

Supplementary Figures and Tables

Application of SourceTracker for Accurate Identification of Fecal Pollution in Recreational Freshwater: A Double-Blinded Study

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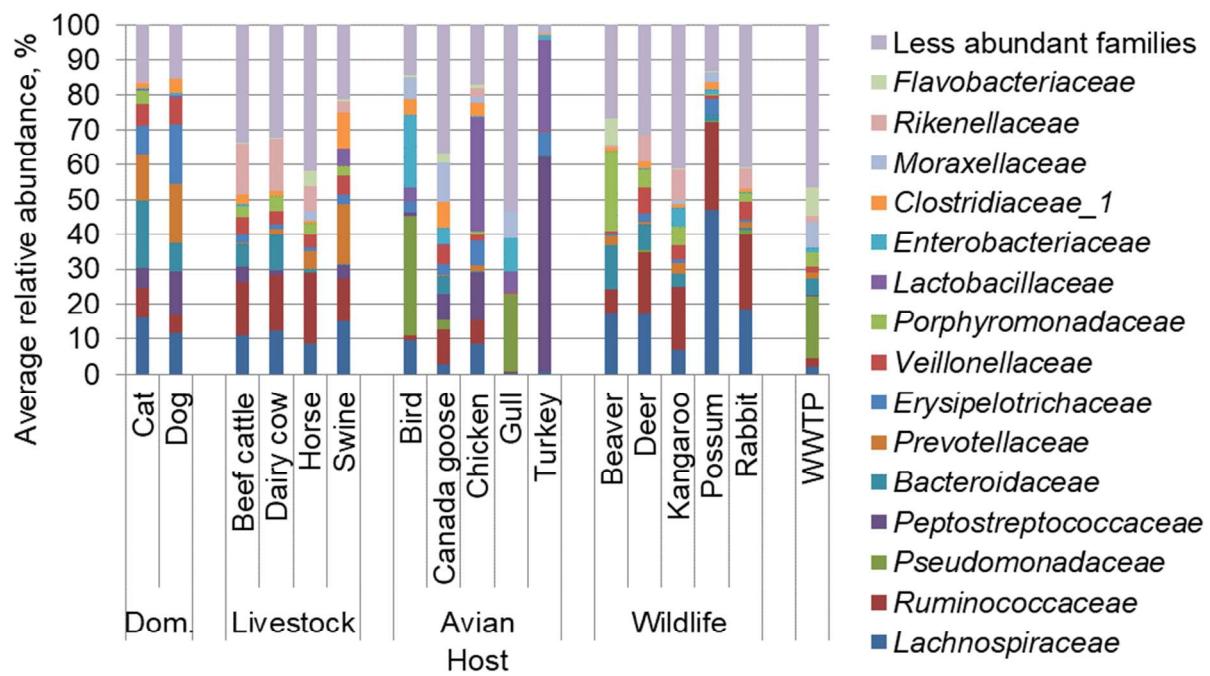


Figure S1 – Distribution of abundant families among all host categories, irrespective of geography. Only the 15 most abundant families are shown. Dom: domesticated animals.

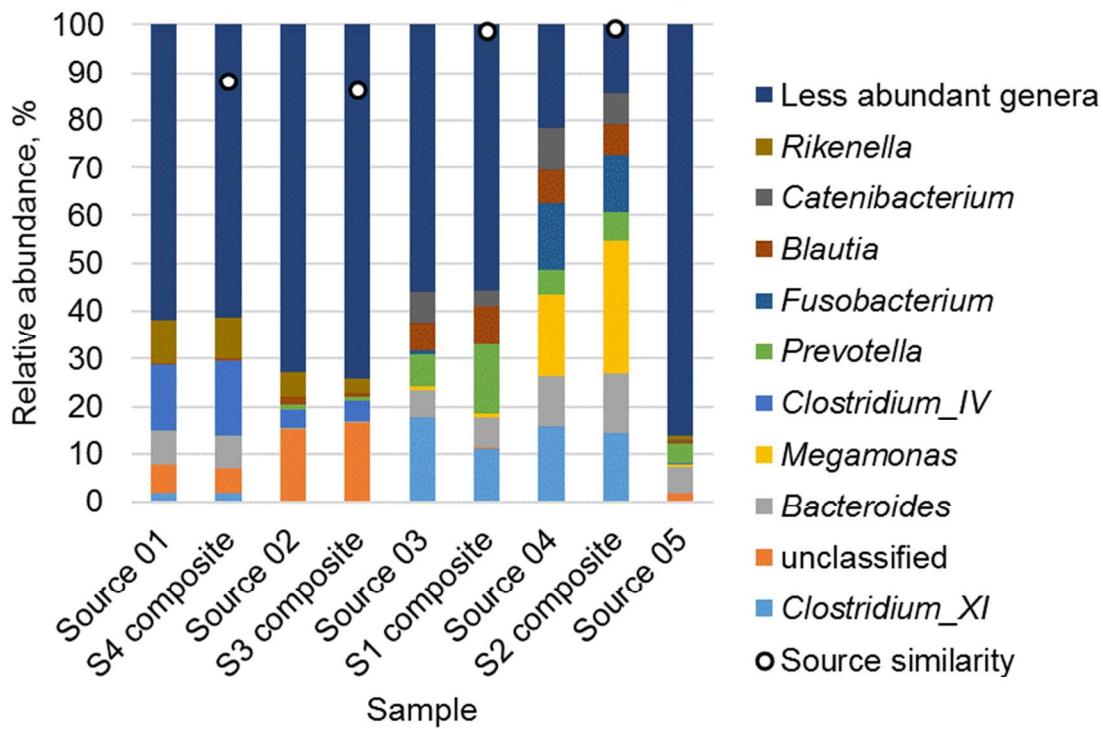


Figure S2 – Distribution of abundant genera in blinded source and composite samples. “Source similarity” refers to the SourceTracker sink prediction from the correct individual sources (confirmed after unblinding).

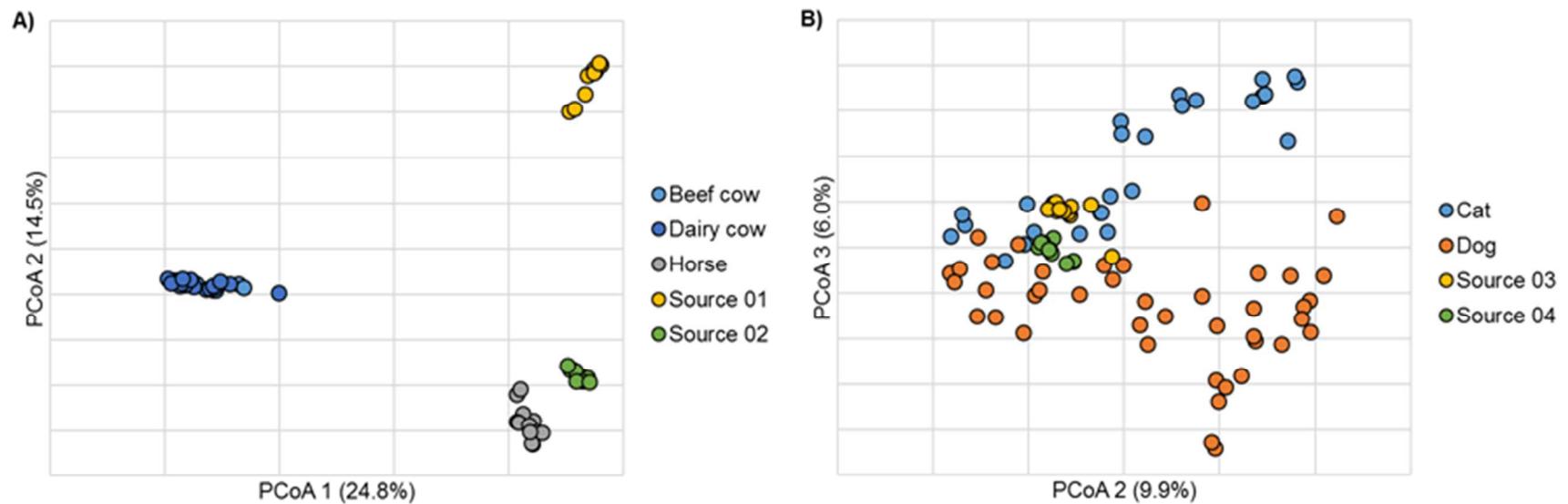


Figure S3 – Principal coordinate analyses of Bray-Curtis dissimilarity matrices among bacterial communities. Samples shown represent those of individual blind sources hypothesized to be A) livestock or B) domestic animals.

Table S2 – Proportions of spiked source material (% vol/vol) in blinded sink samples and SourceTracker sink predictions (% mean ± standard deviation) using the initial library alone or the full library, including FL blinded sources. “SW” is the sample number of the blinded water samples. NT: not tested (not in the source library); NA: not applicable (not spiked in blinded samples).

Sample ID	Composition	Beef cattle	Dairy cattle	Cow	Horse	Cat	Dog	WWTP
All Sources								
SW01	Expected	NA	NA	2.0	2.0	2.0	2.0	2.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.1	2.5 ± 0.1	1.0 ± 0.2
	Full	0.0 ± 0.0	0.0 ± 0.0	4.0 ± 0.0	29.0 ± 0.0	10.0 ± 1.0	42.0 ± 1.0	9.0 ± 0.0
SW34	Expected	NA	NA	0.2	0.2	0.2	0.2	0.2
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	2.1 ± 0.3	2.5 ± 0.2	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	11.2 ± 0.3	5.4 ± 0.3	14.0 ± 0.9	39.5 ± 0.9	1.9 ± 0.3
SW03	Expected	NA	NA	0.025	0.025	0.025	0.025	0.025
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	2.0 ± 0.0	0.0 ± 0.0	4.0 ± 0.0	12.0 ± 0.0	0.0 ± 0.0
Cow + horse + cat + dog								
SW32	Expected	NA	NA	2.0	2.0	2.0	2.0	0.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.1 ± 0.1	0.2 ± 0.4	2.5 ± 0.3	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	6.1 ± 0.2	34.6 ± 0.3	8.9 ± 0.9	45.2 ± 0.9	1.0 ± 0.1
SW05	Expected	NA	NA	0.25	0.25	0.25	0.25	0.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	2.0 ± 0.2	3.0 ± 0.2	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	11.0 ± 1.0	6.0 ± 0.0	10.0 ± 1.0	41.0 ± 1.0	0.0 ± 0.0
SW30	Expected	NA	NA	0.05	0.05	0.05	0.05	0.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.4 ± 0.5	0.8 ± 0.4	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	4.9 ± 0.3	0.1 ± 0.3	4.2 ± 0.7	17.1 ± 0.8	0.0 ± 0.0
Cow + WWTP								
SW20	Expected	NA	NA	5.0	0.0	0.0	0.0	5.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	7.2 ± 0.3
	Full	0.0 ± 0.0	0.0 ± 0.0	27.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	61.0 ± 0.0
SW17	Expected	NA	NA	0.5	0.0	0.0	0.0	0.5
	Initial	0.1 ± 0.3	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	2.4 ± 0.3
	Full	0.0 ± 0.0	0.0 ± 0.0	35.0 ± 1.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	20.0 ± 1.0

SW18	Expected	NA	NA	0.05	0.0	0.0	0.0	0.05
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	12.0 ± 1.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	3.0 ± 0.0
Horse + WWTP								
SW26	Expected	NA	NA	0.0	5.0	0.0	0.0	5.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	1.1 ± 0.4	0.0 ± 0.0	0.0 ± 0.0	6.2 ± 0.2
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	42.9 ± 0.3	0.0 ± 0.0	0.0 ± 0.0	45.5 ± 0.3
SW11	Expected	NA	NA	0.0	0.5	0.0	0.0	0.5
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	3.0 ± 0.4	0.0 ± 0.0	0.0 ± 0.0	3.0 ± 0.4
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	23.0 ± 0.0	1.0 ± 0.0	0.0 ± 0.0	23.0 ± 1.0
SW24	Expected	NA	NA	0.0	0.05	0.0	0.0	0.05
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.6 ± 0.4
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	2.8 ± 0.4	0.6 ± 0.3	0.0 ± 0.0	3.1 ± 0.5
Cat + WWTP								
SW07	Expected	NA	NA	0.0	0.0	5.0	0.0	5.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.8 ± 0.4	0.0 ± 0.0	5.2 ± 0.2
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	35.0 ± 0.0	0.0 ± 0.0	61.0 ± 0.0
SW28	Expected	NA	NA	0.0	0.0	0.5	0.0	0.5
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	3.1 ± 0.4	0.0 ± 0.0	4.5 ± 0.4
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	46.3 ± 0.2	0.0 ± 0.0	13.3 ± 0.5
SW09	Expected	NA	NA	0.0	0.0	0.05	0.0	0.05
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.1 ± 0.2	0.0 ± 0.0	1.2 ± 0.3
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	14.0 ± 0.0	0.0 ± 0.0	4.0 ± 1.0
Dog + WWTP								
SW13	Expected	NA	NA	0.0	0.0	0.0	5.0	5.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.0	2.2 ± 0.2	3.3 ± 0.2
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	70.0 ± 0.0	26.0 ± 0.0
SW22	Expected	NA	NA	0.0	0.0	0.0	0.5	0.5
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.6 ± 0.6	4.3 ± 0.4	0.7 ± 0.6
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	62.5 ± 0.2	10.9 ± 0.4
SW15	Expected	NA	NA	0.0	0.0	0.0	0.05	0.05
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.0	1.9 ± 0.2	0.9 ± 0.2
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	28.0 ± 0.0	3.0 ± 0.0

Cow								
SW31	Expected	NA	NA	10.0	0.0	0.0	0.0	0.0
	Initial	0.1 ± 0.3	0.1 ± 0.3	NT	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	61.6 ± 0.5	9.3 ± 0.4	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
SW04	Expected	NA	NA	1.0	0.0	0.0	0.0	0.0
	Initial	0.5 ± 0.7	0.1 ± 0.4	NT	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	55.0 ± 1.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
SW33	Expected	NA	NA	0.1	0.0	0.0	0.0	0.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	21.4 ± 0.8	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
Horse								
SW14	Expected	NA	NA	0.0	10.0	0.0	0.0	0.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	3.9 ± 0.4	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	83.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
SW23	Expected	NA	NA	0	1.0	0	0	0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	6.5 ± 0.5	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	50.6 ± 0.7	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
SW12	Expected	NA	NA	0	0.1	0	0	0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.1 ± 0.2	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	11.0 ± 1.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
Cat								
SW19	Expected	NA	NA	0.0	0.0	10	0.0	0.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	4.6 ± 0.3	0.0 ± 0.0	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	97.0 ± 0	0.0 ± 0.0	0.0 ± 0.0
SW16	Expected	NA	NA	0.0	0.0	1.0	0.0	0.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	3.6 ± 0.3	0.0 ± 0.0	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	68.0 ± 0	0.0 ± 0.0	0.0 ± 0.0
SW21	Expected	NA	NA	0.0	0.0	0.1	0.0	0.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	1.7 ± 0.2	0.0 ± 0.0	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	27.4 ± 0.3	0.0 ± 0.0	0.0 ± 0.0
Dog								
SW25	Expected	NA	NA	0.0	0.0	0.0	10.0	0.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	3.8 ± 0.6	0.0 ± 0.0	0.0 ± 0.0

	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	1.1 ± 0.6	0.1 ± 0.4	94.7 ± 0.5	0.2 ± 0.4
SW10	Expected	NA	NA	0.0	0.0	0.0	1.0	0.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.3 ± 0.5	4.6 ± 0.4	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	85.0 ± 0.0	0.0 ± 0.0
SW27	Expected	NA	NA	0.0	0.0	0.0	0.1	0.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.0	3.8 ± 0.3	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	46.5 ± 0.3	0.0 ± 0.0
WWTP								
SW08	Expected	NA	NA	0.0	0.0	0.0	0.0	10
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	12.8 ± 0.6
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	93.0 ± 0.0
SW29	Expected	NA	NA	0.0	0.0	0.0	0.0	1.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.3 ± 0.3	0.0 ± 0.0	9.2 ± 0.4
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	4.2 ± 0.4	0.0 ± 0.0	41.3 ± 0.5
SW06	Expected	NA	NA	0.0	0.0	0.0	0.0	0.1
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	1.1 ± 0.4
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	1.0 ± 0.0	0.0 ± 0.0	4.0 ± 1.0
Blank								
SW02	Expected	NA	NA	0.0	0.0	0.0	0.0	0.0
	Initial	0.0 ± 0.0	0.0 ± 0.0	NT	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	Full	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0