Supplementary Information

Table S1. Concentration of bacteria per sampling unit (individual funnel, see Section 2.1) drainage, average and CI_{95} (cfu mL^{-1}). Event 0 summarizes the background bacteria as collected during the preliminary irrigation event (see Section 2.5) run previously to addition of biosolids. Biosolids were added once, before irrigation Event 1.

Irrigation Event	*E. coli*	*Enterococcus* spp.	*Salmonella* spp.	*C. perfringens*
		Clay		
0	8.8 (3.2)	0.1 (0.14)	0 (0)	5.9 (11.6)
1	28,589.0 (18816.0)	59.9 (25.6)	3.2 (1.76)	86.7 (19.4)
2	394.0 (129.0)	4.1 (1.7)	0.02 (0.04)	6.1 (1.8)
3	188.0 (77.6)	7.6 (9.6)	1.5 (0.9)	36.0 (30.2)
4	2.9 (1.0)	0 (0)	0.1 (0.2)	7.6 (2.3)
		Clay Loam		
0	36.7 (11.7)	3.0 (2.8)	3.5 (5.0)	2.5 (1.7)
1	176.0 (58.7)	103.0 (52.7)	7.8 (4.6)	75,335.0 (43.1)
2	111.0 (29.8)	1.1 (1.0)	0.8 (1.1)	11.0 (3.4)
3	447.0 (191.0)	2.1 (2.0)	2.7 (1.8)	6.3 (2.2)
4	2.9 (1.3)	0.01 (0.01)	0.01 (0.01)	0.9 (0.3)
		Sandy Loam		
0	5.3 (4.0)	0.3 (0.4)	0.7 (0.4)	6.3 (3.6)
1	2.1 (0.9)	0.3 (0.1)	0.4 (0.3)	13.0 (5.8)
2	2.5 (1.6)	0.002 (0.005)	0.2 (0.1)	8.3 (4.8)
3	0.6 (0.7)	0.002 (0.004)	1.5 (1.0)	7.8 (2.4)
4	8.5 (3.4)	0.03 (0.03)	0.06 (0.03)	11.9 (10.4)

Table S2. Filtration coefficients best fit; Drainage Event 1 (see Figure 1).

Treatment *	*E. coli*	*Enterococcus* spp.	*Salmonella* spp.	*C. perfringens*	Microspheres
C-DMW	$y = 6.3054x^{-0.119}$ $R^2 = 0.48$	$y = 7.4358x^{-0.123}$ $R^2 = 0.62$	–	$y = 5.8745x^{-0.132}$ $R^2 = 0.41$	$y = 3.6652x^{-0.162}$ $R^2 = 0.67$
C-LMB	$y = 0.0198x^{-0.539}$ $R^2 = 0.01$	$y = 8.8864x^{-0.1}$ $R^2 = 0.44$	$y = 8.4362x^{-0.099}$ $R^2 = 0.72$	$y = 8.6857x^{-0.112}$ $R^2 = 0.69$	$y = 2.6833x^{-0.154}$ $R^2 = 0.13$
CL-DMW	$y = 15.137x^{-0.044}$ $R^2 = 0.14$	$y = -9482.3x + 31.038$ $R^2 = 0.38$	$y = 9.3455x^{-0.133}$ $R^2 = 0.75$	$y = 13.854x^{-0.064}$ $R^2 = 0.28$	$y = 6.6168x^{-0.107}$ $R^2 = 0.82$
CL-LMB	$y = 3.3475x^{-0.158}$ $R^2 = 0.57$	$y = 8.362x^{-0.093}$ $R^2 = 0.34$	$y = 8.4521x^{-0.088}$ $R^2 = 0.69$	$y = 32.32e^{-6677x}$ $R^2 = 0.45$	$y = 0.2716x^{-0.387}$ $R^2 = 0.44$
SL-DMW	$y = 15.345x^{-0.077}$ $R^2 = 0.59$	$y = 15.228x^{-0.083}$ $R^2 = 0.70$	–	$y = 15.228x^{-0.083}$ $R^2 = 0.40$	–
SL-LMB	$y = -3860.2x + 15.932$ $R^2 = 0.37$	$y = -3968.1x + 24.152$ $R^2 = 0.54$	$y = -3.451\ln(x) - 9.4794$ $R^2 = 0.60$	$y = -6305.8x + 23.312$ $R^2 = 0.39$	$y = -3722.9x + 14.739$ $R^2 = 0.42$

Notes: * C–clay soil; CL–clay loam soil; SL–sandy loam soil; DMW–dewatered municipal waste biosolids organic amendment; LMB–liquid municipal waste biosolids organic amendment.

Table S3. Filtration coefficients best fit; drainage Event 4 (double irrigation) (see Figure 1).

Treatment	*E. coli*	*Enterococcus* spp.	*Salmonella* spp.	*C. perfringens*	Microspheres
C-DMW	$y = 12.562x^{-0.098}$ $R^2 = 0.47$	–	$y = 10.144x^{-0.125}$ $R^2 = 0.40$	$y = 14.033x^{-0.064}$ $R^2 = 0.29$	–
C-LMB	$y = 8.788x^{-0.085}$ $R^2 = 0.82$	–	–	$y = 6.6086x^{-0.143}$ $R^2 = 0.53$	$y = 37.24e - 117.1x$ $R^2 = 0.52$
CL-DMW	$y = 13.6x^{-0.081}$ $R^2 = 0.26$	$y = 24.393x^{-0.023}$ $R^2 = 0.61$	–	$y = 14.843x^{-0.063}$ $R^2 = 0.39$	$y = 24.433x^{-0.047}$ $R^2 = 0.36$
CL-LMB	–	–	–	$y = 14.085x^{-0.061}$ $R^2 = 0.21$	$y = 20.761x^{-0.067}$ $R^2 = 0.33$
SL-DMW	$y = 13.6x^{-0.081}$ $R^2 = 0.26$	$y = 24.393x^{-0.023}$ $R^2 = 0.61$	–	$y = 14.843x^{-0.063}$ $R^2 = 0.38$	$y = 27.745x^{-0.031}$ $R^2 = 0.22$
SL-LMB	$y = 2.7494x^{-0.193}$ $R^2 = 0.24$	–	$y = 10.403x^{-0.079}$ $R^2 = 0.41$	$y = -1.323\ln(x) + 11.388$ $R^2 = 0.21$	$y = 27.138x^{-0.027}$ $R^2 = 0.08$

Notes: C–clay soil; CL–clay loam soil; SL–sandy loam soil; DMW–dewatered municipal waste biosolids organic amendment; LMB–liquid municipal waste biosolids organic amendment.

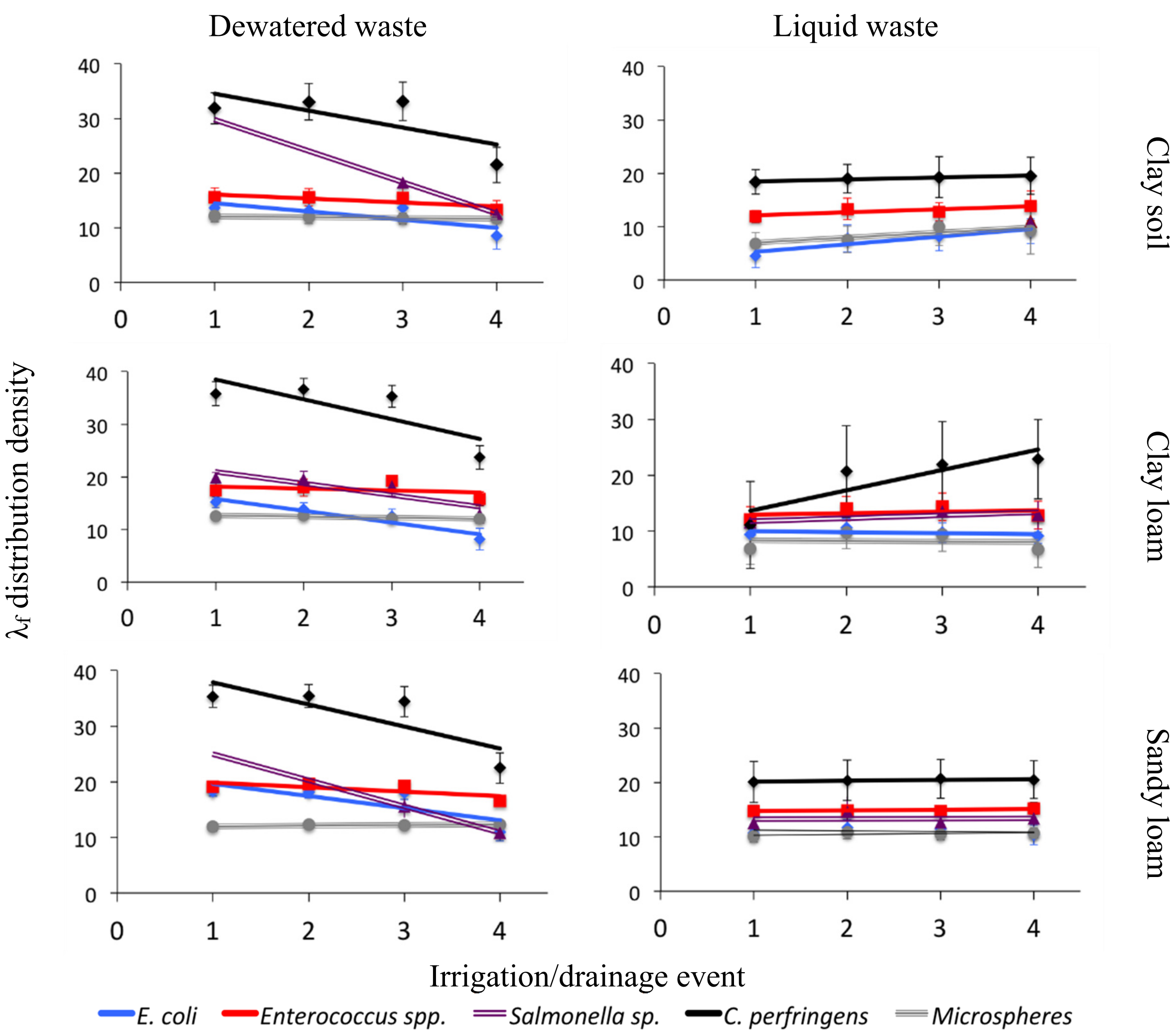

Figure S1. Mean cumulative filtration coefficients (λ_f); Mean, standard deviations, and linear fit. The slope of the fit indicates an increase or decrease in average cumulative filtration. For dewatered waste all slopes were negative; for liquid waste slopes were either positive or very close to 0.

Table S4. Kolmogorov-Smirnov dissimilarity indices between the empirical distributions of microsphere and the respective bacterial distributions.

Bacterial Tracer	**Irrigation & Drainage Event**							
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**
	Clay Soil & Dewatered Municipal Biosolid				**Clay Soil & Liquid Municipal Biosolid**			
E. coli	**0.39 (0.059) ***	**0.36 (0.082)**	0.39 (0.039)	0.71 (<0.001)	0.46 (0.005)	**0.33 (0.307)**	0.51 (0.015)	**0.35 (0.525)**
***Enterococcus* spp.**	0.79 (<0.001)	0.77 (<0.001)	0.75 (<0.001)	0.45 (0.005)	0.88 (<0.001)	0.80 (0.002)	**0.47 (0.142)**	**0.55 (0.191)**
C. perfringens	1 (<0.001)	1 (<0.001)	1 (<0.001)	0.99 (<0.001)	1 (<0.001)	1 (<0.001)	0.91 (<0.001)	0.93 (<0.001)
***Salmonella* sp.**	nd	nd	1 (<0.001)	**0.36 (0.16)**	0.85 (<0.001)	nd	nd	nd
	Clay Loam Soil & Dewatered Municipal Biosolid				**Clay Loam Soil & Liquid Municipal Biosolid**			
E. coli	0.9 (<0.001)	**0.51 (0.125)**	**0.36 (0.626)**	0.88 (<0.001)	**0.46 (0.034)**	0.76 (<0.001)	0.83 (<0.001)	0.87 (<0.001)
***Enterococcus* spp.**	1 (<0.001)	1 (<0.001)	1 (<0.001)	0.87 (<0.001)	0.48 (0.012)	**0.27 (0.511)**	**0.25 (0.423)**	0.73 (0.001)
C. perfringens	1 (<0.001)	1 (<0.001)	1 (<0.001)	1 (<0.001)	0.78 (<0.001)	0.76 (<0.001)	0.78 (<0.001)	0.78 (<0.001)
***Salmonella* spp.**	1 (<0.001)	1 (<0.001)	1 (<0.001)	**0.38 (0.078)**	0.78 (<0.001)	0.73 (0.002)	0.71 (0.006)	nd
	Sandy Loam Soil & Dewatered Municipal Biosolid				**Sandy Loam Soil & Liquid Municipal Biosolid**			
E. coli	1 (0.003)	1 (<0.001)	1 (<0.001)	**0.55 (0.06)**	**0.32 (0.159)**	**0.42 (0.063)**	**0.43 (0.072)**	**0.35 (0.1)**
***Enterococcus* spp.**	1 (0.011)	1 (0.047)	1 (0.007)	1 (<0.001)	1 (<0.001)	0.99 (<0.001)	1 (<0.001)	0.99 (<0.001)
C. perfringens	1 (0.003)	1 (<0.001)	1 (<0.001)	1 (<0.001)	1 (<0.001)	1 (<0.001)	1 (<0.001)	1 (<0.001)
***Salmonella* spp.**	nd	nd	0.86 (0.001)	0.88 (0.004)	0.72 (<0.001)	0.83 (<0.001)	0.86 (0.001)	0.57 (0.019)

Notes: ***** Values represent dissimilarity between the empirical PDF of microspheres and the PDF of each of the four bacterial tracers on a scale of 0 to 1 with 1 being most dissimilar. In parentheses the asymptotic *p*-values. Analysis was carried out via a Kolmogorov-Smirnov test for comparison of two empirical distributions with H0: $F1(x) = F2(x)$; therefore any *p*-value smaller than 0.05 rejects H0 indicating that distributions are dissimilar; Distributions that are statistically likely to be similar (*i.e.*, $p > 0.05$) are highlighted in bold [29]; nd = not determined.

Table S5. Best fit probability density functions (PDF) visualised in Figure 5.

Treatment	Tracer	Event 1	Event 2	Event 3	Event 4
Clay soil–dewatered waste	*E. coli*	*Gamma* (2) κ = 74.4 ± 0.3; β =.0.18 ± 0.08; *N* = 31; 99.9%	*Weibull* (3); β = 3.3 ± 0.3; γ = 5.2 ± 0.1; μ = 8.5 ± 0.2; *N* = 63; 99%	*Beta 4* α = 1.13 ± 0.2; β = 1.14 ± 0.2; *c* = 9.6 ± 0.3; *d* = 17.7 ± (<0.01); *N* = 52; 47.7%	*Gamma* (1) κ = 8.5 ± 0.2; *N* = 83; 82.5%
	Enterococcus spp.	*Log-normal* μ = 2.7; σ = 0.1; *N* = 29; 94%	*Log-normal* μ = 2.7 ± 0.6; σ = 0.1 ± 0.3; *N* = 44; 83.7%	*GEV* κ = −0.03 ± 0.14; β = 1.4 ± 0.2; μ = 14.6 ± 0.3; *N* = 35; 97.4%	*Log-normal* μ = 2.6 ± 0.3; σ = 0.13 ± 0.05; *N* = 44; 83.7%
	Salmonella spp.	*N* < 10	*N* < 10	*Weibull* (2) β = 21.9 ± 5.2; γ = 18.8 ± 0.3; *N* = 10; 91.8%	*Log-normal* μ = 2.5 ± 1.2; σ = 0.1 ± 0.5; *N* = 16; 99.9%
	C. perfringens	*Gamma* (2) κ = 125.6 ± 2.1; β =.0.3 ± 1.3; *N* = 23; 99.6%	*Log-normal* μ = 3.5 ± 0.5; σ = 0.1 ± 0.5; *N* = 61; 85.5%	*GEVl* κ = −0. 3 ± 0.1; β = 3.5 ± 0.3; μ = 31.9 ± 0.5; *N* = 73; 85.6%	*Weibull* (2) β = 7.5 ± 0.6; γ = 22.9 ± 0.3; *N* = 96; 67.62%
	Microspheres	*Normal* μ = 12.1; σ = 1.5; *N* = 17; 99.5%	*Gamma* (2) κ = 58.7 ± 1.4; β = 0.2 ± 0.6; *N* = 14; 99.6%	*GEV* κ = 0.2 ± 0.3; β = 1.4 ± 0.3; μ = 11.1 ± 0.4; *N* = 16; 93.9%	*GEV* κ = 0.3 ± 0.2; β = 1.4 ± 0.3; μ = 11.2 ± 0.4; *N* = 19; 96.5%
Clay soil–liquid waste	*E. coli*	*Weibull (2)* β = 2.2 ± 0.3; γ = 5.1 ± 0.5; *N* = 26; 61.7%	*Beta 4* α = 1.2 ± 0.3; β = 0.6 ± 0.1; *c* = 1.4 ± 1868; *d* = 10.6 ± (<0.01); *N* = 32; 52.9%	*GEV* κ = −0. 3 ± 0.1; β = 3.5 ± 0.3; μ = 31.9 ± 0.5; *N* = 73; 85.6%	*GEV* κ = −0.3 ± 0.2; β = 2.2 ± 0.4; μ = 8.3 ± 0.6; *N* = 20; 99.8%
	Enterococcus spp.	*Beta 4* α = 1.1 ± 0.3; β = 1.1 ± 0.3; *c* = 9.8 ± 0.3; *d* = 14.0 ± (<0.01); *N* = 25; 99.6%	*Beta 4* α = 0.7 ± 0.3; β = 0.6 ± 0.2; *c* = 13.3 ± 0.5; *d* = 16.1 ± (<0.01); *N* =0.12; 90.3%	*N* < 10	*N* < 10

Table S5. *Cont.*

Treatment	Tracer	Event			
		1	2	3	4
	Salmonella spp.	*Beta 4* α = 0.8 ± 0.3; β = 0.7 ± 0.3; *c* = 9.6 ± 0.3; *d* = 12.2 ± (<0.01); *N* =0.13; 99.9%	*N* < 10	*N* < 10	*N* < 10
	C. perfringens	*Logistic* μ = 18.4 ± 0.4; *s* = 1.2 ± 0.2; *N* = 25; 99.8%	*Logistic* μ = 18.4 ± 0.5; *s* = 1.5 ± 0.2; *N* = 29; 97.8%	*Logistic* μ = 19.3 ± 0.5; *s* = 2.1 ± 0.3; *N* = 42; 96.6%	*Logistic* μ = 19.4 ± 0.4; *s* = 1.9 ± 0.2; *N* = 72; 99.1%
	Microspheres	*GEV* κ = −0.06 ± 0.2; β = 1.5 ± 0.2; μ = 5.9 ± 0.3; *N* = 26; 99.7%	*Gamma (2)* κ = 9.0 ± 0.6; β = 0.8 ± 0.3; *N* = 10; 95.7%	*Beta 4* α = 0.8 ± 0.3; β = 0.7 ± 0.3; *c* = 3.7 ± 1799; *d* = 14.8 ± (<0.01); *N* =0.12; 37.1%	*N* < 10
Clay loam s– dewatered waste	*E. coli*	*Log-normal* μ = 2.7 ± 0.6; σ = 0.1 ± 0.2; *N* = 29; 98.2%	*GEV* κ = −0.06 ± 0.1; β = 0.8 ± 0.08; μ = 13.4 ± 0.1; *N* = 55; 89.3 %	*Weibull (2)* β = 10.8 ± 1.3; γ = 13.1 ± 0.2; *N* = 41; 99.0%	*Log-normal* μ = 2.1 ± 0.2; σ = 0.3 ± 0.08; *N* = 29; 76.2%
	Enterococcus spp.	*N* < 10	*Logistic* μ = 18.1 ± 0.5; s = 1.0 ± 0.2; *N* = 15; 57.2%	*GEV* κ = 0.2 ± 0.3; β = 0.7 ± 0.2; μ = 18.9 ± 0.2; *N* = 14; 99.8%	*GEV* κ = 0.6 ± (<0.001); β = 1.5 ± 0.2; μ = 15.5 ± 0.3; *N* = 30; 32.4%
	Salmonella spp.	*Log-normal* μ = 3.0; σ = 0.1; *N* = 10; 98.5%	*Logistic* μ = 19.8 ± 0.3; s = 0.6 ± 0.1; *N* = 18; 97.0%	*Beta 4* α = 1.1 ± 0.3; β = 1.0 ± 0.3; *c* = 14.8 ± 0.4; *d* = 21.3 ± (<0.01); *N* = 27; 96.5%	*GEV* κ = 0.7 ± 0.2; β = 11.9 ± (<0.001); μ = 12.6 ± (<0.001); *N* = 48; 96.9%
	C. perfringens	*Normal* μ = 35.8; σ = 2.3; *N* = 12; 98.4%	*Weibull (3)* β = 10.0 ± 1.6; γ = 17.2 ± 0.7; μ = 20.3 ± 0.8; *N* = 24; 74.0%	*Normal* μ = 35.3; σ = 2.0; *N* = 51; 88.4%	*Normal* μ = 23.7; σ = 2.2; *N* = 63; 91.9%
	Microspheres	*N* < 10	*N* < 10	*N* < 10	*Log-normal* μ = 2.5 ± 0.4; σ = 0.1 ± 0.2; *N* = 13; 93.5%

Table S5. *Cont.*

Treatment	Tracer	Event 1	Event 2	Event 3	Event 4
Clay loam– liquid waste	*E. coli*	*Fisher-Tippet* β = 1.7 ± 0.3; μ = 9.3 ± 0.4; *N* = 23; 66.3%	*Weibull (3)* β = 16.9 ± 2.8; γ = 24.3 ± 0.8; μ = −13 ± 0.9; *N* = 22; 80.6%	*Gamma (2)* κ = 31.1 ± 0.4; β = 0.3 ± 0.2; *N* = 42; 97.1%	*Logistic* μ = 9.1 ± 0.3; *s* = 0.7 ± 0.1; *N* = 21; 99.5%
	Enterococcus spp.	*Fisher-Tippet* β = 1.9 ± 0.3; μ = 10.9 ± 0.4; *N* = 24; 79.7%	*Weibull (3)* β = 354 ± 64; γ = 628 ± 5.6; μ = −613 ± 5.6; *N* = 18; 99%	*Logistic* μ = 14.5 ± 0.5; *s* = 1.5 ± 0.2; *N* = 27; 54.05%	*Beta 4* α = 1.1 ± 0.3; β = 1.1 ± 0.3; *c* = 8.3 ± 0.6; *d* = 17.4 ± (<0.01); *N* = 20; 32.6%
	Salmonella spp.	*Logistic* μ = 11.5 ± 0.3; *s* = 0.8 ± 0.2; *N* = 17; 94.0%	*Weibull (2)* β = 16.0 ± 4.1; γ = 14.0 ± 0.3; *N* = 10; 96.1%	*N* < 10	*N* < 10
	C. perfringens	*Log-normal* μ = 2.2 ± 0.2; σ = 0.7 ± 1.9; *N* = 15; 36.8%	*GEV* κ = 0.7 ± 0.2; β = 8.9 ± 0.001; μ = 19.3 ± 0.001; *N* = 49; 35.5%	*GEV* κ = 0.7 ± 0.1; β = 8.1 ± 0.9; μ = 20.8 ± 1.1; *N* = 63; 26.8%	*GEV* κ = 0.8 ± (<0.001) β = 7.7 ± 0.6; μ = 22.1 ± 0.9; *N* = 49; 18.9%
	Microspheres	*Logistic* μ = 6.7 ± 0.7; *s* = 1.6 ± 0.3; *N* = 18; 99.7%	*Beta 4* α = 1.0 ± 0.4; β = 0.7 ± 0.2; *c* = 3.5 ± 2088; *d* = 13.4 ± (<0.01); *N* = 14; 88.9%	*Beta 4* α = 0.9 ± 0.3; β = 0.5 ± 0.2; *c* = 3.3 ± 2240; *d* = 12.4 ± (<0.01); *N* = 16; 91.9%	*N* < 10
Sandy loam dewatered waste	*E. coli*	*Weibull (2)* β = 25.3 ± 4.4; γ = 18.6 ± 0.32; *N* = 20; 95.8%	*Logistic* μ = 18.2 ± 0.2; *s* = 0.6 ± 0.1; *N* = 26; 99.9%	*Logistic* μ = 18.1 ± 0.2 *s* = 0.6 ± 0.1; *N* = 29; 99.9%	*Beta 4* α = 1.4 ± 0.43; β = 1.1 ± 0.3; *c* = 7.2 ± 0.5; *d* = 13.8 ± 0.001; *N* = 29; 93.0%
	Enterococcus spp.	*N* < 10	*N* < 10	*N* < 10	*N* < 10
	Salmonella spp.	*N* < 10	*N* < 10	*Logistic* μ = 15.7 ± 0.4; *s* = 1.1 ± 0.2; *N* = 19; 96.1%	*Weibull (3)* β = 1.6 ± 0.3; γ = 1.6 ± 0.2; μ = 9.4 ± 0.2; *N* = 11; 88.9%
	C. perfringens	*Logistic* μ = 35.4 ± 0.5; *s* = 1.1 ± 0.2; *N* = 17; 99.6%	*GEV* κ = 0.6 ± 0.2; β = 2.2 ± (<0.001); μ = 34.9 ± (<0.001); *N* = 36; 98.6%	*Beta 4* α = 1.7 ± 0.3; β = 1.2 ± 0.2; *c* = 28.0 ± 0.6; *d* = 39.1 ±<0.001; *N* = 45; 99.7%	*Beta 4* α = 1.8 ± 0.3; β = 1.8 ± 0.3; c = 16.3 ± 0.4; *d* = 28.5 ±<0.001; *N* = 66; 84.9%
	Microspheres	*N* < 10	*N* < 10	*N* < 10	*N* < 10

Table S5. *Cont.*

Treatment	Tracer	Event 1	Event 2	Event 3	Event 4
Sandy loam soil–liquid waste	*E. coli*	*Logistic* μ = 10.8 ± 0.2; *s* = 0.7 ± 0.1; *N* = 24; 99.6%	*Logistic* μ = 11.7 ± 0.3; *s* = 0.8 ± 0.1; *N* = 25; 99.1%	*Beta 4* α = 0.9 ± 0.3; β = 1.1 ± 0.3; *c* = 9.0 ± 0.3; *d* = 14.2 ±<0.001; *N* = 23; 96.5%	*Logistic* μ = 10.3 ± 0.3; *s* = 1.0.± 0.1; *N* = 49; 98.1%
	Enterococcus spp.	*Logistic* μ = 14.8 ± 0.7; *s* = 0.6 ± 0.1; *N* = 27; 99.8%	*Logistic* μ = 15.0 ± 0.3; *s* = 0.5 ± 0.1; *N* = 12; 99.8%	*Log-normal* μ = 2.6; σ = 0.1; *N* = 12; 99.9%	*Weibull (2)* β = 14.9 ± 2.6; γ = 15.7 ± 0.3; *N* = 18; 82.5%
	Salmonella spp.	*N* < 10	*Logistic* μ = 14.2 ± 0.7; *s* = 1.3 ± 0.4; *N* = 10; 97.5%	*N* < 10	*Gamma (2)* κ = 37.8 ± 0.4; β = 0.3 ± 0.3; *N* = 11; 83.5%
	C. perfringens	*Weibull (2)* β = 6.0 ± 0.7; γ = 21.6 ± 0.5; *N* = 49; 99.2%	*Logistic* μ = 20.41 ± 0.5; *s* = 2.1 ± 0.2; *N* = 68; 99.5%	*Weibull (3)* β = 5.3 ± 0.4; γ = 17.8 ± 0.4; μ = 4.2 ± 0.5; *N* = 88; 95.4%	*Logistic* μ = 20.5 ± 0.3; *s* = 2.0 ± 0.2; *N* = 109; 95.9%
	Microspheres	*Logistic* μ = 10.1 ± 0.2; *s* = 0.6 ± 0.1; *N* = 21; 81.8%	*Weibull (3)* β = 878 ± 184; γ = 804 ± 5; μ = −793 ± 5; *N* = 14; 95.8%	*N* < 10	*GEV* κ = 0.7 ± 0.3; β = 1.0 ± (<0.001); μ = 10.6 ± (<0.001); *N* = 15; 69.7%

Legend

Gamma (2) = PDF type; α, β, γ, σ ,κ, μ, c, d, s = PDF parameters; *N* = Number of samples; 99.9% = The risk to reject the hypothesis that the sample follows the best fit PDF type

Distribution Equations (Addinsoft, 2014)

Normal **Distribution**

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2}}$$

Lognormal **Distribution**

$$f(x) = \frac{1}{x\sigma\sqrt{2\pi}} e^{\frac{(\ln(x)-\mu)^2}{2\sigma^2}}$$

Logistic **Distribution**

$$f(x) = \frac{e^{-\frac{(x-\mu)}{s}}}{s\left(1 + e^{-\frac{(x-\mu}{s}}\right)}$$

Weibull **(β, γ) Distribution**

$$f(x) = \frac{\beta}{\gamma}\left(\frac{x}{\gamma}\right)^{\beta-1} e^{-\left(\frac{x}{\gamma}\right)^{\beta}}$$

Weibull **(β, γ, μ) Distribution**

$$f(x) = \frac{\beta}{\gamma}\left(\frac{x-\mu}{\gamma}\right)^{\beta-1} e^{-\left(\frac{x-\mu}{\gamma}\right)^{\beta}}$$

Gamma **Distribution**

$$f(x) = (x-\mu)^{k-1} \frac{e^{-(x-\mu)/\beta}}{\beta^k \Gamma(k)}$$

GEV **(Generalized Extreme Values) Distribution** $f(x) = \frac{1}{\beta}\left(1 - k\frac{x-\mu}{\beta}\right)^{\frac{1}{k}-1} exp\left(-\left(1 - k\frac{x-\mu}{\beta}\right)^{\frac{1}{k}}\right)$

Fisher-Tippet **Distribution** $f(x) = \frac{1}{\beta} exp\left(-\frac{x-\mu}{\beta} - exp\left(-\frac{x-\mu}{\beta}\right)\right)$

Beta 4 **Distribution** $f(x) = \frac{1}{B(\alpha,\beta)} \frac{(x-c)^{\alpha-1}(d-x)^{\beta-1}}{(d-c)^{\alpha+\beta-1}}$ $, with\ \alpha, \beta > 0\ and\ x \in [c, d]\ and\ c, d \in\ R\ and\ B(\alpha, \beta) = \frac{\Gamma(\alpha)\Gamma(\beta)}{\Gamma(\alpha+\beta)}$

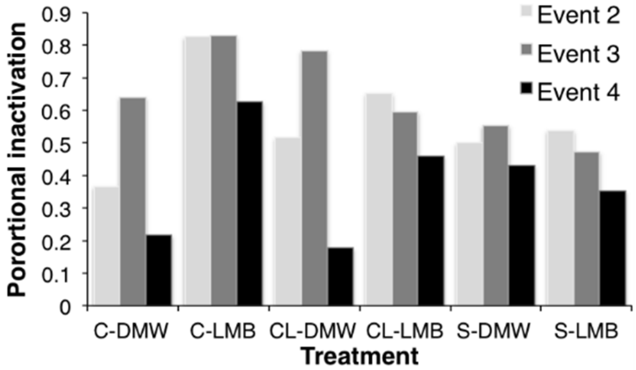

Figure S2. Proportion of inactivated collectors. This is the sum of total inactive collectors that were active at any one or more of the previous irrigation events (*i.e.*, it does not include collectors that were consistently inactive throughout the experiment).