Table\_1\_SuppInfo. Information of the bacterial strains and plasmid used in this study.

|  |  |  |  |
| --- | --- | --- | --- |
| Strain | Close match | GenBank No. | Source |
| Resident species | QL-A2 | *Ralstonia mannitolilytica* | JN699058 | (Wei *et al.*, 2013) |
| QL-A3 | *Ralstonia mannitolilytica* | KJ780056 | (Wei *et al.*, 2013) |
| QL-A6 | *Ralstonia pickettii* | HQ267096 | (Wei *et al.*, 2013) |
| QL-117 | *Ralstonia taiwanensis* | KJ780054 | (Wei *et al.*, 2015) |
| QL-140 | *Ralstonia sp.* | KJ780055 | (Wei *et al.*, 2015) |
| Invader | QL-Rs1115 | *Ralstonia solanacearum* | GU390462 | (Wei *et al.*, 2011) |
| Plasmid | PYC12-M | mCherry inserted in the pYC12, under control of the constitutive Ptac promotor, gmR |  | (Wei *et al.*, 2015) |

Table\_2\_SuppInfo. The composition of resident species communities used in the study. In the table, “1” denotes for the presence of the species in the community and “0” for the absence of species in the community. Richness denotes for species richness.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Community | QL-A2 | QL-A3 | QL-A6 | QL-117 | QL-140 | Richness |
| 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2 | 0 | 1 | 0 | 0 | 0 | 1 |
| 3 | 0 | 0 | 1 | 0 | 0 | 1 |
| 4 | 0 | 0 | 0 | 1 | 0 | 1 |
| 5 | 0 | 0 | 0 | 0 | 1 | 1 |
| 6 | 1 | 1 | 0 | 0 | 0 | 2 |
| 7 | 1 | 0 | 1 | 0 | 0 | 2 |
| 8 | 1 | 0 | 0 | 1 | 0 | 2 |
| 9 | 1 | 0 | 0 | 0 | 1 | 2 |
| 10 | 0 | 1 | 1 | 0 | 0 | 2 |
| 11 | 0 | 1 | 0 | 1 | 0 | 2 |
| 12 | 0 | 1 | 0 | 0 | 1 | 2 |
| 13 | 0 | 0 | 1 | 1 | 0 | 2 |
| 14 | 0 | 0 | 1 | 0 | 1 | 2 |
| 15 | 0 | 0 | 0 | 1 | 1 | 2 |
| 16 | 1 | 1 | 1 | 0 | 0 | 3 |
| 17 | 1 | 1 | 0 | 1 | 0 | 3 |
| 18 | 1 | 1 | 0 | 0 | 1 | 3 |
| 19 | 0 | 1 | 1 | 1 | 0 | 3 |
| 20 | 0 | 1 | 1 | 0 | 1 | 3 |
| 21 | 0 | 0 | 1 | 1 | 1 | 3 |
| 22 | 1 | 0 | 1 | 1 | 0 | 3 |
| 23 | 1 | 0 | 0 | 1 | 1 | 3 |
| 24 | 0 | 1 | 0 | 1 | 1 | 3 |
| 25 | 1 | 0 | 1 | 0 | 1 | 3 |
| 26 | 1 | 1 | 1 | 1 | 0 | 4 |
| 27 | 1 | 0 | 1 | 1 | 1 | 4 |
| 28 | 0 | 1 | 1 | 1 | 1 | 4 |
| 29 | 1 | 1 | 0 | 1 | 1 | 4 |
| 30 | 1 | 1 | 1 | 0 | 1 | 4 |
| 31 | 1 | 1 | 1 | 1 | 1 | 5 |

Table\_3\_SuppInfo. The resource use patterns of each resident species and the invader on 48 different resources. The plus sign denotes for species ability to grow on specific resources.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Resources | QL-A2 | QL-A3 | QL-A6 | QL-117 | QL-140 | QL-Rs1115 |
| 1 | Acetic aicd(Ace) |  |  | + |  | + | + |
| 2 | L-Alanine(Ala) |  |  | + | + | + | + |
| 3 | β-Alanine(Ala) |  | + | + | + | + |  |
| 4 | L-Arginine(Arg) |  |  |  |  |  |  |
| 5 | Ascorbic acid(Asc) |  |  |  |  | + |  |
| 6 | L-Asparagine(Asn) | + | + | + | + | + | + |
| 7 | γ-Aminobutyric acid(Ami) | + | + | + |  | + | + |
| 8 | Citric acid(Cit) |  |  | + |  | + | + |
| 9 | Citrulline(Cin) |  |  | + | + | + | + |
| 10 | Ethanolamine(Eth) |  |  |  |  |  |  |
| 11 | Formic acid(For) |  |  |  |  |  |  |
| 12 | Fructose(Fruc) |  |  | + |  | + |  |
| 13 | Galacturonic acid(Galac) |  |  | + |  |  | + |
| 14 | Glucose(Glu) | + | + | + |  |  | + |
| 15 | L-Glutamine(Gln) | + | + | + | + | + | + |
| 16 | Glutaric acid(Glut) |  |  |  |  | + |  |
| 17 | L-Glycine(Gly) |  |  | + |  | + |  |
| 18 | Glycolic acid(Glyc) |  |  | + | + | + |  |
| 19 | L-Histidine(His) |  | + | + | + | + | + |
| 20 | Isoleucine(Iso) | + |  |  | + | + |  |
| 21 | Lactic acid(Lac) | + | + | + | + | + | + |
| 22 | L-Lysine(Lys) |  |  |  |  |  |  |
| 23 | L-Leucine(Leu) |  |  |  | + | + |  |
| 24 | Maleic acid(Male) |  |  |  |  | + |  |
| 25 | Malic acid(Mal) |  |  | + | + | + | + |
| 26 | Malonic acid(Malon) |  |  | + | + | + |  |
| 27 | L-Methionine(Met) |  |  |  |  |  |  |
| 28 | Myoinositol(Ino) |  |  |  |  |  | + |
| 29 | 2-Oxoglutaric(Oxo) |  |  | + |  | + | + |
| 30 | L-Phenyalanine(Phe) |  |  | + | + | + | + |
| 31 | L-Proline(Pro) | + | + | + | + | + | + |
| 32 | Pyruvic acid(Pyr) |  | + | + | + | + | + |
| 33 | L-Serine(Ser) |  |  | + |  |  | + |
| 34 | Succinic acid(Succ) |  |  | + | + | + | + |
| 35 | Sucrose(Sucs) |  |  |  |  |  | + |
| 36 | Tartaric acid(Tar) |  |  |  |  |  | + |
| 37 | L-Threonine(Thr) |  |  | + | + | + |  |
| 38 | L-Tryptophan(Try) |  |  | + | + | + |  |
| 39 | L-Valine(Val) |  | + | + | + | + |  |
| 40 | Maltose(Mal) |  |  | + |  | + |  |
| 41 | L-Arabinose(Ara) |  |  | + |  | + |  |
| No. | Resources | QL-A2 | QL-A3 | QL-A6 | QL-117 | QL-140 | QL-Rs1115 |
| 42 | D-Galactose(Gal) |  | + | + |  |  |  |
| 43 | D-Mannose(Man) |  | + | + |  |  |  |
| 44 | D-Xylose(Xyl) |  |  |  |  |  |  |
| 45 | D-Ribose(Rib) |  |  |  |  |  |  |
| 46 | D-Mannitol |  | + |  |  |  |  |
| 47 | Inosine(I) |  | + |  |  |  |  |
| 48 | Oxalic acid(Oxal) |  |  |  |  |  |  |

Table\_4\_SuppInfo. Composition of Nutrient Broth (NB) medium through each resource availability level.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Total concentration of NB media (g L-1) | Proportion of NB media in final diluted media (%) | Glucose (g) | Tryptone (g) | Beef Extract (g) | Yeast Extract (g) |
| 18.5 | 100 | 10 | 5 | 3 | 0.5 |
| 9.25 | 50 | 5 | 2.5 | 1.5 | 0.25 |
| 3.7 | 20 | 2 | 1 | 0.6 | 0.1 |
| 1.85 | 10 | 1 | 0.5 | 0.3 | 0.05 |
| 0.925 | 5 | 0.5 | 0.25 | 0.16 | 0.025 |
| 0.37 | 2 | 0.2 | 0.1 | 0.06 | 0.01 |

Table\_5\_SuppInfo. The catabolic similarity (number of resources both invader and at least one resident community species can utilize) between the invader and the resident communities. High index values denote for high catabolic similarity.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| QL-A2 | QL-A3 | QL-A6 | QL-117 | QL-140 | QL-Rs1115 | Richness | Catabolic similarity |
| 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0.285714 |
| 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0.285714 |
| 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0.380952 |
| 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0.380952 |
| 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0.857143 |
| 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0.857143 |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0.52381 |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0.52381 |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.714286 |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.714286 |
| 1 | 1 | 0 | 0 | 0 | 1 | 2 | 0.380952 |
| 1 | 0 | 1 | 0 | 0 | 1 | 2 | 0.857143 |
| 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0.619048 |
| 1 | 0 | 0 | 0 | 1 | 1 | 2 | 0.761905 |
| 0 | 1 | 1 | 0 | 0 | 1 | 2 | 0.857143 |
| 0 | 1 | 0 | 1 | 0 | 1 | 2 | 0.619048 |
| 0 | 1 | 0 | 0 | 1 | 1 | 2 | 0.761905 |
| 0 | 0 | 1 | 1 | 0 | 1 | 2 | 0.857143 |
| 0 | 0 | 1 | 0 | 1 | 1 | 2 | 0.857143 |
| 0 | 0 | 0 | 1 | 1 | 1 | 2 | 0.714286 |
| 1 | 1 | 1 | 0 | 0 | 1 | 3 | 0.857143 |
| 1 | 1 | 0 | 1 | 0 | 1 | 3 | 0.619048 |
| 1 | 1 | 0 | 0 | 1 | 1 | 3 | 0.761905 |
| 0 | 1 | 1 | 1 | 0 | 1 | 3 | 0.857143 |
| 0 | 1 | 1 | 0 | 1 | 1 | 3 | 0.857143 |
| 0 | 0 | 1 | 1 | 1 | 1 | 3 | 0.857143 |
| 1 | 0 | 1 | 1 | 0 | 1 | 3 | 0.857143 |
| 1 | 0 | 0 | 1 | 1 | 1 | 3 | 0.761905 |
| 0 | 1 | 0 | 1 | 1 | 1 | 3 | 0.761905 |
| 1 | 0 | 1 | 0 | 1 | 1 | 3 | 0.857143 |
| 1 | 1 | 1 | 1 | 0 | 1 | 4 | 0.857143 |
| 1 | 0 | 1 | 1 | 1 | 1 | 4 | 0.857143 |
| 0 | 1 | 1 | 1 | 1 | 1 | 4 | 0.857143 |
| 1 | 1 | 0 | 1 | 1 | 1 | 4 | 0.761905 |
| 1 | 1 | 1 | 0 | 1 | 1 | 4 | 0.857143 |
| 1 | 1 | 1 | 1 | 1 | 1 | 5 | 0.857143 |
| 1 | 1 | 1 | 1 | 1 | 1 | 5 | 0.857143 |
| 1 | 1 | 1 | 1 | 1 | 1 | 5 | 0.857143 |
| 1 | 1 | 1 | 1 | 1 | 1 | 5 | 0.857143 |
| 1 | 1 | 1 | 1 | 1 | 1 | 5 | 0.857143 |

Table\_6\_SuppInfo. Table summarizing the effects of resource availability and resident species identity effects on the invader relative density at each resource availability level. On the effect column, the “1” denotes for a positive effect, “0” for a neutral effect, and “-1” for a negative effect. Coefficient was calculated by function “sAICfun” in R 3.3.1.

|  |  |
| --- | --- |
| Strain | Resource availability |
| 0.37 g L-1 | 0.925 g L-1 | 1.85 g L-1 | 3.7 g L-1 | 9.25 g L-1 | 18.5 g L-1 |
|  | Effect | Coefficient | Effect | Coefficient | Effect | Coefficient | Effect | Coefficient | Effect | Coefficient | Effect | Coefficient |
| QL-A2 | 1 | 0.076 | 0 | 0 | -1 | -0.16 | -1 | -0.27 | -1 | -0.45 | -1 | -0.47 |
| QL-A3 | 1 | 0.076 | -1 | -0.14 | -1 | -0.34 | -1 | -0.36 | -1 | -0.57 | -1 | -0.53 |
| QL-A6 | -1 | -0.54 | -1 | -0.51 | -1 | -0.26 | -1 | -0.24 | 0 | 0 | 0 | 0 |
| QL-117 | -1 | -0.10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| QL-140 | -1 | -0.095 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2.18 | 0 | 0 |

Table\_7\_SuppInfo. Table summarizing the effects of resource availability and resident species identity effects on the growth rate of resident communities at each resource availability. On the effect column, the “1” denotes for a positive effect, “0” for neutral effect, and “-1” for a negative effect. Coefficient was calculated by function “sAICfun” in R 3.3.1.

|  |  |
| --- | --- |
|  Strain | Resource availability |
| 0.37 g L-1 | 0.925 g L-1 | 1.85 g L-1 | 3.7 g L-1 | 9.25 g L-1 | 18.5 g L-1 |
|   | Effect | Coefficient | Effect | Coefficient | Effect | Coefficient | Effect | Coefficient | Effect | Coefficient | Effect | Coefficient |
| QL-A2 | 0 | 0 | -1 | -0.014 | -1 | -0.0075 | 0 | 0 | 1 | 0.015 | 1 | 0.044 |
| QL-A3 | 0 | 0 | 0 | 0 | -1 | -0.0077 | -1 | -0.0058 | 1 | 0.017 | 1 | 0.042 |
| QL-A6 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -0.012 | -1 | -0.0076 | 0 | 0 |
| QL-117 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.0081 | 0 | 0 | 0 | 0 |
| QL-140 | 0 | 0 | 1 | 0.010 | 0 | 0 | -1 | -0.0073 | 0 | 0 | 0 | 0 |

Figure\_1\_Suppinfo. Explanatory power of the presence of each resident species on the growth rate of all the communities at all resource availability levels. Explanatory power is defined as the general coefficient of the presence of a given resident species in the community (values lower than “0” denote for a negative effect of certain species on invader relative density, values higher than “0” denote for a positive effect and “0” denote for a neutral effect). Separates analyses were performed at each resource availability level.

Figure\_2\_Suppinfo. The effect of resident species identity effects (the presence in the community) on the catabolic similarity with the invader. Explanatory power is defined as the general coefficient of the presence of a given resident species in the community (values lower than “0” denote for a negative effect of certain species on invader relative density, values higher than “0” denote for a positive effect and “0” denote for a neutral effect).

Figure\_3\_Suppinfo. The effect of resident species richness and resource availability on the growth of the uninvaded communities (OD600) after 48 h incubation. Different lines show richness-productivity relationships through all resource availability levels.

***References***

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