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Draft Genome Sequence of Frankia Strain G2, a Nitrogen-Fixing Actinobacterium Isolated from *Casuarina equisetifolia* and Able To Nodulate Actinorhizal Plants of the Order Rhamnales

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Draft Genome Sequence of *Frankia* Strain G2, a Nitrogen-Fixing Actinobacterium Isolated from *Casuarina equisetifolia* and Able To Nodulate Actinorrhizal Plants of the Order *Rhamnales*

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***Frankia* sp. strain G2 was originally isolated from *Casuarina equisetifolia* and is characterized by its ability to nodulate actinorrhizal plants of the *Rhamnales* order, but not its original host. It represents one of the largest *Frankia* genomes so far sequenced (9.5 Mbp).**

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The genus *Frankia* contains actinobacteria known for their ability to fix nitrogen and to infect the roots of eight actinorrhizal plant families (1–3). Phylogenetic studies of *Frankia* strains based on 16S rRNA (4), *gyr B* (5), *gln II* (5, 6) genes and 16S-23S rRNA Intergenic Spacer Region (7) indicate four groups. Group 1 forms nodules on *Betulaceae*, *Myricaceae*, and *Casuarinaceae*. Group 2 contains microsymbionts of *Coriariaceae*, *Datisceae*, *Dryadoideae* (*Rosaceae*), and *Ceanothus* (*Rhamnaceae*). Group 3 includes strains associated with *Morella* (*Myricaceae*), *Colletieae* (*Rhamnaceae*), *Elaeagnaceae*, and *Gymnostoma* (*Casuarinaceae*). Group 4 includes atypical, non-infective (Nod-) and/or ineffective (Fix-) *Frankia* strains. Our knowledge about the biology of this genus has been well improved due to the information provided by sequenced *Frankia* genomes (8–21). Group 3 has a broad host range, considerable genetic diversity between the strains (5, 7), high potential for a saprophytic lifestyle (7–22), and a variable genome size ranging from 7.5 to 10.45 Mbp. Strain G2 (=DSM45899=CECT9038) was selected for genome sequencing within the Genomic Encyclopaedia of Type Strains, Phase II: From Individual Species to Whole Genera (23), the second production phase of the Genomic Encyclopedia of *Bacteria* and *Archaea*: Sequencing a Myriad of Type Strains Initiative (24). The candidate type strain G2 for a novel *Frankia* species, selected to enrich the diversity of group 3, was isolated from *Casuarina equisetifolia* nodules collected in the INRA Research Station, Saint-François, Grande Terre, Guadeloupe (25). It has the potential to produce natural products such as the red-pigmented antibiotics (benzo[a]naphthacenequinones) (26). It is infective on members of the actinorrhizal *Rhamnales*, but not on its original host plant *C. equisetifolia* (25). The draft genome of strain G2 was sequenced using Illumina technology (27) with a 300 bp insert standard shotgun library on an Illumina HiSeq-2500 1-TB platform, which generated 6,201,478 reads totaling 936.4 Mbp, at the Joint Genome Institute (JGI) (28). The assembly was realized using

Velvet (version 1.2.07) (29) and Allpaths-LG (version r46652) (30). Annotation was performed using the JGI annotation pipeline (31) and the data are available from the IMG data management system (32). The final draft assembly contained 90 contigs in 83 scaffolds, totaling 9,537,992 bp in size based on 856.6 Mbp of data with 171.3 × input read coverage. The genome draft encodes 7,790 protein genes, 47 tRNAs, and 2 rRNA regions, with an overall G+C content of 70.9%. Genome annotation was performed as described by Tisa et al. (21). As expected, since *Frankia* is a nitrogen fixing actinobacterium, six nitrogenase genes, *nifH*, *nifE*, *nifD*, *nifK*, *nifW*, and *nifN*, have been detected.

Project information is available in the Genomes Online Database (33) and DNA from the DNA Bank Network (34).

Nucleotide sequence accession number. This whole-genome shotgun project has been deposited in DDBJ/EMBL/GenBank under the accession no. [FAOZ00000000](https://www.ncbi.nlm.nih.gov/nuclink/FAOZ00000000). The version described in this paper is the first version.

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