

## Impact of Interspecies Interactions on Structure and Function of Mixed Biofilms

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Biofilms are highly diverse, harboring multiple, interacting species. Such interspecies interactions lead to emergent properties unique to the community setting and are referred to as community intrinsic properties. We have studied biofilm interspecies interactions, and their structural and functional impacts, in a four species bacterial community composed of the soil isolates *Stenotrophomonas rhizophila*, *Xanthomonas retroflexus*, *Microbacterium oxydans* and *Paenibacillus amylolyticus*.

We show that spatial bacterial organization and the biofilm matrix differ in mono vs multispecies biofilms, depending strongly on interspecies interactions. Moreover, we observed swarming behavior by the community at specific growth conditions, whereas none of the species swarmed when cultured individually. Functional community intrinsic properties were also observed when examining enzymatic activity and metabolic capacities of the community, and its ability of protecting plants during drought. Furthermore, the four species biofilms were more protected against protozoan grazing than monospecies biofilms. In conclusion, community intrinsic properties related to structure, function and protection were identified in the four species model community, emphasizing their relevance for function and fitness of bacterial ecosystems.