# **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 S1.

V.harveyi ZJ0603		1000   10
V. harveyi VHJR7	; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	Ware app.
V. harveyi CAIM 1792	\$ - 2 & - 3 & 6 & 6 & 6 & 6 & 6 & 6 & 6 & 6 & 6 &	N. ratificitums.  O.2088  O.2088  S. 20 S.
V. harveyi AOD131	75.75	Maintenance
V. harveyi 823TEZI	- TH FI - S - S - S - S - S - S - S - S - S -	Land 11469  12.20  12.2
V. harveyi NBRC 15634 <sup>7</sup>	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	V. community (V. community) (V. comm
V. campbellii PEL22A	9,9,9,9,9,9,9,9,9,9,9,9,9,9,9,9,9,9,9,	N. Ourmill MACS490 8994 8994 8994 8995 8987 8987 8987 8987 8987 8987 8987
V. campbellii HY01	; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	7. C. communication of the com
V. vampbeliii DS40M4	9.64 1 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	7. A merentii 17666-1 2005 2005 2005 2005 2005 2005 2005 200
V. campbellii CCS02	1	7, controls   10,000
V. campbeliii	# # # # # # # # # # # # # # # # # # #	N. Amerikii (1911) B 8974 8831 8835 8835 8835 8835 8835 8835 8835
V. campbellii V. 200612B. ATCC	19.99   19.99	LMG 254417  89.5%
V. campbellii 151112C	8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	W, institute MWB 21 TO 19 TO 1
V. campbellii 051011G	77.79 77.79	7, junction 20, 12, junction 20, 12, junction 20, 20, 20, 20, 20, 20, 20, 20, 20, 20,
V. campbellii 051011F	78, 19	V, Institute 200 200 200 200 200 200 200 200 200 20
V. campbellii 051011E	96.08 1 19.00	P. Javicrida (1998) Re. 2013 (
Average mucleotide identities (ANI) between the analyzed strains.  Tester genome V. cumpbetlii Reference genome NBRC 15631	Without completely   NIRK   1851	National Control
identities (ANI) betwe	NUMECTISETT  OS DOILE  OS	State   Stat
Average nucleotide i Reference genome	When completelli When completelli When completelli Campbelli Cambbelli Cambb	Supplementary table Si Mercangement table Si Mercangement (September 1997)

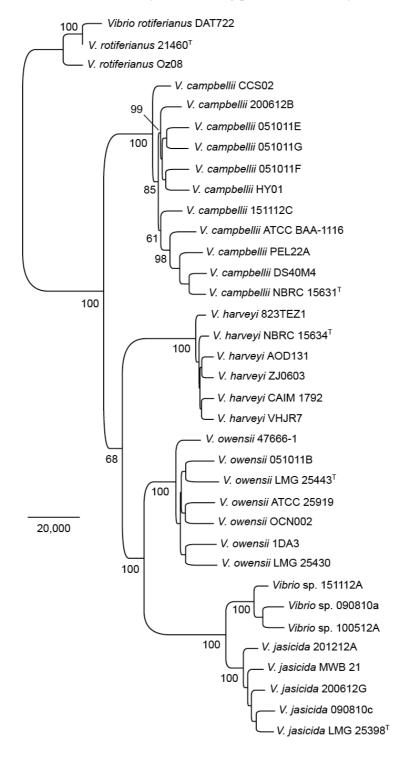
## Supplementary table S2.

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					Average ANI between strains from different clades
Vibrio campbellii 051011E	V. campbellii 200612B	V. harveyi NBRC 15634 <sup>T</sup>	V. harveyi ZJ0603	6	87.92
V. campbellii 051011E	V. campbellii 200612B	V. harveyi CAIM 1792	V. harveyi VHJR7	9	88.02
V. campbellii 051011E	V. campbellii 200612B	V. jasicida LMG 25398 <sup>T</sup>	V. jasicida 200612G	7	87.15
V. campbellii 051011E	V. campbellii 200612B	V. jasicida 090810c	V. jasicida MWB 21	11	87.21
V. campbellii 051011E	V. campbellii 200612B	V. owensii ATCC 25919	V. owensii 051011B	13	89.74
V. campbellii 051011E	V. campbellii 200612B	V. owensii 1DA3	V. owensii LMG 25443 <sup>T</sup>	10	89.76
V. campbellii 051011E	V. campbellii 200612B	V. rotiferianus LMG 21460 <sup>†</sup>	V. rotiferianus Oz08	31	87.35
V. campbellii 151112C	V. campbellii HY01	V. harveyi NBRC 15634 <sup>1</sup>	V. harveyi ZJ0603	11	87.77
V. campbellii 151112C	V. campbellii HY01	V. harveyi CAIM 1792 V. jasicida LMG 25398 <sup>T</sup>	V. harveyi VHJR7	6 2	87.87
V. campbellii 151112C V. campbellii 151112C	V. campbellii HY01	V. jasicida LMG 25398° V. jasicida 090810c	V. jasicida 200612G	9	87.03 87.11
V. campbellii 151112C	V. campbellii HY01 V. campbellii HY01	V. owensii ATCC 25919	V. jasicida MWB 21 V. owensii 051011B	14	89.68
V. campbellii 151112C	V. campbellii HY01	V. owensii 1DA3	V. owensii LMG 25443 <sup>T</sup>	12	89.71
V. campbellii 151112C	V. campbellii HY01	V. rotiferianus LMG 21460 <sup>T</sup>	V. rotiferianus Oz08	31	87.16
V. campbellii 151112C	V. campbellii HY01	Vibrio sp. 151112A	Vibrio sp. 090810a	7	86.32
V. campbellii DS40M4	V. campbellii NBRC 15631 <sup>T</sup>	V. harveyi NBRC 15634 <sup>T</sup>	V. harveyi ZJ0603	0	87.74
V. campbellii DS40M4	V. campbellii NBRC 15631 <sup>T</sup>	V. harveyi CAIM 1792	V. harveyi VHJR7	0	87.83
V. campbellii DS40M4	V. campbellii NBRC 15631 <sup>T</sup>	V. jasicida LMG 25398 <sup>T</sup>	V. jasicida 200612G	3	86.84
V. campbellii DS40M4	V. campbellii NBRC 15631T	V. jasicida 090810c	V. jasicida MWB 21	2	86.90
V. campbellii DS40M4	V. campbellii NBRC 15631 <sup>™</sup>	V. owensii ATCC 25919	V. owensii 051011B	6	89.46
V. campbellii DS40M4	V. campbellii NBRC 15631T	V. owensii 1DA3	V. owensii LMG 25443 <sup>T</sup>	5	89.52
V. campbellii DS40M4	V. campbellii NBRC 15631 <sup>T</sup>	V. rotiferianus LMG 21460 <sup>™</sup>	V. rotiferianus Oz08	5	86.97
V. campbellii DS40M4	V. campbellii NBRC 15631 <sup>T</sup>	Vibrio sp. 151112A	Vibrio sp. 090810a	0	86.28
V. harveyi NBRC 15634T	V. harveyi ZJ0603	V. jasicida LMG 25398 <sup>T</sup>	V. jasicida 200612G	6	86.16
V. harveyi NBRC 15634 <sup>T</sup>	V. harveyi ZJ0603	V. jasicida 090810c	V. jasicida MWB 21	13	86.20
V. harveyi NBRC 15634T	V. harveyi ZJ0603	V. owensii ATCC 25919	V. owensii 051011B	25	88.18
V. harveyi NBRC 15634T	V. harveyi ZJ0603	V. owensii 1DA3	V. owensii LMG 25443 <sup>T</sup>	31	88.43
V. harveyi NBRC 15634 <sup>T</sup>	V. harveyi ZJ0603	V. rotiferianus LMG 21460 <sup>™</sup>	V. rotiferianus Oz08	21	86.34
V. harveyi NBRC 15634T	V. harveyi ZJ0603	Vibrio sp. 151112A	Vibrio sp. 090810a	4	85.50
V. harveyi CAIM 1792	V. harveyi VHJR7	V. jasicida LMG 25398 <sup>-</sup>	V. jasicida 200612G	9	86.23
V. harveyi CAIM 1792	V. harveyi VHJR7	V. jasicida 090810c	V. jasicida MWB 21	16	86.22
V. harveyi CAIM 1792	V. harveyi VHJR7	V. owensii ATCC 25919	V. owensii 051011B	15	87.76
V. harveyi CAIM 1792	V. harveyi VHJR7	V. owensii 1DA3	V. owensii LMG 25443 <sup>T</sup>	36	88.51
V. harveyi CAIM 1792	V. harveyi VHJR7	V. rotiferianus LMG 21460 <sup>⊤</sup>	V. rotiferianus Oz08	15	86.38
V. harveyi CAIM 1792	V. harveyi VHJR7	Vibrio sp. 151112A	Vibrio sp. 090810a	2	85.58
V. jasicida LMG 25398 <sup>r</sup>	V. jasicida 200612G	V. owensii ATCC 25919	V. owensii 051011B	29	89.14
V. jasicida LMG 25398 <sup>T</sup>	V. jasicida 200612G	V. owensii 1DA3	V. owensii LMG 25443 <sup>T</sup>	27	89.18
V. jasicida LMG 253981	V. jasicida 200612G	V. rotiferianus LMG 21460 <sup>⊤</sup>	V. rotiferianus Oz08	13	85.42
V. jasicida LMG 25398 <sup>†</sup>	V. jasicida 200612G	Vibrio sp. 151112A	Vibrio sp. 090810a	51	93.53
V. jasicida 090810c	V. jasicida MWB 21	V. owensii ATCC 25919	V. owensii 051011B	29	89.17
V. jasicida 090810c	V. jasicida MWB 21	V. owensii 1DA3	V. owensii LMG 25443 <sup>T</sup>	27	89.24
V. jasicida 090810c	V. jasicida MWB 21	V. rotiferianus LMG 21460 <sup>⊤</sup>	V. rotiferianus Oz08	17	85.51
V. jasicida 090810c	V. jasicida MWB 21	Vibrio sp. 151112A	Vibrio sp. 090810a	63	93.41
V. owensii ATCC 25919	V. owensii 051011B	V. rotiferianus LMG 21460 <sup>™</sup>	V. rotiferianus Oz08	37	86.93
V. owensii ATCC 25919	V. owensii 051011B	Vibrio sp. 151112A	Vibrio sp. 090810a	8	87.69
V. owensii 1DA3	V. owensii LMG 25443 <sup>T</sup>	V. rotiferianus LMG 21460 <sup>T</sup>	V. rotiferianus Oz08	42 12	87.07
V. owensii 1DA3 V. rotiferianus LMG 21460 <sup>T</sup>	V. owensii LMG 25443 <sup>T</sup> V. rotiferianus Oz08	Vibrio sp. 151112A Vibrio sp. 151112A	Vibrio sp. 090810a Vibrio sp. 090810a	15	87.75 84.82
V. campbellii ATCC BAA-1116	V. campbellii PEL22A	V. harveyi NBRC 15634 <sup>T</sup>	V. harveyi ZJ0603	4	87.70
V. campbellii ATCC BAA-1116	V. campbellii PEL22A	V. harveyi CAIM 1792	V. harveyi VHJR7	5	87.86
V. campbellii ATCC BAA-1116  V. campbellii ATCC BAA-1116	V. campbellii PEL22A  V. campbellii PEL22A	V. jasicida LMG 25398 <sup>T</sup>	V. jasicida 200612G	7	86.99
V. campbellii ATCC BAA-1116	V. campbellii PEL22A  V. campbellii PEL22A	V. jasicida 090810c	V. jasicida MWB 21	8	87.03
V. campbellii ATCC BAA-1116	V. campbellii PEL22A	V. owensii ATCC 25919	V. owensii 051011B	15	89.67
V. campbellii ATCC BAA-1116	V. campbellii PEL22A  V. campbellii PEL22A	V. owensii 1DA3	V. owensii LMG 25443 <sup>T</sup>	15	89.73
V. campbellii ATCC BAA-1116	V. campbellii PEL22A	V. rotiferianus LMG 21460	V. rotiferianus Oz08	24	87.09
V. campbellii ATCC BAA-1116	V. campbellii PEL22A	Vibrio sp. 151112A	Vibrio sp. 090810a	5	86.34
V. campbellii ATCC BAA-1116	V. campbellii DS40M4	V. harvevi NBRC 15634 <sup>T</sup>	V. harvevi ZJ0603	2	87.73
V. campbellii ATCC BAA-1116	V. campbellii DS40M4	V. harveyi CAIM 1792	V. harveyi VHJR7	3	87.87
V. campbellii ATCC BAA-1116	V. campbellii DS40M4	V. jasicida LMG 25398 <sup>-</sup>	V. jasicida 200612G	6	86.96
V. campbellii ATCC BAA-1116		V. jasicida 090810c	V. jasicida MWB 21	7	87.01
V. campbellii ATCC BAA-1116	V. campbellii DS40M4	V. owensii ATCC 25919	V. owensii 051011B	11	89.63
V. campbellii ATCC BAA-1116	V. campbellii DS40M4	V. owensii 1DA3	V. owensii LMG 25443 <sup>T</sup>	10	89.69
V. campbellii ATCC BAA-1116	V. campbellii DS40M4	V. rotiferianus LMG 21460 <sup>T</sup>	V. rotiferianus Oz08	22	87.10
V. campbellii ATCC BAA-1116	V. campbellii DS40M4	Vibrio sp. 151112A	Vibrio sp. 090810a	3	86.31
V. campbellii 151112C	V. campbellii 051011E	V. jasicida 090810c	V. jasicida 200612G	14	87.16
V. campbellii 151112C	V. campbellii 051011E	Vibrio sp. 151112A	Vibrio sp. 090810a	3	86.37
V. jasicida 090810c	V. jasicida 200612G	Vibrio sp. 151112A	Vibrio sp. 090810a	62	93.55
V. campbellii 051011E	V. campbellii 200612B	V. jasicida 090810c	V. jasicida 200612G	11	87.13
V. campbellii 051011E	V. campbellii 200612B	Vibrio sp. 151112A	Vibrio sp. 090810a	4	86.33
V. campbellii 051011E	V. campbellii 200612B	V. campbellii DS40M4	V. campbellii NBRC 15631 <sup>⊤</sup>	47	96.27
V. campbellii 151112C	V. campbellii HY01	V. campbellii DS40M4	V. campbellii NBRC 15631 <sup>⊤</sup>	62	96.05
V. campbellii 051011E	V. campbellii 200612B	V. campbellii ATCC BAA-1116	V. campbellii PEL22A	191	96.53
V. campbellii 151112C	V. campbellii HY01	V. campbellii ATCC BAA-1116	V. campbellii PEL22A	229	96.39
V. campbellii 051011E	V. campbellii 200612B	V. campbellii ATCC BAA-1116	V. campbellii DS40M4	162	96.34
V. campbellii 151112C	V. campbellii IIY01	V. campbellii ATCC BAA-1116	V. campbellii DS40M4	203	96.22
V. campbellii 051011E	V. campbellii 200612B	V. campbellii NBRC 15631 <sup>T</sup>	V. campbellii ATCC BAA-1116	154	96.42
V. campbellii 151112C	V. campbellii HY01	V. campbellii NBRC 15631 <sup>™</sup>	V. campbellii ATCC BAA-1116	224	96.21
V. campbellii 051011E	V. campbellii 200612B	V. campbellii NBRC 15631 <sup>™</sup>	V. campbellii PEL22A	100	96.39
V. campbellii 151112C	V. campbellii HY01	V. campbellii NBRC 15631 <sup>™</sup>	V. campbellii PEL22A	138	96.21
V. campbellii 051011E	V. campbellii 200612B	V. campbellii DS40M4	V. campbellii ATCC BAA-1116	163	96.34
V. campbellii 151112C	V. campbellii HY01	V. campbellii DS40M4	V. campbellii ATCC BAA-1116	203	96.22
		V. campbellii DS40M4	V. campbellii PEL22A	119	96.31
V. campbellii 051011E V. campbellii 151112C	V. campbellii 200612B V. campbellii HY01	V. campbellii DS40M4	V. campbellii PEL22A	138	96.23

#### Supplementary figure S1.

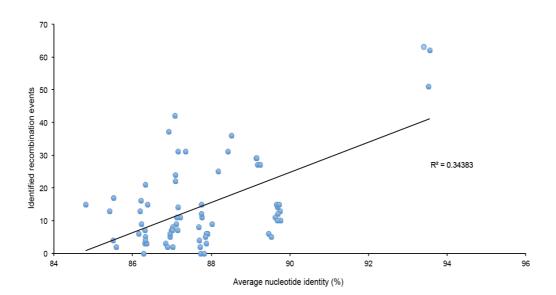
Phylogenetic resolution of the 'Harveyi clade' using parsimonious analysis.



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.

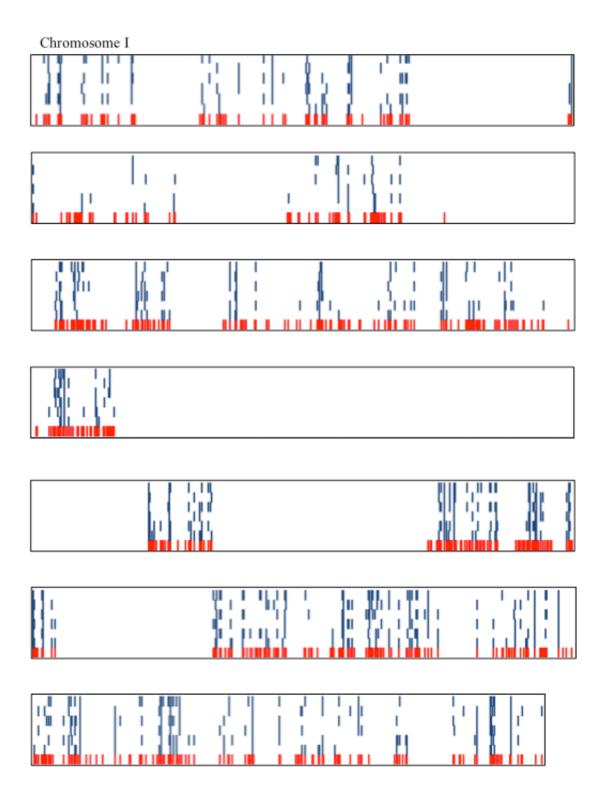


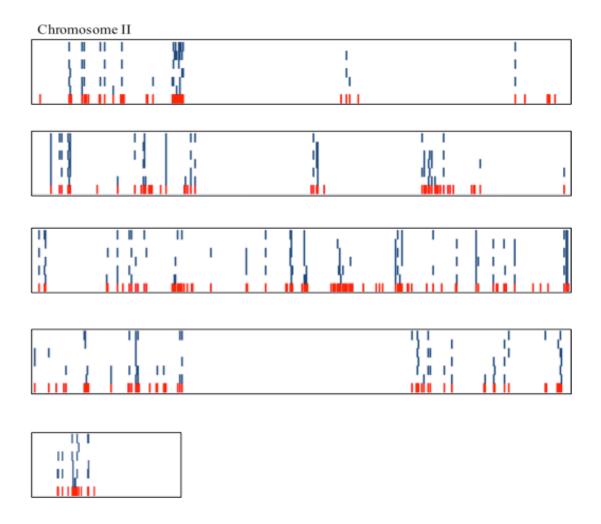
#### Supplementary figure S3.

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





## **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.

