

Supplementary Materials: Skin and blood microbial signatures of sedentary and migratory trout (*Salmo trutta*) of Kerguelen Islands

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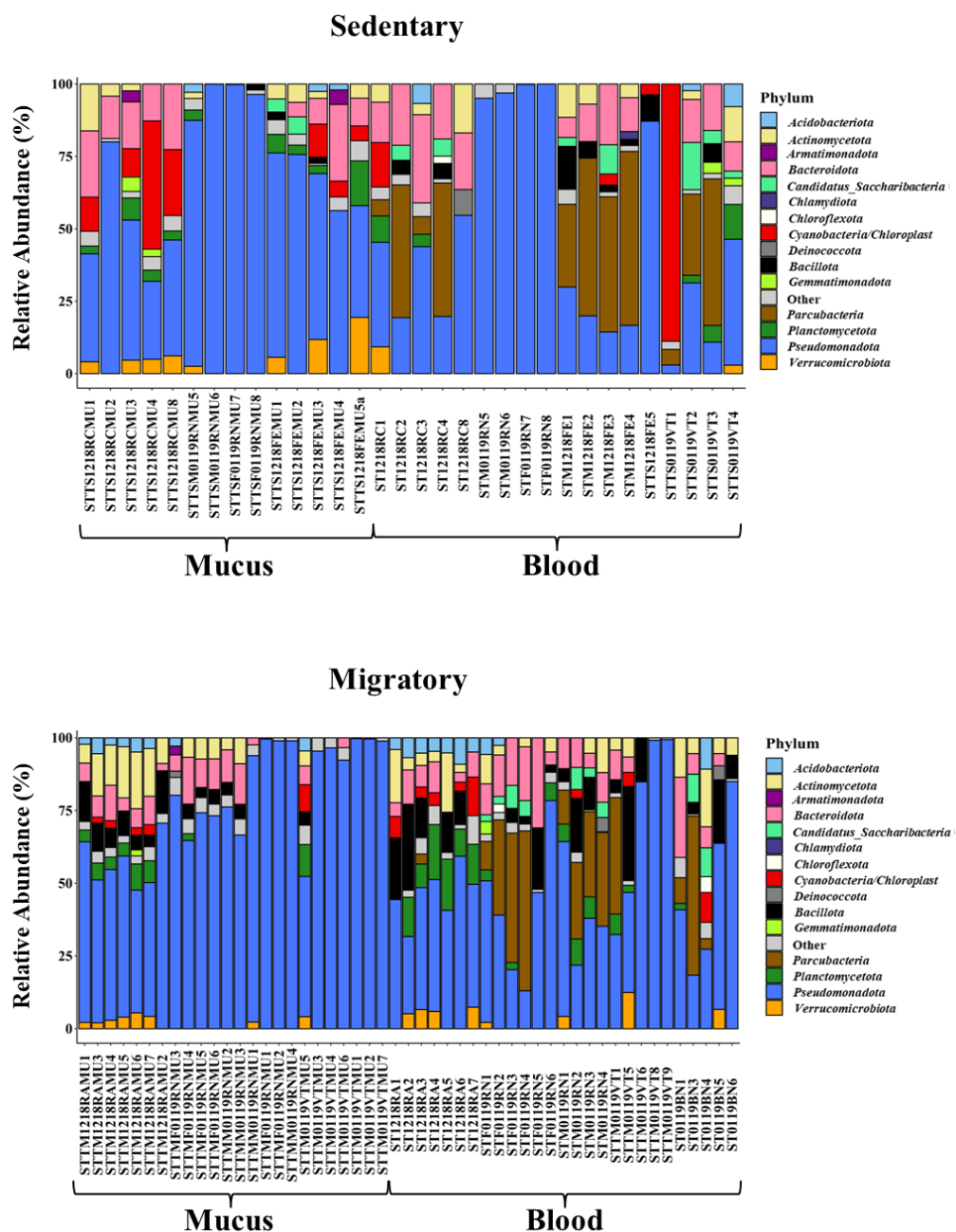


Figure. S1: Individual variations in the circulating and mucosal microbiomes at the phylum level. Bar plots display the main phyla between sedentary and migratory brown trout (*S. trutta*) for mucosal (left) and circulating (right) microbiomes. Phyla with a relative abundance of $\leq 1.5\%$ are represented as "Other."

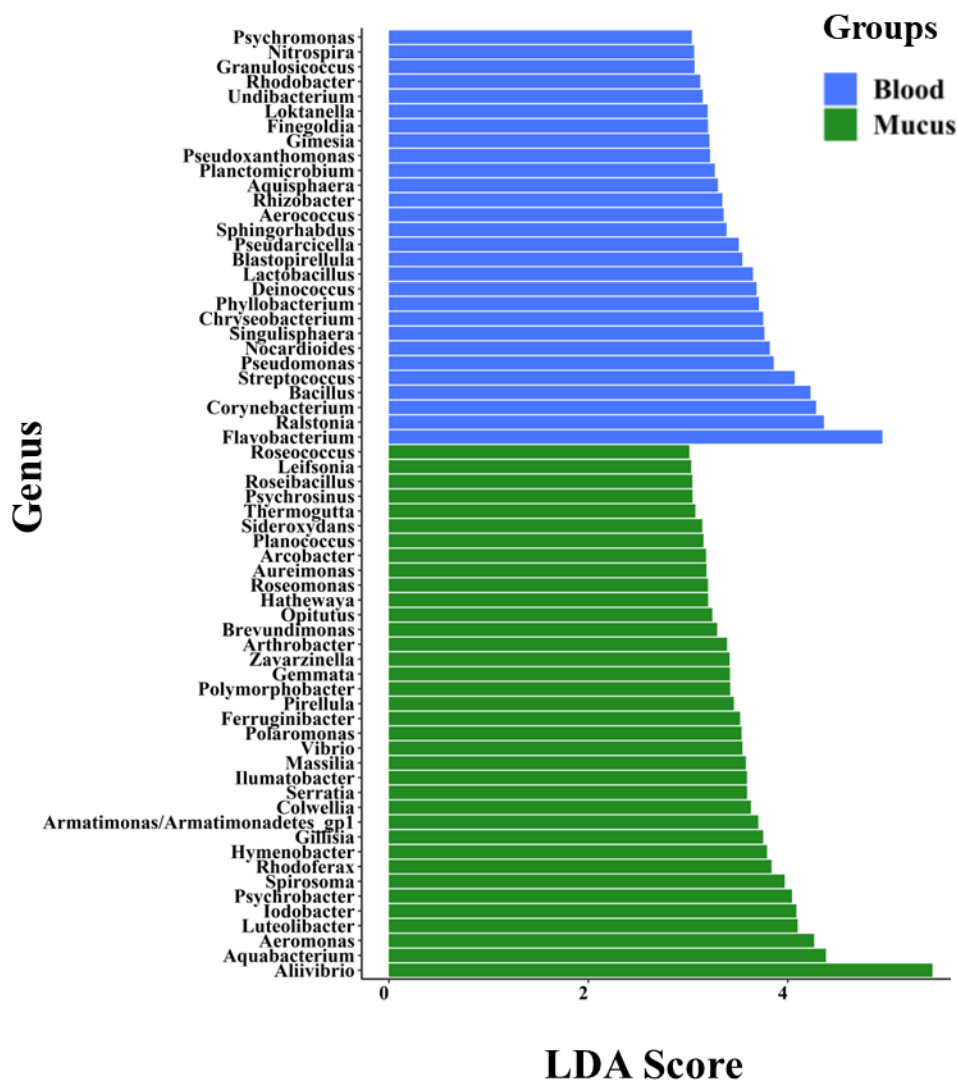


Figure. S2: Discriminant genera between the circulating and mucosal compartments. LEfSe analysis (log-transformed LDA > 3) showing the top genus-level biomarkers that distinguished both compartments in brown trout (*S. trutta*).

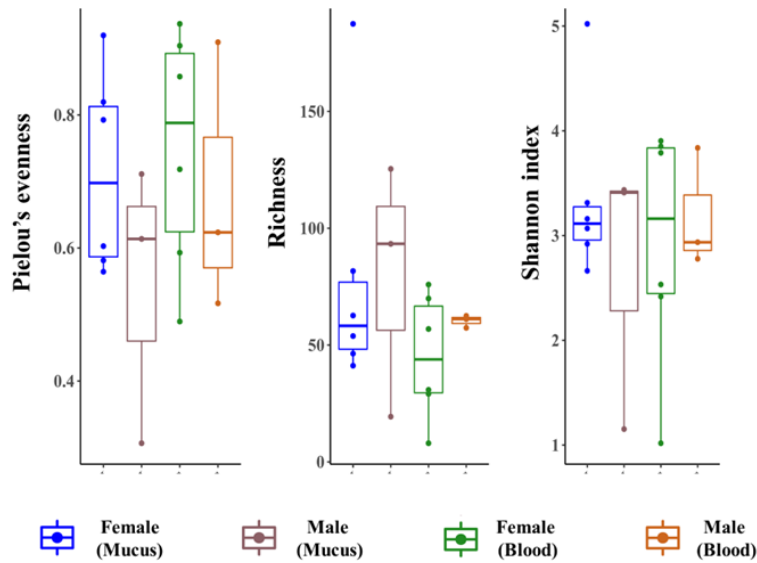
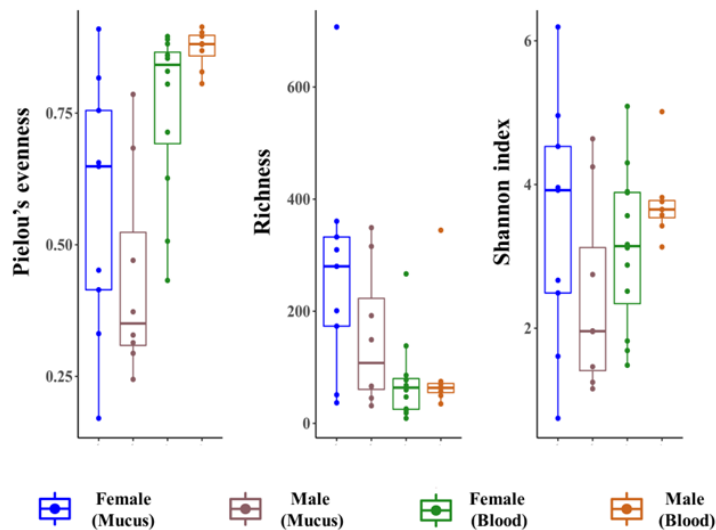
A**B**

Figure. S3: Alpha diversity analysis of mucosal and circulating microbiomes in (A) sedentary and (B) migratory brown trout (*S. trutta*). Species evenness, observed richness and Shannon diversity indexes were calculated for both female and male samples. No significant differences were observed between specimens for the same compartment.

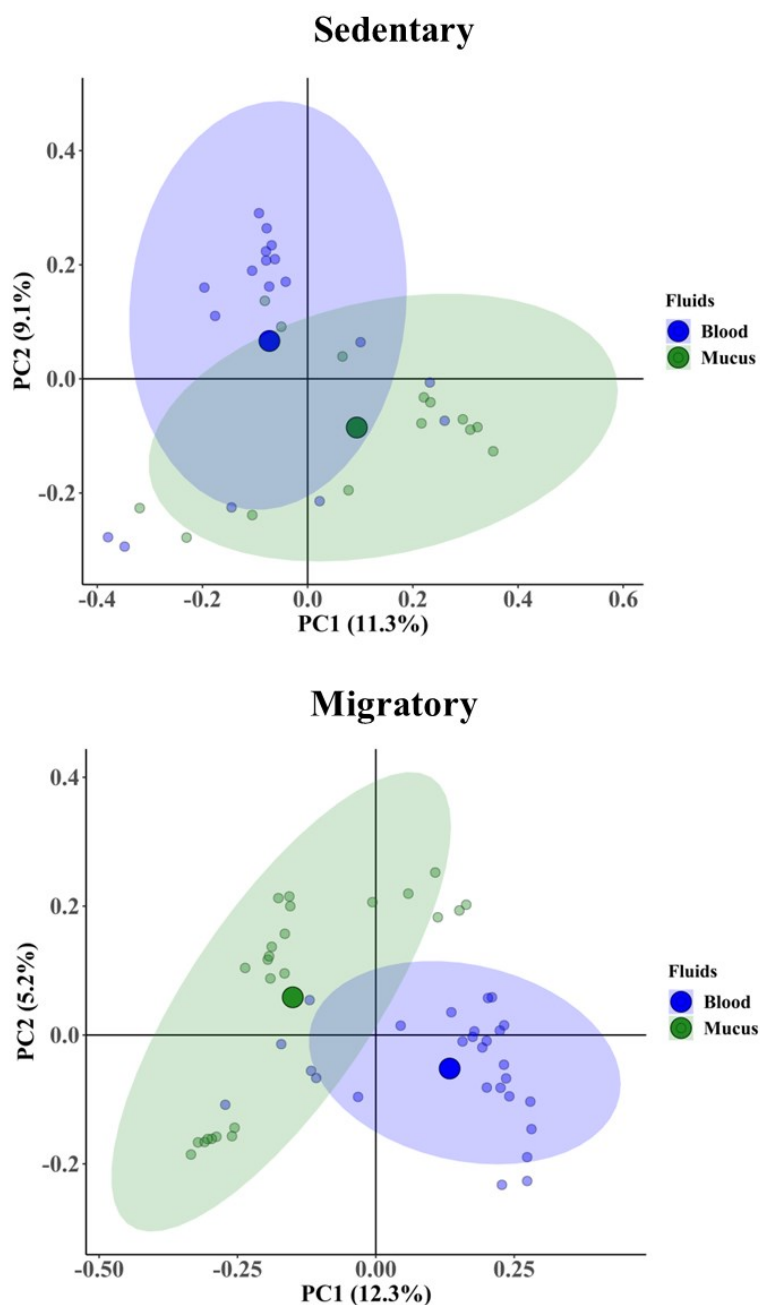


Figure. S4: Principal Coordinates Analysis (PCoA) of bacterial DNA bacterial communities in both sedentary and migratory brown trout (*S. trutta*). Unweighted UniFrac-based of blood (blue) and mucosa (red) samples. Centroids for each site are illustrated by larger circles. Ellipses represent 95% confidence interval.

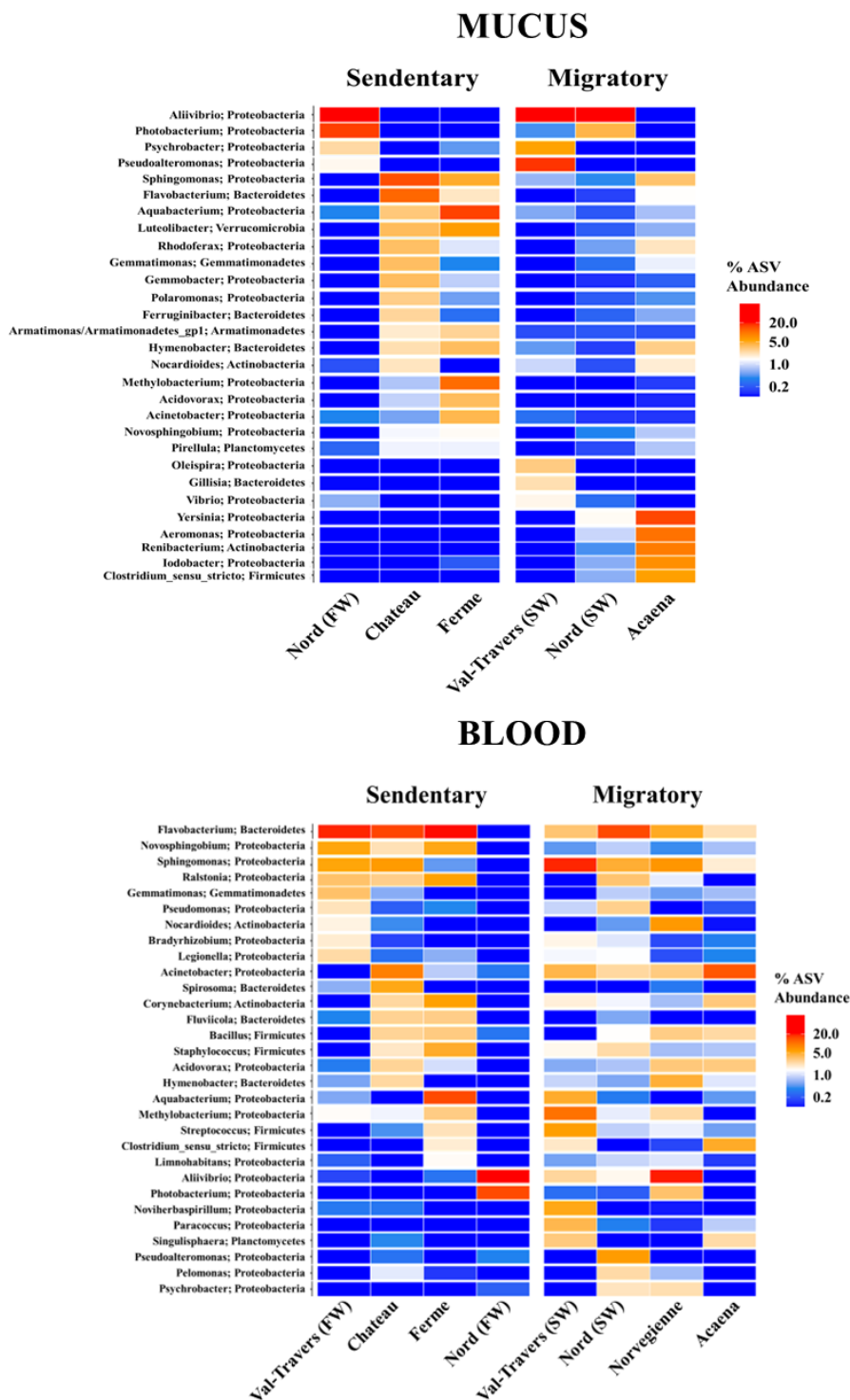


Figure. S5: Heatmaps showing relative abundance (%) of the top 30 bacterial genera of mucosal and circulating microbiomes between sedentary and migratory brown trout (*S. trutta*). Red colors indicate higher abundance and blue colors indicate lower abundances.

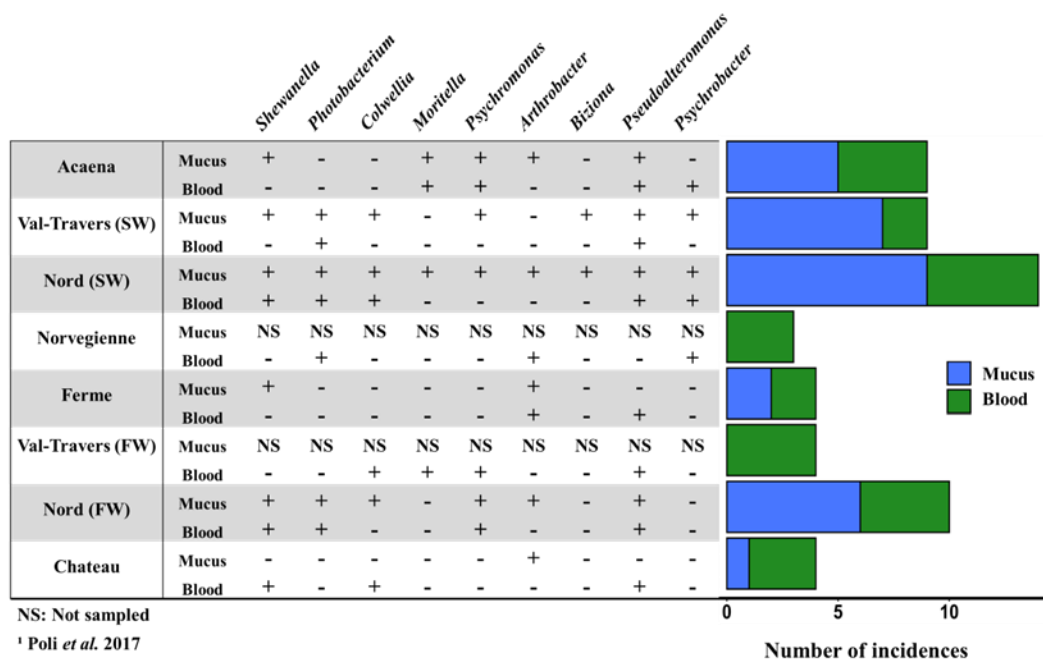


Figure. S6: Presence of psychrophilic bacterial genera isolated from Kerguelen sites and compared to Poli *et al.* (2017) identification of psychrophilic bacteria.

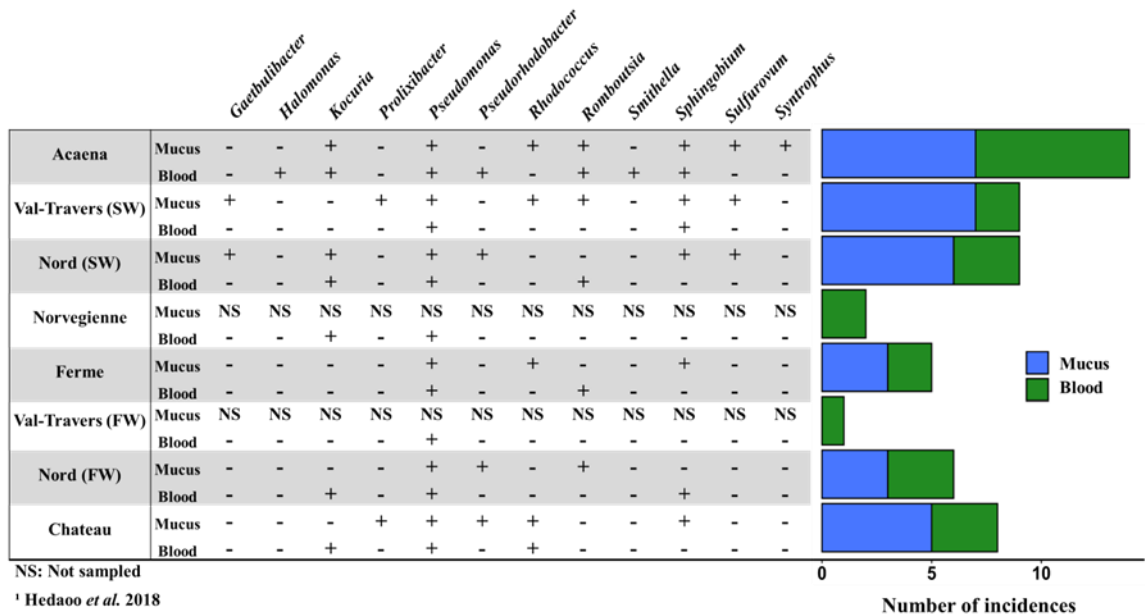


Figure. S7: Presence of Kerguelen bacterial genera commonly associated to oil spills (cited more than four times in different scientific papers) based on Hedao *et al.* (2018).

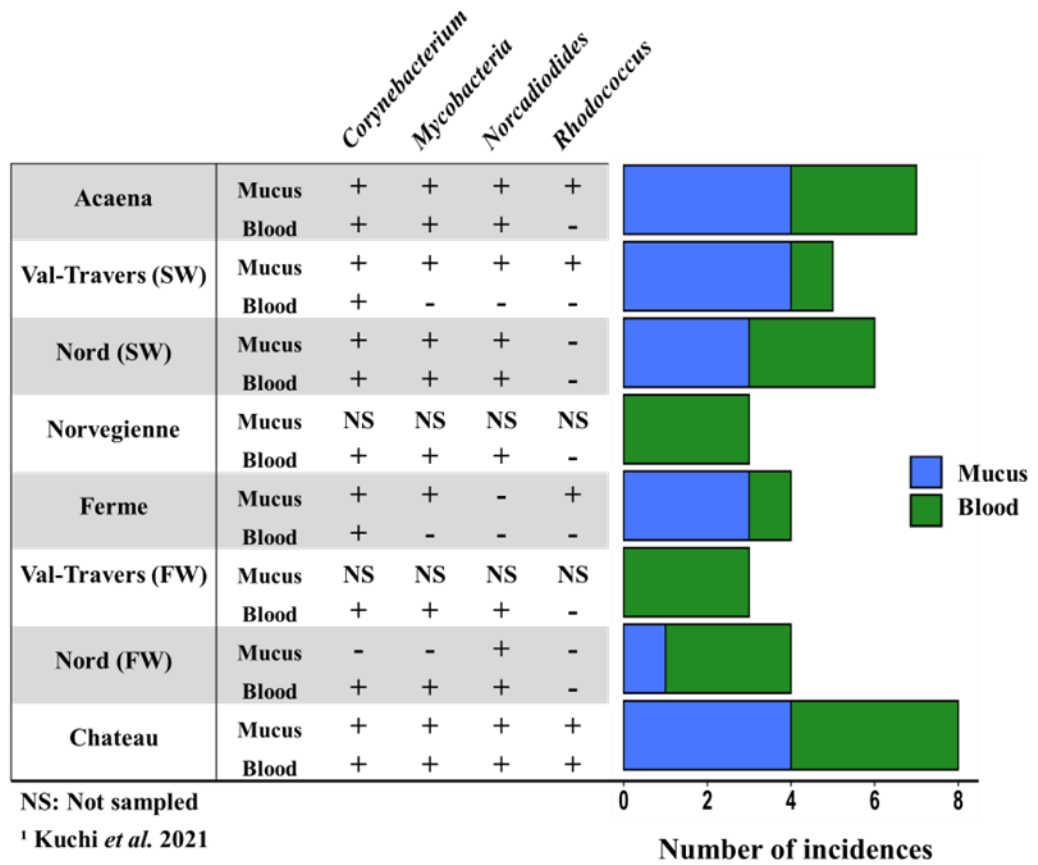


Figure. S8: Presence of Kerguelen bacterial genera known to degrade alkanes, phenols and phenanthrene which can be used as biomarkers for PAHs detection, based on Kuchi *et al.* (2021).

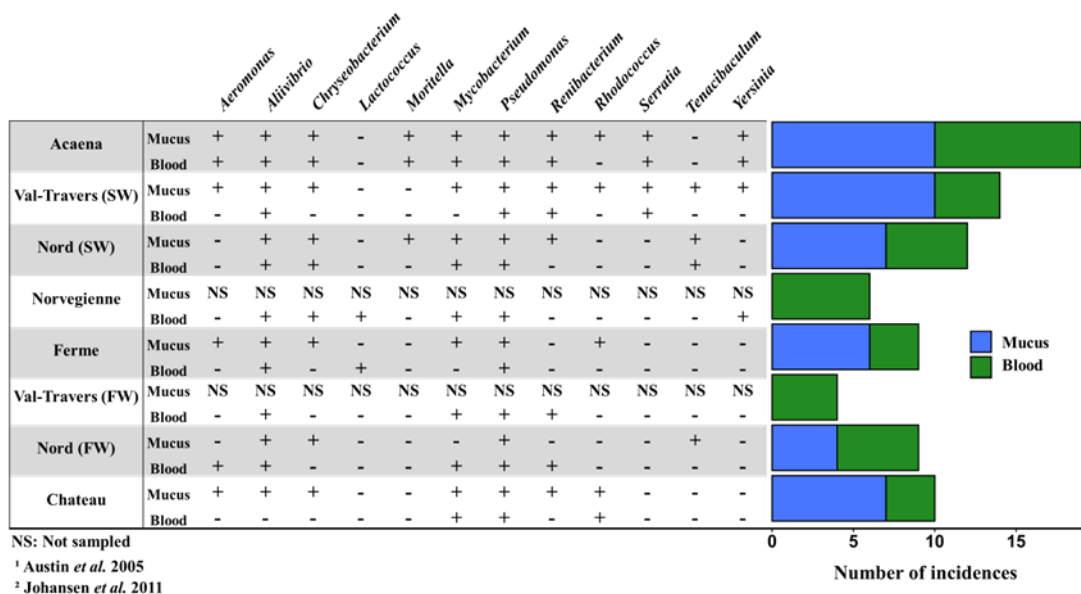


Figure. S9: Presence of potentially pathogenic bacterial genera found at different sites in Kerguelen.

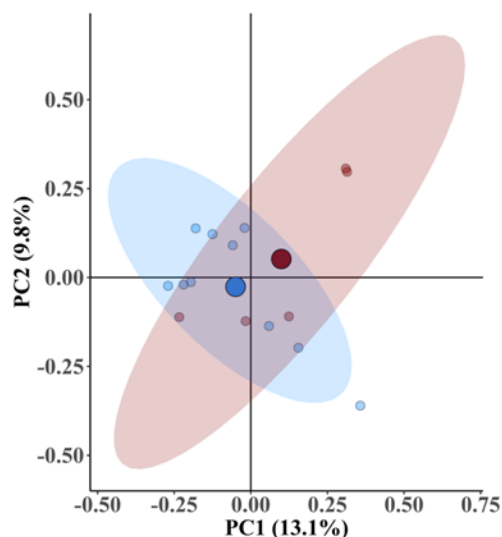
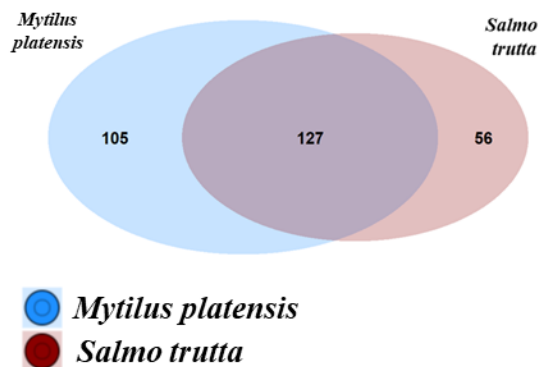
A**B**

Figure. S10: Bacterial cmDNA profiles in blue mussels (*Mytilus platensis*) and brown trout (*S. trutta*) collected at the mouth of the Norvegienne river. (A) Principal Coordinates Analysis (PCoA) of bacterial DNA bacterial communities in both species. Unweighted UniFrac-based of blue mussels (blue) and brown trout (red) samples. Centroids for each site are illustrated by larger circles. Ellipses represent 95% confidence interval. (C) A Venn diagram showing the number of unique and shared bacterial genera in blue mussels (blue) and brown trout (red) samples.

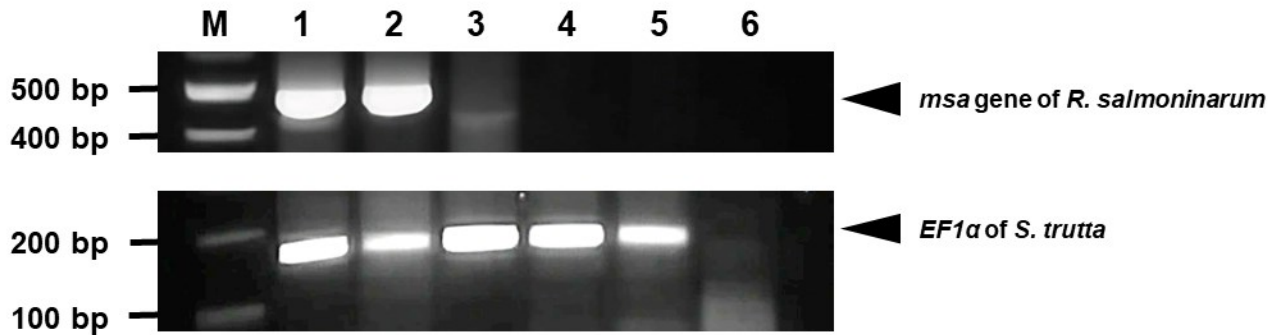


Figure. S11: Amplified fragments shown on 1.5% agarose gel electrophoresis. A. Amplicons generated from the *msa* gene of *R. salmoninarum* in positive mucosal and blood samples from Acaena river according to the protocol by Brown *et al.*(1994). No amplification occurred in samples from Baie Norvegienne river. The primer sequences are 5'-CAAGGTGAAGGGAATTCTTCCACT-3' and 5'-GACGGCAATGTCCGTTCCCGGTTT-3' for the forward and the reverse primers, respectively. **B.** Amplicons generated from the *EF1α* gene of *S. trutta* samples. The primer sequences are 5'-ATTGCCACACTGCTCACATC-3' and 5'-CTGGAAGCTCTCCACACACA-3' for the forward and the reverse primers, respectively. M: 100-base-pair DNA ladder; lanes 1–2: mucosal samples from Acaena river; lane 3: blood sample from Acaena river; lanes 4–5: blood samples from Baie Norvégienne river; lane 6: no DNA template.

Table S1. Characteristics of brown trout (*S. trutta*) collected at different sites at Kerguelen Islands.

| Phenotype | Site | Compartment | <i>n</i> | Average weight (kg) ± SE |
|-----------|-------------|---------------|----------|-----------------------------|
| Sedentary | Chateau | Mucosal/Blood | 5/5 | 0.9 ± 0.1 |
| Sedentary | Nord | Mucosal/Blood | 4/4 | 2.7 ± 0.4 |
| Sedentary | Ferme | Mucosal/Blood | 5/5 | 0.3 ± 0.06 |
| Sedentary | Val-Travers | Blood | 4 | 0.08 ± 0.01 |
| Migratory | Acaena | Mucosal/Blood | 7/7 | 1.7 ± 0.4 |
| Migratory | Nord | Mucosal/Blood | 10/10 | 2.2 ± 0.3 |
| Migratory | Val-Travers | Mucosal/Blood | 7/7 | 1.8 ± 0.2 |
| Migratory | Norvegienne | Blood | 5 | 3.2 ± 0.4 |