 ## 203-Sp18-Cr53-0-19_S88_ 92639 33398 15743 15743 15715
93 ## 204-Sp18-Cr54-0-20_S89_ 95422 59781 38645 38645 38431
94 ## 205-Sp19-Cr55-0-20_S90_ 204505 101955 73534 73534 71731
95 ## 206-Sp19-Cr56-0-18_S91_ 98520 7220 2276 2276 2276
96 ## 207-Sp19-Cr57-0-18_S92_ 97994 36745 19184 19184 19184
97 ## 208-Sp20-Cr58-0-20_S93_ 81724 36655 17796 17796 17796
98 ## 209-Sp20-Cr59-0-19_S94_ 148052 84565 54466 54466 53727
99 ## 210-Sp20-Cr60-0-20_S95_ 66841 40391 25375 25375 25288
100 ## 211-Sp1-Cr1-0-20_S96_ 134100 15037 6086 6086 6086
101 ## 212-Sp1-Cr2-0-20_S97_ 66264 14952 7640 7640 7537
102 ## 213-Sp1-Cr3-0-20_S98_ 71197 33638 23553 23553 19873
103 ## 214-Sp2-Cr4-0-20_S99_ 64668 32062 19681 19681 19681
104 ## 215-Sp2-Cr5-0-20_S100_ 59680 9677 3727 3727 3727
105 ## 216-Sp2-Cr6-0-20_S101_ 83270 51845 41388 41388 41287
106 ## 217-Sp3-Cr7-0-20_S102_ 73671 46034 29507 29507 29332
107 ## 218-Sp3-Cr8-0-20_S103_ 97858 53712 31869 31869 31707
108 ## 219-Sp3-Cr9-0-20_S104_ 97545 61866 40989 40989 40599
109 ## 220-Sp4-Cr10-0-20_S105_ 71516 34617 18555 18555 18555
110 ## 221-Sp4-Cr11-0-20_S106_ 63790 17585 6625 6625 6625
111 ## 222-Sp4-Cr12-0-20_S107_ 117411 78366 57338 57338 56779
112 ## 223-Sp5-Cr13-0-20_S108_ 108733 20176 6204 6204 6204
113 ## 224-Sp5-Cr14-0-20_S109_ 90829 58242 40371 40371 40169
114 ## 225-Sp5-Cr15-0-20_S110_ 64613 28212 13220 13220 13143
115 ## 226-Sp6-Cr16-0-15_S111_ 82006 19304 7464 7464 7464
116 ## 227-Sp6-Cr17-0-20_S112_ 76389 49052 30022 30022 29835
117 ## 228-Sp6-Cr18-0-20_S113_ 90349 34880 16346 16346 16247
118 ## 229-Sp7-Cr19-0-20_S114_ 115919 64710 51544 51544 50690
119 ## 230-Sp7-Cr20-0-20_S115_ 74230 18776 11523 11523 11499
120 ## 231-Sp7-Cr21-0-13_S116_ 75045 12521 5294 5294 5294
121 ## 232-Sp8-Cr22-0-20_S117_ 141073 69721 45560 45560 45482
122 ## 233-Sp8-Cr23-0-20_S118_ 110558 45709 26455 26455 26417
123 ## 234-Sp8-Cr24-0-20_S119_ 61465 37231 24321 24321 24273
124 ## 235-Sp9-Cr25-0-15_S120_ 83784 41544 22254 22254 22165
125 ## 236-Sp9-Cr26-0-20_S121_ 80446 48274 32007 32007 31862
126 ## 237-Sp9-Cr27-0-15_S122_ 80498 21827 8729 8729 8729
127 ## 238-Sp10-Cr28-0-20_S123_ 75603 36729 24170 24170 24160
128 ## 239-Sp10-Cr29-0-15_S124_ 84146 43982 30468 30468 30468
129 ## 240-Sp10-Cr30-0-20_S125_ 85612 12867 4856 4856 4856
130 ## 241-S-0-30-Dry_S126_ 81180 46857 39598 39598 39224

```

```

# Import final otu table
OTUs = readRDS("../2020-03-12-hatch-final-data-merged/reads/otutab.nochim.rds")
# Change rows and columns so taxa are rows
OTUs = t(OTUs)
# Import as phyloseq object table
otutab = otu_table(OTUs, taxa_are_rows=TRUE)
head(otutab)

```

```

131 ## OTU Table:          [6 taxa and 126 samples]
132 ##                    taxa are rows
133 ##
134 ## CGTAGGGCGCAAGCGTTATCCGGAATTATTGGGCGTAAAGAGCTCGTAGGCGGTTTGTGCGCTCTGCCGTGAAAGTCCGGGGCTCAACTCCGGATCTGCGG
135 ## CAGAGGTCTCAAGCGTTGTTCCGATTTCATTGGGCGTAAAGGGTGCGTAGGCGGCGGTAAGTCGGGTGTGAAATCTCGGAGCTTAAGTCCGAACTGCA

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Braus, M. J.

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Braus, M. J.

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1000 ## CAGAGGTCTCAAGCGTTGTTTCGGATTCATTGGGCGTAAAGGGTGCGTAGGCGGCGCGGTAAGTCGGGTGTGAAATCTCGGGGCTTAAGTCCGAAACTGCA
1001 ##
1002 ## CGTAGGGCGCAAGCGTTATCCGGAATTATTGGGCGTAAAGAGCTCGTAGGCGGTTTGTGCGCTCTGCCGTGAAAGTCCGGGGCTCAACTCCGGATCTGCG
1003 ## CAGAGGTCTCAAGCGTTGTTTCGGATTCATTGGGCGTAAAGGGTGCGTAGGCGGCGCGGTAAGTCGGGTGTGAAATCTCGGAGCTTAAGTCCGAAACTGCA
1004 ## GTAGGGGGCAAGCGTTATCCAGATTACTGGGCGTAAAGCGCGTGTAGGCGGCTGGTTAGGTGTGATGTGAAATCTTCGGGCTCAACCGGAAAACTGCAT
1005 ## CGAAGGGGGCTAGCGTTGCTCGGAATCACTGGGCGTAAAGGGTGCGTAGGCGGCTCTTAAGTCAGGGGTGAAATCCTGGAGCTCAACTCCAGAACTGCC
1006 ## CGTAGGTGGCAAGCGTTGTCCGATTTACTGGGCGTAAAGAGCGCGCAGGCGGTCTTCAAGTCGCGTGTGAAAGCCCCGGCTCAACTGGGGAGGGTCA
1007 ## CAGAGGTCTCAAGCGTTGTTTCGGATTCATTGGGCGTAAAGGGTGCGTAGGCGGCGCGGTAAGTCGGGTGTGAAATCTCGGGGCTTAAGTCCGAAACTGCA
1008 ##
1009 ## CGTAGGGCGCAAGCGTTATCCGGAATTATTGGGCGTAAAGAGCTCGTAGGCGGTTTGTGCGCTCTGCCGTGAAAGTCCGGGGCTCAACTCCGGATCTGCG
1010 ## CAGAGGTCTCAAGCGTTGTTTCGGATTCATTGGGCGTAAAGGGTGCGTAGGCGGCGCGGTAAGTCGGGTGTGAAATCTCGGAGCTTAAGTCCGAAACTGCA
1011 ## GTAGGGGGCAAGCGTTATCCAGATTACTGGGCGTAAAGCGCGTGTAGGCGGCTGGTTAGGTGTGATGTGAAATCTTCGGGCTCAACCGGAAAACTGCAT
1012 ## CGAAGGGGGCTAGCGTTGCTCGGAATCACTGGGCGTAAAGGGTGCGTAGGCGGCTCTTAAGTCAGGGGTGAAATCCTGGAGCTCAACTCCAGAACTGCC
1013 ## CGTAGGTGGCAAGCGTTGTCCGATTTACTGGGCGTAAAGAGCGCGCAGGCGGTCTTCAAGTCGCGTGTGAAAGCCCCGGCTCAACTGGGGAGGGTCA
1014 ## CAGAGGTCTCAAGCGTTGTTTCGGATTCATTGGGCGTAAAGGGTGCGTAGGCGGCGCGGTAAGTCGGGTGTGAAATCTCGGGGCTTAAGTCCGAAACTGCA

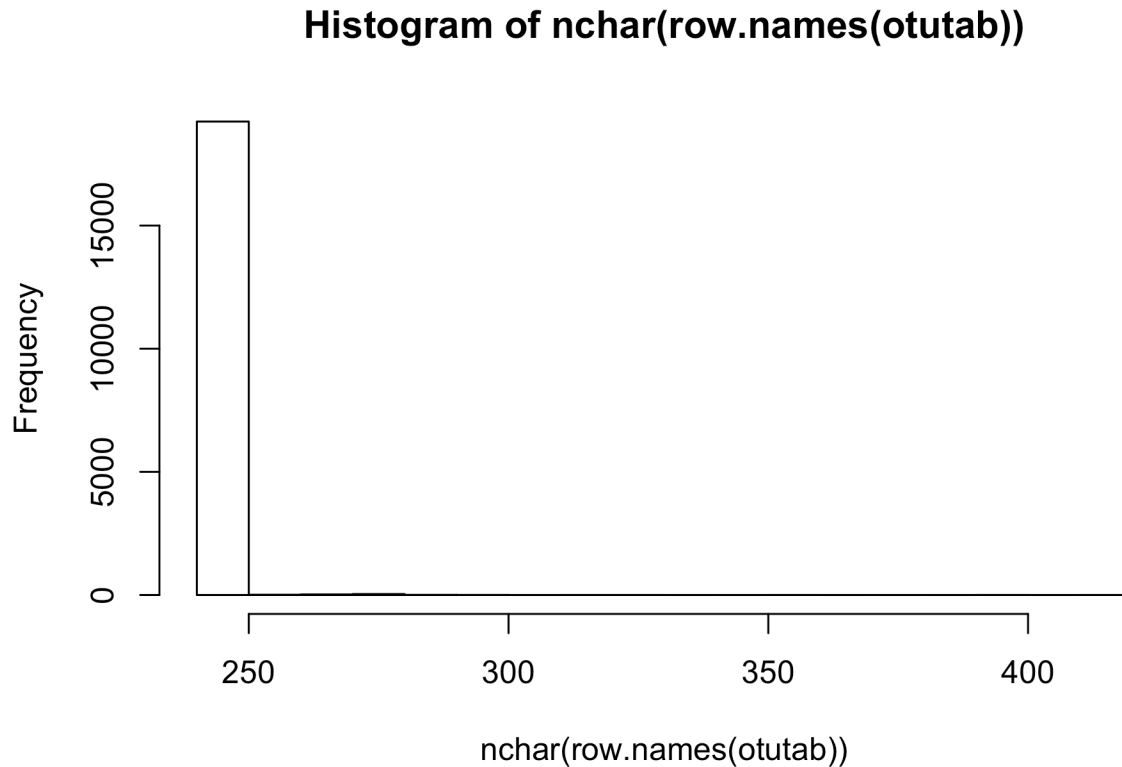
# Look at lowest-abundance samples
head(sort(sample_sums(otutab)))

1015 ##          024-M2-24-38_S24__F_filt.fastq.gz
1016 ##                                1360
1017 ## 206-Sp19-Cr56-0-18_S91__F_filt.fastq.gz
1018 ##                                2276
1019 ## 215-Sp2-Cr5-0-20_S100__F_filt.fastq.gz
1020 ##                                3727
1021 ## 201-Sp17-Cr51-0-18_S86__F_filt.fastq.gz
1022 ##                                4159
1023 ## 240-Sp10-Cr30-0-20_S125__F_filt.fastq.gz
1024 ##                                4856
1025 ## 231-Sp7-Cr21-0-13_S116__F_filt.fastq.gz
1026 ##                                5294

name = row.names(otutab)[1]
name

1027 ## [1] "CGTAGGGCGCAAGCGTTATCCGGAATTATTGGGCGTAAAGAGCTCGTAGGCGGTTTGTGCGCTCTGCCGTGAAAGTCCGGGGCTCAACTCCGGAT
hist(nchar(row.names(otutab)))

```



1028

```
colnames(otutab)
```

```
1029 ## [1] "001-K1-0-17_S1__F_filt.fastq.gz"
1030 ## [2] "002-K1-17-45_S2__F_filt.fastq.gz"
1031 ## [3] "003-K1-45-60_S3__F_filt.fastq.gz"
1032 ## [4] "004-K2-Muck_S4__F_filt.fastq.gz"
1033 ## [5] "005-K3-0-15_S5__F_filt.fastq.gz"
1034 ## [6] "006-K3-15-35_S6__F_filt.fastq.gz"
1035 ## [7] "007-K3-35-50_S7__F_filt.fastq.gz"
1036 ## [8] "008-K4-0-15_S8__F_filt.fastq.gz"
1037 ## [9] "009-K4-15-30_S9__F_filt.fastq.gz"
1038 ## [10] "010-K4-30-50_S10__F_filt.fastq.gz"
1039 ## [11] "011-R1-0-27_S11__F_filt.fastq.gz"
1040 ## [12] "012-R1-27-50_S12__F_filt.fastq.gz"
1041 ## [13] "013-R1-50-70_S13__F_filt.fastq.gz"
1042 ## [14] "014-R2-0-30_S14__F_filt.fastq.gz"
1043 ## [15] "015-R2-30-45_S15__F_filt.fastq.gz"
1044 ## [16] "016-R2-45-60_S16__F_filt.fastq.gz"
1045 ## [17] "017-R2-60-100_S17__F_filt.fastq.gz"
1046 ## [18] "018-R3-0-20_S18__F_filt.fastq.gz"
1047 ## [19] "019-R3-20-30_S19__F_filt.fastq.gz"
1048 ## [20] "020-M1-0-31_S20__F_filt.fastq.gz"
1049 ## [21] "021-M1-31-50_S21__F_filt.fastq.gz"
1050 ## [22] "022-M1-50-70_S22__F_filt.fastq.gz"
1051 ## [23] "023-M2-0-24_S23__F_filt.fastq.gz"
1052 ## [24] "024-M2-24-38_S24__F_filt.fastq.gz"
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1053 ## [25] "025-M2-38-55_S25__F_filt.fastq.gz"
1054 ## [26] "026-M3-0-15_S26__F_filt.fastq.gz"
1055 ## [27] "027-M3-15-30_S27__F_filt.fastq.gz"
1056 ## [28] "028-S-0-30_S28__F_filt.fastq.gz"
1057 ## [29] "029-S-30-60_S29__F_filt.fastq.gz"
1058 ## [30] "030-H1-0-30_S30__F_filt.fastq.gz"
1059 ## [31] "031-H1-30-40_S31__F_filt.fastq.gz"
1060 ## [32] "032-H1-40-60_S32__F_filt.fastq.gz"
1061 ## [33] "033-H2-0-30_S33__F_filt.fastq.gz"
1062 ## [34] "034-H2-30-60_S34__F_filt.fastq.gz"
1063 ## [35] "035-A249-0-35_S35__F_filt.fastq.gz"
1064 ## [36] "036-A249-35-60_S36__F_filt.fastq.gz"
1065 ## [37] "037-A341-0-33_S37__F_filt.fastq.gz"
1066 ## [38] "038-A341-33-55_S38__F_filt.fastq.gz"
1067 ## [39] "039-A341-55-75_S39__F_filt.fastq.gz"
1068 ## [40] "040-A341-75-85_S40__F_filt.fastq.gz"
1069 ## [41] "041-L2-0-23_S41__F_filt.fastq.gz"
1070 ## [42] "042-L2-23-45_S42__F_filt.fastq.gz"
1071 ## [43] "043-L3-0-12_S43__F_filt.fastq.gz"
1072 ## [44] "044-L3-12-20_S44__F_filt.fastq.gz"
1073 ## [45] "045-L3-20-40_S45__F_filt.fastq.gz"
1074 ## [46] "046-L4-0-10_S46__F_filt.fastq.gz"
1075 ## [47] "047-L4-10-20_S47__F_filt.fastq.gz"
1076 ## [48] "048-L4-20-40_S48__F_filt.fastq.gz"
1077 ## [49] "049-W3-Compost_S49__F_filt.fastq.gz"
1078 ## [50] "050-W4-0-28_S50__F_filt.fastq.gz"
1079 ## [51] "051-W4-28-45_S51__F_filt.fastq.gz"
1080 ## [52] "052-W4-45-55_S52__F_filt.fastq.gz"
1081 ## [53] "053-W5-0-35_S53__F_filt.fastq.gz"
1082 ## [54] "054-W5-35-65_S54__F_filt.fastq.gz"
1083 ## [55] "055-W7-0-15_S55__F_filt.fastq.gz"
1084 ## [56] "056-W7-15-30_S56__F_filt.fastq.gz"
1085 ## [57] "057-P1-0-30_S57__F_filt.fastq.gz"
1086 ## [58] "058-P1-30-45_S58__F_filt.fastq.gz"
1087 ## [59] "059-P1-45-55_S59__F_filt.fastq.gz"
1088 ## [60] "060-P2-0-20_S60__F_filt.fastq.gz"
1089 ## [61] "061-P2-20-45_S61__F_filt.fastq.gz"
1090 ## [62] "062-P2-45-55_S62__F_filt.fastq.gz"
1091 ## [63] "063-P4-0-25_S63__F_filt.fastq.gz"
1092 ## [64] "064-P4-25-35_S64__F_filt.fastq.gz"
1093 ## [65] "065-P4-35-50_S65__F_filt.fastq.gz"
1094 ## [66] "181-Sp11-Cr31-0-20_S66__F_filt.fastq.gz"
1095 ## [67] "182-Sp11-Cr32-0-16_S67__F_filt.fastq.gz"
1096 ## [68] "183-Sp11-Cr33-0-20_S68__F_filt.fastq.gz"
1097 ## [69] "184-Sp12-Cr34-0-16_S69__F_filt.fastq.gz"
1098 ## [70] "185-Sp12-Cr35-0-18_S70__F_filt.fastq.gz"
1099 ## [71] "186-Sp12-Cr36-0-20_S71__F_filt.fastq.gz"
1100 ## [72] "187-Sp13-Cr37-0-20_S72__F_filt.fastq.gz"
1101 ## [73] "188-Sp13-Cr38-0-20_S73__F_filt.fastq.gz"
1102 ## [74] "189-Sp13-Cr39-0-19_S74__F_filt.fastq.gz"
1103 ## [75] "190-Sp14-Cr40-0-17_S75__F_filt.fastq.gz"
1104 ## [76] "191-Sp14-Cr41-0-18_S76__F_filt.fastq.gz"
1105 ## [77] "192-Sp14-Cr42-0-20_S77__F_filt.fastq.gz"
1106 ## [78] "193-Sp15-Cr43-0-18_S78__F_filt.fastq.gz"

```

```

1107 ## [79] "194-Sp15-Cr44-0-17_S79__F_filt.fastq.gz"
1108 ## [80] "195-Sp15-Cr45-0-20_S80__F_filt.fastq.gz"
1109 ## [81] "196-Sp16-Cr46-0-20_S81__F_filt.fastq.gz"
1110 ## [82] "197-Sp16-Cr47-0-17_S82__F_filt.fastq.gz"
1111 ## [83] "198-Sp16-Cr48-0-20_S83__F_filt.fastq.gz"
1112 ## [84] "199-Sp17-Cr49-0-20_S84__F_filt.fastq.gz"
1113 ## [85] "200-Sp17-Cr50-0-18_S85__F_filt.fastq.gz"
1114 ## [86] "201-Sp17-Cr51-0-18_S86__F_filt.fastq.gz"
1115 ## [87] "202-Sp18-Cr52-0-18_S87__F_filt.fastq.gz"
1116 ## [88] "203-Sp18-Cr53-0-19_S88__F_filt.fastq.gz"
1117 ## [89] "204-Sp18-Cr54-0-20_S89__F_filt.fastq.gz"
1118 ## [90] "205-Sp19-Cr55-0-20_S90__F_filt.fastq.gz"
1119 ## [91] "206-Sp19-Cr56-0-18_S91__F_filt.fastq.gz"
1120 ## [92] "207-Sp19-Cr57-0-18_S92__F_filt.fastq.gz"
1121 ## [93] "208-Sp20-Cr58-0-20_S93__F_filt.fastq.gz"
1122 ## [94] "209-Sp20-Cr59-0-19_S94__F_filt.fastq.gz"
1123 ## [95] "210-Sp20-Cr60-0-20_S95__F_filt.fastq.gz"
1124 ## [96] "211-Sp1-Cr1-0-20_S96__F_filt.fastq.gz"
1125 ## [97] "212-Sp1-Cr2-0-20_S97__F_filt.fastq.gz"
1126 ## [98] "213-Sp1-Cr3-0-20_S98__F_filt.fastq.gz"
1127 ## [99] "214-Sp2-Cr4-0-20_S99__F_filt.fastq.gz"
1128 ## [100] "215-Sp2-Cr5-0-20_S100__F_filt.fastq.gz"
1129 ## [101] "216-Sp2-Cr6-0-20_S101__F_filt.fastq.gz"
1130 ## [102] "217-Sp3-Cr7-0-20_S102__F_filt.fastq.gz"
1131 ## [103] "218-Sp3-Cr8-0-20_S103__F_filt.fastq.gz"
1132 ## [104] "219-Sp3-Cr9-0-20_S104__F_filt.fastq.gz"
1133 ## [105] "220-Sp4-Cr10-0-20_S105__F_filt.fastq.gz"
1134 ## [106] "221-Sp4-Cr11-0-20_S106__F_filt.fastq.gz"
1135 ## [107] "222-Sp4-Cr12-0-20_S107__F_filt.fastq.gz"
1136 ## [108] "223-Sp5-Cr13-0-20_S108__F_filt.fastq.gz"
1137 ## [109] "224-Sp5-Cr14-0-20_S109__F_filt.fastq.gz"
1138 ## [110] "225-Sp5-Cr15-0-20_S110__F_filt.fastq.gz"
1139 ## [111] "226-Sp6-Cr16-0-15_S111__F_filt.fastq.gz"
1140 ## [112] "227-Sp6-Cr17-0-20_S112__F_filt.fastq.gz"
1141 ## [113] "228-Sp6-Cr18-0-20_S113__F_filt.fastq.gz"
1142 ## [114] "229-Sp7-Cr19-0-20_S114__F_filt.fastq.gz"
1143 ## [115] "230-Sp7-Cr20-0-20_S115__F_filt.fastq.gz"
1144 ## [116] "231-Sp7-Cr21-0-13_S116__F_filt.fastq.gz"
1145 ## [117] "232-Sp8-Cr22-0-20_S117__F_filt.fastq.gz"
1146 ## [118] "233-Sp8-Cr23-0-20_S118__F_filt.fastq.gz"
1147 ## [119] "234-Sp8-Cr24-0-20_S119__F_filt.fastq.gz"
1148 ## [120] "235-Sp9-Cr25-0-15_S120__F_filt.fastq.gz"
1149 ## [121] "236-Sp9-Cr26-0-20_S121__F_filt.fastq.gz"
1150 ## [122] "237-Sp9-Cr27-0-15_S122__F_filt.fastq.gz"
1151 ## [123] "238-Sp10-Cr28-0-20_S123__F_filt.fastq.gz"
1152 ## [124] "239-Sp10-Cr29-0-15_S124__F_filt.fastq.gz"
1153 ## [125] "240-Sp10-Cr30-0-20_S125__F_filt.fastq.gz"
1154 ## [126] "241-S-0-30-Dry_S126__F_filt.fastq.gz"

```

```

# The sample names have suffixes appended to them - we just want sample IDs
# Get names
names = colnames(otutab)
# Remove last 17 characters
newnames = gsub('.{17}$', '', names)

```

---

*# Check out names*

newnames

1155	##	[1]	"001-K1-0-17_S1"	"002-K1-17-45_S2"
1156	##	[3]	"003-K1-45-60_S3"	"004-K2-Muck_S4"
1157	##	[5]	"005-K3-0-15_S5"	"006-K3-15-35_S6"
1158	##	[7]	"007-K3-35-50_S7"	"008-K4-0-15_S8"
1159	##	[9]	"009-K4-15-30_S9"	"010-K4-30-50_S10"
1160	##	[11]	"011-R1-0-27_S11"	"012-R1-27-50_S12"
1161	##	[13]	"013-R1-50-70_S13"	"014-R2-0-30_S14"
1162	##	[15]	"015-R2-30-45_S15"	"016-R2-45-60_S16"
1163	##	[17]	"017-R2-60-100_S17"	"018-R3-0-20_S18"
1164	##	[19]	"019-R3-20-30_S19"	"020-M1-0-31_S20"
1165	##	[21]	"021-M1-31-50_S21"	"022-M1-50-70_S22"
1166	##	[23]	"023-M2-0-24_S23"	"024-M2-24-38_S24"
1167	##	[25]	"025-M2-38-55_S25"	"026-M3-0-15_S26"
1168	##	[27]	"027-M3-15-30_S27"	"028-S-0-30_S28"
1169	##	[29]	"029-S-30-60_S29"	"030-H1-0-30_S30"
1170	##	[31]	"031-H1-30-40_S31"	"032-H1-40-60_S32"
1171	##	[33]	"033-H2-0-30_S33"	"034-H2-30-60_S34"
1172	##	[35]	"035-A249-0-35_S35"	"036-A249-35-60_S36"
1173	##	[37]	"037-A341-0-33_S37"	"038-A341-33-55_S38"
1174	##	[39]	"039-A341-55-75_S39"	"040-A341-75-85_S40"
1175	##	[41]	"041-L2-0-23_S41"	"042-L2-23-45_S42"
1176	##	[43]	"043-L3-0-12_S43"	"044-L3-12-20_S44"
1177	##	[45]	"045-L3-20-40_S45"	"046-L4-0-10_S46"
1178	##	[47]	"047-L4-10-20_S47"	"048-L4-20-40_S48"
1179	##	[49]	"049-W3-Compost_S49"	"050-W4-0-28_S50"
1180	##	[51]	"051-W4-28-45_S51"	"052-W4-45-55_S52"
1181	##	[53]	"053-W5-0-35_S53"	"054-W5-35-65_S54"
1182	##	[55]	"055-W7-0-15_S55"	"056-W7-15-30_S56"
1183	##	[57]	"057-P1-0-30_S57"	"058-P1-30-45_S58"
1184	##	[59]	"059-P1-45-55_S59"	"060-P2-0-20_S60"
1185	##	[61]	"061-P2-20-45_S61"	"062-P2-45-55_S62"
1186	##	[63]	"063-P4-0-25_S63"	"064-P4-25-35_S64"
1187	##	[65]	"065-P4-35-50_S65"	"181-Sp11-Cr31-0-20_S66"
1188	##	[67]	"182-Sp11-Cr32-0-16_S67"	"183-Sp11-Cr33-0-20_S68"
1189	##	[69]	"184-Sp12-Cr34-0-16_S69"	"185-Sp12-Cr35-0-18_S70"
1190	##	[71]	"186-Sp12-Cr36-0-20_S71"	"187-Sp13-Cr37-0-20_S72"
1191	##	[73]	"188-Sp13-Cr38-0-20_S73"	"189-Sp13-Cr39-0-19_S74"
1192	##	[75]	"190-Sp14-Cr40-0-17_S75"	"191-Sp14-Cr41-0-18_S76"
1193	##	[77]	"192-Sp14-Cr42-0-20_S77"	"193-Sp15-Cr43-0-18_S78"
1194	##	[79]	"194-Sp15-Cr44-0-17_S79"	"195-Sp15-Cr45-0-20_S80"
1195	##	[81]	"196-Sp16-Cr46-0-20_S81"	"197-Sp16-Cr47-0-17_S82"
1196	##	[83]	"198-Sp16-Cr48-0-20_S83"	"199-Sp17-Cr49-0-20_S84"
1197	##	[85]	"200-Sp17-Cr50-0-18_S85"	"201-Sp17-Cr51-0-18_S86"
1198	##	[87]	"202-Sp18-Cr52-0-18_S87"	"203-Sp18-Cr53-0-19_S88"
1199	##	[89]	"204-Sp18-Cr54-0-20_S89"	"205-Sp19-Cr55-0-20_S90"
1200	##	[91]	"206-Sp19-Cr56-0-18_S91"	"207-Sp19-Cr57-0-18_S92"
1201	##	[93]	"208-Sp20-Cr58-0-20_S93"	"209-Sp20-Cr59-0-19_S94"
1202	##	[95]	"210-Sp20-Cr60-0-20_S95"	"211-Sp1-Cr1-0-20_S96"
1203	##	[97]	"212-Sp1-Cr2-0-20_S97"	"213-Sp1-Cr3-0-20_S98"
1204	##	[99]	"214-Sp2-Cr4-0-20_S99"	"215-Sp2-Cr5-0-20_S100"
1205	##	[101]	"216-Sp2-Cr6-0-20_S101"	"217-Sp3-Cr7-0-20_S102"



```

1206 ## [103] "218-Sp3-Cr8-0-20_S103" "219-Sp3-Cr9-0-20_S104"
1207 ## [105] "220-Sp4-Cr10-0-20_S105" "221-Sp4-Cr11-0-20_S106"
1208 ## [107] "222-Sp4-Cr12-0-20_S107" "223-Sp5-Cr13-0-20_S108"
1209 ## [109] "224-Sp5-Cr14-0-20_S109" "225-Sp5-Cr15-0-20_S110"
1210 ## [111] "226-Sp6-Cr16-0-15_S111" "227-Sp6-Cr17-0-20_S112"
1211 ## [113] "228-Sp6-Cr18-0-20_S113" "229-Sp7-Cr19-0-20_S114"
1212 ## [115] "230-Sp7-Cr20-0-20_S115" "231-Sp7-Cr21-0-13_S116"
1213 ## [117] "232-Sp8-Cr22-0-20_S117" "233-Sp8-Cr23-0-20_S118"
1214 ## [119] "234-Sp8-Cr24-0-20_S119" "235-Sp9-Cr25-0-15_S120"
1215 ## [121] "236-Sp9-Cr26-0-20_S121" "237-Sp9-Cr27-0-15_S122"
1216 ## [123] "238-Sp10-Cr28-0-20_S123" "239-Sp10-Cr29-0-15_S124"
1217 ## [125] "240-Sp10-Cr30-0-20_S125" "241-S-0-30-Dry_S126"

```

```
# Assign new names to samples
```

```
colnames(otutab) = newnames
```

```
# Same thing if we wanted to simplify OTU names to IDs
```

```
# Instead of sequences (although that's useful)
```

```
otunames=row.names(otutab)
```

```
length(otunames)
```

```
1218 ## [1] 19313
```

```
newotunames = paste("OTU",rep(1:length(otunames)),sep="")
```

```
head(newotunames)
```

```
1219 ## [1] "OTU1" "OTU2" "OTU3" "OTU4" "OTU5" "OTU6"
```

```
row.names(otutab) = newotunames
```

```
head(otutab)
```

```

1220 ## OTU Table:          [6 taxa and 126 samples]
1221 ##                taxa are rows
1222 ##      001-K1-0-17_S1 002-K1-17-45_S2 003-K1-45-60_S3 004-K2-Muck_S4
1223 ## OTU1              0                0                49                0
1224 ## OTU2             461              369                0                0
1225 ## OTU3             157              522              429                0
1226 ## OTU4             482              159                0                0
1227 ## OTU5              0                0                0                0
1228 ## OTU6             181              247              271                0
1229 ##      005-K3-0-15_S5 006-K3-15-35_S6 007-K3-35-50_S7 008-K4-0-15_S8
1230 ## OTU1             115                0                25                0
1231 ## OTU2             546              509              983                0
1232 ## OTU3              64              343              452                0
1233 ## OTU4             452              227              313                0
1234 ## OTU5              0                0                24                0
1235 ## OTU6             269              429             1184                0
1236 ##      009-K4-15-30_S9 010-K4-30-50_S10 011-R1-0-27_S11 012-R1-27-50_S12
1237 ## OTU1              0                0             1096             635
1238 ## OTU2              0              156              205              84
1239 ## OTU3             635             1162              184             1659
1240 ## OTU4              0                75              262                0
1241 ## OTU5              0                0                0                0
1242 ## OTU6              0                0                0             198
1243 ##      013-R1-50-70_S13 014-R2-0-30_S14 015-R2-30-45_S15 016-R2-45-60_S16
1244 ## OTU1              225             1303              730             349

```

---

1245	##	OTU2	0	0	233	0
1246	##	OTU3	1094	0	984	332
1247	##	OTU4	0	167	71	0
1248	##	OTU5	0	333	193	0
1249	##	OTU6	0	0	1665	456
1250	##	017-R2-60-100_S17	018-R3-0-20_S18	019-R3-20-30_S19	020-M1-0-31_S20	
1251	##	OTU1	1483	426	0	216
1252	##	OTU2	0	211	64	246
1253	##	OTU3	838	45	1711	6
1254	##	OTU4	0	87	0	112
1255	##	OTU5	0	72	0	536
1256	##	OTU6	555	0	57	0
1257	##	021-M1-31-50_S21	022-M1-50-70_S22	023-M2-0-24_S23	024-M2-24-38_S24	
1258	##	OTU1	89	128	149	0
1259	##	OTU2	298	258	105	0
1260	##	OTU3	1691	5550	5	72
1261	##	OTU4	108	183	81	0
1262	##	OTU5	279	53	329	98
1263	##	OTU6	0	248	0	0
1264	##	025-M2-38-55_S25	026-M3-0-15_S26	027-M3-15-30_S27	028-S-0-30_S28	
1265	##	OTU1	39	115	656	51
1266	##	OTU2	0	424	644	436
1267	##	OTU3	904	15	1119	80
1268	##	OTU4	0	201	119	240
1269	##	OTU5	52	547	457	0
1270	##	OTU6	0	0	671	144
1271	##	029-S-30-60_S29	030-H1-0-30_S30	031-H1-30-40_S31	032-H1-40-60_S32	
1272	##	OTU1	71	354	158	129
1273	##	OTU2	1128	0	140	902
1274	##	OTU3	1042	0	0	0
1275	##	OTU4	181	87	17	105
1276	##	OTU5	0	999	163	31
1277	##	OTU6	574	0	106	704
1278	##	033-H2-0-30_S33	034-H2-30-60_S34	035-A249-0-35_S35	036-A249-35-60_S36	
1279	##	OTU1	96	287	462	95
1280	##	OTU2	119	497	322	315
1281	##	OTU3	0	15	0	311
1282	##	OTU4	60	82	195	149
1283	##	OTU5	138	71	1203	173
1284	##	OTU6	0	296	405	479
1285	##	037-A341-0-33_S37	038-A341-33-55_S38	039-A341-55-75_S39	040-A341-75-85_S40	
1286	##	OTU1	305	119	232	64
1287	##	OTU2	157	695	389	220
1288	##	OTU3	0	126	1302	2972
1289	##	OTU4	88	0	133	43
1290	##	OTU5	682	312	443	129
1291	##	OTU6	0	573	681	256
1292	##	041-L2-0-23_S41	042-L2-23-45_S42	043-L3-0-12_S43	044-L3-12-20_S44	
1293	##	OTU1	77	174	0	130
1294	##	OTU2	788	2370	317	830
1295	##	OTU3	0	240	0	14
1296	##	OTU4	133	269	121	216
1297	##	OTU5	272	166	180	561
1298	##	OTU6	263	788	0	483

---

1299	##	045-L3-20-40_S45	046-L4-0-10_S46	047-L4-10-20_S47	048-L4-20-40_S48
1300	##	OTU1	71	27	0
1301	##	OTU2	674	1202	2267
1302	##	OTU3	614	0	16
1303	##	OTU4	265	235	314
1304	##	OTU5	397	186	303
1305	##	OTU6	606	32	720
1306	##	049-W3-Compost_S49	050-W4-0-28_S50	051-W4-28-45_S51	052-W4-45-55_S52
1307	##	OTU1	0	0	970
1308	##	OTU2	0	324	1291
1309	##	OTU3	0	0	2177
1310	##	OTU4	0	0	388
1311	##	OTU5	0	0	324
1312	##	OTU6	0	0	1538
1313	##	053-W5-0-35_S53	054-W5-35-65_S54	055-W7-0-15_S55	056-W7-15-30_S56
1314	##	OTU1	367	31	180
1315	##	OTU2	547	1871	978
1316	##	OTU3	32	117	94
1317	##	OTU4	212	210	152
1318	##	OTU5	430	49	198
1319	##	OTU6	293	1051	795
1320	##	057-P1-0-30_S57	058-P1-30-45_S58	059-P1-45-55_S59	060-P2-0-20_S60
1321	##	OTU1	665	135	875
1322	##	OTU2	548	0	71
1323	##	OTU3	0	28	130
1324	##	OTU4	91	105	60
1325	##	OTU5	588	0	80
1326	##	OTU6	0	0	390
1327	##	061-P2-20-45_S61	062-P2-45-55_S62	063-P4-0-25_S63	064-P4-25-35_S64
1328	##	OTU1	192	462	160
1329	##	OTU2	136	0	395
1330	##	OTU3	0	0	0
1331	##	OTU4	124	129	154
1332	##	OTU5	0	159	497
1333	##	OTU6	0	0	0
1334	##	065-P4-35-50_S65	181-Sp11-Cr31-0-20_S66	182-Sp11-Cr32-0-16_S67	
1335	##	OTU1	211	307	195
1336	##	OTU2	79	231	242
1337	##	OTU3	0	0	0
1338	##	OTU4	158	124	157
1339	##	OTU5	256	204	170
1340	##	OTU6	0	0	0
1341	##	183-Sp11-Cr33-0-20_S68	184-Sp12-Cr34-0-16_S69	185-Sp12-Cr35-0-18_S70	
1342	##	OTU1	785	975	685
1343	##	OTU2	151	267	240
1344	##	OTU3	0	0	0
1345	##	OTU4	204	275	2352
1346	##	OTU5	81	461	380
1347	##	OTU6	0	0	0
1348	##	186-Sp12-Cr36-0-20_S71	187-Sp13-Cr37-0-20_S72	188-Sp13-Cr38-0-20_S73	
1349	##	OTU1	744	423	1472
1350	##	OTU2	171	279	395
1351	##	OTU3	0	0	62
1352	##	OTU4	318	324	363

---

1353	##	OTU5	126	263	92
1354	##	OTU6	0	0	144
1355	##	189-Sp13-Cr39-0-19_S74	190-Sp14-Cr40-0-17_S75	191-Sp14-Cr41-0-18_S76	
1356	##	OTU1	1393	121	730
1357	##	OTU2	467	0	120
1358	##	OTU3	72	43	115
1359	##	OTU4	361	181	228
1360	##	OTU5	173	0	0
1361	##	OTU6	129	0	0
1362	##	192-Sp14-Cr42-0-20_S77	193-Sp15-Cr43-0-18_S78	194-Sp15-Cr44-0-17_S79	
1363	##	OTU1	635	1568	1439
1364	##	OTU2	179	0	0
1365	##	OTU3	140	0	479
1366	##	OTU4	359	376	235
1367	##	OTU5	47	0	0
1368	##	OTU6	0	0	0
1369	##	195-Sp15-Cr45-0-20_S80	196-Sp16-Cr46-0-20_S81	197-Sp16-Cr47-0-17_S82	
1370	##	OTU1	1037	321	1055
1371	##	OTU2	0	0	348
1372	##	OTU3	0	0	0
1373	##	OTU4	688	175	348
1374	##	OTU5	50	138	323
1375	##	OTU6	0	0	141
1376	##	198-Sp16-Cr48-0-20_S83	199-Sp17-Cr49-0-20_S84	200-Sp17-Cr50-0-18_S85	
1377	##	OTU1	397	492	1223
1378	##	OTU2	192	0	0
1379	##	OTU3	0	281	101
1380	##	OTU4	516	166	1959
1381	##	OTU5	130	0	90
1382	##	OTU6	0	0	0
1383	##	201-Sp17-Cr51-0-18_S86	202-Sp18-Cr52-0-18_S87	203-Sp18-Cr53-0-19_S88	
1384	##	OTU1	482	1306	857
1385	##	OTU2	0	236	271
1386	##	OTU3	83	0	0
1387	##	OTU4	164	278	279
1388	##	OTU5	0	553	300
1389	##	OTU6	0	107	0
1390	##	204-Sp18-Cr54-0-20_S89	205-Sp19-Cr55-0-20_S90	206-Sp19-Cr56-0-18_S91	
1391	##	OTU1	1367	1716	113
1392	##	OTU2	227	162	0
1393	##	OTU3	0	242	51
1394	##	OTU4	347	446	0
1395	##	OTU5	384	0	0
1396	##	OTU6	83	0	0
1397	##	207-Sp19-Cr57-0-18_S92	208-Sp20-Cr58-0-20_S93	209-Sp20-Cr59-0-19_S94	
1398	##	OTU1	1179	997	1546
1399	##	OTU2	0	314	323
1400	##	OTU3	41	0	70
1401	##	OTU4	0	341	711
1402	##	OTU5	0	315	408
1403	##	OTU6	0	0	256
1404	##	210-Sp20-Cr60-0-20_S95	211-Sp1-Cr1-0-20_S96	212-Sp1-Cr2-0-20_S97	
1405	##	OTU1	878	99	96
1406	##	OTU2	225	0	0

1407	## OTU3	0	0	0
1408	## OTU4	181	127	2578
1409	## OTU5	204	0	0
1410	## OTU6	194	0	0
1411	##	213-Sp1-Cr3-0-20_S98	214-Sp2-Cr4-0-20_S99	215-Sp2-Cr5-0-20_S100
1412	## OTU1	253	1054	0
1413	## OTU2	0	228	0
1414	## OTU3	50	0	0
1415	## OTU4	0	153	0
1416	## OTU5	0	0	0
1417	## OTU6	0	0	0
1418	##	216-Sp2-Cr6-0-20_S101	217-Sp3-Cr7-0-20_S102	218-Sp3-Cr8-0-20_S103
1419	## OTU1	356	1342	1200
1420	## OTU2	344	240	257
1421	## OTU3	150	0	0
1422	## OTU4	154	465	164
1423	## OTU5	0	405	375
1424	## OTU6	131	99	111
1425	##	219-Sp3-Cr9-0-20_S104	220-Sp4-Cr10-0-20_S105	221-Sp4-Cr11-0-20_S106
1426	## OTU1	1786	962	676
1427	## OTU2	286	176	102
1428	## OTU3	0	0	0
1429	## OTU4	245	303	107
1430	## OTU5	425	191	84
1431	## OTU6	130	176	0
1432	##	222-Sp4-Cr12-0-20_S107	223-Sp5-Cr13-0-20_S108	224-Sp5-Cr14-0-20_S109
1433	## OTU1	1114	204	1062
1434	## OTU2	363	132	313
1435	## OTU3	33	0	0
1436	## OTU4	336	202	417
1437	## OTU5	547	224	505
1438	## OTU6	388	0	228
1439	##	225-Sp5-Cr15-0-20_S110	226-Sp6-Cr16-0-15_S111	227-Sp6-Cr17-0-20_S112
1440	## OTU1	908	160	754
1441	## OTU2	136	0	131
1442	## OTU3	0	0	0
1443	## OTU4	227	196	316
1444	## OTU5	204	143	329
1445	## OTU6	0	0	70
1446	##	228-Sp6-Cr18-0-20_S113	229-Sp7-Cr19-0-20_S114	230-Sp7-Cr20-0-20_S115
1447	## OTU1	377	296	300
1448	## OTU2	233	0	0
1449	## OTU3	0	250	0
1450	## OTU4	172	235	250
1451	## OTU5	330	0	0
1452	## OTU6	0	0	0
1453	##	231-Sp7-Cr21-0-13_S116	232-Sp8-Cr22-0-20_S117	233-Sp8-Cr23-0-20_S118
1454	## OTU1	525	1144	831
1455	## OTU2	0	469	484
1456	## OTU3	44	93	97
1457	## OTU4	0	415	280
1458	## OTU5	0	183	84
1459	## OTU6	0	129	0
1460	##	234-Sp8-Cr24-0-20_S119	235-Sp9-Cr25-0-15_S120	236-Sp9-Cr26-0-20_S121

---

```

1461 ## OTU1 312 753 405
1462 ## OTU2 776 160 204
1463 ## OTU3 71 0 0
1464 ## OTU4 287 190 196
1465 ## OTU5 169 412 484
1466 ## OTU6 0 0 0
1467 ## 237-Sp9-Cr27-0-15_S122 238-Sp10-Cr28-0-20_S123 239-Sp10-Cr29-0-15_S124
1468 ## OTU1 611 353 271
1469 ## OTU2 126 0 0
1470 ## OTU3 0 144 43
1471 ## OTU4 61 169 319
1472 ## OTU5 224 35 55
1473 ## OTU6 0 0 0
1474 ## 240-Sp10-Cr30-0-20_S125 241-S-0-30-Dry_S126
1475 ## OTU1 130 0
1476 ## OTU2 0 204
1477 ## OTU3 58 312
1478 ## OTU4 114 160
1479 ## OTU5 0 0
1480 ## OTU6 0 0

```

```

# Cut off the sampling ID to match metadata
for (i in 1:length(colnames(otutab))){
  newname = strsplit(colnames(otutab[i]),"_")[[i]][1]
  colnames(otutab)[i]=newname
}

# Import sample data
samdat = read.csv("../2020-03-12-hatch-final-data-merged/source/metrology-compiled/2020-03-12-hatch-dat
# samdat$Sample.ID = as.character(samdat$Sample.ID)
# samdat$Sample.ID[1:9] = paste("00",samdat$Sample.ID[1:9],sep="")
# samdat$Sample.ID[10:length(samdat$Sample.ID)] = paste("0",samdat$Sample.ID[10:length(samdat$Sample.ID
# Check we have all the same sample names now
samdat$Sample.ID[1:65] == colnames(otutab)[1:65]

```

```

1481 ## [1] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
1482 ## [16] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
1483 ## [31] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
1484 ## [46] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
1485 ## [61] TRUE TRUE TRUE TRUE TRUE

```

```

samdat$Sample.ID[66:125] == colnames(otutab)[66:125]

```

```

1486 ## [1] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
1487 ## [16] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
1488 ## [31] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
1489 ## [46] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE

```

```

samdat = sample_data(samdat)

```

```

# Exponentiate all pH values
samdat$DNA.Extr.Hplus.After.C1 <- 10^-samdat$DNA.Extr.pH.After.C1
samdat$DNA.Extr.Hplus.After.C2 <- 10^-samdat$DNA.Extr.pH.After.C2
samdat$Lab.CO2.Hplus.one2one <- 10^-samdat$Lab.CO2.pH.one2one
samdat$Lab.CO2.Hplus.one2two <- 10^-samdat$Lab.CO2.pH.one2two

```

```

samdat$Lab.CO2.Hplus.one2three <- 10^-samdat$Lab.CO2.pH.one2three
samdat$Lab.CO2.Hplus.one2four <- 10^-samdat$Lab.CO2.pH.one2four
samdat$High.CO2.Hplus.one2one <- 10^-samdat$High.CO2.pH.one2one
samdat$High.CO2.Hplus.one2two <- 10^-samdat$High.CO2.pH.one2two
samdat$High.CO2.Hplus.one2three <- 10^-samdat$High.CO2.pH.one2three
samdat$High.CO2.Hplus.one2four <- 10^-samdat$High.CO2.pH.one2four

```

```

row.names(samdat) = samdat$Sample.ID

```

```

# Create phyloseq object

```

```

ps = phyloseq(otu_table=otutab,sample_data=samdat)

```

```

library(dplyr)

```

```

# Checking total read depth

```

```

Depth = data.frame(sample_sums(ps))

```

```

Depth$Sample.ID = row.names(Depth)

```

```

colnames(Depth)[1] = "SampleSums"

```

```

Depth = Depth %>%

```

```

  arrange(SampleSums)

```

```

head(Depth)

```

```

1490 ##      SampleSums      Sample.ID
1491 ## 1         1360      024-M2-24-38
1492 ## 2         2276 206-Sp19-Cr56-0-18
1493 ## 3         3727  215-Sp2-Cr5-0-20
1494 ## 4         4159 201-Sp17-Cr51-0-18
1495 ## 5         4856 240-Sp10-Cr30-0-20
1496 ## 6         5294  231-Sp7-Cr21-0-13

```

```

# It looked to me like this has already been done (no Compost or Muck)

```

```

# We don't want the Spooner samples removed anyway, I think

```

```

ps = subset_samples(ps, Sample.ID != "049-W3-Compost" & Sample.ID!="004-K2-Muck" & Sample.ID!="028-S-0-")

```

```

# Melt

```

```

ps.melt = psmelt(ps)

```

```

head(ps.melt)

```

```

1497 ##      Sample      OTU Abundance Water.Soil.Ratio      Sample.ID
1498 ## 1796119 213-Sp1-Cr3-0-20 OTU10      6555      1-to-1 213-Sp1-Cr3-0-20
1499 ## 1139493  064-P4-25-35 OTU26      5830      1-to-1  064-P4-25-35
1500 ## 386263   022-M1-50-70 OTU3      5550      1-to-1  022-M1-50-70
1501 ## 212482   013-R1-50-70 OTU39      5320      1-to-1  013-R1-50-70
1502 ## 1139487   064-P4-25-35 OTU20      4707      1-to-1  064-P4-25-35
1503 ## 598715   035-A249-0-35 OTU12      3998      1-to-1  035-A249-0-35
1504 ##      Sample.Num Random.Num.1.to.65      Study Sample.Number
1505 ## 1796119      213      29.065274      Spooner      213
1506 ## 1139493      64      9.498628 Wisconsin      64
1507 ## 386263      22      55.041233 Wisconsin      22
1508 ## 212482      13      32.647708 Wisconsin      13
1509 ## 1139487      64      9.498628 Wisconsin      64
1510 ## 598715      35      36.643249 Wisconsin      35
1511 ##      DNA.Extr.pH.After.C1 DNA.Extr.pH.After.C2 Lab.CO2.pH.one2one
1512 ## 1796119      9.174      8.090      5.39

```

1513	##	1139493	9.071	7.880	6.83		
1514	##	386263	8.737	7.635	5.36		
1515	##	212482	9.530	7.973	5.69		
1516	##	1139487	9.071	7.880	6.83		
1517	##	598715	8.925	7.795	6.75		
1518	##	Lab.CO2.pH.one2two Lab.CO2.pH.one2three Lab.CO2.pH.one2four					
1519	##	1796119	5.45	7.08	5.24		
1520	##	1139493	7.65	7.24	7.22		
1521	##	386263	5.21	5.15	5.10		
1522	##	212482	5.61	5.38	5.48		
1523	##	1139487	7.65	7.24	7.22		
1524	##	598715	7.07	6.86	7.38		
1525	##	High.CO2.pH.one2one High.CO2.pH.one2two High.CO2.pH.one2three					
1526	##	1796119	5.44	5.57	6.93		
1527	##	1139493	6.79	7.56	7.50		
1528	##	386263	5.18	5.36	5.33		
1529	##	212482	5.52	5.61	5.70		
1530	##	1139487	6.79	7.56	7.50		
1531	##	598715	6.70	7.28	7.17		
1532	##	High.CO2.pH.one2four Perc.Sand Perc.Silt Perc.Clay Texture.Name OM.perc					
1533	##	1796119	5.44	NA	NA	NA	NA
1534	##	1139493	7.38	50.8	28.8	20.4	Loam 1.9
1535	##	386263	5.36	29.6	37.6	32.8	Clay Loam 1.0
1536	##	212482	5.65	97.6	-0.4	2.8	Sand 0.2
1537	##	1139487	7.38	50.8	28.8	20.4	Loam 1.9
1538	##	598715	7.12	11.2	65.2	23.6	Silt Loam 3.6
1539	##	Scoop.Density.g.4.24.cc Soil.pH Sikora.pH Total.N.perc Total.Org.C.perc					
1540	##	1796119	NA	NA	NA	NA	NA
1541	##	1139493	4.63	7.5	7.4	0.12	1.56
1542	##	386263	4.60	4.8	6.1	0.10	0.12
1543	##	212482	6.48	5.9	7.4	0.07	0.01
1544	##	1139487	4.63	7.5	7.4	0.12	1.56
1545	##	598715	4.07	7.2	7.3	0.21	2.23
1546	##	Bray.1.P.ppm K.ppm K.perc.CEC Ca.ppm Ca.perc.CEC Mg.ppm Mg.perc.CEC					
1547	##	1796119	NA	NA	NA	NA	NA
1548	##	1139493	12	45	2	1378	98 360 42
1549	##	386263	8	67	1	1281	37 633 30
1550	##	212482	25	35	28	47	72 3 8
1551	##	1139487	12	45	2	1378	98 360 42
1552	##	598715	28	78	2	1785	98 505 45
1553	##	Na.ppm Na.perc.CEC Est.Ac.Hplus Hplus.perc.CEC CEC.sum					
1554	##	1796119	NA	NA	NA	NA	NA
1555	##	1139493	NA	0	0.0	0	6
1556	##	386263	NA	0	10.7	62	16
1557	##	212482	NA	0	0.0	0	0
1558	##	1139487	NA	0	0.0	0	6
1559	##	598715	NA	0	0.0	0	10
1560	##	Date.of.Collection Station.Name St.pH.WSS Site.Number Upper.Depth.cm					
1561	##	1796119		Spooner	NA	NA	NA
1562	##	1139493	9/10/2018	Peninsular	7.20	4	25
1563	##	386263	9/7/2018	Marshfield	5.65	1	50
1564	##	212482	8/24/2018	Rhineland	5.50	1	50
1565	##	1139487	9/10/2018	Peninsular	7.20	4	25
1566	##	598715	8/31/2018	Arlington	6.50	249	0



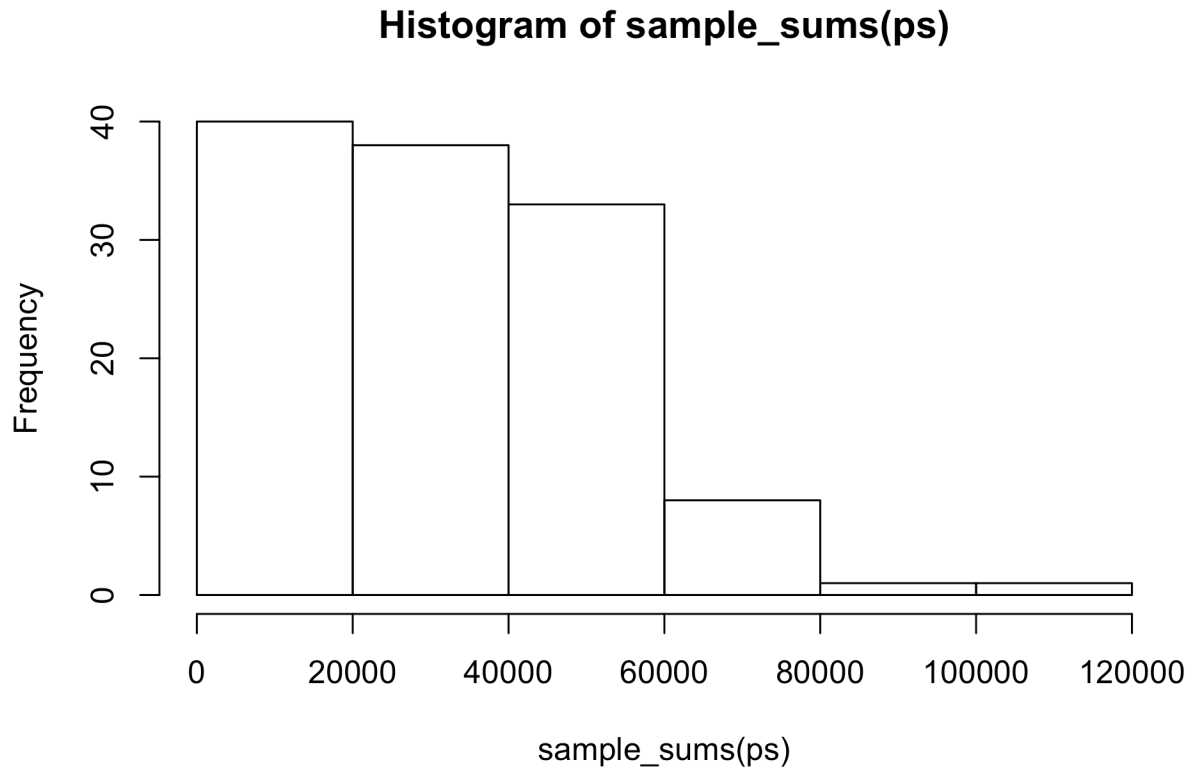
---

```

1567 ##          Lower.Depth.cm DNA.Extr.Hplus.After.C1 DNA.Extr.Hplus.After.C2
1568 ## 1796119          NA          6.698846e-10          8.128305e-09
1569 ## 1139493          35          8.491805e-10          1.318257e-08
1570 ## 386263          70          1.832314e-09          2.317395e-08
1571 ## 212482          70          2.951209e-10          1.064143e-08
1572 ## 1139487          35          8.491805e-10          1.318257e-08
1573 ## 598715          35          1.188502e-09          1.603245e-08
1574 ##          Lab.CO2.Hplus.one2one Lab.CO2.Hplus.one2two Lab.CO2.Hplus.one2three
1575 ## 1796119          4.073803e-06          3.548134e-06          8.317638e-08
1576 ## 1139493          1.479108e-07          2.238721e-08          5.754399e-08
1577 ## 386263          4.365158e-06          6.165950e-06          7.079458e-06
1578 ## 212482          2.041738e-06          2.454709e-06          4.168694e-06
1579 ## 1139487          1.479108e-07          2.238721e-08          5.754399e-08
1580 ## 598715          1.778279e-07          8.511380e-08          1.380384e-07
1581 ##          Lab.CO2.Hplus.one2four High.CO2.Hplus.one2one High.CO2.Hplus.one2two
1582 ## 1796119          5.754399e-06          3.630781e-06          2.691535e-06
1583 ## 1139493          6.025596e-08          1.621810e-07          2.754229e-08
1584 ## 386263          7.943282e-06          6.606934e-06          4.365158e-06
1585 ## 212482          3.311311e-06          3.019952e-06          2.454709e-06
1586 ## 1139487          6.025596e-08          1.621810e-07          2.754229e-08
1587 ## 598715          4.168694e-08          1.995262e-07          5.248075e-08
1588 ##          High.CO2.Hplus.one2three High.CO2.Hplus.one2four
1589 ## 1796119          1.174898e-07          3.630781e-06
1590 ## 1139493          3.162278e-08          4.168694e-08
1591 ## 386263          4.677351e-06          4.365158e-06
1592 ## 212482          1.995262e-06          2.238721e-06
1593 ## 1139487          3.162278e-08          4.168694e-08
1594 ## 598715          6.760830e-08          7.585776e-08

```

```
hist(sample_sums(ps))
```



1595

```
# Relative abundances
ps.norm = transform_sample_counts(ps,function(x) x/sum(x))
head(otu_table(ps.norm))
```

```
1596 ## OTU Table:          [6 taxa and 121 samples]
1597 ##                   taxa are rows
1598 ##      001-K1-0-17 002-K1-17-45 003-K1-45-60 005-K3-0-15 006-K3-15-35
1599 ## OTU1 0.000000000 0.000000000 0.00242923 0.002214264 0.000000000
1600 ## OTU2 0.005162547 0.008838747 0.000000000 0.010512939 0.021672486
1601 ## OTU3 0.001758178 0.012503593 0.02126816 0.001232286 0.014604445
1602 ## OTU4 0.005397718 0.003808566 0.000000000 0.008703019 0.009665333
1603 ## OTU5 0.000000000 0.000000000 0.000000000 0.000000000 0.000000000
1604 ## OTU6 0.002026944 0.005916451 0.01343513 0.005179452 0.018266201
1605 ##      007-K3-35-50 008-K4-0-15 009-K4-15-30 010-K4-30-50 011-R1-0-27
1606 ## OTU1 0.0003990423          0 0.000000000 0.000000000 0.050420941
1607 ## OTU2 0.0156903432          0 0.000000000 0.00417090 0.009430924
1608 ## OTU3 0.0072146848          0 0.02185811 0.03106786 0.008464830
1609 ## OTU4 0.0049960096          0 0.000000000 0.00200524 0.012053181
1610 ## OTU5 0.0003830806          0 0.000000000 0.000000000 0.000000000
1611 ## OTU6 0.0188986433          0 0.000000000 0.000000000 0.000000000
1612 ##      012-R1-27-50 013-R1-50-70 014-R2-0-30 015-R2-30-45 016-R2-45-60
1613 ## OTU1 0.011196727 0.006132294 0.038346086 0.010910178 0.01394996
1614 ## OTU2 0.001481142 0.000000000 0.000000000 0.003482290 0.000000000
1615 ## OTU3 0.029252552 0.029816576 0.000000000 0.014706322 0.01327045
1616 ## OTU4 0.000000000 0.000000000 0.004914656 0.001061127 0.000000000
1617 ## OTU5 0.000000000 0.000000000 0.009799882 0.002884472 0.000000000
```

---

1618	##	OTU6	0.003491263	0.000000000	0.000000000	0.024884173	0.01822688
1619	##		017-R2-60-100	018-R3-0-20	019-R3-20-30	020-M1-0-31	021-M1-31-50
1620	##	OTU1	0.03090163	0.020958378	0.000000000	0.0076980648	0.004572074
1621	##	OTU2	0.000000000	0.010380793	0.001977139	0.0087672405	0.015308743
1622	##	OTU3	0.01746161	0.002213913	0.052857584	0.0002138351	0.086869413
1623	##	OTU4	0.000000000	0.004280232	0.000000000	0.0039915892	0.005548135
1624	##	OTU5	0.000000000	0.003542261	0.000000000	0.0191026052	0.014332683
1625	##	OTU6	0.01156467	0.000000000	0.001760890	0.0000000000	0.000000000
1626	##		022-M1-50-70	023-M2-0-24	024-M2-24-38	025-M2-38-55	026-M3-0-15
1627	##	OTU1	0.002628337	0.0059101186	0.000000000	0.006092798	0.0026139334
1628	##	OTU2	0.005297741	0.0041648487	0.000000000	0.000000000	0.0096374588
1629	##	OTU3	0.113963039	0.0001983261	0.05294118	0.141227933	0.0003409478
1630	##	OTU4	0.003757700	0.0032128833	0.000000000	0.000000000	0.0045687010
1631	##	OTU5	0.001088296	0.0130498592	0.07205882	0.008123731	0.0124332310
1632	##	OTU6	0.005092402	0.0000000000	0.000000000	0.000000000	0.0000000000
1633	##		027-M3-15-30	030-H1-0-30	031-H1-30-40	032-H1-40-60	033-H2-0-30
1634	##	OTU1	0.011794955	0.012794564	0.0088081168	0.0022443370	0.015122873
1635	##	OTU2	0.011579193	0.000000000	0.0078046605	0.0156929608	0.018746062
1636	##	OTU3	0.020119748	0.000000000	0.0000000000	0.0000000000	0.000000000
1637	##	OTU4	0.002139634	0.003144427	0.0009477088	0.0018267859	0.009451796
1638	##	OTU5	0.008216912	0.036106694	0.0090868547	0.0005393368	0.021739130
1639	##	OTU6	0.012064656	0.000000000	0.0059092429	0.0122481645	0.000000000
1640	##		034-H2-30-60	035-A249-0-35	036-A249-35-60	037-A341-0-33	038-A341-33-55
1641	##	OTU1	0.0070747159	0.006064823	0.004776510	0.007176808	0.005235602
1642	##	OTU2	0.0122513373	0.004226998	0.015837900	0.003694291	0.030577676
1643	##	OTU3	0.0003697587	0.000000000	0.015636784	0.000000000	0.005543579
1644	##	OTU4	0.0020213474	0.002559828	0.007491578	0.002070686	0.000000000
1645	##	OTU5	0.0017501910	0.015792168	0.008698275	0.016047814	0.013726957
1646	##	OTU6	0.0072965711	0.005316565	0.024083664	0.000000000	0.025210084
1647	##		039-A341-55-75	040-A341-75-85	041-L2-0-23	042-L2-23-45	043-L3-0-12
1648	##	OTU1	0.003486467	0.0011130822	0.003334199	0.003696701	0.000000000
1649	##	OTU2	0.005845844	0.0038262200	0.034121417	0.050351611	0.03579898
1650	##	OTU3	0.019566295	0.0516887544	0.000000000	0.005098897	0.000000000
1651	##	OTU4	0.001998708	0.0007478521	0.005759072	0.005715014	0.01366460
1652	##	OTU5	0.006657349	0.0022435563	0.011777951	0.003526737	0.02032750
1653	##	OTU6	0.010233984	0.0044523288	0.011388239	0.016741380	0.000000000
1654	##		044-L3-12-20	045-L3-20-40	046-L4-0-10	047-L4-10-20	048-L4-20-40
1655	##	OTU1	0.0023542195	0.001783785	0.002944063	0.0000000000	0.001721276
1656	##	OTU2	0.0150307859	0.016933397	0.131065315	0.0716022867	0.026556833
1657	##	OTU3	0.0002535313	0.015425973	0.000000000	0.0005053536	0.010542817
1658	##	OTU4	0.0039116262	0.006657790	0.025624250	0.0099175642	0.011280507
1659	##	OTU5	0.0101593625	0.009974123	0.020281322	0.0095701336	0.006024467
1660	##	OTU6	0.0087468309	0.015224983	0.003489260	0.0227409115	0.016044753
1661	##		050-W4-0-28	051-W4-28-45	052-W4-45-55	053-W5-0-35	054-W5-35-65
1662	##	OTU1	0.000000000	0.008101224	0.004191060	0.009935837	0.0005988487
1663	##	OTU2	0.03254319	0.010782144	0.016519626	0.014808999	0.0361434146
1664	##	OTU3	0.000000000	0.018181818	0.016584857	0.000866340	0.0022601708
1665	##	OTU4	0.000000000	0.003240489	0.003620293	0.005739502	0.0040567168
1666	##	OTU5	0.000000000	0.002705976	0.007778738	0.011641444	0.0009465672
1667	##	OTU6	0.000000000	0.012845033	0.009784576	0.007932425	0.0203029015
1668	##		056-W7-15-30	057-P1-0-30	058-P1-30-45	059-P1-45-55	060-P2-0-20
1669	##	OTU1	0.000000000	0.016138035	0.015320018	0.017306513	0.013624895
1670	##	OTU2	0.034400060	0.013298711	0.000000000	0.001404300	0.002158677
1671	##	OTU3	0.068725174	0.000000000	0.003177485	0.002571253	0.000000000

---

1672	##	OTU4	0.004946414	0.002208363	0.011915570	0.001186732	0.004401458
1673	##	OTU5	0.000000000	0.014269420	0.000000000	0.001582310	0.012531539
1674	##	OTU6	0.040620550	0.000000000	0.000000000	0.007713760	0.000000000
1675	##		061-P2-20-45	062-P2-45-55	063-P4-0-25	064-P4-25-35	065-P4-35-50
1676	##	OTU1	0.008175083	0.008289672	0.004669079	0.004857677	0.004336656
1677	##	OTU2	0.005790684	0.000000000	0.011526789	0.003958644	0.001623677
1678	##	OTU3	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000
1679	##	OTU4	0.005279741	0.002314649	0.004493989	0.003538129	0.003247354
1680	##	OTU5	0.000000000	0.002852939	0.014503327	0.004625669	0.005261535
1681	##	OTU6	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000
1682	##		181-Sp11-Cr31-0-20	182-Sp11-Cr32-0-16	183-Sp11-Cr33-0-20		
1683	##	OTU1	0.02875878		0.02652339	0.11648613	
1684	##	OTU2	0.02163934		0.03291621	0.02240689	
1685	##	OTU3	0.000000000		0.000000000	0.000000000	
1686	##	OTU4	0.01161593		0.02135473	0.03027155	
1687	##	OTU5	0.01911007		0.02312296	0.01201959	
1688	##	OTU6	0.000000000		0.000000000	0.000000000	
1689	##		184-Sp12-Cr34-0-16	185-Sp12-Cr35-0-18	186-Sp12-Cr36-0-20		
1690	##	OTU1	0.026295917		0.017801455	0.12297521	
1691	##	OTU2	0.007201036		0.006237006	0.02826446	
1692	##	OTU3	0.000000000		0.000000000	0.000000000	
1693	##	OTU4	0.007416797		0.061122661	0.05256198	
1694	##	OTU5	0.012433249		0.009875260	0.02082645	
1695	##	OTU6	0.000000000		0.000000000	0.000000000	
1696	##		187-Sp13-Cr37-0-20	188-Sp13-Cr38-0-20	189-Sp13-Cr39-0-19		
1697	##	OTU1	0.02552806		0.048596897	0.031996509	
1698	##	OTU2	0.01683766		0.013040607	0.010726755	
1699	##	OTU3	0.000000000		0.002046880	0.001653804	
1700	##	OTU4	0.01955341		0.011984153	0.008291988	
1701	##	OTU5	0.01587206		0.003037306	0.003973723	
1702	##	OTU6	0.000000000		0.004754044	0.002963065	
1703	##		190-Sp14-Cr40-0-17	191-Sp14-Cr41-0-18	192-Sp14-Cr42-0-20		
1704	##	OTU1	0.015714286		0.012692562	0.015742371	
1705	##	OTU2	0.000000000		0.002086449	0.004437613	
1706	##	OTU3	0.005584416		0.001999513	0.003470759	
1707	##	OTU4	0.023506494		0.003964252	0.008900017	
1708	##	OTU5	0.000000000		0.000000000	0.001165183	
1709	##	OTU6	0.000000000		0.000000000	0.000000000	
1710	##		193-Sp15-Cr43-0-18	194-Sp15-Cr44-0-17	195-Sp15-Cr45-0-20		
1711	##	OTU1	0.038968140		0.021049706	0.031842049	
1712	##	OTU2	0.000000000		0.000000000	0.000000000	
1713	##	OTU3	0.000000000		0.007006817	0.000000000	
1714	##	OTU4	0.009344401		0.003437582	0.021125679	
1715	##	OTU5	0.000000000		0.000000000	0.001535296	
1716	##	OTU6	0.000000000		0.000000000	0.000000000	
1717	##		196-Sp16-Cr46-0-20	197-Sp16-Cr47-0-17	198-Sp16-Cr48-0-20		
1718	##	OTU1	0.03589801		0.024907923	0.027411448	
1719	##	OTU2	0.000000000		0.008216073	0.013256922	
1720	##	OTU3	0.000000000		0.000000000	0.000000000	
1721	##	OTU4	0.01957057		0.008216073	0.035627978	
1722	##	OTU5	0.01543279		0.007625838	0.008976041	
1723	##	OTU6	0.000000000		0.003328926	0.000000000	
1724	##		199-Sp17-Cr49-0-20	200-Sp17-Cr50-0-18	201-Sp17-Cr51-0-18		
1725	##	OTU1	0.009658422		0.020429982	0.11589324	

1726	##	OTU2	0.000000000	0.000000000	0.000000000
1727	##	OTU3	0.005516294	0.001687186	0.01995672
1728	##	OTU4	0.003258736	0.032724721	0.03943256
1729	##	OTU5	0.000000000	0.001503433	0.000000000
1730	##	OTU6	0.000000000	0.000000000	0.000000000
1731	##	202-Sp18-Cr52-0-18	203-Sp18-Cr53-0-19	204-Sp18-Cr54-0-20	
1732	##	OTU1	0.026511307	0.05453388	0.035570243
1733	##	OTU2	0.004790711	0.01724467	0.005906690
1734	##	OTU3	0.000000000	0.000000000	0.000000000
1735	##	OTU4	0.005643295	0.01775374	0.009029169
1736	##	OTU5	0.011225691	0.01909004	0.009991934
1737	##	OTU6	0.002172060	0.000000000	0.002159715
1738	##	205-Sp19-Cr55-0-20	206-Sp19-Cr56-0-18	207-Sp19-Cr57-0-18	
1739	##	OTU1	0.023922711	0.04964851	0.061457465
1740	##	OTU2	0.002258438	0.000000000	0.000000000
1741	##	OTU3	0.003373716	0.02240773	0.002137198
1742	##	OTU4	0.006217674	0.000000000	0.000000000
1743	##	OTU5	0.000000000	0.000000000	0.000000000
1744	##	OTU6	0.000000000	0.000000000	0.000000000
1745	##	208-Sp20-Cr58-0-20	209-Sp20-Cr59-0-19	210-Sp20-Cr60-0-20	211-Sp1-Cr1-0-20
1746	##	OTU1	0.05602383	0.028775104	0.034720025 0.01626684
1747	##	OTU2	0.01764441	0.006011875	0.008897501 0.000000000
1748	##	OTU3	0.000000000	0.001302883	0.000000000 0.000000000
1749	##	OTU4	0.01916161	0.013233570	0.007157545 0.02086756
1750	##	OTU5	0.01770061	0.007593947	0.008067067 0.000000000
1751	##	OTU6	0.000000000	0.004764830	0.007671623 0.000000000
1752	##	212-Sp1-Cr2-0-20	213-Sp1-Cr3-0-20	214-Sp2-Cr4-0-20	215-Sp2-Cr5-0-20
1753	##	OTU1	0.01273716	0.012730841	0.053554189 0
1754	##	OTU2	0.000000000	0.000000000	0.011584777 0
1755	##	OTU3	0.000000000	0.002515976	0.000000000 0
1756	##	OTU4	0.34204591	0.000000000	0.007773995 0
1757	##	OTU5	0.000000000	0.000000000	0.000000000 0
1758	##	OTU6	0.000000000	0.000000000	0.000000000 0
1759	##	216-Sp2-Cr6-0-20	217-Sp3-Cr7-0-20	218-Sp3-Cr8-0-20	219-Sp3-Cr9-0-20
1760	##	OTU1	0.008622569	0.045752080	0.037846532 0.043991231
1761	##	OTU2	0.008331920	0.008182190	0.008105466 0.007044508
1762	##	OTU3	0.003633105	0.000000000	0.000000000 0.000000000
1763	##	OTU4	0.003729988	0.015852993	0.005172359 0.006034631
1764	##	OTU5	0.000000000	0.013807446	0.011827041 0.010468238
1765	##	OTU6	0.003172912	0.003375153	0.003500804 0.003202049
1766	##	220-Sp4-Cr10-0-20	221-Sp4-Cr11-0-20	222-Sp4-Cr12-0-20	223-Sp5-Cr13-0-20
1767	##	OTU1	0.051845864	0.10203774	0.0196199299 0.03288201
1768	##	OTU2	0.009485314	0.01539623	0.0063932088 0.02127660
1769	##	OTU3	0.000000000	0.000000000	0.0005812008 0.000000000
1770	##	OTU4	0.016329830	0.01615094	0.0059176808 0.03255964
1771	##	OTU5	0.010293721	0.01267925	0.0096338435 0.03610574
1772	##	OTU6	0.009485314	0.000000000	0.0068335124 0.000000000
1773	##	224-Sp5-Cr14-0-20	225-Sp5-Cr15-0-20	226-Sp6-Cr16-0-15	227-Sp6-Cr17-0-20
1774	##	OTU1	0.026438298	0.06908621	0.02143623 0.025272331
1775	##	OTU2	0.007792078	0.01034771	0.000000000 0.004390816
1776	##	OTU3	0.000000000	0.000000000	0.000000000 0.000000000
1777	##	OTU4	0.010381140	0.01727155	0.02625938 0.010591587
1778	##	OTU5	0.012571884	0.01552157	0.01915863 0.011027317
1779	##	OTU6	0.005676019	0.000000000	0.000000000 0.002346238

---

```

1780 ##      228-Sp6-Cr18-0-20 229-Sp7-Cr19-0-20 230-Sp7-Cr20-0-20 231-Sp7-Cr21-0-13
1781 ## OTU1      0.02320428      0.005839416      0.02608923      0.099168870
1782 ## OTU2      0.01434111      0.000000000      0.00000000      0.000000000
1783 ## OTU3      0.00000000      0.004931939      0.00000000      0.008311296
1784 ## OTU4      0.01058657      0.004636023      0.02174102      0.000000000
1785 ## OTU5      0.02031144      0.000000000      0.00000000      0.000000000
1786 ## OTU6      0.00000000      0.000000000      0.00000000      0.000000000
1787 ##      232-Sp8-Cr22-0-20 233-Sp8-Cr23-0-20 234-Sp8-Cr24-0-20 235-Sp9-Cr25-0-15
1788 ## OTU1      0.025152808      0.031457016      0.012853788      0.033972479
1789 ## OTU2      0.010311772      0.018321535      0.031969678      0.007218588
1790 ## OTU3      0.002044765      0.003671878      0.002925061      0.000000000
1791 ## OTU4      0.009124489      0.010599235      0.011823837      0.008572073
1792 ## OTU5      0.004023570      0.003179771      0.006962469      0.018587864
1793 ## OTU6      0.002836287      0.000000000      0.000000000      0.000000000
1794 ##      236-Sp9-Cr26-0-20 237-Sp9-Cr27-0-15 238-Sp10-Cr28-0-20 239-Sp10-Cr29-0-15
1795 ## OTU1      0.012711066      0.06999656      0.014610927      0.008894578
1796 ## OTU2      0.006402611      0.01443464      0.000000000      0.000000000
1797 ## OTU3      0.000000000      0.00000000      0.005960265      0.001411317
1798 ## OTU4      0.006151528      0.00698820      0.006995033      0.010470001
1799 ## OTU5      0.015190509      0.02566159      0.001448675      0.001805173
1800 ## OTU6      0.000000000      0.00000000      0.000000000      0.000000000
1801 ##      240-Sp10-Cr30-0-20
1802 ## OTU1      0.02677100
1803 ## OTU2      0.00000000
1804 ## OTU3      0.01194399
1805 ## OTU4      0.02347611
1806 ## OTU5      0.00000000
1807 ## OTU6      0.00000000

```

```
sample_sums(ps.norm)
```

```

1808 ##      001-K1-0-17      002-K1-17-45      003-K1-45-60      005-K3-0-15
1809 ##      1      1      1      1
1810 ##      006-K3-15-35      007-K3-35-50      008-K4-0-15      009-K4-15-30
1811 ##      1      1      1      1
1812 ##      010-K4-30-50      011-R1-0-27      012-R1-27-50      013-R1-50-70
1813 ##      1      1      1      1
1814 ##      014-R2-0-30      015-R2-30-45      016-R2-45-60      017-R2-60-100
1815 ##      1      1      1      1
1816 ##      018-R3-0-20      019-R3-20-30      020-M1-0-31      021-M1-31-50
1817 ##      1      1      1      1
1818 ##      022-M1-50-70      023-M2-0-24      024-M2-24-38      025-M2-38-55
1819 ##      1      1      1      1
1820 ##      026-M3-0-15      027-M3-15-30      030-H1-0-30      031-H1-30-40
1821 ##      1      1      1      1
1822 ##      032-H1-40-60      033-H2-0-30      034-H2-30-60      035-A249-0-35
1823 ##      1      1      1      1
1824 ##      036-A249-35-60      037-A341-0-33      038-A341-33-55      039-A341-55-75
1825 ##      1      1      1      1
1826 ##      040-A341-75-85      041-L2-0-23      042-L2-23-45      043-L3-0-12
1827 ##      1      1      1      1
1828 ##      044-L3-12-20      045-L3-20-40      046-L4-0-10      047-L4-10-20
1829 ##      1      1      1      1
1830 ##      048-L4-20-40      050-W4-0-28      051-W4-28-45      052-W4-45-55
1831 ##      1      1      1      1

```

---

```

1832 ##          053-W5-0-35          054-W5-35-65          055-W7-0-15          056-W7-15-30
1833 ##                1                1                1                1
1834 ##          057-P1-0-30          058-P1-30-45          059-P1-45-55          060-P2-0-20
1835 ##                1                1                1                1
1836 ##          061-P2-20-45          062-P2-45-55          063-P4-0-25          064-P4-25-35
1837 ##                1                1                1                1
1838 ##          065-P4-35-50 181-Sp11-Cr31-0-20 182-Sp11-Cr32-0-16 183-Sp11-Cr33-0-20
1839 ##                1                1                1                1
1840 ## 184-Sp12-Cr34-0-16 185-Sp12-Cr35-0-18 186-Sp12-Cr36-0-20 187-Sp13-Cr37-0-20
1841 ##                1                1                1                1
1842 ## 188-Sp13-Cr38-0-20 189-Sp13-Cr39-0-19 190-Sp14-Cr40-0-17 191-Sp14-Cr41-0-18
1843 ##                1                1                1                1
1844 ## 192-Sp14-Cr42-0-20 193-Sp15-Cr43-0-18 194-Sp15-Cr44-0-17 195-Sp15-Cr45-0-20
1845 ##                1                1                1                1
1846 ## 196-Sp16-Cr46-0-20 197-Sp16-Cr47-0-17 198-Sp16-Cr48-0-20 199-Sp17-Cr49-0-20
1847 ##                1                1                1                1
1848 ## 200-Sp17-Cr50-0-18 201-Sp17-Cr51-0-18 202-Sp18-Cr52-0-18 203-Sp18-Cr53-0-19
1849 ##                1                1                1                1
1850 ## 204-Sp18-Cr54-0-20 205-Sp19-Cr55-0-20 206-Sp19-Cr56-0-18 207-Sp19-Cr57-0-18
1851 ##                1                1                1                1
1852 ## 208-Sp20-Cr58-0-20 209-Sp20-Cr59-0-19 210-Sp20-Cr60-0-20 211-Sp1-Cr1-0-20
1853 ##                1                1                1                1
1854 ## 212-Sp1-Cr2-0-20 213-Sp1-Cr3-0-20 214-Sp2-Cr4-0-20 215-Sp2-Cr5-0-20
1855 ##                1                1                1                1
1856 ## 216-Sp2-Cr6-0-20 217-Sp3-Cr7-0-20 218-Sp3-Cr8-0-20 219-Sp3-Cr9-0-20
1857 ##                1                1                1                1
1858 ## 220-Sp4-Cr10-0-20 221-Sp4-Cr11-0-20 222-Sp4-Cr12-0-20 223-Sp5-Cr13-0-20
1859 ##                1                1                1                1
1860 ## 224-Sp5-Cr14-0-20 225-Sp5-Cr15-0-20 226-Sp6-Cr16-0-15 227-Sp6-Cr17-0-20
1861 ##                1                1                1                1
1862 ## 228-Sp6-Cr18-0-20 229-Sp7-Cr19-0-20 230-Sp7-Cr20-0-20 231-Sp7-Cr21-0-13
1863 ##                1                1                1                1
1864 ## 232-Sp8-Cr22-0-20 233-Sp8-Cr23-0-20 234-Sp8-Cr24-0-20 235-Sp9-Cr25-0-15
1865 ##                1                1                1                1
1866 ## 236-Sp9-Cr26-0-20 237-Sp9-Cr27-0-15 238-Sp10-Cr28-0-20 239-Sp10-Cr29-0-15
1867 ##                1                1                1                1
1868 ## 240-Sp10-Cr30-0-20
1869 ##                1

```

```
# Looks good
```

```
# Spooner Vs. Wisconsin
```

```
ps.wisc <- subset_samples(ps, Study=="Wisconsin")
```

```
ps.spoon <- subset_samples(ps, Study=="Spooner")
```

```
ps.norm.wisc <- subset_samples(ps.norm, Study=="Wisconsin")
```

```
ps.norm.spoon <- subset_samples(ps.norm, Study=="Spooner")
```

```
1870 MJB: Let's try this again, correctly this time.
```

```
df.wisc = as(sample_data(ps.norm.wisc), "data.frame")
```

```
d.wisc = distance(ps.norm.wisc, method = "bray")
```

```
Lab.CO2.pH.oneZone.wisc <- adonis(d.wisc ~ Lab.CO2.pH.oneZone, data=df.wisc)
```

```
Lab.CO2.pH.oneZone.wisc
```

```

1871 ##
1872 ## Call:
1873 ## adonis(formula = d.wisc ~ Lab.CO2.pH.one2one, data = df.wisc)
1874 ##
1875 ## Permutation: free
1876 ## Number of permutations: 999
1877 ##
1878 ## Terms added sequentially (first to last)
1879 ##
1880 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
1881 ## Lab.CO2.pH.one2one  1      2.0581 2.05808  5.5794 0.0864  0.001 ***
1882 ## Residuals          59      21.7633 0.36887      0.9136
1883 ## Total              60      23.8213      1.0000
1884 ## ---
1885 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Lab.CO2.pH.one2two.wisc <- adonis(d.wisc ~ Lab.CO2.pH.one2two, data=df.wisc)
Lab.CO2.pH.one2two.wisc

```

```

1886 ##
1887 ## Call:
1888 ## adonis(formula = d.wisc ~ Lab.CO2.pH.one2two, data = df.wisc)
1889 ##
1890 ## Permutation: free
1891 ## Number of permutations: 999
1892 ##
1893 ## Terms added sequentially (first to last)
1894 ##
1895 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
1896 ## Lab.CO2.pH.one2two  1      2.145 2.14505  5.8385 0.09005  0.001 ***
1897 ## Residuals          59      21.676 0.36739      0.90995
1898 ## Total              60      23.821      1.00000
1899 ## ---
1900 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Lab.CO2.pH.one2three.wisc <- adonis(d.wisc ~ Lab.CO2.pH.one2three, data=df.wisc)
Lab.CO2.pH.one2three.wisc

```

```

1901 ##
1902 ## Call:
1903 ## adonis(formula = d.wisc ~ Lab.CO2.pH.one2three, data = df.wisc)
1904 ##
1905 ## Permutation: free
1906 ## Number of permutations: 999
1907 ##
1908 ## Terms added sequentially (first to last)
1909 ##
1910 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
1911 ## Lab.CO2.pH.one2three  1      2.1335 2.13351  5.8041 0.08956  0.001 ***
1912 ## Residuals          59      21.6878 0.36759      0.91044
1913 ## Total              60      23.8213      1.00000
1914 ## ---
1915 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Lab.CO2.pH.one2four.wisc <- adonis(d.wisc ~ Lab.CO2.pH.one2four, data=df.wisc)
Lab.CO2.pH.one2four.wisc

```



```

1916 ##
1917 ## Call:
1918 ## adonis(formula = d.wisc ~ Lab.CO2.pH.one2four, data = df.wisc)
1919 ##
1920 ## Permutation: free
1921 ## Number of permutations: 999
1922 ##
1923 ## Terms added sequentially (first to last)
1924 ##
1925 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
1926 ## Lab.CO2.pH.one2four  1      2.0417 2.04169  5.5308 0.08571  0.001 ***
1927 ## Residuals          59      21.7797 0.36915           0.91429
1928 ## Total              60      23.8213           1.00000
1929 ## ---
1930 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

# Just running the sample numbers to see what the R2 is for an arbitrary factor.
sample.num.wisc <- adonis(d.wisc ~ Sample.Num, data=df.wisc)
sample.num.wisc

1931 ##
1932 ## Call:
1933 ## adonis(formula = d.wisc ~ Sample.Num, data = df.wisc)
1934 ##
1935 ## Permutation: free
1936 ## Number of permutations: 999
1937 ##
1938 ## Terms added sequentially (first to last)
1939 ##
1940 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
1941 ## Sample.Num  1      1.7926 1.79260  4.8012 0.07525  0.001 ***
1942 ## Residuals  59      22.0287 0.37337           0.92475
1943 ## Total      60      23.8213           1.00000
1944 ## ---
1945 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

sample.random.wisc <- adonis(d.wisc ~ Random.Num.1.to.65, data=df.wisc)
sample.random.wisc

1946 ##
1947 ## Call:
1948 ## adonis(formula = d.wisc ~ Random.Num.1.to.65, data = df.wisc)
1949 ##
1950 ## Permutation: free
1951 ## Number of permutations: 999
1952 ##
1953 ## Terms added sequentially (first to last)
1954 ##
1955 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
1956 ## Random.Num.1.to.65  1      0.2756 0.27555  0.69046 0.01157  0.953
1957 ## Residuals          59      23.5458 0.39908           0.98843
1958 ## Total              60      23.8213           1.00000

Lab.CO2.Hplus.one2one.wisc <- adonis(d.wisc ~ Lab.CO2.Hplus.one2one, data=df.wisc)
Lab.CO2.Hplus.one2one.wisc

```

```

1959 ##
1960 ## Call:
1961 ## adonis(formula = d.wisc ~ Lab.CO2.Hplus.one2one, data = df.wisc)
1962 ##
1963 ## Permutation: free
1964 ## Number of permutations: 999
1965 ##
1966 ## Terms added sequentially (first to last)
1967 ##
1968 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
1969 ## Lab.CO2.Hplus.one2one  1      1.6946 1.69458  4.5185 0.07114  0.001 ***
1970 ## Residuals              59      22.1268 0.37503      0.92886
1971 ## Total                  60      23.8213      1.00000
1972 ## ---
1973 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Lab.CO2.Hplus.one2two.wisc <- adonis(d.wisc ~ Lab.CO2.Hplus.one2two, data=df.wisc)
Lab.CO2.Hplus.one2two.wisc

1974 ##
1975 ## Call:
1976 ## adonis(formula = d.wisc ~ Lab.CO2.Hplus.one2two, data = df.wisc)
1977 ##
1978 ## Permutation: free
1979 ## Number of permutations: 999
1980 ##
1981 ## Terms added sequentially (first to last)
1982 ##
1983 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
1984 ## Lab.CO2.Hplus.one2two  1      1.6752 1.67524  4.463 0.07033  0.001 ***
1985 ## Residuals              59      22.1461 0.37536      0.92967
1986 ## Total                  60      23.8213      1.00000
1987 ## ---
1988 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Lab.CO2.Hplus.one2three.wisc <- adonis(d.wisc ~ Lab.CO2.Hplus.one2three, data=df.wisc)
Lab.CO2.Hplus.one2three.wisc

1989 ##
1990 ## Call:
1991 ## adonis(formula = d.wisc ~ Lab.CO2.Hplus.one2three, data = df.wisc)
1992 ##
1993 ## Permutation: free
1994 ## Number of permutations: 999
1995 ##
1996 ## Terms added sequentially (first to last)
1997 ##
1998 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
1999 ## Lab.CO2.Hplus.one2three  1      1.6909 1.69091  4.508 0.07098  0.001 ***
2000 ## Residuals              59      22.1304 0.37509      0.92902
2001 ## Total                  60      23.8213      1.00000
2002 ## ---
2003 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Lab.CO2.Hplus.one2four.wisc <- adonis(d.wisc ~ Lab.CO2.Hplus.one2four, data=df.wisc)
Lab.CO2.Hplus.one2four.wisc

```

```

2004 ##
2005 ## Call:
2006 ## adonis(formula = d.wisc ~ Lab.CO2.Hplus.one2four, data = df.wisc)
2007 ##
2008 ## Permutation: free
2009 ## Number of permutations: 999
2010 ##
2011 ## Terms added sequentially (first to last)
2012 ##
2013 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2014 ## Lab.CO2.Hplus.one2four  1    1.4641 1.46413  3.8638 0.06146  0.001 ***
2015 ## Residuals              59    22.3572 0.37894      0.93854
2016 ## Total                  60    23.8213      1.00000
2017 ## ---
2018 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

High.CO2.pH.one2one.wisc <- adonis(d.wisc ~ High.CO2.pH.one2one, data=df.wisc)
High.CO2.pH.one2one.wisc

```

```

2019 ##
2020 ## Call:
2021 ## adonis(formula = d.wisc ~ High.CO2.pH.one2one, data = df.wisc)
2022 ##
2023 ## Permutation: free
2024 ## Number of permutations: 999
2025 ##
2026 ## Terms added sequentially (first to last)
2027 ##
2028 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2029 ## High.CO2.pH.one2one  1    2.0519 2.05186  5.561 0.08614  0.001 ***
2030 ## Residuals              59    21.7695 0.36897      0.91386
2031 ## Total                  60    23.8213      1.00000
2032 ## ---
2033 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

High.CO2.pH.one2two.wisc <- adonis(d.wisc ~ High.CO2.pH.one2two, data=df.wisc)
High.CO2.pH.one2two.wisc

```

```

2034 ##
2035 ## Call:
2036 ## adonis(formula = d.wisc ~ High.CO2.pH.one2two, data = df.wisc)
2037 ##
2038 ## Permutation: free
2039 ## Number of permutations: 999
2040 ##
2041 ## Terms added sequentially (first to last)
2042 ##
2043 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2044 ## High.CO2.pH.one2two  1    2.0674 2.06744  5.6072 0.08679  0.001 ***
2045 ## Residuals              59    21.7539 0.36871      0.91321
2046 ## Total                  60    23.8213      1.00000
2047 ## ---
2048 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

High.CO2.pH.one2three.wisc <- adonis(d.wisc ~ High.CO2.pH.one2three, data=df.wisc)
High.CO2.pH.one2three.wisc

```

```

2049 ##
2050 ## Call:
2051 ## adonis(formula = d.wisc ~ High.CO2.pH.one2three, data = df.wisc)
2052 ##
2053 ## Permutation: free
2054 ## Number of permutations: 999
2055 ##
2056 ## Terms added sequentially (first to last)
2057 ##
2058 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2059 ## High.CO2.pH.one2three  1      2.1523 2.15225  5.8601 0.09035  0.001 ***
2060 ## Residuals              59      21.6691 0.36727      0.90965
2061 ## Total                  60      23.8213      1.00000
2062 ## ---
2063 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

High.CO2.pH.one2four.wisc <- adonis(d.wisc ~ High.CO2.pH.one2four, data=df.wisc)
High.CO2.pH.one2four.wisc

2064 ##
2065 ## Call:
2066 ## adonis(formula = d.wisc ~ High.CO2.pH.one2four, data = df.wisc)
2067 ##
2068 ## Permutation: free
2069 ## Number of permutations: 999
2070 ##
2071 ## Terms added sequentially (first to last)
2072 ##
2073 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2074 ## High.CO2.pH.one2four  1      2.1467 2.14669  5.8434 0.09012  0.001 ***
2075 ## Residuals              59      21.6747 0.36737      0.90988
2076 ## Total                  60      23.8213      1.00000
2077 ## ---
2078 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

High.CO2.Hplus.one2one.wisc <- adonis(d.wisc ~ High.CO2.Hplus.one2one, data=df.wisc)
High.CO2.Hplus.one2one.wisc

2079 ##
2080 ## Call:
2081 ## adonis(formula = d.wisc ~ High.CO2.Hplus.one2one, data = df.wisc)
2082 ##
2083 ## Permutation: free
2084 ## Number of permutations: 999
2085 ##
2086 ## Terms added sequentially (first to last)
2087 ##
2088 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2089 ## High.CO2.Hplus.one2one  1      1.5384 1.53839  4.0733 0.06458  0.001 ***
2090 ## Residuals              59      22.2830 0.37768      0.93542
2091 ## Total                  60      23.8213      1.00000
2092 ## ---
2093 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

High.CO2.Hplus.one2two.wisc <- adonis(d.wisc ~ High.CO2.Hplus.one2two, data=df.wisc)
High.CO2.Hplus.one2two.wisc

```

```

2094 ##
2095 ## Call:
2096 ## adonis(formula = d.wisc ~ High.CO2.Hplus.one2two, data = df.wisc)
2097 ##
2098 ## Permutation: free
2099 ## Number of permutations: 999
2100 ##
2101 ## Terms added sequentially (first to last)
2102 ##
2103 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2104 ## High.CO2.Hplus.one2two  1    1.5833 1.58330  4.2007 0.06647  0.001 ***
2105 ## Residuals              59    22.2380 0.37692      0.93353
2106 ## Total                  60    23.8213      1.00000
2107 ## ---
2108 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

High.CO2.Hplus.one2three.wisc <- adonis(d.wisc ~ High.CO2.Hplus.one2three, data=df.wisc)
High.CO2.Hplus.one2three.wisc

```

```

2109 ##
2110 ## Call:
2111 ## adonis(formula = d.wisc ~ High.CO2.Hplus.one2three, data = df.wisc)
2112 ##
2113 ## Permutation: free
2114 ## Number of permutations: 999
2115 ##
2116 ## Terms added sequentially (first to last)
2117 ##
2118 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2119 ## High.CO2.Hplus.one2three  1    1.6325 1.63254  4.3409 0.06853  0.001 ***
2120 ## Residuals              59    22.1888 0.37608      0.93147
2121 ## Total                  60    23.8213      1.00000
2122 ## ---
2123 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

High.CO2.Hplus.one2four.wisc <- adonis(d.wisc ~ High.CO2.Hplus.one2four, data=df.wisc)
High.CO2.Hplus.one2four.wisc

```

```

2124 ##
2125 ## Call:
2126 ## adonis(formula = d.wisc ~ High.CO2.Hplus.one2four, data = df.wisc)
2127 ##
2128 ## Permutation: free
2129 ## Number of permutations: 999
2130 ##
2131 ## Terms added sequentially (first to last)
2132 ##
2133 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2134 ## High.CO2.Hplus.one2four  1    1.6225 1.62250  4.3123 0.06811  0.001 ***
2135 ## Residuals              59    22.1988 0.37625      0.93189
2136 ## Total                  60    23.8213      1.00000
2137 ## ---
2138 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

df.spoon = as(sample_data(ps.norm.spoon), "data.frame")
d.spoon = distance(ps.norm.spoon, method = "bray")

```

---

```
Lab.CO2.pH.one2one.spoon <- adonis(d.spoon ~ Lab.CO2.pH.one2one, data=df.spoon)
Lab.CO2.pH.one2one.spoon
```

```
2139 ##
2140 ## Call:
2141 ## adonis(formula = d.spoon ~ Lab.CO2.pH.one2one, data = df.spoon)
2142 ##
2143 ## Permutation: free
2144 ## Number of permutations: 999
2145 ##
2146 ## Terms added sequentially (first to last)
2147 ##
2148 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2149 ## Lab.CO2.pH.one2one  1      2.4938 2.49377  8.9838 0.13412  0.001 ***
2150 ## Residuals          58     16.0999 0.27758      0.86588
2151 ## Total              59     18.5936      1.00000
2152 ## ---
2153 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Lab.CO2.pH.one2two.spoon <- adonis(d.spoon ~ Lab.CO2.pH.one2two, data=df.spoon)
Lab.CO2.pH.one2two.spoon
```

```
2154 ##
2155 ## Call:
2156 ## adonis(formula = d.spoon ~ Lab.CO2.pH.one2two, data = df.spoon)
2157 ##
2158 ## Permutation: free
2159 ## Number of permutations: 999
2160 ##
2161 ## Terms added sequentially (first to last)
2162 ##
2163 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2164 ## Lab.CO2.pH.one2two  1      2.6055 2.60546  9.4518 0.14013  0.001 ***
2165 ## Residuals          58     15.9882 0.27566      0.85987
2166 ## Total              59     18.5936      1.00000
2167 ## ---
2168 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Lab.CO2.pH.one2three.spoon <- adonis(d.spoon ~ Lab.CO2.pH.one2three, data=df.spoon)
Lab.CO2.pH.one2three.spoon
```

```
2169 ##
2170 ## Call:
2171 ## adonis(formula = d.spoon ~ Lab.CO2.pH.one2three, data = df.spoon)
2172 ##
2173 ## Permutation: free
2174 ## Number of permutations: 999
2175 ##
2176 ## Terms added sequentially (first to last)
2177 ##
2178 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2179 ## Lab.CO2.pH.one2three  1      2.9809 2.98088 11.074 0.16032  0.001 ***
2180 ## Residuals          58     15.6128 0.26919      0.83968
2181 ## Total              59     18.5936      1.00000
2182 ## ---
```

```

2183 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Lab.CO2.pH.one2four.spoon <- adonis(d.spoon ~ Lab.CO2.pH.one2four, data=df.spoon)
Lab.CO2.pH.one2four.spoon

2184 ##
2185 ## Call:
2186 ## adonis(formula = d.spoon ~ Lab.CO2.pH.one2four, data = df.spoon)
2187 ##
2188 ## Permutation: free
2189 ## Number of permutations: 999
2190 ##
2191 ## Terms added sequentially (first to last)
2192 ##
2193 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2194 ## Lab.CO2.pH.one2four  1      2.8842 2.88418  10.649 0.15512  0.001 ***
2195 ## Residuals          58     15.7095 0.27085      0.84488
2196 ## Total              59     18.5936      1.00000
2197 ## ---
2198 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Lab.CO2.Hplus.one2one.spoon <- adonis(d.spoon ~ Lab.CO2.Hplus.one2one, data=df.spoon)
Lab.CO2.Hplus.one2one.spoon

2199 ##
2200 ## Call:
2201 ## adonis(formula = d.spoon ~ Lab.CO2.Hplus.one2one, data = df.spoon)
2202 ##
2203 ## Permutation: free
2204 ## Number of permutations: 999
2205 ##
2206 ## Terms added sequentially (first to last)
2207 ##
2208 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2209 ## Lab.CO2.Hplus.one2one  1      1.8268 1.82683   6.3194 0.09825  0.001 ***
2210 ## Residuals          58     16.7668 0.28908      0.90175
2211 ## Total              59     18.5936      1.00000
2212 ## ---
2213 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Lab.CO2.Hplus.one2two.spoon <- adonis(d.spoon ~ Lab.CO2.Hplus.one2two, data=df.spoon)
Lab.CO2.Hplus.one2two.spoon

2214 ##
2215 ## Call:
2216 ## adonis(formula = d.spoon ~ Lab.CO2.Hplus.one2two, data = df.spoon)
2217 ##
2218 ## Permutation: free
2219 ## Number of permutations: 999
2220 ##
2221 ## Terms added sequentially (first to last)
2222 ##
2223 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2224 ## Lab.CO2.Hplus.one2two  1      1.9567 1.95670   6.8215 0.10523  0.001 ***
2225 ## Residuals          58     16.6369 0.28684      0.89477
2226 ## Total              59     18.5936      1.00000

```

```

2227 ## ---
2228 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Lab.CO2.Hplus.one2three.spoon <- adonis(d.spoon ~ Lab.CO2.Hplus.one2three, data=df.spoon)
Lab.CO2.Hplus.one2three.spoon

2229 ##
2230 ## Call:
2231 ## adonis(formula = d.spoon ~ Lab.CO2.Hplus.one2three, data = df.spoon)
2232 ##
2233 ## Permutation: free
2234 ## Number of permutations: 999
2235 ##
2236 ## Terms added sequentially (first to last)
2237 ##
2238 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2239 ## Lab.CO2.Hplus.one2three  1      2.2953 2.29530  8.1682 0.12345  0.001 ***
2240 ## Residuals              58     16.2983 0.28101      0.87655
2241 ## Total                  59     18.5936      1.00000
2242 ## ---
2243 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Lab.CO2.Hplus.one2four.spoon <- adonis(d.spoon ~ Lab.CO2.Hplus.one2four, data=df.spoon)
Lab.CO2.Hplus.one2four.spoon

2244 ##
2245 ## Call:
2246 ## adonis(formula = d.spoon ~ Lab.CO2.Hplus.one2four, data = df.spoon)
2247 ##
2248 ## Permutation: free
2249 ## Number of permutations: 999
2250 ##
2251 ## Terms added sequentially (first to last)
2252 ##
2253 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2254 ## Lab.CO2.Hplus.one2four  1      1.9794 1.97942  6.9101 0.10646  0.001 ***
2255 ## Residuals              58     16.6142 0.28645      0.89354
2256 ## Total                  59     18.5936      1.00000
2257 ## ---
2258 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
High.CO2.pH.one2one.spoon <- adonis(d.spoon ~ High.CO2.pH.one2one, data=df.spoon)
High.CO2.pH.one2one.spoon

2259 ##
2260 ## Call:
2261 ## adonis(formula = d.spoon ~ High.CO2.pH.one2one, data = df.spoon)
2262 ##
2263 ## Permutation: free
2264 ## Number of permutations: 999
2265 ##
2266 ## Terms added sequentially (first to last)
2267 ##
2268 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2269 ## High.CO2.pH.one2one    1      2.3846 2.38458  8.5326 0.12825  0.001 ***
2270 ## Residuals              58     16.2091 0.27947      0.87175

```



```

2271 ## Total          59    18.5936          1.00000
2272 ## ---
2273 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
High.CO2.pH.one2two.spoon <- adonis(d.spoon ~ High.CO2.pH.one2two, data=df.spoon)
High.CO2.pH.one2two.spoon

2274 ##
2275 ## Call:
2276 ## adonis(formula = d.spoon ~ High.CO2.pH.one2two, data = df.spoon)
2277 ##
2278 ## Permutation: free
2279 ## Number of permutations: 999
2280 ##
2281 ## Terms added sequentially (first to last)
2282 ##
2283 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2284 ## High.CO2.pH.one2two  1      2.6985 2.69849  9.8466 0.14513  0.001 ***
2285 ## Residuals          58     15.8951 0.27405          0.85487
2286 ## Total              59     18.5936          1.00000
2287 ## ---
2288 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
High.CO2.pH.one2three.spoon <- adonis(d.spoon ~ High.CO2.pH.one2three, data=df.spoon)
High.CO2.pH.one2three.spoon

2289 ##
2290 ## Call:
2291 ## adonis(formula = d.spoon ~ High.CO2.pH.one2three, data = df.spoon)
2292 ##
2293 ## Permutation: free
2294 ## Number of permutations: 999
2295 ##
2296 ## Terms added sequentially (first to last)
2297 ##
2298 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2299 ## High.CO2.pH.one2three  1      3.1036 3.10359 11.621 0.16692  0.001 ***
2300 ## Residuals          58     15.4900 0.26707          0.83308
2301 ## Total              59     18.5936          1.00000
2302 ## ---
2303 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
High.CO2.pH.one2four.spoon <- adonis(d.spoon ~ High.CO2.pH.one2four, data=df.spoon)
High.CO2.pH.one2four.spoon

2304 ##
2305 ## Call:
2306 ## adonis(formula = d.spoon ~ High.CO2.pH.one2four, data = df.spoon)
2307 ##
2308 ## Permutation: free
2309 ## Number of permutations: 999
2310 ##
2311 ## Terms added sequentially (first to last)
2312 ##
2313 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2314 ## High.CO2.pH.one2four  1      2.7714  2.7714 10.159 0.14905  0.001 ***

```

```

2315 ## Residuals          58  15.8222  0.2728          0.85095
2316 ## Total              59  18.5936          1.00000
2317 ## ---
2318 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

High.CO2.Hplus.one2one.spoon <- adonis(d.spoon ~ High.CO2.Hplus.one2one, data=df.spoon)
High.CO2.Hplus.one2one.spoon

2319 ##
2320 ## Call:
2321 ## adonis(formula = d.spoon ~ High.CO2.Hplus.one2one, data = df.spoon)
2322 ##
2323 ## Permutation: free
2324 ## Number of permutations: 999
2325 ##
2326 ## Terms added sequentially (first to last)
2327 ##
2328 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2329 ## High.CO2.Hplus.one2one  1    1.8045 1.80445  6.2337 0.09705  0.001 ***
2330 ## Residuals              58   16.7892 0.28947      0.90295
2331 ## Total                  59   18.5936          1.00000
2332 ## ---
2333 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

High.CO2.Hplus.one2two.spoon <- adonis(d.spoon ~ High.CO2.Hplus.one2two, data=df.spoon)
High.CO2.Hplus.one2two.spoon

2334 ##
2335 ## Call:
2336 ## adonis(formula = d.spoon ~ High.CO2.Hplus.one2two, data = df.spoon)
2337 ##
2338 ## Permutation: free
2339 ## Number of permutations: 999
2340 ##
2341 ## Terms added sequentially (first to last)
2342 ##
2343 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)
2344 ## High.CO2.Hplus.one2two  1    2.0702 2.07018  7.2667 0.11134  0.001 ***
2345 ## Residuals              58   16.5235 0.28489      0.88866
2346 ## Total                  59   18.5936          1.00000
2347 ## ---
2348 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

High.CO2.Hplus.one2three.spoon <- adonis(d.spoon ~ High.CO2.Hplus.one2three, data=df.spoon)
High.CO2.Hplus.one2three.spoon

2349 ##
2350 ## Call:
2351 ## adonis(formula = d.spoon ~ High.CO2.Hplus.one2three, data = df.spoon)
2352 ##
2353 ## Permutation: free
2354 ## Number of permutations: 999
2355 ##
2356 ## Terms added sequentially (first to last)
2357 ##
2358 ##              Df SumsOfSqs MeanSqs F.Model      R2 Pr(>F)

```

```

2359 ## High.CO2.Hplus.one2three 1 1.8918 1.89179 6.5696 0.10174 0.001 ***
2360 ## Residuals 58 16.7018 0.28796 0.89826
2361 ## Total 59 18.5936 1.00000
2362 ## ---
2363 ## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

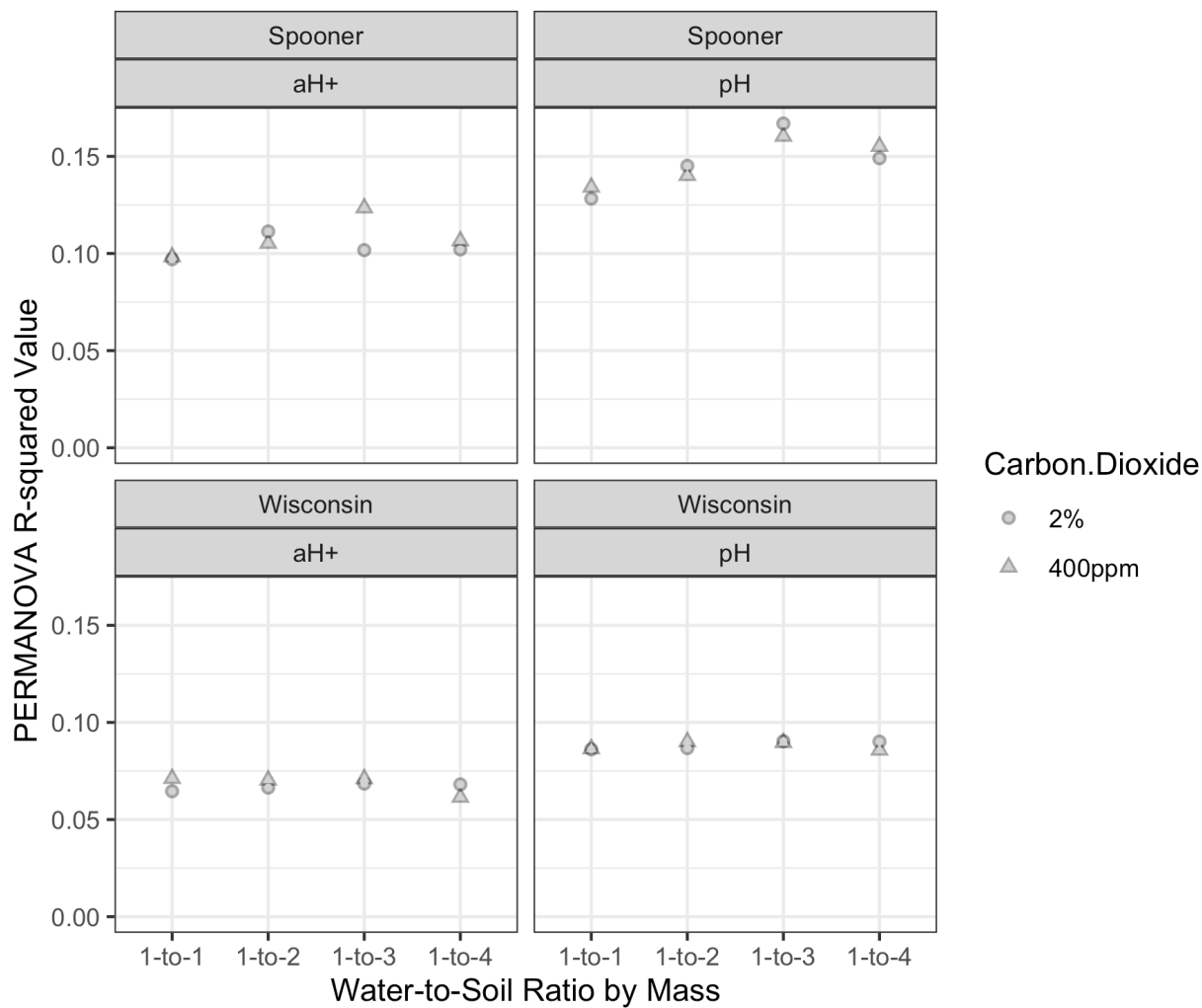
High.CO2.Hplus.one2four.spoon <- adonis(d.spoon ~ High.CO2.Hplus.one2four, data=df.spoon)
High.CO2.Hplus.one2four.spoon

2364 ##
2365 ## Call:
2366 ## adonis(formula = d.spoon ~ High.CO2.Hplus.one2four, data = df.spoon)
2367 ##
2368 ## Permutation: free
2369 ## Number of permutations: 999
2370 ##
2371 ## Terms added sequentially (first to last)
2372 ##
2373 ## Df SumsOfSqs MeanSqs F.Model R2 Pr(>F)
2374 ## High.CO2.Hplus.one2four 1 1.8994 1.89935 6.5988 0.10215 0.001 ***
2375 ## Residuals 58 16.6943 0.28783 0.89785
2376 ## Total 59 18.5936 1.00000
2377 ## ---
2378 ## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R.squared <- c(Lab.CO2.pH.one2one.wisc$aov.tab[1,5],
Lab.CO2.Hplus.one2one.wisc$aov.tab[1,5],
Lab.CO2.pH.one2two.wisc$aov.tab[1,5],
Lab.CO2.Hplus.one2two.wisc$aov.tab[1,5],
Lab.CO2.pH.one2three.wisc$aov.tab[1,5],
Lab.CO2.Hplus.one2three.wisc$aov.tab[1,5],
Lab.CO2.pH.one2four.wisc$aov.tab[1,5],
Lab.CO2.Hplus.one2four.wisc$aov.tab[1,5],
High.CO2.pH.one2one.wisc$aov.tab[1,5],
High.CO2.Hplus.one2one.wisc$aov.tab[1,5],
High.CO2.pH.one2two.wisc$aov.tab[1,5],
High.CO2.Hplus.one2two.wisc$aov.tab[1,5],
High.CO2.pH.one2three.wisc$aov.tab[1,5],
High.CO2.Hplus.one2three.wisc$aov.tab[1,5],
High.CO2.pH.one2four.wisc$aov.tab[1,5],
High.CO2.Hplus.one2four.wisc$aov.tab[1,5],
Lab.CO2.pH.one2one.spoon$aov.tab[1,5],
Lab.CO2.Hplus.one2one.spoon$aov.tab[1,5],
Lab.CO2.pH.one2two.spoon$aov.tab[1,5],
Lab.CO2.Hplus.one2two.spoon$aov.tab[1,5],
Lab.CO2.pH.one2three.spoon$aov.tab[1,5],
Lab.CO2.Hplus.one2three.spoon$aov.tab[1,5],
Lab.CO2.pH.one2four.spoon$aov.tab[1,5],
Lab.CO2.Hplus.one2four.spoon$aov.tab[1,5],
High.CO2.pH.one2one.spoon$aov.tab[1,5],
High.CO2.Hplus.one2one.spoon$aov.tab[1,5],
High.CO2.pH.one2two.spoon$aov.tab[1,5],
High.CO2.Hplus.one2two.spoon$aov.tab[1,5],
High.CO2.pH.one2three.spoon$aov.tab[1,5],
High.CO2.Hplus.one2three.spoon$aov.tab[1,5],

```

```
High.CO2.pH.one2four.spoon$aov.tab[1,5],
High.CO2.Hplus.one2four.spoon$aov.tab[1,5]
)
dat.rsq <- read.csv("rsq-data.csv", header=T)
dat.rsq$R.squared <- R.squared
# str(dat.rsq)
ggplot(dat.rsq, aes(Water.Soil.Ratio, R.squared, shape = Carbon.Dioxide)) + geom_point(color="black", s
```



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