

Supplementary Material for:

Contrasting inter- and intraspecies recombination patterns in the 'Harveyi clade' *Vibrio* collected over large spatial and temporal scales.

Henryk Urbanczyk, Yoshitoshi Ogura, Tetsuya Hayashi.

Supplementary table S2.

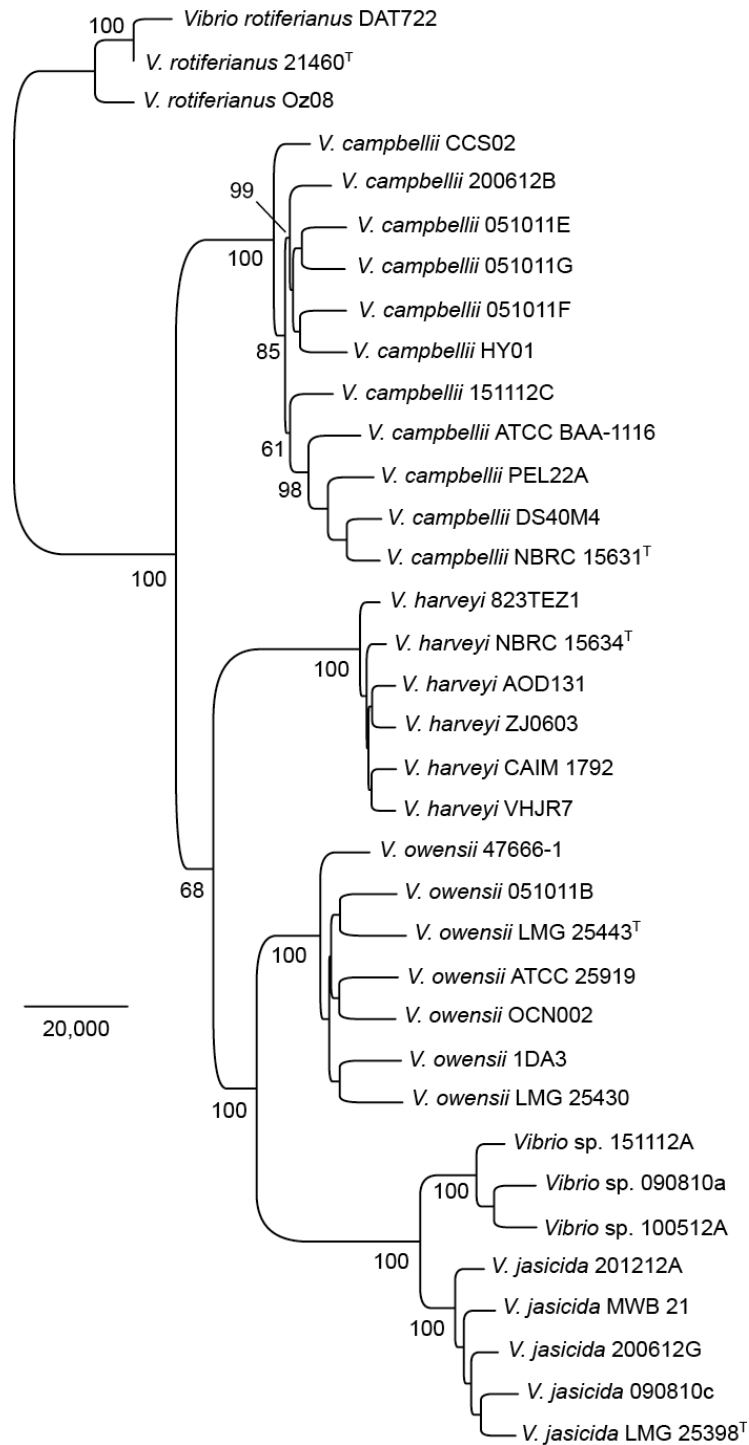
Supplementary table S2

Number of identified recombination events. Blue: analysis of interspecies recombination events, orange: analysis recombination events in strains isolated in the Miyazaki prefecture within a short time frame, green: analysis of intraspecies recombination events.

Strains used in the analysis				Number of identified recombination events	Average ANI between strains from different clades
<i>Vibrio campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. harveyi</i> NBRC 15634 [†]	<i>V. harveyi</i> ZJ0603	6	87.92
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. harveyi</i> CAIM 1792	<i>V. harveyi</i> VHJR7	9	88.02
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. jasicida</i> LMG 25398 [†]	<i>V. jasicida</i> 200612G	7	87.15
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. jasicida</i> 090810c	<i>V. jasicida</i> MWB 21	11	87.21
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. owensii</i> ATCC 25919	<i>V. owensii</i> 051011B	13	89.74
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. owensii</i> 1DA3	<i>V. owensii</i> LMG 25443 [†]	10	89.76
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. rotiferianus</i> LMG 21460 [†]	<i>V. rotiferianus</i> Oz08	31	87.35
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. harveyi</i> NBRC 15634 [†]	<i>V. harveyi</i> ZJ0603	11	87.77
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. harveyi</i> CAIM 1792	<i>V. harveyi</i> VHJR7	6	87.87
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. jasicida</i> LMG 25398 [†]	<i>V. jasicida</i> 200612G	2	87.03
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. jasicida</i> 090810c	<i>V. jasicida</i> MWB 21	9	87.11
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. owensii</i> ATCC 25919	<i>V. owensii</i> 051011B	14	89.68
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. owensii</i> 1DA3	<i>V. owensii</i> LMG 25443 [†]	12	89.71
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. rotiferianus</i> LMG 21460 [†]	<i>V. rotiferianus</i> Oz08	31	87.16
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	7	86.32
<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> NBRC 15631 [†]	<i>V. harveyi</i> NBRC 15634 [†]	<i>V. harveyi</i> ZJ0603	0	87.74
<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> NBRC 15631 [†]	<i>V. harveyi</i> CAIM 1792	<i>V. harveyi</i> VHJR7	7	87.83
<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> NBRC 15631 [†]	<i>V. jasicida</i> LMG 25398 [†]	<i>V. jasicida</i> 200612G	3	86.84
<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> NBRC 15631 [†]	<i>V. jasicida</i> 090810c	<i>V. jasicida</i> MWB 21	2	86.90
<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> NBRC 15631 [†]	<i>V. owensii</i> ATCC 25919	<i>V. owensii</i> 051011B	6	89.46
<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> NBRC 15631 [†]	<i>V. owensii</i> 1DA3	<i>V. owensii</i> LMG 25443 [†]	5	89.52
<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> NBRC 15631 [†]	<i>V. rotiferianus</i> LMG 21460 [†]	<i>V. rotiferianus</i> Oz08	5	86.97
<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> NBRC 15631 [†]	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	0	86.28
<i>V. harveyi</i> NBRC 15634 [†]	<i>V. harveyi</i> ZJ0603	<i>V. jasicida</i> LMG 25398 [†]	<i>V. jasicida</i> 200612G	6	86.16
<i>V. harveyi</i> NBRC 15634 [†]	<i>V. harveyi</i> ZJ0603	<i>V. jasicida</i> 090810c	<i>V. jasicida</i> MWB 21	13	86.20
<i>V. harveyi</i> NBRC 15634 [†]	<i>V. harveyi</i> ZJ0603	<i>V. owensii</i> ATCC 25919	<i>V. owensii</i> 051011B	25	88.18
<i>V. harveyi</i> NBRC 15634 [†]	<i>V. harveyi</i> ZJ0603	<i>V. owensii</i> 1DA3	<i>V. owensii</i> LMG 25443 [†]	31	88.43
<i>V. harveyi</i> NBRC 15634 [†]	<i>V. harveyi</i> ZJ0603	<i>V. rotiferianus</i> LMG 21460 [†]	<i>V. rotiferianus</i> Oz08	21	86.34
<i>V. harveyi</i> NBRC 15634 [†]	<i>V. harveyi</i> ZJ0603	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	4	85.50
<i>V. harveyi</i> CAIM 1792	<i>V. harveyi</i> VHJR7	<i>V. jasicida</i> LMG 25398 [†]	<i>V. jasicida</i> 200612G	9	86.23
<i>V. harveyi</i> CAIM 1792	<i>V. harveyi</i> VHJR7	<i>V. jasicida</i> 090810c	<i>V. jasicida</i> MWB 21	16	86.22
<i>V. harveyi</i> CAIM 1792	<i>V. harveyi</i> VHJR7	<i>V. owensii</i> ATCC 25919	<i>V. owensii</i> 051011B	15	87.76
<i>V. harveyi</i> CAIM 1792	<i>V. harveyi</i> VHJR7	<i>V. owensii</i> 1DA3	<i>V. owensii</i> LMG 25443 [†]	36	88.51
<i>V. harveyi</i> CAIM 1792	<i>V. harveyi</i> VHJR7	<i>V. rotiferianus</i> LMG 21460 [†]	<i>V. rotiferianus</i> Oz08	15	86.38
<i>V. harveyi</i> CAIM 1792	<i>V. harveyi</i> VHJR7	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	2	85.58
<i>V. jasicida</i> LMG 25398 [†]	<i>V. jasicida</i> 200612G	<i>V. owensii</i> ATCC 25919	<i>V. owensii</i> 051011B	29	89.14
<i>V. jasicida</i> LMG 25398 [†]	<i>V. jasicida</i> 200612G	<i>V. owensii</i> 1DA3	<i>V. owensii</i> LMG 25443 [†]	27	89.18
<i>V. jasicida</i> LMG 25398 [†]	<i>V. jasicida</i> 200612G	<i>V. rotiferianus</i> LMG 21460 [†]	<i>V. rotiferianus</i> Oz08	13	85.42
<i>V. jasicida</i> LMG 25398 [†]	<i>V. jasicida</i> 200612G	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	51	93.53
<i>V. jasicida</i> 090810c	<i>V. jasicida</i> MWB 21	<i>V. owensii</i> ATCC 25919	<i>V. owensii</i> 051011B	29	89.17
<i>V. jasicida</i> 090810c	<i>V. jasicida</i> MWB 21	<i>V. owensii</i> 1DA3	<i>V. owensii</i> LMG 25443 [†]	27	89.24
<i>V. jasicida</i> 090810c	<i>V. jasicida</i> MWB 21	<i>V. rotiferianus</i> LMG 21460 [†]	<i>V. rotiferianus</i> Oz08	17	85.51
<i>V. jasicida</i> 090810c	<i>V. jasicida</i> MWB 21	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	63	93.41
<i>V. owensii</i> ATCC 25919	<i>V. owensii</i> 051011B	<i>V. rotiferianus</i> LMG 21460 [†]	<i>V. rotiferianus</i> Oz08	37	86.93
<i>V. owensii</i> ATCC 25919	<i>V. owensii</i> 051011B	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	8	87.69
<i>V. owensii</i> 1DA3	<i>V. owensii</i> LMG 25443 [†]	<i>V. rotiferianus</i> LMG 21460 [†]	<i>V. rotiferianus</i> Oz08	42	87.07
<i>V. owensii</i> 1DA3	<i>V. owensii</i> LMG 25443 [†]	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	12	87.75
<i>V. rotiferianus</i> LMG 21460 [†]	<i>V. rotiferianus</i> Oz08	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	15	84.82
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> PEL22A	<i>V. harveyi</i> NBRC 15634 [†]	<i>V. harveyi</i> ZJ0603	4	87.70
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> PEL22A	<i>V. harveyi</i> CAIM 1792	<i>V. harveyi</i> VHJR7	5	87.86
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> PEL22A	<i>V. jasicida</i> LMG 25398 [†]	<i>V. jasicida</i> 200612G	7	86.99
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> PEL22A	<i>V. jasicida</i> 090810c	<i>V. jasicida</i> MWB 21	8	87.03
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> PEL22A	<i>V. owensii</i> ATCC 25919	<i>V. owensii</i> 051011B	15	89.67
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> PEL22A	<i>V. owensii</i> 1DA3	<i>V. owensii</i> LMG 25443 [†]	15	89.73
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> PEL22A	<i>V. rotiferianus</i> LMG 21460 [†]	<i>V. rotiferianus</i> Oz08	24	87.09
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> PEL22A	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	5	86.34
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> DS40M4	<i>V. harveyi</i> NBRC 15634 [†]	<i>V. harveyi</i> ZJ0603	2	87.73
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> DS40M4	<i>V. harveyi</i> CAIM 1792	<i>V. harveyi</i> VHJR7	3	87.87
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> DS40M4	<i>V. jasicida</i> LMG 25398 [†]	<i>V. jasicida</i> 200612G	6	86.96
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> DS40M4	<i>V. jasicida</i> 090810c	<i>V. jasicida</i> MWB 21	7	87.01
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> DS40M4	<i>V. owensii</i> ATCC 25919	<i>V. owensii</i> 051011B	11	89.63
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> DS40M4	<i>V. owensii</i> 1DA3	<i>V. owensii</i> LMG 25443 [†]	10	89.69
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> DS40M4	<i>V. rotiferianus</i> LMG 21460 [†]	<i>V. rotiferianus</i> Oz08	22	87.10
<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> DS40M4	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	3	86.31
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> 051011E	<i>V. jasicida</i> 090810c	<i>V. jasicida</i> 200612G	14	87.16
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> 051011E	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	3	86.37
<i>V. jasicida</i> 090810c	<i>V. jasicida</i> 200612G	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	62	93.55
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. jasicida</i> 090810c	<i>V. jasicida</i> 200612G	11	87.13
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>Vibrio</i> sp. 151112A	<i>Vibrio</i> sp. 090810a	4	86.33
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> NBRC 15631 [†]	47	96.27
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> NBRC 15631 [†]	62	96.05
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> PEL22A	191	96.53
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> PEL22A	229	96.39
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> DS40M4	162	96.34
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. campbellii</i> ATCC BAA-1116	<i>V. campbellii</i> DS40M4	203	96.22
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. campbellii</i> NBRC 15631 [†]	<i>V. campbellii</i> ATCC BAA-1116	154	96.42
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. campbellii</i> NBRC 15631 [†]	<i>V. campbellii</i> ATCC BAA-1116	224	96.21
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. campbellii</i> NBRC 15631 [†]	<i>V. campbellii</i> PEL22A	100	96.39
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. campbellii</i> NBRC 15631 [†]	<i>V. campbellii</i> PEL22A	138	96.21
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> ATCC BAA-1116	163	96.34
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> ATCC BAA-1116	203	96.22
<i>V. campbellii</i> 051011E	<i>V. campbellii</i> 200612B	<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> PEL22A	119	96.31
<i>V. campbellii</i> 151112C	<i>V. campbellii</i> HY01	<i>V. campbellii</i> DS40M4	<i>V. campbellii</i> PEL22A	138	96.23

Supplementary figure S1.

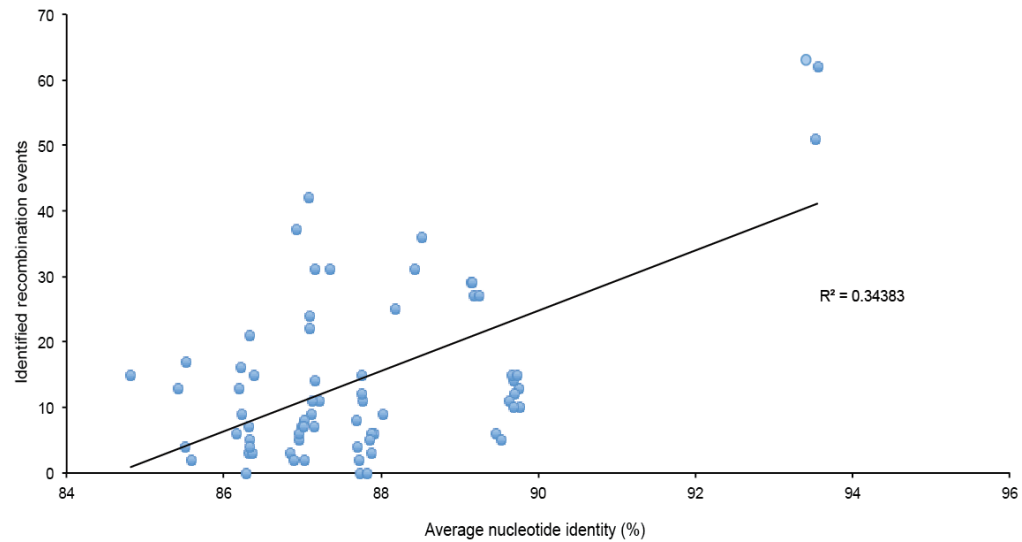
Phylogenetic resolution of the 'Harveyi clade' using parsimonious analysis.



For the analysis an alignment of concatenated sequences of 897 protein coding sequences conserved in the six *Vibrio* species was used. A single most parsimonious tree was found; tree length was equal to 672,871. Jackknife resampling values are reported at the nodes, some omitted for clarity.

Supplementary figure S2.

Relationship between the number of interspecies recombination events and the average nucleotide identity (ANI). Each marker represents the number of recombination events identified between two pairs of strains from different species plotted against average ANI between strains from different species. A linear trend line is shown.



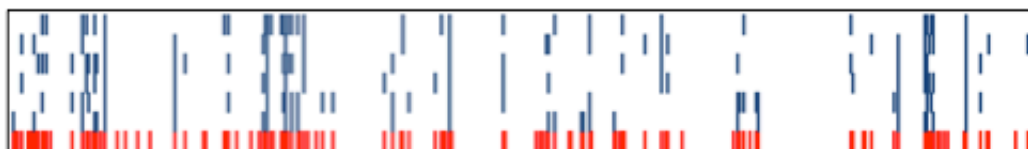
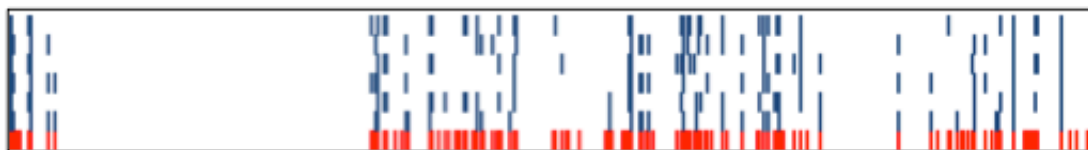
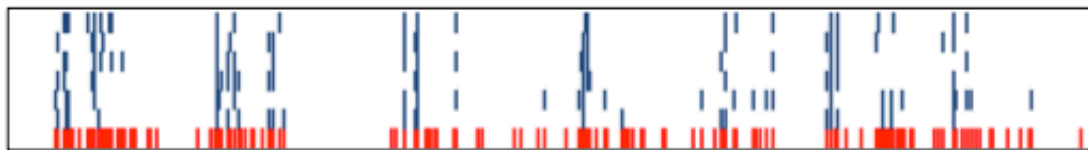
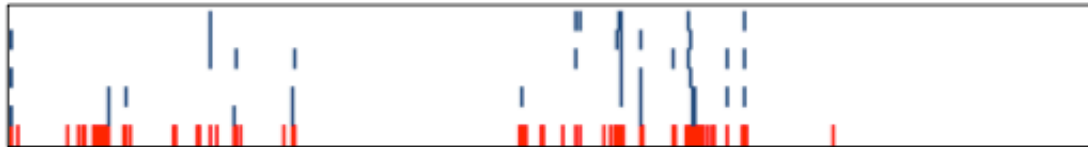
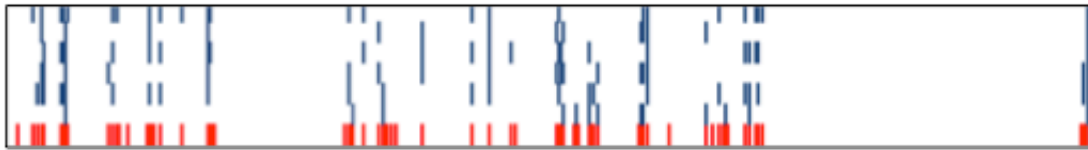
Supplementary figure S3.

Graphic representation of chromosomal location of 895 protein coding genes conserved in the ‘Harveyi clade’ on the map of *V. campbellii* ATCC BAA-1116 chromosomes. Each rectangle represents 500 (or less) protein coding genes organized in the same order as on the ATCC BAA-1116 chromosomes, starting from the origin of replication. 895 conserved sequences are marked red. Blue rectangles indicate sequences showing evidence of recombination between *V. campbellii* strains identified during six analyses of intraspecies recombination events that included strain ATCC BAA-1116.

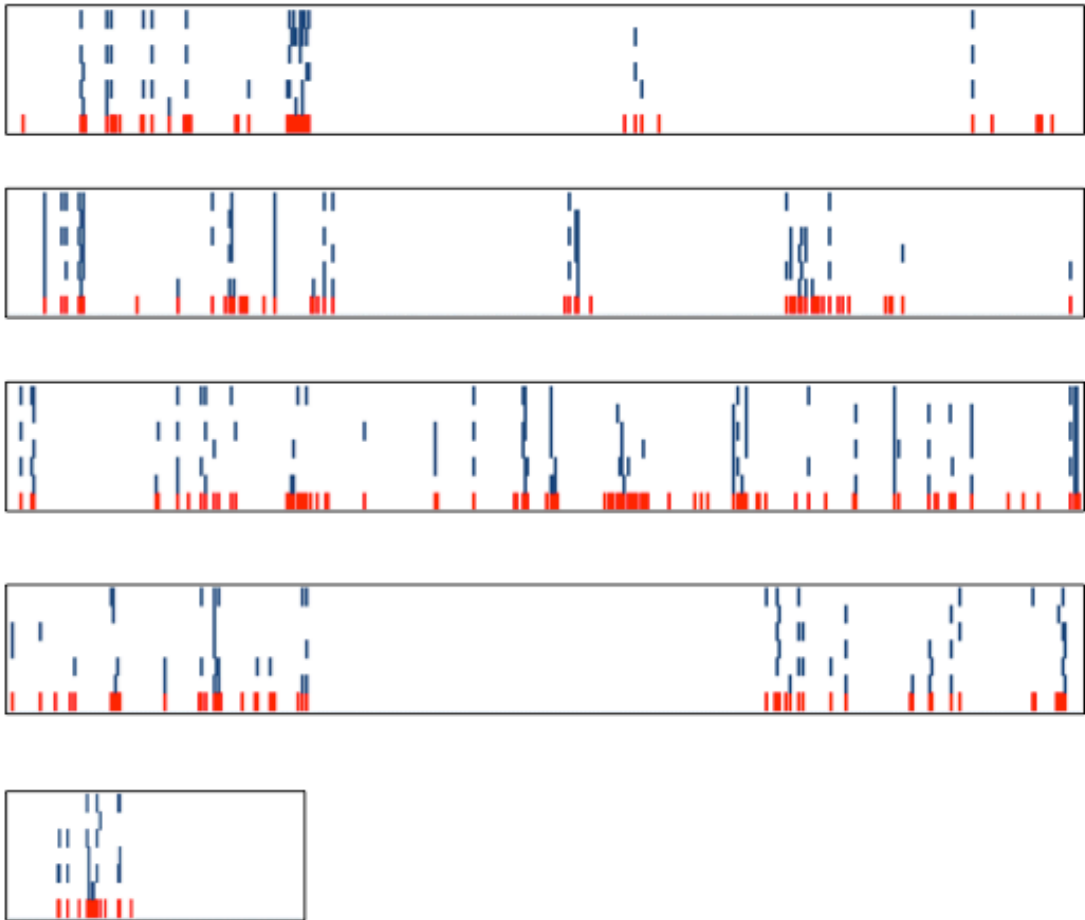
The analyses (from top to bottom) are:

1. *V. campbellii* 051011E + *V. campbellii* 200612B and *V. campbellii* ATCC BAA-1116 + *V. campbellii* PEL22A
2. *V. campbellii* 151112C + *V. campbellii* HY01 and *V. campbellii* ATCC BAA-1116 + *V. campbellii* PEL22A
3. *V. campbellii* 051011E + *V. campbellii* 200612B and *V. campbellii* ATCC BAA-1116 + *V. campbellii* DS40M4
4. *V. campbellii* 151112C + *V. campbellii* HY01 and *V. campbellii* ATCC BAA-1116 + *V. campbellii* DS40M4
5. *V. campbellii* 051011E + *V. campbellii* 200612B and *V. campbellii* NBRC 15631T + *V. campbellii* ATCC BAA-1116
6. *V. campbellii* 151112C + *V. campbellii* HY01 and *V. campbellii* NBRC 15631T + *V. campbellii* ATCC BAA-1116

Chromosome I



Chromosome II



Supplementary figure S4

ClonalFrame estimation of genealogy among 11 *V. campbellii* strains (A), 5 *V. jasicida* and 3 *Vibrio* sp. strains (B), and 3 *Vibrio* sp. and *V. jasicida* 090810c (C). Next to each strain are estimates of recombination (r) and mutations (m) based on ClonalFrame analyses.

