

Supporting Material

Can Microplastic Pollution Change Soil–Water Dynamics? Results from Controlled Laboratory Experiments

Farhad Jazaei ^{1,*}, Tareq Jamal Chy ¹ and Maryam Salehi ²

¹ Department of Civil Engineering, University of Memphis, Memphis, TN 38152, USA

² Department of Civil and Environmental Engineering, University of Missouri, Columbia, MO 65211, USA

* Correspondence: fjazaei@memphis.edu

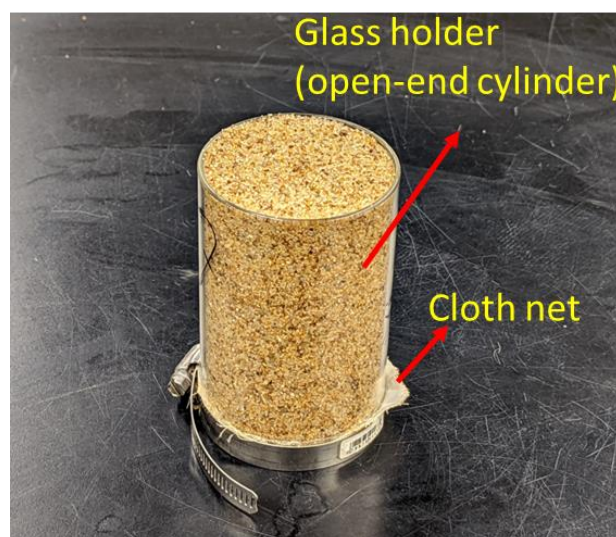


Figure S1. An image of a glass holder and soil sample.

Citation: Jazaei, F.; Chy, T.J.; Salehi, M. Can Microplastic Pollution Change Soil–water Dynamics? Results from Controlled Laboratory Experiments. *Water* **2022**, *14*, 3430. <https://doi.org/10.3390/w14213430>

Academic Editor: Yves Coque

Received: 5 July 2022

Accepted: 13 October 2022

Published: 28 October 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

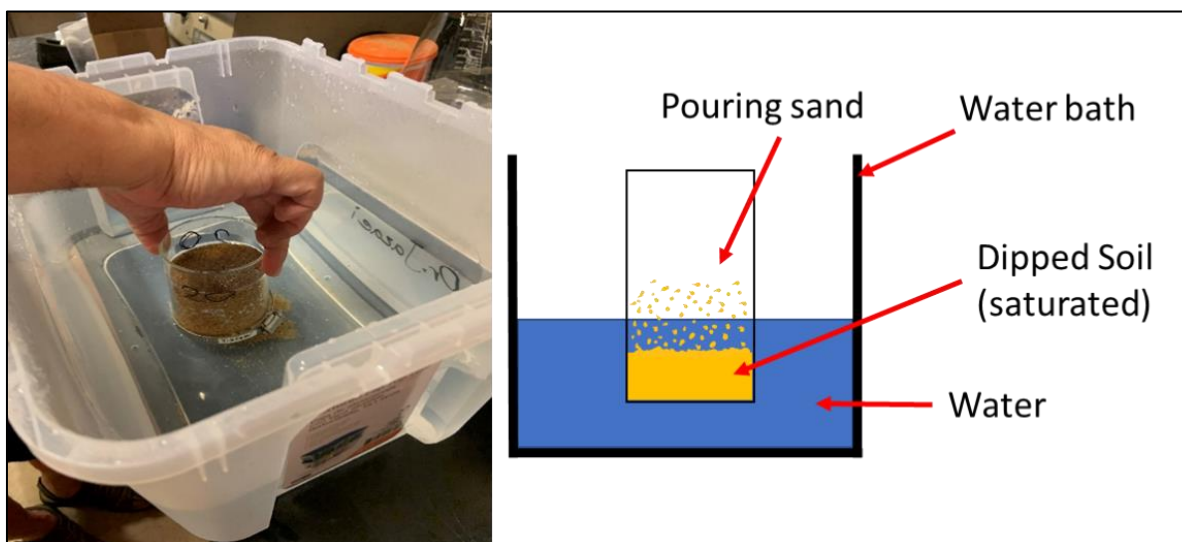


Figure S2. Creating saturated soil samples using a water bath and layer-by-layer filling of the sample holder.

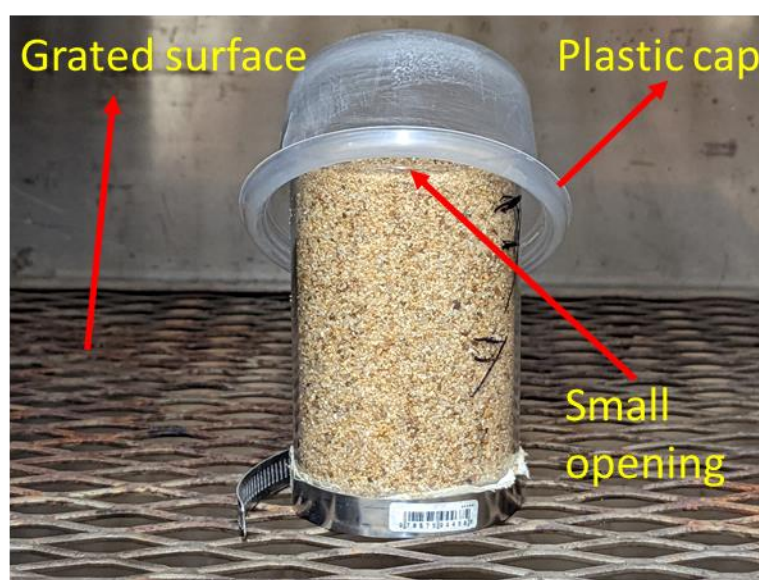


Figure S3. Saturated samples were then taken out of the water and placed on a grated surface for 24 hours to let the excess water drain away by gravity through the soil column. A plastic cap covered each sample to inhibit evaporation from the soil's surface but without sealing it hermetically, to avoid possible vacuum pressure effects due to water draining.

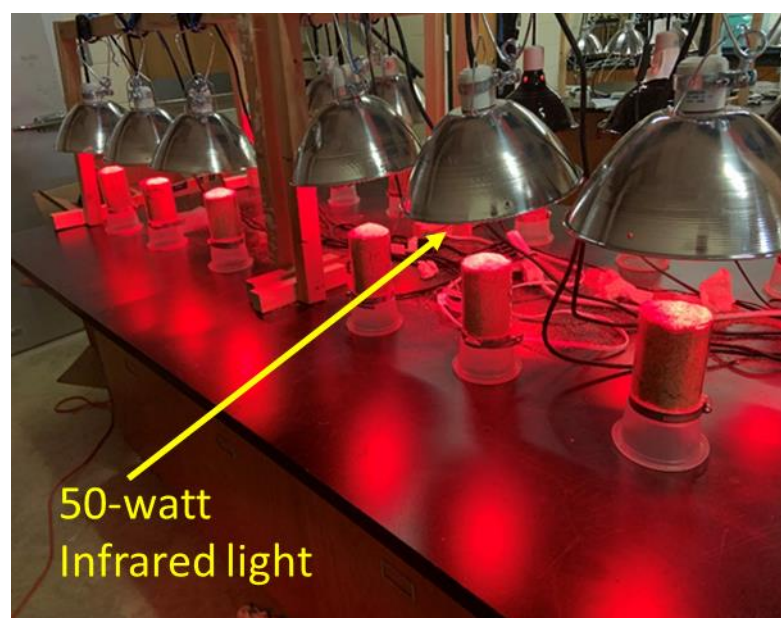


Figure S4. After reaching the field capacity in Experiment 1, every sample was placed with its surface at precisely 10 cm below a 50-Watt infrared light for 41 hours.

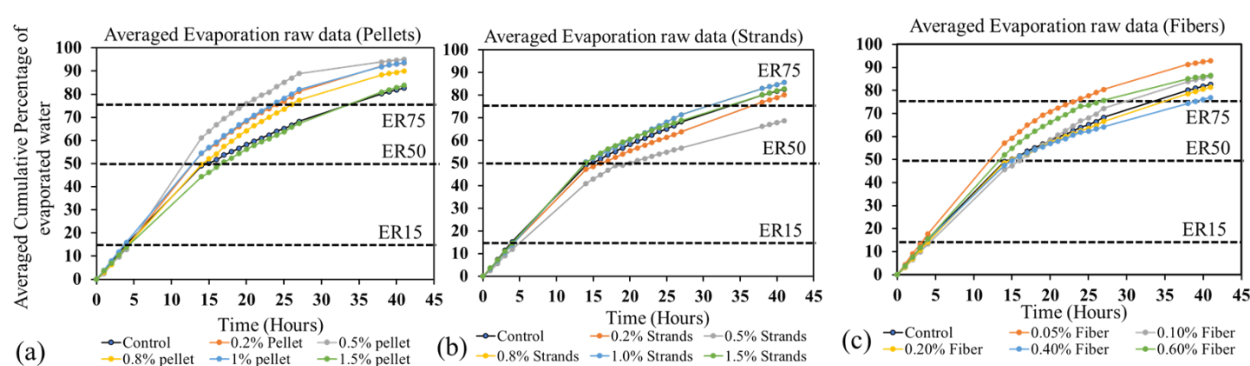


Figure S5. (a-c) shows the averaged values of cumulative evaporation percentage of water vs time (hr) for Pellets, Strands, and Fibers, respectively. Horizontal dotted lines represent ER15, 50, and 75. The average value of cumulative percentage of water was determined by measuring and recording the weight of the samples for 41 hours.

Table S1. Detailed descriptive statistics (Pellet and Strands).

Descriptive Statistics				
Type of MP		Mean	Std. Deviation	N
WHC [g/g]	Pellet	.00	0.207165	0.0019324
		.20	0.206367	0.0025200
		.50	0.203364	0.0039369
		.80	0.204282	0.0028170
		1.00	0.203355	0.0024747
		1.50	0.200141	0.0034652
		Total	0.204112	0.0036320
	Strand	.00	0.207165	0.0019324
		.20	0.197314	0.0036488
		.50	0.194098	0.0034836
		.80	0.198075	0.0035958

ER15 [hr]		1.00	0.196158	0.0031948	10
		1.50	0.190885	0.0036436	10
		Total	0.197282	0.0059614	60
	Pellet	.00	4.241000	1.1655085	10
		.20	4.290000	1.0516548	10
		.50	4.581000	0.7718297	10
		.80	4.400000	1.0988479	10
		1.00	3.824000	0.4680028	10
		1.50	4.466000	0.6698292	10
		Total	4.300333	0.9008865	60
	Strand	.00	4.241000	1.1655085	10
		.20	4.540000	1.1696913	10
		.50	4.778000	0.3886672	10
		.80	4.689000	1.5239966	10
		1.00	3.852000	0.4859767	10
		1.50	4.392000	0.9987637	10
		Total	4.415333	1.0383143	60
ER50 [hr]	Total	.00	4.241000	1.1344226	20
		.20	4.415000	1.0901448	20
		.50	4.679500	0.6032846	20
		.80	4.544500	1.3015759	20
		1.00	3.838000	0.4645722	20
		1.50	4.429000	0.8285428	20
		Total	4.357833	0.9696601	120
	Pellet	.00	17.066000	4.2315119	10
		.20	13.897000	3.4765374	10
		.50	12.729000	3.7218677	10
		.80	14.909000	3.6696396	10
		1.00	15.117000	6.0739097	10
		1.50	16.502000	2.4265513	10
		Total	15.036667	4.1781168	60
	Strand	.00	17.066000	4.2315119	10
		.20	17.276000	5.5477527	10
		.50	18.250000	3.5374975	10
		.80	15.536000	4.7151109	10
		1.00	12.589000	1.4443641	10
		1.50	15.548000	4.9024819	10
		Total	16.044167	4.4809349	60
ER75 [hr]	Total	.00	17.066000	4.1186513	20
		.20	15.586500	4.8278962	20
		.50	15.489500	4.5288717	20
		.80	15.222500	4.1247161	20
		1.00	13.853000	4.4883535	20
		1.50	16.025000	3.7964866	20
		Total	15.540417	4.3434897	120
	Pellet	.00	38.037000	7.1185190	10
		.20	22.805000	5.5900810	10
		.50	20.809000	7.7638943	10
		.80	26.654000	6.2120800	10
		1.00	23.523000	3.3528364	10
		1.50	31.674000	6.4499392	10
		Total	27.250333	8.4541794	60
	Strand	.00	38.037000	7.1185190	10
		.20	36.572000	9.2243793	10
		.50	38.000000	4.6188022	10
		.80	30.662000	7.9998025	10
		1.00	28.591000	5.1487851	10

	1.50	32.622000	9.5889390	10
	Total	34.080667	8.0965286	60
	.00	38.037000	6.9286576	20
	.20	29.688500	10.2461676	20
	.50	29.404500	10.7902366	20
Total	.80	28.658000	7.2678141	20
	1.00	26.057000	4.9640106	20
	1.50	32.148000	7.9684864	20
	Total	30.665500	8.9274349	120

Table S2. Detailed descriptive statistics (Fibers).

		Descriptives		
		Mean	Std. Deviation	N
WHC	.0000	0.207100	0.0020248	10
	.0500	0.211100	0.0034464	10
	.1000	0.208000	0.0061644	10
	.2000	0.208400	0.0040056	10
	.4000	0.210900	0.0026437	10
	.6000	0.220600	0.0052957	10
	Total	0.211017	0.0060744	60
ER15	.0000	4.241000	1.1655085	10
	.0500	3.882000	0.2532368	10
	.1000	4.679000	0.8439780	10
	.2000	4.403000	0.9620586	10
	.4000	4.414000	1.1271025	10
	.6000	4.055000	0.8572469	10
	Total	4.279000	0.9170600	60
Er50	.0000	17.066000	4.2315119	10
	.0500	13.517000	1.0408122	10
	.1000	16.205000	3.1551589	10
	.2000	15.812000	3.8158669	10
	.4000	15.846000	3.5321671	10
	.6000	14.086000	2.8157580	10
	Total	15.422000	3.3592830	60
ER75	.0000	38.037000	7.1185190	10
	.0500	25.075000	2.2362233	10
	.1000	31.466000	4.0101682	10
	.2000	33.800000	6.0516297	10
	.4000	33.740000	5.1648814	10
	.6000	27.634000	8.2179954	10
	Total	31.625333	7.0290399	60
	Total	15.311864	11.6385223	59