

Common Garden Soil Bacterial Microbes

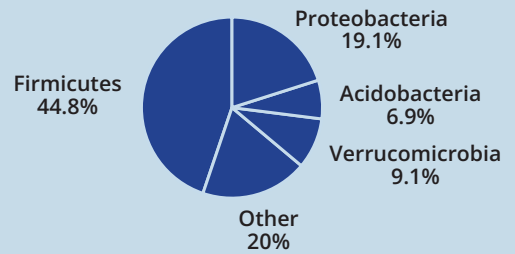
Our research

To improve our understanding of the abundance and diversity of bacterial microbes in garden soils, we collected soil samples from 40 gardens across Central Oregon and the Willamette Valley. We included gardens with different management practices and, within a garden, we sampled soil from beds with different crops. We found that the most abundant soil bacterial microbes tended to be remarkably consistent across garden sites, compared to less common and rare microbes, which varied across sites. Here, we explore the identities of the most common bacteria we found in Oregon garden soils.

What we found

Most abundant bacterial phyla

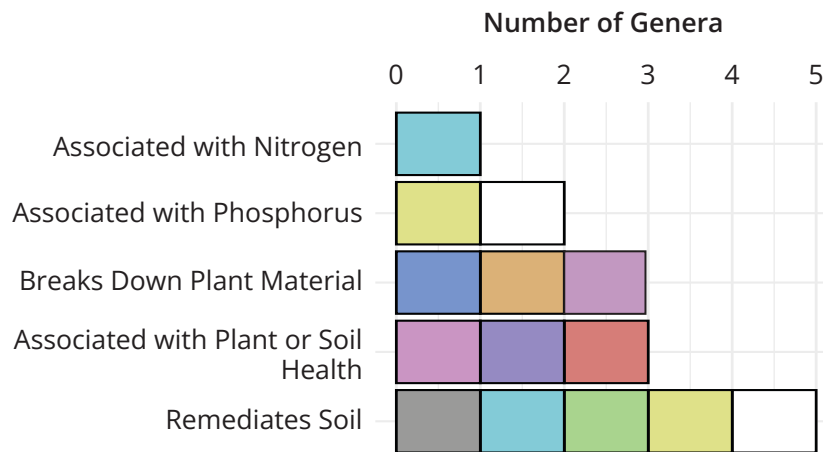
We observed an unusually high abundance of Firmicutes in garden soils. Bacteria in this group are the dominant microbes in chicken and cattle manure. They are also abundant in horse manure.



Bacterial Genus

- Arenimonas*
- Candidatus udaeobacter*
- Cthoniobacter*
- Ellin6055*
- Nocardioides*
- Pseudarthrobacter*
- Pseudomonas*
- RB41*
- Sphingomonas*
- Streptomyces*

Associations or Functions



Fifty percent of the most common bacterial microbes act to remediate soils, by breaking down metals, concentrated nutrients, pesticides, or other environmental toxins. This suggests that many gardeners were using pesticides in their gardens, or may have an excess of some soil nutrients.

One common bacteria, however, is a bioindicator of soil health, and is associated with carbon-rich soils with reduced disturbance (*Candidatus udaeobacter*). Two other bacteria were associated with plant health: *RB41* protect plants from pathogens and are associated with improved plant growth. *Streptomyces*, which can form a mycelia, produce antibiotics in the soil. *Streptomyces* are also known for producing geosmin, which is the molecule that gives soil its "earthy" scent.



How does this relate to your garden?

Very little is known about the ecology of many soil bacterial microbes, including the abundant taxa we found in garden soils. Many cannot be cultured and studied in a laboratory, they are only known from their genetic code. Nonetheless, it is notable that several of the common bacteria found in Oregon garden soils are associated carbon-rich or phosphorus-rich soils. Others are known for their ability to degrade environmental pollutants, including pesticides.

The predominance of Firmicutes is consistent with other research in our lab, which found that Oregon garden soils are characterized by an excessive addition of organic matter and soil nutrients. Organic matter and soil nutrients exert a strong influence on soil microbial communities. We did not measure pesticide applications or chemical markers in our study, but the abundance of bacteria capable of degrading environmental pollutants suggests that pesticides may have been in use.

Because so little is known about garden soil microbes, it is difficult for us to provide management practices for promoting particular bacterial microbes. We nonetheless suggest that gardeners look to practices that can help preserve local soil biodiversity, which may support soil microbes. These include avoiding excessive additions of compost, fertilizers, and pesticides in gardens and landscapes.

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>
- See our other brief on soil bacterial microbes: [Cultivating Garden Soil Bacterial Microbes](#)
- See our brief on soil additives: [Gardeners Overapply Compost & Fertilizers](#)
- For more on Gwynne's Research, check out her website: undesignme.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 <https://cmastergardeners.org>.

The Garden Ecology Lab Briefs are supported in part by a Gray & Norrene Thompson Community Projects Grant, 10-Minute University™, and the Clackamas County Master Gardener Association.



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