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Composition, structure, and transformability of local *Pseudomonas stutzeri* populations from soil and marine sediment.

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Pseudomonas stutzeri is a genomically and metabolically highly diverse species with a wide environmental distribution. It is further characterized by ecologically important features as denitrification, the ability to degrade a variety of xenobiotics, and natural transformability. Despite extensive knowledge on the species diversity and on single strains, so far a detailled analysis of local environmental populations of this organism has not been performed. Recently we developed a method for the specific isolation of *P. stutzeri* cells from environmental samples. We isolated four local populations (each n > 100 strains) from one marine sediment and two soils and characterized them by high and low resolutive methods (RAPD-PCR, PCR-RFLP, and 16S sequence). The populations were made up by unique compositions of strains with different degrees of divergence. We analyzed the recent evolutionary history of subpopulations of closely related strains (identical 16S sequence) using neutrality tests. All populations contained transformable and non-transformable strains. Within each population transformability varied by at least four orders of magnitude. Within one population we observed different degrees of sexual isolation in heterologous transformation with a chromosomal marker.
The results showed local *P. stutzeri* populations to be highly diverse with unique structure and composition. Furthermore the data suggest that transformability is widespread among environmental *P. stutzeri* strains and that horizontal gene transfer by transformation occurs preferentially between members of the same cluster of a local population. The coexistance of strains, the diversity structure of the populations and the transformability of the local populations are discussed with respect to taxonomic, ecologic and evolutionary aspects.