

Supplementary

MacLean et al., *The Terrestrial Plastisphere: Diversity and Polymer-colonizing Potential of Plastic-associated Microbial Communities in Soil* (2021)

Table S1. Alpha diversity indices (mean values) of the microbial taxa present in plastic debris (plastic) and reference soil (soil) samples. Significant P values ($p < 0.05$) of the Wilcoxon rank sum test are marked with *.

	Chao1	+/- SD	Wilcoxon Rank sum test (P<0.05)
Plastic	2578.30	1404.99	0.53
Soil	2730.57	1451.21	
Site (NGK vs. Alba)			0.47

	Simpson	+/- SD	Wilcoxon Rank sum test (P<0.05)
Plastic	0.970	0.070	0.012 *
Soil	0.980	0.060	
Site (NGK vs. Alba)			0.014*

	Shannon	+/- SD	Wilcoxon Rank sum test (P<0.05)
Plastic	6.31	1.04	0.03 *
Soil	6.56	0.95	
Site (NGK vs. Alba)			0.08 *

	Pielou	+/- SD	Wilcoxon Rank sum test (P<0.05)
Plastic	0.82	0.11	0.00053 *
Soil	0.85	0.09	
Site (NGK vs. Alba)			0.021 *

Table S2. Testing homogeneity of multivariate group variances (soil versus plastic)

	Df	Sum Sq	Mean Sq	F value	Pr (>F)
Groups	1	0.017161	0.0171615	2.1563	0.1555
Residuals	23	0.183047	0.0079586		

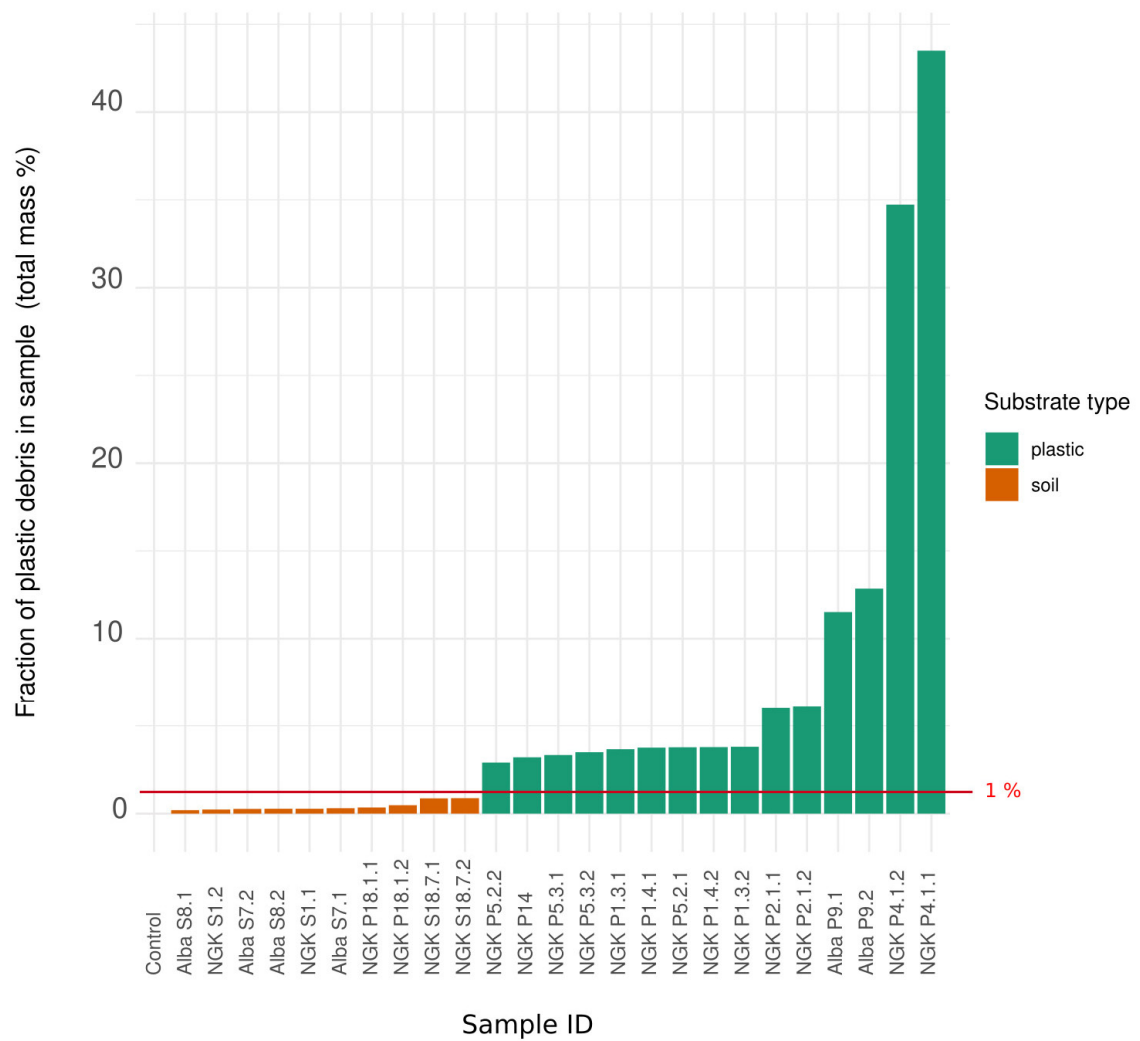


Figure S1. TGA quantification of the total plastic content in all sequenced samples. The content is given in mass percentage of the total (soil) material. Samples which contained less than 1% plastic debris, where considered as natural soil samples without a major influence of plastic on the soil microbial habitat.

Table S3. Two-way PERMANOVA (adonis)

Permutation test for adonis under reduced model
Terms added sequentially (first to last)
Permutation: free
Number of permutations: 999

	Df	SumOfSqs	R2	F	Pr(>F)
Sediment_type	1	1.6019	0.19347	6.3992	0.001 ***
Site	1	0.6617	0.07992	2.6433	0.006 **
Sediment_type:Site	1	0.7596	0.09173	3.0342	0.001 ***
Residual	21	5.2570	0.63489		
Total	24	8.2802	1.00000		

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Table S4. Wilcoxon rank sum test for differences in abundances of Top50 ASV’s plastic debris versus soil

Wilcoxon rank sum test with continuity correction

Abundance by Substrate_type
W = 44750
p-value = 0.001347 *
alternative hypothesis: true location shift is not equal to 0

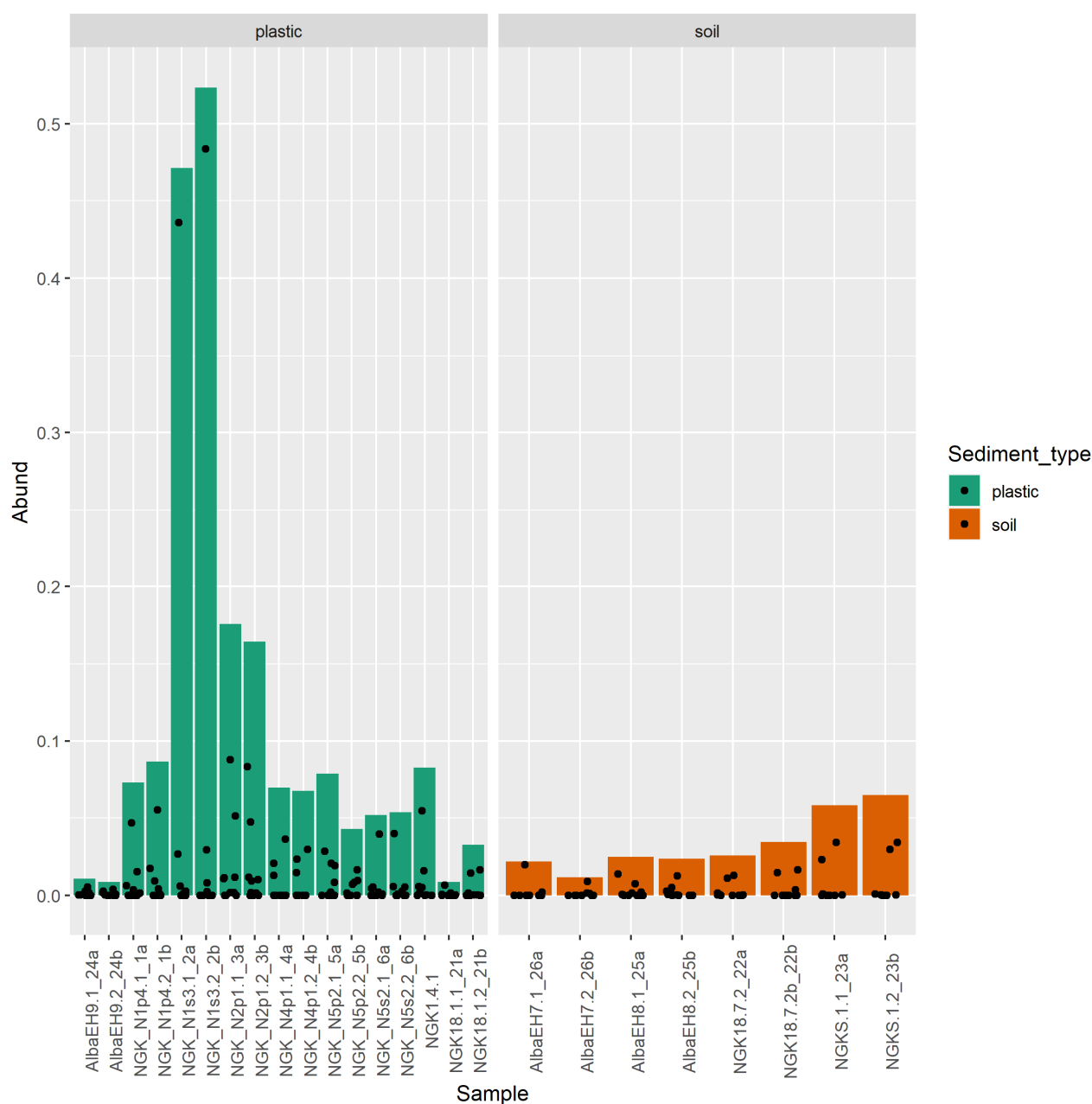


Figure S2. Relative abundances of top ten most abundant ASV's per sample type (plastic debris vs. soil).



Figure S3. Sampling spots of plastic debris (a-c and e-g) and natural reference soil (d and h) used in our study. Images show the sampling location “Alba” (a-d): a plastic recycling factory and its surrounding terrain (d), as well as the location “Niemegek” (e-h): an abandoned plastic landfill and the adjacent meadow soil (h).



EH 9.2 Plastic debris



NGK 1.3 Plastic debris



NGK 4.1.2 Plastic debris



NGK 4.1.1 Plastic debris



EH 7.2 Reference soil



NGK S1.2 Reference soil

Figure S4. Sampled material used for DNA extraction and TGA plastic quantification. Soil or plastic debris was ground and homogenized using FastPrep ® Bead Tubes inside a FastPrep ® Cell disrupter for DNA extraction and the cryogenic homogenizer Retsch CryoMill for TGA measurements. Larger particles (foils) were cut prior to disruption.

Table S5. Average relative abundances of Top50 ASV's and corresponding genera in soil

Abundances of top 50 ASV's (Genera) in soil						
Genus	N	mean	sd	med	se	
Pseudarthrobacter	10	0.027	0.011	0.026	0.003	
Sphingomonas	10	0.019	0.009	0.018	0.003	
Bradyrhizobium	10	0.012	0.007	0.012	0.002	
Bacillus	10	0.009	0.006	0.008	0.002	
Microvirga	10	0.007	0.005	0.010	0.002	
Pedobacter	10	0.006	0.012	0.000	0.004	
Skermanella	10	0.006	0.006	0.004	0.002	
Pseudonocardia	10	0.006	0.005	0.006	0.002	
Mycobacterium	10	0.005	0.002	0.005	0.001	
Nocardioides	10	0.004	0.004	0.003	0.001	
Methyloligellaceae(uncult.)	10	0.004	0.003	0.004	0.001	
67-14(uncult.)	10	0.004	0.004	0.003	0.001	
Marmoricola	10	0.004	0.003	0.003	0.001	
Sphingomonadaceae(uncult.)	10	0.004	0.003	0.003	0.001	
Roseiflexaceae(uncult.)	10	0.003	0.006	0.000	0.002	
Gaiella	10	0.003	0.002	0.002	0.001	
Hyphomicrobium	10	0.003	0.002	0.002	0.001	
Ilumatobacter	10	0.002	0.002	0.002	0.001	
Pedomicrobium	10	0.002	0.002	0.001	0.001	
CL500-29 marine group	10	0.002	0.002	0.002	0.001	
Streptomyces	10	0.002	0.002	0.002	0.001	
Nakamurella	10	0.002	0.002	0.002	0.001	
Gemmatimonadaceae(uncult.)	10	0.002	0.002	0.001	0.001	
RB41	10	0.002	0.003	0.001	0.001	
MND1	10	0.002	0.003	0.001	0.001	
Average		0.006				

Table S6. Average relative abundances of Top50 ASV's and corresponding genera in plastic debris

Abundances of top 50 ASV's (Genera) on plastic

Genus	N	mean	sd	med	se
Tychonema CCAP 1459-11B	15	0.083	0.162	0.004	0.042
Blastococcus	15	0.027	0.021	0.024	0.005
Skermanella	15	0.012	0.009	0.012	0.002
Rickettsiella	15	0.012	0.022	0.002	0.006
Sphingomonadaceae(uncult.)	15	0.010	0.007	0.012	0.002
Nocardioides	15	0.009	0.005	0.008	0.001
Microvirga	15	0.008	0.007	0.008	0.002
Streptomyces	15	0.004	0.003	0.005	0.001
Marmoricola	15	0.004	0.002	0.004	0.001
Actinomycetospora	15	0.004	0.003	0.003	0.001
Hyphomicrobium	15	0.004	0.004	0.003	0.001
67-14(uncult.)	15	0.004	0.006	0.001	0.002
Pseudarthrobacter	15	0.004	0.005	0.002	0.001
Cellulosimicrobium	15	0.003	0.004	0.002	0.001
Aeromicrobium	15	0.003	0.002	0.003	0.001
Devosia	15	0.002	0.002	0.002	0.001
Geodermatophilus	15	0.002	0.006	0.000	0.002
Arthrobacter	15	0.002	0.002	0.001	0.001
Paracoccus	15	0.002	0.003	0.000	0.001
Pseudonocardia	15	0.002	0.003	0.001	0.001
Methylobacteriaceae(uncult.)	15	0.002	0.002	0.002	0.000
Rubrobacter	15	0.002	0.003	0.001	0.001
Methylobacterium	15	0.002	0.002	0.001	0.001
Hyphomicrobiaceae(uncult.)	15	0.002	0.003	0.000	0.001
Planifilum	15	0.002	0.003	0.000	0.001
Gemmatimonadaceae(uncult.)	15	0.002	0.002	0.000	0.001
Aeribacillus	15	0.002	0.003	0.000	0.001
Rhodococcus	15	0.002	0.003	0.000	0.001
Average		0.008			