

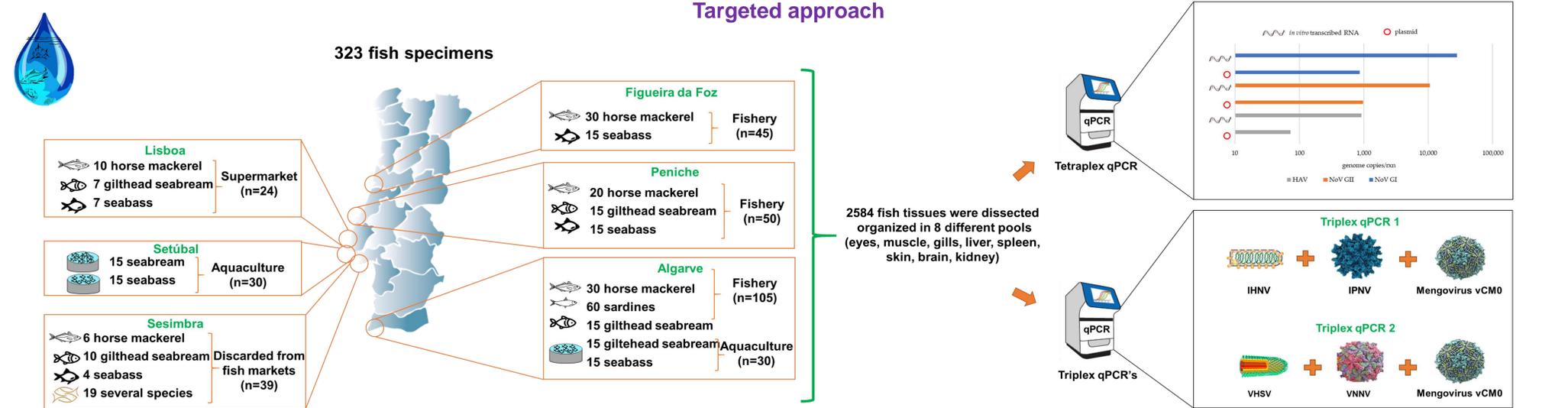


## Introduction

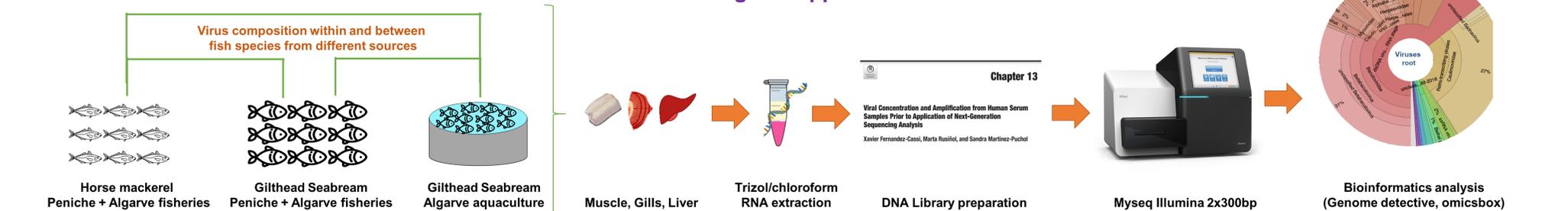
The increase of global demand for seafood and fish stock maintenance are pressing issues to aquaculture production in terms of fish resources sustainability. However, fish are constantly exposed to microorganisms present in their environment, being viruses commonly associated with losses in fish production and foodborne diseases, which can pose a risk to public health. Therefore, the main goal of this work was to identify and assess the viral diversity in wild and farmed fish from the Portuguese coast by targeted and untargeted approaches. As a targeted approach, *TaqMan* multiplex real-time PCR (qPCR) assays were developed: one to detect four viruses responsible for economic losses in fisheries (Infectious Pancreatic Necrosis Virus (IPNV), Infectious Hematopoietic Necrotic Virus (IHNV), Viral Haemorrhagic septicaemia Virus (VHSV) and Viral Nervous Necrosis Virus (VNNV)), and other to identify and quantify three commonly associated foodborne viruses (Norovirus GI (Nov GI), Norovirus GII (Nov GII) and Hepatitis A (HAV)) responsible for several outbreaks. For the untargeted approach, a characterisation by next generation sequencing (NGS) of some relevant fish tissues was achieved.

## Methodology

### Targeted approach

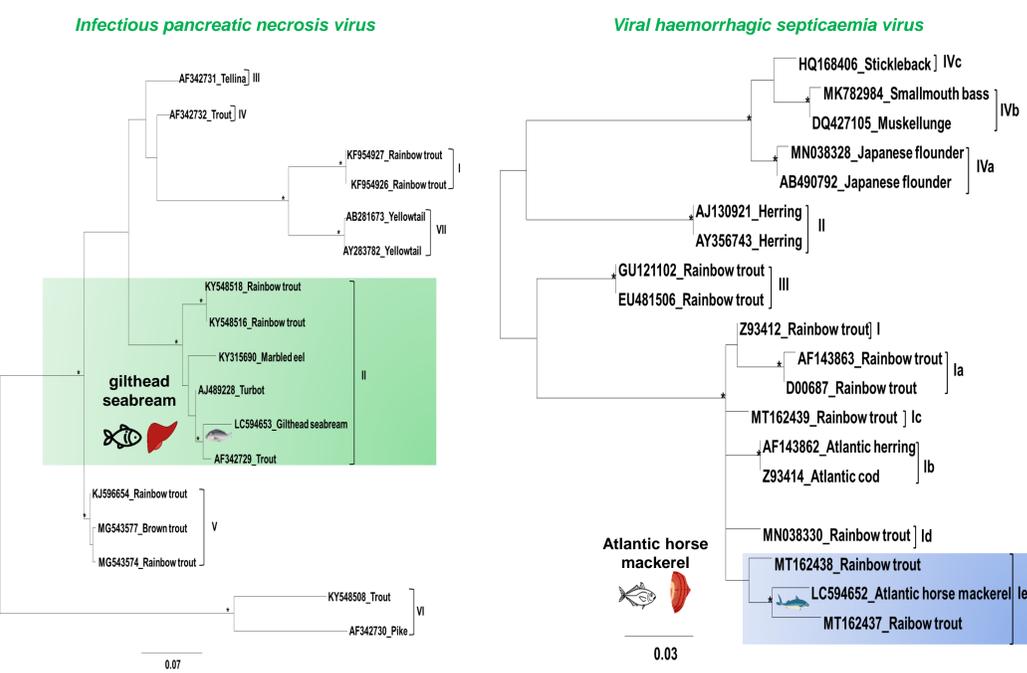


### Untargeted approach

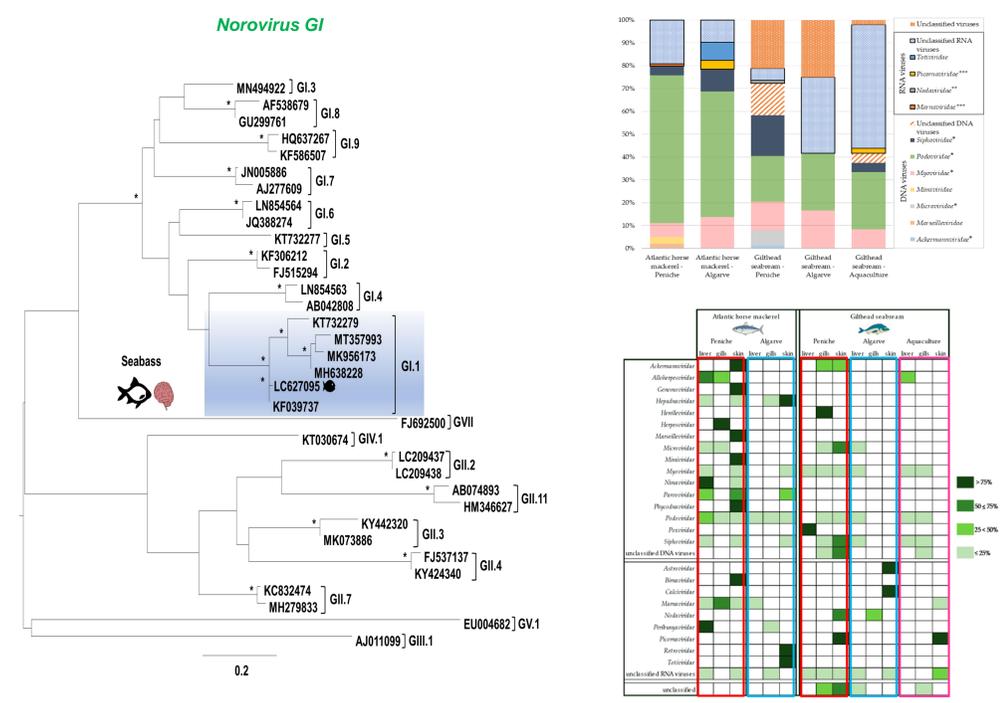


## Results

### Targeted approach



### Untargeted approach



## Take home message

- Fish commonly sold in the markets (increasingly consumed raw or undercooked) harbour a wide range of known and unknown viral genomes.
- The detection of human pathogenic virus in internal tissues shows that these viruses circulate in seawater and may infect fish - monitoring of these viruses to assess the risk to human health in a food safety perspective is crucial since NoV and HAV are responsible for several outbreaks worldwide.
- The identification of virus in fish can pose a potential risk to human health since part of them are human viral pathogens with interest regarding food safety.
- Metagenomics studies are a useful tool to exhaustively characterize fish viral-associated diversity and to identify putative viral pathogens that can directly impact fish/human health and the biosafety of aquatic environment.
- This study allowed the first virological screening in four fish species from the Portuguese coast by two molecular approaches – the protocols developed are important molecular tools for viral diagnosis, namely in asymptomatic hosts, in order to prevent and control viral infectious diseases before an outbreak occurs.

## References

## Acknowledgements