

Supplementary material:

Table S1. Table presenting physical and chemical characteristics of the soils and the crops grown in the fields in 3 seasons before the collection

soil	pH	SD	OM	SD	Fe	SD	K	SD	Mg	SD	P	SD	S	SD	C	SD	N	SD	C:N	soil type	2016	2015	2014
BS	7.53	0.05	0.24	0.04	0.19	0.01	2.02	0.32	0.00	0.00	0.11	0.03	0.00	0.00	0.05	0.01	0.00	0.00	NA	Sand	-	-	-
S01	6.22	0.17	3.46	0.35	0.09	0.00	34.00	0.92	163.19	1.75	1.40	0.01	1.29	0.08	2.31	0.18	0.14	0.01	16.50	Sand	-	-	-
S02	6.75	0.04	3.81	0.08	0.03	0.00	86.66	2.38	36.86	0.79	0.89	0.02	2.50	0.15	1.60	0.08	0.11	0.01	14.55	Clay	Wheat	Potatoes	Wheat
S03	5.28	0.27	5.49	0.68	0.45	0.06	59.95	2.29	56.74	2.11	2.69	0.08	2.60	0.16	3.77	1.13	0.26	0.10	14.50	Sand	Winter wheat	Winter wheat	Winter wheat
S04	7.30	0.30	3.10	0.29	0.02	0.00	117.12	1.20	56.49	0.25	1.53	0.05	7.21	0.99	2.11	0.02	0.13	0.00	16.23	Clay	Wheat	Onions	Lucerne
S05	6.47	0.10	3.56	0.37	0.16	0.00	109.72	2.16	74.87	1.58	7.76	0.32	1.29	0.18	1.99	0.53	0.16	0.04	12.44	Clay	Winter wheat	Potatoes	Winter wheat
S06	7.58	0.02	3.51	0.40	0.05	0.00	223.26	1.92	84.60	0.92	2.62	0.08	12.23	0.85	2.72	1.11	0.19	0.10	14.32	Sandy loam	Rye	Leaf vegetables	Winter wheat
S07	7.58	0.06	4.32	0.36	0.03	0.00	82.92	1.74	61.11	0.43	1.66	0.05	5.57	0.07	2.92	0.11	0.18	0.01	16.22	Sand	Winter wheat	Potatoes	Winter wheat
S08	6.87	0.06	2.81	0.51	0.08	0.00	181.54	3.76	109.68	1.70	16.23	0.05	1.14	0.05	1.94	0.24	0.16	0.01	12.13	Sand	Spring wheat	Pattison/ yakon	Pattison/ yakon
S09	6.87	0.18	3.26	0.32	0.06	0.01	174.31	1.13	113.01	0.78	3.06	0.07	1.26	0.22	1.35	0.14	0.12	0.01	11.25	Sand	Spring wheat	Onions	Sweet corn
S10	7.49	0.04	2.92	0.44	0.02	0.00	97.07	2.67	70.88	0.54	1.12	0.07	2.96	0.05	2.62	0.13	0.16	0.01	16.38	Clay	Spelt	Peas	Beetroot/pumpkins
S11	7.28	0.19	3.48	0.47	0.11	0.00	68.77	1.10	56.43	0.58	5.43	0.04	1.17	0.15	1.99	0.88	0.16	0.07	12.44	Sand	Luzerne/grass	Luzerne/grass	Barley
S12	7.75	0.01	3.81	0.32	0.02	0.00	233.38	0.68	83.72	0.95	1.06	0.01	9.00	0.29	2.03	0.35	0.14	0.04	14.50	Clay	Celery	Cabbage	Grass clover
S13	7.55	0.14	7.03	0.25	0.04	0.00	207.13	4.04	122.52	1.44	3.40	0.12	7.57	0.06	3.82	0.01	0.34	0.00	11.24	Clay	Grass clover	Grass clover	Red cabbage
S14	7.61	0.05	5.04	0.35	0.04	0.00	82.49	4.08	98.91	4.04	0.70	0.06	8.61	0.08	2.35	0.14	0.15	0.01	15.67	Sandy clay	Winter wheat	Beetroot	Potatoes
S15	7.82	0.05	3.77	0.63	0.02	0.00	45.83	0.53	60.60	0.52	0.90	0.05	5.95	0.06	1.91	0.08	0.11	0.01	17.36	Clay	Potatoes	Grass clover	Onions
S16	7.63	0.12	2.91	0.57	0.03	0.00	53.60	0.85	78.47	0.42	5.61	0.17	2.79	0.21	2.33	1.44	0.18	0.13	12.94	Clay	Luzerne	Potatoes	Carrots
S17	7.75	0.06	4.23	0.79	0.01	0.00	87.17	2.45	74.54	0.80	1.03	0.04	2.27	0.06	2.63	0.05	0.15	0.00	17.53	Clay	Potatoes	Spelt	Pumpkins
S18	7.69	0.06	7.53	0.94	0.02	0.00	53.59	0.56	113.54	0.51	1.49	0.06	5.80	0.37	2.30	0.02	0.24	0.00	9.58	Clay	Winter wheat	Winter wheat	Winter wheat
S19	7.73	0.02	5.38	0.50	0.02	0.01	63.09	0.68	104.28	2.48	1.50	0.01	5.00	0.28	2.35	0.02	0.24	0.00	9.79	Clay	Winter wheat	Winter wheat	Sugar beet
S20	7.30	0.16	8.00	0.21	0.10	0.00	234.45	3.76	299.63	6.42	2.69	0.02	6.98	0.41	3.25	0.65	0.36	0.10	9.03	Sand	Maize	Maize	Winter wheat
S21	5.56	0.12	20.59	1.00	0.82	0.07	58.82	4.26	484.44	14.16	4.86	0.10	24.70	0.13	9.30	0.39	1.04	0.03	8.94	Sand	Pasture	Pasture	Pasture
S22	6.50	0.10	3.02	0.48	0.03	0.01	74.84	1.84	237.38	3.52	0.87	0.09	3.67	0.15	2.65	0.10	0.30	0.01	8.83	Clay	Maize	Winter wheat	Sugar beet
S23	5.92	0.39	4.50	0.50	0.47	0.04	51.98	1.52	122.23	3.32	11.88	0.27	4.03	0.29	1.92	0.60	0.17	0.05	11.29	Sand	Grass clover	Maize	Maize
S24	7.27	0.06	6.15	0.38	0.02	0.00	76.47	1.19	66.70	0.61	2.58	0.12	5.24	0.45	0.98	0.07	0.11	0.00	8.91	Clay	Wheat	Beetroot	Wheat
S25	5.35	0.15	7.34	0.55	0.24	0.04	57.68	12.82	83.30	3.25	1.26	0.05	5.61	1.70	3.17	0.03	0.26	0.01	12.19	Clay	Forest	Forest	Forest
S26	5.76	0.05	8.54	1.92	0.12	0.01	27.52	2.83	113.43	0.69	1.41	0.14	3.50	0.46	3.13	0.12	0.32	0.01	9.78	Clay	Pasture	Pasture	Pasture
S27	7.05	0.04	7.86	0.94	0.04	0.01	52.66	2.86	98.95	2.37	0.85	0.04	4.53	0.47	3.21	0.14	0.31	0.01	10.35	Clay	Winter rape	Winter wheat	Winter rape
S28	7.13	0.07	3.29	0.12	0.02	0.00	71.36	0.44	160.26	2.70	0.79	0.02	1.74	0.24	1.52	0.01	0.17	0.00	8.94	Clay	Winter wheat	Winter wheat	Winter rape

* to highlight the differences in the measured parameters, pH values are colored from red to blue, showing low to high values respectively.
 Other parameters: organic matter content (OM), content of bioavailable elements (Fe, K, Mg, P, S), total carbon (C) and nitrogen (N) are colored with green bars according to their normalized values. Presented values are average of three replicates with standard deviations (SD).
 Column "soil": soil samples in the collection S01 to S28 and BS: "Bergharen soil" used as a standard substrate in the study.

Table S2. Sequencing depths for all rhizosphere samples, the value following underscore indicates the replicate number.

sample-id	input	filtered	denoised	merged	non-chimeric
S01_1	41725	33607	33607	17264	16866
S01_2	45462	36178	36178	19858	19373
S01_3	41822	33415	33415	17196	16778
S01_4	49352	39531	39531	25025	23379
S02_1	53186	42592	42592	23199	22708
S02_2	42743	33988	33988	17520	17061
S02_3	54037	42031	42031	24111	23450
S02_4	43360	34930	34930	19538	19008
S03_1	44954	36506	36506	20855	19746
S03_2	42219	33757	33757	19801	18422
S03_3	46183	36515	36515	18537	17677
S03_4	46941	38080	38080	26964	21045
S04_1	49195	39946	39946	22155	21807
S04_2	49236	39690	39690	21736	21295
S04_3	47442	38178	38178	18923	18293
S04_4	49544	39379	39379	21418	21023
S05_1	49240	39988	39988	22254	21030
S05_2	48264	39067	39067	22833	19870
S05_3	49934	39348	39348	21713	20461
S05_4	39082	31770	31770	15274	14745
S06_1	36164	28958	28958	14296	13856
S06_2	42717	33193	33193	17723	17161
S06_3	45214	36400	36400	19923	19316
S06_4	48268	39142	39142	22538	21914
S07_1	53097	43001	43001	24869	23953
S07_2	45927	36549	36549	20537	19901
S07_3	63205	50499	50499	28516	27743
S07_4	33926	23095	23095	11884	11526
S08_1	46293	36945	36945	19611	18169
S08_2	44794	35469	35469	17577	17171
S08_3	49441	39931	39931	20719	20031
S08_4	37841	30283	30283	15807	15425
S09_1	50458	40629	40629	20554	19966
S09_2	49480	40250	40250	21995	20986
S09_3	52163	41629	41629	21864	21281
S09_4	42913	34941	34941	20271	19325
S10_1	46209	37005	37005	19507	18922
S10_2	50250	40050	40050	22734	21712
S10_3	48066	38386	38386	20345	19824
S10_4	49532	39101	39101	21937	21262
S11_1	56437	45456	45456	23637	22725

S11_2	39385	31551	31551	17438	16721
S11_3	53460	42318	42318	25257	21916
S11_4	50498	40678	40678	23542	22765
S12_1	45994	36824	36824	20278	19617
S12_2	51667	41515	41515	21963	21437
S12_3	45604	36075	36075	18933	18300
S12_4	51902	41044	41044	21966	21488
S13_1	51177	36785	36785	19145	18648
S13_2	41781	24407	24407	11186	10807
S13_3	49981	35778	35778	18301	17694
S13_4	52143	36067	36067	19093	18040
S14_1	43642	34264	34264	16925	16489
S14_2	48616	35195	35195	17718	17067
S14_3	44910	35575	35575	19273	18733
S14_4	46545	37762	37762	19310	18766
S15_1	42858	34576	34576	21410	19796
S15_2	44762	36195	36195	21763	20477
S15_3	47422	37758	37758	22556	20948
S15_4	40163	32478	32478	19295	17778
S16_1	37249	29402	29402	17735	15462
S16_2	42173	33561	33561	19422	17928
S16_3	45586	35797	35797	19070	18582
S16_4	47442	37272	37272	20494	19546
S17_1	51215	40873	40873	23147	22687
S17_2	36361	28296	28296	15250	14910
S17_3	46849	35967	35967	21923	20765
S17_4	34766	27361	27361	15537	14981
S18_1	41336	32946	32946	20058	19553
S18_2	40194	32632	32632	22587	20284
S18_3	42221	33277	33277	20019	19251
S18_4	46846	37084	37084	22159	21539
S19_1	46160	37438	37438	20790	19621
S19_2	50469	40792	40792	25392	24178
S19_3	48494	38879	38879	22395	21824
S19_4	47951	38527	38527	21996	21417
S20_1	47183	38076	38076	21987	20928
S20_2	42260	34401	34401	18843	17951
S20_3	50901	40503	40503	24416	23098
S20_4	46791	37990	37990	21608	20737
S21_1	41015	33565	33565	20978	19475
S21_2	42477	34136	34136	22696	20685
S21_3	40303	32376	32376	20665	18926
S21_4	48019	38702	38702	25304	23038
S22_1	40909	32639	32639	18592	17702
S22_2	41907	33008	33008	19844	19022

S22_3	39314	30697	30697	16937	16152
S22_4	38281	29928	29928	16296	15277
S23_1	40319	31358	31358	18190	17451
S23_2	37341	29756	29756	16975	16319
S23_3	44530	34840	34840	24350	23209
S23_4	32947	26534	26534	17998	15700
S24_1	33962	27307	27307	18314	16753
S24_2	28800	21596	21596	12698	12206
S24_3	37292	29303	29303	17886	17219
S24_4	34107	27271	27271	15776	15092
S25_1	49186	38629	38629	23479	22078
S25_2	34056	27924	27924	17522	16205
S25_3	33382	26871	26871	16546	15777
S25_4	46462	37279	37279	23340	22028
S26_1	44438	35281	35281	24243	22827
S26_2	35931	28941	28941	18414	17321
S26_3	41725	33546	33546	21393	20124
S26_4	38662	30842	30842	19765	18296
S27_1	43453	34538	34538	18675	17996
S27_2	36183	29045	29045	16110	15616
S27_3	35734	29053	29053	17498	16072
S27_4	45394	36708	36708	20020	19196
S28_1	36616	29403	29403	17577	16093
S28_2	31889	26103	26103	15858	14455
S28_3	34760	27914	27914	16259	15566
S28_4	45368	36476	36476	21778	20336

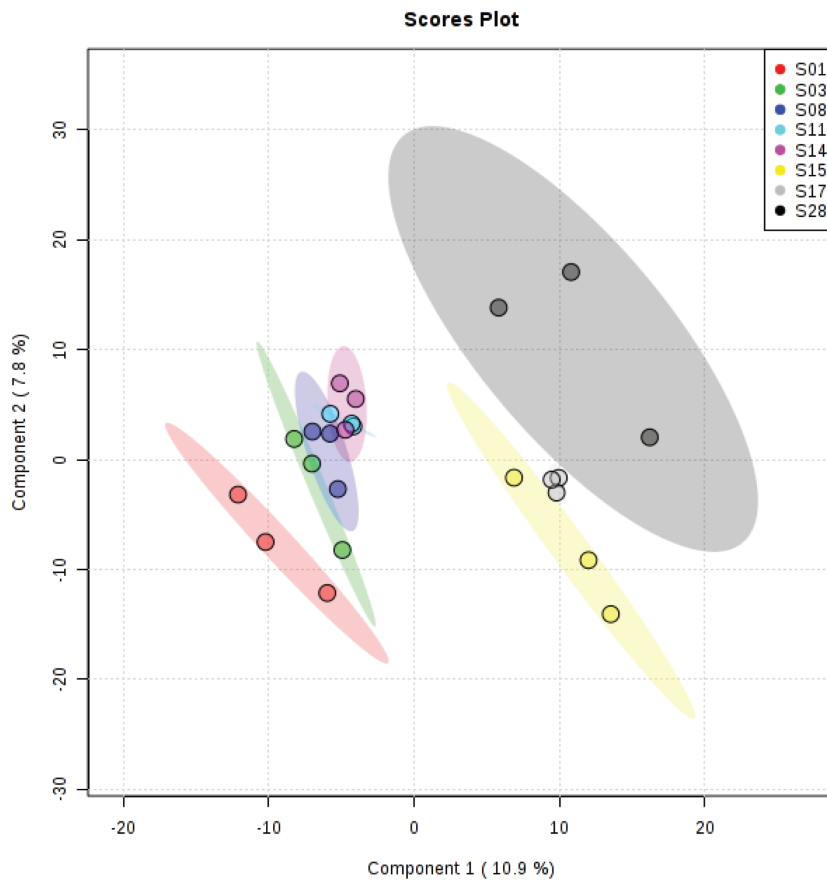
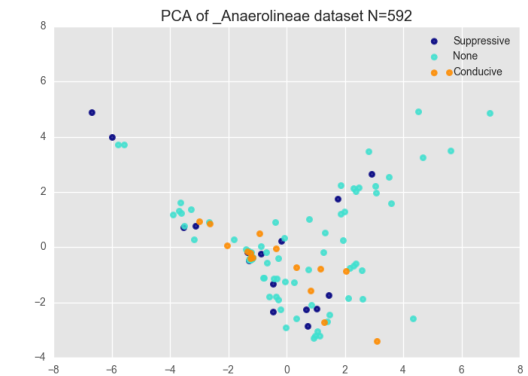
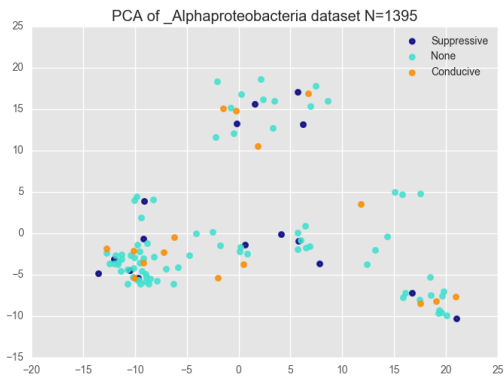
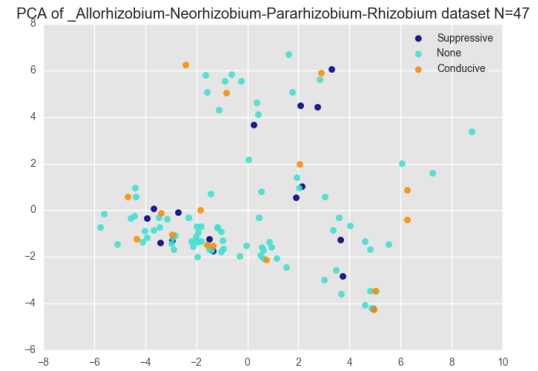
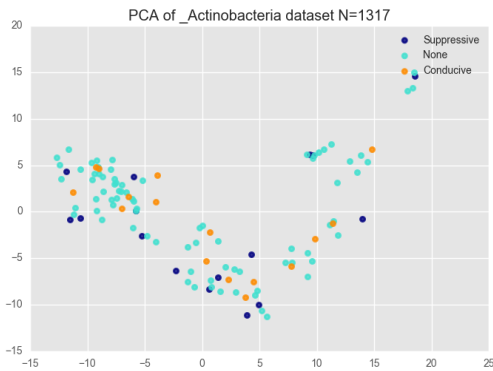
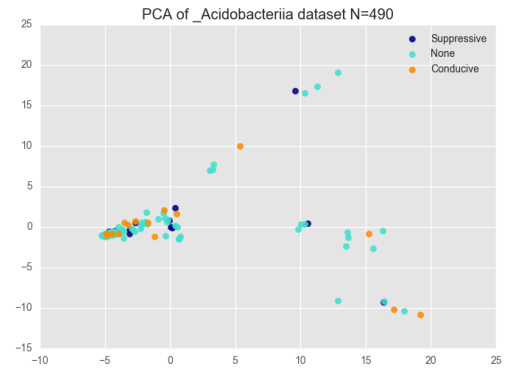
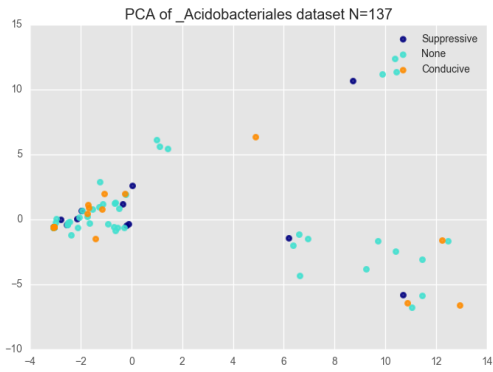
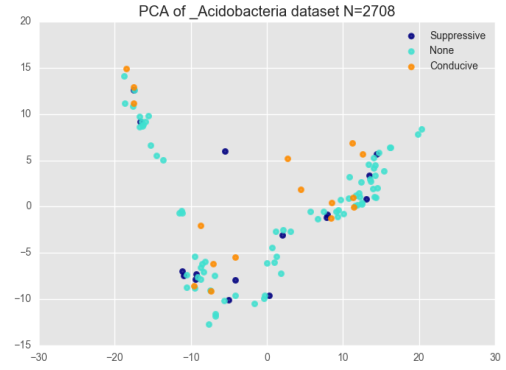
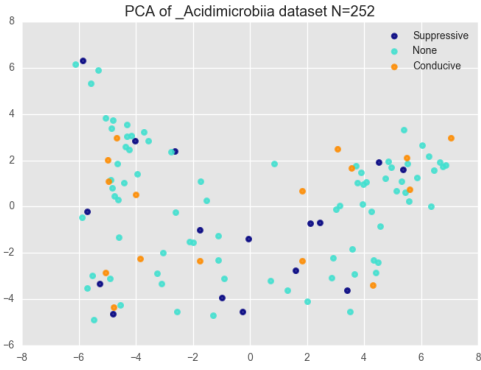
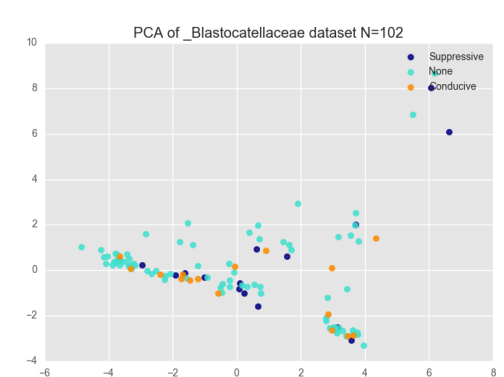
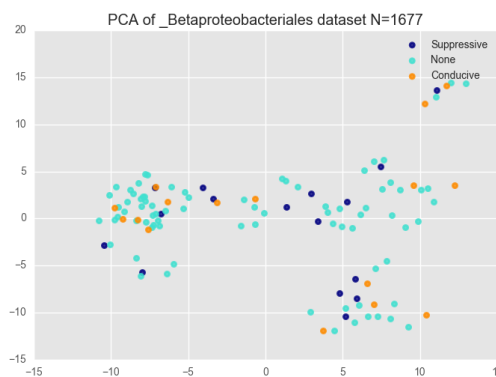
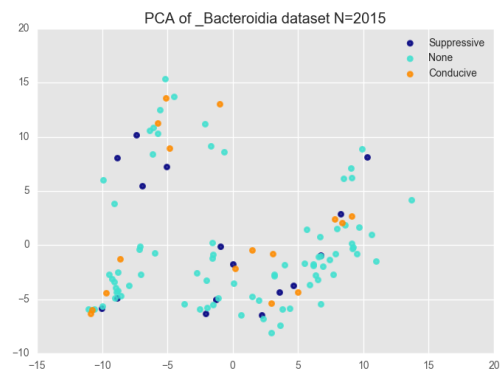
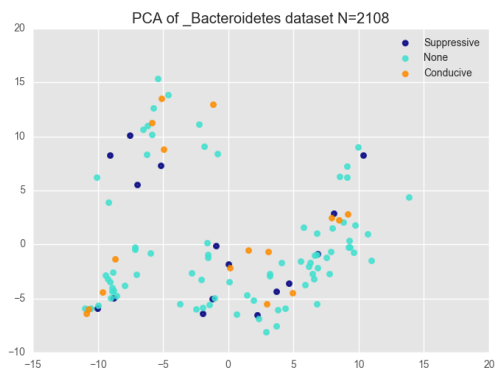
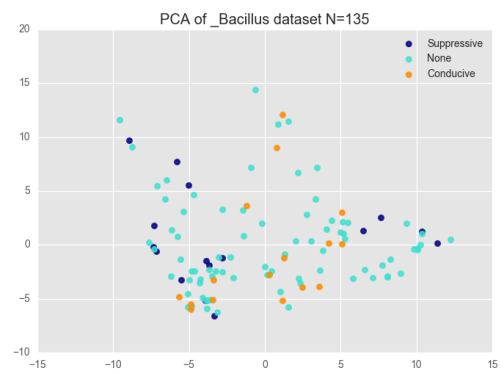
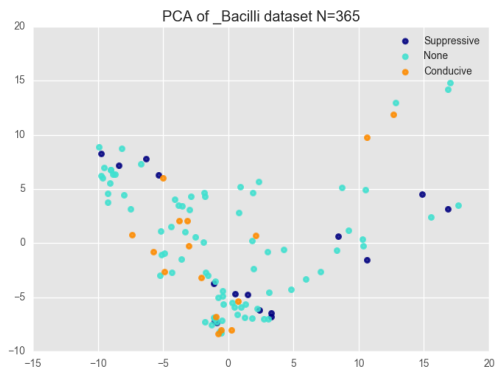
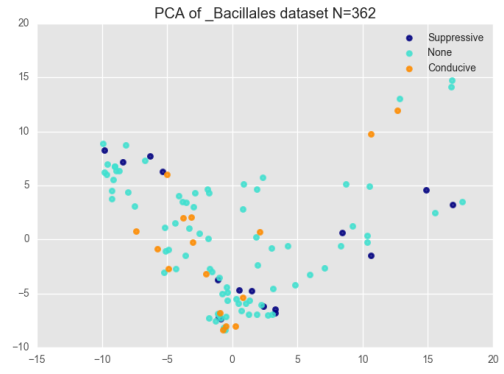
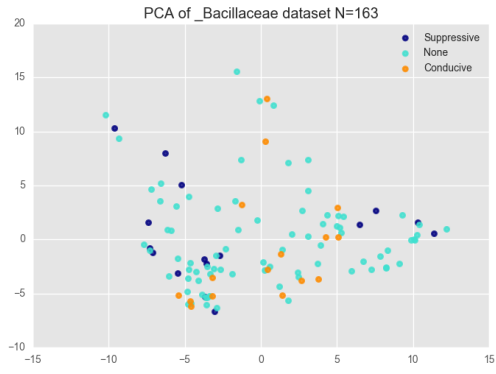
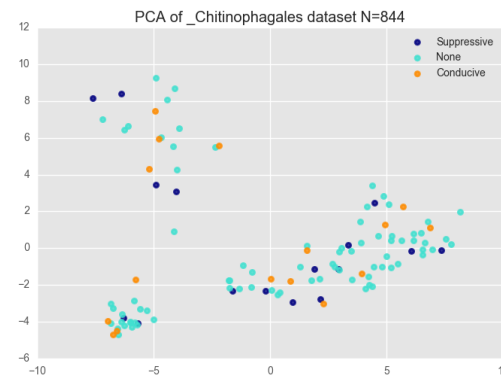
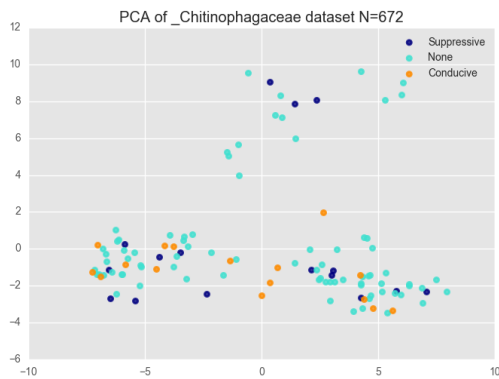
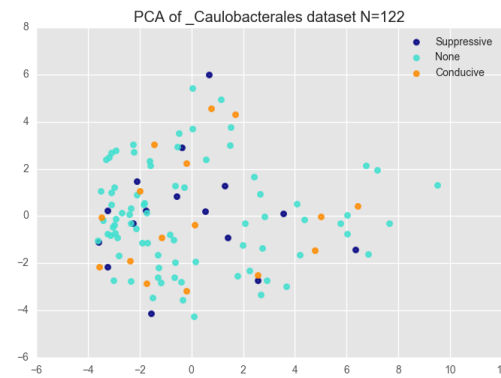
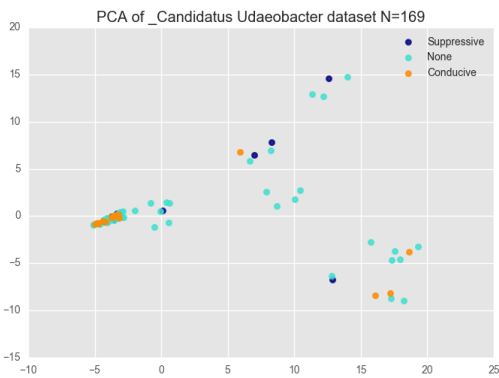
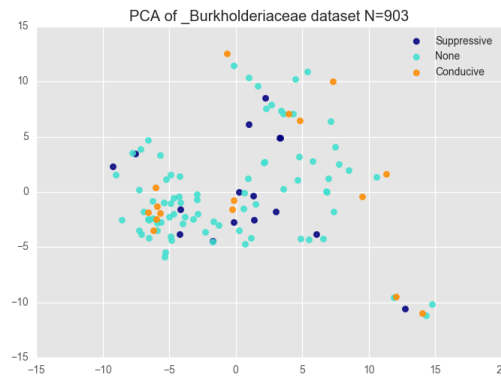
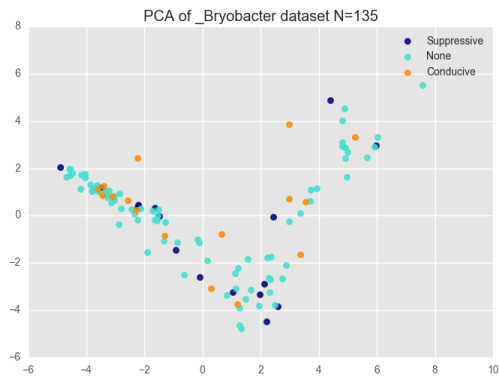
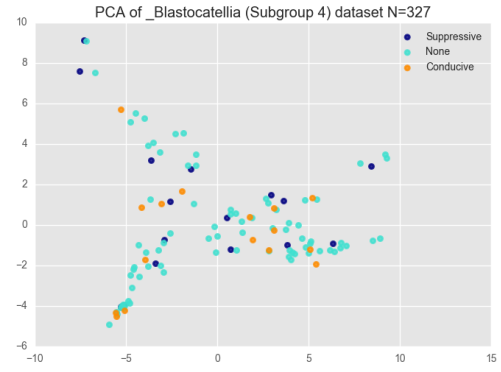
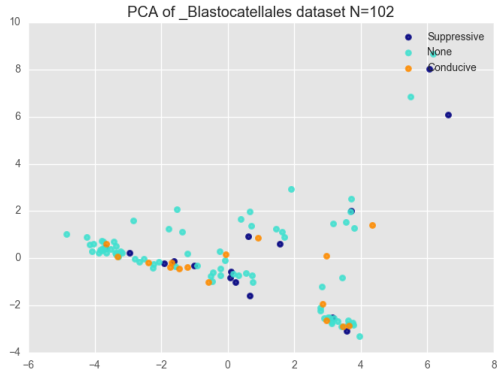
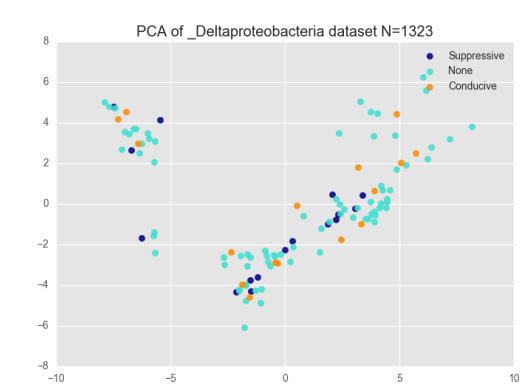
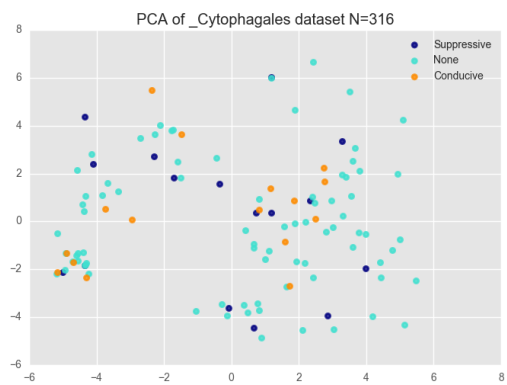
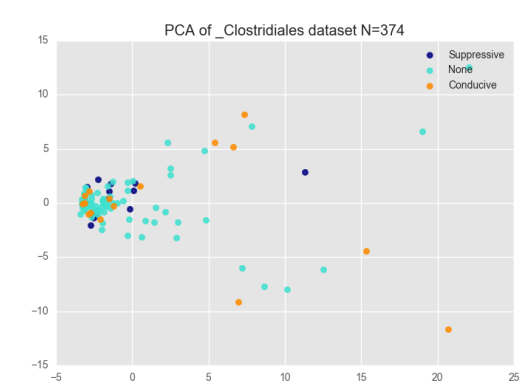
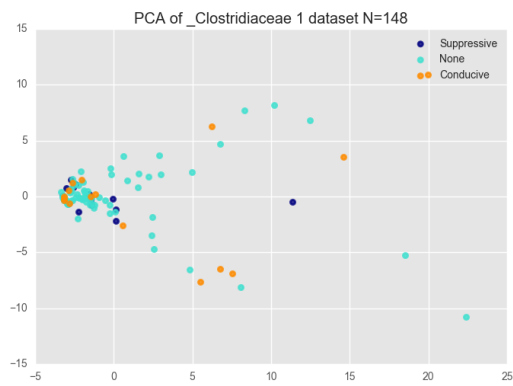
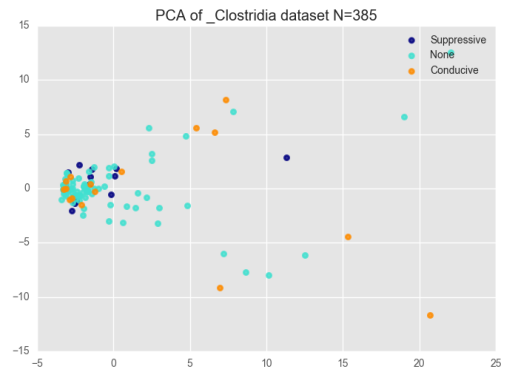
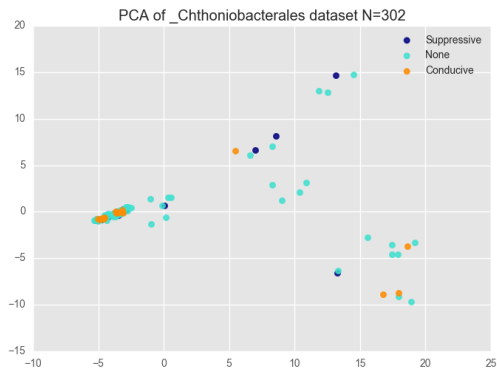
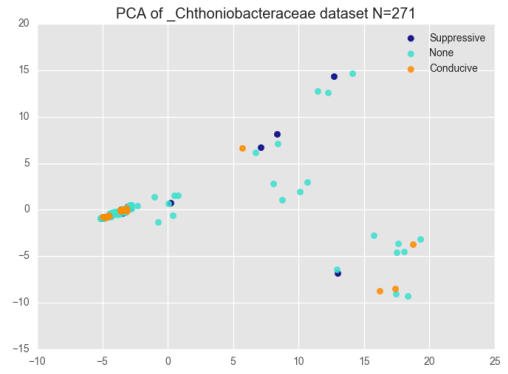
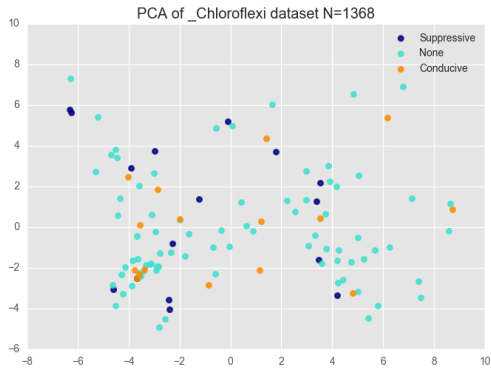


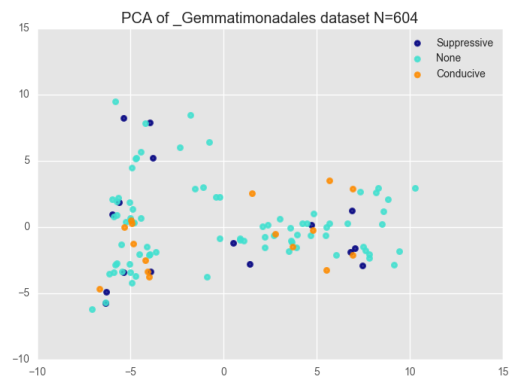
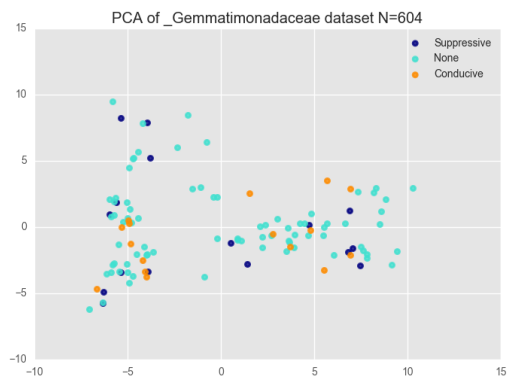
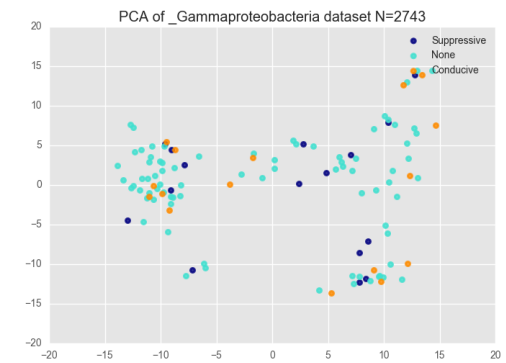
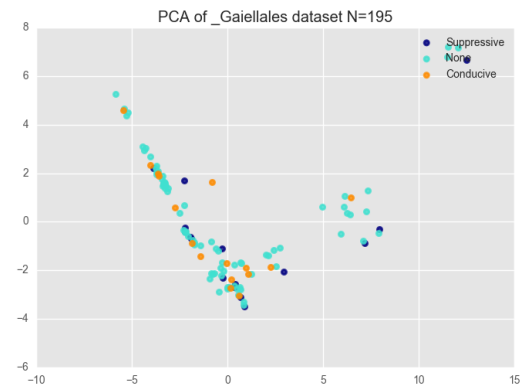
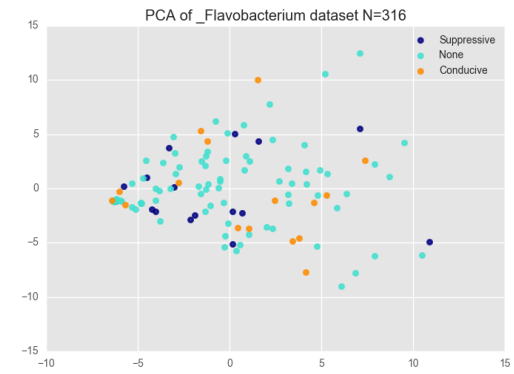
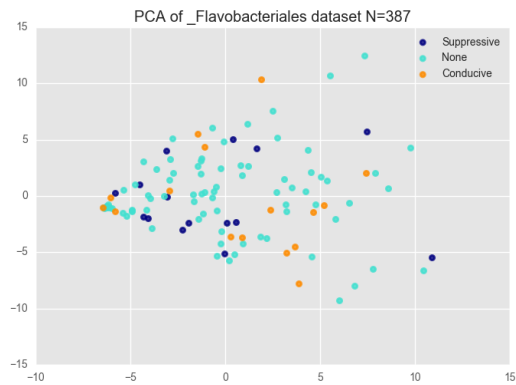
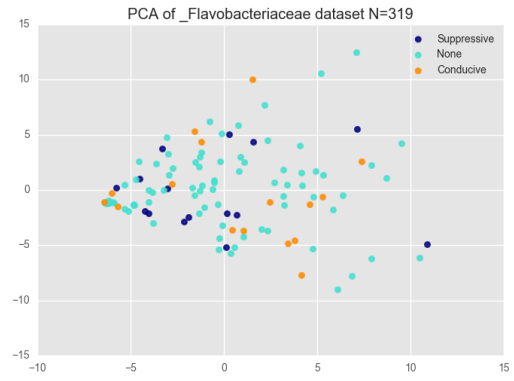
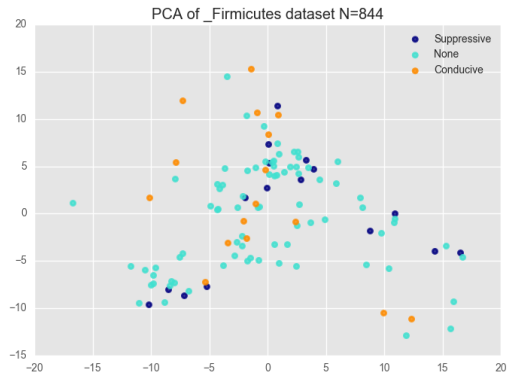
Figure S3. PCoA plot showing GC-MS profiles of volatile compounds emitted by eight soils, four suppressive (S01, S03, S11 and S28) and four conducive (S08, S14, S15 and S17) soils.

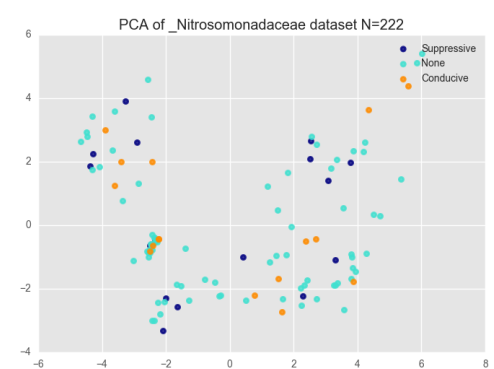
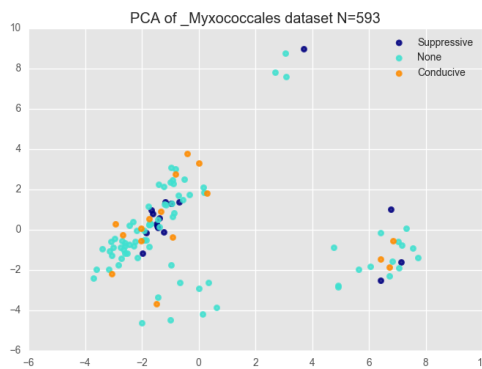
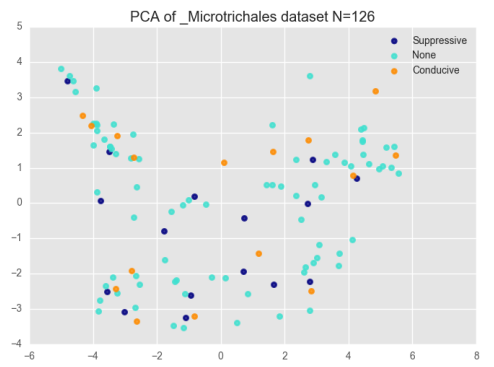
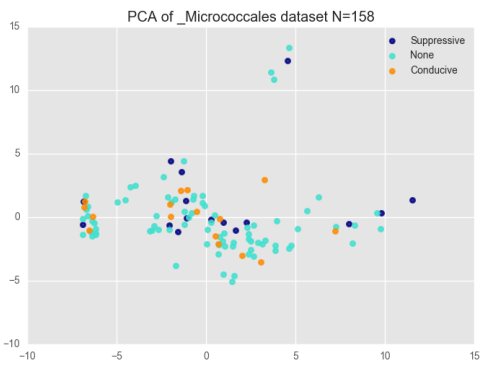
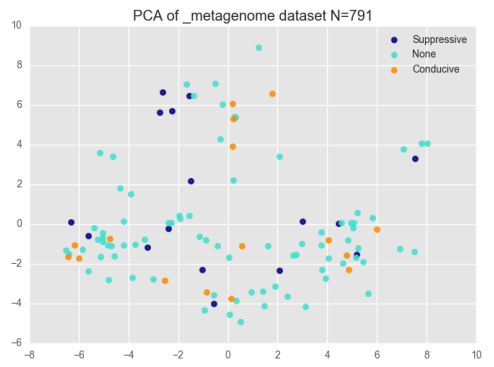
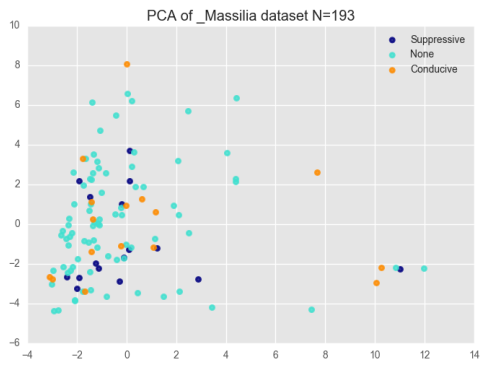
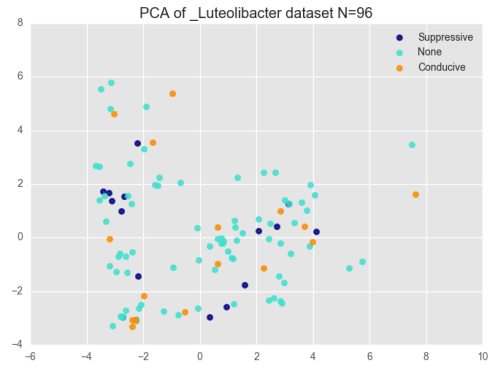
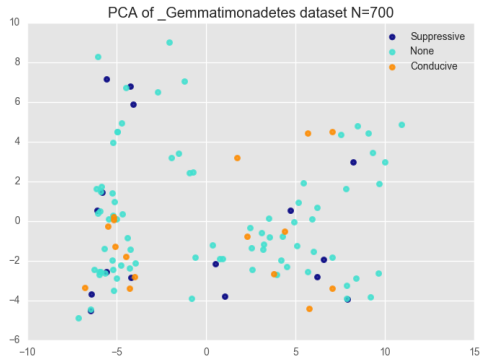


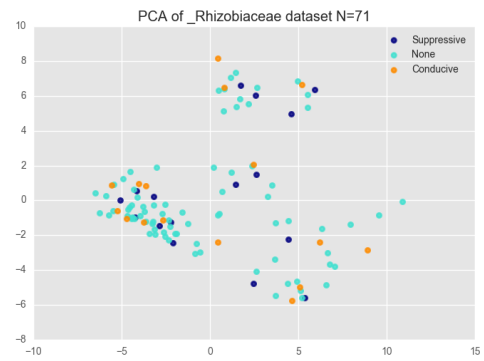
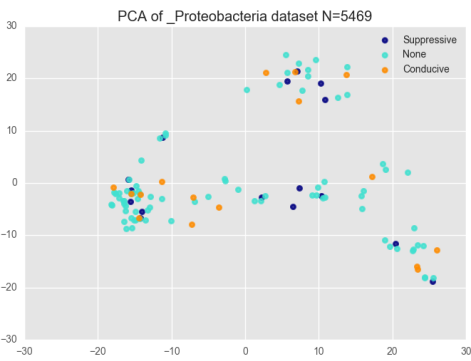
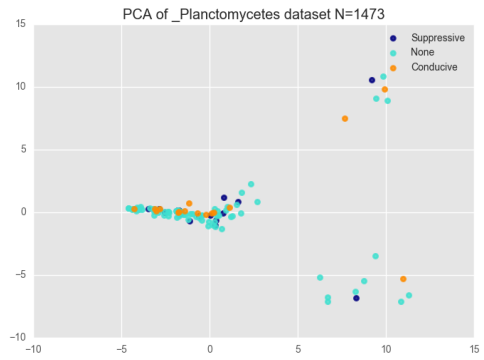
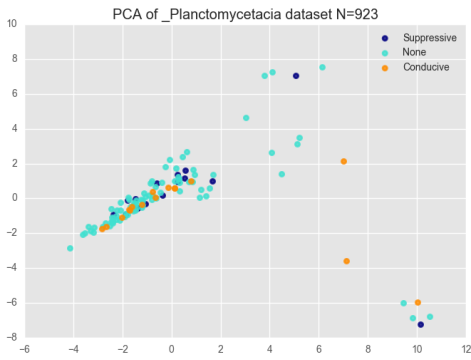
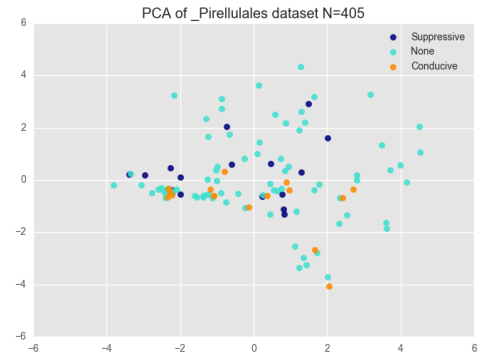
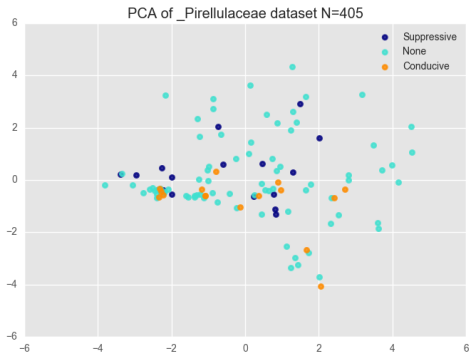
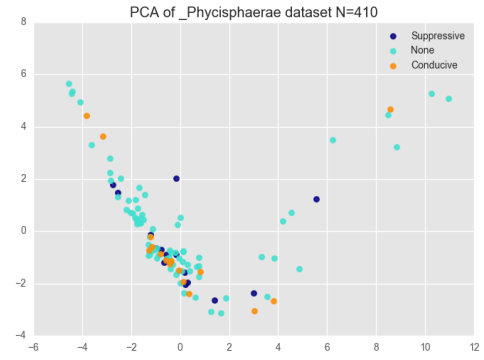
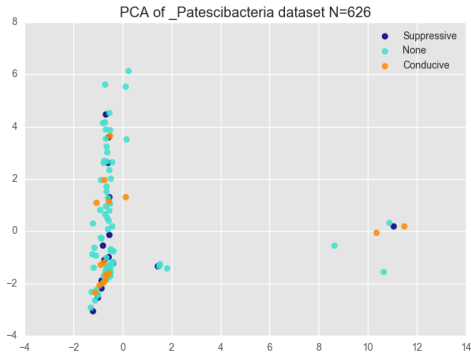


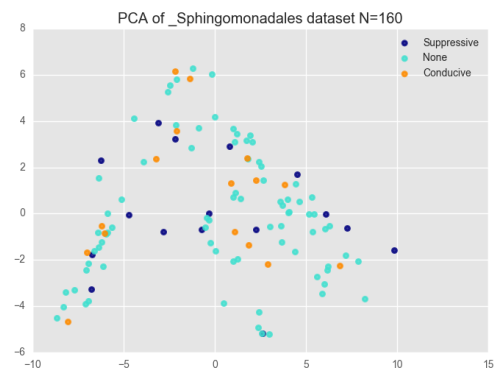
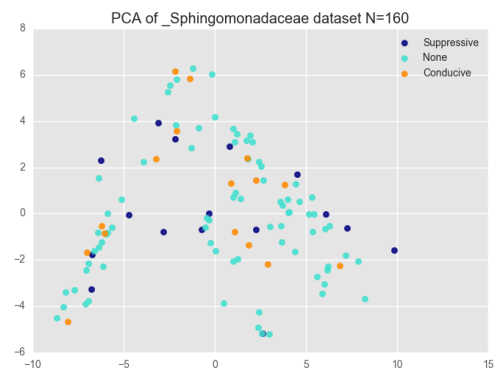
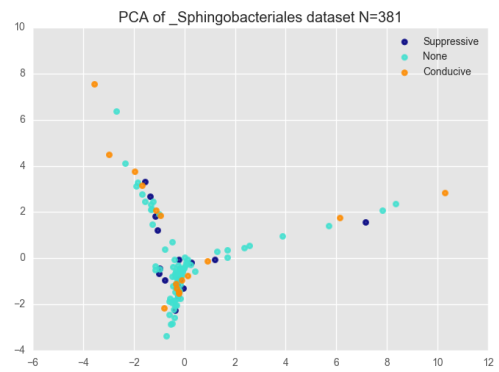
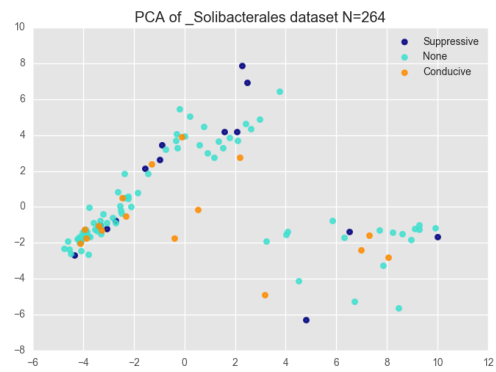
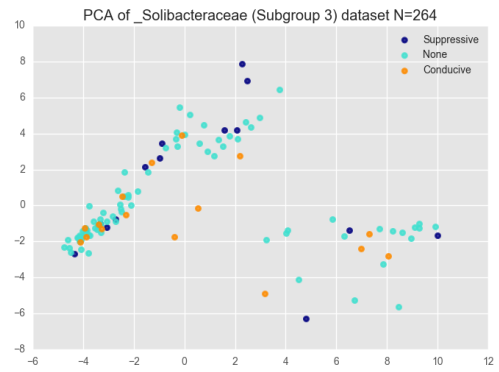
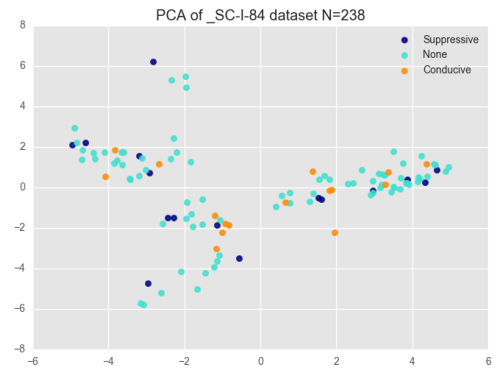
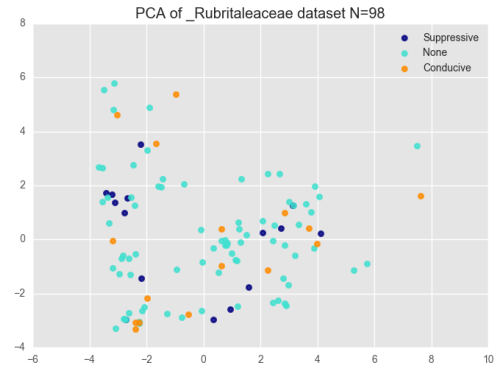
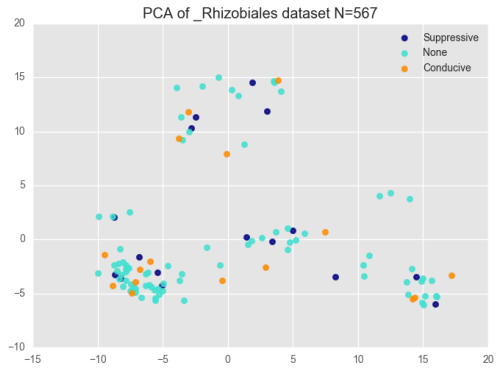


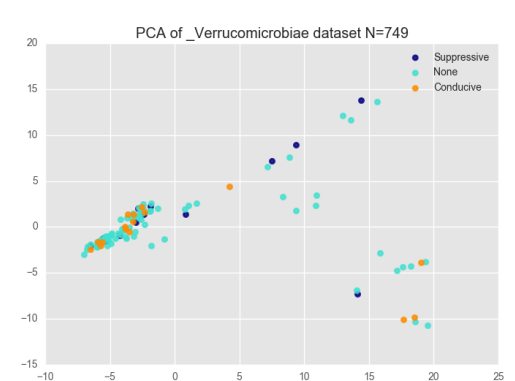
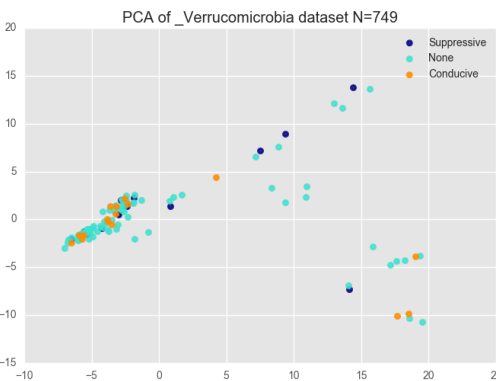
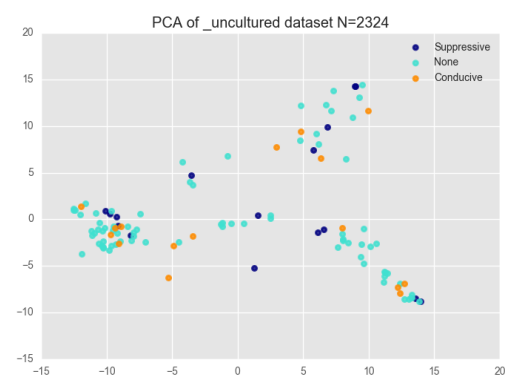
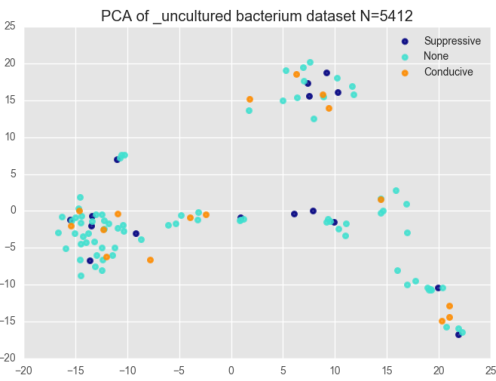
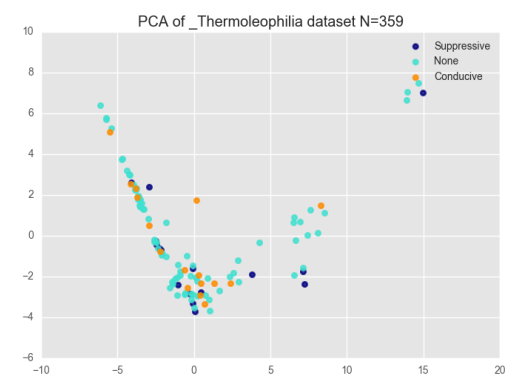
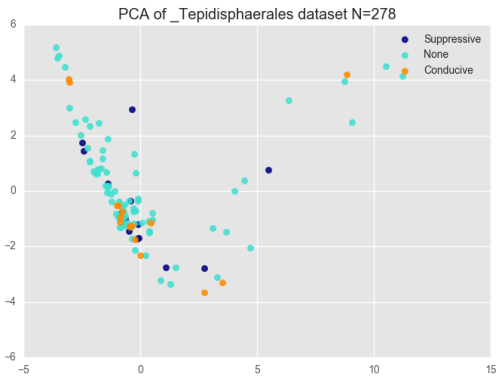
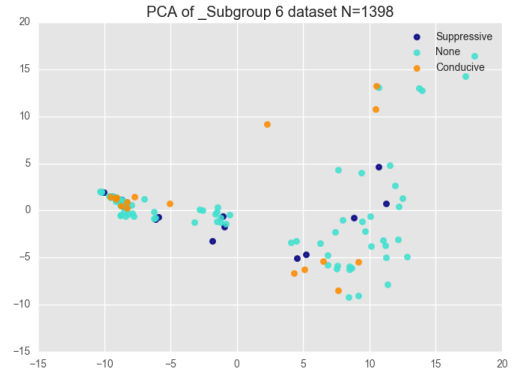
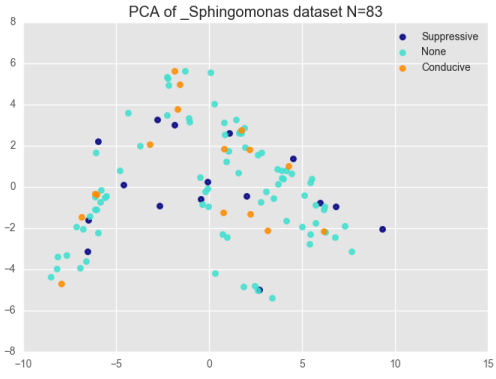












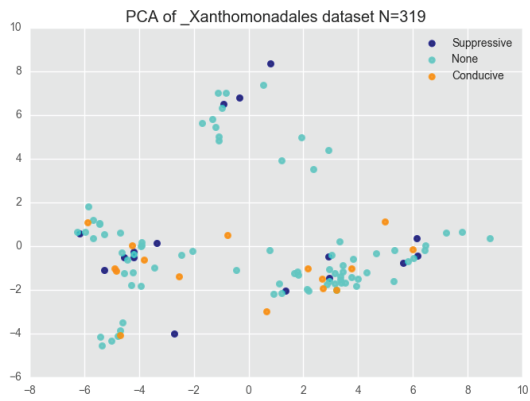
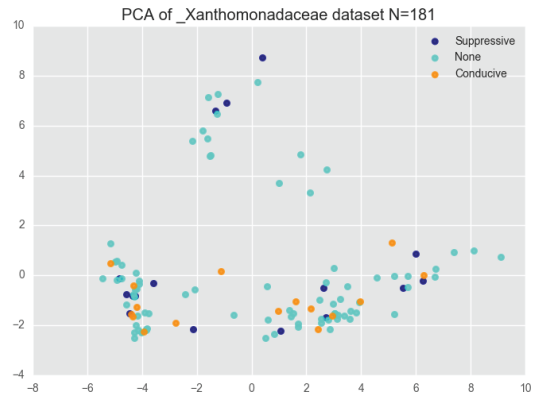
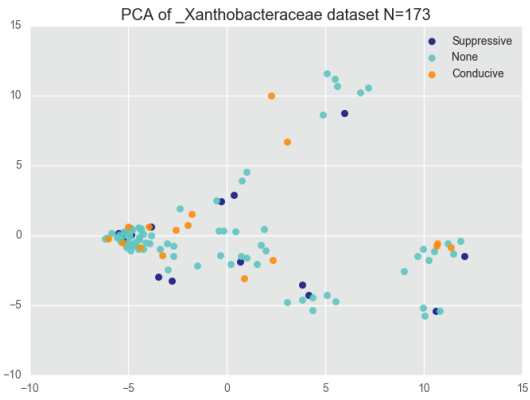
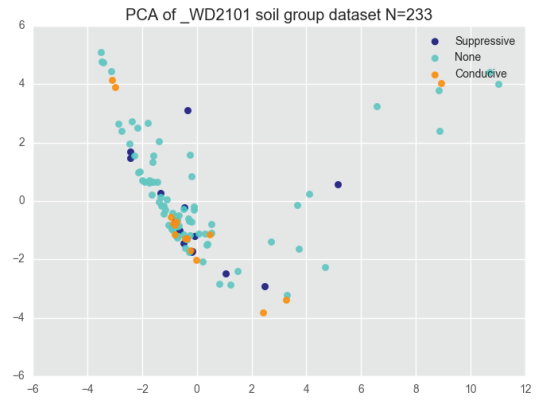
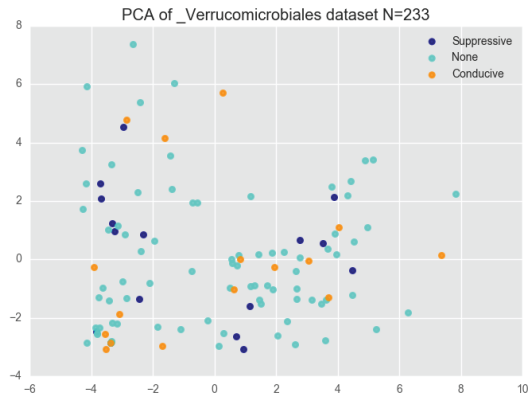


Figure S4. PCA plots of different taxonomy groups. The number of ASVs used for the component analysis is reported on top of each plot together with the taxonomic group represented in the figure.

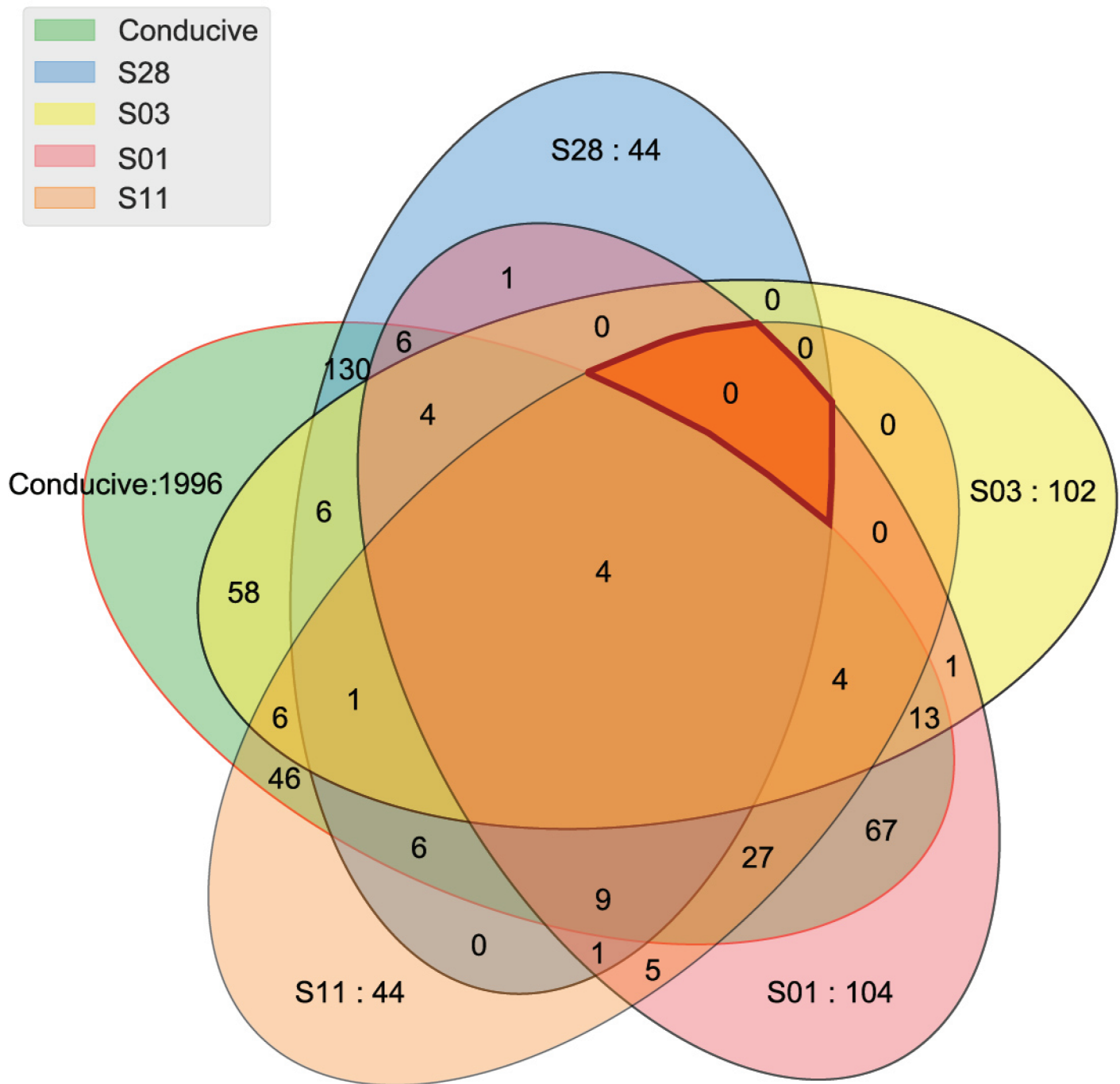


Figure S5. Presence-absence patterns of consistent ASVs. Venn diagram representing the ASVs which consistently appear in all replicates for each of the suppressive samples (S01, S03, S11 and S28) and the conducive samples (here grouped under “conductive”).



Figure S6. Examples of healthy and diseased plants obtained in the screening with disease scores indicated in brackets.