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Figures

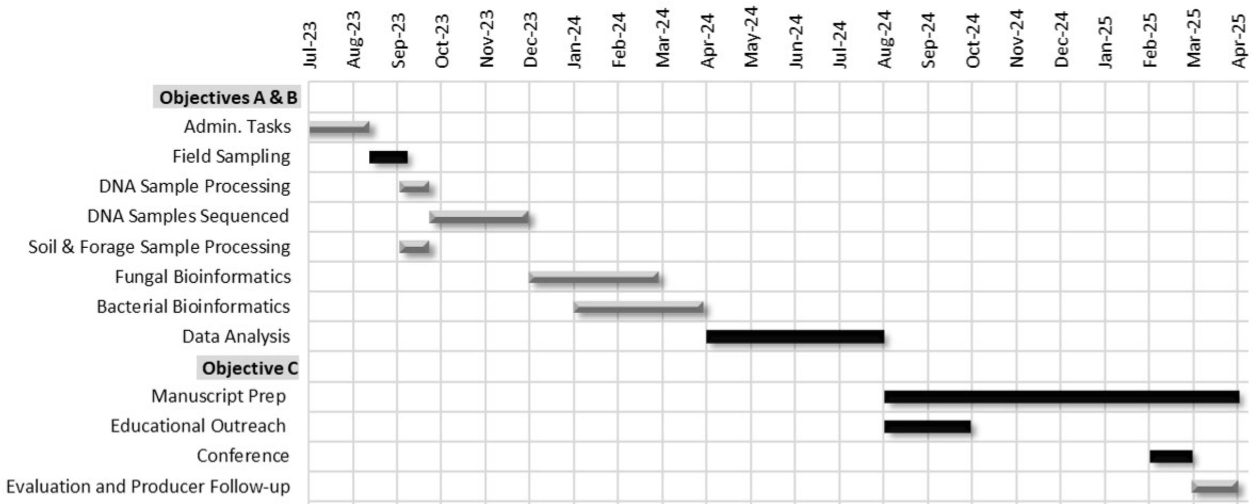

Figure 1. Project timeline. Black shading indicates a major milestone.

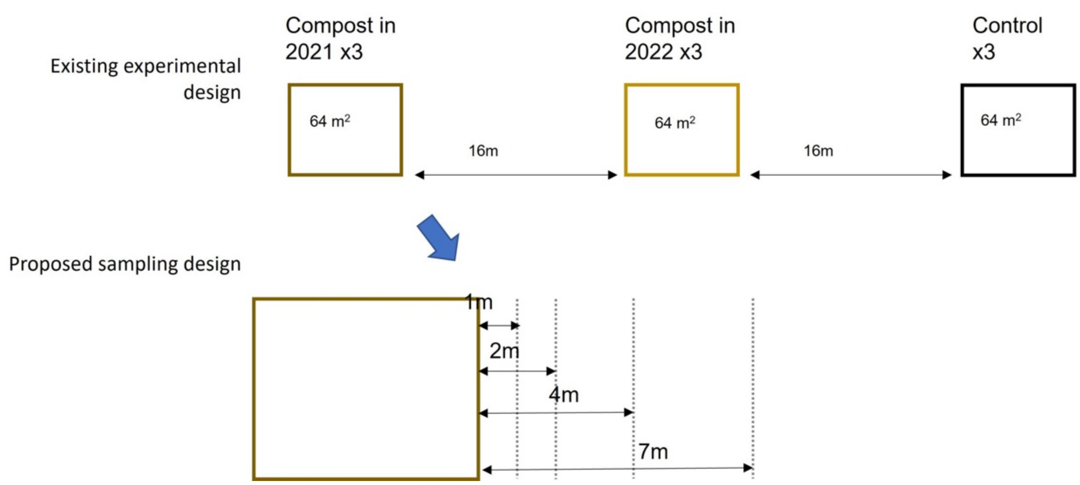

Figure 2. Field setup at each of three ranches of experimental compost applied in ("21monsoon") or 2022 ("22monsoon") and control plots. Each ranch contains three replicate plots per year of compost added and three control plots. We sampled from 4 new transects (dashed lines) along a distance gradient.

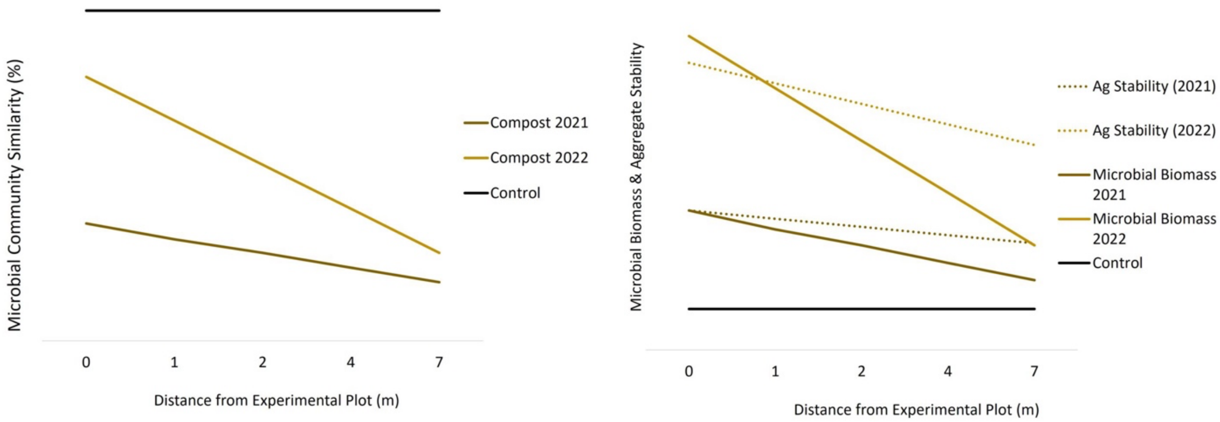

Figure 3. a) Expected trend in microbial similarity in compost plots and, b) expected trends in aggregate stability associated with microbial biomass at each transect starting inside the application site and moving away up to 7 m.

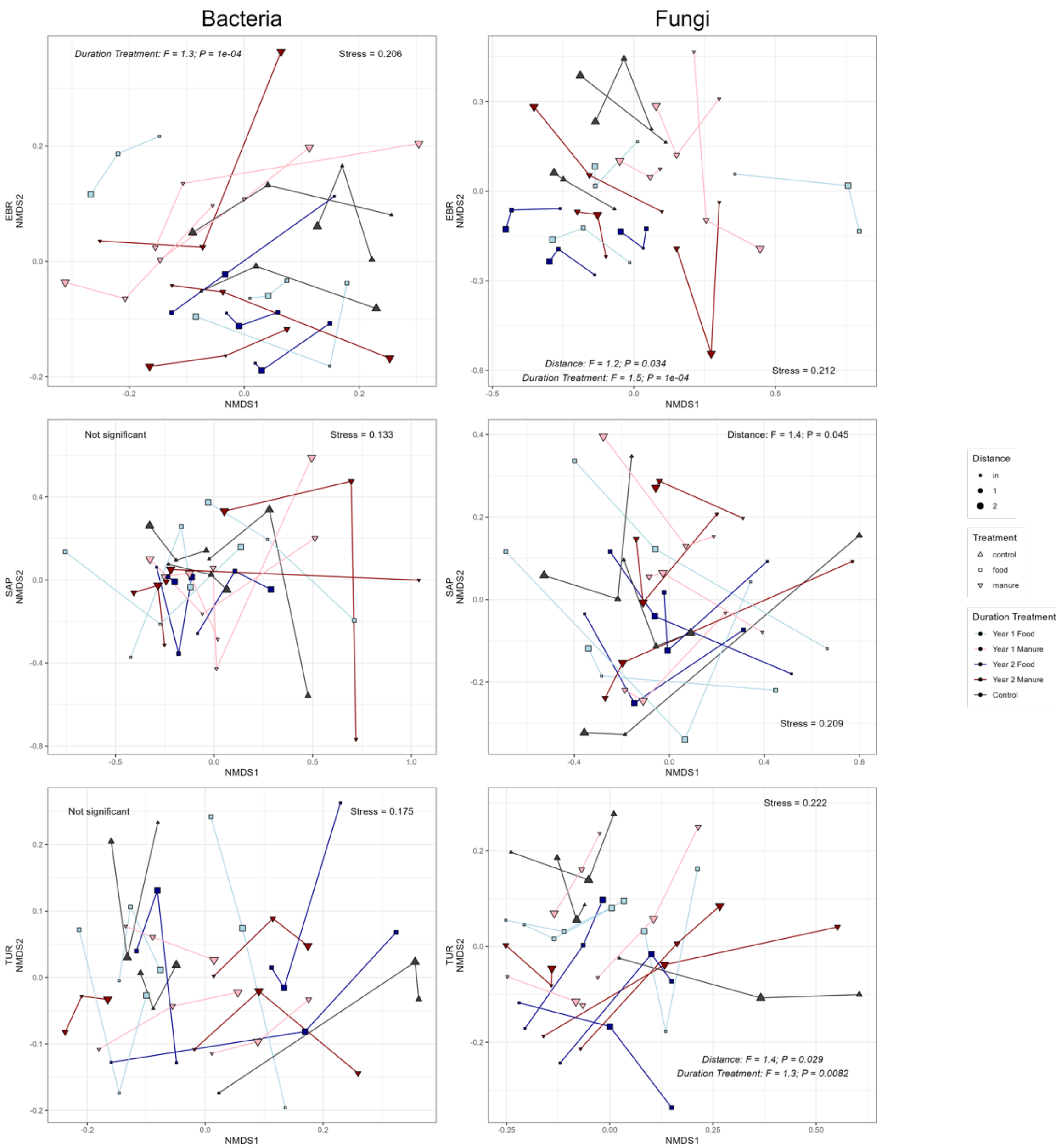

Figure 4. Nonmetric multidimensional scaling results of bacterial (left column) and fungal (right column) composition at each site in New Mexico (rows) by distance from the plot (shape size; in = 0m), type of compost (control, food-based compost, or manure-based compost), and the duration of the treatment (control, after 1 year (“22monsoon”), and after 2 years (“22monsoon”) since compost addition) with stress reported. Results of PERMANOVA tests with $P < 0.05$ are overlaid in text.

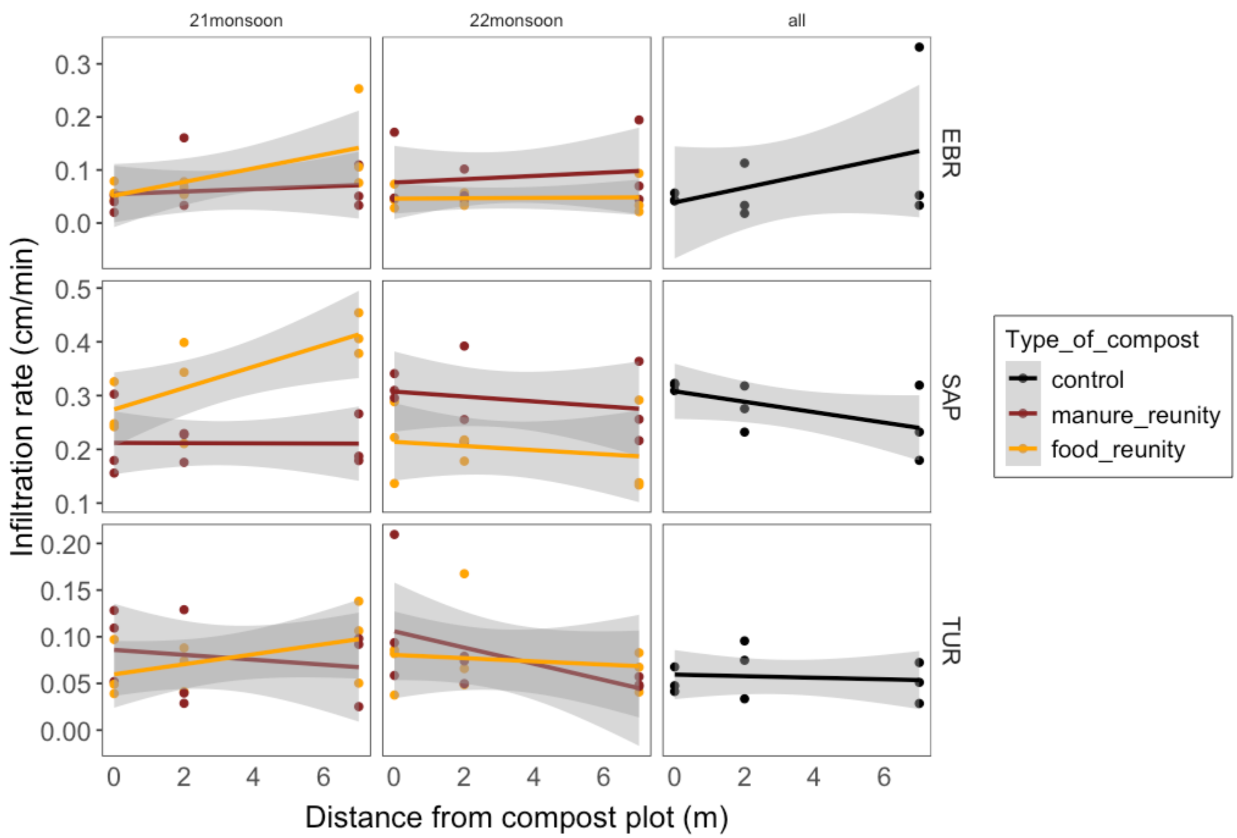

Figure 5. Infiltration time of the second inch of water in a single ring infiltrometer test by type of compost (colors) deployed in different years (columns: deployed in 2021 = “21monsoon”; deployed in 2022 = “22monsoon”; all = control plots that were the same for both deployment years) at three sites in New Mexico (rows).

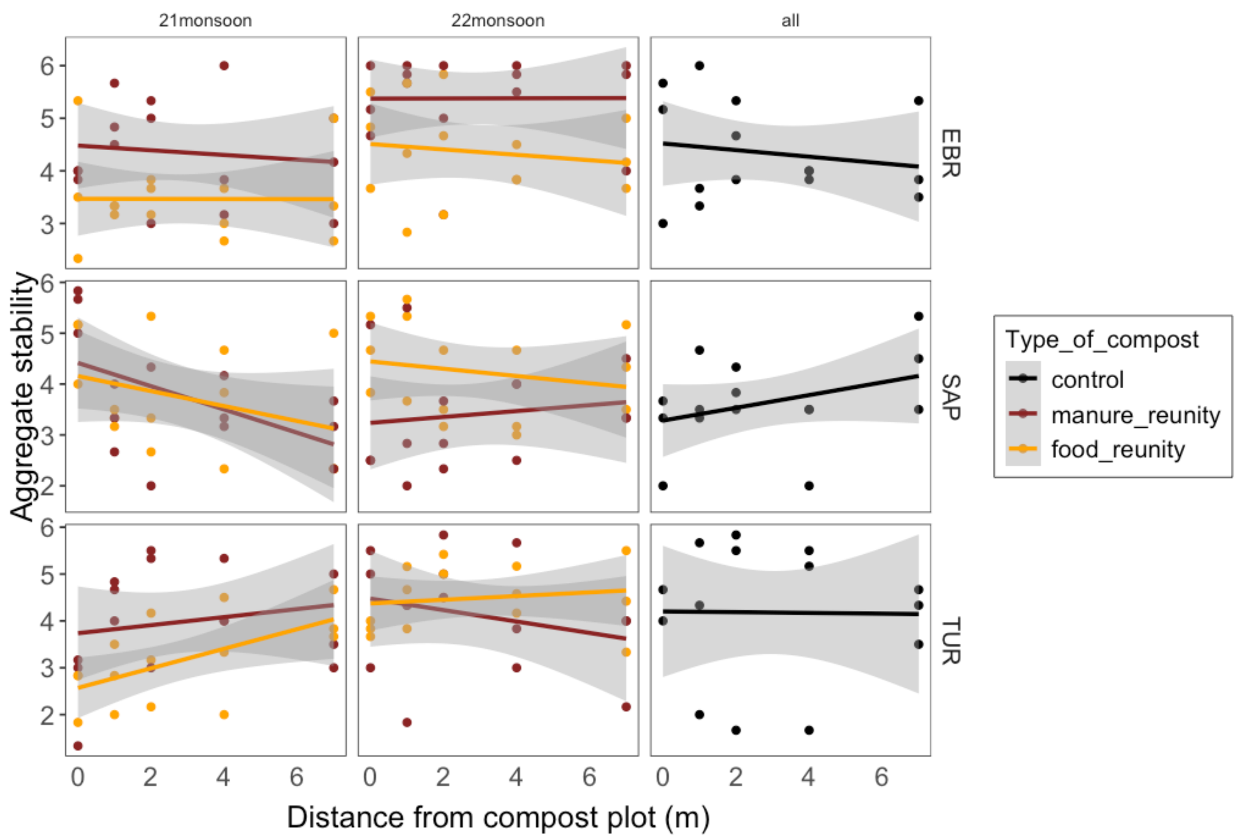

Figure 6. Aggregate stability (unitless) by type of compost (colors) deployed in different years (columns: deployed in 2021 = “21monsoon”; deployed in 2022 = “22monsoon”; all = control plots that were the same for both deployment years) at three sites in New Mexico (rows).

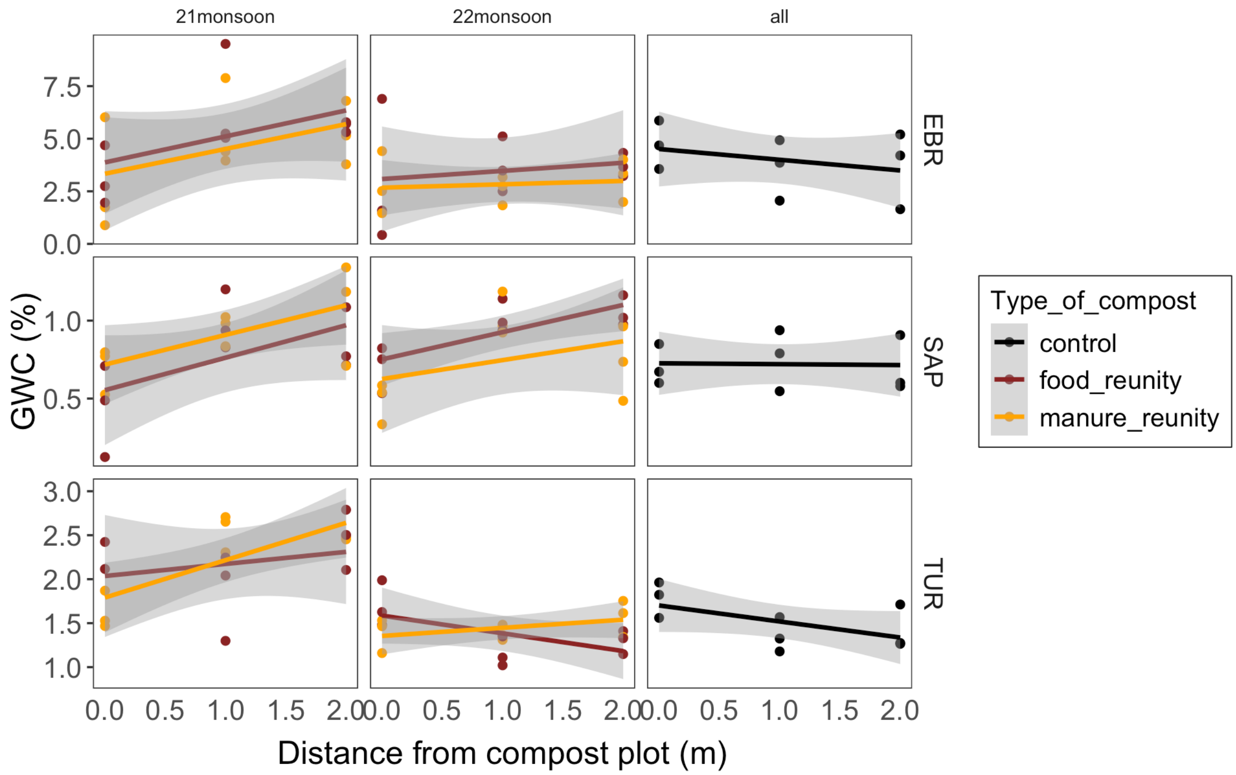

Figure 7. Soil Gravimetric Water Content (GWC %; 0-10cm depth) by type of compost (color) deployed in different years (columns: deployed in 2021 = "21monsoon"; deployed in 2022 = "22monsoon"; all = control plots that were the same for both deployment years) at three sites in New Mexico (rows).

Table 1. Abiotic and vegetation characteristics of the three ranches in New Mexico to be used to study microbial dispersal.

Site/Ranch	Location	Temperature: mean low, mean high °C	Mean annual precipitation (mm)	Elevation (m)	Dominant vegetation	Land use
EBR	Rio Arriba County	-3.3, 15.9	425	2295	Blue grama grassland with pinyon juniper or ponderosa forest	Cattle grazing
SAP	Sandoval County	5, 21.1	308	1600	Galleta/sand dropseed grassland	Cattle grazing
TUR	Socorro County	5.8, 23.3	278	1455	Black grama with creosote shrubs	Big game grazing

Table 2. Analysis of variance results for infiltration rate and aggregate stability by distance (inside = 0m up to 2 or 7m) from amendment plot by compost/year treatment combination (Five levels: control ("all"), and manure-based vs. food-based compost added in 2021 ("21monsoon") or 2022 ("22monsoon")).

		Infiltration rate (cm min^{-1}); 0-7m distant		Aggregate stability; 0-7m distant		GWC (%); 0-2m distant	
	df	F	P	F	P	F	P
Distance	1	1.04	0.315	0.46	0.500	9.75	**0.004**
Compost/Year treatment	4	2.30	*0.082*	1.95	0.126	0.73	0.580
Site	2	129.98	**<0.001**	2.03	0.148	39.72	**<0.001**
Distance x Compost/Year	4	2.91	**0.038**	0.38	0.820	2.20	*0.093*
Distance x Site	2	2.18	0.130	1.27	0.284	1.84	0.174
Compost/Year x Site	8	1.68	0.143	1.73	0.130	0.875	0.548
Distance x Compost/Year x Site	8	0.89	0.537	2.02	**0.049**	0.571	0.793
marginal R2		0.76		0.24		0.73	