Article title : The microbiome of the leaf surface of Arabidopsis protects against a fungal pathogen

Authors : Unyarat Ritpitakphong, Laurent Falquet, Artit Vimoltust, Antoine Berger, Jean-Pierre Métraux, Floriane L'Haridon

Supporting Information :

Fig. S1 The growth of *B. cinerea* on leaves of *A. thaliana* Col-0, *bdg* and *lacs2.3* in sterile and non-sterile conditions determined by trypan blue staining. Representative pictures were taken 3 days after infection of Col-0, *bdg* and *lacs2.3* in sterile and non-sterile conditions.

Fig. S2 Rarefaction curves. This figure shows that 41out of 48 samples reached the saturation with at least 30'000 contigs. Thus, at least 90% of the bacterial diversity was sampled.

Fig. S3 Top 20 most abundant genera in *bdg* and the relative abundance in *A. thaliana* Col-0 plants, *lacs2-3* and soil samples compared to *bdg*.
Asterisks denote significant differences compared to *bdg* (n=15; error bars indicate variance within each respective group).

Fig. S4 Effect of surface washes of leaves from sterile *A. thaliana* Col-0 plants and cuticle mutants on the resistance of non-sterile Col-0 plants to *B. cinerea*.
The leaf surface from sterile Col-0, *bdg* and *lacs2.3* were washed, mixed to *B. cinerea* and inoculated on WT Col-0 plants (n=48; ± SE). The average lesion size was determined 3 days after inoculation with *B. cinerea*. Different letters above each bar represent statistically significant differences (Tukey's test; P<0,05). The experiment was repeated twice with similar results.

Fig. S5 The activity of phyllosphere microbes from *A. thaliana* Col-0, *bdg* and *lacs2.3* on the spore germination of *B. cinerea in vitro.*
One representative picture of phyllosphere microbes from Col-0, *bdg* or *lacs2.3* incubated with spores from *B. cinerea* is shown.

Fig. S6 Genome of strain 3 and strain 1 (a) Comparison of the genome of strain 3 with *P. mandelii* (JR-1) and *P. sp.* UMRO177WK12:I12 (AZVV01). (b) MAUVE comparison of the strain 3 vs AZVV01 the closest publicly available sequence (ANI=99.56%). The contigs of AZVV01 were ordered according to strain 3. The colors represent LCB (Locally collinear blocks) or segments apparently free of rearrangements (Darling *et al.*, 2010). (c) MAUVE comparison of the strain 1 vs *P. sp.* UMRO177WK12:I11 (AZVN01) the closest publicly available sequence (ANI=99.59%). The contigs of AZVN01 were ordered according to strain 1. The colors represent LCB (Locally collinear blocks) or segments apparently free of rearrangements (Darling *et al.*, 2010).

Fig. S7 Dose-dependent effect of strain 3 (*P. sp. friburgensis*) on the resistance of *A. thaliana* Col-0 plants to *B. cinerea*. Strain 3 was diluted in PDB ¼ at different concentrations (in CFU μl^{-1}) then mixed to *B. cinerea* and inoculated on WT Col-0 plants (n=48; ± SE). The average lesion size was determined 3 days after inoculation with *B. cinerea*. The concentrations are indicated below each histogram. Different letters above each bar represent statistically significant differences (Tukey's test; P<0,05). The experiment was repeated twice with similar results.

Fig. S8 Effect of strain 3 (*P. sp. friburgensis*) on the resistance of sterile *A. thaliana* Col-0 plants and cuticle mutants to *B. cinerea*.
Strain 3 was diluted in PDB ¼ at different concentrations (in CFU μl^{-1}) then mixed with *B. cinerea* and inoculated on sterile Col-0, *bdg* and *lacs2.3* plants (n=54; ± SE). The average lesion size was determined 3 days after inoculation with *B. cinerea*. The concentrations used are indicated below each histogram. Different letters above each bar represent statistically significant differences (Tukey's test; P<0,05). The experiment was repeated twice with similar results.

Fig. S9 Effect of boiled strain 3 (*P. sp. friburgensis*) on the resistance of *A. thaliana* Col-0 plants to *B. cinerea*.
Strain 3 was diluted in PDB ¼ at different concentrations (in CFU μl^{-1}) then boiled 25 min at 100°C and finally mixed with *B. cinerea* spores and inoculated on WT Col-0 plants. The results were compared with the non-boiled strain 3 (n=48; ± SE). The average lesion size was determined 3 days after inoculation with *B. cinerea*. The concentrations are indicated below each histogram. Different letters above each bar represent statistically significant differences (Tukey's test; P<0,05). The experiment was repeated twice with similar results.

Fig. S10 Effect of strain 3 (*P. sp. friburgensis*) on the resistance of *A. thaliana* Col-0 plants and SA-, JA- and ET- signalling mutants to *B. cinerea*.
Strain 3 was diluted in PDB ¼ at different concentrations (in CFU μl^{-1}) then mixed to *B. cinerea* and inoculated on Col-0 plants, SA mutant (*sid2*), JA mutants (*jar1*, *dde2.2*) and ET mutants (*ein2, etr1*) (n=48; ± SE). The average lesion size was determined 3 days after inoculation with *B. cinerea*. The concentrations used are indicated below each histogram. Col-0 and each mutant treated with strain 3 were compared with their corresponding control (Ctrl) inoculated with *B. cinerea.* Asterisks above each bar represent statistically significant differences (Tukey's test; P<0,05). The experiment was carried out two times with similar results.

Fig. S11 Effect of strain 3 (*P. sp. friburgensis*) on the resistance of *A. thaliana* Col-0 plants and PAMP receptor mutants to *B. cinerea*.
Strain 3 was diluted in PDB ¼ at different concentrations (in CFU μl^{-1}) then mixed to *B. cinerea* and inoculated on Col-0 plants, *efr* and *fls2* mutants (n=48; ± SE). The average lesion size was determined 3 days after inoculation with *B. cinerea*. The concentrations used are indicated below each histogram. Col-0 and each mutant treated with strain 3 were compared with its own control (Ctrl) inoculated with *B. cinerea* and asterisks above each bar represent statistically significant differences (Tukey's test; P<0,05). The experiment was carried out two times with similar results.

Fig. S12 Average of colony forming units (CFU) cm^{-2} extracted from the phyllosphere of *A. thaliana* Col-0 plants and cuticle mutants.
Extracts of washed leaf surfaces from Col-0, *bdg* and *lacs2.3* were spread on LB agar plate during 24h at 28°C. The colonies were counted and the average was determined on 10 independent experiments (n=10; ± SD). Different letters above each bar represent statistically significant differences (Tukey's test; P<0,05).

Fig. S13 Effect of strain 3 (*P. sp. friburgensis*) on the resistance of apple fruit to *B. cinerea*. The disinfected apple fruits were wounded and inoculated with strain 3 diluted in PDB ¼ at 95 CFU μl^{-1} mixed to *B. cinerea* and compared to apple fruits inoculated with *B. cinerea* at 5 x 10^4 sp ml^{-1} in PDB ¼ (n=48; ± SE). The average lesion size was determined 3 days after inoculation with *B. cinerea*. The asterisk represents a statistically significant difference (*t*-test; P<0,05). The experiment was carried out two times with similar results.

Fig. S1 The growth of *B. cinerea* on leaves of *A. thaliana* Col-0, *bdg* and *lacs2.3* in sterile and non-sterile conditions determined by trypan blue staining

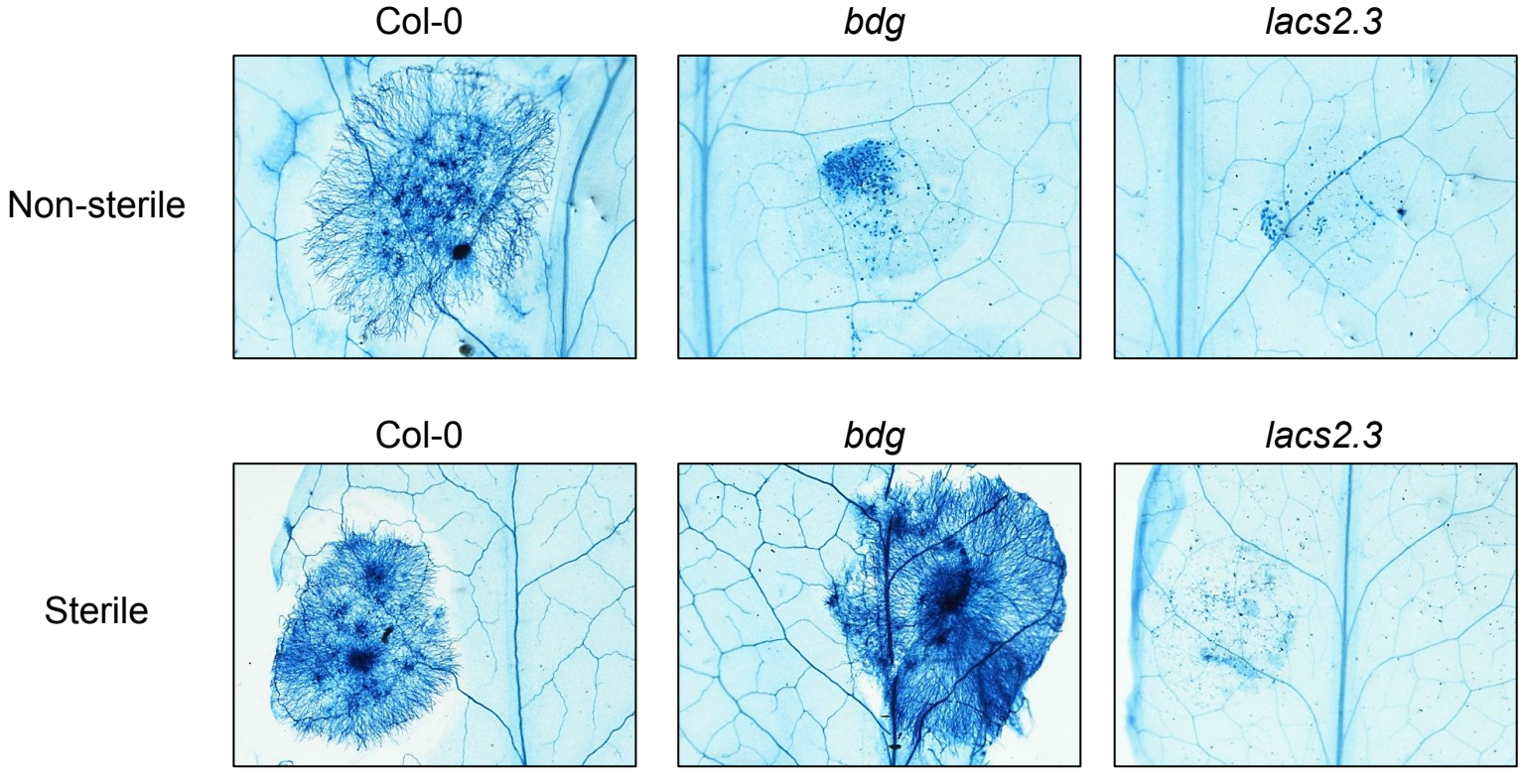
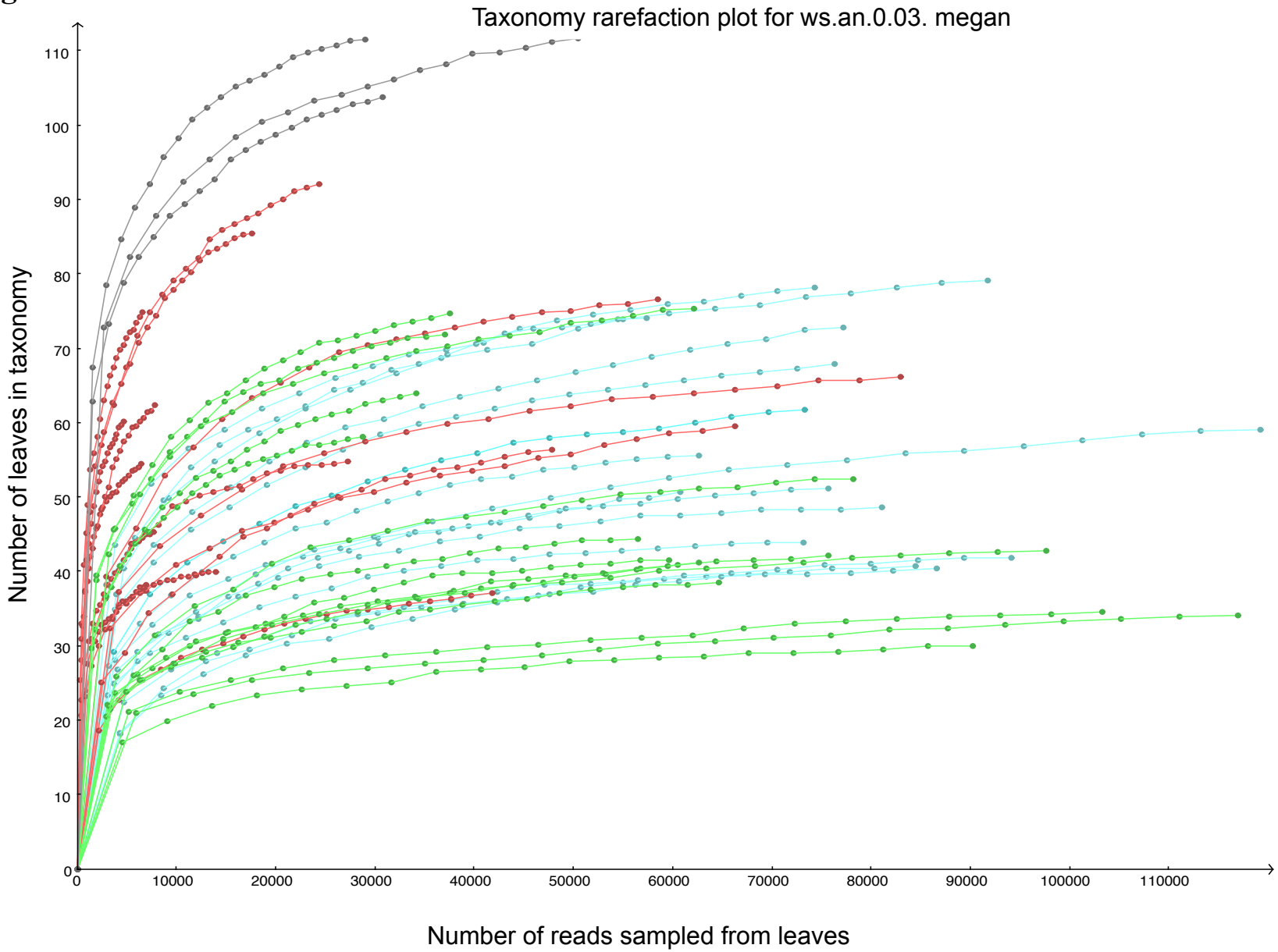


Fig. S2 Rarefaction curves



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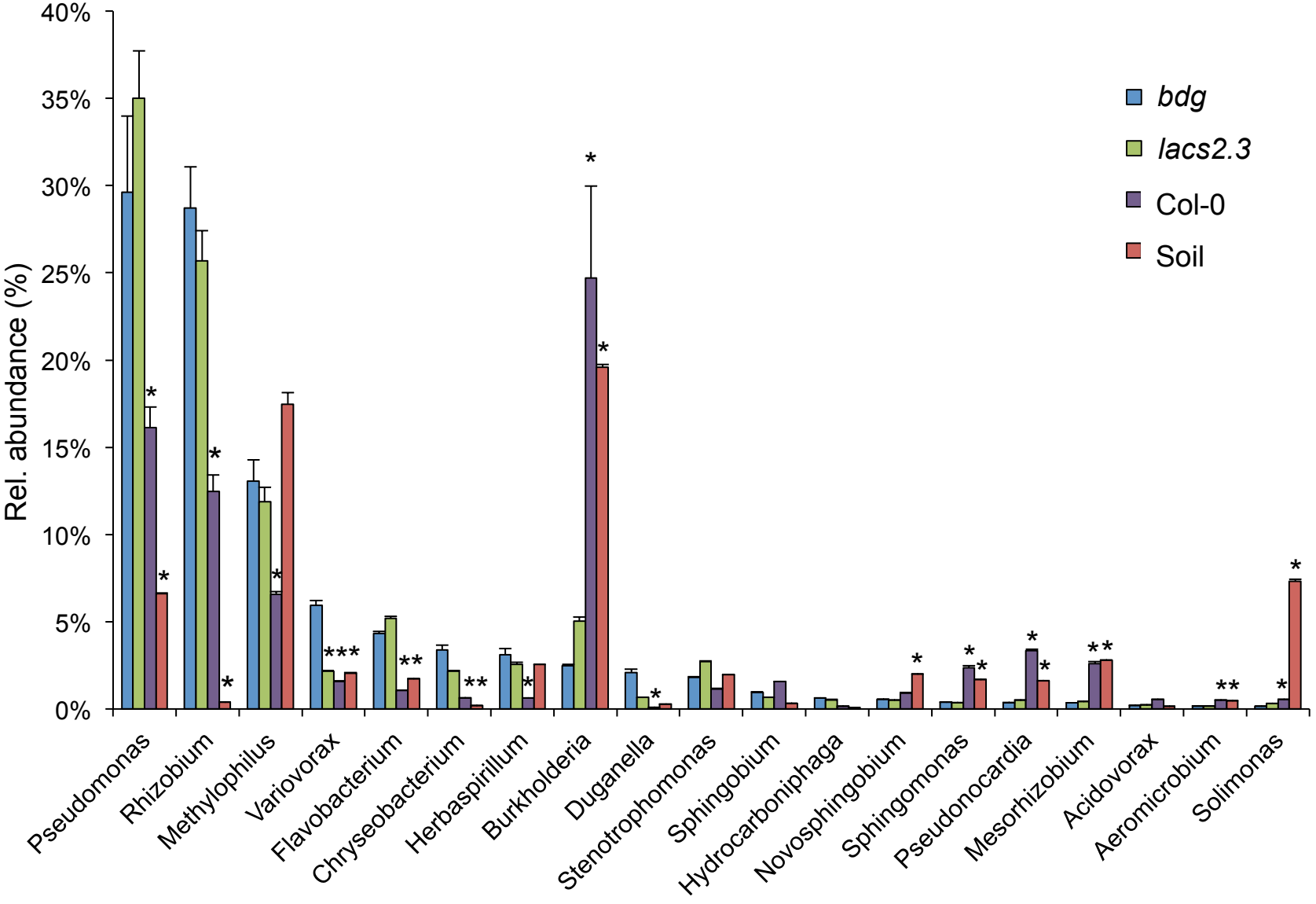


Fig. S4 Effect of surface washes of leaves from sterile *A. thaliana* Col-0 plants and cuticle mutants on the resistance of non-sterile Col-0 plants to *B. cinerea*

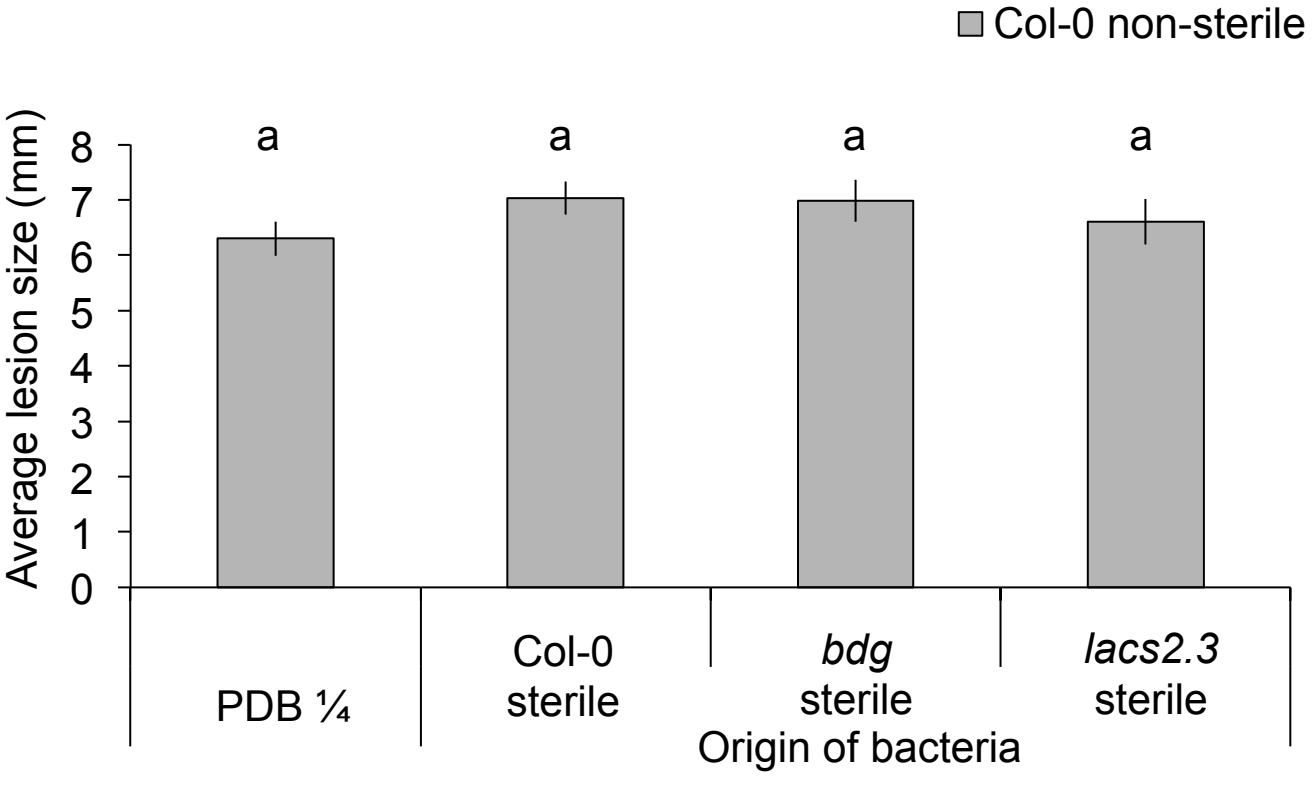


Fig. S5 The activity of phyllosphere microbes from *A. thaliana* Col-0, *bdg* and *lacs2.3* on the spore germination of *B. cinerea in vitro*

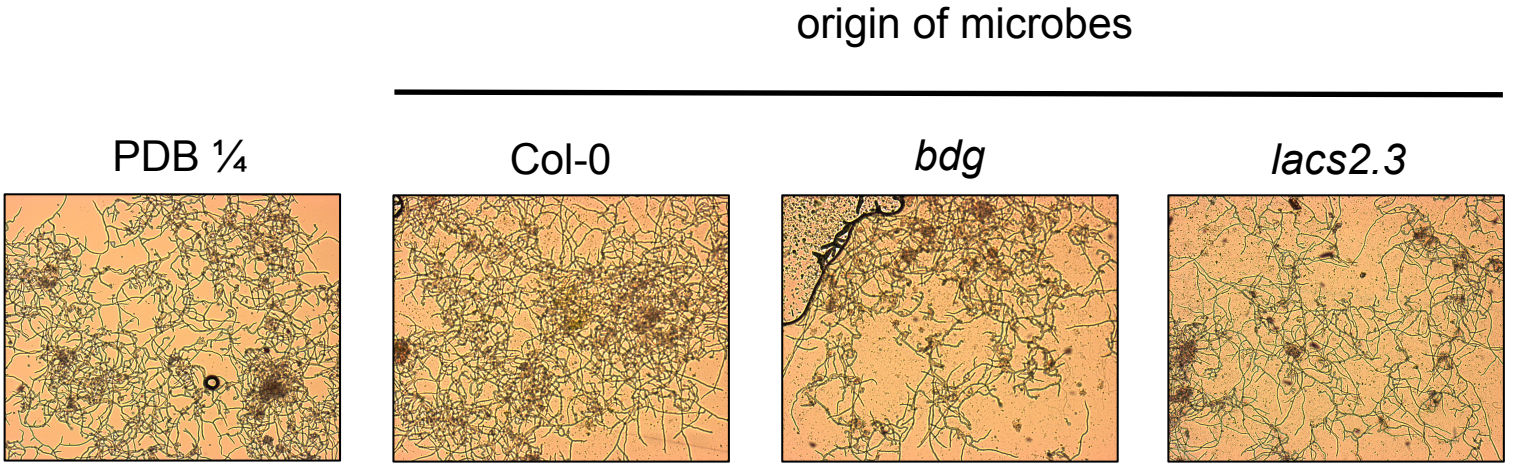
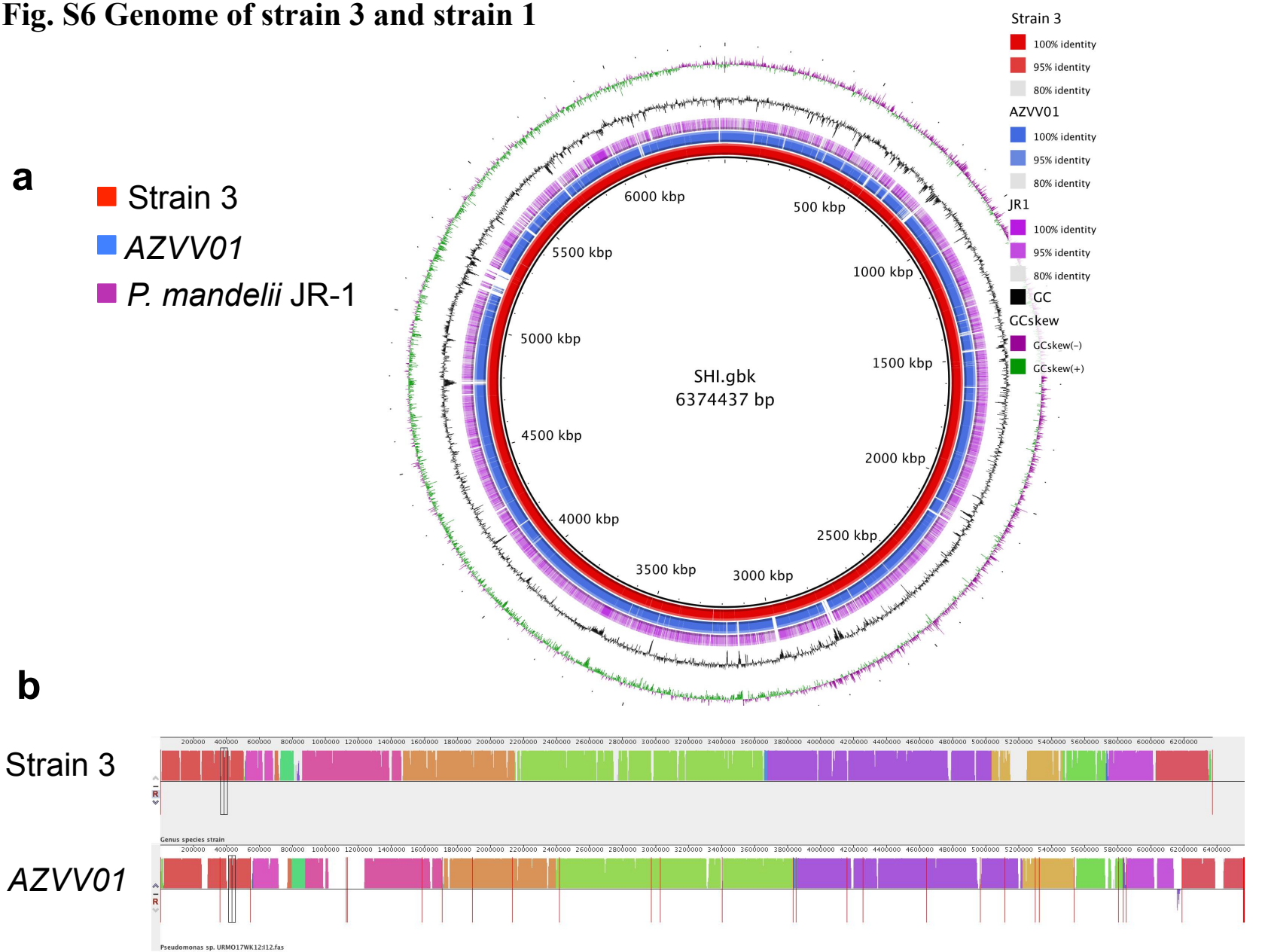


Fig. S6 Genome of strain 3 and strain 1



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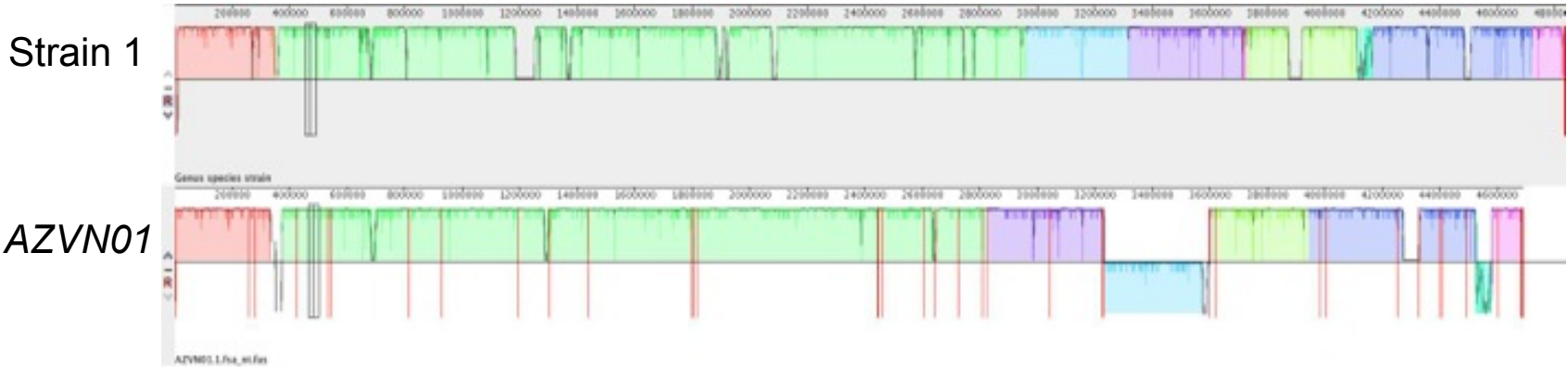

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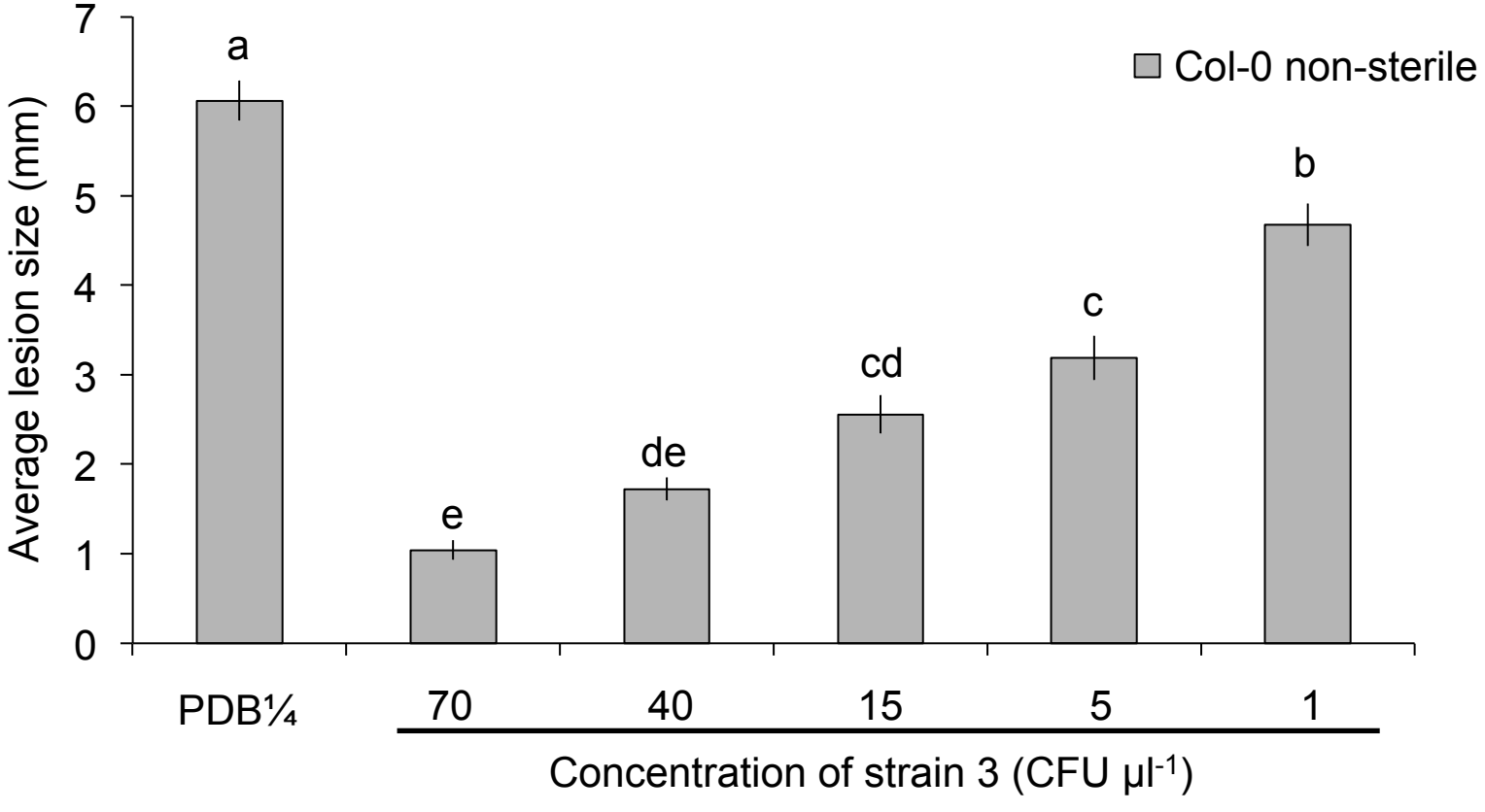
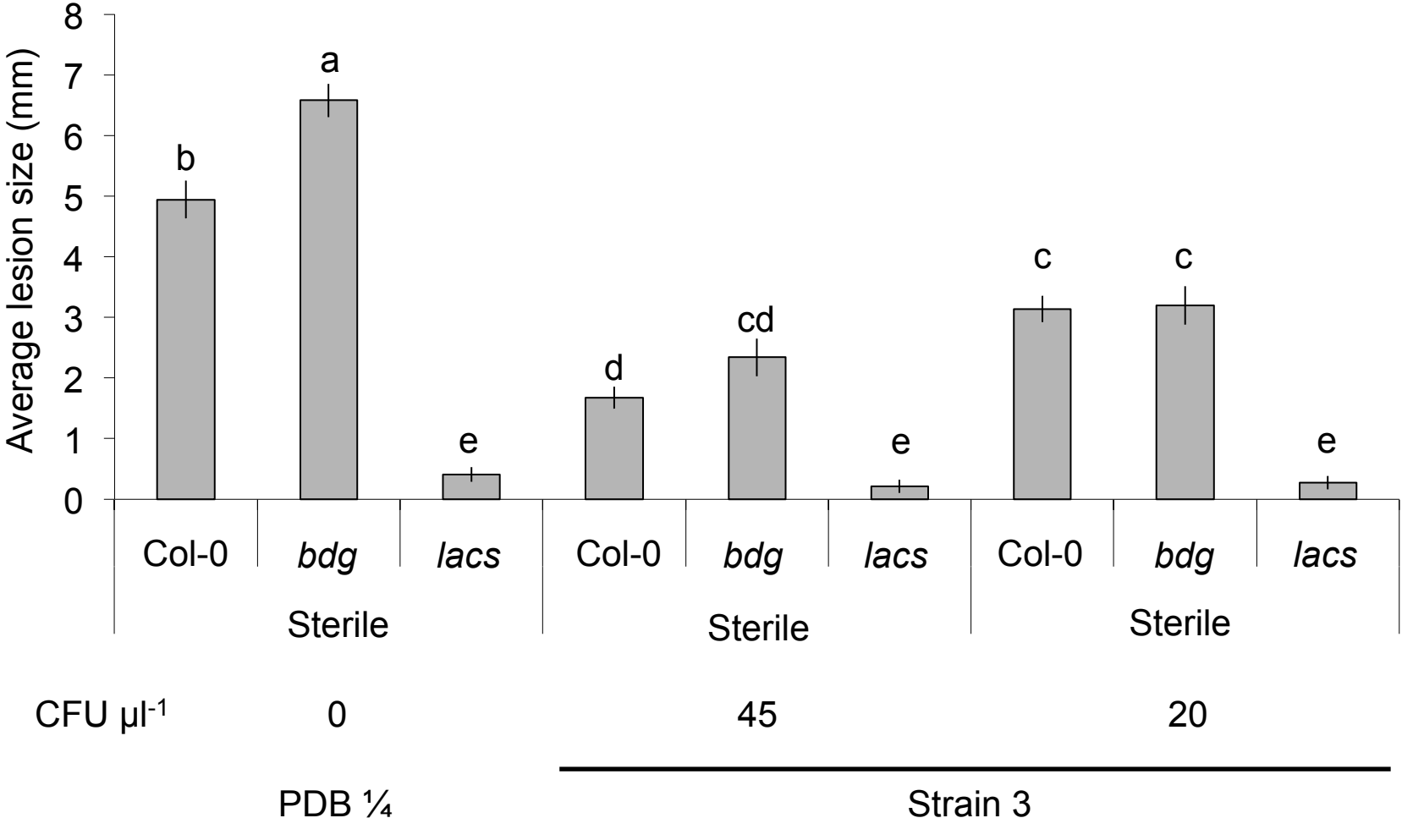


Fig. S8 Effect of strain 3 (*P. sp. friburgensis*) on the resistance of sterile *A. thaliana* Col-0 plants and cuticle mutants to *B. cinerea*



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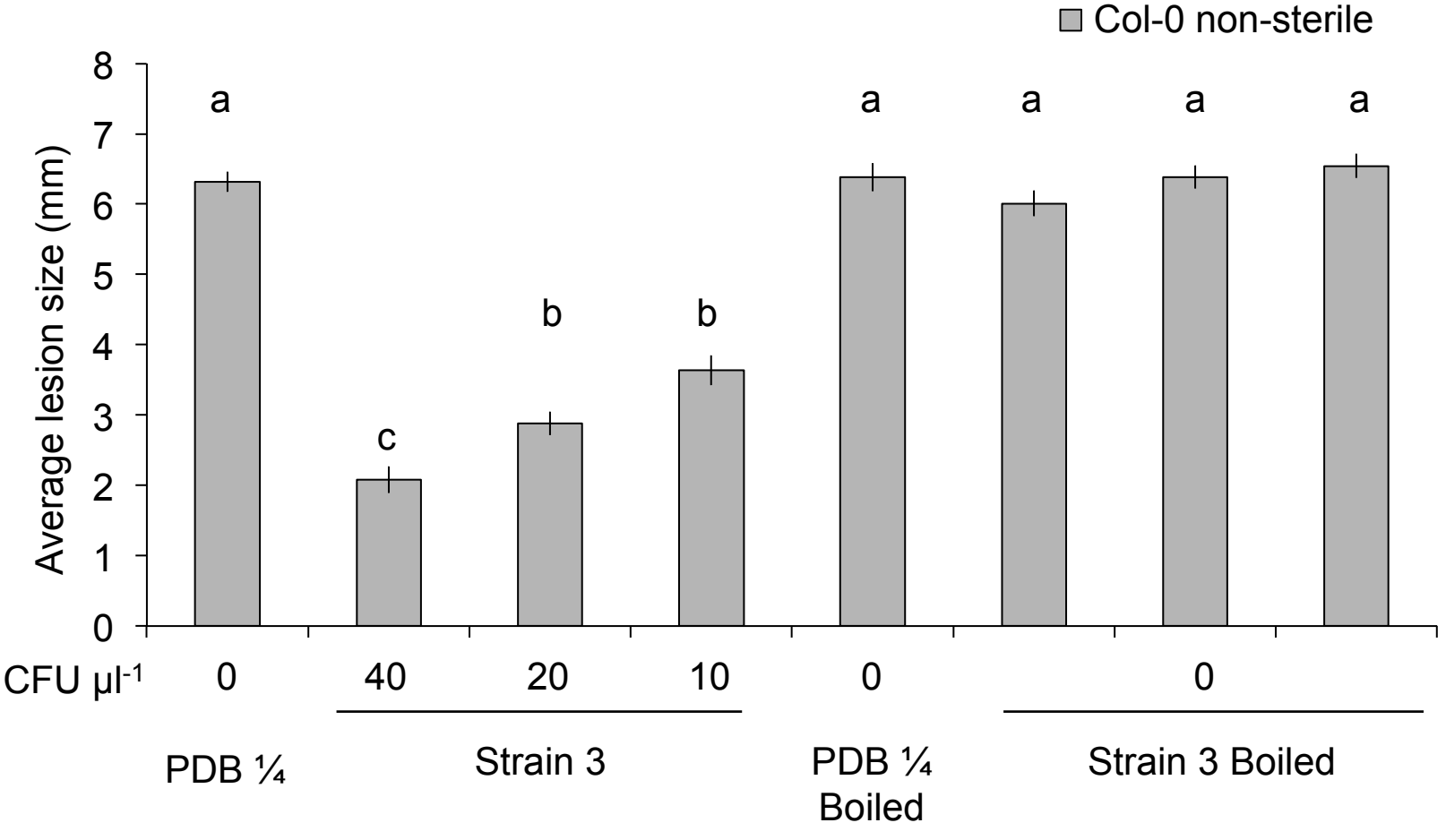

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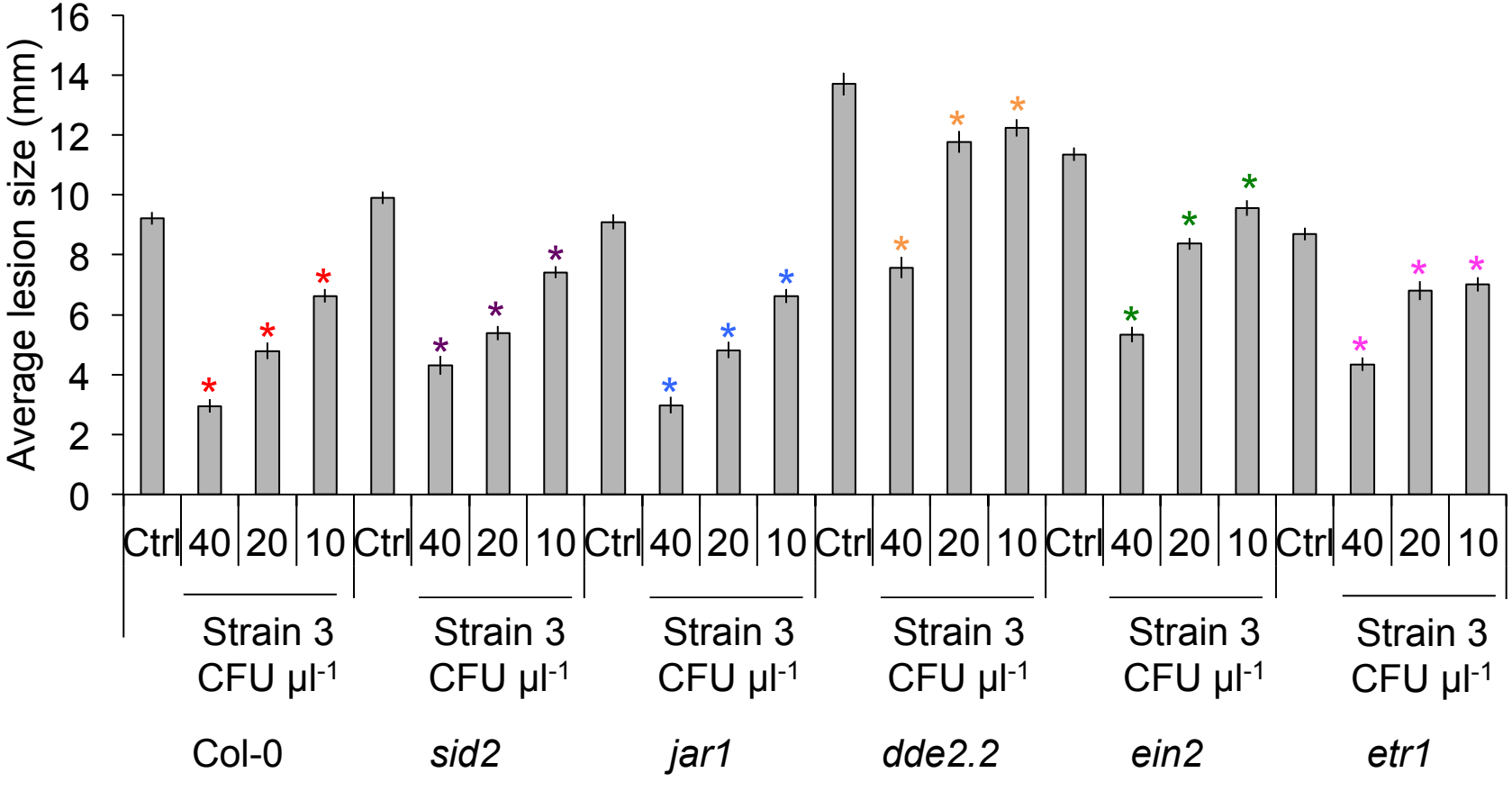

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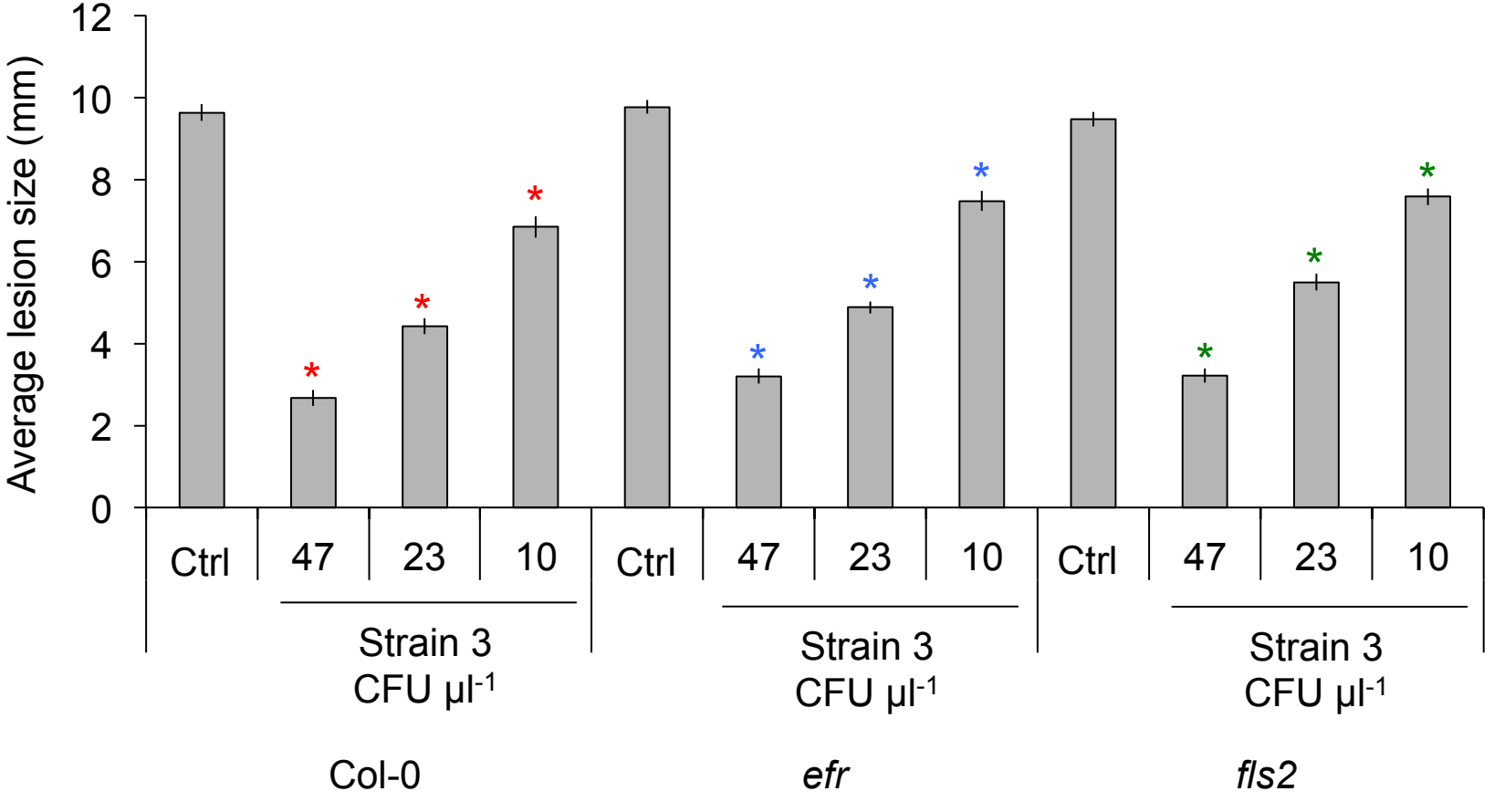

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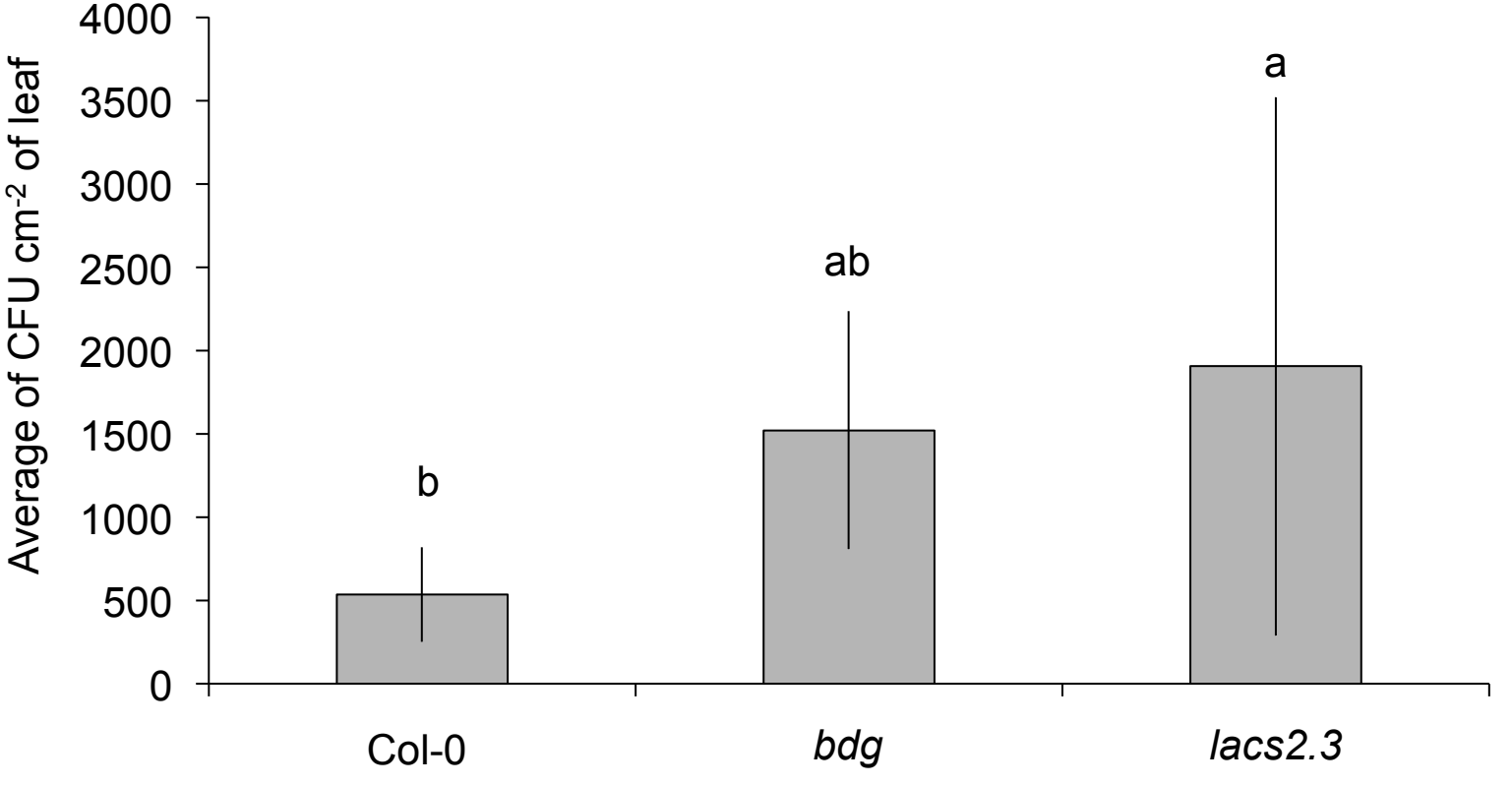

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