

Supplementary Table S1. Description of the fecal samples collection.

Families, genera and species	Name	Diet	Diet (detailed)	Wild/domestic	No. of birds/animals tested	Types of samples	Status in Brittany
Laridae					86		
Larinae (sub-family)					83		
<i>Chroicocephalus</i>	Gull	Omnivore	Opportunistic omnivorous feeder	Wild	3	Feces	
<i>Chroicocephalus ridibundus</i>	Black headed gull	Omnivore	Opportunistic omnivorous feeder	Wild	13	Feces	Breeding / Migration / Winter
<i>Larus</i>	Seagull	Omnivore	Opportunistic omnivorous feeder	Wild	45	Feces	
<i>Larus argentatus</i>	Herring gull	Omnivore	Opportunistic omnivorous feeder	Wild	15	Feces	Breeding / Migration / Winter
<i>Larus marinus</i>	Great black backed gull	Omnivore	Opportunistic omnivorous feeder	Wild	7	Feces	Breeding / Sedentary
Sternidae (sub-family)					3		
<i>Thalasseus sandvicensis</i>	Sandwich tern	Carnivore	Fish-eating species and invertebrate feeder	Wild	3	Feces	Breeding / Migration / Winter
Phalacrocoracidae					24		
<i>Phalacrocorax aristotelis</i>	European shag	Carnivore	fish-eating species	Wild	3	Feces	Breeding / Sedentary
<i>Phalacrocorax carbo</i>	Great cormorant	Carnivore	fish-eating species	Wild	21	Feces	Breeding / Migration / Winter
Scolopacidae					27		
<i>Calidris alpina</i>	Dunlin	Carnivore	shoreline-foraging invertebrate feeder	Wild	5	Feces	Migration / Winter
<i>Calidris canutus</i>	Red knot	Carnivore	shoreline-foraging invertebrate feeder	Wild	11	Feces	Migration / Winter
<i>Numenius arquata</i>	Curlew	Carnivore	shoreline-foraging invertebrate feeder	Wild	11	Feces	Breeding / Migration / Winter
Haematopodidae					23		
<i>Haematopus ostralegus</i>	Oystercatcher	Carnivore	Aquatic invertebrate feeder	Wild	23	Feces	Breeding / Migration / Winter
Anatidae					133		
<i>Anas platyrhynchos</i>	Mallard	Omnivore	Aquatic invertebrate and seed feeder	Wild	20		Breeding / Migration / Winter
<i>Branta bernicla</i>	Brent goose	Herbivore	Aquatic plant-eating species	Wild	56	Feces	Migration / Winter
<i>Cygnus olor</i>	Mute swan	Herbivore	Aquatic plant-eating species	Wild	12	Feces	Breeding / Migration / Winter
<i>Tadorna tadorna</i>	Common shelduck	Omnivore	Algae and aquatic invertebrate feeder	Wild	25	Feces	
<i>Anas</i>	Breeding duck	Omnivore	Seed feeder	Domestic	3	Feces	
<i>Anser anser</i>	Greylag goose	Herbivore	Aquatic plant-eating species	Domestic	1	Feces	
<i>Anser brachyrhynchus</i>	Pink footed goose	Herbivore	Aquatic plant-eating species	Domestic	1	Feces	

Supplementary Table S1. *Continued.*

Families, genera and species	Name	Diet	Diet (detailed)	Wild/domestic	No. of birds/animals tested	Types of samples	Status in Brittany
<i>Anser erythropus</i>	Lesser white front goose	Herbivore	Aquatic plant-eating species	Domestic	1	Feces	
<i>Anser indicus</i>	Bar headed goose	Herbivore	Aquatic plant-eating species	Domestic	1	Feces	
<i>Branta canadensis</i>	Canada goose	Herbivore	Aquatic plant-eating species	Domestic	1	Feces	
<i>Branta leucopsis</i>	Barnacle goose	Herbivore	Aquatic plant-eating species	Domestic	1	Feces	
<i>Branta sandvicensis</i>	Hawaiian goose	Herbivore	Aquatic plant-eating species	Domestic	1	Feces	
<i>Chen caerulescens</i>	Snow goose	Herbivore	Aquatic plant-eating species	Domestic	1	Feces	
<i>Chen rossii</i>	Moss goose	Herbivore	Aquatic plant-eating species	Domestic	1	Feces	
<i>Cyanochen cyanoptera</i>	Blue winged goose	Herbivore	Aquatic plant-eating species	Domestic	1	Feces	
<i>Cygnus atratus</i>	Black swan	Herbivore	Aquatic plant-eating species	Domestic	2	Feces	
<i>Cygnus immutabilis</i>	Polish mute swan	Herbivore	Aquatic plant-eating species	Domestic	2	Feces	
<i>Cygnus melancoryphus</i>	Black necked swan	Herbivore	Aquatic plant-eating species	Domestic	2	Feces	
<i>Neochen jubata</i>	Orinoco goose	Herbivore	Aquatic plant-eating species	Domestic	1	Feces	
Hydrobatidae					2		
<i>Hydrobates pelagicus</i>	Storm petrels	Carnivore	Planktonophagous and fish-eating species	Wild	2	Feces	Breeding / Migration
Numididae					11		
<i>Numida meleagris</i>	Guinea fowls	Omnivore	Seed feeders	Domestic	11	Feces	
Phasianidae					36		
<i>Gallus</i>	Chicken/hens	Omnivore	Seed feeders	Domestic	17	Feces	
					9	Poultry Litter	
<i>Meleagris</i>	Turkey	Omnivore	Seed feeders	Domestic	3	Feces	
					7	Poultry Litter	
Bovidae					33		
<i>Bos taurus</i>	Cattle	Herbivore	Plant-eating	Domestic	26	Feces	
					7	Solid manure	
Suidae					37		
<i>Sus scrofa domesticus</i>	Pigs	Omnivore	omnivorous	Domestic	11	Feces	

Supplementary Table S1. *Continued.*

Families, genera and species	Name	Diet	Wild/domestic	No. of birds/animals tested	Types of samples	Status in Brittany
				2	Solid manure	
				24	Liquid manure	
Wastewaters (WW)				13		
WW	Influents/effluents	NA		9	Influents	
				4	Effluents	
Total				425		

NA. not applicable.

Supplementary Table S2. Metadata on the collected fecal samples from wild birds.

Bird species	Scientific nomenclature	# of fecal samples	Geographic distribution	#	Date	#	
Mallard	<i>Anas platyrhynchos</i>	20	Côtes-d'Armor	20	08/02/2017	20	
Brent goose	<i>Branta bernicla</i>	56	Côtes-d'Armor	19	01/12/2016	4	
			Finistère	7	12/12/2016	3	
			Gironde	30	30/01/2017	11	
					31/01/2017	3	
					02/02/2017	10	
					15/02/2017	16	
					27/03/2017	8	
	19/06/2017	1					
Dunlin	<i>Calidris alpina</i>	5	Côtes-d'Armor	4	30/01/2017	5	
			Finistère	1			
Knot	<i>Calidris canutus</i>	11	Côtes-d'Armor	11	14/02/2017	11	
Gull	<i>Chroicocephalus</i>	3	Côtes-d'Armor	3	10/07/2017	3	
Black-headed gull	<i>Chroicocephalus ridibundus</i>	13	Côtes-d'Armor	6	30/01/2017	2	
			Finistère	7	19/06/2017	5	
						26/09/2017	6
Mute swan	<i>Cygnus olor</i>	12	Charente-Maritime	7	22/02/2017	3	
			Finistère	5	27/04/2017	3	
						19/06/2017	2
						10/10/2017	4

Supplementary Table S2. *Continued.*

Bird species	Scientific nomenclature	# of fecal samples	Geographic distribution	#	Date	#		
Oystercatcher	<i>Haematopus ostralegus</i>	23	Côtes-d'Armor	23	31/01/2017	9		
					14/02/2017	2		
					20/03/2017	7		
					26/09/2017	5		
Storm petrel	<i>Hydrobates pelagicus</i>	2	Finistère	2	23/08/2017	2		
Seagull	<i>Larus</i>	45	Charente-Maritime	4	29/07/2016	1		
				Côtes-d'Armor	31	30/01/2017	8	
					Finistère	9	27/03/2017	8
						Hérault	1	27/04/2017
							19/06/2017	3
							10/07/2017	5
							26/09/2017	13
	10/10/2017	4						
Herring gull	<i>Larus argentatus</i>	15	Finistère	15	27/03/2017	2		
					18/04/2017	13		
Black-backed gull	<i>Larus marinus</i>	7	Côtes-d'Armor	3	30/01/2017	1		
				Finistère	4	20/03/2017	3	
						27/03/2017	2	
						24/05/2017	1	
Curlew	<i>Numenius arquata</i>	11	Côtes-d'Armor	11	31/01/2017	3		
					20/03/2017	7		
					26/09/2017	1		

Supplementary Table S2. *Continued.*

Bird species	Scientific nomenclature	# of fecal samples	Geographic distribution	#	Date	#	
European shag	<i>Phalacrocorax aristotelis</i>	3	Finistère	3	18/05/2017	3	
Great cormorant	<i>Phalacrocorax carbo</i>	21	Charente-Maritime	2	22/02/2017	2	
			Finistère	19	28/03/2017	10	
						29/03/2017	9
Common shelduck	<i>Tadorna tadorna</i>	25	Côtes-d'Armor	15	12/12/2016	4	
			Finistère	10	30/01/2017	3	
						27/03/2017	10
						26/09/2017	8
Sandwich tern	<i>Thalasseus sandvicensis</i>	3	Finistère	3	31/05/2017	3	

Supplementary Table S4. Total numbers of species and the corresponding pathogenic within the selected 37 genera. This list was validated according to the Canadian ePATHogen risk group database (<https://health.canada.ca/en/epathogen>, accessed on February 17th 2021).

Phyla/genus	Total species number	Pathogenic species number^a
Actinobacteria		
<i>Corynebacterium</i>	152	32
<i>Mycobacterium</i>	211	90
Bacteroidetes		
<i>Bacteroides</i>	102	21
<i>Flavobacterium</i>	274	3
<i>Porphyromonas</i>	20	6
<i>Prevotella</i>	58	18
Firmicutes		
<i>Bacillus</i>	440	10
<i>Clostridium</i>	247	38
<i>Enterococcus</i>	65	10
<i>Finegoldia</i>	1	1
<i>Lactococcus</i>	21	2
<i>Staphylococcus</i>	64	26
<i>Streptococcus</i>	138	38
<i>Vagococcus</i>	16	2
Fusobacteria		
<i>Fusobacterium</i>	22	17
<i>Leptotrichia</i>	7	3
Proteobacteria		
<i>Aeromonas</i>	38	12
<i>Arcobacter</i>	30	4
<i>Burkholderia</i>	178	14
<i>Campylobacter</i>	41	27
<i>Enterobacter</i>	49	10
<i>Escherichia-Shigella</i>	8-6	5-6
<i>Haemophilus</i>	25	10
<i>Helicobacter</i>	50	9
<i>Legionella</i>	64	39
<i>Massilia</i>	55	1
<i>Pasteurella</i>	25	8
<i>Plesiomonas</i>	1	1
<i>Pseudomonas</i>	179	7
<i>Psychrobacter</i>	43	3
<i>Rickettsia</i>	74	23
<i>Sphingomonas</i>	169	5
<i>Stenotrophomonas</i>	19	1
<i>Vibrio</i>	155	14
<i>Yersinia</i>	27	12
Spirochaetes		
<i>Treponema</i>	39	17
Tenericutes		
<i>Mycoplasma</i>	155	14

^aCorresponding to pathogens classified as level 2 or above.

Supplementary Table S5. Selected ASVs as potential MST markers with their respective taxonomic allocations, ANCOM scores and GenBank accession numbers.

Selected ASVs	ANCOM score (W)	Family	Genus	Species	GenBank accession
Species level					
Mute swan (Swan_2)	7293	Peptostreptococcaceae	<i>Romboutsia</i>	unclassified	MZ021257
Oystercatcher (Oyscab)	7339	Bacteroidaceae	<i>Bacteroides</i>	unclassified	MZ021258
Mallard	4067	Bacteroidaceae	<i>Bacteroides</i>	unclassified	MZ021259
Great cormorant	7339	Peptostreptococcaceae	<i>Paeniclostridium</i>	<i>sordellii</i>	MZ021260
Storm petrels	7317	Dermacoccaceae	<i>Flexivirga</i>	unclassified	MZ021261
Guinea fowl	7339	Lactobacillaceae	<i>Lactobacillus</i>	unclassified	MZ021262
Group level					
Wild birds	7345	Fusobacteriaceae	<i>Cetobacterium</i>	unclassified	MZ021263
Wild birds	7344	Enterococcaceae	<i>Catelicoccus</i>	unclassified	MZ021264
Birds	7344	Fusobacteriaceae	<i>Lactobacillus</i>	unclassified	MZ021265
Poultry	7346	Lactobacillaceae	<i>Lactobacillus</i>	<i>salivarius</i>	MZ021266
Cattle	7348	Ruminococcaceae	UCG-005	unclassified	MZ021267
Cattle	7343	Bacteroidaceae	<i>Bacteroides</i>	unclassified	MZ021268
Pig	7348	Erysipelotrichaceae	<i>Turicibacter</i>	unclassified	MZ021269
Pig	7344	Rikenellaceae	DMER64	unclassified	MZ021270
Wastewater	7346	Arcobacteraceae	<i>Arcobacter</i>	unclassified	MZ021271
Wastewater	7345	Moraxellaceae	<i>Acinetobacter</i>	unclassified	MZ021272

Supplementary Table S6. Relative proportion of the 31 bacterial phyla (mean \pm standard deviation; greater than 0.5%) inferred from the V3-V4 16S rRNA gene dataset over the investigated fecal samples.

Phylum	Wildbirds	Poultry	Cattle	Pigs	WasteWater
Firmicutes	47.45 \pm 26.83	67.92 \pm 25.49	62.81 \pm 10.49	64.69 \pm 12.96	21.23 \pm 20.77
Proteobacteria	19.13 \pm 20.56	13.26 \pm 20.60	4.90 \pm 8.01	5.18 \pm 8.02	39.44 \pm 10.19
Fusobacteria	17.03 \pm 25.17	0.63 \pm 2.52	+	+	1.57 \pm 3.00
Bacteroidetes	5.02 \pm 11.59	2.37 \pm 6.04	27.96 \pm 7.16	22.56 \pm 6.33	12.92 \pm 8.25
Actinobacteria	8.50 \pm 13.92	15.70 \pm 16.23	2.96 \pm 4.44	2.34 \pm 2.38	18.54 \pm 13.03
Epsilonbacteraeota	2.25 \pm 5.49	+	+	+	5.47 \pm 5.07
Tenericutes	+	+	+	+	nd
Deferribacteres	+	+	nd	+	nd
Cyanobacteria	+	+	nd	+	+
Acidobacteria	+	+	nd	+	+
Gemmatimonadetes	+	+	+	+	+
Fibrobacteres	+	+	+	0.60 \pm 0.76	+
Dependentiae	+	+	+	+	+
Spirochaetes	+	+	0.83 \pm 0.74	1.94 \pm 2.20	+
Chloroflexi	+	+	+	+	nd
Nitrospirae	+	+	nd	nd	+
Patescibacteria	+	nd	nd	+	+
Halanaerobiaeota	+	nd	nd	nd	nd
Latescibacteria	+	nd	nd	nd	+
Chlamydiae	+	nd	nd	nd	+
Calditrichaeota	+	nd	nd	nd	nd
Planctomycetes	+	nd	nd	nd	+
Schekmanbacteria	+	nd	nd	nd	nd
Cloacimonetes	+	nd	+	1.79 \pm 3.39	+
Entotheonellaeota	+	+	nd	nd	nd
MAT-CR-M4-B07	+	nd	nd	nd	nd
Kiritimatiellaeota	+	nd	+	+	nd
Elusimicrobia	nd	nd	nd	+	+
Margulisbacteria	nd	nd	nd	+	nd
Marinimicrobia (SAR406 clade)	nd	nd	nd	+	nd
Synergistetes	nd	nd	nd	+	nd

+: relative abundance < 0.5%; nd: not detected.