8. Appendix

Appendix 1: Mueller-Hinton Agar cation and composition information
Appendix 2: Initial AST data
Appendix 3: Sodium Pyruvate AST data.
Appendix 4: Re-establishing Antibiotic resistance profiles.
Appendix 5: Growth curve and full MIC and Efflux assay data.

Appendix 1a:
Table 1: EUCAST and CLSI evaluation of cation concentration from 21 manufacturers of Mueller-Hinton and Mueller-Hinton Cation adjusted agar. Take taken from Åhman et al., 2020

MH agar brand	Cation content (mg/L)					MH agar brand	Cation content (mg/L)				
	Ca	**Mg**	**Zn**	**Mn**	**Fe**		**Ca**	**Mg**	**Zn**	**Mn**	**Fe**
Bio-Rad MH Agar	43	9.6	0.47	<0.21	0.45	bioMérieux MHE Agar	40	13	2	<0.21	0.57
Biolife MH Agar II	43	19	0.53	<0.21	0.68	Acumedia MH Agar	28	12	2.9	<0.21	0.65
Oxoid MH Agar	24	15	0.39	<0.21	0.92	Remel MH Agar	27	17	1.1	<0.21	0.44
Sigma MH Agar 2	19	8.4	0.5	<0.21	0.63	Lab M MH Agar	14	64	0.52	<0.21	0.84
BD BBL MH II Agar	21	20	0.89	<0.21	0.75	Merck MH Agar acc. to CLSI	31	15	2	<0.21	0.54
CRITERION MH Agar	35	11	0.43	<0.21	0.59	Mast MH Agar	8.8	7.7	0.61	<0.21	0.62
BD Difco MH Agar	18	7	0.69	<0.21	0.65	Sifin MH Agar	29	15	1.9	<0.21	0.47
Alpha Biosciences MH Agar	40	6.7	7.8	<0.21	0.77	HiMedia MH Agar No. 2	6.8	4	0.57	<0.21	1.3
E&O Labs MH Agar	23	14	0.62	<0.21	0.66	Biolab MH II Agar	17	38	0.56	<0.21	0.81
Sigma MH Agar	19	8.5	0.54	<0.21	0.48	Merck MH Agar	7.4	4.2	0.66	23	<0.34
HiMedia MH Agar	15	9.3	0.36	<0.21	8.8						

Table 2: recommendations of standards and compositions for Muller-Hinton agar by 4 different bodies comparison by EUCAST and CLSI. Table from Åhman et al., 2020

Requirements for Mueller–Hinton agar in four standards

Standard	DIN 58940-3: 2008-10	WHO 28th report, 1977	ISO/TS 16782: 2016	FDA BAM, 8th ed. Rev. A, 1998
Meat infusion (g/L)	2			
Dehydrated infusion from beef (g)		300	300	300
Casein hydrolysate (g/L)	17.5			17.5
Acid digest of casein (g/L)		17.5	17.5	
Starch (g/L)	1.5		1.5	1.5
Corn starch (g/L)		1.5		
Agar (g/L)	12–18	17	17	17
Ca2+ (mg/L)		50–100		
Mg2+ (mg/L)		20–35		
Mn2+ (mg/L)			<8.0	
Zn2+ (mg/L)			<3.0	
Thymidine (mg/L)			<0.03	

DIN - Deutsches Institut für Normung

WHO - World Health Organisation

ISO/TS - International organisation for Standardization

FDA BAM - Food and Drug Administration Bacteriological Analytical Manual

Appendix 2a. *E.coli* Initial AST data (ENV)

N.B : red highlight indicates resistance to antibiotic

Table 1 : Initial AST data *E. coli* Environmental isolates veterinary antibiotic panel

Farm	Visit No.	Sample no.	freeze tag no./environment	Amoxicillin						Ampicillin						Oxytetracycline					
				RT ZOI	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD
Farm 1	1	1E	Holding yard	26	24	24	24	24	0	19	23	23	23	23	0	23	28	28	27	28	0
Farm 1	2	1E	Scraper tractor	12	23	23	23	23	0	6	18	18	18	18	0	14	23	23	23	23	0
Farm 1	4	1C	Holding Yard	24	25	25	25	25	0	19	21	21	21	21	0	6	28	28	28	28	0
Farm 2	2	3A	collecting yard		22	22	23	22	0		21	21	21	21	0		22	22	22	22	0
Farm 2	2	5E	crush	32	25	25	25	25	0	25	22	22	22	22	0	22	23	23	22	23	0
Farm 1	3	1B	Scraper tractor	25	24	24	24	24	0	20	20	20	20	20	0	6	6	6	6	6	0
Farm 1	3	4C	Cubicle Shed	20	22	22	22	22	0	16	19	19	19	19	0	9	6	6	6	6	0
Farm 1	4	1D	Holding Yard	30	26	26	26	26	0	25	22	22	21	22	0	6	6	6	6	6	0
Farm 2	2	16B2	scraper tractor		23	23	23	23	0		20	20	21	20	0		6	6	6	6	0
Farm 3	1	1C	Cubicle Shed	33	26	25	26	26	0	29	22	22	22	22	0	13	6	6	6	6	0
Farm 3	1	3A	Scraper tractor	12	25	25	26	25	0	7	24	24	24	24	0	6	6	6	6	6	0
Farm 1	2	3E	Crush	6	6	6	6	6	0	6	6	6	6	6	0	6	11	11	11	11	0
Farm 1	2	4E	Cubicle shed	24	6	6	6	6	0	24	6	6	6	6	0	22	21	21	21	21	0
Farm 2	2	20F	feed passage	35	11	11	12	11	0	30	11	11	11	11	0	6	6	6	6	6	0
Farm 2	1	22B	Collecting Parlour	6	6	6	6	6	0	6	6	6	6	6	0	6	6	6	6	6	0
Farm 2	1	24D1	Feed Passage	13	10	9	11	10	1	6	10	10	11	10	0	6	6	6	6	6	0
Farm 2	1	24D2	Feed Passage	6	11	11	11	11	0	6	9	10	9	9	0	6	6	6	6	6	0
Farm 2	1	22E	Collecting Parlour	6	6	6	6	6	0	6	6	6	6	6	0	6	7	7	9	8	1
Farm 2	1	22B1	Collecting Parlour	6	6	6	6	6	0	6	6	6	6	6	0	6	6	6	6	6	0

Table 2a : Initial AST data *E. coli* Environmental isolates ESBL A panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Cefotaxime- 5						Cefotaxime- 30						Amoxycilin-Clavulanic Acid						Piperacillin					
				RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD
Farm 1	1	1E	Holding yard	29	30	30	30	30	0		36	36	34	35	1	23	23	23	24	23	0	24	29	28	29	29	0
Farm 1	2	1E	Scraper tractor	29	39	39	39	39	0		33	33	33	33	0	22	21	21	21	21	0	29	21	21	21	21	0
Farm 1	4	1C	Holding Yard	31	30	30	30	30	0		33	33	33	33	0	22	24	24	24	24	0	27	28	28	29	28	0
Farm 2	2	3A	collecting yard		30	30	30	30	0		33	32	34	33	1		23	23	23	23	0		22	22	22	22	0
Farm 2	2	5E	crush	34	29	29	29	29	0		36	36	36	36	0	27	25	25	25	25	0	26	23	23	22	23	0
Farm 1	3	1B	Scraper tractor	29	31	31	31	31	0		34	34	34	34	0	24	25	25	25	25	0	24	27	27	28	27	0
Farm 1	3	4C	Cubicle Shed	30	32	34	31	32	1		37	37	37	37	0	22	25	25	26	25	0	25	25	25	26	25	0
Farm 1	4	1D	Holding Yard	33	34	34	34	34	0		39	39	39	39	0	26	26	26	26	26	0	29	27	27	28	27	0
Farm 2	2	16B2	scraper tractor		34	34	34	34	0		44	44	44	44	0		26	26	26	26	0		24	24	24	24	0
Farm 3	1	1C	Cubicle Shed	25	31	31	31	31	0		38	38	38	38	0	22	29	30	28	29	1	29	27	27	26	27	0
Farm 3	1	3A	Scraper tractor	22	36	36	36	36	0		45	45	45	45	0	23	25	25	25	25	0	17	28	28	28	28	0
Farm 1	2	3E	Crush	29	29	29	29	29	0		34	33	34	34	0	7	10	10	10	10	0	8	19	19	19	19	0
Farm 1	2	4E	Cubicle shed	31	17	17	17	17	0		30	30	30	30	0	26	19	16	16	17	1	28	29	29	29	29	0
Farm 2	2	20F	feed passage	37	39	37	42	39	2		48	48	48	48	0	32	29	29	30	29	0	25	22	22	22	22	0
Farm 2	1	22B	Collecting Parlour	23	27	27	26	27	0		37	37	36	37	0	12	29	29	29	29	0	26	26	26	26	26	0
Farm 2	1	24D1	Feed Passage	31	30	30	30	30	0		36	36	37	36	0	24	22	22	22	22	0	26	19	19	19	19	0
Farm 2	1	24D2	Feed Passage	24	30	30	33	31	1		36	36	36	36	0	6	23	23	22	23	0	24	15	15	16	15	0
Farm 2	1	22E	Collecting Parlour	21	27	25	29	27	2		32	32	33	32	0	13	12	12	12	12	0	26	22	22	22	22	0
Farm 2	1	22B1	Collecting Parlour	21	31	31	31	31	0		35	35	35	35	0	11	11	11	12	11	0	23	21	21	20	21	0

Table 2B : Initial AST data *E. coli* Environmental isolates ESBL A panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**freeze tag no./environment**	Piperacillin-Tazobactam						Cefuroxime						Cefotoxin					
				RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD
Farm 1	1	1E	Holding yard	22	24	24	23	24	0	27	26	26	27	26	0	24	26	26	27	26	0
Farm 1	2	1E	Scraper tractor	27	23	23	22	23	0	12	20	20	20	20	0	25	22	22	22	22	0
Farm 1	4	1C	Holding Yard	25	29	29	30	29	0	30	32	32	32	32	0	28	30	30	30	30	0
Farm 2	2	3A	collecting yard		24	24	25	24	0		27	27	27	27	0		26	26	26	26	0
Farm 2	2	5E	crush	26	24	24	24	24	0	30	27	27	28	27	0	26	28	28	28	28	0
Farm 1	3	1B	Scraper tractor	23	36	36	35	36	0	24	26	26	26	26	0	28	26	26	26	26	0
Farm 1	3	4C	Cubicle Shed	23	24	25	24	24	0	23	28	29	28	28	0	25	24	24	24	24	0
Farm 1	4	1D	Holding Yard	27	27	28	27	27	0	26	29	29	30	29	0	24	27	27	27	27	0
Farm 2	2	16B2	scraper tractor		26	26	27	26	0		24	24	24	24	0		22	22	22	22	0
Farm 3	1	1C	Cubicle Shed	23	26	26	26	26	0	15	28	28	28	28	0	21	23	23	23	23	0
Farm 3	1	3A	Scraper tractor	10	25	25	26	25	0	14	27	27	28	27	0	13	23	21	25	23	2
Farm 1	2	3E	Crush	14	20	21	20	20	0	24	21	21	21	21	0	25	25	25	25	25	0
Farm 1	2	4E	Cubicle shed	29	29	29	29	29	0	25	6	6	6	6	0	27	23	23	23	23	0
Farm 2	2	20F	feed passage	26	23	23	23	23	0	30	26	26	25	26	0	26	21	21	21	21	0
Farm 2	1	22B	Collecting Parlour	28	24	24	25	24	0	11	18	18	18	18	0	6	6	6	6	6	0
Farm 2	1	24D1	Feed Passage	23	23	23	24	23	0	27	24	24	24	24	0	15	23	23	23	23	0
Farm 2	1	24D2	Feed Passage	28	23	23	23	23	0	11	22	22	22	22	0	6	14	14	14	14	0
Farm 2	1	22E	Collecting Parlour	27	26	26	26	26	0	26	23	23	23	23	0	11	8	8	8	8	0
Farm 2	1	22B1	Collecting Parlour	26	19	19	19	19	0	9	17	17	17	17	0	6	6	6	6	6	0

Table 3a: Initial AST data *E. coli* Environmental isolates ESBL B panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**freeze tag no./environment**	Ceftazidime - 10						Cefepime					
				RT ZOI	1	2	3	average	SD	RT ZOI	1	2	3	average	SD
Farm 1	1	1E	Holding yard	26	32	32	32	32	0	38	35	35	35	35	0
Farm 1	2	1E	Scraper tractor	26	25	25	25	25	0	36	34	34	34	34	0
Farm 1	4	1C	Holding Yard	27	31	32	31	31	0	38	38	38	38	38	0
Farm 2	2	3A	collecting yard		26	26	28	27	1		32	32	32	32	0
Farm 2	2	5E	crush	31	27	27	26	27	0	35	35	34	36	35	1
Farm 1	3	1B	Scraper tractor	28	30	30	30	30	0	35	35	35	35	35	0
Farm 1	3	4C	Cubicle Shed	28	30	29	30	30	0	35	31	31	30	31	0
Farm 1	4	1D	Holding Yard	31	32	31	32	32	0	38	36	36	36	36	0
Farm 2	2	16B2	scraper tractor		27	27	25	26	1		29	29	29	29	0
Farm 3	1	1C	Cubicle Shed	21	31	31	26	29	2	37	29	29	29	29	0
Farm 3	1	3A	Scraper tractor	24	31	31	30	31	0	36	33	33	33	33	0
Farm 1	2	3E	Crush	31	22	22	22	22	0	35	32	32	33	32	0
Farm 1	2	4E	Cubicle shed	32	32	32	32	32	0	35	35	35	35	35	0
Farm 2	2	20F	feed passage	33	26	26	27	26	0	40	23	23	29	25	3
Farm 2	1	22B	Collecting Parlour	30	28	28	26	27	1	45	31	31	31	31	0
Farm 2	1	24D1	Feed Passage	34	27	27	28	27	0	42	33	33	33	33	0
Farm 2	1	24D2	Feed Passage	33	24	24	27	25	1	39	33	33	33	33	0
Farm 2	1	22E	Collecting Parlour	31	28	28	21	26	3	39	33	33	33	33	0
Farm 2	1	22B1	Collecting Parlour	29	21	21	28	23	3	40	30	30	30	30	0

Table 3b: Initial AST data *E. coli* Environmental isolates ESBL B panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**freeze tag no./environment**	Ertapenem						Meropenem						Imipenem					
				RT ZOI	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT ZOI	1	2	3	average	SD
Farm 1	1	1E	Holding yard	37	34	34	34	34	0	38	34	34	35	34	0	38	28	28	29	28	0
Farm 1	2	1E	Scraper tractor	37	32	32	32	32	0	39	34	34	34	34	0		28	28	28	28	0
Farm 1	4	1C	Holding Yard	38	41	41	40	41	0	35	34	34	34	34	0	32	31	31	31	31	0
Farm 2	2	3A	collecting yard		30	30	30	30	0		33	33	33	33	0		28	28	28	28	0
Farm 2	2	5E	crush	40	34	34	33	34	0	38	33	33	33	33	0	37	29	29	29	29	0
Farm 1	3	1B	Scraper tractor	34	33	33	33	33	0	34	31	31	31	31	0	29	27	27	28	27	0
Farm 1	3	4C	Cubicle Shed	34	31	31	31	31	0	36	33	33	33	33	0	34	29	29	30	29	0
Farm 1	4	1D	Holding Yard	36	37	37	37	37	0	32	31	31	31	31	0	33	28	28	28	28	0
Farm 2	2	16B2	scraper tractor		29	29	29	29	0		34	34	34	34	0		27	27	27	27	0
Farm 3	1	1C	Cubicle Shed	35	31	31	31	31	0	20	32	32	32	32	0	25	28	28	28	28	0
Farm 3	1	3A	Scraper tractor	18	31	31	31	31	0	6	35	35	35	35	0	6	29	29	29	29	0
Farm 1	2	3E	Crush	40	28	28	29	28	0	35	35	35	35	35	0	35	34	34	34	34	0
Farm 1	2	4E	Cubicle shed	36	32	32	33	32	0	27	32	32	32	32	0	35	24	24	24	24	0
Farm 2	2	20F	feed passage	40	28	28	28	28	0	34	35	35	36	35	0	37	30	30	30	30	0
Farm 2	1	22B	Collecting Parlour	35	29	29	29	29	0	38	33	33	33	33	0	35	24	24	24	24	0
Farm 2	1	24D1	Feed Passage	38	31	31	31	31	0	41	30	30	30	30	0	34	27	27	27	27	0
Farm 2	1	24D2	Feed Passage	38	30	30	30	30	0	36	32	32	32	32	0	32	26	26	26	26	0
Farm 2	1	22E	Collecting Parlour	38	33	33	33	33	0	39	33	33	33	33	0	34	28	28	28	28	0
Farm 2	1	22B1	Collecting Parlour	31	26	26	26	26	0	35	32	32	32	32	0	31	26	26	26	26	0

Table 4: Initial AST data *E. coli* Environmental isolates Clinical panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Ciprofloxacin						Gentamicin						Tigecycline					
				RT zoi	1	2	3	average	SD	RT ZOI	1	2	3	average	SD	RT ZOI	1	2	3	average	SD
Farm 1	1	1E	Holding yard	40	32	32	33	32	0	16	17	17	17	17	0	20	25	25	25	25	0
Farm 1	2	1E	Scraper tractor	21	34	34	34	34	0	37	21	21	21	21	0	17	24	24	24	24	0
Farm 1	4	1C	Holding Yard	34	29	29	30	29	0	14	18	18	18	18	0	18	26	26	26	26	0
Farm 2	2	3A	collecting yard		32	32	32	32	0		19	19	19	19	0		20	20	20	20	0
Farm 2	2	5E	crush	37	35	35	35	35	0	17	18	18	18	18	0	24	23	23	23	23	0
Farm 1	3	1B	Scraper tractor	35	32	32	32	32	0	14	17	17	17	17	0	18	22	22	22	22	0
Farm 1	3	4C	Cubicle Shed	32	35	35	35	35	0	16	20	20	20	20	0	19	21	21	21	21	0
Farm 1	4	1D	Holding Yard	26	35	35	35	35	0	16	19	19	19	19	0	19	20	20	20	20	0
Farm 2	2	16B2	scraper tractor		42	42	42	42	0		20	20	20	20	0		16	16	17	16	0
Farm 3	1	1C	Cubicle Shed	40	37	37	37	37	0	24	19	19	19	19	0	20	19	19	19	19	0
Farm 3	1	3A	Scraper tractor	26	45	45	45	45	0	15	20	19	21	20	1	13	20	20	21	20	0
Farm 1	2	3E	Crush	38	32	32	32	32	0	19	18	18	18	18	0	18	21	21	21	21	0
Farm 1	2	4E	Cubicle shed	22	32	33	32	32	0	37	18	18	18	18	0	15	22	22	22	22	0
Farm 2	2	20F	feed passage	38	38	38	38	38	0	17	20	21	20	20	0	19	19	19	19	19	0
Farm 2	1	22B	Collecting Parlour	38	38	38	38	38	0	18	18	18	18	18	0	18	20	20	20	20	0
Farm 2	1	24D1	Feed Passage	39	29	29	29	29	0	16	17	17	17	17	0	18	21	21	21	21	0
Farm 2	1	24D2	Feed Passage	37	32	32	32	32	0	16	19	19	19	19	0	19	18	18	19	18	0
Farm 2	1	22E	Collecting Parlour	37	29	29	29	29	0	16	18	18	18	18	0	19	21	21	21	21	0
Farm 2	1	22B1	Collecting Parlour	44	35	35	35	35	0	14	19	19	19	19	0	21	19	19	19	19	0

Appendix 2b. *E. coli* Initial AST data (BG)
N.B : red highlight indicates resistance to antibiotic
Table 5: Initial AST data *E. coli* BG isolates, Veterinary panel

Farm	Visit No.	Sample no.	freeze tag no./environment	Amoxicillin						Ampicillin						Oxytetracycline					
				RT ZOI	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD
Farm 1	1	12C	921	25	25	25	25	25	0	23	22	22	22	22	0	6	26	26	26	26	0
Farm 1	1	13D	541	29	24	24	24	24	0	22	22	21	23	22	1	26	26	25	26	26	0
Farm 1	1	15C	131	25	19	19	18	19	0	22	21	21	21	21	0	25	27	27	27	27	0
Farm 1	2	7C	557	20	25	25	25	25	0	28	20	20	20	20	0	21	27	27	27	27	0
Farm 1	2	11C	117	22	24	24	24	24	0	25	21	21	21	21	0	9	26	26	26	26	0
Farm 1	2	13C	508	18	25	25	25	25	0	22	20	20	20	20	0	26	25	25	24	25	0
Farm 1	3	6E	408	21	26	26	26	26	0	19	23	23	23	23	0	6	24	24	25	24	0
Farm 1	3	11B	422	16	18	18	18	18	0	17	17	17	17	17	0	20	23	23	24	23	0
Farm 1	3	11C	422	29	26	26	26	26	0	27	25	25	25	25	0	20	25	25	24	25	0
Farm 1	3	14B	3499	26	23	23	23	23	0	24	18	18	18	18	0	6	22	22	22	22	0
Farm 1	3	17D	816	28	23	23	23	23	0	25	24	24	24	24	0	24	23	24	22	23	1
Farm 1	3	21C	3511	27	21	21	21	21	0	18	17	17	17	17	0	6	26	26	26	26	0
Farm 1	3	23C	3513	27	21	21	21	21	0	25	21	21	21	21	0	24	27	27	27	27	0
Farm 2	1	2A	T824	27	21	21	21	21	0	16	17	17	18	17	0	28	22	22	21	22	0
Farm 2	1	10F	T229	27	24	24	24	24	0	24	21	21	21	21	0	24	26	26	26	26	0
Farm 2	1	12F	V30	36	22	21	23	22	1	30	19	19	19	19	0	23	24	24	24	24	0
Farm 2	1	18D	V27	23	22	22	22	22	0	19	20	20	20	20	0	26	21	21	21	21	0
Farm 2	1	19A	R100	27	22	22	22	22	0	25	20	20	20	20	0	26	23	23	24	23	0
Farm 2	1	19B	R100		25	25	25	25	0		19	19	19	19	0		24	24	24	24	0
Farm 2	1	20F	T352	30	24	24	24	24	0	23	21	21	21	21	0	6	22	22	22	22	0
Farm 2	1	25D	W160	30	23	23	23	23	0	22	19	17	22	19	2	27	25	25	25	25	0
Farm 2	2	8D	V4	26	21	21	21	21	0	19	18	18	18	18	0	8	24	24	24	24	0
Farm 2	2	14C	T247	25	24	24	24	24	0	18	21	21	20	21	0	22	25	25	25	25	0
Farm 2	2	15B	V63	31	21	21	21	21	0	19	17	16	21	18	2	27	12	12	12	12	0
Farm 3	1	6A	672	34	25	24	26	25	1	27	21	21	21	21	0	31	23	23	24	23	0
Farm 3	1	7B	681	29	23	23	23	23	0	23	21	21	21	21	0	29	27	27	27	27	0
Farm 3	1	10B	641	26	23	22	23	23	0	21	17	17	16	17	0	6	31	31	31	31	0
Farm 3	1	15B	414	30	23	23	23	23	0	24	19	19	19	19	0	31	26	26	26	26	0
Farm 3	1	19D2	695	29	22	22	22	22	0	22	21	21	21	21	0	6	23	23	23	23	0
Farm 3	2	8C	701	31	22	22	22	22	0	24	19	19	19	19	0	27	24	24	24	24	0
Farm 3	2	8D	701	26	21	21	20	21	0	21	17	17	17	17	0	28	22	22	22	22	0
Farm 3	2	11E	509	30	23	23	24	23	0	31	21	21	21	21	0	27	25	25	25	25	0
Farm 3	2	15C	694	30	23	23	22	23	0	39	22	22	22	22	0	31	24	24	25	24	0
Farm 3	2	16B	579	34	27	27	27	27	0	29	25	25	25	25	0	30	24	22	27	24	2
Farm 3	2	18B	639	21	23	23	23	23	0	26	18	18	18	18	0	27	23	23	23	23	0
Farm 3	2	22E	564	31	23	23	22	23	0	48	18	18	18	18	0	30	25	25	25	25	0
Farm 2	2	13E	R82	26	21	21	21	21	0	19	18	18	18	18	0	22	21	21	21	21	0
Farm 1	3	12B	6592	27	20	20	20	20	0	25	18	18	18	18	0	26	21	21	22	21	0
Farm 1	4	8C	557	27	27	27	27	27	0	19	21	21	21	21	0	20	25	25	25	25	0
Farm 2	1	21D	L169	22	18	18	18	18	0	20	16	16	16	16	0	25	24	24	24	24	0
Farm 2	2	7C	V4	29	34	34	34	34	0	27	20	20	20	20	0	25	23	23	23	23	0
Farm 2	1	16B	S148	6	18	18	18	18	0	6	23	23	23	23	0	6	29	29	29	29	0
Farm 2	1	25B	W160	25	19	19	19	19	0	22	15	15	15	15	0	28	20	20	20	20	0
Farm 1	2	15C	563	20	24	24	24	24	0	23	20	20	20	20	0	23	26	26	25	26	0
Farm 1	3	6C	408	30	21	21	21	21	0	23	16	16	16	16	0	22	6	6	6	6	0
Farm 1	3	7D	536	25	23	23	23	23	0	20	20	20	20	20	0	6	6	6	6	6	0
Farm 1	4	9B	562	21	27	27	27	27	0	18	24	24	24	24	0	10	6	6	6	6	0
Farm 1	4	10B	407	26	20	20	20	20	0	22	21	21	21	21	0	6	6	6	6	6	0
Farm 1	4	10C	407	25	25	26	24	25	1	20	21	20	22	21	1	6	6	6	6	6	0
Farm 2	1	7E	T236	32	24	24	24	24	0	24	21	21	21	21	0	6	6	6	6	6	0
Farm 2	1	20A1	T352		18	18	18	18	0		19	19	19	19	0		6	6	6	6	0
Farm 2	2	9D	W97	21	24	24	24	24	0	20	20	20	20	20	0	14	6	6	6	6	0
Farm 2	2	11C	Y34	28	24	24	24	24	0	25	21	21	21	21	0	24	6	6	6	6	0
Farm 2	2	15D	V63	30	21	21	21	21	0	21	20	20	20	20	0	27	6	6	6	6	0
Farm 3	1	11D	517	33	23	24	23	23	0	24	22	22	21	22	0	6	6	6	6	6	0
Farm 2	1	19C	R100	25	22	22	22	22	0	23	21	21	21	21	0	6	6	6	6	6	0
Farm 1	2	19C	547	17	30	30	30	30	0	25	25	25	25	25	0	7	6	6	6	6	0
Farm 1	2	9C	3542	18	19	19	19	19	0	24	12	12	12	12	0	25	24	24	24	24	0
Farm 1	1	16E	623	8	11	11	12	11	0	8	10	10	10	10	0	22	29	29	29	29	0
Farm 3	1	9B	494	15	10	10	10	10	0	9	9	9	10	9	0	6	22	22	21	22	0
Farm 1	4	7C	443	12	11	11	11	11	0	12	12	12	12	12	0	6	6	6	6	6	0
Farm 3	1	16A	478	6	6	6	6	6	0	18	11	11	11	11	0	6	6	6	6	6	0

Table 6a: Initial AST data *E. coli* BG isolates. ESBL A panel

N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Cefotaxime- 5						Cefotaxime- 30						Amoxycilin-Clavulanic Acid					
				RT zol	1	2	3	average	SD	RT zol	1	2	3	average	SD	RT zol	1	2	3	average	SD
Farm 1	1	12C	921	31	33	33	33	33	0		39	39	38	39	0	25	25	25	25	25	0
Farm 1	1	13D	541	30	28	28	28	28	0		35	35	35	35	0	24	25	25	25	25	0
Farm 1	1	15C	131	29	28	28	28	28	0		32	32	32	32	0	26	24	24	24	24	0
Farm 1	2	7C	557	28	33	33	33	33	0		36	36	36	36	0	23	24	24	24	24	0
Farm 1	2	11C	117	26	27	27	27	27	0		33	33	33	33	0	22	23	23	23	23	0
Farm 1	2	13C	508	27	29	29	29	29	0		35	35	35	35	0	21	23	22	24	23	1
Farm 1	3	6E	408	25	29	29	29	29	0		33	32	35	33	1	18	25	25	25	25	0
Farm 1	3	11B	422	29	32	32	32	32	0		38	38	38	38	0	21	23	23	23	23	0
Farm 1	3	11C	422	32	31	31	31	31	0		36	36	36	36	0	30	27	27	27	27	0
Farm 1	3	14B	3499	33	29	29	29	29	0		35	35	35	35	0	26	24	24	24	24	0
Farm 1	3	17D	816	28	31	31	31	31	0		37	37	37	37	0	26	25	25	25	25	0
Farm 1	3	21C	3511	38	28	28	28	28	0		30	30	30	30	0	35	23	23	23	23	0
Farm 1	3	23C	3513	28	33	33	33	33	0		38	38	38	38	0	22	24	24	24	24	0
Farm 2	1	2A	T824	36	29	19	29	26	5		33	33	33	33	0	25	22	20	23	22	1
Farm 2	1	10F	T229	30	32	32	28	31	2		35	35	36	35	0	23	25	25	25	25	0
Farm 2	1	12F	V30	31	27	26	25	26	1		34	34	35	34	0	25	22	22	23	22	0
Farm 2	1	18D	V27	32	28	28	31	29	1		33	33	33	33	0	27	23	23	24	23	0
Farm 2	1	19A	R100	36	32	32	31	32	0		38	38	38	38	0	31	22	23	22	22	0
Farm 2	1	19B	R100		30	30	30	30	0		33	33	33	33	0		26	26	26	26	0
Farm 2	1	20F	T352	33	30	30	30	30	0		33	33	33	33	0	29	25	25	25	25	0
Farm 2	1	25D	W160	33	28	28	28	28	0		33	33	33	33	0	26	22	22	22	22	0
Farm 2	2	8D	V4	31	26	26	26	26	0		32	32	32	32	0	22	22	22	22	22	0
Farm 2	2	14C	T247	28	34	34	34	34	0		33	33	34	33	0	23	24	24	24	24	0
Farm 2	2	15B	V63	34	30	30	30	30	0		34	35	34	34	0	24	21	21	22	21	0
Farm 3	1	6A	672	36	27	27	27	27	0		33	33	33	33	0	31	26	26	27	26	0
Farm 3	1	7B	681	34	29	29	29	29	0		33	33	33	33	0	23	25	25	25	25	0
Farm 3	1	10B	641	34	30	30	31	30	0		35	35	35	35	0	24	22	22	22	22	0
Farm 3	1	15B	414	37	30	30	30	30	0		32	32	32	32	0	27	24	24	24	24	0
Farm 3	1	19D2	695	36	28	28	28	28	0		31	31	31	31	0	29	23	23	23	23	0
Farm 3	2	8C	701	35	26	26	26	26	0		30	30	30	30	0	24	20	20	20	20	0
Farm 3	2	8D	701	35	29	29	29	29	0		33	33	33	33	0	25	23	23	23	23	0
Farm 3	2	11E	509	28	41	40	41	41	0		34	34	33	34	0	29	24	24	24	24	0
Farm 3	2	15C	694	36	30	30	30	30	0		33	32	35	33	1	27	25	25	25	25	0
Farm 3	2	16B	579	38	31	31	31	31	0		35	35	35	35	0	29	27	27	28	27	0
Farm 3	2	18B	639	34	29	29	29	29	0		34	34	34	34	0	26	24	24	24	24	0
Farm 3	2	22E	564	31	28	28	28	28	0		32	32	32	32	0	23	24	25	24	24	0
Farm 2	2	13E	R82	28	28	28	28	28	0		35	35	35	35	0	24	22	22	22	22	0
Farm 1	3	12B	6592	28	30	30	30	30	0		33	33	33	33	0	22	23	23	23	23	0
Farm 1	4	8C	557	29	29	29	29	29	0		32	32	32	32	0	25	24	24	24	24	0
Farm 2	1	21D	L169	34	29	29	29	29	0		35	35	35	35	0	25	24	24	24	24	0
Farm 2	2	7C	V4	33	30	30	30	30	0		35	35	35	35	0	28	23	23	23	23	0
Farm 2	1	16B	S148	32	25	25	28	26	1		29	29	29	29	0	27	22	22	22	22	0
Farm 2	1	25B	W160	24	28	28	27	28	0		34	35	35	35	0	22	20	20	21	20	0
Farm 1	2	15C	563	29	25	25	25	25	0		35	35	35	35	0	24	23	12	12	16	5
Farm 1	3	6C	408	30	32	31	33	32	1		36	35	37	36	1	29	24	24	24	24	0
Farm 1	3	7D	536	30	35	35	35	35	0		40	40	40	40	0	24	26	26	26	26	0
Farm 1	4	9B	562	30	32	32	32	32	0		38	38	38	38	0	24	26	26	26	26	0
Farm 1	4	10B	407	22	32	32	32	32	0		37	37	37	37	0	26	24	24	24	24	0
Farm 1	4	10C	407	31	41	39	43	41	2		35	35	36	35	0	22	23	23	23	23	0
Farm 2	1	7E	T236	34	27	25	29	27	2		31	31	30	31	0	28	22	22	22	22	0
Farm 2	1	20A1	T352		32	31	32	32	0		37	37	37	37	0		26	26	26	26	0
Farm 2	2	9D	W97	32	32	32	32	32	0		38	38	39	38	0	22	22	22	22	22	0
Farm 2	2	11C	Y34	32	31	31	31	31	0		35	35	35	35	0	25	23	23	23	23	0
Farm 2	2	15D	V63	29	32	32	32	32	0		34	34	34	34	0	26	24	24	25	24	0
Farm 3	1	11D	517	17	34	32	30	32	2		44	44	44	44	0	10	26	26	26	26	0
Farm 2	1	19C	R100	35	32	32	33	32	0		38	38	38	38	0	27	25	25	25	25	0
Farm 1	2	19C	547	33	33	33	33	33	0		37	37	37	37	0	22	22	22	22	22	0
Farm 1	2	9C	3542	27	28	28	28	28	0		34	34	34	34	0	25	23	23	23	23	0
Farm 1	1	16E	623	26	31	31	31	31	0		35	35	35	35	0	21	24	24	24	24	0
Farm 3	1	9B	494	33	29	27	32	29	2		31	31	31	31	0	20	25	25	25	25	0
Farm 1	4	7C	443	31	31	31	31	31	0		33	33	33	33	0	19	23	23	23	23	0
Farm 3	1	16A	478	24	28	28	28	28	0		29	29	30	29	0	12	12	12	12	12	0

Table 6b: Initial AST data *E. coli* BG isolates. ESBL A panel

N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Piperacillin						Piperacillin-Tazobactam					
				RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD
Farm 1	1	12C	921	26	28	28	28	28	0	26	21	22	21	21	0
Farm 1	1	13D	541	26	27	27	27	27	0	26	27	27	27	27	0
Farm 1	1	15C	131	27	25	25	26	25	0	25	26	26	26	26	0
Farm 1	2	7C	557	28	26	26	26	26	0	23	26	26	26	26	0
Farm 1	2	11C	117	25	25	25	25	25	0	25	26	26	26	26	0
Farm 1	2	13C	508	23	23	23	24	23	0	23	28	28	28	28	0
Farm 1	3	6E	408	23	25	25	25	25	0	22	25	26	25	25	0
Farm 1	3	11B	422	24	22	22	22	22	0	22	23	23	23	23	0
Farm 1	3	11C	422	6	28	28	28	28	0	29	30	30	30	30	0
Farm 1	3	14B	3499	29	23	23	23	23	0	26	24	24	24	24	0
Farm 1	3	17D	816	32	23	23	23	23	0	24	26	26	26	26	0
Farm 1	3	21C	3511	37	25	25	25	25	0	33	24	24	24	24	0
Farm 1	3	23C	3513	26	25	25	26	25	0	25	24	24	25	24	0
Farm 2	1	2A	T824	30	21	22	20	21	1	25	21	21	21	21	0
Farm 2	1	10F	T229	25	26	26	26	26	0	24	26	26	26	26	0
Farm 2	1	12F	V30	26	23	23	22	23	0	26	23	23	23	23	0
Farm 2	1	18D	V27	28	24	24	24	24	0	30	25	25	25	25	0
Farm 2	1	19A	R100	32	24	24	24	24	0	32	25	25	25	25	0
Farm 2	1	19B	R100		26	26	25	26	0		25	25	25	25	0
Farm 2	1	20F	T352	28	27	27	27	27	0	29	25	25	25	25	0
Farm 2	1	25D	W160	28	26	26	26	26	0	28	26	26	26	26	0
Farm 2	2	8D	V4	24	22	22	22	22	0	22	22	22	22	22	0
Farm 2	2	14C	T247	23	24	24	24	24	0	24	25	25	25	25	0
Farm 2	2	15B	V63	26	23	23	24	23	0	25	22	22	22	22	0
Farm 3	1	6A	672	35	23	23	23	23	0	32	24	24	24	24	0
Farm 3	1	7B	681	31	24	24	24	24	0	28	25	25	25	25	0
Farm 3	1	10B	641	28	23	23	23	23	0	27	23	23	23	23	0
Farm 3	1	15B	414	28	26	26	26	26	0	32	25	25	25	25	0
Farm 3	1	19D2	695	31	25	25	25	25	0	32	25	25	25	25	0
Farm 3	2	8C	701	33	22	22	22	22	0	31	23	23	23	23	0
Farm 3	2	8D	701	23	26	26	26	26	0	30	26	26	26	26	0
Farm 3	2	11E	509	32	27	27	27	27	0	34	25	25	25	25	0
Farm 3	2	15C	694	34	27	27	27	27	0	33	27	28	27	27	0
Farm 3	2	16B	579	31	27	27	27	27	0	30	28	28	28	28	0
Farm 3	2	18B	639	32	23	23	23	23	0	29	23	23	23	23	0
Farm 3	2	22E	564	31	25	25	25	25	0	28	24	24	25	24	0
Farm 2	2	13E	R82	24	23	23	23	23	0	23	24	24	24	24	0
Farm 1	3	12B	6592	25	20	20	20	20	0	22	21	21	21	21	0
Farm 1	4	8C	557	27	27	27	28	27	0	25	28	28	28	28	0
Farm 2	1	21D	L169	29	22	22	23	22	0	27	23	23	23	23	0
Farm 2	2	7C	V4	27	26	26	26	26	0	29	25	25	25	25	0
Farm 2	1	16B	S148	28	26	26	26	26	0	26	22	22	23	22	0
Farm 2	1	25B	W160	28	22	22	22	22	0	27	21	21	21	21	0
Farm 1	2	15C	563	25	27	27	28	27	0	25	26	26	26	26	0
Farm 1	3	6C	408	27	28	28	28	28	0	27	25	25	25	25	0
Farm 1	3	7D	536	25	28	28	28	28	0	23	22	22	22	22	0
Farm 1	4	9B	562	26	28	28	28	28	0	24	30	30	30	30	0
Farm 1	4	10B	407	24	27	27	28	27	0	23	26	26	26	26	0
Farm 1	4	10C	407	25	28	28	28	28	0	26	28	28	28	28	0
Farm 2	1	7E	T236	28	24	24	24	24	0	26	25	25	25	25	0
Farm 2	1	20A1	T352		22	22	22	22	0		23	23	23	23	0
Farm 2	2	9D	W97	26	25	25	26	25	0	24	29	29	30	29	0
Farm 2	2	11C	Y34	26	23	23	22	23	0	25	23	23	23	23	0
Farm 2	2	15D	V63	30	22	22	22	22	0	27	23	23	23	23	0
Farm 3	1	11D	517	15	26	26	26	26	0	13	24	24	24	24	0
Farm 2	1	19C	R100	29	27	27	27	27	0	31	28	28	28	28	0
Farm 1	2	19C	547	31	29	29	28	29	0	28	29	29	29	29	0
Farm 1	2	9C	3542	27	24	24	25	24	0	26	22	22	22	22	0
Farm 1	1	16E	623	20	18	18	19	18	0	22	22	22	22	22	0
Farm 3	1	9B	494	23	16	15	17	16	1	25	21	21	21	21	0
Farm 1	4	7C	443	27	28	28	28	28	0	24	28	28	29	28	0
Farm 3	1	16A	478	30	23	23	23	23	0	30	24	24	24	24	0

Table 6c: Initial AST data *E. coli* BG isolates. EBLA A panel

N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Cefuroxime						Cefotoxin					
				RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD
Farm 1	1	12C	921	26	27	27	27	27	0	27	25	27	27	26	1
Farm 1	1	13D	541	31	26	27	26	26	0	30	27	27	27	27	0
Farm 1	1	15C	131	26	23	23	23	23	0	25	26	26	26	26	0
Farm 1	2	7C	557	23	27	27	27	27	0	22	26	26	26	26	0
Farm 1	2	11C	117	22	25	25	25	25	0	22	25	25	25	25	0
Farm 1	2	13C	508	23	23	23	23	23	0	24	23	24	23	23	0
Farm 1	3	6E	408	21	25	25	25	25	0	21	24	24	24	24	0
Farm 1	3	11B	422	22	24	24	24	24	0	23	25	25	26	25	0
Farm 1	3	11C	422	29	26	26	26	26	0	32	26	26	26	26	0
Farm 1	3	14B	3499	26	23	23	23	23	0	26	24	24	25	24	0
Farm 1	3	17D	816	25	26	26	27	26	0	26	24	24	25	24	0
Farm 1	3	21C	3511	34	22	22	22	22	0	32	22	22	21	22	0
Farm 1	3	23C	3513	23	28	28	28	28	0	23	26	26	26	26	0
Farm 2	1	2A	T824	27	21	21	21	21	0	30	23	23	22	23	0
Farm 2	1	10F	T229	25	24	24	24	24	0	23	24	24	24	24	0
Farm 2	1	12F	V30	26	22	22	22	22	0	25	23	23	23	23	0
Farm 2	1	18D	V27	27	23	23	23	23	0	27	23	23	23	23	0
Farm 2	1	19A	R100	29	22	22	22	22	0	28	26	26	26	26	0
Farm 2	1	19B	R100		26	26	26	26	0		26	26	26	26	0
Farm 2	1	20F	T352	28	24	24	24	24	0	30	26	26	26	26	0
Farm 2	1	25D	W160	29	25	25	25	25	0	28	24	24	24	24	0
Farm 2	2	8D	V4	26	23	23	23	23	0	25	23	23	23	23	0
Farm 2	2	14C	T247	27	24	24	24	24	0	25	27	27	28	27	0
Farm 2	2	15B	V63	28	23	23	23	23	0	26	22	22	23	22	0
Farm 3	1	6A	672	30	23	23	23	23	0	29	26	26	26	26	0
Farm 3	1	7B	681	28	22	22	22	22	0	25	23	23	23	23	0
Farm 3	1	10B	641	25	22	22	22	22	0	23	25	25	25	25	0
Farm 3	1	15B	414	29	23	23	23	23	0	25	23	23	23	23	0
Farm 3	1	19D2	695	30	25	25	25	25	0	26	27	28	27	27	0
Farm 3	2	8C	701	29	23	23	23	23	0	36	21	21	20	21	0
Farm 3	2	8D	701	29	24	24	24	24	0	27	24	24	24	24	0
Farm 3	2	11E	509	25	24	24	24	24	0	29	24	23	24	24	0
Farm 3	2	15C	694	30	24	24	24	24	0	28	24	24	24	24	0
Farm 3	2	16B	579	29	27	26	27	27	0	26	28	28	28	28	0
Farm 3	2	18B	639	29	22	22	22	22	0	21	22	22	22	22	0
Farm 3	2	22E	564	27	23	23	23	23	0	26	24	24	24	24	0
Farm 2	2	13E	R82	25	22	22	22	22	0	27	23	23	23	23	0
Farm 1	3	12B	6592	24	20	20	20	20	0	28	20	20	21	20	0
Farm 1	4	8C	557	24	27	27	28	27	0	23	26	26	27	26	0
Farm 2	1	21D	L169	26	22	22	22	22	0	26	24	24	24	24	0
Farm 2	2	7C	V4	30	27	27	27	27	0	25	26	26	26	26	0
Farm 2	1	16B	S148	23	25	25	25	25	0	28	6	6	6	6	0
Farm 2	1	25B	W160	26	17	17	17	17	0	6	20	20	20	20	0
Farm 1	2	15C	563	25	25	25	25	25	0	26	26	26	26	26	0
Farm 1	3	6C	408	26	22	22	22	22	0	29	25	25	25	25	0
Farm 1	3	7D	536	23	26	26	26	26	0	25	25	25	25	25	0
Farm 1	4	9B	562	23	28	28	28	28	0	19	28	28	29	28	0
Farm 1	4	10B	407	31	23	23	22	23	0	27	24	24	24	24	0
Farm 1	4	10C	407	24	26	26	27	26	0	24	29	29	30	29	0
Farm 2	1	7E	T236	28	22	22	22	22	0	31	21	21	21	21	0
Farm 2	1	20A1	T352		23	23	23	23	0		22	22	22	22	0
Farm 2	2	9D	W97	27	27	27	27	27	0	27	26	26	26	26	0
Farm 2	2	11C	Y34	25	23	23	23	23	0	23	25	25	25	25	0
Farm 2	2	15D	V63	29	22	22	22	22	0	27	24	22	26	24	2
Farm 3	1	11D	517	20	25	25	25	25	0	10	22	23	22	22	0
Farm 2	1	19C	R100	29	27	27	27	27	0	31	23	23	23	23	0
Farm 1	2	19C	547	26	31	31	31	31	0	28	26	26	26	26	0
Farm 1	2	9C	3542	23	22	22	22	22	0	23	36	36	35	36	0
Farm 1	1	16E	623	25	25	25	25	25	0	25	26	26	26	26	0
Farm 3	1	9B	494	24	23	23	23	23	0	23	23	23	23	23	0
Farm 1	4	7C	443	20	24	24	24	24	0	27	25	25	25	25	0
Farm 3	1	16A	478	28	24	24	24	24	0	6	6	6	6	6	0

Table 7a: Initial AST data *E. coli* BG isolates. ESBL B panel

N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Ceftazidime - 10						Cefepime					
				RT ZOI	1	2	3	average	SD	RT ZOI	1	2	3	average	SD
Farm 1	1	12C	921	29	30	30	31	30	0	35	35	35	35	35	0
Farm 1	1	13D	541	29	30	30	31	30	0	36	34	34	35	34	0
Farm 1	1	15C	131	27	31	31	30	31	0	37	34	34	34	34	0
Farm 1	2	7C	557	27	27	27	28	27	0	32	34	34	34	34	0
Farm 1	2	11C	117	23	28	56	28	37	13	32	36	36	36	36	0
Farm 1	2	13C	508	26	26	5*	26	26	12	26	35	35	36	35	0
Farm 1	3	6E	408	27	26	31	26	28	2	35	35	35	35	35	0
Farm 1	3	11B	422	25	25	31	25	27	3	33	33	33	33	33	0
Farm 1	3	11C	422	31	31	25	21	26	4	36	36	36	35	36	0
Farm 1	3	14B	3499	32	28	29	28	28	0	44	35	35	35	35	0
Farm 1	3	17D	816	30	29	28	29	29	0	40	33	33	33	33	0
Farm 1	3	21C	3511	36	28	28	28	28	0	41	38	38	38	38	0
Farm 1	3	23C	3513	27	28	31	28	29	1	35	33	33	33	33	0
Farm 2	1	2A	T824	32	23	23	23	23	0	38	32	32	32	32	0
Farm 2	1	10F	T229	26	28	28	28	28	0	33	33	33	33	33	0
Farm 2	1	12F	V30	27	25	25	26	25	0	36	31	31	31	31	0
Farm 2	1	18D	V27	29	27	27	27	27	0	37	31	31	31	31	0
Farm 2	1	19A	R100	42	27	28	26	27	1	30	34	34	34	34	0
Farm 2	1	19B	R100		29	29	29	29	0		35	35	35	35	0
Farm 2	1	20F	T352	30	27	27	32	29	2	40	34	34	31	33	1
Farm 2	1	25D	W160	31	28	28	24	27	2	38	33	33	33	33	0
Farm 2	2	8D	V4	25	26	26	31	28	2	37	29	29	30	29	0
Farm 2	2	14C	T247	29	27	27	25	26	1	35	36	35	36	36	0
Farm 2	2	15B	V63	30	26	26	27	26	0	39	28	28	29	28	0
Farm 3	1	6A	672	32	26	26	26	26	0	38	32	32	32	32	0
Farm 3	1	7B	681	30	29	29	29	29	0	37	35	35	36	35	0
Farm 3	1	10B	641	26	25	25	25	25	0	37	31	31	31	31	0
Farm 3	1	15B	414	33	28	28	28	28	0	38	35	35	36	35	0
Farm 3	1	19D2	695	37	27	27	27	27	0	38	30	30	30	30	0
Farm 3	2	8C	701	35	26	26	26	26	0	34	30	30	30	30	0
Farm 3	2	8D	701	26	29	29	29	29	0	38	34	34	34	34	0
Farm 3	2	11E	509	30	29	30	29	29	0	35	33	33	33	33	0
Farm 3	2	15C	694	33	30	30	31	30	0	39	34	34	34	34	0
Farm 3	2	16B	579	30	28	28	28	28	0	35	34	34	34	34	0
Farm 3	2	18B	639	32	25	25	26	25	0	37	33	33	33	33	0
Farm 3	2	22E	564	29	28	28	28	28	0	36	34	34	34	34	0
Farm 2	2	13E	R82	31	25	25	26	25	0	35	31	31	31	31	0
Farm 1	3	12B	6592	31	25	28	25	26	1	38	25	25	24	25	0
Farm 1	4	8C	557	27	30	34	30	31	2	34	21	21	21	21	0
Farm 2	1	21D	L169	30	26	26	27	26	0	40	15	15	16	15	0
Farm 2	2	7C	V4	27	30	30	28	29	1	34	20	21	20	20	0
Farm 2	1	16B	S148	31	29	29	29	29	0	39	35	35	35	35	0
Farm 2	1	25B	W160	6	24	24	24	24	0	22	32	32	32	32	0
Farm 1	2	15C	563	28	29	6	29	21	11	37	34	34	34	34	0
Farm 1	3	6C	408	29	29	26	29	28	1	37	33	33	33	33	0
Farm 1	3	7D	536	31	31	25	31	29	3	37	35	35	35	35	0
Farm 1	4	9B	562	29	34	32	34	33	1	34	40	40	40	40	0
Farm 1	4	10B	407	27	30	32	29	30	1	25	35	35	35	35	0
Farm 1	4	10C	407	28	31	31	31	31	0	35	35	35	35	35	0
Farm 2	1	7E	T236	31	28	28	28	28	0	40	33	33	33	33	0
Farm 2	1	20A1	T352		31	30	9	23	10		31	31	31	31	0
Farm 2	2	9D	W97	28	28	28	26	27	1	31	34	34	34	34	0
Farm 2	2	11C	Y34	27	26	26	28	27	1	32	32	32	32	32	0
Farm 2	2	15D	V63	29	25	25	26	25	0	35	29	29	29	29	0
Farm 3	1	11D	517	17	28	28	28	28	0	35	34	34	34	34	0
Farm 2	1	19C	R100	34	29	29	2	20	13	40	33	33	33	33	0
Farm 1	2	19C	547	27	6	30	6	14	11	35	27	27	28	27	0
Farm 1	2	9C	3542	23	26	5/	26	26	12	35	33	33	33	33	0
Farm 1	1	16E	623	26	28	29	28	28	0	29	33	33	33	33	0
Farm 3	1	9B	494	30	26	26	26	26	0	35	30	32	29	30	1
Farm 1	4	7C	443	30	31	30	31	31	0	36	34	34	34	34	0
Farm 3	1	16A	478	34	24	24	24	24	0	38	32	32	32	32	0

Table 7b: Initial AST data *E. coli* BG isolates. ESBL B panel

N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Ertapenem						Meropenem						Imipenem					
				RT ZOI	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT ZOI	1	2	3	average	SD
Farm 1	1	12C	921	33	33	33	34	33	0	37	33	33	33	33	0	33	39	39	39	39	0
Farm 1	1	13D	541	35	35	36	35	35	0	37	35	35	36	35	0	35	29	29	29	29	0
Farm 1	1	15C	131	29	35	35	35	35	0	33	33	33	34	33	0	33	29	29	29	29	0
Farm 1	2	7C	557	34	35	35	35	35	0	38	33	33	33	33	0	31	29	29	30	29	0
Farm 1	2	11C	117	36	36	36	37	36	0	30	31	31	31	31	0	32	33	33	33	33	0
Farm 1	2	13C	508	37	36	36	36	36	0	37	32	32	32	32	0	25	29	29	29	29	0
Farm 1	3	6E	408	34	33	33	33	33	0	31	30	30	30	30	0	30	30	30	30	30	0
Farm 1	3	11B	422	34	29	29	29	29	0	36	31	31	31	31	0	36	28	28	28	28	0
Farm 1	3	11C	422	37	31	31	30	31	0	35	33	33	33	33	0	31	30	30	30	30	0
Farm 1	3	14B	3499	38	31	31	31	31	0	31	32	32	32	32	0	35	29	29	29	29	0
Farm 1	3	17D	816	36	32	32	32	32	0	36	32	32	32	32	0	39	32	32	32	32	0
Farm 1	3	21C	3511	44	35	35	35	35	0	38	31	31	31	31	0	29	29	29	29	29	0
Farm 1	3	23C	3513	36	32	32	32	32	0	34	35	35	35	35	0	33	33	33	33	33	0
Farm 2	1	2A	T824	37	29	29	29	29	0	40	30	30	30	30	0	42	27	27	27	27	0
Farm 2	1	10F	T229	35	32	32	32	32	0	30	35	35	35	35	0	35	31	31	31	31	0
Farm 2	1	12F	V30	36	30	30	30	30	0	37	29	29	29	29	0	35	27	27	27	27	0
Farm 2	1	18D	V27	37	30	30	31	30	0	36	29	29	29	29	0	36	27	27	27	27	0
Farm 2	1	19A	R100	39	34	34	34	34	0	40	36	36	36	36	0	40	33	33	33	33	0
Farm 2	1	19B	R100		33	33	34	33	0		33	33	33	33	0		30	30	30	30	0
Farm 2	1	20F	T352	36	35	35	34	35	0	36	34	34	34	34	0	35	29	29	29	29	0
Farm 2	1	25D	W160	39	32	32	32	32	0	39	31	31	31	31	0	39	28	28	29	28	0
Farm 2	2	8D	V4	36	40	40	40	40	0	36	30	30	30	30	0	35	27	27	28	27	0
Farm 2	2	14C	T247	34	32	32	33	32	0	33	33	33	33	33	0	32	30	30	31	30	0
Farm 2	2	15B	V63	38	29	29	30	29	0	39	32	32	32	32	0	37	29	29	29	29	0
Farm 3	1	6A	672	40	31	31	32	31	0	34	31	31	31	31	0	37	28	28	28	28	0
Farm 3	1	7B	681	40	32	32	31	32	0	36	32	32	32	32	0	34	29	29	29	29	0
Farm 3	1	10B	641	37	30	30	31	30	0	28	33	33	32	33	0	24	30	30	30	30	0
Farm 3	1	15B	414	38	33	33	33	33	0	36	32	32	32	32	0	35	26	26	26	26	0
Farm 3	1	19D2	695	40	33	33	31	32	1	31	31	31	31	31	0	35	27	27	27	27	0
Farm 3	2	8C	701	40	31	31	31	31	0	30	28	28	29	28	0	38	25	25	27	26	1
Farm 3	2	8D	701	39	31	31	31	31	0	30	29	28	29	29	0	35	27	27	27	27	0
Farm 3	2	11E	509	36	30	30	30	30	0	34	28	28	28	28	0	32	27	27	27	27	0
Farm 3	2	15C	694	34	32	32	32	32	0	37	31	31	31	31	0	36	27	27	28	27	0
Farm 3	2	16B	579	37	32	32	32	32	0	35	33	33	33	33	0	34	31	31	32	31	0
Farm 3	2	18B	639	39	32	32	31	32	0	33	32	32	32	32	0	37	28	28	27	28	0
Farm 3	2	22E	564	37	31	31	31	31	0	37	30	30	31	30	0	31	27	28	27	27	0
Farm 2	2	13E	R82	33	30	30	30	30	0	35	35	35	35	35	0	39	30	30	30	30	0
Farm 1	3	12B	6592	37	27	27	28	27	0	27	29	29	29	29	0	31	29	29	29	29	0
Farm 1	4	8C	557	34	36	36	37	36	0	33	31	31	31	31	0	31	29	29	30	29	0
Farm 2	1	21D	L169	38	32	32	33	32	0	37	32	32	32	32	0	37	28	28	28	28	0
Farm 2	2	7C	V4	34	33	33	33	33	0	39	33	33	33	33	0	33	30	30	30	30	0
Farm 2	1	16B	S148	39	37	37	35	36	1	36	30	30	30	30	0	36	28	28	28	28	0
Farm 2	1	25B	W160	20	30	30	30	30	0	26	31	31	31	31	0	36	29	29	29	29	0
Farm 1	2	15C	563	35	30	30	31	30	0	35	26	26	26	26	0	34	28	28	29	28	0
Farm 1	3	6C	408	37	31	31	32	31	0	37	33	33	34	33	0	35	30	30	30	30	0
Farm 1	3	7D	536	38	32	33	32	32	0	34	35	35	35	35	0	32	31	32	31	31	0
Farm 1	4	9B	562	35	39	39	39	39	0	33	33	33	34	33	0	32	28	28	28	28	0
Farm 1	4	10B	407	34	34	34	34	34	0	32	34	34	34	34	0	32	30	30	30	30	0
Farm 1	4	10C	407	35	32	32	33	32	0	31	34	34	35	34	0	31	29	29	29	29	0
Farm 2	1	7E	T236	41	31	31	31	31	0	45	30	30	30	30	0	40	27	27	27	27	0
Farm 2	1	20A1	T352		32	32	32	32	0		33	33	33	33	0		27	27	27	27	0
Farm 2	2	9D	W97	37	32	32	32	32	0	34	30	30	30	30	0	35	27	27	28	27	0
Farm 2	2	11C	Y34	32	31	31	31	31	0	33	32	32	32	32	0	37	30	30	30	30	0
Farm 2	2	15D	V63	38	28	28	28	28	0	36	33	33	33	33	0	34	30	30	30	30	0
Farm 3	1	11D	517	34	29	29	29	29	0	31	31	31	31	31	0	27	26	26	26	26	0
Farm 2	1	19C	R100	44	31	31	31	31	0	35	31	31	31	31	0	34	25	25	25	25	0
Farm 1	2	19C	547	39	24	25	24	24	0	39	38	38	38	38	0	31	32	32	33	32	0
Farm 1	2	9C	3542	36	32	32	33	32	0	34	32	32	33	32	0	35	32	32	32	32	0
Farm 1	1	16E	623	29	33	33	33	33	0	33	34	34	34	34	0	31	35	35	35	35	0
Farm 3	1	9B	494	29	28	28	29	28	0	31	28	28	28	28	0	25	25	25	26	25	0
Farm 1	4	7C	443	33	37	37	38	37	0	33	30	30	30	30	0	31	25	25	26	25	0
Farm 3	1	16A	478	34	30	30	30	30	0	32	30	30	30	30	0	30	25	25	25	25	0

Table 8: Initial AST data *E. coli* BG isolates. Clinical panel

N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Ciprofloxacin						Gentamicin						Tigecycline					
				RT zoi	1	2	3	average	SD	RT ZOI	1	2	3	average	SD	RT ZOI	1	2	3	average	SD
Farm 1	1	12C	921	38	32	32	32	32	0	15	18	18	18	18	0	14	24	24	24	24	0
Farm 1	1	13D	541	34	34	34	34	34	0	16	19	19	19	19	0	18	24	24	24	24	0
Farm 1	1	15C	131	32	33	33	33	33	0	16	19	19	19	19	0	19	31	31	31	31	0
Farm 1	2	7C	557	20	33	33	33	33	0	35	19	19	19	19	0	20	24	24	24	24	0
Farm 1	2	11C	117	14	30	30	31	30	0	34	18	18	18	18	0	13	24	24	24	24	0
Farm 1	2	13C	508	20	34	34	35	34	0	18	20	20	20	20	0	15	22	22	22	22	0
Farm 1	3	6E	408	40	31	31	30	31	0	15	18	18	18	18	0	17	22	22	22	22	0
Farm 1	3	11B	422	37	35	35	36	35	0	15	19	19	19	19	0	17	22	22	22	22	0
Farm 1	3	11C	422	37	33	33	34	33	0	16	19	19	19	19	0	23	22	24	21	22	1
Farm 1	3	14B	3499	38	31	31	32	31	0	18	17	17	17	17	0	18	22	22	22	22	0
Farm 1	3	17D	816	41	36	36	36	36	0	16	18	18	18	18	0	19	20	20	20	20	0
Farm 1	3	21C	3511	41	33	33	33	33	0	18	19	19	19	19	0	17	25	25	25	25	0
Farm 1	3	23C	3513	35	38	38	38	38	0	15	20	20	20	20	0	18	24	24	24	24	0
Farm 2	1	2A	T824	39	27	27	27	27	0	15	17	17	17	17	0	18	19	19	19	19	0
Farm 2	1	10F	T229	36	35	35	35	35	0	19	18	18	19	18	0	16	24	24	23	24	0
Farm 2	1	12F	V30	38	29	29	29	29	0	15	18	18	19	18	0	17	20	20	21	20	0
Farm 2	1	18D	V27	38	32	32	32	32	0	16	19	19	20	19	0	20	20	20	21	20	0
Farm 2	1	19A	R100	37	32	32	32	32	0	17	19	20	19	19	0	18	21	21	21	21	0
Farm 2	1	19B	R100		31	31	31	31	0		19	19	19	19	0		22	22	22	22	0
Farm 2	1	20F	T352	38	31	31	31	31	0	15	19	19	19	19	0	20	21	21	21	21	0
Farm 2	1	25D	W160	40	31	31	31	31	0	15	16	17	16	16	0	23	23	23	22	23	0
Farm 2	2	8D	V4	40	30	30	30	30	0	17	18	18	19	18	0	9	21	21	21	21	0
Farm 2	2	14C	T247	32	31	31	31	31	0	17	19	19	19	19	0	17	20	20	20	20	0
Farm 2	2	15B	V63	42	31	31	31	31	0	17	17	17	17	17	0	23	21	21	21	21	0
Farm 3	1	6A	672	36	35	35	35	35	0	25	16	16	17	16	0	24	23	23	22	23	0
Farm 3	1	7B	681	45	32	32	32	32	0	24	19	19	19	19	0	25	22	22	22	22	0
Farm 3	1	10B	641	31	33	33	33	33	0	11	17	17	17	17	0	16	21	21	20	21	0
Farm 3	1	15B	414	38	31	31	31	31	0	27	19	19	19	19	0	26	22	22	22	22	0
Farm 3	1	19D2	695	41	33	33	33	33	0	23	17	17	18	17	0	22	22	22	21	22	0
Farm 3	2	8C	701	38	29	29	29	29	0	27	17	17	18	17	0	26	22	22	22	22	0
Farm 3	2	8D	701	36	33	33	33	33	0	27	18	18	17	18	0	28	25	25	25	25	0
Farm 3	2	11E	509	34	30	30	31	30	0	23	17	17	17	17	0	25	22	22	22	22	0
Farm 3	2	15C	694	24	33	33	32	33	0	27	17	17	17	17	0	27	23	23	24	23	0
Farm 3	2	16B	579	44	39	39	38	39	0	23	19	19	19	19	0	25	24	24	23	24	0
Farm 3	2	18B	639	37	32	32	31	32	0	25	18	18	18	18	0	26	23	24	23	23	0
Farm 3	2	22E	564	37	32	33	32	32	0	23	17	17	17	17	0	24	25	25	25	25	0
Farm 2	2	13E	R82	37	31	31	31	31	0	20	16	16	16	16	0	18	20	20	20	20	0
Farm 1	3	12B	6592	34	32	32	33	32	0	17	18	18	18	18	0	17	19	19	19	19	0
Farm 1	4	8C	557	32	29	29	29	29	0	16	19	19	19	19	0	17	25	25	25	25	0
Farm 2	1	21D	L169	37	32	32	32	32	0	17	19	19	19	19	0	16	18	18	18	18	0
Farm 2	2	7C	V4	34	31	31	31	31	0	14	19	19	19	19	0	17	20	20	20	20	0
Farm 2	1	16B	S148	38	26	26	26	26	0	15	17	17	16	17	0	19	25	25	24	25	0
Farm 2	1	25B	W160	28	29	29	29	29	0	17	16	16	17	16	0	19	20	20	20	20	0
Farm 1	2	15C	563	32	35	35	35	35	0	18	21	21	21	21	0	15	25	25	25	25	0
Farm 1	3	6C	408	42	42	4	42	29	18	16	20	20	20	20	0	22	21	21	21	21	0
Farm 1	3	7D	536	31	44	44	43	44	0	20	19	19	19	19	0	19	20	20	20	20	0
Farm 1	4	9B	562	40	34	34	34	34	0	17	20	20	20	20	0	17	20	20	21	20	0
Farm 1	4	10B	407	44	35	35	35	35	0	15	20	20	20	20	0	18	21	21	21	21	0
Farm 1	4	10C	407	39	31	31	30	31	0	19	18	18	18	18	0	16	20	20	20	20	0
Farm 2	1	7E	T236	39	30	30	30	30	0	16	17	17	17	17	0	17	23	23	23	23	0
Farm 2	1	20A1	T352		35	35	35	35	0		20	20	20	20	0		21	21	21	21	0
Farm 2	2	9D	W97	38	42	42	42	42	0	39	20	20	19	20	0	15	19	19	20	19	0
Farm 2	2	11C	Y34	36	31	31	31	31	0	15	17	17	17	17	0	15	21	21	21	21	0
Farm 2	2	15D	V63	39	32	32	32	32	0	17	19	19	19	19	0	17	19	19	20	19	0
Farm 3	1	11D	517	28	45	45	44	45	0	24	17	17	19	18	1	16	19	19	19	19	0
Farm 2	1	19C	R100	41	42	42	42	42	0	18	19	19	19	19	0	18	23	23	23	23	0
Farm 1	2	19C	547	36	34	33	35	34	1	15	17	17	17	17	0	16	21	21	21	21	0
Farm 1	2	9C	3542	31	31	31	31	31	0	16	18	18	18	18	0	19	21	21	21	21	0
Farm 1	1	16E	623	33	34	34	34	34	0	14	19	19	19	19	0	14	20	20	20	20	0
Farm 3	1	9B	494	36	30	30	30	30	0	27	20	20	20	20	0	21	18	18	19	18	0
Farm 1	4	7C	443	40	37	27	37	34	5	15	17	17	17	17	0	16	21	21	21	21	0
Farm 3	1	16A	478	48	29	29	29	29	0	28	19	19	17	18	1	22	19	19	19	19	0

Appendix 2c.

Table 9: Initial AST data *P. aeruginosa* ENV isolates. Veterinary panel

N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Amoxicillin						Ampicillin						Oxytetracycline					
				RT ZOI	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD
Farm 1	1	3F	Crush	46	6	6	6	6	0	44	6	6	6	6	0	31	32	30	34	32	2
Farm 1	1	5A	Cubicle shed	23	29	29	28	29	0	20	27	27	27	27	0	6	6	6	6	6	0
Farm 1	1	5C	Cubicle shed	6	44	42	45	44	1	11	38	38	38	38	0	31	31	31	31	31	0
Farm 1	1	5G	Cubicle shed	6	6	6	6	6	0	6	6	6	6	6	0	10	7	7	8	7	0
Farm 1	2	1D	Scraper tractor	6	6	6	6	6	0	9	6	6	6	6	0	9	6	6	6	6	0
Farm 1	2	2B	Holding Yard	6	6	6	6	6	0	6	6	6	6	6	0	6	28	28	28	28	0
Farm 1	2	3B	Crush	6	6	6	6	6	0	7	24	24	24	24	0	13	12	12	12	12	0
Farm 1	2	5D	Collecting yard	34	26	26	26	26	0	34	25	25	25	25	0	26	6	6	6	6	0
Farm 1	4	22B	Cubicle Shed	33	29	29	29	29	0	36	29	29	29	29	0	6	6	6	6	6	0
Farm 2	1	22D	Collecting Parlour	6	22	22	23	22	0	30	17	17	17	17	0	10	22	23	22	22	0
Farm 2	2	3A1	collecting yard	6	13	13	13	13	0	9	9	10	9	9	0	21	31	31	31	31	0
Farm 2	2	3D	Collecting yard		25	25	26	25	0		11	11	11	11	0		33	33	33	33	0
Farm 3	1	2B	Crush	18	6	6	6	6	0	6	6	6	6	6	0	15	12	12	11	12	0
Farm 3	1	2C	Crush	17	6	6	6	6	0	11	6	6	6	6	0	6	27	27	28	27	0
Farm 3	1	5C	Crush		26	26	26	26	0		24	24	24	24	0		6	6	6	6	0
Farm 3	2	2F	crusch	7	6	6	6	6	0	9	6	6	6	6	0	14	8	8	8	8	0
Farm 3	2	3E	holding yard	37	23	23	23	23	0	30	22	22	22	22	0	6	23	23	23	23	0

Table 10a: Initial AST data *P. aeruginosa* ENV isolates. ESBL A panel

N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Cefotaxime- 5						Cefotaxime- 30						Amoxycilin-Clavulanic Acid					
				RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD
Farm 1	1	3F	Crush	45	34	31	36	34	2		45	45	45	45	0	45	24	24	24	24	0
Farm 1	1	5A	Cubicle shed	38	35	35	35	35	0		42	42	42	42	0	23	31	30	32	31	1
Farm 1	1	5C	Cubicle shed	30	37	37	37	37	0		40	40	40	40	0	33	41	41	40	41	0
Farm 1	1	5G	Cubicle shed	32	33	33	32	33	0		39	39	39	39	0	25	29	29	29	29	0
Farm 1	2	1D	Scraper tractor	21	21	21	21	21	0		26	26	26	26	0	21	20	22	19	20	1
Farm 1	2	2B	Holding Yard	32	28	28	28	28	0		35	35	35	35	0	35	19	19	20	19	0
Farm 1	2	3B	Crush	33	39	39	39	39	0		39	39	39	39	0	25	24	24	24	24	0
Farm 1	2	5D	Collecting yard	33	35	35	35	35	0		39	39	39	39	0	35	28	28	28	28	0
Farm 1	4	22B	Cubicle Shed	30	33	33	33	33	0		37	39	37	38	1	33	28	28	28	28	0
Farm 2	1	22D	Collecting Parlour	36	35	35	34	35	0		39	40	39	39	0	28	24	24	29	26	2
Farm 2	2	3A1	collecting yard	36	27	27	27	27	0		33	33	33	33	0	16	21	21	21	21	0
Farm 2	2	3D	Collecting yard		25	25	26	25	0		30	30	30	30	0		25	25	25	25	0
Farm 3	1	2B	Crush	33	36	36	35	36	0		41	41	41	41	0	32	25	25	25	25	0
Farm 3	1	2C	Crush	37	42	41	42	42	0		47	47	47	47	0	28	26	26	26	26	0
Farm 3	1	5C	Crush		38	37	39	38	1		33	33	33	33	0		26	26	26	26	0
Farm 3	2	2F	crusch	37	42	42	42	42	0		49	49	49	49	0	21	20	20	37	26	8
Farm 3	2	3E	holding yard	34	11	11	11	11	0		19	19	19	19	0	30	37	37	28	34	4

Table 10b: Initial AST data *P. aeruginosa* ENV isolates. ESBL A panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Piperacillin						Piperacillin-Tazobactam						Cefuroxime						Cefotoxin					
				RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD
Farm 1	1	3F	Crush	45	24	24	24	24	0	45	28	28	28	28	0	36	31	31	31	31	0	38	35	35	35	35	0
Farm 1	1	5A	Cubicle shed	34	32	32	32	32	0	30	31	31	31	31	0	26	31	31	31	31	0	31	27	27	27	27	0
Farm 1	1	5C	Cubicle shed	30	28	28	28	28	0	26	35	35	35	35	0	35	41	41	40	41	0	31	40	40	40	40	0
Farm 1	1	5G	Cubicle shed	30	29	29	29	29	0	32	31	31	31	31	0	8	6	6	6	6	0	29	24	24	24	24	0
Farm 1	2	1D	Scraper tractor	27	21	21	21	21	0	28	28	28	28	28	0	14	6	6	6	6	0	23	21	21	21	21	0
Farm 1	2	2B	Holding Yard	33	24	24	24	24	0	32	22	22	22	22	0	32	23	23	23	23	0	22	19	19	18	19	0
Farm 1	2	3B	Crush	23	21	21	21	21	0	27	29	29	29	29	0	25	29	29	29	29	0	24	27	27	27	27	0
Farm 1	2	5D	Collecting yard	33	28	28	28	28	0	32	30	30	30	30	0	32	27	27	27	27	0	22	21	21	20	21	0
Farm 1	4	22B	Cubicle Shed	32	32	32	32	32	0	31	24	24	24	24	0	36	31	31	31	31	0	31	30	30	30	30	0
Farm 2	1	22D	Collecting Parlour	30	27	27	27	27	0	29	25	25	25	25	0	32	23	23	23	23	0	28	24	24	24	24	0
Farm 2	2	3A1	collecting yard	19	23	23	23	23	0	20	23	23	23	23	0	33	22	22	22	22	0	29	30	30	30	30	0
Farm 2	2	3D	Collecting yard		35	35	35	35	0		36	36	36	36	0		15	15	16	15	0		24	24	24	24	0
Farm 3	1	2B	Crush	31	23	23	23	23	0	33	22	22	22	22	0	33	27	27	27	27	0	19	25	25	25	25	0
Farm 3	1	2C	Crush	27	23	23	23	23	0	25	23	23	23	23	0	31	32	32	32	32	0	24	28	28	28	28	0
Farm 3	1	5C	Crush		29	29	29	29	0		27	27	27	27	0		27	27	27	27	0		23	23	23	23	0
Farm 3	2	2F	crusch	37	23	23	23	23	0	35	14	15	15	15	0	37	30	30	31	30	0	28	28	28	28	28	0
Farm 3	2	3E	holding yard	37	25	25	23	24	1	35	24	24	24	24	0	27	21	31	22	25	4	21	22	22	22	22	0

Table 11a: Initial AST data *P. aeruginosa* ENV isolates. ESBL B panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Ceftazidime - 10						Cefepime						Ertapenem					
				RT ZOI	1	2	3	average	SD	RT ZOI	1	2	3	average	SD	RT ZOI	1	2	3	average	SD
Farm 1	1	3F	Crush	41	35	35	35	35	0	44	42	40	44	42	2	43	39	39	40	39	0
Farm 1	1	5A	Cubicle shed	37	34	34	34	34	0	43	36	36	36	36	0	35	34	34	35	34	0
Farm 1	1	5C	Cubicle shed	37	32	32	33	32	0	43	42	42	42	42	0	35	42	42	41	42	0
Farm 1	1	5G	Cubicle shed	15	32	32	33	32	0	28	34	34	32	33	1	32	33	33	33	33	0
Farm 1	2	1D	Scraper tractor	27	31	31	30	31	0	36	32	32	31	32	0	36	28	28	28	28	0
Farm 1	2	2B	Holding Yard	26	24	24	23	24	0	38	27	27	27	27	0	38	25	25	25	25	0
Farm 1	2	3B	Crush	31	32	32	32	32	0	38	39	39	39	39	0	37	36	36	36	36	0
Farm 1	2	5D	Collecting yard	26	29	29	29	29	0	28	36	39	39	38	1	40	32	32	32	32	0
Farm 1	4	22B	Cubicle Shed	34	34	34	34	34	0	39	38	38	39	38	0	37	34	34	34	34	0
Farm 2	1	22D	Collecting Parlour	30	28	28	28	28	0	39	34	34	35	34	0	45	33	33	33	33	0
Farm 2	2	3A1	collecting yard	32	26	26	26	26	0	40	35	35	35	35	0	33	32	32	32	32	0
Farm 2	2	3D	Collecting yard		35	35	35	35	0		39	39	39	39	0		40	40	40	40	0
Farm 3	1	2B	Crush	33	31	31	31	31	0	42	29	29	29	29	0	36	16	16	16	16	0
Farm 3	1	2C	Crush	33	23	23	23	23	0	35	37	37	37	37	0	35	23	23	23	23	0
Farm 3	1	5C	Crush		31	31	31	31	0		16	16	17	16	0		29	29	29	29	0
Farm 3	2	2F	crusch	43	23	23	23	23	0	51	6	6	6	6	0	23	25	25	25	25	0
Farm 3	2	3E	holding yard	34	27	27	27	27	0	35	33	33	33	33	0	31	33	33	33	33	0

Table 11b: Initial AST data *P. aeruginosa* ENV isolates. ESBL B panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Meropenem						Imipenem					
				RT zoi	1	2	3	average	SD	RT ZOI	1	2	3	average	SD
Farm 1	1	3F	Crush	34	35	35	35	35	0	45	28	28	28	28	0
Farm 1	1	5A	Cubicle shed	40	37	37	37	37	0	35	30	30	30	30	0
Farm 1	1	5C	Cubicle shed	40	45	45	11	34	16	35	43	43	43	43	0
Farm 1	1	5G	Cubicle shed	34	33	33	33	33	0	33	27	27	27	27	0
Farm 1	2	1D	Scraper tractor	36	31	31	31	31	0	31	24	22	26	24	2
Farm 1	2	2B	Holding Yard	40	32	32	32	32	0	27	27	27	27	27	0
Farm 1	2	3B	Crush	34	37	37	36	37	0	38	33	33	33	33	0
Farm 1	2	5D	Collecting yard	27	33	33	33	33	0	32	27	27	27	27	0
Farm 1	4	22B	Cubicle Shed	33	33	33	33	33	0	26	28	28	29	28	0
Farm 2	1	22D	Collecting Parlour	40	34	34	34	34	0	40	30	30	30	30	0
Farm 2	2	3A1	collecting yard	38	32	32	32	32	0	37	29	29	29	29	0
Farm 2	2	3D	Collecting yard		38	38	38	38	0		35	35	34	35	0
Farm 3	1	2B	Crush	31	26	26	26	26	0	6	21	21	21	21	0
Farm 3	1	2C	Crush	21	28	28	28	28	0	6	19	19	19	19	0
Farm 3	1	5C	Crush		31	31	31	31	0		26	26	25	26	0
Farm 3	2	2F	crusch	47	34	34	34	34	0	36	28	28	28	28	0
Farm 3	2	3E	holding yard	35	26	26	27	26	0	20	35	35	35	35	0

Table 12: Initial AST data *P. aeruginosa* ENV isolates. Clinical panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Ciprofloxacin						Gentamicin						Tigecycline					
				RT zoi	1	2	3	average	SD	RT ZOI	1	2	3	average	SD	RT ZOI	1	2	3	average	SD
Farm 1	1	3F	Crush	45	35	35	36	35	0	22	17	17	17	17	0	30	25	25	25	25	0
Farm 1	1	5A	Cubicle shed	50	43	43	44	43	0	19	20	20	20	20	0	24	22	22	22	22	0
Farm 1	1	5C	Cubicle shed	45	39	38	39	39	0	19	26	26	26	26	0	24	28	28	28	28	0
Farm 1	1	5G	Cubicle shed	26	34	33	35	34	1	19	20	20	20	20	0	19	22	22	22	22	0
Farm 1	2	1D	Scraper tractor	23	35	35	35	35	0	42	20	20	20	20	0	17	22	22	22	22	0
Farm 1	2	2B	Holding Yard	27	32	32	32	32	0	16	18	18	18	18	0	16	24	24	24	24	0
Farm 1	2	3B	Crush	19	42	42	42	42	0	38	20	20	20	20	0	16	22	22	22	22	0
Farm 1	2	5D	Collecting yard	25	40	40	40	40	0	17	20	20	20	20	0	16	21	21	21	21	0
Farm 1	4	22B	Cubicle Shed	40	42	42	42	42	0	16	21	21	21	21	0	16	24	24	24	24	0
Farm 2	1	22D	Collecting Parlour	46	38	38	37	38	0	21	18	18	18	18	0	23	23	23	23	23	0
Farm 2	2	3A1	collecting yard	40	28	28	29	28	0	17	16	16	16	16	0	13	23	23	23	23	0
Farm 2	2	3D	Collecting yard		42	42	42	42	0		25	25	26	25	0		32	32	32	32	0
Farm 3	1	2B	Crush	41	35	35	35	35	0	29	19	19	19	19	0	22	21	21	21	21	0
Farm 3	1	2C	Crush	40	39	39	39	39	0	28	26	26	26	26	0	21	24	24	24	24	0
Farm 3	1	5C	Crush		35	35	25	32	5		19	19	19	19	0		20	20	20	20	0
Farm 3	2	2F	crusch	54	34	34	34	34	0	33	18	18	18	18	0	30	21	21	21	21	0
Farm 3	2	3E	holding yard	47	50	50	50	50	0	29	29	29	28	29	0	19	22	22	22	22	0

Appendix 2d

Table 13: Initial AST data *P. aeruginosa* BG isolates. Veterinary panel

N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Amoxicillin						Ampicillin						Oxytetracycline					
				RT ZOI	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD
Farm 1	2	6D	446	36	27	27	27	27	0	40	25	25	25	25	0	8	6	6	6	6	0
Farm 1	2	7A	557	32	28	28	29	28	0	44	27	27	27	27	0	6	6	6	6	6	0
Farm 1	2	8A	556	32	26	26	25	26	0	36	25	25	25	25	0	6	6	6	6	6	0
Farm 1	2	14B	75	26	29	29	29	29	0	24	23	23	22	23	0	25	6	6	6	6	0
Farm 1	2	14D	75	38	26	26	27	26	0	34	37	38	37	37	0	6	6	6	6	6	0
Farm 1	2	16C	214	33	29	29	30	29	0	36	28	28	28	28	0	32	30	30	30	30	0
Farm 1	2	19D	547	35	27	27	26	27	0	40	25	25	25	25	0	29	6	6	6	6	0
Farm 2	2	2E	Y125	32	25	25	25	25	0	28	22	22	22	22	0	23	24	24	24	24	0
Farm 2	2	10C1	V52	40	22	22	22	22	0	37	10	10	10	10	0	6	6	6	6	6	0
Farm 3	1	11C	517	29	24	24	24	24	0	22	23	23	23	23	0	6	6	6	6	6	0
Farm 3	1	20C	659	33	22	22	22	22	0	30	23	23	23	23	0	6	6	6	6	6	0
Farm 3	2	9B	601	43	29	29	29	29	0	40	25	25	25	25	0	34	26	26	26	26	0
Farm 3	2	9D	601	33	21	21	22	21	0	16	20	20	20	20	0	6	6	6	6	6	0
Farm 3	2	22D	564	28	21	21	21	21	0	23	19	19	19	19	0	6	6	6	6	6	0

Table 14a: Initial AST data *P. aeruginosa* BG isolates. ESBL A panel

N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Cefotaxime- 5						Cefotaxime- 30						Amoxycilin-Clavulanic Acid					
				RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD
Farm 1	2	6D	446	37	37	37	37	37	0		44	44	43	44	0	36	31	31	31	31	0
Farm 1	2	7A	557	24	35	35	35	35	0		39	39	39	39	0	30	29	29	29	29	0
Farm 1	2	8A	556	38	34	34	34	34	0		40	40	40	40	0	36	31	31	30	31	0
Farm 1	2	14B	75	33	37	37	37	37	0		43	43	44	43	0	26	33	33	33	33	0
Farm 1	2	14D	75	30	33	33	33	33	0		39	39	39	39	0	30	32	32	32	32	0
Farm 1	2	16C	214	38	33	33	33	33	0		39	39	39	39	0	34	37	37	37	37	0
Farm 1	2	19D	547	17	19	19	18	19	0		27	44	27	33	8	36	39	39	39	39	0
Farm 2	2	2E	Y125	33	30	30	30	30	0		34	34	34	34	0	27	24	24	24	24	0
Farm 2	2	10C1	V52	26	33	33	34	33	0		42	42	42	42	0	33	28	28	28	28	0
Farm 3	1	11C	517	32	31	31	31	31	0		35	35	35	35	0	24	26	26	26	26	0
Farm 3	1	20C	659	42	33	33	33	33	0		39	39	39	39	0	31	25	25	25	25	0
Farm 3	2	9B	601	42	33	31	35	33	2		35	35	35	35	0	35	28	28	27	28	0
Farm 3	2	9D	601	37	32	32	33	32	0		37	37	37	37	0	27	27	27	27	27	0
Farm 3	2	22D	564	31	33	33	33	33	0		41	41	41	41	0	22	27	27	27	27	0

Table 14b: Initial AST data *P. aeruginosa* BG isolates. ESBL A panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Piperacillin						Piperacillin-Tazobactam						Cefuroxime						Cefotoxin					
				RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT zoi	1	2	3	average	SD
Farm 1	2	6D	446	34	32	32	32	32	0	35	32	32	31	32	0	36	29	29	29	29	0	29	24	24	24	24	0
Farm 1	2	7A	557	30	30	30	30	30	0	20	31	31	31	31	0	20	30	30	36	32	3	18	25	25	26	25	0
Farm 1	2	8A	556	40	33	33	33	33	0	35	31	31	31	31	0	36	27	27	27	27	0	30	29	29	29	29	0
Farm 1	2	14B	75	28	29	29	29	29	0	26	32	32	33	32	0	28	28	28	28	28	0	30	22	922	21	322	424
Farm 1	2	14D	75	24	32	32	32	32	0	23	33	33	33	33	0	16	32	32	32	32	0	6	25	25	26	25	0
Farm 1	2	16C	214	33	33	33	33	33	0	34	35	35	36	35	0	34	33	33	33	33	0	31	26	26	26	26	0
Farm 1	2	19D	547	27	27	27	27	27	0	25	28	28	28	28	0	29	31	31	31	31	0	21	25	25	25	25	0
Farm 2	2	2E	Y125	29	27	27	27	27	0	29	29	29	29	29	0	29	26	26	26	26	0	29	25	25	25	25	0
Farm 2	2	10C1	V52	36	25	25	25	25	0	28	24	24	24	24	0	27	20	20	20	20	0	32	23	23	23	23	0
Farm 3	1	11C	517	30	24	24	24	24	0	28	25	25	25	25	0	26	22	22	21	22	0	21	20	20	20	20	0
Farm 3	1	20C	659	34	27	27	27	27	0	40	24	24	24	24	0	31	27	27	28	27	0	26	21	21	21	21	0
Farm 3	2	9B	601	40	27	27	27	27	0	39	28	28	28	28	0	38	26	26	26	26	0	35	25	25	25	25	0
Farm 3	2	9D	601	34	30	30	30	30	0	28	32	32	31	32	0	24	27	27	27	27	0	26	31	31	31	31	0
Farm 3	2	22D	564	33	29	29	29	29	0	32	21	21	22	21	0	28	25	25	25	25	0	24	21	21	21	21	0

Table 15a: Initial AST data *P. aeruginosa* BG isolates. ESBL B panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Ceftazidime - 10						Cefepime					
				RT ZOI	1	2	3	average	SD	RT ZOI	1	2	3	average	SD
Farm 1	2	6D	446	35	31	31	31	31	0	39	35	35	35	35	0
Farm 1	2	7A	557	21	31	31	31	31	0	25	37	37	37	37	0
Farm 1	2	8A	556	37	33	33	33	33	0	33	35	35	35	35	0
Farm 1	2	14B	75	34	27	27	27	27	0	36	32	31	35	33	2
Farm 1	2	14D	75	16	6	6	6	6	0	16	26	26	26	26	0
Farm 1	2	16C	214	31	33	33	33	33	0	33	38	38	38	38	0
Farm 1	2	19D	547	6	6	6	6	6	0	22	26	26	25	26	0
Farm 2	2	2E	Y125	27	28	28	28	28	0	35	37	37	38	37	0
Farm 2	2	10C1	V52	33	26	26	26	26	0	38	31	31	31	31	0
Farm 3	1	11C	517	28	27	27	27	27	0	35	32	32	22	29	5
Farm 3	1	20C	659	35	28	28	28	28	0	41	28	28	28	28	0
Farm 3	2	9B	601	42	32	32	32	32	0	53	36	36	36	36	0
Farm 3	2	9D	601	34	31	31	31	31	0	38	31	31	31	31	0
Farm 3	2	22D	564	19	28	28	28	28	0	28	27	27	27	27	0

Table 15b: Initial AST data *P. aeruginosa* BG isolates. ESBL B panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Ertapenem						Meropenem						Imipenem					
				RT ZOI	1	2	3	average	SD	RT zoi	1	2	3	average	SD	RT ZOI	1	2	3	average	SD
Farm 1	2	6D	446	37	34	34	34	34	0	36	36	36	37	36	0	28	30	30	30	30	0
Farm 1	2	7A	557	33	33	33	33	33	0	30	35	35	35	35	0	32	29	29	29	29	0
Farm 1	2	8A	556	33	34	34	34	34	0	34	34	34	34	34	0	29	29	29	29	29	0
Farm 1	2	14B	75	40	31	31	31	31	0	27	37	37	38	37	0	35	32	32	32	32	0
Farm 1	2	14D	75	25	36	36	36	36	0	30	30	30	31	30	0	7	26	26	27	26	0
Farm 1	2	16C	214	38	40	40	40	40	0	35	31	31	30	31	0	30	28	28	27	28	0
Farm 1	2	19D	547	23	23	23	23	23	0	29	27	27	27	27	0	30	31	31	30	31	0
Farm 2	2	2E	Y125	32	44	44	44	44	0	24	31	31	31	31	0	35	28	28	28	28	0
Farm 2	2	10C1	V52	40	31	31	32	31	0	36	31	31	31	31	0	33	27	27	28	27	0
Farm 3	1	11C	517	36	31	31	31	31	0	35	30	30	30	30	0	31	25	25	25	25	0
Farm 3	1	20C	659	35	30	30	30	30	0	37	32	32	32	32	0	33	28	28	28	28	0
Farm 3	2	9B	601	44	36	36	36	36	0	45	37	37	37	37	0	42	35	35	35	35	0
Farm 3	2	9D	601	39	24	24	24	24	0	35	31	31	31	31	0	33	27	27	27	27	0
Farm 3	2	22D	564	30	31	31	31	31	0	27	33	33	33	33	0	22	26	26	26	26	0

Table 16: Initial AST data *P. aeruginosa* BG isolates. Clinical panel
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	freeze tag no./environment	Ciprofloxacin						Gentamicin						Tigecycline					
				RT zoi	1	2	3	average	SD	RT ZOI	1	2	3	average	SD	RT ZOI	1	2	3	average	SD
Farm 1	2	6D	446	18	44	44	44	44	0	43	24	24	24	24	0	17	22	22	22	22	0
Farm 1	2	7A	557	19	39	39	39	39	0	45	22	22	22	22	0	18	22	22	22	22	0
Farm 1	2	8A	556	42	47	47	47	47	0	15	22	22	22	22	0	16	22	22	22	22	0
Farm 1	2	14B	75	24	44	44	44	44	0	15	21	21	21	21	0	17	19	19	19	19	0
Farm 1	2	14D	75	23	34	34	33	34	0	15	17	17	17	17	0	16	21	21	21	21	0
Farm 1	2	16C	214	17	39	39	40	39	0	13	20	20	20	20	0	14	21	21	21	21	0
Farm 1	2	19D	547	17	26	26	26	26	0	26	25	25	25	25	0	18	19	19	19	19	0
Farm 2	2	2E	Y125	40	30	30	31	30	0	14	17	17	17	17	0	13	22	22	22	22	0
Farm 2	2	10C1	V52	21	28	28	28	28	0	18	18	18	19	18	0	12	19	19	19	19	0
Farm 3	1	11C	517	40	32	32	31	32	0	19	18	18	18	18	0	16	20	20	20	20	0
Farm 3	1	20C	659	50	43	43	43	43	0	26	19	19	19	19	0	21	19	19	19	19	0
Farm 3	2	9B	601	53	51	51	51	51	0	32	21	21	22	21	0	32	27	27	27	27	0
Farm 3	2	9D	601	40	39	39	39	39	0	28	17	17	17	17	0	20	22	22	22	22	0
Farm 3	2	22D	564	40	42	42	42	42	0	28	18	18	18	18	0	19	21	21	21	21	0

Appendix 3 Sodium Pyruvate AST data
Table 17: NaPyr AST. Vet panel Amoxicillin
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	Sample origin	freeze tag no./environment location	species	Resistant-Intermediate (R),	Amoxicillin											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	26	26	25	26	26	27	26	26	27	27	26	27
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	6	6	6	6	9	7	9	8	9	8	9	9
Farm 1	2	19C	Bg	547	*E. coli*	R	25	26	26	26	28	26	26	27	25	27	26	26
Farm 1	3	12B	Bg	6592	*E. coli*	R	26	25	24	25	25	25	25	25	25	26	24	25
Farm 2	1	2A	Bg	T824	*E. coli*	R	26	27	25	26	26	26	25	26	26	26	24	25
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	23	24	24	24	24	24	22	23	25	24	24	24
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	18	16	16	17	16	16	16	16	19	15	16	17
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	28	29	29	29	30	30	29	30	28	29	29	29
Farm 2	1	25B	Bg	W160	*E. coli*	R	29	24	24	26	25	24	24	24	25	24	24	24
Farm 3	1	16A	Bg	478	*E. coli*	R	11	11	13	12	10	10	13	11	12	12	13	12
Farm 1	2	11C	Bg	117	*E. coli*	S	21	23	2	15	22	21	22	22	23	20	23	22
Farm 1	3	11B	Bg	442	*E. coli*	S	23	23	25	24	23	23	21	22	23	23	22	23
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	21	25	23	23	25	23	22	23	21	25	22	23
Farm 2	1	18D	Bg	V27	*E. coli*	S	21	22	23	22	21	22	23	22	24	23	23	23
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	21	23	22	22	20	21	21	21	23	24	22	23
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	29	24	26	26	24	25	25	25	25	26	26	26
Farm 2	2	14C	Bg	T247	*E. coli*	S	24	24	25	24	23	24	23	23	25	25	23	24
Farm 3	1	19D2	Bg	695	*E. coli*	S	22	22	22	22	24	24	22	23	23	23	22	23
Farm 3	2	16B	Bg	579	*E. coli*	S	29	29	29	29	28	30	30	29	28	28	30	29
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	6	6	6	6	6	6	6	6	6	6	6	6
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	30	30	32	31	31	31	32	31	30	30	30	30
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	20	19	18	19	21	21	21	21	26	25	25	25
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	26	25	24	25	26	26	26	26	27	26	26	26
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	19	19	20	19	19	19	19	19	18	19	18	18
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	19	18	19	19	26	25	26	26	27	25	23	25
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	18	16	16	17	12	17	13	14	18	18	15	17
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	10	10	10	10	10	10	11	10	21	18	16	18
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	42	42	42	42	43	42	42	42	43	43	43	43
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	30	29	29	29	27	28	29	28	28	29	30	29
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	35	35	35	35	33	34	32	33	33	33	36	34
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	23	23	25	24	24	24	24	24	23	24	24	24

Table 18: NaPyr AST. Vet panel Ampicillin

N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**freeze tag no./environment location**	**species**	**Resistant-Intermediate (R),**	ampicilllin											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	20	19	20	20	22	21	21	21	23	23	23	23
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	10	11	10	10	13	13	13	13	19	16	19	18
Farm 1	2	19C	Bg	547	*E. coli*	R	20	22	23	22	21	26	23	23	20	25	23	23
Farm 1	3	12B	Bg	6592	*E. coli*	R	30	22	22	25	21	23	22	22	26	22	22	23
Farm 2	1	2A	Bg	T824	*E. coli*	R	23	23	21	22	23	23	23	23	23	23	21	22
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	20	21	22	21	22	23	23	23	23	23	22	23
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	18	15	16	16	16	16	16	16	16	16	16	16
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	27	27	27	27	28	27	27	27	28	27	27	27
Farm 2	1	25B	Bg	W160	*E. coli*	R	22	22	22	22	22	22	22	22	22	20	22	21
Farm 3	1	16A	Bg	478	*E. coli*	R	24	24	23	24	25	25	20	23	23	24	19	22
Farm 1	2	11C	Bg	117	*E. coli*	S	18	21	18	19	18	21	20	20	19	20	21	20
Farm 1	3	11B	Bg	442	*E. coli*	S	20	20	18	19	21	21	18	20	21	21	18	20
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	21	21	19	20	19	19	19	19	21	21	21	21
Farm 2	1	18D	Bg	V27	*E. coli*	S	18	18	17	18	17	17	18	17	18	17	17	17
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	20	18	19	19	16	18	18	17	19	19	22	20
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	20	22	23	22	21	21	21	21	21	22	22	22
Farm 2	2	14C	Bg	T247	*E. coli*	S	21	22	20	21	20	22	18	20	22	22	19	21
Farm 3	1	19D2	Bg	695	*E. coli*	S	23	22	21	22	23	22	22	22	22	22	21	22
Farm 3	2	16B	Bg	579	*E. coli*	S	26	28	28	27	29	27	27	28	26	27	26	26
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	6	6	6	6	6	6	6	6	6	6	6	6
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	20	20	18	19	24	22	23	23	23	21	23	22
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	9	9	9	9	18	16	15	16	9	10	10	10
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	23	22	22	22	24	24	25	24	25	24	25	25
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	16	16	16	16	16	16	16	16	16	17	17	17
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	25	24	25	25	21	22	23	22	25	24	25	25
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	11	11	12	11	13	12	14	13	11	11	11	11
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	22	21	22	22	21	23	21	22	23	23	22	23
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	46	44	42	44	40	38	44	41	44	47	41	44
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	27	25	25	26	25	25	25	25	26	26	25	26
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	34	33	34	34	35	35	35	35	34	34	34	34
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	21	22	21	21	23	23	23	23	24	23	23	23

Table 19: NaPyr AST. Vet panel Oxytetracycline
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**freeze tag no./environment location**	**species**	**Resistant-Intermediate (R),**	oxytetracycline											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	19	19	21	20	21	22	24	22	27	25	26	26
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	6	6	6	6	11	10	11	11	10	8	10	9
Farm 1	2	19C	Bg	547	*E. coli*	R	6	8	8	7	6	8	8	7	6	6	8	7
Farm 1	3	12B	Bg	6592	*E. coli*	R	27	28	28	28	27	29	28	28	27	28	28	28
Farm 2	1	2A	Bg	T824	*E. coli*	R	27	25	26	26	29	29	27	28	28	28	26	27
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	24	23	25	24	24	23	22	23	24	24	23	24
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	26	29	28	28	28	27	28	28	24	30	30	28
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	10	6	6	7	8	6	6	7	8	6	6	7
Farm 2	1	25B	Bg	W160	*E. coli*	R	27	28	28	28	25	28	28	27	24	27	28	26
Farm 3	1	16A	Bg	478	*E. coli*	R	6	6	6	6	6	6	6	6	6	6	6	6
Farm 1	2	11C	Bg	117	*E. coli*	S	20	26	26	24	29	21	25	25	21	23	28	24
Farm 1	3	11B	Bg	442	*E. coli*	S	22	21	26	23	23	23	25	24	23	23	23	23
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	23	29	23	25	21	22	24	22	23	28	24	25
Farm 2	1	18D	Bg	V27	*E. coli*	S	25	26	25	25	25	26	25	25	26	26	25	26
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	22	24	24	23	24	25	24	24	24	25	22	24
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	25	23	24	24	24	28	25	26	24	27	23	25
Farm 2	2	14C	Bg	T247	*E. coli*	S	25	24	23	24	28	29	29	29	25	25	24	25
Farm 3	1	19D2	Bg	695	*E. coli*	S	20	21	21	21	25	27	23	25	20	20	20	20
Farm 3	2	16B	Bg	579	*E. coli*	S	35	33	33	34	24	26	25	25	23	24	23	23
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	23	23	23	23	23	23	23	23	21	22	22	22
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	6	6	6	6	6	6	6	6	6	6	6	6
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	7	7	7	7	6	6	6	6	9	9	9	9
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	23	22	21	22	22	22	22	22	21	23	22	22
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	31	30	32	31	33	30	31	31	31	31	31	31
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	10	11	10	10	19	16	18	18	6	11	9	9
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	11	11	11	11	13	11	12	12	13	13	12	13
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	10	9	10	10	12	10	10	11	10	10	10	10
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	31	30	31	31	33	32	33	33	32	32	32	32
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	6	6	6	6	6	6	6	6	6	6	6	6
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	28	29	29	29	30	30	30	30	30	30	30	30
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	22	23	22	22	24	25	25	25	22	22	26	23

Table 20: NaPyr AST. Vet panel Marbofloxacin
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**freeze tag no./environment location**	**species**	**Resistant-Intermediate (R),**	marbofloxacin											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	29	30	30	30	30	32	31	31	35	34	34	34
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	33	33	33	33	34	33	34	34	30	35	33	33
Farm 1	2	19C	Bg	547	*E. coli*	R	35	33	32	33	37	35	34	35	36	31	32	33
Farm 1	3	12B	Bg	6592	*E. coli*	R	35	33	34	34	36	35	36	36	35	37	36	36
Farm 2	1	2A	Bg	T824	*E. coli*	R	32	33	30	32	31	31	31	31	33	34	29	32
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	30	31	30	30	32	32	31	32	32	32	31	32
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	29	33	33	32	32	33	33	33	31	32	33	32
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	35	36	35	35	37	35	36	36	36	37	37	37
Farm 2	1	25B	Bg	W160	*E. coli*	R	30	30	30	30	30	28	30	29	29	29	30	29
Farm 3	1	16A	Bg	478	*E. coli*	R	30	31	32	31	32	32	30	31	32	32	32	32
Farm 1	2	11C	Bg	117	*E. coli*	S	29	33	32	31	29	34	31	31	33	34	34	34
Farm 1	3	11B	Bg	442	*E. coli*	S	31	32	31	31	30	30	24	28	29	29	28	29
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	28	30	28	29	31	28	27	29	30	32	30	31
Farm 2	1	18D	Bg	V27	*E. coli*	S	30	30	31	30	29	31	31	30	30	31	31	31
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	34	30	31	32	28	28	27	28	32	30	28	30
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	31	30	31	31	30	28	31	30	32	30	30	31
Farm 2	2	14C	Bg	T247	*E. coli*	S	31	32	28	30	31	31	30	31	30	30	29	30
Farm 3	1	19D2	Bg	695	*E. coli*	S	30	30	30	30	28	29	29	29	31	32	30	31
Farm 3	2	16B	Bg	579	*E. coli*	S	35	33	33	34	34	37	36	36	33	34	33	33
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	34	34	33	34	35	36	34	35	35	35	35	35
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	30	31	31	31	36	34	37	36	34	34	32	33
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	37	36	37	37	36	36	36	36	34	35	36	35
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	35	35	34	35	35	33	34	34	35	35	35	35
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	27	28	27	27	26	26	26	26	29	28	32	30
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	27	26	28	27	26	25	27	26	26	25	27	26
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	30	30	30	30	30	30	30	30	30	30	30	30
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	40	40	40	40	35	42	39	39	37	36	38	37
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	30	29	28	29	28	28	28	28	30	31	30	30
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	34	33	32	33	32	33	33	33	32	35	33	33
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	33	35	34	34	32	33	32	32	33	32	33	33
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	28	29	28	28	29	29	29	29	30	32	31	31

Table 21: NaPyr AST. ESBL A panel Cefotaxime 5ug
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	Sample origin	freeze tag no./environment location	species	Resistant-Intermediate (R),	Cefotaxime -5											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	27	28	28	28	28	28	28	28	28	28	29	28
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	29	30	29	29	30	30	30	30	30	31	30	30
Farm 1	2	19C	Bg	547	*E. coli*	R	30	32	32	31	31	31	32	31	32	32	32	32
Farm 1	3	12B	Bg	6592	*E. coli*	R	38	35	34	36	35	35	35	35	35	35	34	35
Farm 2	1	2A	Bg	T824	*E. coli*	R	28	28	29	28	29	29	30	29	29	29	29	29
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	28	29	28	28	28	26	26	27	28	28	28	28
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	31	27	28	29	31	27	27	28	31	37	27	32
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	23	31	29	28	33	28	29	30	32	29	29	30
Farm 2	1	25B	Bg	W160	*E. coli*	R	31	29	29	30	30	29	29	29	29	29	29	29
Farm 3	1	16A	Bg	478	*E. coli*	R	30	30	29	30	30	30	30	30	29	30	31	30
Farm 1	2	11C	Bg	117	*E. coli*	S	28	28	28	28	28	29	31	29	27	28	27	27
Farm 1	3	11B	Bg	442	*E. coli*	S	28	28	28	28	29	29	28	29	25	25	28	26
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	31	37	31	33	33	30	31	31	31	31	32	31
Farm 2	1	18D	Bg	V27	*E. coli*	S	21	21	21	21	20	20	21	20	23	23	22	23
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	28	27	28	28	27	28	28	28	31	30	29	30
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	30	30	31	30	30	28	23	27	30	30	30	30
Farm 2	2	14C	Bg	T247	*E. coli*	S	31	30	28	30	29	30	27	29	28	29	28	28
Farm 3	1	19D2	Bg	695	*E. coli*	S	21	21	23	22	28	29	27	28	26	28	27	27
Farm 3	2	16B	Bg	579	*E. coli*	S	31	33	33	32	28	31	31	30	30	32	31	31
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	22	24	17	21	18	21	22	20	24	22	26	24
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	15	16	18	16	18	18	19	18	20	20	20	20
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	10	11	10	10	9	9	9	9	20	19	19	19
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	31	31	31	31	32	32	31	32	35	34	34	34
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	27	27	24	26	26	27	25	26	29	28	28	28
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	25	30	26	27	32	33	31	32	30	33	32	32
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	35	33	36	35	37	37	35	36	38	36	37	37
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	30	33	30	31	47	42	42	44	37	40	41	39
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	25	25	24	25	24	24	24	24	25	25	25	25
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	27	25	27	26	28	27	28	28	27	27	28	27
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	32	35	34	34	35	37	35	36	35	36	36	36
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	28	28	28	28	29	28	29	29	29	29	29	29

Table 22: NaPyr AST. ESBL A panel Cefotaxime 30ug
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	Sample origin	freeze tag no./environment location	species	Resistant-Intermediate (R),	Cefotaxime 30											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	33	32	32	32	33	32	33	33	36	32	36	35
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	36	35	36	36	36	35	36	36	36	36	36	36
Farm 1	2	19C	Bg	547	*E. coli*	R	35	33	33	34	35	33	35	34	35	36	33	35
Farm 1	3	12B	Bg	6592	*E. coli*	R	38	40	41	40	39	41	41	40	38	41	41	40
Farm 2	1	2A	Bg	T824	*E. coli*	R	33	34	33	33	33	33	32	33	33	34	31	33
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	32	32	32	32	33	33	32	33	33	33	31	32
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	33	30	32	32	33	31	32	32	35	31	32	33
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	35	35	36	35	37	36	36	36	37	33	34	35
Farm 2	1	25B	Bg	W160	*E. coli*	R	32	30	30	31	35	31	31	32	34	32	31	32
Farm 3	1	16A	Bg	478	*E. coli*	R	35	35	31	34	32	33	32	32	33	33	34	33
Farm 1	2	11C	Bg	117	*E. coli*	S	33	33	31	32	30	31	31	31	31	32	32	32
Farm 1	3	11B	Bg	442	*E. coli*	S	33	32	32	32	32	31	32	32	31	31	31	31
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	37	38	36	37	36	35	36	36	38	38	35	37
Farm 2	1	18D	Bg	V27	*E. coli*	S	27	27	28	27	25	26	26	26	25	26	27	26
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	34	34	31	33	32	31	32	32	31	35	30	32
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	25	34	35	31	24	36	36	32	25	35	35	32
Farm 2	2	14C	Bg	T247	*E. coli*	S	35	36	34	35	32	33	33	33	28	35	33	32
Farm 3	1	19D2	Bg	695	*E. coli*	S	34	34	36	35	32	33	35	33	31	33	35	33
Farm 3	2	16B	Bg	579	*E. coli*	S	35	39	39	38	35	39	39	38	35	37	37	36
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	25	25	24	25	27	26	27	27	25	25	25	25
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	40	42	41	41	44	40	41	42	40	40	40	40
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	40	39	38	39	39	39	39	39	40	40	40	40
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	37	37	36	37	37	36	36	36	37	37	36	37
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	30	29	30	30	34	30	32	32	31	32	31	31
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	31	35	37	34	37	36	38	37	38	37	37	37
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	40	39	42	40	42	44	39	42	38	39	42	40
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	52	50	53	52	48	51	49	49	53	53	53	53
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	32	32	31	32	33	32	31	32	32	32	32	32
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	39	38	37	38	37	38	38	38	39	38	38	38
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	37	39	36	37	36	38	39	38	41	40	40	40
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	30	38	35	34	30	34	34	33	39	34	35	36

Table 23: NaPyr AST. ESBL A panel Amoxicillin/clavulanic acid
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	Sample origin	freeze tag no./environment location	species	Resistant-Intermediate (R),	CO-AMOXICLAV											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	24	25	24	24	29	27	28	28	26	25	25	25
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	28	25	26	26	28	24	28	27	26	26	26	26
Farm 1	2	19C	Bg	547	*E. coli*	R	20	26	25	24	20	25	25	23	20	25	25	23
Farm 1	3	12B	Bg	6592	*E. coli*	R	23	24	25	24	24	35	28	29	23	32	28	28
Farm 2	1	2A	Bg	T824	*E. coli*	R	23	24	24	24	25	25	27	26	25	24	26	25
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	23	22	23	23	23	23	22	23	24	25	24	24
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	10	15	15	13	15	15	15	15	18	16	15	16
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	30	28	28	29	30	28	28	29	28	28	28	28
Farm 2	1	25B	Bg	W160	*E. coli*	R	25	23	23	24	23	23	23	23	25	23	23	24
Farm 3	1	16A	Bg	478	*E. coli*	R	14	14	16	15	15	16	16	16	19	18	16	18
Farm 1	2	11C	Bg	117	*E. coli*	S	22	24	24	23	22	22	23	22	22	23	23	23
Farm 1	3	11B	Bg	442	*E. coli*	S	22	22	21	22	21	22	20	21	19	20	21	20
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	22	28	22	24	23	22	22	22	25	23	24	24
Farm 2	1	18D	Bg	V27	*E. coli*	S	25	26	26	26	25	27	24	25	25	26	24	25
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	22	21	22	22	22	20	21	21	22	23	22	22
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	24	25	26	25	23	24	19	22	25	25	25	25
Farm 2	2	14C	Bg	T247	*E. coli*	S	24	25	22	24	23	25	22	23	23	25	22	23
Farm 3	1	19D2	Bg	695	*E. coli*	S	22	23	22	22	20	23	22	22	21	22	21	21
Farm 3	2	16B	Bg	579	*E. coli*	S	28	28	28	28	28	26	26	27	26	27	28	27
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	20	20	20	20	19	20	21	20	21	21	21	21
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	17	17	17	17	17	16	16	16	16	17	17	17
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	9	10	10	10	11	11	12	11	22	18	18	19
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	25	24	24	24	25	25	25	25	25	26	26	26
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	15	16	15	15	15	15	15	15	16	16	15	16
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	10	9	9	9	9	9	9	9	9	9	9	9
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	31	31	30	31	31	32	31	31	30	30	31	30
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	23	24	22	23	30	28	29	29	29	29	29	29
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	43	46	40	43	46	45	46	46	44	42	47	44
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	25	24	24	24	24	24	24	24	27	24	25	25
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	40	40	42	41	39	40	38	39	39	39	39	39
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	24	26	25	25	23	24	24	24	26	26	27	26

Table 24: NaPyr AST. ESBL A panel Piperacillin
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	Sample origin	freeze tag no./environment location	species	Resistant-Intermediate (R),	PIPPERACILLIN											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	28	29	29	29	27	27	26	27	28	29	28	28
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	28	28	28	28	28	28	28	28	28	29	28	28
Farm 1	2	19C	Bg	547	*E. coli*	R	30	29	28	29	31	29	28	29	30	28	28	29
Farm 1	3	12B	Bg	6592	*E. coli*	R	28	29	29	29	33	34	30	32	29	33	32	31
Farm 2	1	2A	Bg	T824	*E. coli*	R	26	26	25	26	26	23	25	25	26	26	24	25
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	25	24	25	25	26	26	28	27	26	28	26	27
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	21	27	26	25	25	27	26	26	26	26	26	26
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	29	28	28	28	29	29	28	29	30	28	28	29
Farm 2	1	25B	Bg	W160	*E. coli*	R	24	27	27	26	24	25	27	25	25	24	27	25
Farm 3	1	16A	Bg	478	*E. coli*	R	26	26	25	26	26	26	26	26	26	26	25	26
Farm 1	2	11C	Bg	117	*E. coli*	S	24	22	23	23	23	22	18	21	24	22	24	23
Farm 1	3	11B	Bg	442	*E. coli*	S	25	25	23	24	25	25	22	24	19	24	24	22
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	24	26	24	25	25	25	25	25	25	26	25	25
Farm 2	1	18D	Bg	V27	*E. coli*	S	21	22	21	21	21	21	21	21	21	22	21	21
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	22	25	22	23	28	23	24	25	25	29	28	27
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	24	24	24	24	24	24	24	24	25	24	25	25
Farm 2	2	14C	Bg	T247	*E. coli*	S	25	26	25	25	26	26	24	25	26	26	24	25
Farm 3	1	19D2	Bg	695	*E. coli*	S	25	24	26	25	25	25	26	25	25	24	26	25
Farm 3	2	16B	Bg	579	*E. coli*	S	28	33	33	31	28	32	32	31	27	31	30	29
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	20	20	21	20	22	21	21	21	22	22	22	22
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	32	32	31	32	32	32	32	32	32	33	32	32
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	31	30	31	31	31	30	30	30	31	31	31	31
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	28	27	28	28	28	28	28	28	27	27	27	27
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	21	22	22	22	22	22	22	22	22	22	22	22
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	29	30	30	30	30	30	30	30	32	31	32	32
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	25	25	25	25	26	26	27	26	26	26	25	26
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	27	24	23	25	24	24	23	24	29	26	25	27
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	32	33	32	32	36	34	34	35	34	34	34	34
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	33	33	32	33	32	32	32	32	33	32	32	32
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	28	28	28	28	27	27	28	27	29	28	28	28
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	25	25	25	25	25	25	26	25	26	25	26	26

Table 25: NaPyr AST. ESBL A panel Piperacillin/Tazobactam
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**freeze tag no./environment location**	**species**	**Resistant-Intermediate (R),**	Pipperacillin-tazobactam											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	26	26	26	26	26	26	26	26	27	27	27	27
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	28	28	28	28	28	27	28	28	28	28	28	28
Farm 1	2	19C	Bg	547	*E. coli*	R	28	28	28	28	31	28	28	29	30	28	28	29
Farm 1	3	12B	Bg	6592	*E. coli*	R	28	32	32	31	32	34	33	33	31	32	32	32
Farm 2	1	2A	Bg	T824	*E. coli*	R	26	26	25	26	28	27	25	27	26	26	23	25
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	26	25	26	26	25	25	25	25	25	27	27	26
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	25	22	24	24	26	26	26	26	29	27	27	28
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	23	32	30	28	31	30	31	31	31	29	30	30
Farm 2	1	25B	Bg	W160	*E. coli*	R	25	27	26	26	26	27	25	26	26	26	25	26
Farm 3	1	16A	Bg	478	*E. coli*	R	28	28	27	28	27	28	26	27	26	27	27	27
Farm 1	2	11C	Bg	117	*E. coli*	S	21	22	23	22	18	22	23	21	23	24	23	23
Farm 1	3	11B	Bg	442	*E. coli*	S	27	27	22	25	26	25	23	25	25	25	23	24
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	23	26	25	25	25	24	25	25	26	25	26	26
Farm 2	1	18D	Bg	V27	*E. coli*	S	24	24	25	24	24	25	25	25	25	25	25	25
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	25	28	23	25	22	23	23	23	26	25	25	25
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	24	22	25	24	25	24	23	24	23	25	25	24
Farm 2	2	14C	Bg	T247	*E. coli*	S	26	26	24	25	25	25	24	25	26	26	23	25
Farm 3	1	19D2	Bg	695	*E. coli*	S	25	25	25	25	25	25	25	25	25	25	25	25
Farm 3	2	16B	Bg	579	*E. coli*	S	28	31	31	30	26	31	31	29	29	31	31	30
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	29	29	28	29	28	28	29	28	27	28	29	28
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	26	27	28	27	28	27	28	28	28	28	28	28
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	31	32	32	32	34	34	34	34	33	36	35	35
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	26	26	28	27	26	28	29	28	29	29	29	29
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	23	24	24	24	23	24	23	23	24	24	24	24
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	28	29	30	29	25	29	32	29	28	30	32	30
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	30	29	30	30	28	28	27	28	29	29	29	29
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	31	31	30	31	30	30	30	30	32	31	31	31
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	36	38	37	37	37	38	37	37	37	37	37	37
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	31	32	31	31	32	32	32	32	33	32	33	33
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	32	33	33	33	34	34	33	34	33	33	33	33
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	26	26	26	26	26	26	26	26	26	26	26	26

Table 26: NaPyr AST. ESBL A panel Cefuroxime
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**freeze tag no./environment location**	**species**	**Resistant-Intermediate (R),**	cefuroxime											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	24	24	23	24	25	25	25	25	26	25	25	25
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	16	15	16	16	18	16	18	17	20	19	20	20
Farm 1	2	19C	Bg	547	*E. coli*	R	31	28	28	29	30	28	28	29	30	28	28	29
Farm 1	3	12B	Bg	6592	*E. coli*	R	33	33	31	32	32	31	31	31	32	31	31	31
Farm 2	1	2A	Bg	T824	*E. coli*	R	24	25	25	25	24	24	24	24	26	26	23	25
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	24	23	22	23	24	23	23	23	25	27	25	26
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	24	28	27	26	25	27	27	26	26	27	27	27
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	27	28	29	28	29	30	30	30	28	29	29	29
Farm 2	1	25B	Bg	W160	*E. coli*	R	25	25	25	25	25	25	25	25	25	26	25	25
Farm 3	1	16A	Bg	478	*E. coli*	R	26	26	25	26	25	26	25	25	26	26	24	25
Farm 1	2	11C	Bg	117	*E. coli*	S	22	26	22	23	21	17	21	20	22	20	21	21
Farm 1	3	11B	Bg	442	*E. coli*	S	24	24	25	24	24	24	23	24	24	24	23	24
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	25	28	25	26	26	25	27	26	28	28	26	27
Farm 2	1	18D	Bg	V27	*E. coli*	S	26	26	25	26	24	25	25	25	26	25	25	25
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	23	26	22	24	21	22	22	22	29	24	22	25
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	25	25	25	25	24	26	25	25	25	25	27	26
Farm 2	2	14C	Bg	T247	*E. coli*	S	25	25	25	25	25	25	26	25	25	25	28	26
Farm 3	1	19D2	Bg	695	*E. coli*	S	24	24	25	24	24	24	24	24	24	24	24	24
Farm 3	2	16B	Bg	579	*E. coli*	S	29	29	29	29	26	28	28	27	27	28	28	28
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	6	6	6	6	6	6	6	6	6	6	6	6
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	30	30	30	30	30	30	30	30	30	30	30	30
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	31	30	30	30	30	31	31	31	29	30	32	30
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	29	28	28	28	29	29	29	29	27	28	29	28
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	25	24	26	25	24	24	23	24	24	24	24	24
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	22	23	22	22	24	24	23	24	23	21	24	23
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	32	32	33	32	33	33	33	33	32	31	32	32
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	43	43	42	43	41	42	41	41	43	43	43	43
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	33	34	33	33	35	34	34	34	33	34	34	34
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	30	30	31	30	30	30	30	30	31	30	31	31
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	32	31	32	32	34	36	33	34	32	32	32	32
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	23	23	23	23	24	23	24	24	23	23	25	24

Table 27: NaPyr AST. ESBL A panel Cefoxitin
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**freeze tag no./environment location**	**species**	**Resistant-Intermediate (R),**	cefoxitin											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	25	24	25	25	25	26	26	26	26	24	24	25
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	23	23	23	23	26	26	26	26	29	29	29	29
Farm 1	2	19C	Bg	547	*E. coli*	R	25	22	22	23	25	22	22	23	25	21	22	23
Farm 1	3	12B	Bg	6592	*E. coli*	R	17	17	26	20	26	28	27	27	23	22	26	24
Farm 2	1	2A	Bg	T824	*E. coli*	R	27	26	28	27	28	28	28	28	27	27	27	27
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	23	22	22	22	24	24	24	24	24	24	25	24
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	13	11	10	11	12	14	14	13	16	15	14	15
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	29	28	27	28	28	25	26	26	28	26	27	27
Farm 2	1	25B	Bg	W160	*E. coli*	R	30	28	28	29	30	28	28	29	31	28	28	29
Farm 3	1	16A	Bg	478	*E. coli*	R	6	6	6	6	6	6	6	6	6	6	6	6
Farm 1	2	11C	Bg	117	*E. coli*	S	25	25	25	25	25	26	26	26	26	27	25	26
Farm 1	3	11B	Bg	442	*E. coli*	S	28	28	26	27	29	29	26	28	28	28	26	27
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	28	28	23	26	28	24	24	25	30	29	23	27
Farm 2	1	18D	Bg	V27	*E. coli*	S	23	23	23	23	24	25	23	24	24	24	24	24
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	20	28	24	24	23	24	25	24	24	29	26	26
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	29	30	29	29	24	26	25	25	25	25	27	26
Farm 2	2	14C	Bg	T247	*E. coli*	S	28	28	26	27	27	27	27	27	25	28	26	26
Farm 3	1	19D2	Bg	695	*E. coli*	S	28	28	28	28	28	28	28	28	26	27	28	27
Farm 3	2	16B	Bg	579	*E. coli*	S	28	29	29	29	26	30	30	29	28	27	27	27
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	21	22	21	21	21	21	21	21	22	22	21	22
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	9	8	12	10	12	9	9	10	9	9	9	9
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	10	11	11	11	9	12	12	11	20	20	17	19
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	29	28	29	29	29	29	29	29	28	29	29	29
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	27	27	27	27	28	26	27	27	28	28	28	28
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	18	19	20	19	26	25	24	25	20	22	21	21
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	32	32	32	32	32	32	32	32	31	32	31	31
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	31	31	31	31	29	30	28	29	32	32	30	31
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	35	35	34	35	35	34	34	34	35	34	35	35
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	14	17	16	16	27	22	25	25	20	22	21	21
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	35	36	35	35	37	37	38	37	37	37	37	37
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	27	26	26	26	27	27	28	27	28	27	28	28

Table 28: NaPyr AST. ESBL B panel Ceftazidime
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**freeze tag no./environment location**	**species**	**Resistant-Intermediate (R),**	ceftazadime											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	29	28	29	29	29	28	28	28	29	28	29	29
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	35	33	33	34	32	30	32	31	32	33	32	32
Farm 1	2	19C	Bg	547	*E. coli*	R	32	29	29	30	31	29	29	30	32	29	29	30
Farm 1	3	12B	Bg	6592	*E. coli*	R	30	34	34	33	31	34	34	33	32	34	34	33
Farm 2	1	2A	Bg	T824	*E. coli*	R	29	29	26	28	29	29	27	28	29	30	27	29
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	28	28	27	28	29	28	27	28	28	28	28	28
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	29	27	28	28	28	27	28	28	28	28	28	28
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	28	31	31	30	30	30	31	30	28	31	31	30
Farm 2	1	25B	Bg	W160	*E. coli*	R	27	30	29	29	28	30	29	29	28	29	29	29
Farm 3	1	16A	Bg	478	*E. coli*	R	29	28	28	28	27	28	26	27	27	27	26	27
Farm 1	2	11C	Bg	117	*E. coli*	S	28	28	26	27	29	27	26	27	26	27	26	26
Farm 1	3	11B	Bg	442	*E. coli*	S	28	28	27	28	28	28	26	27	28	28	28	28
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	26	28	28	27	25	27	31	28	29	28	26	28
Farm 2	1	18D	Bg	V27	*E. coli*	S	27	27	28	27	26	26	28	27	24	25	27	25
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	27	27	27	27	27	26	27	27	28	29	29	29
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	27	28	28	28	29	28	28	28	28	28	28	28
Farm 2	2	14C	Bg	T247	*E. coli*	S	29	29	30	29	28	27	28	28	28	28	29	28
Farm 3	1	19D2	Bg	695	*E. coli*	S	28	27	28	28	27	27	27	27	27	27	28	27
Farm 3	2	16B	Bg	579	*E. coli*	S	30	31	32	31	29	32	32	31	30	31	31	31
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	28	28	28	28	29	28	29	29	30	30	29	30
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	34	34	35	34	34	35	34	34	34	34	35	34
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	34	35	35	35	34	35	36	35	35	36	35	35
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	30	30	30	30	30	30	30	30	30	30	30	30
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	23	23	23	23	24	24	24	24	23	23	23	23
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	27	29	27	28	33	32	31	32	32	31	32	32
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	34	35	34	34	33	34	33	33	33	33	33	33
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	40	40	40	40	40	40	40	40	40	40	40	40
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	18	17	18	18	18	19	20	19	18	18	19	18
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	35	33	35	34	35	34	34	34	34	33	34	34
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	30	30	30	30	31	33	32	32	31	31	31	31
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	26	26	28	27	28	28	28	28	29	29	29	29

Table 29: NaPyr AST. ESBL B panel Cefepime
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**freeze tag no./environment location**	**species**	**Resistant-Intermediate (R),**	Cefepime											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	35	35	35	35	35	35	35	35	35	35	35	35
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	33	33	33	33	33	35	35	34	36	35	36	36
Farm 1	2	19C	Bg	547	*E. coli*	R	36	34	33	34	36	33	33	34	36	33	33	34
Farm 1	3	12B	Bg	6592	*E. coli*	R	39	38	37	38	39	37	37	38	39	37	37	38
Farm 2	1	2A	Bg	T824	*E. coli*	R	35	35	33	34	35	35	33	34	35	35	34	35
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	32	32	32	32	31	32	31	31	31	32	32	32
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	32	32	33	32	35	35	35	35	36	35	36	36
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	30	32	31	31	35	30	31	32	33	30	31	31
Farm 2	1	25B	Bg	W160	*E. coli*	R	36	35	35	35	36	36	36	36	36	36	36	36
Farm 3	1	16A	Bg	478	*E. coli*	R	31	31	34	32	31	31	33	32	28	29	35	31
Farm 1	2	11C	Bg	117	*E. coli*	S	34	33	32	33	33	24	33	30	34	28	33	32
Farm 1	3	11B	Bg	442	*E. coli*	S	35	35	35	35	34	35	39	36	33	33	33	33
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	32	38	38	36	34	33	34	34	36	38	35	36
Farm 2	1	18D	Bg	V27	*E. coli*	S	33	30	31	31	29	30	30	30	32	31	31	31
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	34	36	32	34	35	33	32	33	38	34	31	34
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	35	35	35	35	35	35	34	35	36	37	35	36
Farm 2	2	14C	Bg	T247	*E. coli*	S	30	30	34	31	35	36	37	36	34	33	35	34
Farm 3	1	19D2	Bg	695	*E. coli*	S	30	30	30	30	31	30	30	30	30	30	30	30
Farm 3	2	16B	Bg	579	*E. coli*	S	36	37	37	37	35	38	38	37	35	35	36	35
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	30	32	30	31	32	32	31	32	24	30	28	27
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	30	30	30	30	32	31	30	31	30	32	32	31
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	37	36	33	35	33	36	36	35	34	33	33	33
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	34	33	33	33	33	33	33	33	30	33	35	33
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	30	32	31	31	32	32	32	32	31	31	30	31
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	32	33	32	32	35	34	35	35	33	34	45	37
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	26	30	29	28	38	37	38	38	36	36	37	36
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	48	46	47	47	46	47	47	47	49	47	48	48
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	32	32	31	32	32	32	31	32	31	33	33	32
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	36	35	35	35	35	35	34	35	35	35	35	35
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	35	36	35	35	41	43	41	42	39	39	40	39
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	32	33	32	32	31	31	30	31	32	31	31	31

Table 30: NaPyr AST. ESBL B panel Ertapenem
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**freeze tag no./environment location**	**species**	**Resistant-Intermediate (R),**	ERTAPENEM											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	33	32	32	32	36	36	36	36	32	32	32	32
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	34	34	34	34	33	33	33	33	34	33	35	34
Farm 1	2	19C	Bg	547	*E. coli*	R	32	31	31	31	33	32	31	32	33	30	31	31
Farm 1	3	12B	Bg	6592	*E. coli*	R	29	37	36	34	33	36	33	34	32	33	36	34
Farm 2	1	2A	Bg	T824	*E. coli*	R	35	35	32	34	35	35	33	34	35	35	34	35
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	32	31	31	31	33	32	32	32	32	33	31	32
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	33	35	25	31	33	34	25	31	34	37	27	33
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	30	35	35	33	31	35	35	34	31	35	35	34
Farm 2	1	25B	Bg	W160	*E. coli*	R	33	35	34	34	35	34	35	35	34	34	35	34
Farm 3	1	16A	Bg	478	*E. coli*	R	30	31	31	31	32	32	30	31	30	30	32	31
Farm 1	2	11C	Bg	117	*E. coli*	S	34	35	32	34	32	29	28	30	32	33	28	31
Farm 1	3	11B	Bg	442	*E. coli*	S	36	36	31	34	33	34	31	33	34	34	32	33
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	34	32	33	33	32	34	31	32	39	34	32	35
Farm 2	1	18D	Bg	V27	*E. coli*	S	23	23	22	23	22	22	23	22	25	26	27	26
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	31	32	31	31	30	29	29	29	34	32	33	33
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	34	35	37	35	32	31	32	32	34	33	34	34
Farm 2	2	14C	Bg	T247	*E. coli*	S	34	34	32	33	34	34	33	34	32	33	33	33
Farm 3	1	19D2	Bg	695	*E. coli*	S	31	31	32	31	32	31	32	32	31	31	32	31
Farm 3	2	16B	Bg	579	*E. coli*	S	35	36	36	36	32	36	36	35	32	38	37	36
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	29	28	29	29	28	28	28	28	28	28	28	28
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	37	36	35	36	35	36	36	36	37	36	37	37
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	35	33	35	34	34	35	36	35	36	36	36	36
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	33	32	31	32	33	32	31	32	30	32	32	31
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	29	29	28	29	28	28	28	28	29	27	28	28
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	33	33	33	33	30	32	34	32	35	34	36	35
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	27	27	26	27	27	27	27	27	25	24	26	25
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	28	27	28	28	27	27	27	27	28	28	28	28
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	35	34	35	35	36	35	35	35	35	35	35	35
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	36	35	36	36	35	36	35	35	36	36	36	36
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	40	40	41	40	39	42	40	40	39	44	42	42
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	30	30	30	30	30	30	30	30	30	30	30	30

Table 31: NaPyr AST. ESBL B panel Meropenem
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**freeze tag no./environment location**	**species**	**Resistant-Intermediate (R),**	MEROPENEM											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	32	32	32	32	34	32	33	33	32	32	32	32
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	32	32	32	32	33	33	33	33	35	35	35	35
Farm 1	2	19C	Bg	547	*E. coli*	R	29	30	30	30	30	30	30	30	30	30	30	30
Farm 1	3	12B	Bg	6592	*E. coli*	R	27	37	33	32	32	36	34	34	31	33	33	32
Farm 2	1	2A	Bg	T824	*E. coli*	R	35	35	30	33	35	35	30	33	33	33	32	33
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	32	32	31	32	32	32	33	32	33	33	33	33
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	31	33	33	32	32	33	33	33	30	32	33	32
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	30	30	30	30	31	30	31	31	30	32	32	31
Farm 2	1	25B	Bg	W160	*E. coli*	R	32	32	32	32	33	32	32	32	31	33	32	32
Farm 3	1	16A	Bg	478	*E. coli*	R	30	30	30	30	30	30	30	30	29	30	30	30
Farm 1	2	11C	Bg	117	*E. coli*	S	30	33	30	31	30	31	30	30	31	31	30	31
Farm 1	3	11B	Bg	442	*E. coli*	S	33	32	32	32	33	33	32	33	31	31	32	31
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	30	35	32	32	34	33	30	32	33	38	32	34
Farm 2	1	18D	Bg	V27	*E. coli*	S	33	33	35	34	34	33	33	33	35	34	33	34
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	30	31	30	30	30	27	30	29	31	32	29	31
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	31	31	35	32	30	32	31	31	32	34	34	33
Farm 2	2	14C	Bg	T247	*E. coli*	S	34	36	31	34	31	33	30	31	31	33	30	31
Farm 3	1	19D2	Bg	695	*E. coli*	S	29	29	28	29	31	30	32	31	29	29	31	30
Farm 3	2	16B	Bg	579	*E. coli*	S	34	37	38	36	33	37	37	36	33	37	36	35
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	28	28	28	28	28	28	29	28	30	28	31	30
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	35	35	34	35	34	34	34	34	35	36	34	35
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	33	33	31	32	33	32	33	33	32	33	32	32
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	30	30	30	30	31	30	31	31	30	32	32	31
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	30	30	30	30	30	30	30	30	30	30	30	30
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	28	29	28	28	32	33	31	32	32	32	32	32
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	33	33	35	34	32	33	33	33	31	33	32	32
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	32	33	32	32	31	32	29	31	32	32	35	33
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	40	42	43	42	43	43	42	43	43	43	43	43
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	35	36	36	36	35	35	34	35	35	35	35	35
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	42	44	42	43	40	40	40	40	41	43	41	42
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	30	30	30	30	30	30	32	31	32	30	32	31

Table 32: NaPyr AST. ESBL B panel Imipenem
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**freeze tag no./environment location**	**species**	**Resistant-Intermediate (R),**	IMIPENEM											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	28	29	29	29	29	28	28	28	28	28	28	28
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	30	25	30	28	29	27	29	28	28	28	28	28
Farm 1	2	19C	Bg	547	*E. coli*	R	23	24	26	24	28	23	26	26	27	24	26	26
Farm 1	3	12B	Bg	6592	*E. coli*	R	18	28	29	25	26	29	31	29	26	30	29	28
Farm 2	1	2A	Bg	T824	*E. coli*	R	32	32	30	31	32	31	30	31	32	32	32	32
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	29	28	30	29	29	29	27	28	31	30	28	30
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	30	29	29	29	29	28	29	29	29	27	29	28
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	28	29	28	28	29	28	29	29	28	28	28	28
Farm 2	1	25B	Bg	W160	*E. coli*	R	31	30	30	30	32	30	30	31	31	29	30	30
Farm 3	1	16A	Bg	478	*E. coli*	R	23	25	27	25	31	31	25	29	26	27	26	26
Farm 1	2	11C	Bg	117	*E. coli*	S	31	29	28	29	29	29	29	29	29	28	27	28
Farm 1	3	11B	Bg	442	*E. coli*	S	30	30	29	30	31	32	30	31	29	29	29	29
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	29	30	28	29	30	30	28	29	33	30	29	31
Farm 2	1	18D	Bg	V27	*E. coli*	S	32	32	31	32	32	31	31	31	33	33	31	32
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	30	29	27	29	27	27	27	27	28	28	27	28
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	29	26	30	28	29	30	29	29	28	28	29	28
Farm 2	2	14C	Bg	T247	*E. coli*	S	30	30	29	30	30	30	30	30	29	30	29	29
Farm 3	1	19D2	Bg	695	*E. coli*	S	23	23	24	23	26	27	27	27	26	26	25	26
Farm 3	2	16B	Bg	579	*E. coli*	S	31	34	33	33	30	32	32	31	30	32	31	31
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	23	23	24	23	24	25	24	24	23	23	23	23
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	25	26	25	25	25	26	26	26	27	26	26	26
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	21	22	22	22	21	23	22	22	21	21	21	21
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	30	30	30	30	32	30	31	31	31	31	31	31
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	31	31	30	31	30	30	32	31	32	32	32	32
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	27	27	28	27	26	27	28	27	26	27	26	26
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	23	23	24	23	21	22	23	22	23	23	21	22
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	26	25	24	25	25	25	24	25	23	23	24	23
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	45	44	45	45	44	44	44	44	45	44	44	44
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	26	26	27	26	26	25	26	26	26	26	27	26
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	39	38	39	39	38	38	38	38	43	44	41	43
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	31	32	30	31	31	31	31	31	32	31	32	32

Table 33: NaPyr AST. Clinical panel Ciprofloxacin
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	Sample origin	freeze tag no./environment location	species	Resistant-Intermediate (R),	CIPROFRLOACIN											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	32	33	31	32	31	32	31	31	32	33	32	32
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	33	34	33	33	36	32	36	35	34	35	34	34
Farm 1	2	19C	Bg	547	*E. coli*	R	37	35	35	36	39	35	35	36	38	33	35	35
Farm 1	3	12B	Bg	6592	*E. coli*	R	41	36	38	38	41	39	40	40	41	42	40	41
Farm 2	1	2A	Bg	T824	*E. coli*	R	31	30	31	31	31	31	30	31	33	33	30	32
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	33	31	31	32	33	32	30	32	33	31	31	32
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	32	34	35	34	32	35	35	34	32	35	35	34
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	32	33	34	33	35	35	21	30	34	34	20	29
Farm 2	1	25B	Bg	W160	*E. coli*	R	30	31	32	31	31	31	31	31	31	31	32	31
Farm 3	1	16A	Bg	478	*E. coli*	R	30	31	31	31	31	31	31	31	31	31	31	31
Farm 1	2	11C	Bg	117	*E. coli*	S	31	29	31	30	29	29	28	29	27	28	27	27
Farm 1	3	11B	Bg	442	*E. coli*	S	28	28	31	29	31	31	28	30	28	28	31	29
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	28	31	29	29	31	30	29	30	29	30	30	30
Farm 2	1	18D	Bg	V27	*E. coli*	S	26	26	28	27	29	28	30	29	25	25	27	26
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	32	30	30	31	29	33	32	31	31	29	29	30
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	30	28	32	30	32	31	31	31	31	30	32	31
Farm 2	2	14C	Bg	T247	*E. coli*	S	30	30	29	30	31	30	31	31	30	30	30	30
Farm 3	1	19D2	Bg	695	*E. coli*	S	26	26	27	26	30	32	31	31	28	27	28	28
Farm 3	2	16B	Bg	579	*E. coli*	S	32	34	34	33	32	33	32	32	31	31	30	31
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	30	30	30	30	32	30	31	31	31	32	32	32
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	36	38	39	38	39	40	39	39	40	39	38	39
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	35	35	35	35	36	35	36	36	37	36	37	37
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	33	32	34	33	33	34	33	33	32	33	34	33
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	30	30	30	30	32	32	30	31	32	32	32	32
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	30	30	30	30	30	33	30	31	32	32	30	31
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	31	31	32	31	32	32	31	32	31	31	31	31
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	32	33	35	33	35	35	34	35	35	35	35	35
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	29	30	30	30	29	28	28	28	27	28	28	28
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	35	35	35	35	35	35	35	35	35	35	35	35
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	32	33	32	32	30	31	31	31	35	35	35	35
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	30	30	0	20	30	30	30	30	30	30	30	30

Table 34: NaPyr AST. Clinical panel Gentamicin
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	Sample origin	freeze tag no./environment location	species	Resistant-Intermediate (R),	GENTAMICIN											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	19	20	18	19	20	20	19	20	21	21	21	21
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	20	18	20	19	22	19	22	21	28	28	28	28
Farm 1	2	19C	Bg	547	*E. coli*	R	19	20	19	19	22	19	20	20	21	20	21	21
Farm 1	3	12B	Bg	6592	*E. coli*	R	20	22	20	21	20	21	21	21	21	21	21	21
Farm 2	1	2A	Bg	T824	*E. coli*	R	20	19	19	19	20	20	17	19	20	19	20	20
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	18	19	16	18	19	19	19	19	20	21	18	20
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	18	20	20	19	19	19	20	19	19	19	20	19
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	19	20	21	20	21	21	21	21	20	21	21	21
Farm 2	1	25B	Bg	W160	*E. coli*	R	18	18	19	18	19	19	20	19	19	19	18	19
Farm 3	1	16A	Bg	478	*E. coli*	R	18	19	20	19	19	19	19	19	18	19	19	19
Farm 1	2	11C	Bg	117	*E. coli*	S	19	19	19	19	18	17	13	16	19	18	18	18
Farm 1	3	11B	Bg	442	*E. coli*	S	20	20	21	20	21	21	17	20	18	19	19	19
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	17	18	17	17	16	16	17	16	18	17	16	17
Farm 2	1	18D	Bg	V27	*E. coli*	S	23	24	26	24	25	26	28	26	28	29	28	28
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	18	18	16	17	18	17	17	17	18	17	18	18
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	18	18	18	18	18	17	29	21	17	18	24	20
Farm 2	2	14C	Bg	T247	*E. coli*	S	24	24	19	22	20	22	20	21	18	20	19	19
Farm 3	1	19D2	Bg	695	*E. coli*	S	17	17	18	17	18	17	18	18	18	17	18	18
Farm 3	2	16B	Bg	579	*E. coli*	S	19	19	19	19	19	22	22	21	19	20	20	20
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	19	19	19	19	19	20	19	19	19	21	18	19
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	22	23	21	22	23	23	22	23	22	22	23	22
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	22	21	22	22	22	22	22	22	21	22	23	22
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	17	19	17	18	19	20	21	20	19	19	21	20
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	20	20	18	19	19	19	20	19	18	18	18	18
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	20	22	19	20	21	20	20	20	20	20	22	21
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	17	16	17	17	17	19	18	18	17	17	18	17
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	19	18	19	19	19	21	16	19	16	19	21	19
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	26	25	26	26	29	28	28	28	27	28	28	28
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	22	21	22	22	20	21	21	21	20	21	22	21
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	27	26	27	27	26	26	26	26	30	31	29	30
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	18	18	16	17	19	18	17	18	16	17	17	17

Table 35: NaPyr AST. Clinical panel Tigecycline
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	Sample no.	Sample origin	freeze tag no./environment location	species	Resistant-Intermediate (R),	TIGICYCLINE											
							MHA				MHA+NaPyr				MCA			
							1	2	3	Average	1	2	3	Average	1	2	3	Average
Farm 1	2	3E	Env	Crush	*E. coli*	R	22	24	23	23	23	23	23	23	25	25	25	25
Farm 1	2	4E	Env	Cubicle shed	*E. coli*	R	23	23	23	23	24	22	24	23	23	23	23	23
Farm 1	2	19C	Bg	547	*E. coli*	R	21	18	19	19	20	19	19	19	22	18	19	20
Farm 1	3	12B	Bg	6592	*E. coli*	R	28	22	22	24	25	20	22	22	25	22	22	23
Farm 2	1	2A	Bg	T824	*E. coli*	R	23	23	22	23	23	23	25	24	23	25	24	24
Farm 2	1	22B1	Env	Collecting parlour	*E. coli*	R	24	25	25	25	25	24	24	24	25	28	27	27
Farm 2	1	22E	Env	Collecting parlour	*E. coli*	R	24	23	22	23	25	22	22	23	19	24	22	22
Farm 2	1	24D1	Env	Feeding passage	*E. coli*	R	21	20	20	20	22	28	20	23	21	20	20	20
Farm 2	1	25B	Bg	W160	*E. coli*	R	26	25	25	25	25	25	25	25	26	25	25	25
Farm 3	1	16A	Bg	478	*E. coli*	R	14	15	21	17	20	20	21	20	20	20	22	21
Farm 1	2	11C	Bg	117	*E. coli*	S	20	25	24	23	22	24	24	23	23	22	26	24
Farm 1	3	11B	Bg	442	*E. coli*	S	23	23	23	23	23	23	24	23	19	19	22	20
Farm 1	4	1C	Env	Holding yard	*E. coli*	S	22	23	17	21	22	22	21	22	21	20	21	21
Farm 2	1	18D	Bg	V27	*E. coli*	S	25	25	25	25	26	26	25	26	25	25	25	25
Farm 2	2	3A	Env	Collecting yard	*E. coli*	S	22	21	20	21	22	23	22	22	21	22	20	21
Farm 2	2	5E	Env	Crush yard	*E. coli*	S	29	23	23	25	29	24	21	25	24	29	23	25
Farm 2	2	14C	Bg	T247	*E. coli*	S	24	24	22	23	22	22	22	22	23	22	22	22
Farm 3	1	19D2	Bg	695	*E. coli*	S	23	22	21	22	22	22	21	22	21	22	20	21
Farm 3	2	16B	Bg	579	*E. coli*	S	24	25	25	25	24	23	23	23	22	24	23	23
Farm 1	2	1D	Env	scraper tractor	*P. aeruginosa*	R	20	20	20	20	21	20	20	20	21	21	21	21
Farm 1	2	8A	Bg	556	*P. aeruginosa*	R	25	26	25	25	26	26	25	26	27	26	25	26
Farm 1	2	19D	Bg	3542	*P. aeruginosa*	R	19	20	20	20	20	20	20	20	21	22	20	21
Farm 2	2	2E	Bg	Y125	*P. aeruginosa*	R	25	25	25	25	25	25	25	25	25	25	25	25
Farm 2	2	3A1	Env	Collecting yard	*P. aeruginosa*	R	22	22	22	22	21	23	20	21	23	23	23	23
Farm 2	2	10C1	Bg	V52	*P. aeruginosa*	R	20	22	20	21	20	22	22	21	20	21	22	21
Farm 3	1	2B	Env	Crush	*P. aeruginosa*	R	24	23	24	24	21	24	24	23	24	21	23	23
Farm 3	2	2F	Env	Crush	*P. aeruginosa*	R	22	24	25	24	25	24	25	25	23	24	24	24
Farm 3	2	3E	Env	Holding yard	*P. aeruginosa*	R	26	26	26	26	27	27	26	27	27	27	27	27
Farm 3	2	9D	Bg	601	*P. aeruginosa*	R	25	24	24	24	23	24	24	24	23	25	25	24
Farm 1	1	5C	Env	Cubicle shed	*P. aeruginosa*	S	25	25	25	25	27	26	25	26	26	25	25	25
Farm 2	1	22D	Env	Collecting parlour	*P. aeruginosa*	S	22	22	2	15	23	22	23	23	22	22	22	22

Appendix 4: AST data Re-establishing antibiotic resistance
Table 36: Vet panel AST Re-establishing antibiotic resistance
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**species**	Amoxicilin			Ampicillin			Oxytetracycline			Marbofloxacin		
					AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE
Farm 1	2	8A	bg	*P. aeruginosa*	30	33	31.5	25	28	26.5	6	6	6	31	31	31
Farm 1	2	19D	bg	*P. aeruginosa*	19	22	20.5	9	11	10	6	6	6	37	36	36.5
Farm 2	2	2E	bg	*P. aeruginosa*	23	26	24.5	22	22	22	20	21	20.5	35	35	35
Farm 2	2	3A1	env	*P. aeruginosa*	6	6	6	10	11	10.5	30	27	28.5	27	27	27
Farm 2	2	10C1	env	*P. aeruginosa*	19	21	20	24	23	23.5	7	8	7.5	29	27	28
Farm 3	1	2B	env	*P. aeruginosa*	17	16	16.5	10	11	10.5	8	8	8	33	34	33.5
Farm 3	2	2F	env	*P. aeruginosa*	9	7	8	6	6	6	10	10	10	30	30	30
Farm 3	2	3E	env	*P. aeruginosa*	37	42	39.5	46	44	45	25	25	25	30	33	31.5
Farm 1	2	4E	env	*E. coli*	11	12	11.5	10	11	10.5	6	6	6	33	33	33
Farm 1	2	19C	bg	*E. coli*	26	28	27	22	23	22.5	6	6	6	34	33	33.5
Farm 1	3	12B	bg	*E. coli*	25	26	25.5	24	23	23.5	24	25	24.5	34	34	34
Farm 2	1	2A	bg	*E. coli*	24	23	23.5	20	21	20.5	24	23	23.5	30	32	31
Farm 2	1	24D1	env	*E. coli*	26	27	26.5	27	26	26.5	6	6	6	37	35	36
Farm 2	1	25B	bg	*E. coli*	26	24	25	20	21	20.5	26	26	26	30	31	30.5

Table 37a: ESBL A panel AST Re-establishing antibiotic resistance
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**species**	Cefotaxime- 5			Cefotaxime- 30			Amoxicilin-Clavulanic Acid		
					AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE
Farm 1	2	8A	bg	*P. aeruginosa*	33	36	34.5	42	41	41.5	16	17	16.5
Farm 1	2	19D	bg	*P. aeruginosa*	13	13	13	39	40	39.5	10	11	10.5
Farm 2	2	2E	bg	*P. aeruginosa*	31	30	30.5	35	36	35.5	21	22	21.5
Farm 2	2	3A1	env	*P. aeruginosa*	25	26	25.5	32	30	31	14	13	13.5
Farm 2	2	10C1	env	*P. aeruginosa*	24	26	25	34	33	33.5	10	8	9
Farm 3	1	2B	env	*P. aeruginosa*	35	32	33.5	41	41	41	29	30	29.5
Farm 3	2	2F	env	*P. aeruginosa*	34	33	33.5	40	38	39	30	31	30.5
Farm 3	2	3E	env	*P. aeruginosa*	30	29	29.5	29	33	31	43	45	44
Farm 1	2	4E	env	*E. coli*	29	30	29.5	36	30	33	26	26	26
Farm 1	2	19C	bg	*E. coli*	30	30	30	38	34	36	22	21	21.5
Farm 1	3	12B	bg	*E. coli*	32	33	32.5	38	38	38	23	22	22.5
Farm 2	1	2A	bg	*E. coli*	29	28	28.5	33	33	33	20	20	20
Farm 2	1	24D1	env	*E. coli*	28	29	28.5	38	35	36.5	26	27	26.5
Farm 2	1	25B	bg	*E. coli*	28	30	29	35	32	33.5	23	24	23.5

Table 37b: ESBL A panel AST Re-establishing antibiotic resistance
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**species**	Piperacillin			Piperacillin-Tazobactam			Cefuroxime			Cefotoxin		
					AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE
Farm 1	2	8A	bg	*P. aeruginosa*	33	32	32.5	31	27	29	30	28	29	10	11	10.5
Farm 1	2	19D	bg	*P. aeruginosa*	30	31	30.5	33	33	33	30	31	30.5	9	10	9.5
Farm 2	2	2E	bg	*P. aeruginosa*	27	26	26.5	27	27	27	27	28	27.5	28	26	27
Farm 2	2	3A1	env	*P. aeruginosa*	23	21	22	24	22	23	23	24	23.5	26	27	26.5
Farm 2	2	10C1	env	*P. aeruginosa*	30	30	30	30	30	30	19	19	19	19	21	20
Farm 3	1	2B	env	*P. aeruginosa*	24	25	24.5	29	29	29	33	32	32.5	21	19	20
Farm 3	2	2F	env	*P. aeruginosa*	24	25	24.5	33	31	32	32	32	32	32	32	32
Farm 3	2	3E	env	*P. aeruginosa*	30	31	30.5	39	37	38	30	30	30	35	34	34.5
Farm 1	2	4E	env	*E. coli*	28	29	28.5	29	33	31	22	23	22.5	34	33	33.5
Farm 1	2	19C	bg	*E. coli*	28	28	28	28	28	28	29	28	28.5	22	22	22
Farm 1	3	12B	bg	*E. coli*	29	28	28.5	30	30	30	30	31	30.5	20	20	20
Farm 2	1	2A	bg	*E. coli*	26	27	26.5	26	26	26	25	25	25	25	25	25
Farm 2	1	24D1	env	*E. coli*	28	28	28	28	28	28	28	27	27.5	29	29	29
Farm 2	1	25B	bg	*E. coli*	26	26	26	28	28	28	23	23	23	29	28	28.5

Table 38a: ESBL B panel AST Re-establishing antibiotic resistance
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**species**	Ceftazidime - 10			Cefepime		
					AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE
Farm 1	2	8A	bg	*P. aeruginosa*	36	37	36.5	35	35	35
Farm 1	2	19D	bg	*P. aeruginosa*	8	8	8	18	18	18
Farm 2	2	2E	bg	*P. aeruginosa*	28	30	29	33	32	32.5
Farm 2	2	3A1	env	*P. aeruginosa*	21	22	21.5	31	31	31
Farm 2	2	10C1	env	*P. aeruginosa*	28	26	27	30	32	31
Farm 3	1	2B	env	*P. aeruginosa*	34	33	33.5	27	26	26.5
Farm 3	2	2F	env	*P. aeruginosa*	40	38	39	36	39	37.5
Farm 3	2	3E	env	*P. aeruginosa*	18	19	18.5	33	32	32.5
Farm 1	2	4E	env	*E. coli*	35	34	34.5	34	34	34
Farm 1	2	19C	bg	*E. coli*	30	32	31	36	33	34.5
Farm 1	3	12B	bg	*E. coli*	30	28	29	38	38	38
Farm 2	1	2A	bg	*E. coli*	28	28	28	36	35	35.5
Farm 2	1	24D1	env	*E. coli*	28	28	28	30	30	30
Farm 2	1	25B	bg	*E. coli*	29	29	29	35	36	35.5

Table 38b: ESBL B panel AST Re-establishing antibiotic resistance
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**species**	Ertapenem			Meropenem			Imipenem		
					AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE
Farm 1	2	8A	bg	*P. aeruginosa*	33	30	31.5	33	34	33.5	25	26	25.5
Farm 1	2	19D	bg	*P. aeruginosa*	19	19	19	33	32	32.5	20	21	20.5
Farm 2	2	2E	bg	*P. aeruginosa*	32	32	32	30	30	30	30	30	30
Farm 2	2	3A1	env	*P. aeruginosa*	28	29	28.5	30	30	30	30	30	30
Farm 2	2	10C1	env	*P. aeruginosa*	33	34	33.5	27	28	27.5	27	27	27
Farm 3	1	2B	env	*P. aeruginosa*	27	27	27	32	35	33.5	18	17	17.5
Farm 3	2	2F	env	*P. aeruginosa*	28	28	28	31	34	32.5	23	24	23.5
Farm 3	2	3E	env	*P. aeruginosa*	30	32	31	46	44	45	44	44	44
Farm 1	2	4E	env	*E. coli*	32	33	32.5	28	31	29.5	29	29	29
Farm 1	2	19C	bg	*E. coli*	32	32	32	30	30	30	24	24	24
Farm 1	3	12B	bg	*E. coli*	35	36	35.5	32	31	31.5	24	24	24
Farm 2	1	2A	bg	*E. coli*	34	33	33.5	33	33	33	30	30	30
Farm 2	1	24D1	env	*E. coli*	31	31	31	30	30	30	28	28	28
Farm 2	1	25B	bg	*E. coli*	34	33	33.5	31	31	31	29	28	28.5

Table 39: Clinical panel AST Re-establishing antibiotic resistance
N.B : red highlight indicates resistance to antibiotic

Farm	Visit No.	**Sample no.**	**Sample origin**	**species**	Ciprofloxacin			Gentamicin			Tigecycline		
					AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE	AST 1	AST 1	AVERAGE
Farm 1	2	8A	bg	*P. aeruginosa*	42	42	42	20	18	19	21	20	20.5
Farm 1	2	19D	bg	*P. aeruginosa*	26	25	25.5	19	21	20	18	19	18.5
Farm 2	2	2E	bg	*P. aeruginosa*	33	31	32	21	19	20	26	23	24.5
Farm 2	2	3A1	env	*P. aeruginosa*	30	31	30.5	18	17	17.5	21	24	22.5
Farm 2	2	10C1	env	*P. aeruginosa*	26	27	26.5	19	19	19	18	19	18.5
Farm 3	1	2B	env	*P. aeruginosa*	42	45	43.5	17	17	17	24	23	23.5
Farm 3	2	2F	env	*P. aeruginosa*	36	34	35	20	18	19	23	26	24.5
Farm 3	2	3E	env	*P. aeruginosa*	33	30	31.5	24	22	23	25	26	25.5
Farm 1	2	4E	env	*E. coli*	32	32	32	18	18	18	21	21	21
Farm 1	2	19C	bg	*E. coli*	36	37	36.5	19	19	19	15	15	15
Farm 1	3	12B	bg	*E. coli*	38	38	38	22	21	21.5	19	20	19.5
Farm 2	1	2A	bg	*E. coli*	30	30	30	18	18	18	21	21	21
Farm 2	1	24D1	env	*E. coli*	33	32	32.5	18	19	18.5	20	20	20
Farm 2	1	25B	bg	*E. coli*	32	31	31.5	19	19	19	25	23	24

Appendix 5 : MIC and Efflux data
N.B: NZ no readable zone detected

Table 40a: Colony count data growth curve supplement

Time (min)	*P. aeruginosa* NCTC	*P. aeruginosa* NCTC	*E. coli* NCTC	*E. coli* NCTC	*E. coli* ENV	*E. coli* ENV	*P. aeruginosa* ENV	*P. aeruginosa* ENV	*E. coli* BG	*E. coli* BG	*E. coli* BG	*P. aeruginosa* BG	*P. aeruginosa* BG	*P. aeruginosa* BG
0	4.282169	4.278754	4.274158	4.288920	4.274158	4.279895	4.278754	4.283301	5.966142	6.008600	5.977724	7.144574	6.234264	7.113943
120	5.812913	5.968483	5.736397	5.866287	5.774517	5.767156	5.792392	5.792392	7.822822	7.711807	7.574031	7.518514	8.035430	7.462398
150	6.113943	6.574031	6.204120	6.190332	6.176091	6.130334	6.130334	6.579784	7.982271	8.002166	7.841985	7.832509	8.252853	7.770852
180	6.322219	6.854306	6.352183	6.361728	6.380211	6.389166	6.342423	6.806180	8.267172	8.123852	7.937016	8.139879	8.562293	8.120574

Table 40b: MIC and efflux assay

Isolate No.	Farm	Visit No.	**Sample no.**	**Sample origin**	**Species**	**Antibiotic MIC ug/ml**				**Antibiotic MIC ug/ml**			
						Cefoxitin				**Ceftazidime**			
						MH	MH +PABN	MHCA	MHCA +PABN	MH	MH +PABN	MHCA	MHCA +PABN
						MIC	MIC	MIC	MIC	MIC	MIC	MIC	MIC
1	Farm 1	2	3E	Env	*E. coli*	2	2	2	4	<0.016	0.125	0.023	1
2	Farm 1	2	4E	Env	*E. coli*	6	6	3	6	0.064	0.047	0.032	0.25
3	Farm 3	1	16A	Bg	*E. coli*	0	0	0	0	0.5	0	0.19	1.5
4	Farm 3	2	2F	Env	*P. aeruginosa*	0.25	0.25	0.25	0.5	<0.016	<0.016	<0.016	<0.016
5	Farm 3	2	9D	Bg	*P. aeruginosa*	0	0	0	0	1	1	0.75	0.5
6	Farm 1	2	19D	Bg	*P. aeruginosa*	6	6	6	8	32	32	35	48

Table 40c: MIC and efflux assay

Isolate No.	Farm	Visit No.	Sample no.	Sample origin	Species	Antibiotic MIC ug/ml				Antibiotic MIC ug/ml			
						Cefepime				Ciprofloxacin			
						MH	MH +PABN	MHCA	MHCA +PABN	MH	MH +PABN	MHCA	MHCA +PABN
						MIC	MIC	MIC	MIC	MIC	MIC	MIC	MIC
1	Farm 1	2	3E	Env	*E. coli*	0.016	0.094	0.016	0.094	0.012	0.003	0.004	0.064
2	Farm 1	2	4E	Env	*E. coli*	0.125	0.064	0.047	0.064	0.064	0.064	0.047	0.094
3	Farm 3	1	16A	Bg	*E. coli*	0.064	0.094	0.023	1	0.016	0.016	0.016	0.016
4	Farm 3	2	2F	Env	*P. aeruginosa*	0.023	0.047	0.023	0.064	<0.002	<0.002	<0.002	<0.002
5	Farm 3	2	9D	Bg	*P. aeruginosa*	0.047	0.094	0.064	0.125	0.032	0.023	0.016	0.016
6	Farm 1	2	19D	Bg	*P. aeruginosa*	6	0.032	6	4	0.25	0.01	0.5	0.25

Table 40d: MIC and efflux assay

isolate No.	Farm	Visit No.	Sample no.	Sample origin	Species	Antibiotic MIC ug/ml				Antibiotic MIC ug/ml			
						Imipenem				Amoxicillin			
										MH	MH +PABN	MHCA	MHCA +PABN
						MIC	MIC	MIC	MIC	MIC	MIC	MIC	MIC
1	Farm 1	2	3E	Env	*E. coli*	0.094	0.19	0.094	0.38	3	8	3	12
2	Farm 1	2	4E	Env	*E. coli*	0.75	0.38	0.38	1	NZ	NZ	NZ	NZ
3	Farm 3	1	16A	Bg	*E. coli*	NZ	2	1	0.75	NZ	NZ	NZ	NZ
4	Farm 3	2	2F	Env	*P. aeruginosa*	0.125	0.25	0.094	0.19	<0.016	<0.016	<0.016	<0.016
5	Farm 3	2	9D	Bg	*P. aeruginosa*	0	2	0.5	1.5	NZ	NZ	NZ	NZ
6	Farm 1	2	19D	Bg	*P. aeruginosa*	1.5	1	0.19	4	1	1	0.75	1

Table 40e: MIC and efflux assay

Isolate No.	Farm	Visit No.	**Sample ID no.**	**Sample origin**	**Species**	**Antibiotic MIC ug/ml**				**Antibiotic MIC ug/ml**			
						Amoxicillin/Clavulanic acid				**Tetracycline**			
						MH	MH +PABN	MHCA	MHCA +PABN	MH	MH +PABN	MHCA	MHCA +PABN
						MIC	MIC	MIC	MIC	MIC	MIC	MIC	MIC
1	Farm 1	2	3E	Env	*E. coli*	1	8	1.5	8	1.5	2	2	4
2	Farm 1	2	4E	Env	*E. coli*	2	6	6	4	NZ	NZ	NZ	NZ
3	Farm 3	1	16A	Bg	*E. coli*	16	32	32	NZ	NZ	NZ	NZ	NZ
4	Farm 3	2	2F	Env	*P. aeruginosa*	1	4	1	4	8	8	8	16
5	Farm 3	2	9D	Bg	*P. aeruginosa*	24	24	24	24	NZ	NZ	NZ	NZ
6	Farm 1	2	19D	Bg	*P. aeruginosa*	0.75	0.75	0.75	1	NZ	NZ	48	NZ