

Reducing the use of antibiotics through salmonid breeding

by

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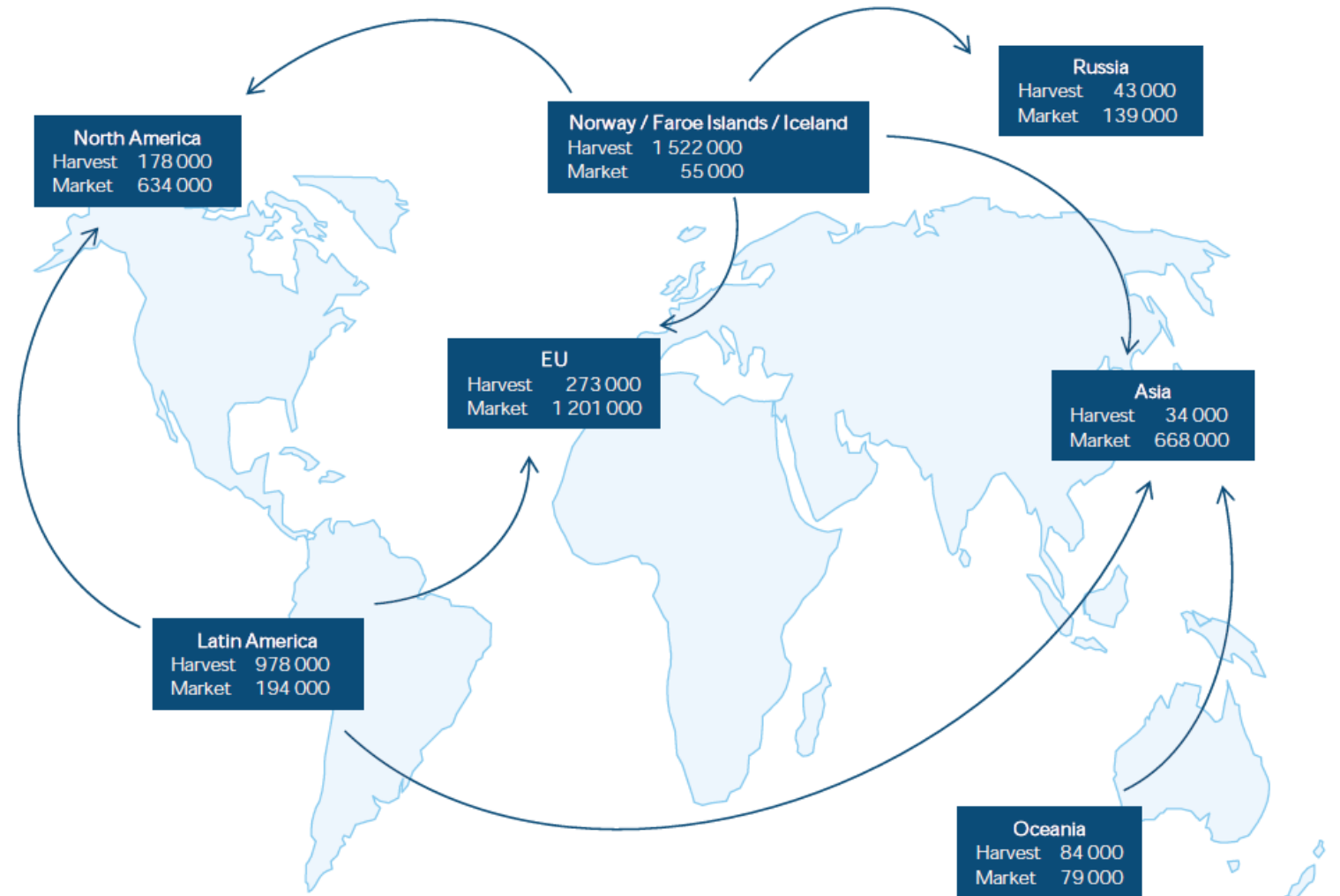
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#Breederstalk Green: HEALTHY & HAPPY ANIMALS for SUSTAINABLE SOCIETIES.

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Global trade of farmed salmonids 2019

- Global production 3,766 mill tons
 - 2,576 mill tons Atlantic salmon
 - Others species are rainbow trout (pan-size and large), coho and chinook



Source: Salmon World 2020, Kontali Analyse

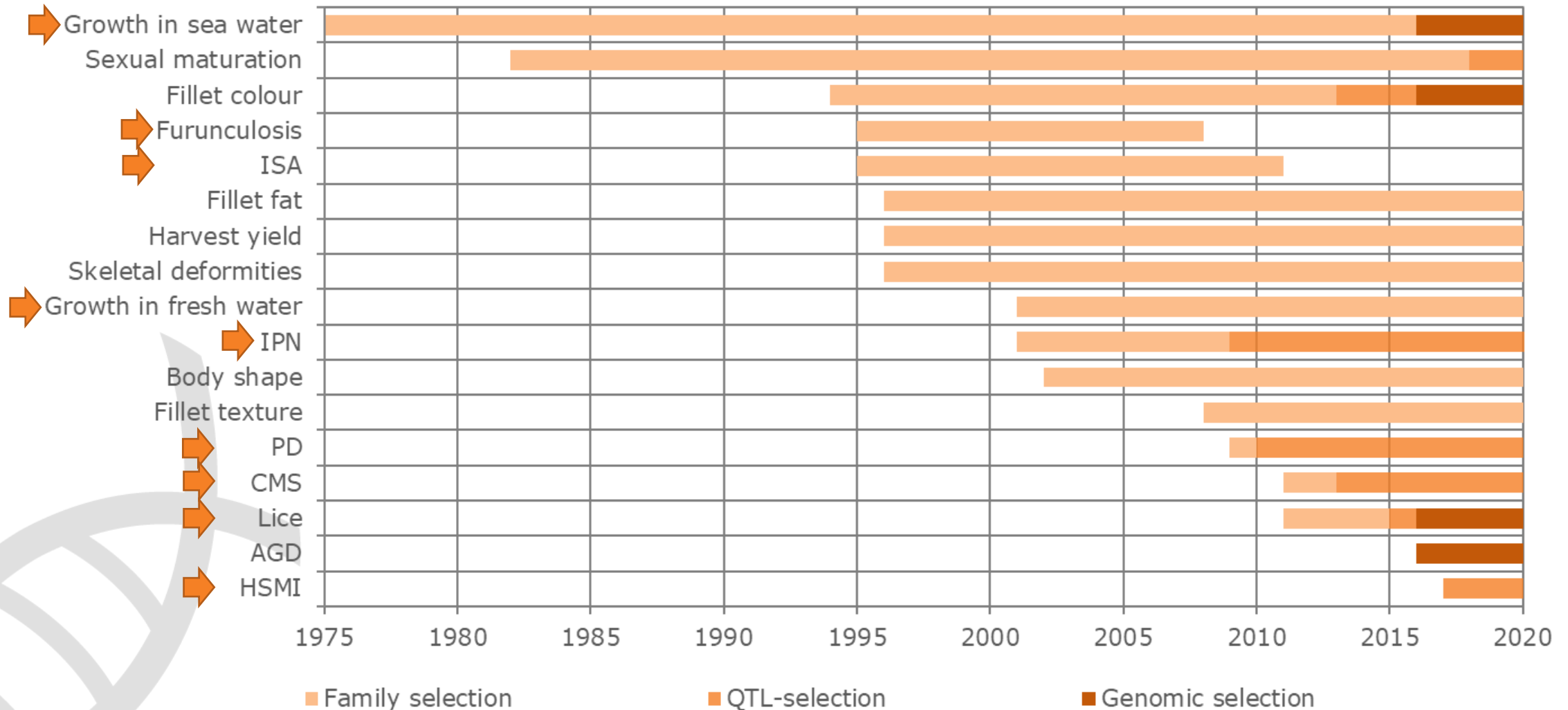


AquaGen

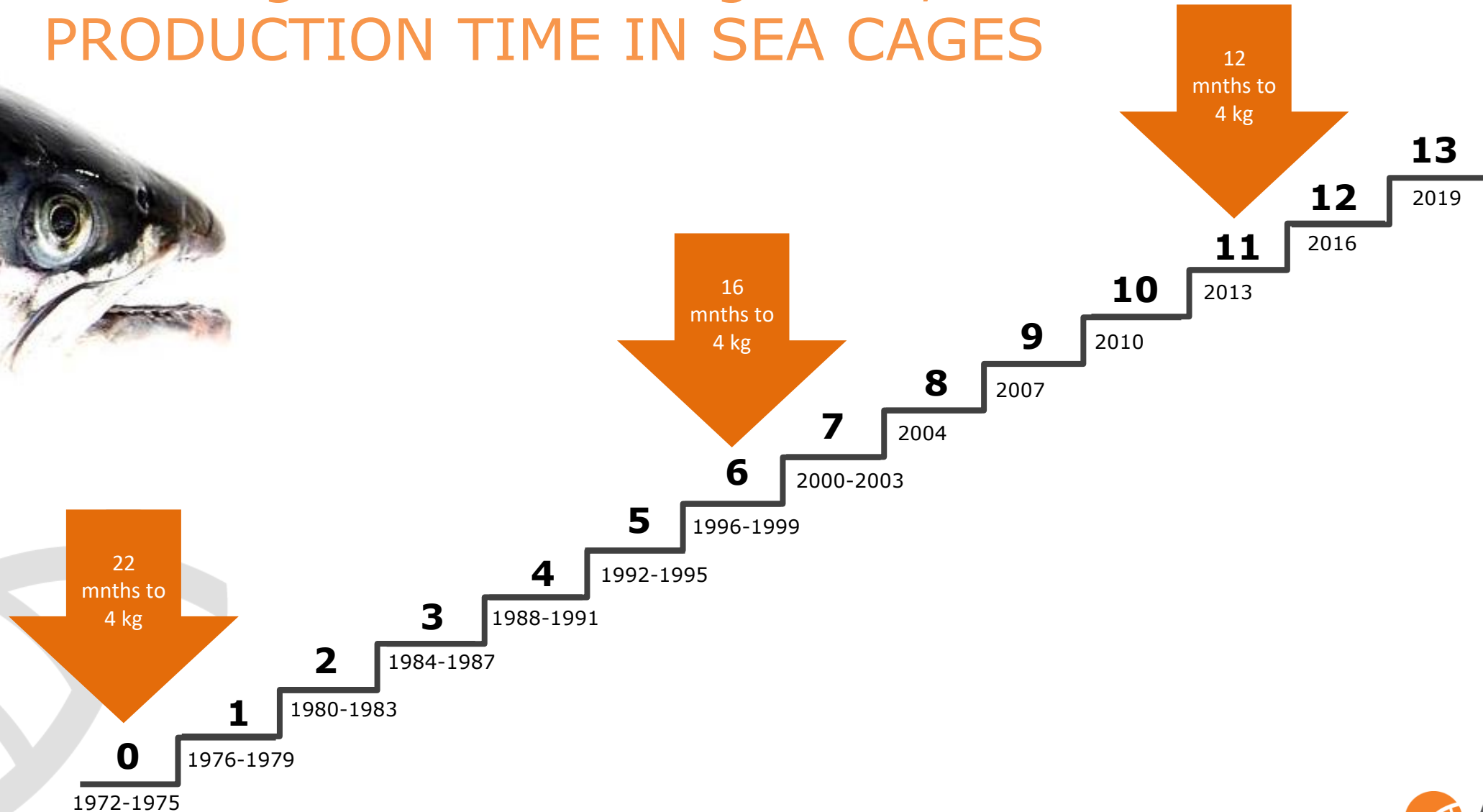
- develops, produces and delivers genetic material to the global aquaculture industry.
- has breeding programmes for Atlantic salmon, rainbow trout, Pacific salmon (Coho) and lumpfish.
- delivers fertilised eggs from production facilities in Norway, Scotland and Chile to customers in many countries.

This year it is 50 years since collection of salmon and rainbow trout from 40 Norwegian rivers started.

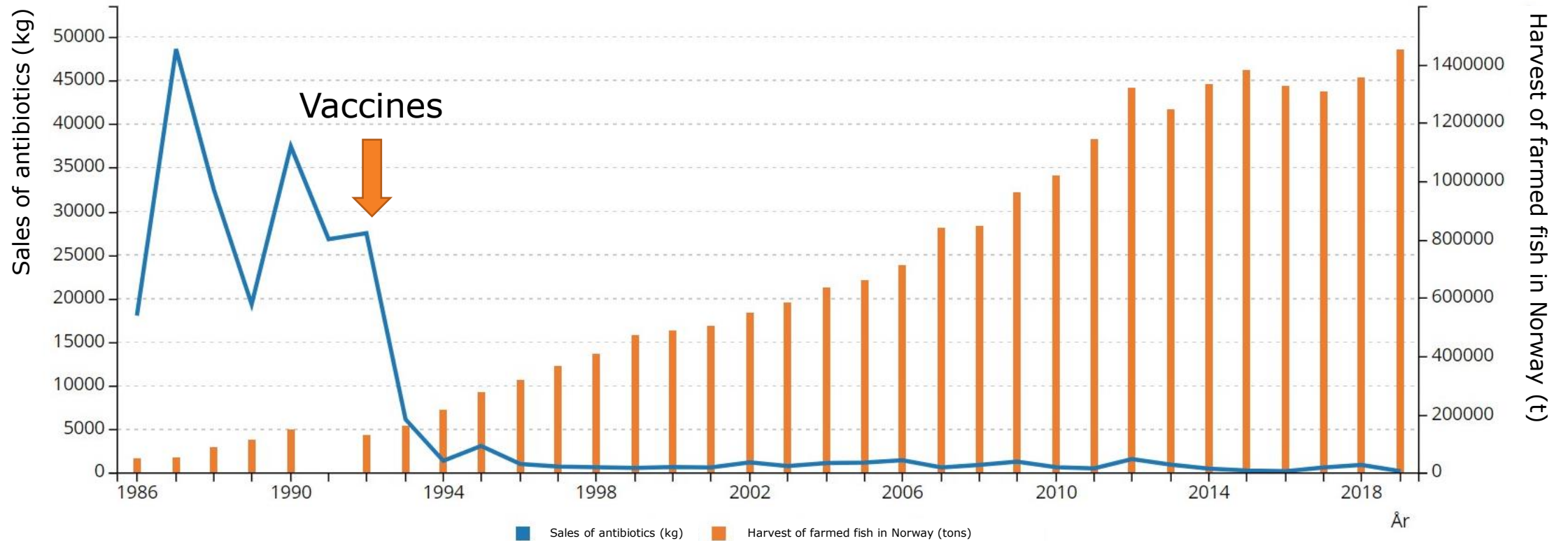
Main traits in AquaGen's salmon breeding program



Breeding for increased growth; PRODUCTION TIME IN SEA CAGES

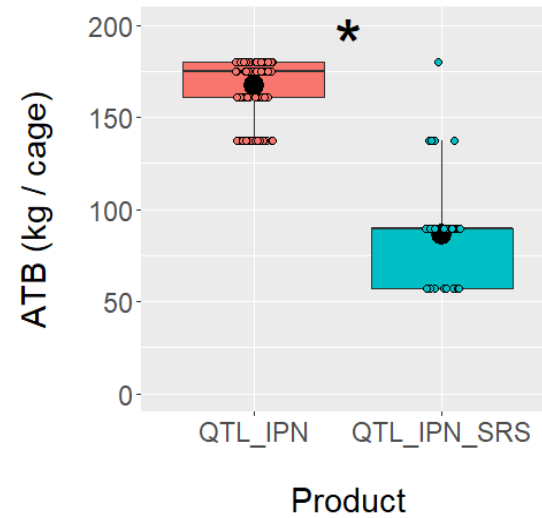


Fish production and antibiotics usage in Norway



Bacterial diseases in other countries

- SRS in Chile:



- Flavo in UK:



Salmon health and welfare

- Top 10 issues affecting survival and welfare in Norwegian salmon farms:

Lice

Virus

Lice

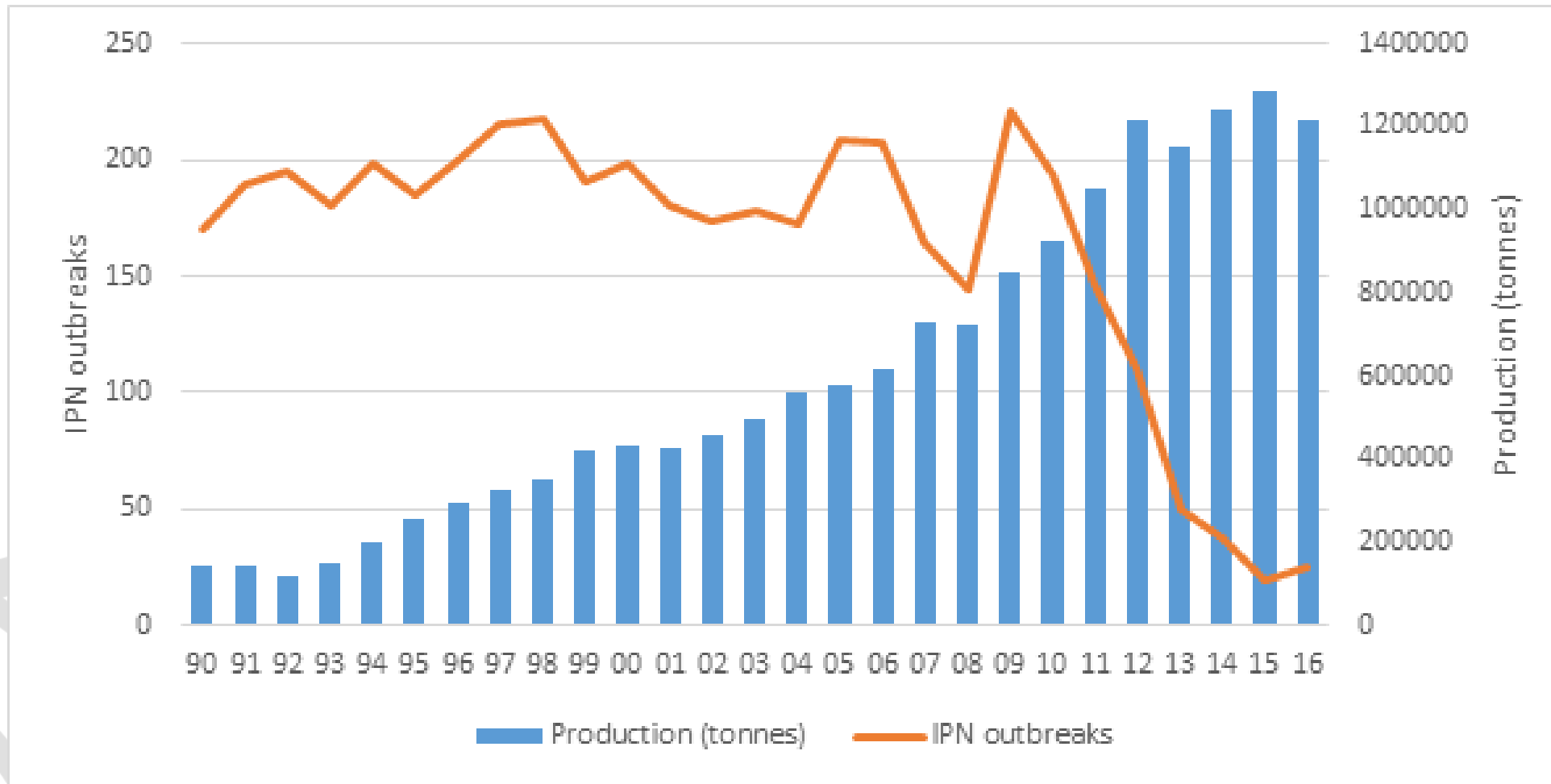
Virus

Virus

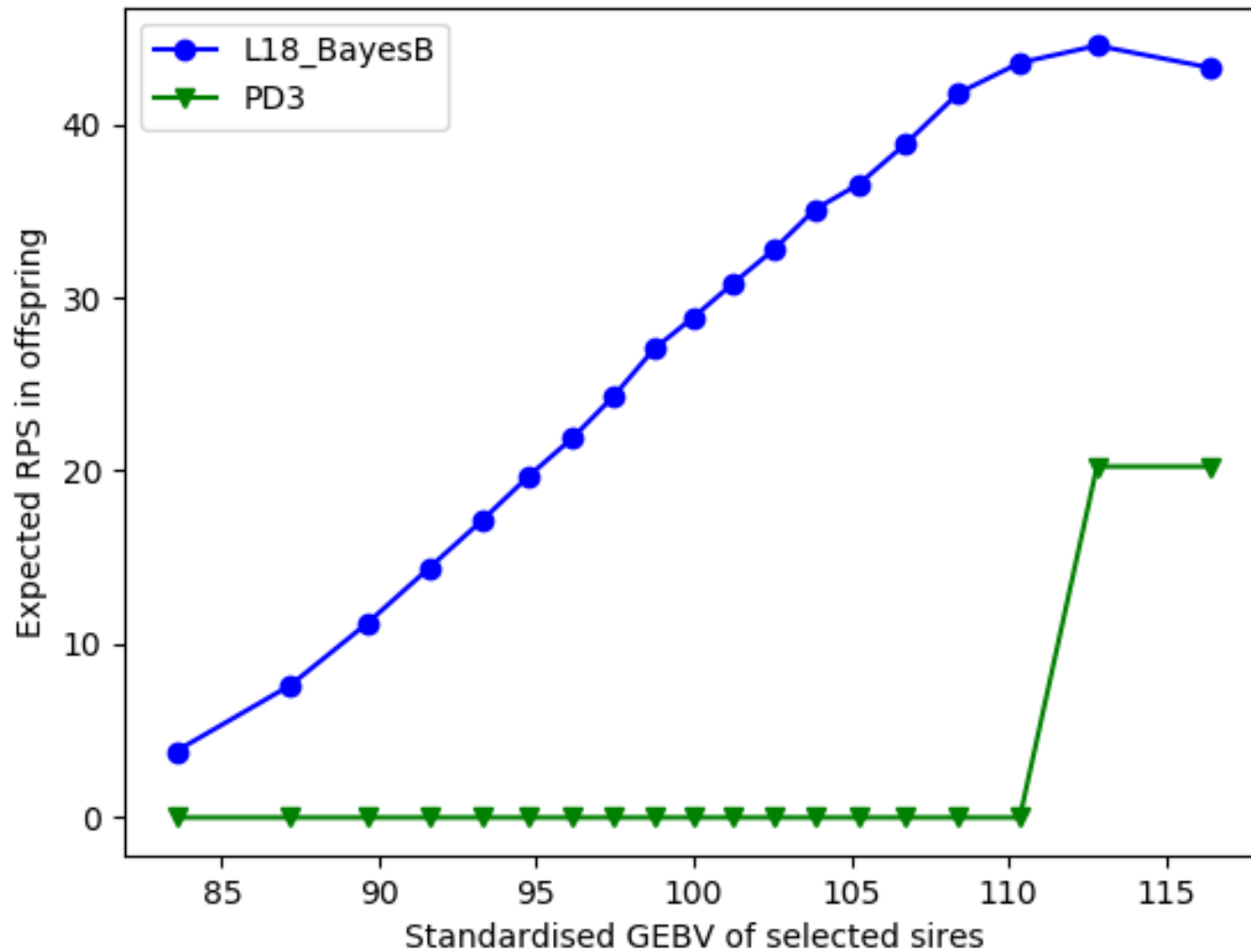
- Handling due to de-licing procedures
- Cardiomyopathy syndrome (CMS)
- Gill diseases (complex/ multi-factorial cause)
- Salmon lice
- Pancreas disease (PD)
- Heart and skeletal muscular inflammation (HSMI)*
- Winter ulcers
- Nephrocalcinosis
- Problems with seawater adaptation

Source: Norwegian Veterinary Institute Fish health report 2019. * Omitted from survey by accident, so ranking is estimated

Breeding for viral disease resistance (IPN)



Breeding for viral disease resistance (PD)



Conclusions

- AquaGen has breeding programs for several species; selects for growth, disease resistance and fillet quality
- Antibiotics usage is not a problem in Norwegian fish farming
- Selective breeding is strong tool against salmonid diseases, whether bacterial, viral or parasitic
- A lot to gain from selective breeding for salmonid health and welfare