

Supplementary Information

Title: Resource availability drives bacteria community resistance to pathogen invasion via altering bacterial pairwise interactions

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Table S1. Bacterial strains used in this study.

Bacterial strain ID	Taxonomic affiliation (GenBank accession number)	Bacterial abbreviation used in this study	Reference
WR4	<i>Flavobacterium johnsoniae</i> (CP000685)	Fj	(Huang et al. 2013)
T-5	<i>Bacillus amyloliquefaciens</i> (JF899265)	Ba	(Tan et al. 2013)
HR92	<i>Lysinibacillus sphaericus</i> (CP000817)	Ls	(Huang et al. 2013)
WR21	<i>Chryseobacterium daecheongense</i> (HQ220102)	Cd	(Huang et al. 2013)
WR42	<i>Delftia acidovorans</i> (AM180725)	Da	(Huang et al. 2013)
QL-A6	<i>Ralstonia pickettii</i> (HQ267096)	Rp	(Wei et al. 2013)
QL-Rs1115	<i>Ralstonia solanacearum</i> (GU390462) tagged with red fluorescent marker	Rs	(Wei et al. 2011; Tan et al. 2016)

Table S2. Combinations of resident species community at one- or two-species levels (N=21). Table rows show different communities and table columns show the absence (0) or presence (1) of given species within the community.

Community ID	Species abbreviation						Resident community species richness
	Fj	Cd	Da	Ba	Ls	Rp	
1	1	0	0	0	0	0	1
2	0	1	0	0	0	0	1
3	0	0	1	0	0	0	1
4	0	0	0	1	0	0	1
5	0	0	0	0	1	0	1
6	0	0	0	0	0	1	1
7	1	1	0	0	0	0	2
8	1	0	1	0	0	0	2
9	1	0	0	1	0	0	2
10	1	0	0	0	1	0	2
11	1	0	0	0	0	1	2
12	0	1	1	0	0	0	2
13	0	1	0	1	0	0	2
14	0	1	0	0	1	0	2
15	0	1	0	0	0	1	2
16	0	0	1	1	0	0	2
17	0	0	1	0	1	0	2
18	0	0	1	0	0	1	2
19	0	0	0	1	1	0	2
20	0	0	0	1	0	1	2
21	0	0	0	0	1	1	2

Table S3. The effects of the resident species identities on productivity of resident communities, resident community toxicity towards invader and density of the invader. Significant effects ($P < 0.05$) are highlighted in bold and the ‘up’ and ‘down’ arrows denote positive and negative effects respectively. LRA and HRA denote low resource availability and high resource availability, respectively. Fj, Cd, Da, Ba, Ls, Rp represent *Flavobacterium johnsoniae*, *Chryseobacterium daecheongense*, *Delftia acidovorans*, *Bacillus amyloliquefaciens*, *Lysinibacillus sphaericus*, *Ralstonia pickettii*, respectively.

		Productivity of resident community			Resident community toxicity towards invader			Invader density		
		df	F	P	df	F	P	df	F	P
HRA	Resident species									
	Fj	1	3.31	0.074	1	1.31	0.257	↓1	24.14	<0.001
	Cd	1	3.58	0.063	↑1	4.3	0.043	1	0.6	0.441
	Da	↑1	9.52	0.003	1	0	0.961	↓1	6.64	0.013
	Ba	↓1	42.6	<0.001	↑1	149.76	<0.001	↓1	107.77	<0.001
	Ls	↑1	5.11	0.028	↑1	6.81	0.012	1	0.09	0.768
	Rp	↑1	48.47	<0.001	1	0.09	0.767	1	3.34	0.073
No. of Residuals		56			56			56		
LRA	Fj	1	1.5	0.225	↑1	23.73	<0.001	↓1	6.85	0.011
	Cd	1	0	0.985	↑1	42.94	<0.001	1	0.52	0.476
	Da	↑1	5.07	0.028	↑1	5.58	0.022	↓1	31.74	<0.001
	Ba	1	3.63	0.062	↑1	8.66	0.005	1	0.08	0.779
	Ls	1	0.01	0.912	1	0.95	0.334	1	0.26	0.614
	Rp	↑1	18.57	<0.001	1	0.86	0.357	↑1	4.28	0.043
	No. of Residuals	56			56			56		

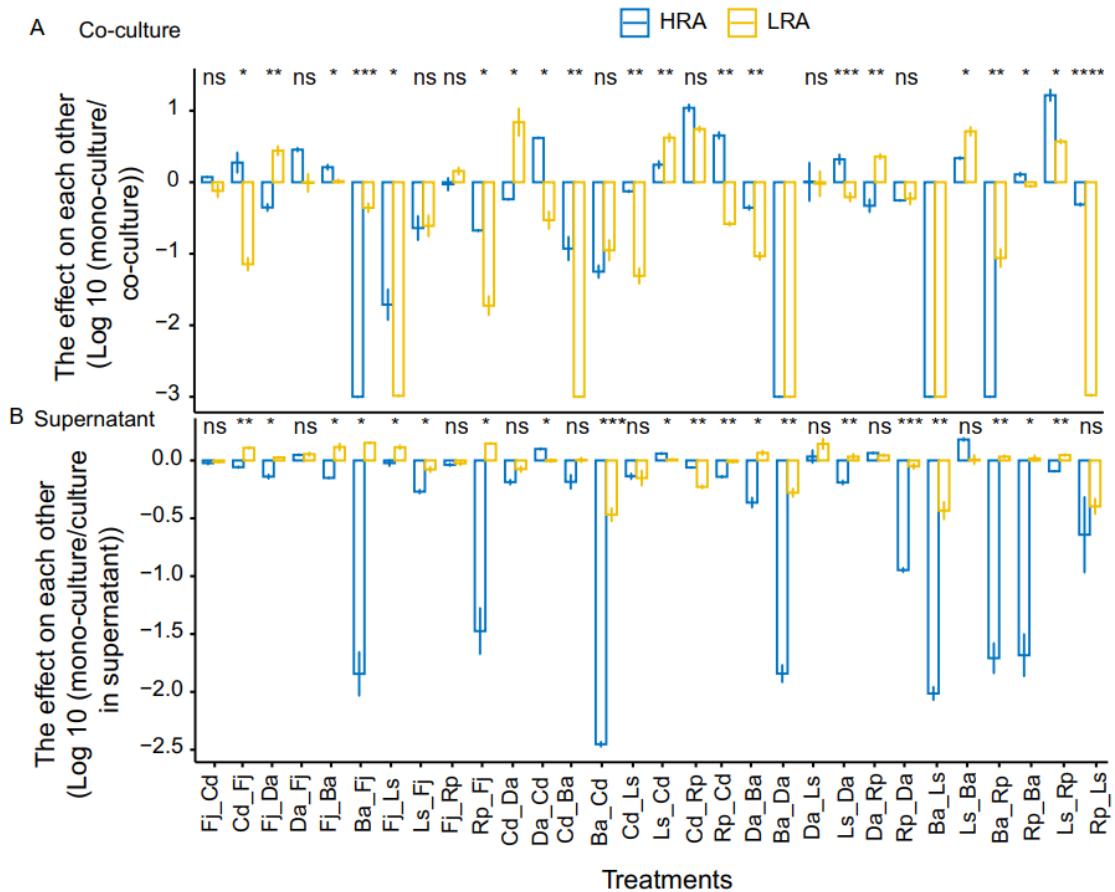


Figure S1. Resource availability influences pairwise interactions between resident bacterial species both in co-culture assay (A) and supernatant assay (B). Fj_Cd means effect of Species Fj on the growth of species Cd. LRA and HRA denote low resource availability and high resource availability, respectively. Bars show mean values \pm SE ($n = 3$). * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$, and ns denotes no significant difference based on t-test. Six species we used in this study: Fj (*Flavobacterium johnsoniae*), Cd (*Chryseobacterium daecheongense*), Da (*Delftia acidovorans*), Ba (*Bacillus amyloliquefaciens*), Ls (*Lysinibacillus sphaericus*), Rp (*Ralstonia pickettii*).

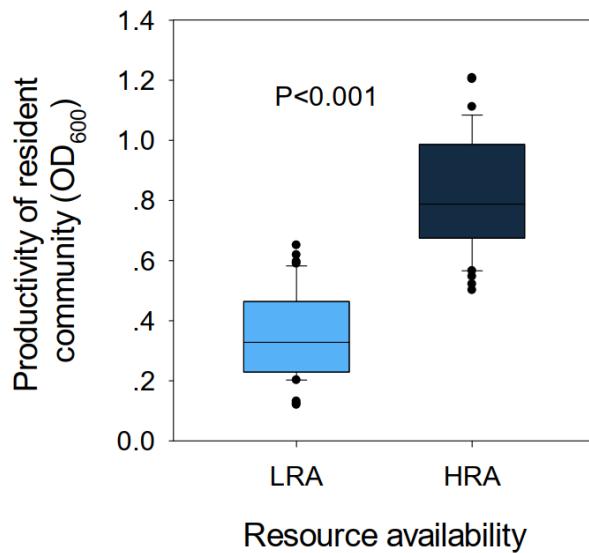


Figure S2. Resource availability influences productivity of two-species resident communities. LRA and HRA denote low resource availability and high resource availability, respectively. $P<0.001$ indicates significant differences between LRA and HRA based on Mann-Whitney Rank Sum Test.

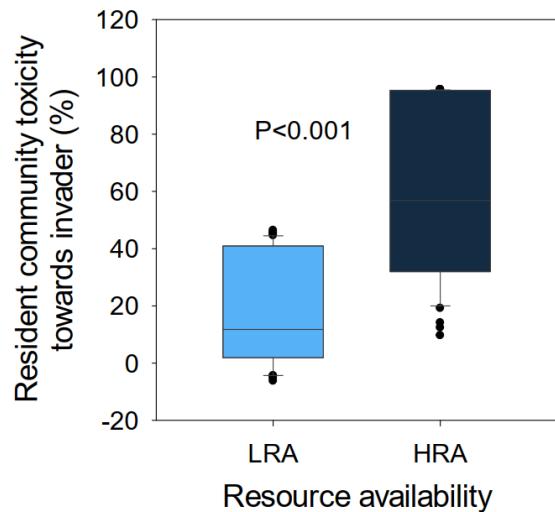


Figure S3. Resource availability influences toxicity of two-species resident communities towards pathogen. LRA and HRA denote low resource availability and high resource availability, respectively. $P < 0.001$ indicates significant differences between LRA and HRA based on Mann-Whitney Rank Sum Test.

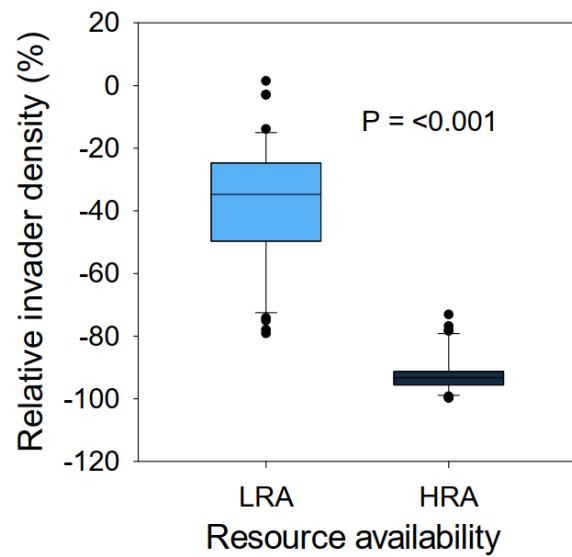


Figure S4. Resource availability influences invasion success of pathogen. LRA and HRA denote low resource availability and high resource availability, respectively. $P < 0.001$ indicates significant differences between LRA and HRA based on Mann-Whitney Rank Sum Test.

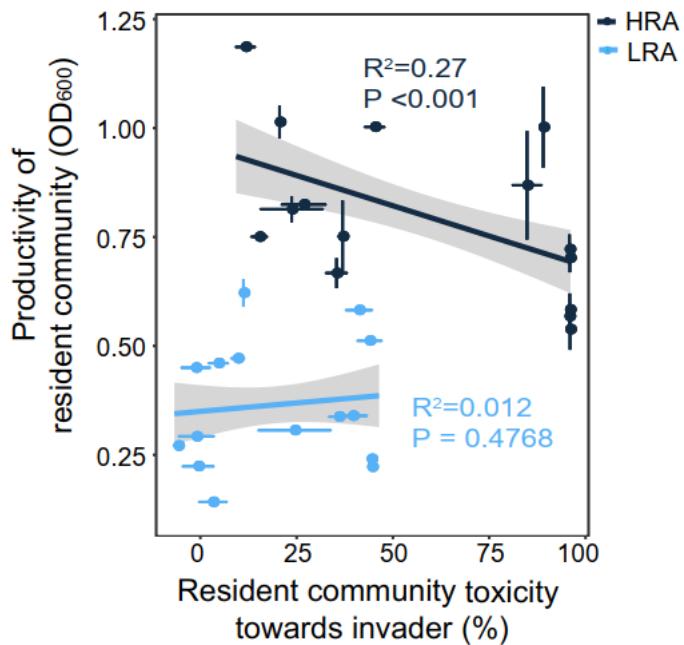


Figure S5. The relationship between two-species resident community toxicity towards invader and productivity of two-species resident community at low and high resource availability, respectively. LRA and HRA denote low resource availability and high resource availability, respectively. Grey shaded areas depict the 95% confidence interval of the logistic regression, horizontal and vertical lines in each dot in the figures are error bars, which denote for ± 2 SEM.