

**TABLE 1****Growth phenotypes of strains**

Shown are *R. rubrum* (*R. rub*) and *R. capsulatus* (*R. caps*) strains and corresponding plasmids used in this study with strain/plasmid references in parentheses. Anaerobic phototrophic growth phenotypes are shown with given carbon/sulfur sources indicated by (+) growth, (-/+) very slow growth, (-) no growth. For (+) and (-/+) phenotypes, doubling time, *T*, is given in hours. NA, not applicable; *R. sph*, *R. sphaeroides*; *M. bur*, *M. burtonii*; *R. pal*, *R. palustris*; *Synecc*, *Synechococcus*.

Strain	Plasmid	Carbon	Sulfur	Growth	<i>T</i>
<i>R. rub</i> WT (16)	None	Malate	SO <sub>4</sub>	+	11 ± 2
		Malate	MTA	+	16 ± 3
		CO <sub>2</sub>	SO <sub>4</sub>	+	38 ± 4
		CO <sub>2</sub>	Met	+	45 ± 5
		CO <sub>2</sub>	MTA	+	23 ± 3
<i>R. rub</i> WR (14)	None	Malate	SO <sub>4</sub>	+	15 ± 2
		Malate	MTA	+	18 ± 3
		CO <sub>2</sub>	SO <sub>4</sub>	+	46 ± 6
		CO <sub>2</sub>	Met	+	51 ± 8
		CO <sub>2</sub>	MTA	+	20 ± 2
<i>R. rub</i> I19A (17)	None	Malate	SO <sub>4</sub>	+	18 ± 4
		Malate	MTA	-	NA
		CO <sub>2</sub>	SO <sub>4</sub>	-	NA
		CO <sub>2</sub>	Met	-	NA
		CO <sub>2</sub>	MTA	-	NA
<i>R. rub</i> I19NifA (18)	None	Malate	SO <sub>4</sub>	+	19 ± 2
		Malate	MTA	-	NA
<i>R. rub</i> IRNifA (this study)	None	Malate	SO <sub>4</sub>	+	19 ± 2
		Malate	MTA	-/+	100 ± 30
		Malate	SO <sub>4</sub>	+	19 ± 4
		Malate	MTA	-/+	97 ± 24
		Malate	SO <sub>4</sub>	+	21 ± 2
		Malate	MTA	+	38 ± 2
		Malate	SO <sub>4</sub>	+	36 ± 3
<i>R. rub</i> IR (14)	None	Malate	SO <sub>4</sub>	+	21 ± 2
		Malate	MTA	-/+	130 ± 45
		CO <sub>2</sub>	SO <sub>4</sub>	-	NA
		CO <sub>2</sub>	Met	-	NA
		CO <sub>2</sub>	MTA	-	NA
		Malate	SO <sub>4</sub>	+	20 ± 5
		Malate	MTA	+	19 ± 10
		Malate	SO <sub>4</sub>	+	55 ± 7
		Malate	MTA	+	59 ± 14
		Malate	SO <sub>4</sub>	+	15 ± 2
		Malate	MTA	+	18 ± 2
<i>R. rub</i> IR (14)	pRPS-6301 ( <i>Synecc rbclS</i> ) (20)	Malate	MTA	+	52 ± 14
		Malate	MTA	+	25 ± 6
		Malate	MTA	+	52 ± 21
<i>R. caps</i> SBI/II- (19)	pRPS-6301 ( <i>Synecc rbclS</i> ) (20)	CO <sub>2</sub>	SO <sub>4</sub>	+	26 ± 7
		CO <sub>2</sub>	SO <sub>4</sub>	-	NA
		CO <sub>2</sub>	SO <sub>4</sub>	-	NA
		CO <sub>2</sub>	SO <sub>4</sub>	-	NA

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