Phaeobacter inhibens from the Roseobacter clade has an environmental niche as a surface colonizer in harbors

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Phaeobacter inhibens belongs to the marine Roseobacter clade and is important as a carbon and sulfur metabolizer, a biofilm former and producer of the antibiotic tropodithietic acid (TDA). The majority of cultured strains have been isolated from marine aquaculture sites, however, their niche in the environment is to date unknown. Here, we report on the repeated isolation of Phaeobacter inhibens strains from a marine environment (harbors) not related to aquaculture. Based on phenotype and 16S rRNA gene sequence similarity, a total of 64 P. inhibens strains were identified from 35 samples (eukaryotic organisms or biofilms on inert surfaces) in Jyllinge Harbor during late summer and autumn, but not during winter and spring in 2009, 2011, and 2012. P. inhibens strains were also isolated from biofilms at three other Danish harbors (in 2012), but not from the surrounding seawater. Ten of the 14 samples from which P. inhibens was cultured contained bryozoans. DNA was extracted (in 2012) from 55 out of 74 Jyllinge Harbor samples, and 35 were positive for Phaeobacter using a genus-specific PCR. P. inhibens strains were isolated from nine of these samples. DNA and RNA were isolated from 13 random samples and used for amplification of 16S rRNA. P. inhibens was detected in five of these samples, all of which were biofilm samples, by pyrotag-sequencing at a prevalence of 0.02–0.68% of the prokaryotic community. The results indicated that P. inhibens had a niche in biofilms of fouled surfaces in harbor areas and that the population followed a seasonal fluctuation.

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