

Microflora of marine and freshwater fish from commercial breeding

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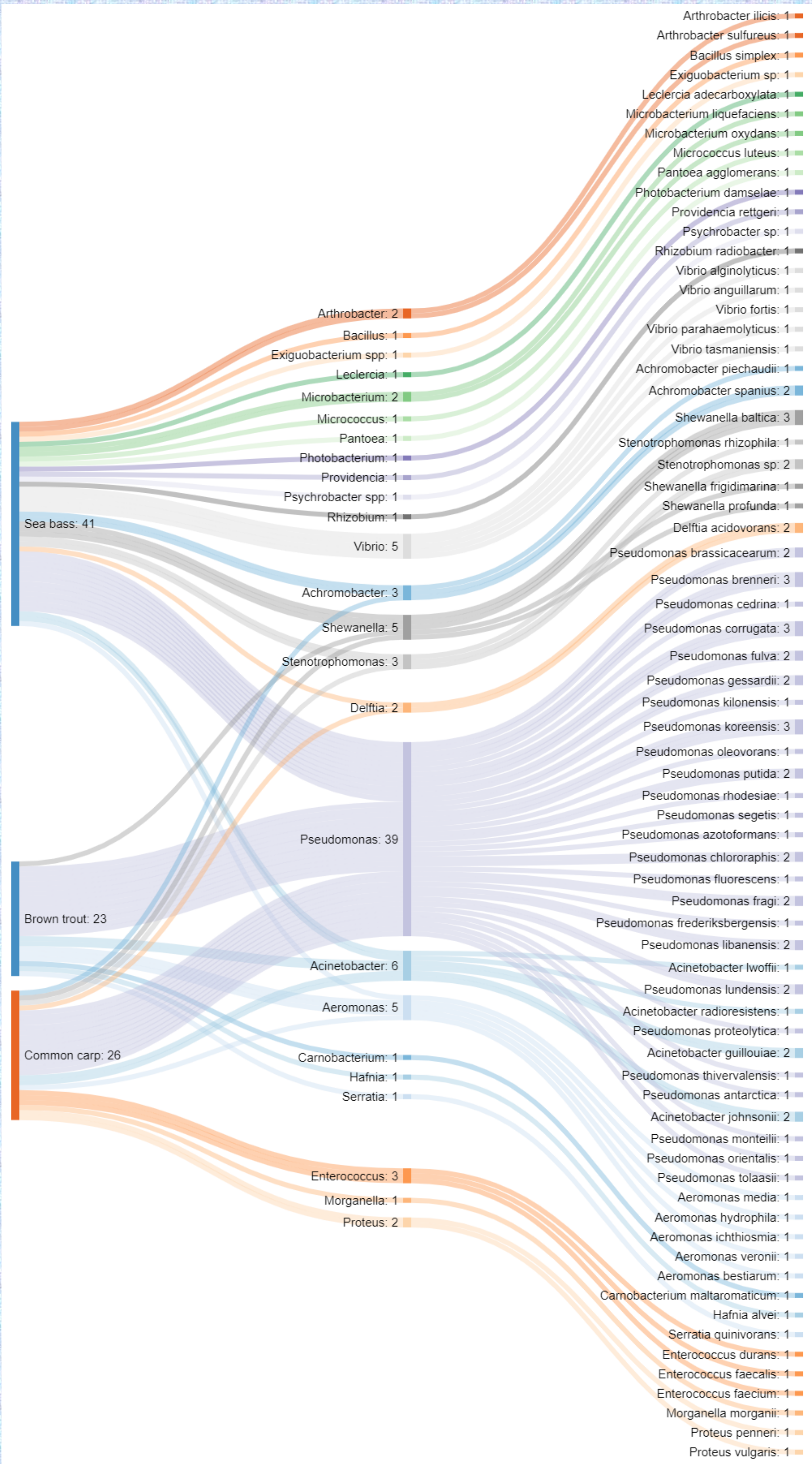


Figure 4 Bacterial species and genera found in particular fish species*

CONCLUSION

If we take into account that only one bacterium species has been found to be non-pathogenic, while 14 are of no known clinical significance, almost 80% of bacterial species found have potential pathogen activity remain. Therefore, it is necessary to continuously monitor the state of microbiological flora on fishes from commercial farms with the simultaneous application of good hygiene practices, as well as other measures that can reduce microbiological contamination of fish, thus indirectly reducing the risk of potential adverse health effects on people, but also the fish themselves. In addition, reduced microbiological contamination can further enhance the quality of fish on the market because among the bacteria found, in all three monitored fish species, there were spoilage bacteria from the genera *Pseudomonas* and *Shewanella*.

*The numbers next to the:
➤ fish species show how many different bacterial species have been identified in that fish species;
➤ bacterial genera show how many bacterial species have been identified from that genus;
➤ bacterial species show in how many fish species that bacterium has been identified;
➤ description of pathogenicity show how many bacterial species has particular pathogenicity characteristic.

INTRODUCTION

Commercial fish farming is a significant contribution to the provision of high-quality protein food on the Croatian market. Sea bass, (*Dicentrarchus labrax*, Figure 1) and gilthead sea bream, (*Sparus aurata*), are the most common species in mariculture, while ciprinides and trout are the most widely cultivated freshwater fish. Since food safety is a basic predisposition for market distribution, the aim of this study was to identify the bacterial microflora of sea bass, common carp (*Cyprinus carpio*; Figure 3) and brown trout (*Salmo trutta*, Figure 2), from commercial farming.



Figure 1. Sea bass (*Dicentrarchus labrax*)



Figure 2. Brown trout (*Salmo trutta*)

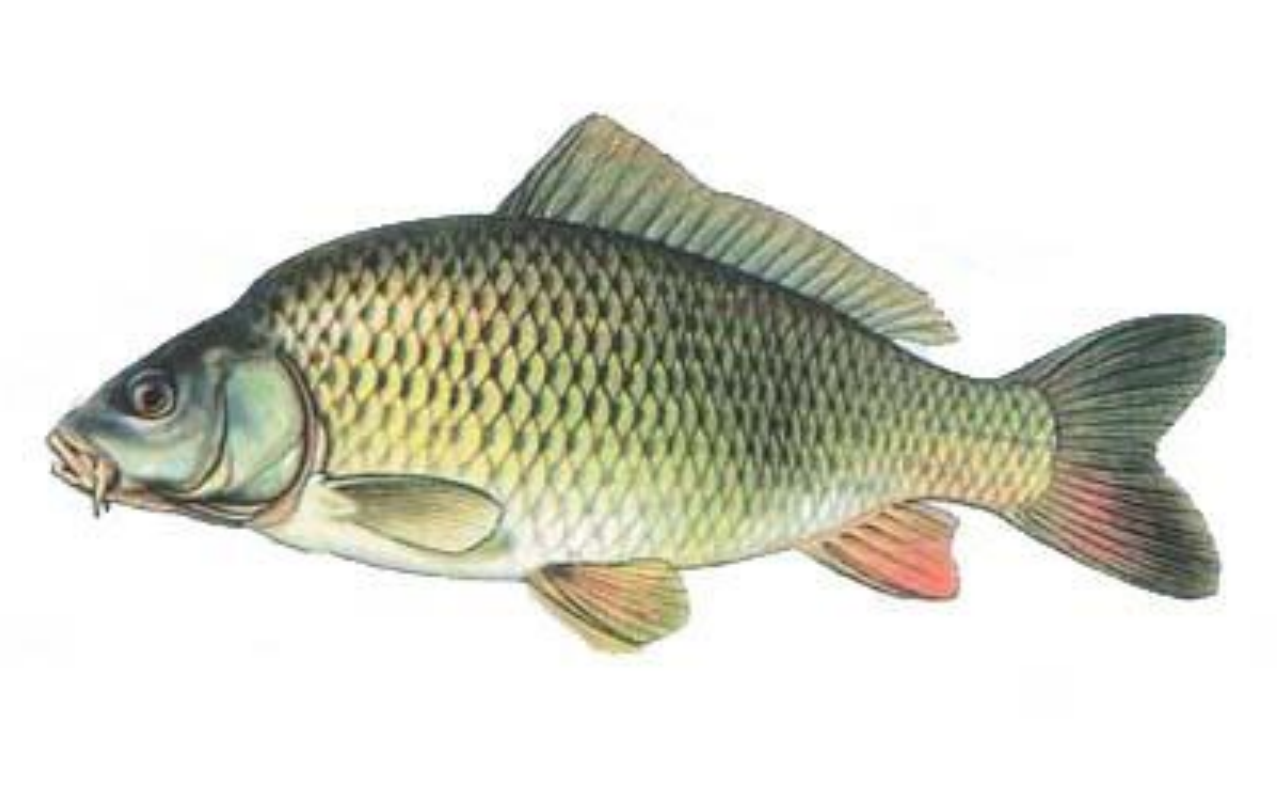


Figure 3. Common carp (*Cyprinus carpio*)

MATERIALS AND METHODS

Skin and gill swabs were taken over three years throughout the seasons at sea bass farms near Pelješac, carp farm near the Ilova River and trout farm on the Krka River.

MALDI-TOF-MS (Matrix-Assisted Laser Desorption/Ionisation Time of Flight Mass Spectrometry) analyses was used for identification of bacterial species. Isolates were prepared for mass spectrometry according to a standard protocol recommended by Bruker company.

RESULTS

70 types of bacteria from 25 genera were detected by the MALDI TOF method. 41 species from 19 genera were found on sea bass, 26 species from 10 genera on common carp, and 23 species from seven genera on brown trout (Picture 4). Given the large number of bacterial species that have been discovered in the last 20 years thanks to the constant improvement of diagnostic methods, for many of them no clinical significance or pathogenicity has been determined, while for other identified bacterial species there are only few literature quotes. In line with the available data, the identified microorganisms were classified according to their pathogenicity as shown in Figure 5.

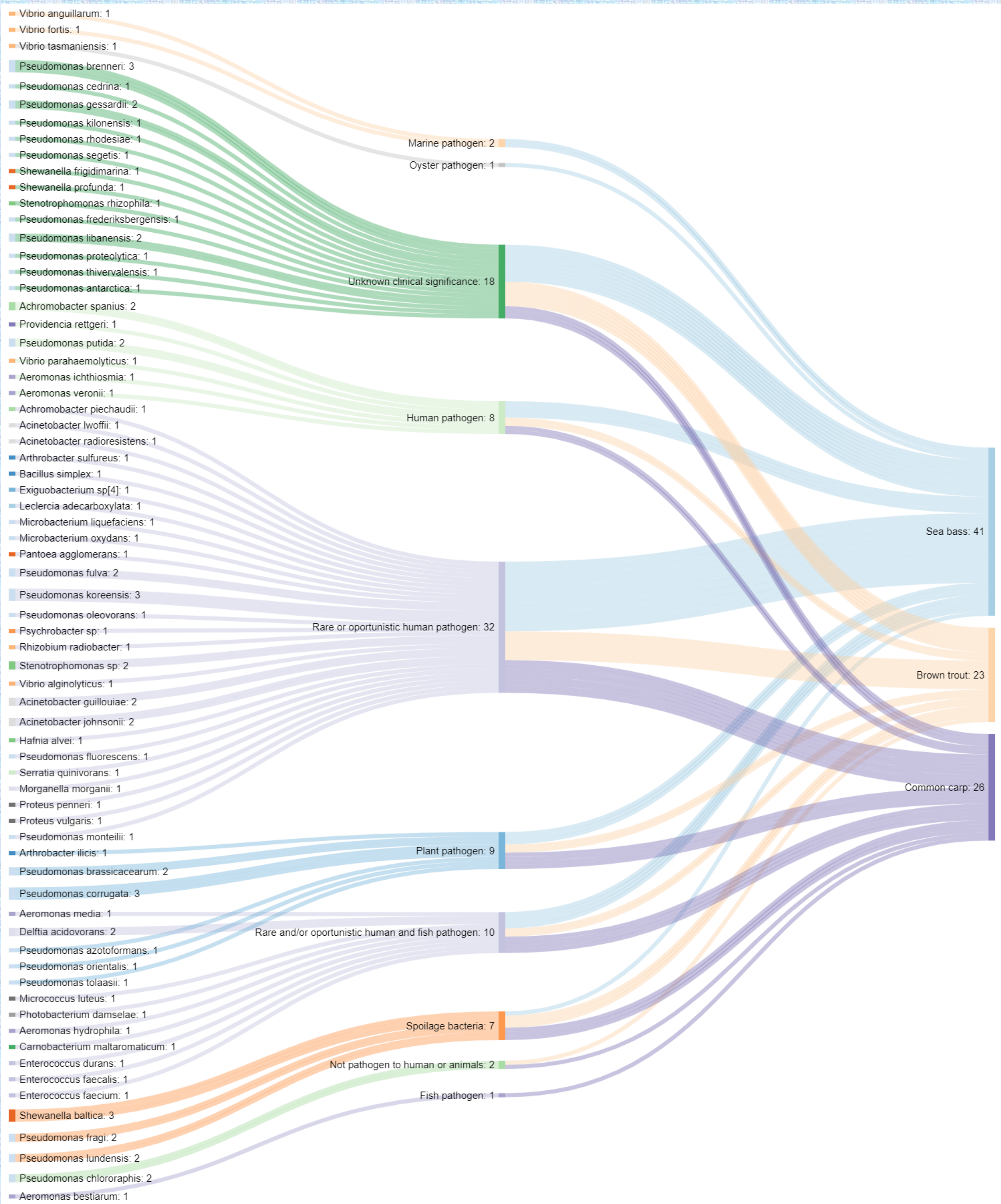


Figure 5 Division of identified bacterial species according to pathogenicity and fish species*

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