

The genome of the fungal-interactive soil bacterium *Burkholderia terrae* BS001-a plethora of outstanding interactive capabilities unveiled.

Haq IU, Graupner K, Nazir R, van Elsas JD (2014) The genome of the fungal-interactive soil bacterium *Burkholderia terrae* BS001-a plethora of outstanding interactive capabilities unveiled. *Genome Biol Evol* 6(7), 1652-1668. [PubMed](#)

ILRS Authors

[Katharina Dornblut](#)

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Abstract

Burkholderia terrae strain BS001, obtained as an inhabitant of the mycosphere of *Laccaria proxima* (a close relative of *Lyophyllum* sp. strain Karsten), actively interacts with *Lyophyllum* sp. strain Karsten. We here summarize the remarkable ecological behavior of *B. terrae* BS001 in the mycosphere and add key data to this. Moreover, we extensively analyze the approximately 11.5-Mb five-replicon genome of *B. terrae* BS001 and highlight its remarkable features. Seventy-nine regions of genomic plasticity (RGP), that is, 16.48% of the total genome size, were found. One 70.42-kb RGP, RGP76, revealed a typical conjugal element structure, including a full type 4 secretion system. Comparative analyses across 24 related *Burkholderia* genomes revealed that 95.66% of the total BS001 genome belongs to the variable part, whereas the remaining 4.34% constitutes the core genome. Genes for biofilm formation and several secretion systems, under which a type 3 secretion system (T3SS), were found, which is consistent with the hypothesis that T3SSs play a role in the interaction with *Lyophyllum* sp. strain Karsten. The high number of predicted metabolic pathways and membrane transporters suggested that strain BS001 can take up and utilize a range of sugars, amino acids and organic acids. In particular, a unique glycerol uptake system was found. The BS001 genome further contains genetic systems for the degradation of complex organic compounds. Moreover, gene clusters encoding nonribosomal peptide synthetases (NRPS) and hybrid polyketide synthases/NRPS were found, highlighting the potential role of secondary metabolites in the ecology of strain BS001. The patchwork of genetic features observed in the genome is consistent with the notion that 1) horizontal gene transfer is a main driver of *B. terrae* BS001 adaptation and 2) the organism is very flexible in its ecological behavior in soil.

Identifier

doi: 10.1093/gbe/evu126 PMID: 24923325

