

Phenotypic and genomic characterizations of four bacteriophages active against *Aeromonas salmonicida* causing furunculosis in salmonids

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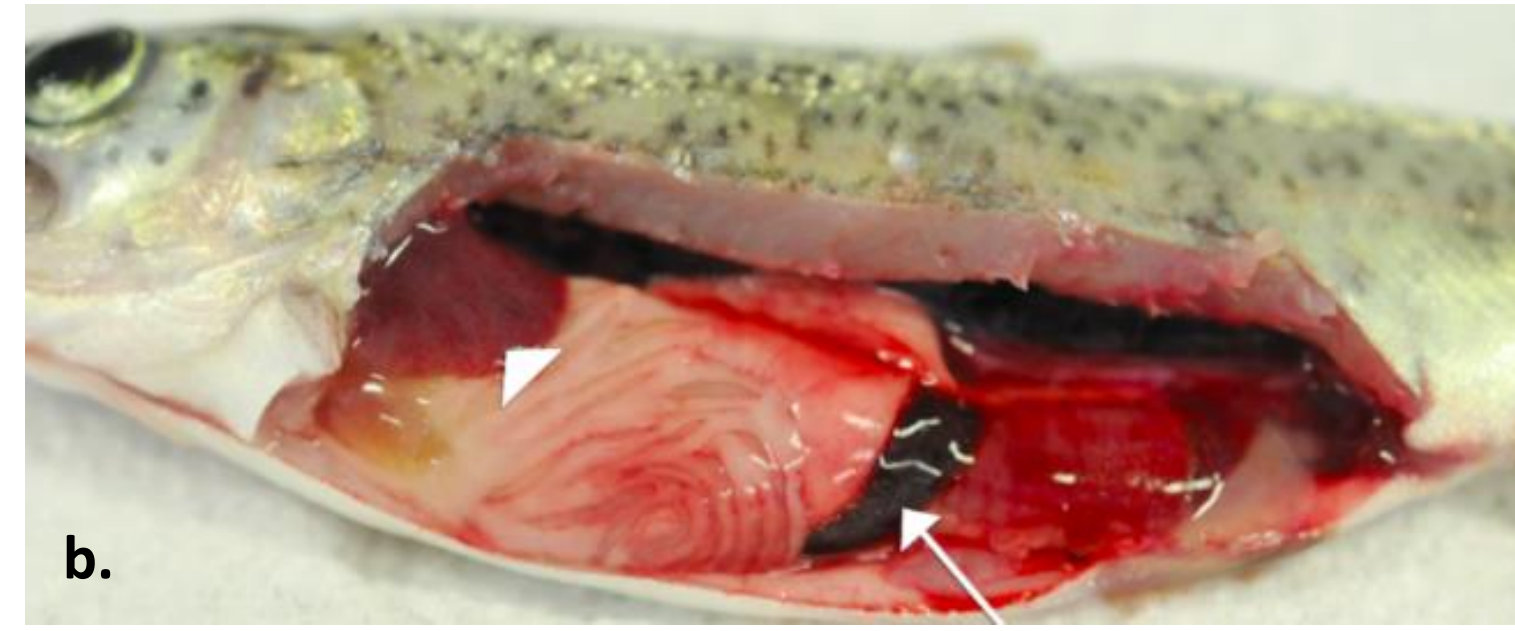
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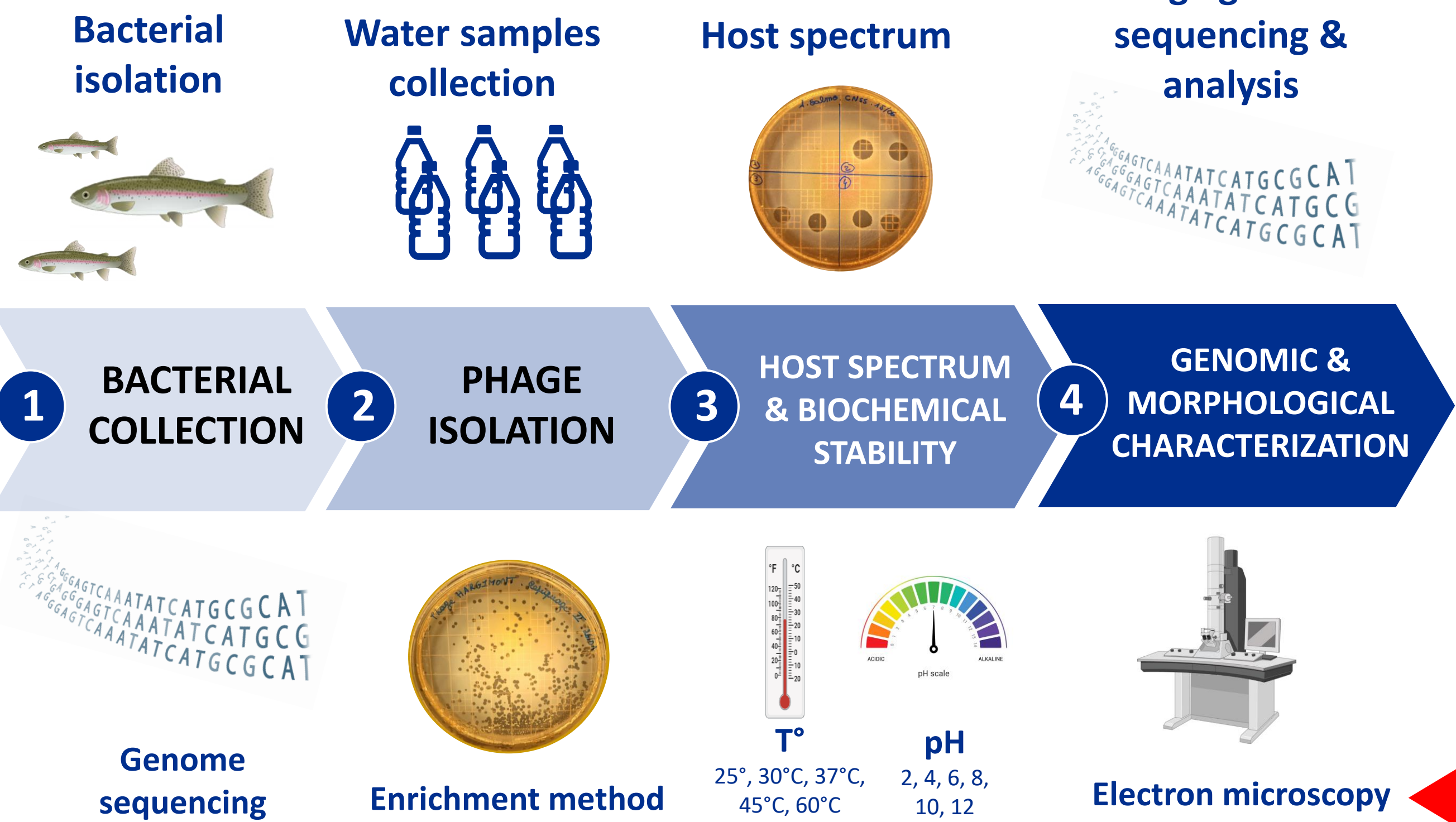


BACKGROUND The Gram-negative bacteria *Aeromonas* (A.) *salmonicida* is a primary fish pathogen that causes **furunculosis in salmonids** as well as septicemia in a variety of fish. In view of the major consequences of furunculosis in salmonid industry worldwide and the frightening tendency of *A. salmonicida* to exhibit antimicrobial (multi-)resistances, phage therapy could represent a leading alternative to treat this infection in aquaculture. The aims of this study were to **1** create a **collection of *A. salmonicida* strains**, **2** **isolate phages** targeting these strains, **3** determine their **host spectrum** and **biochemical stability**, and **4** characterize their **genome** and **morphology**.

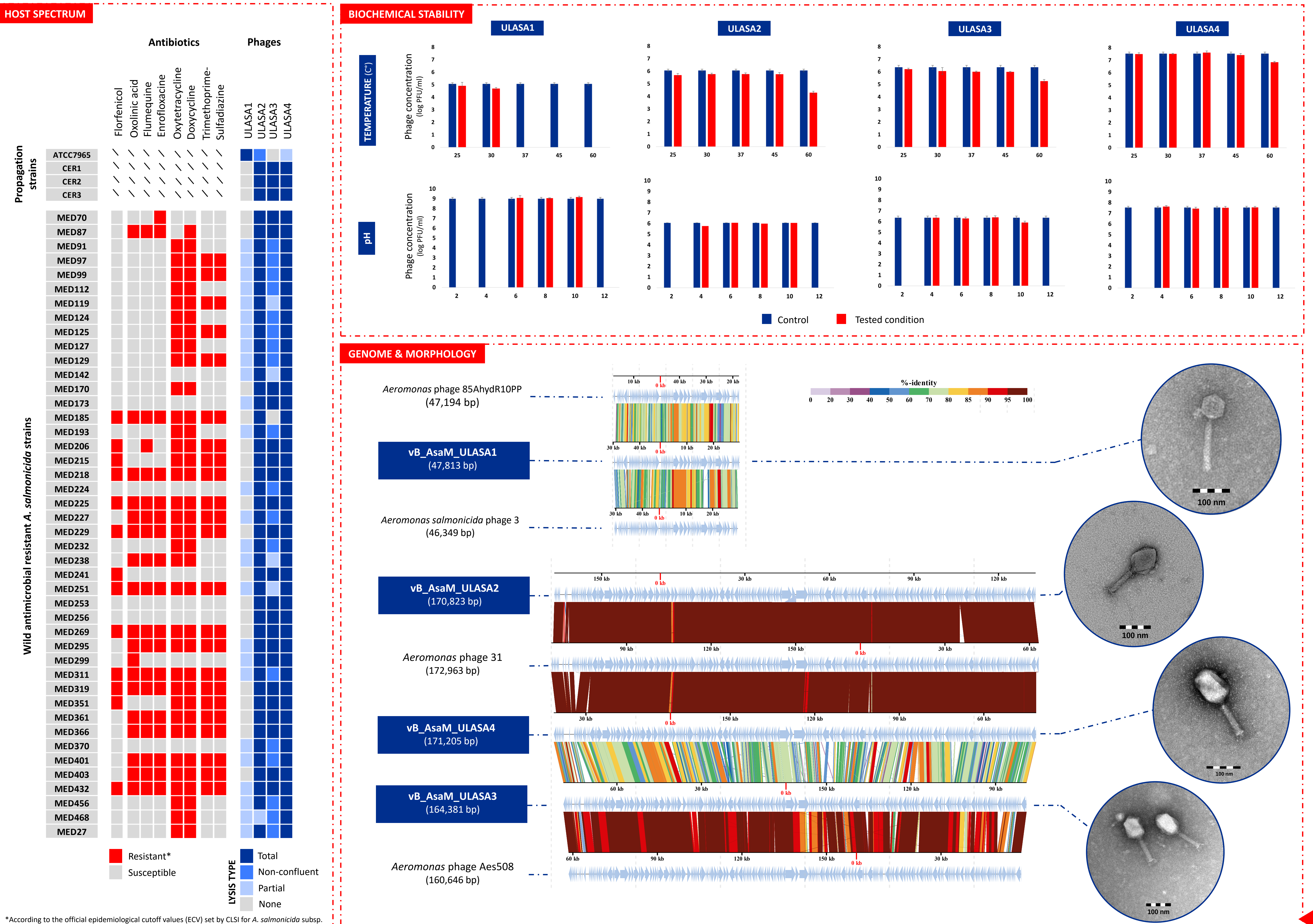


External ulcerative lesions (a), splenomegaly and widespread systemic hemorrhages (b) on a rainbow trout *Oncorhynchus mykiss* (from Menanteau-Ledouble et al., 2016).

METHODS



RESULTS Four new phages targeting *A. salmonicida*, named vB-AsaM-ULASA1 (47,813bp), vB-AsaM-ULASA2 (170,823bp), vB-AsaM-ULASA3 (164,381bp), and vB-AsaM-ULASA4 (171,205bp), were isolated from fish farms and natural aquatic environments from Belgium and France. The phages ULASA2, 3 and 4, affiliated to the ***Straboviridae* family**, showed a **large host spectrum against antimicrobial resistant strains** and **high biochemical tolerance**. The phage ULASA1, for which no known family could be attributed, presented a more restricted host spectrum and a narrower temperature and pH resistance range. All four presented a **myovirus morphotype**.



CONCLUSIONS Four new phages targeting *A. salmonicida* subsp. *salmonicida* were isolated from fish farms and natural aquatic environments. Three of them showed a **large host spectrum against antimicrobial resistant strains** and **high biochemical tolerance**. They were affiliated to the ***Straboviridae* family** and presented a **myovirus morphotype**. In light of these results, these phages could represent potential new candidates for phage therapy to combat (multi-)resistant *A. salmonicida* strains increasingly occurring in aquaculture.

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