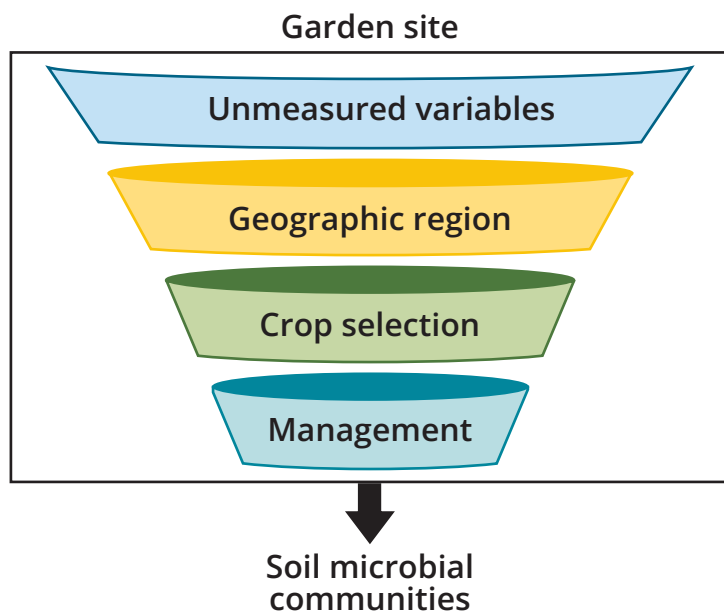


## Cultivating Garden Soil Microbes

### Our research

To understand how a garden's characteristics influence the soil microbial community, we sampled bacterial microbes from 40 Oregon gardens. Half of the gardens were located in Central Oregon, and the other half were located in the Willamette Valley. Within each region, half of the gardeners reported that they only used organic management practices. The other gardeners did not limit themselves to organic management. Within each garden, we took soil samples from three distinct beds, each with a different crop. This sampling design allowed us to assess the influence of region (Central Oregon or Willamette Valley), management practices (organic or non-organic), and crop type on garden soil microbes.

### What we found



Garden soils hosted remarkably diverse bacterial communities, with an average of 3,388 different bacterial taxa (groups) per 0.5 g soil sample!

Gardens had similar bacterial communities: 26 bacterial taxa were common in over 95% of soil samples.

We found that region and crop type significantly influenced the variation of soil bacterial communities across garden sites. Management practices and soil characteristics (e.g., organic matter, nitrate, potassium, calcium, and magnesium) only had a marginal effect on soil microbial communities. An individual garden site, which encompasses all three of these factors, was the strongest predictor of variation in bacterial communities. This suggests that factors we didn't measure, but were associated with an individual garden site, are also important in influencing microbial community composition.



Self-reported organic versus non-organic management practices did not affect microbial bacteria community composition. We have two hypotheses to explain this lack of difference. First, the application of organic composts to garden soils was popular across organic and non-organic gardeners in our study. Second, it is possible that self-reported management practices may not have aligned with USDA organic standards, which are aimed at commercial producers.

### How does this relate to your garden?

Our results provide circumstantial evidence that gardeners are driving soil bacteria community composition, primarily through the crops they grow. Site-specific factors, such as geographic region and unmeasured garden characteristics seem to play the greatest role in determining the soil bacterial community in a given area. Gardeners “fine tune” microbial communities through their gardening decisions, including crop choice and soil management practices. Other soil characteristics (e.g., organic matter, nitrate, potassium, etc.) may also impact bacterial microbes, but more research is needed to understand their potential effects.

It is encouraging that garden soil microbiomes were at least partially distinguished by geographic region, since urban soil microbiomes tend to be homogenized across the globe. Avoiding excessive additions of compost and fertilizers and using locally-sourced amendments when needed may be ways to preserve local diversity in soil microbiomes.

### Additional Information

- Mhuireach, G. A., Van Den Wymelenberg, K. G, & Langellotto, G. A. (2023). Garden soil bacteria transiently colonize gardeners’ skin after direct soil contact. *Urban Agriculture & Regional Food Systems*. 8 e20035: 1-22. <https://doi.org/10.1002/uar2.20035>
- Delgado-Baquerizo, M. et al. (2021). Global homogenization of the structure and function in the soil microbiome of urban greenspaces. *Science Advances*, 7(28), eabg5809. <https://doi.org/10.1126/sciadv.abg5809>
- See other soil briefs: [Gardeners Overapply Compost & Fertilizers & Common Garden Soil Microbes](#)
- For more on Gwynne’s Research, check out her website: [undesigme.com/research/gmp](https://undesigme.com/research/gmp)

### Master Gardener™ Advice

- Contact your local extension office for Master Gardener advice, or look for Master Gardeners at local farmers’ markets.
- For more 10-Minute University™ handouts, videos, and the class schedule, visit [cmastergardeners.org](https://cmastergardeners.org).

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