

FIG. S1. The relative abundance of the 70 OTUs in sewage and animal clone libraries (cats, dogs, pigs and cows). Values of relative abundances increase from yellow to red. Dendograms represent relationship of abundance patterns (Y-axis) and relationship of hosts using absolute distance between OTUs.

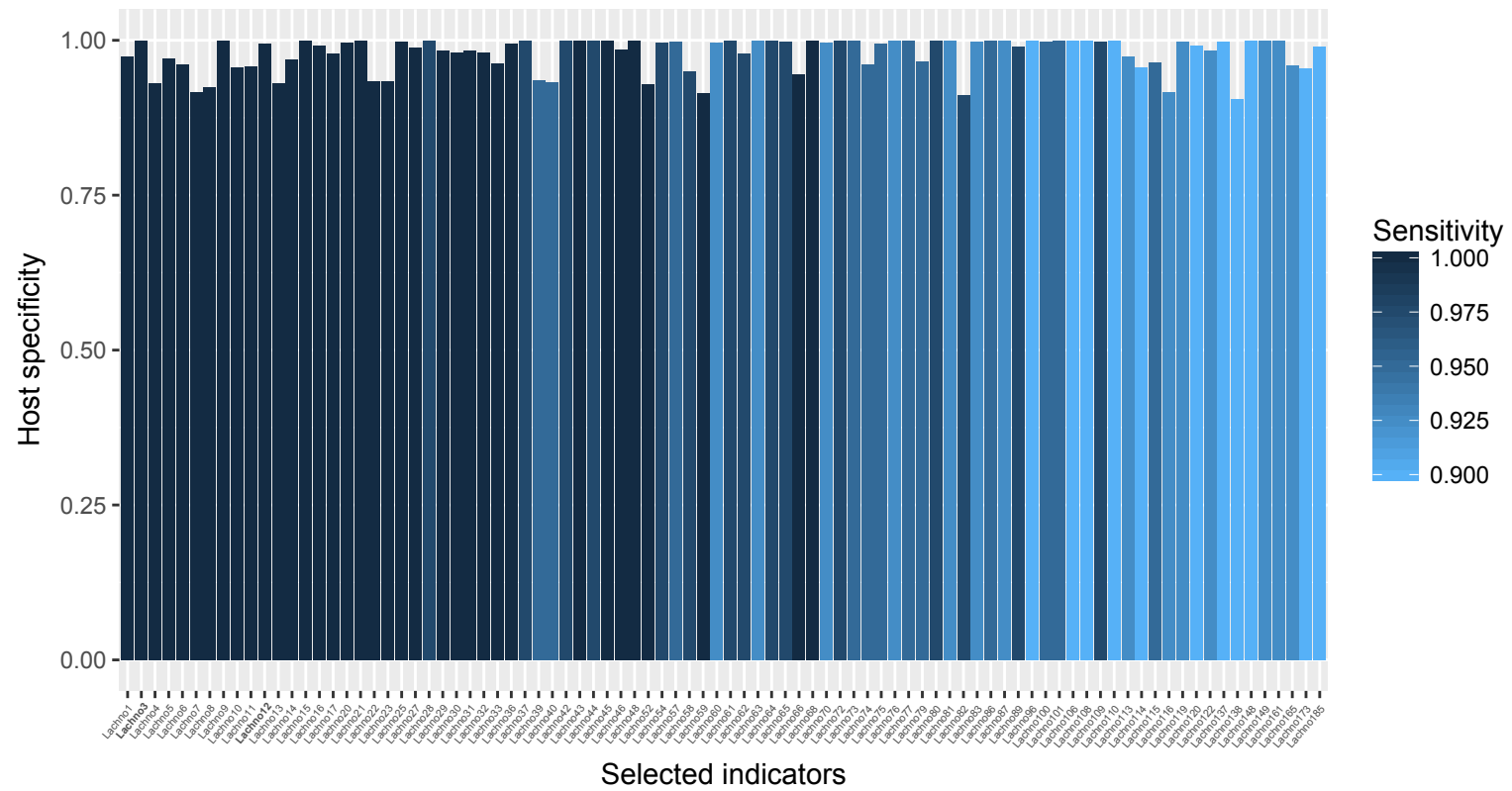


FIG. S2. Sewage indicators candidates of over 90% host specificity and sensitivity chosen by “Indicspecies”. The X-axis lists the chosen indicators and the Y-axis represents indicator host specificity. Deeper color represents higher indicator sensitivity.

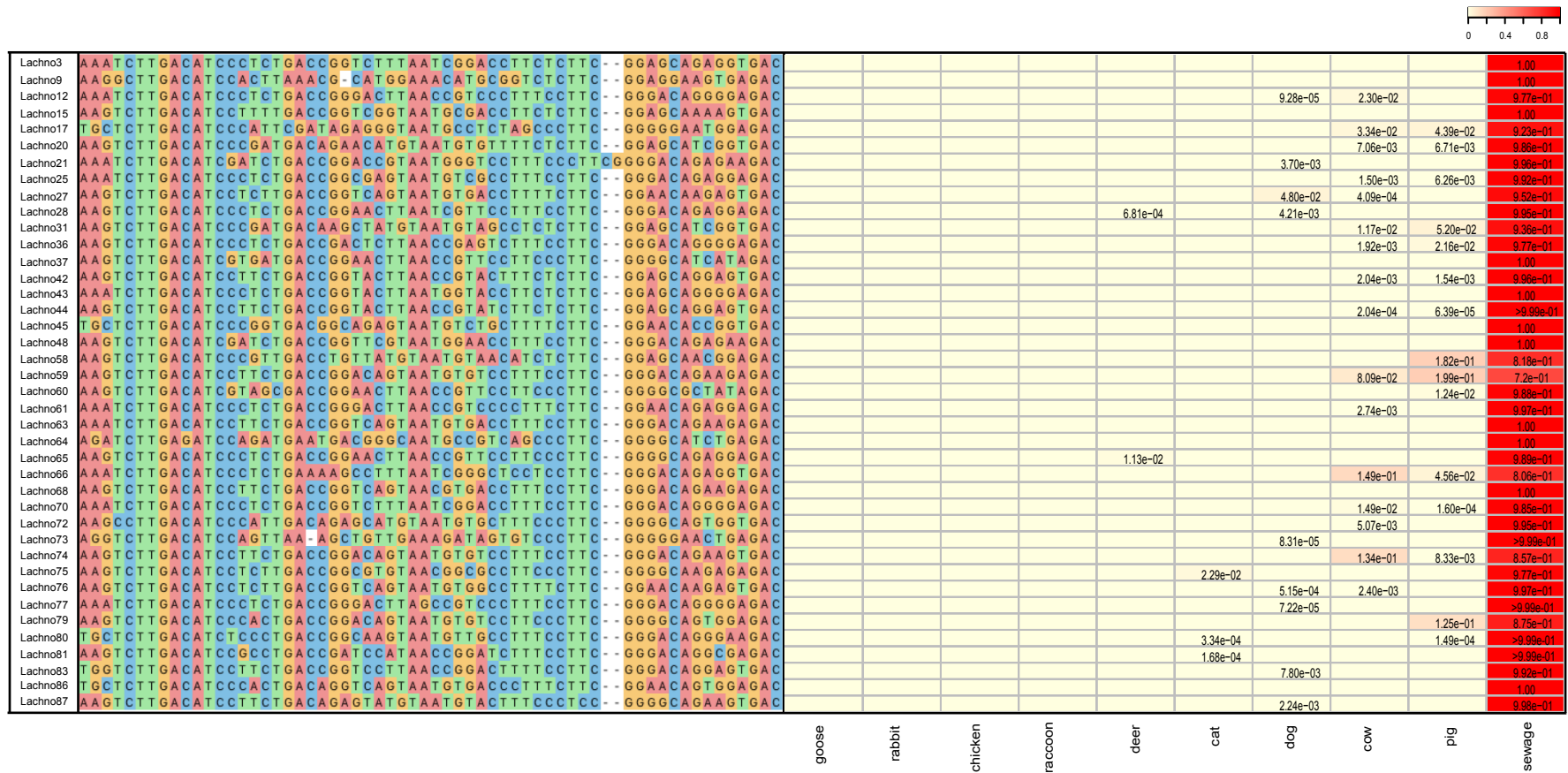


FIG. S3. List of the top 40 Lachnospiraceae fecal markers candidates. Sequences are shown in an alignment. The distribution of each candidate in sewage and nine animal hosts in the V6 NGS dataset are shown in the heatmap. The relative abundances are calculated using total sum of that sequence for all samples and shown in yellow to red with increasing values. Relative abundance values above zero are shown on the heatmap.

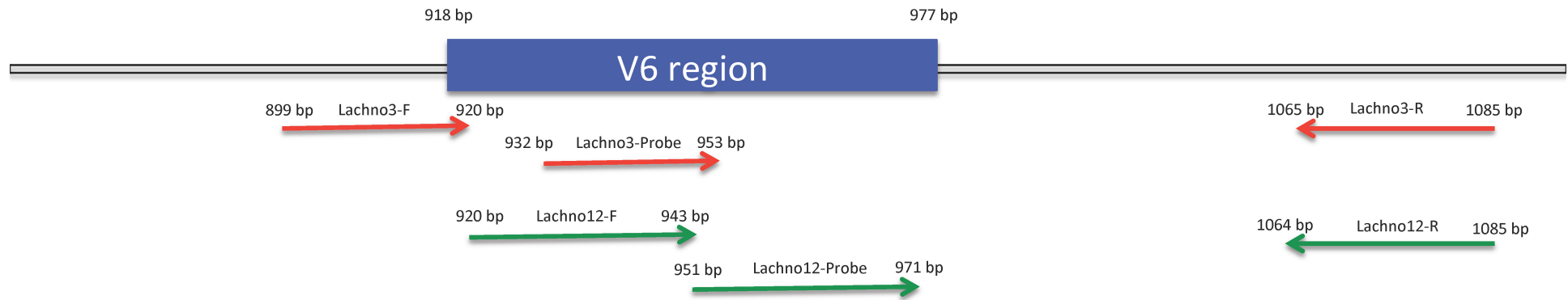


FIG. S4. Positions of Lachno3 and Lachno12 assay primers and probes using a *Lachnospiraceae* reference sequence (GenBank Access Number EF036467). The V6 region is marked in blue. The Lachno3 assay is shown in red arrows and Lachno12 assay is shown in green arrows. Start and end nucleotide positions of each primer and probe are indicated.

Table S1. qPCR assays slopes, Y intercepts, R-Squared and efficiencies.

Target Name	Slope	Intercept	R ²	Efficiency (%)
Lachno3	-3.333	38.321	0.999	95.519
Lachno12	-3.827	40.914	0.998	101.483
Lachno2	-3.525	38.182	0.999	92.316
HB	-3.350	37.202	0.999	98.887
HF183/BacR287	-3.515	38.550	0.999	92.515

Table S2. Lachno3 and Lachno12 assay q-PCR validation results. N is the numbers of the total animal individuals tested. Results are displayed as positive individual numbers (n) with the average copy numbers (CN).

Assays	DNA amt (ng)	Cat (N=11)	Dog (N=10)	Pig (N=9)	Cow (N=10)	Deer (N=11)	Gull (N=4)
n / CN per amt of DNA							
Lachno3	1	2/2	0	0	0	0	0
	0.1	0	0	0	0	0	0
	0.01	0	0	0	0	0	0
Lachno12	1	0	0	3/12	4/216	0	0
	0.1	0	0	3/1	4/28	0	0
	0.01	0	0	0	2/4	0	0
HB	1	0	2/375	0	0	3/406	0
	0.1	0	2/34	0	0	3/41	0
	0.01	0	2/2	0	0	1/15	0
HF183/ BacR287	1	0	0	0	0	3/364	0
	0.1	0	0	0	0	1/117	0
	0.01	0	0	0	0	1/7	0
Lachno2	1	9/884	7/3,100	9/782	7/12	3/9	0
	0.1	9/93	1/2,320	7/77	1/2	0	0
	0.01	2/41	1/223	3/8	0	0	0