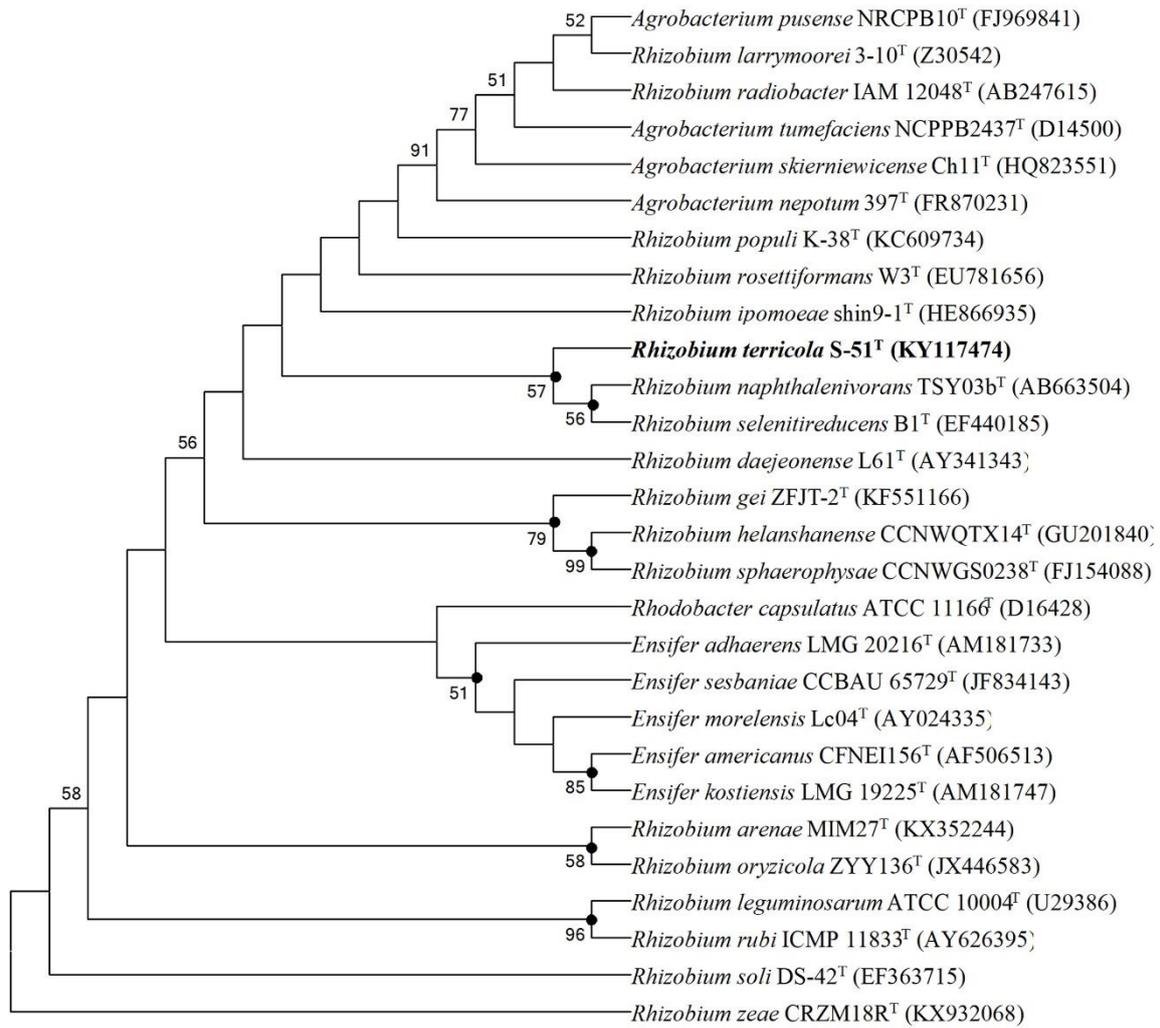
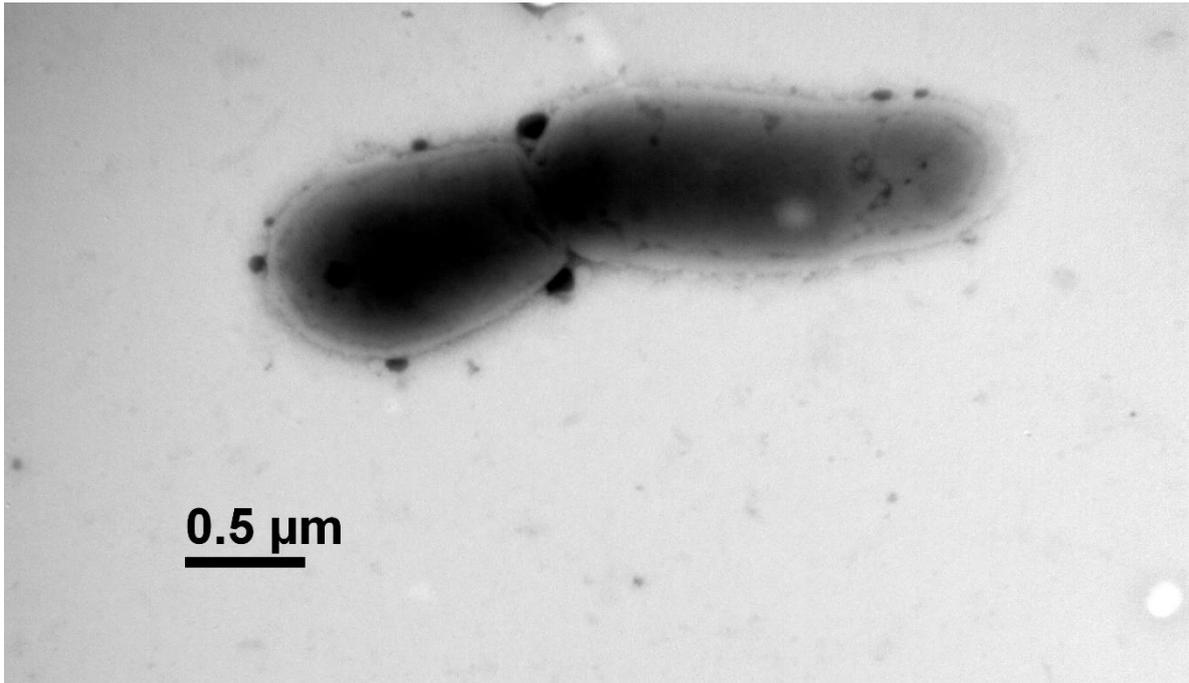


**Supplementary Figure S1.** Neighbor-joining tree based on 16S rRNA gene sequences showing the phylogenetic position of strain S-51<sup>T</sup> among closely related members of the family *Rhizobiaceae*. Filled circles indicate nodes recovered by all three treeing methods (neighbor-joining, maximum-likelihood and maximum-parsimony). The numbers at the nodes indicate the percentage of 1000 bootstrap replicates yielding this topology; only values >50% are shown. *Rhodobacter capsulatus* ATCC 11166<sup>T</sup> was used as an out-group. GenBank accession numbers are given in parentheses. Bar, 0.01 substitutions per nucleotide position.



**Supplementary Figure S2.** Maximum-parsimony tree based on 16S rRNA gene sequences showing the phylogenetic position of strain S-51<sup>T</sup> among closely related members of the family *Rhizobiaceae*. Filled circles indicate nodes recovered by all three treeing methods (neighbor-joining, maximum-likelihood and maximum-parsimony). The numbers at the nodes indicate the percentage of 1000 bootstrap replicates yielding this topology; only values >50% are shown. GenBank accession numbers are given in parentheses.



**Supplementary Figure S3.** Transmission electron microscopic image of strain S-51<sup>T</sup> grown on R2A agar at 40 °C for 1 week. Bar, 0.5 μm.

**Supplementary Table S1.** The distribution of biosynthetic gene clusters in strain S-51<sup>T</sup>. NRPS, non-ribosomal synthesized peptide; T1PKS, type I polyketide synthase. From and To indicate the number of nucleotide position in contigs.

Cluster	Type	From	To	Most similar known cluster
1	Acyl_amino_acids	47,221	107,982	-
2	Hserlactone	898,450	919,091	-
3	Terpene	1,408,750	1,429,604	-
4	Hserlactone	138,179	158,802	-
5	NRPS, T1PKS	58,736	111,321	Entolysin (17%)
6	Bacteriocin	23,326	34,180	-

**Supplementary Table S2.** N<sub>2</sub>-fixation regulatory proteins in S-51<sup>T</sup> genome.

Accession	Locus tag	Protein product	Length	Protein name
JABBGK010000001.1	HHL25_RS02720	WP_169587021.1	396	Nitrogen fixation protein FixF
JABBGK010000001.1	HHL25_RS04965	WP_169587839.1	483	Nitrogen regulation protein NR(I)
JABBGK010000001.1	HHL25_RS05235	WP_015916113.1	112	MULTISPECIES: P-II family nitrogen regulator
JABBGK010000002.1	HHL25_RS13300	WP_169591489.1	154	PTS IIA-like nitrogen regulatory protein PtsN
JABBGK010000003.1	HHL25_RS15770	WP_169593302.1	116	P-II family nitrogen regulator
JABBGK010000002.1	HHL25_RS13290	WP_169591482.1	522	RNA polymerase factor sigma-54