

Draft Genome Sequence of *Aneurinibacillus migulanus* NCTC 7096

Faizah N. Alenezi,^a Hedda J. Weitz,^a  Lassaad Belbahri,^{b,c} Jedidi Nidhal,^c Lenka Luptakova,^b Marcel Jaspars,^d Stephen Woodward^a

University of Aberdeen, Institute of Biological and Environmental Sciences, Aberdeen, United Kingdom^a; Laboratory of Soil Biology, Department of Biology, University of Neuchâtel, Neuchâtel, Switzerland^b; NextBiotech, Agareb, Tunisia^c; School of Natural and Computing Sciences, University of Aberdeen, Aberdeen, United Kingdom^d

***Aneurinibacillus migulanus* has biocontrol activities against fungal, fungus-like, and bacterial plant pathogens with different levels of efficacy depending on the target pathogens. Here, we report the high-quality draft genome sequence of *A. migulanus* NCTC 7096.**

Received 19 February 2015 Accepted 23 February 2015 Published 2 April 2015

Citation Alenezi FN, Weitz HJ, Belbahri L, Nidhal J, Luptakova L, Jaspars M, Woodward S. 2015. Draft genome sequence of *Aneurinibacillus migulanus* NCTC 7096. *Genome Announc* 3(2):e00234-15. doi:10.1128/genomeA.00234-15.

Copyright © 2015 Alenezi et al. This is an open-access article distributed under the terms of the [Creative Commons Attribution 3.0 Unported license](https://creativecommons.org/licenses/by/3.0/).

Address correspondence to Lassaad Belbahri, lassaad.belbahri@unine.ch.

Aneurinibacillus migulanus is a Gram-positive, rod-shaped, motile, spore-forming bacterium present in soil environments. An important feature is the production of the secondary metabolite gramicidin S, which inhibits the growth of many microorganisms (1, 2). Because of the ability of *A. migulanus* to produce antimicrobial compounds, the organism is considered to be a potential biocontrol agent against plant pathogens (1). Many *Bacillus* species have been tested as biological control agents against plant pathogens as they are less damaging to the environment than chemical alternatives (3–5). Moreover, *Bacillus* species produce endospores in extreme environmental conditions, an advantage in the long-term storage of *Bacillus*-based preparations (6). Biological control agents are antagonistic to plant pathogens through various possible mechanisms, including antibiosis, competition for nutrients on infection sites on the plant surface, hyperparasitism, and by induction of host resistance (2, 3). *A. migulanus* strain NCTC 7096 produces gramicidin S (1).

The genome of *A. migulanus* NCTC 7096 was sequenced using the BG7 bacterial genome annotation system specifically designed for NGS data (Era7 Bioinformatics, Granada, Spain [7]). Approximately 14.61 million reads were obtained for assembly after low-quality reads were filtered out. The whole genome was *de novo* assembled into 89 contigs (N_{50} , 157,850 bp) and rearranged into 200 scaffolds.

The draft genome of *A. migulanus* strain NCTC 7096 comprised 6,270,550 bases with the largest contig of 582,874 bp and 43.16% G+C content. The genome of NCTC 7096 contains sequences encoding 5,130 proteins, of which 1,199 belong to uncharacterized proteins.

Nucleotide sequence accession number. The draft genome sequence of *A. migulanus* NCTC 7096 has been deposited at

GenBank under accession no. [JYBO00000000](https://www.ncbi.nlm.nih.gov/nuccore/JYBO00000000). This paper describes the first version of the genome.

ACKNOWLEDGMENTS

This project was funded by the Government of Kuwait (to F.N.A.) and the European Union's Seventh Framework Programme under grant agreement 245268 (ISEFOR; to L.B. and S.W.). Further support came from the SwissBOL project, financed by the Swiss Federal Office for the Environment (grant holder L.B.) and the Sciex–Scientific Exchange Programme NMS.CH (to L.L. and L.B.).

REFERENCES

- Berditsch M, Afonin S, Ulrich AS. 2007. The ability of *Aneurinibacillus migulanus* (*Bacillus brevis*) to produce the antibiotic gramicidin S is correlated with phenotype variation. *Appl Environ Microbiol* 73:6620–6628. <http://dx.doi.org/10.1128/AEM.00881-07>.
- Kim WG, Weon HY, Seok SJ, Lee KH. 2008. *In vitro* antagonistic characteristics of bacilli isolates against *Trichoderma* spp. and three species of mushrooms. *Mycobiology* 36:266–269. <http://dx.doi.org/10.4489/MYCO.2008.36.4.266>.
- Chandel S, Allan EJ, Woodward S. 2010. Biological control of *Fusarium oxysporum* f.sp. *lycopersici* on tomato by *Brevibacillus brevis*. *J Phytopathol* 158:470–478. <http://dx.doi.org/10.1111/j.1439-0434.2009.01635.x>.
- Roberts DP, Lohrke SM. 2003. United States Department of Agriculture–Agricultural Research Service research programs in biological control of plant diseases. *Pest Manag Sci* 59:654–664. <http://dx.doi.org/10.1002/ps.613>.
- Yáñez-Mendizábal V, Usall J, Viñas I, Casals C, Marín S, Solsona C, Teixidó N. 2011. Potential of a new strain of *Bacillus subtilis* CPA-8 to control the major postharvest diseases of fruit. *Biocontrol Sci Technol* 21:409–426. <http://dx.doi.org/10.1080/09583157.2010.541554>.
- Piret JM, Demain AL. 1982. Germination initiation and outgrowth of spores of *Bacillus brevis* strain Nagano and its gramicidin S-negative mutant. *Arch Microbiol* 133:38–43. <http://dx.doi.org/10.1007/BF00943767>.
- Pareja-Tobes P, Manrique M, Pareja-Tobes E, Pareja E, Tobes R. 2012. BG7: a new approach for bacterial genome annotation designed for next generation sequencing data. *PLoS One* 7:e49239. <http://dx.doi.org/10.1371/journal.pone.0049239>.