

Isolation and characterisation of salmonid alphavirus from wild caught ballan wrasse off the coast of Ireland

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The use of cleaner fish as a biological control of sea lice has increased in recent years

Ireland – wild caught wrasse (ballan, goldsinny, corkwing, rock cook) and hatchery reared lumpfish



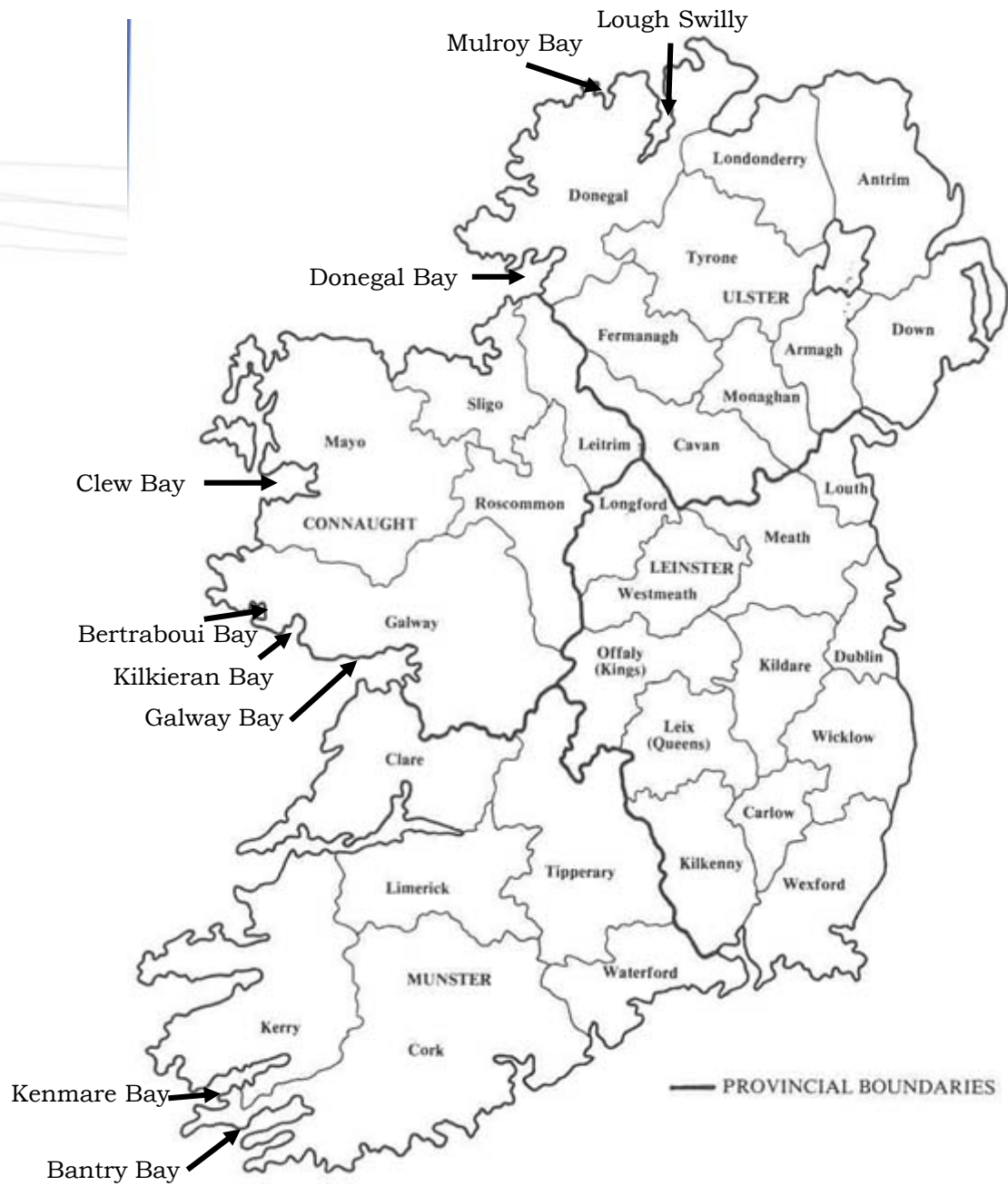


Health Screening

In Ireland the first 60 wrasse from each Bay are screened for pathogens prior to use on marine sites:

- Cell culture on BF2 & EPC (pools of 5)
- Histopathology
- Bacteriology – SWA, CBA+, TCBS
- Molecular – heart & kidney

Species identity is confirmed by sequencing of the mitochondrial control region (Almada *et al.*, 2017; Royal Society Open Science 4, 160773).



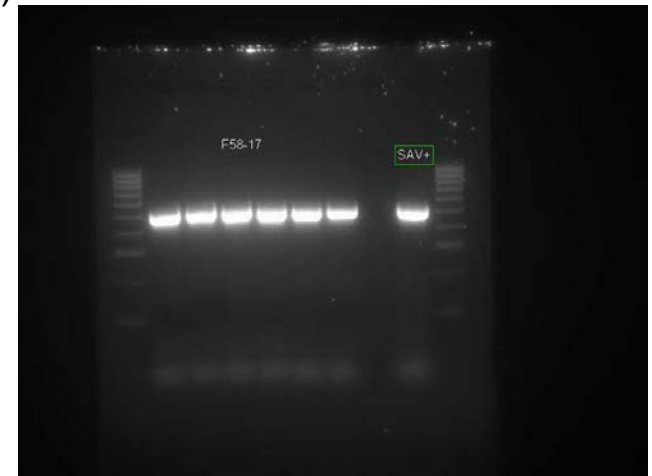


Sample F/58/17: 60 wrasse

- CPE observed on d14 in 1/12 pools (BF2 cells)
- VHS & IPN ELISA negative
- IHN IFAT negative

PCR

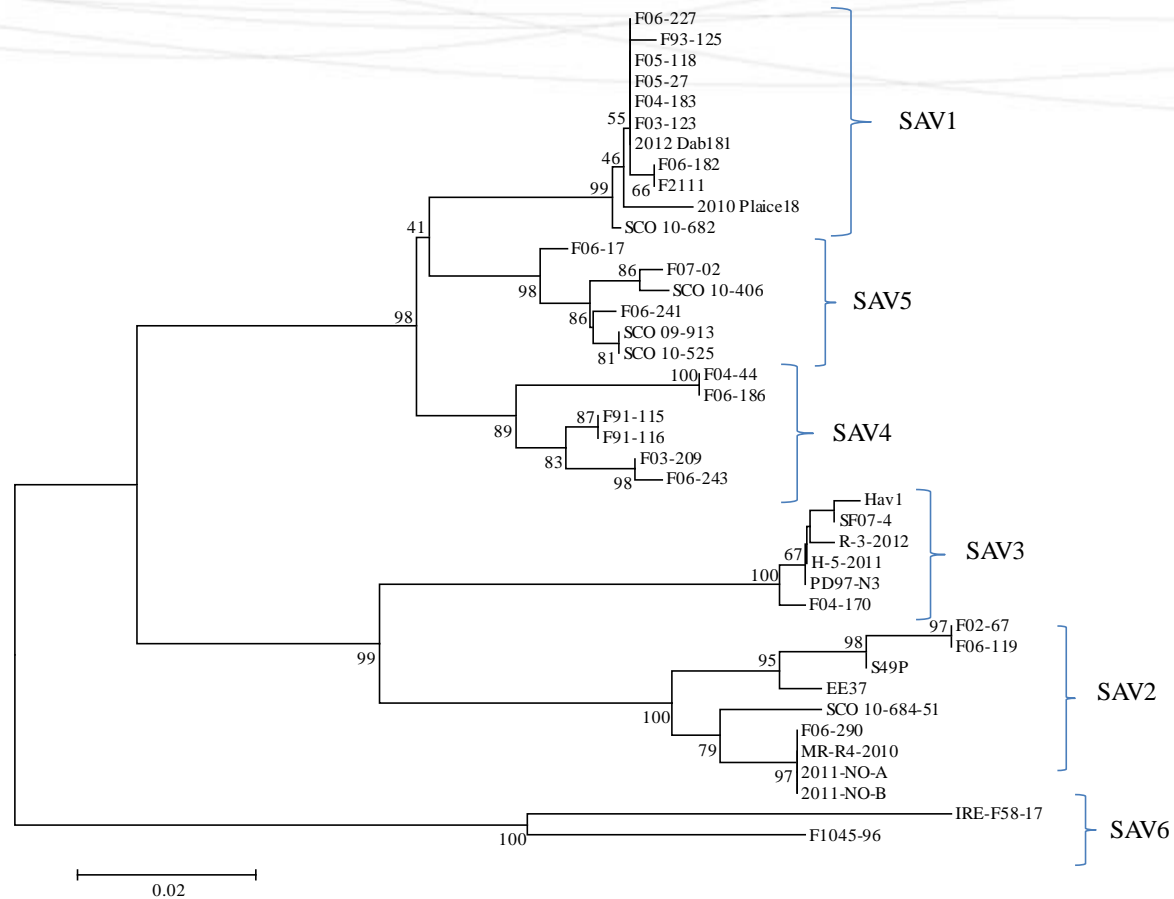
- Ranavirus negative
- Aquatic birnavirus negative
- Rhabdovirus (inc. vesiculovirus) negative
- VHS/IHN negative
- Salmonid alphavirus positive (+qRT-PCR)



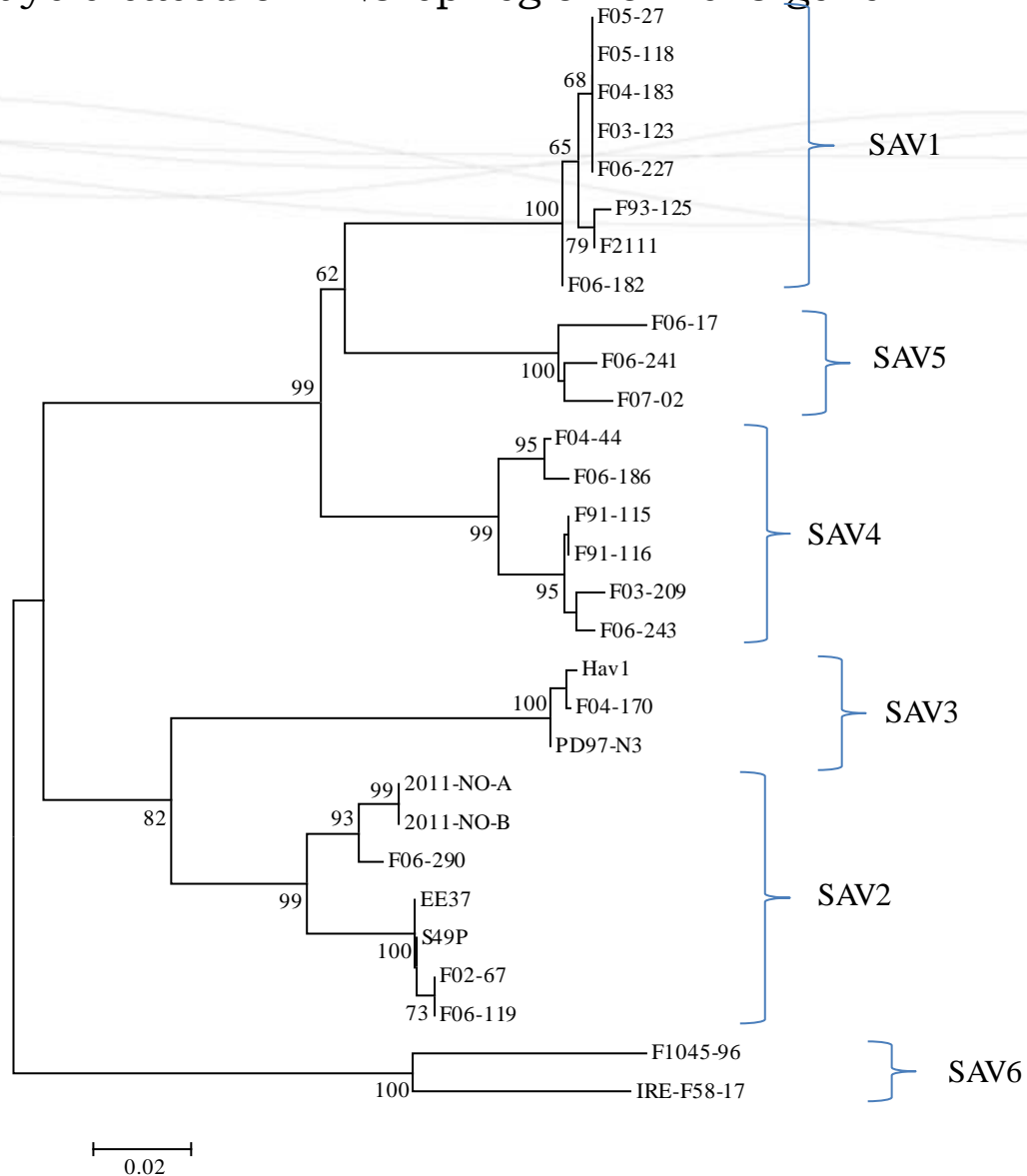
Species

- All five fish in the pool confirmed as Ballan wrasse

Phylogenetic analysis based on 359 bp region of E2 gene



Phylogenetic analysis based on 423 bp region of nsP3 gene





Original SAV6 detection: F1045-96

28.6.96 [REDACTED] 10 x salmon growers (1-2)
 Co. Galway

(CNS2) Neut 27.8 Bfz/CNS2. 28.6.96 Neut 20.8.	Neut. 16.7.96 2 nd Pass 12.7.96 5.7.96 Neut. 12.7.96 / 16.7.96	in FLASKS 2.8.96 9.8.96 16.8.96 10G5 TOGA LIKE VIRUS	Aarhus June '99 * IMMUNO - NEG. inoculation from filtered originals onto CNS2 + RTG-2 16.4.97 + 17.4.97 (PRC PRODUCED) ⇒ T.E.D.
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Conclusion

Second isolation of a SAV6 subtype.

SAV(1,2,5) has been detected in flatfish and SAV5 was isolated from dab.

Increasing evidence that SAV is not restricted to salmonids.

No epidemiological link with aquaculture for the current isolate.



Conclusion

Evolution of alphaviruses – host switching and geographic introductions¹ with a marine origin².

A wild reservoir (North Sea?) could account for multiple introductions of SAV leading to independent outbreaks or self-sustaining epizootics³.

Is SAV6 an ancestral or wild-type SAV?

Has aquaculture production led to competitive exclusion of SAV6 in favour of endemic subtypes SAV1, 2 & 3?

- Health screening of all fish prior to deployment in fish cages is important.

1. Powers et al. 2001. J. Virol. 75, 10118-10131.
2. Forrester et al. 2012. J. Virol. 86, 2719-2738.
3. Karlsen et al. 2014. J. Gen. Virol. 95, 52-59.

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