

GENAEUS –

Genetic broodstock characterisation for pedigree management in whiteleg shrimp *Penaeus vannamei*

HAVE YOUR SHRIMP GENOTYPED FOR SUSTAINABLE
STOCK MANAGEMENT!

EuroShrimp AE2022 Rimini
Vincent Vermeylen



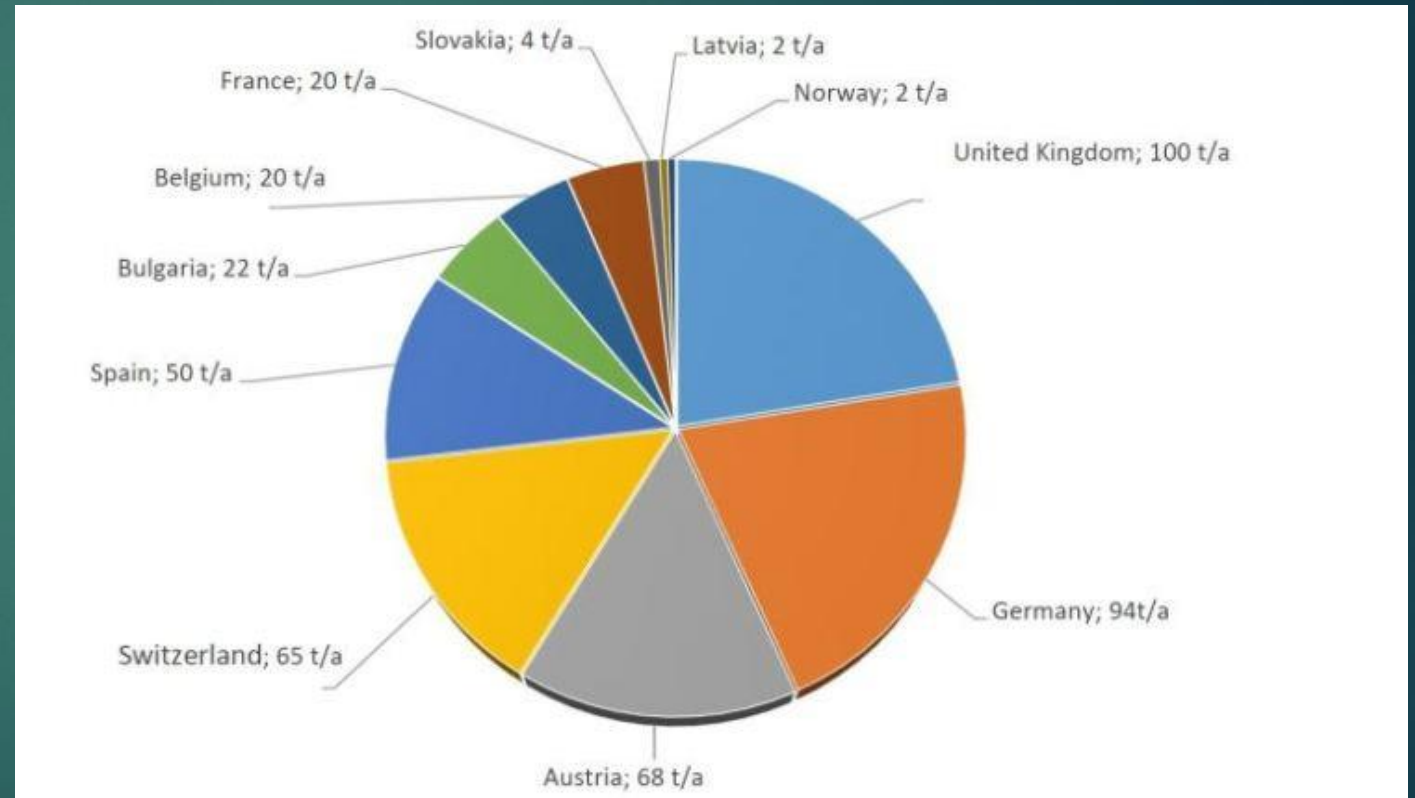
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European shrimp production

- ▶ 450 tonnes in 2020
 - ▶ 25 farms
 - ▶ 13 countries



<https://www.euroshrimp.net/>

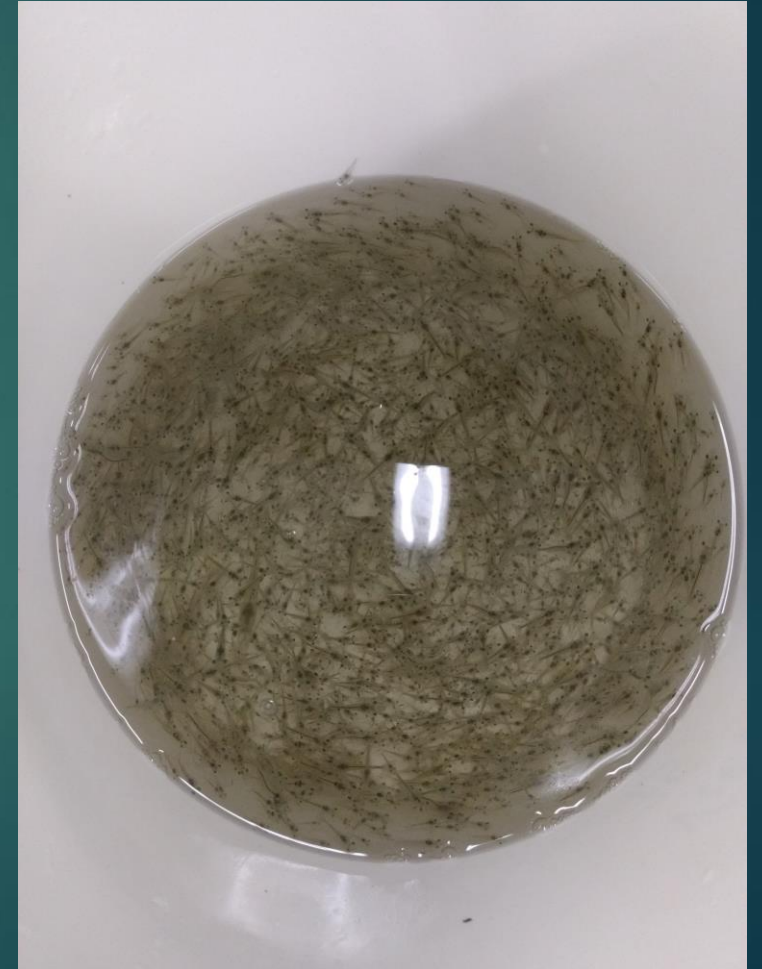
European shrimp production

- ▶ 450 tonnes in 2020
 - 25 farms
 - 13 countries
- ▶ Land-based systems
- ▶ Whiteleg shrimp *Penaeus vannamei*
- ▶ European demand: 600 000 tons



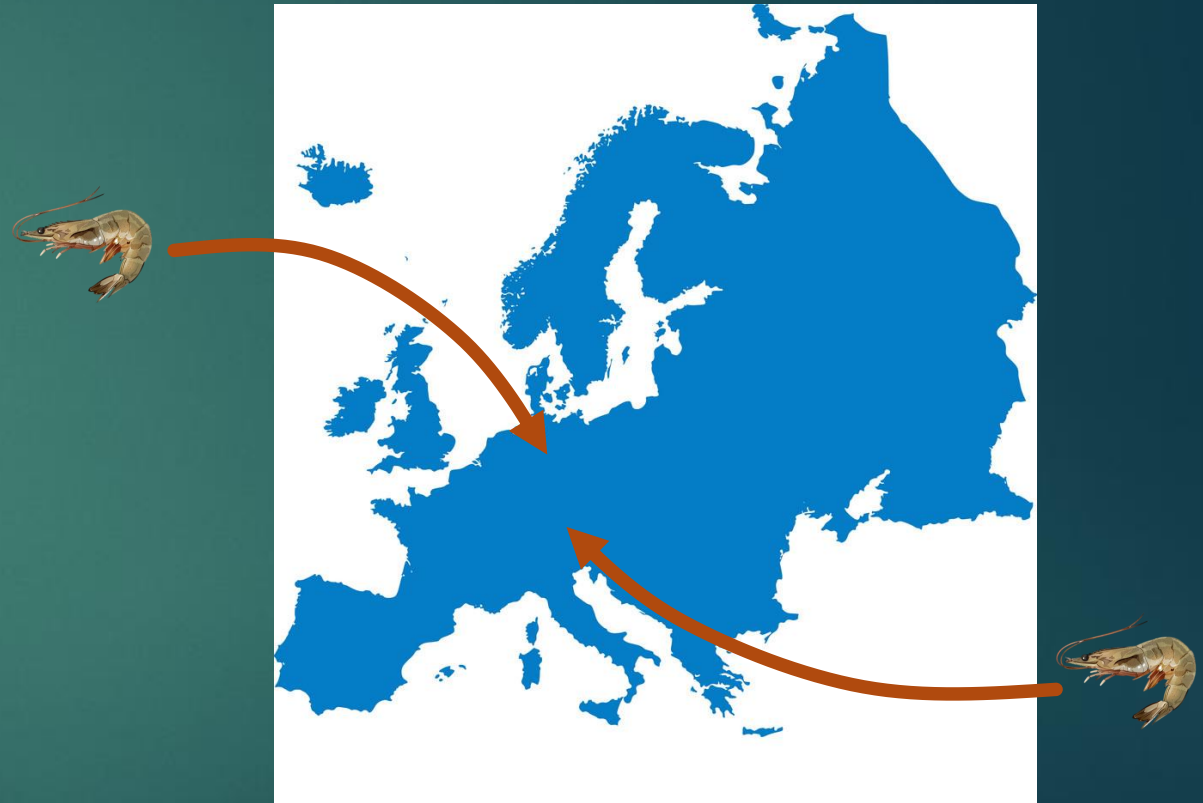
European shrimp production

- ▶ Supply of postlarvae (PLs)
 - Few commercial hatchery initiatives



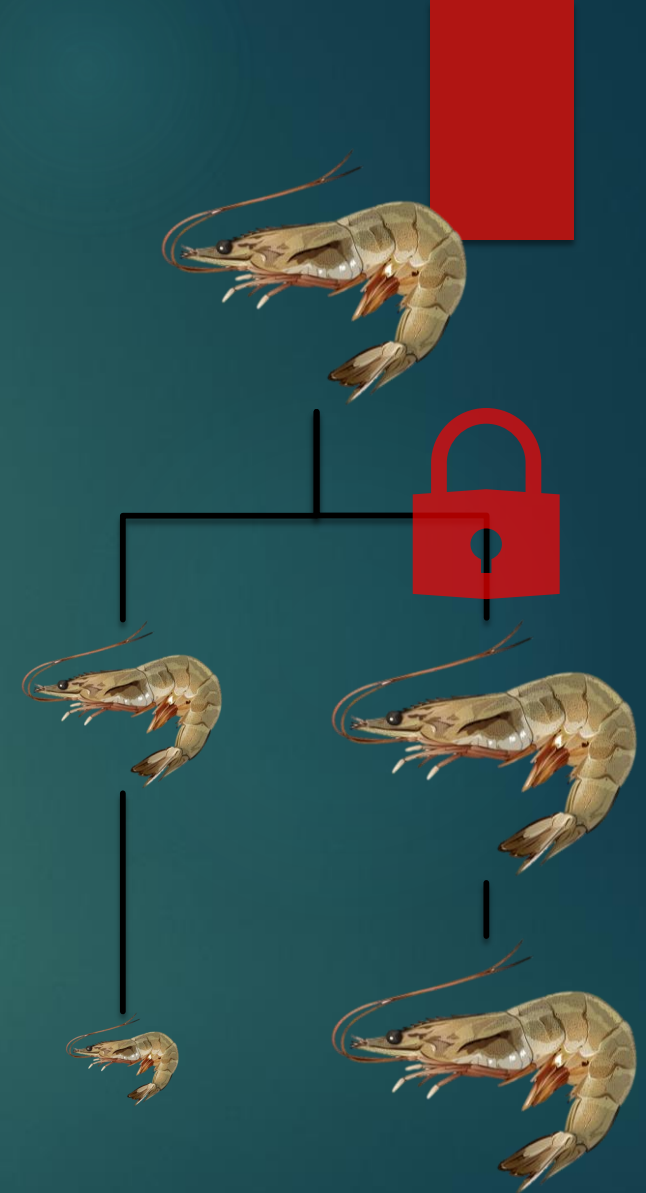
European shrimp production

- ▶ Supply of postlarvae (PLs)
 - Few hatchery initiatives
 - Import from outside Europe
 - Domestic reproduction
 - Shrimp breeding!



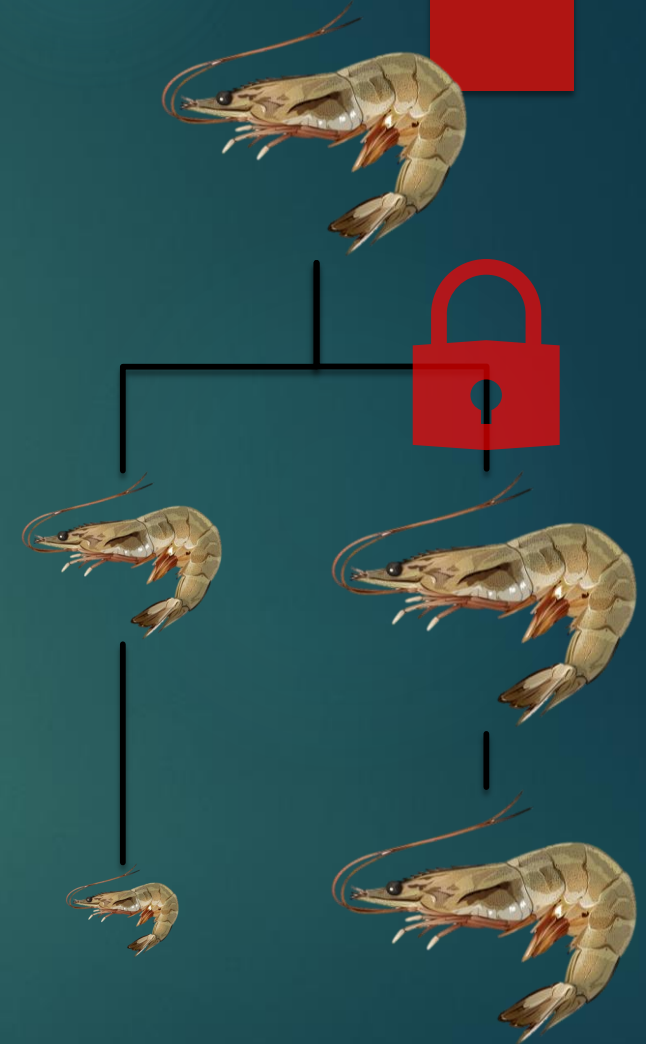
European shrimp breeding

- ▶ Shrimp breeding programs
- ▶ Narrow genetic background?
 - ▶ Selection
 - Inbreeding
 - Breeder lock!
- ▶ Scientific management
 - ▶ How to keep preferred traits?



European shrimp breeding

- ▶ Selection process:
 - ▶ Focus on phenotypic traits
 - ▶ Ignoring genetic diversity
 - ▶ Reduced survival
 - ▶ Reduced growth
 - ▶ Enhanced disease incidence.



Shrimp breeding management

- ▶ Screening genetic diversity (now undocumented)
- ▶ High-throughput methods for genotyping

→ The GENAEUS project

Genaeus – aims

- ▶ Characterize the genetic diversity
- ▶ Characterize the level of inbreeding of *P. vannamei* in European stocks
- ▶ Contribute to sustainable shrimp farming
 - ▶ Traceability
 - ▶ Guidance on selection
- ▶ End users: shrimp breeders producing for market, testing facilities and consultants

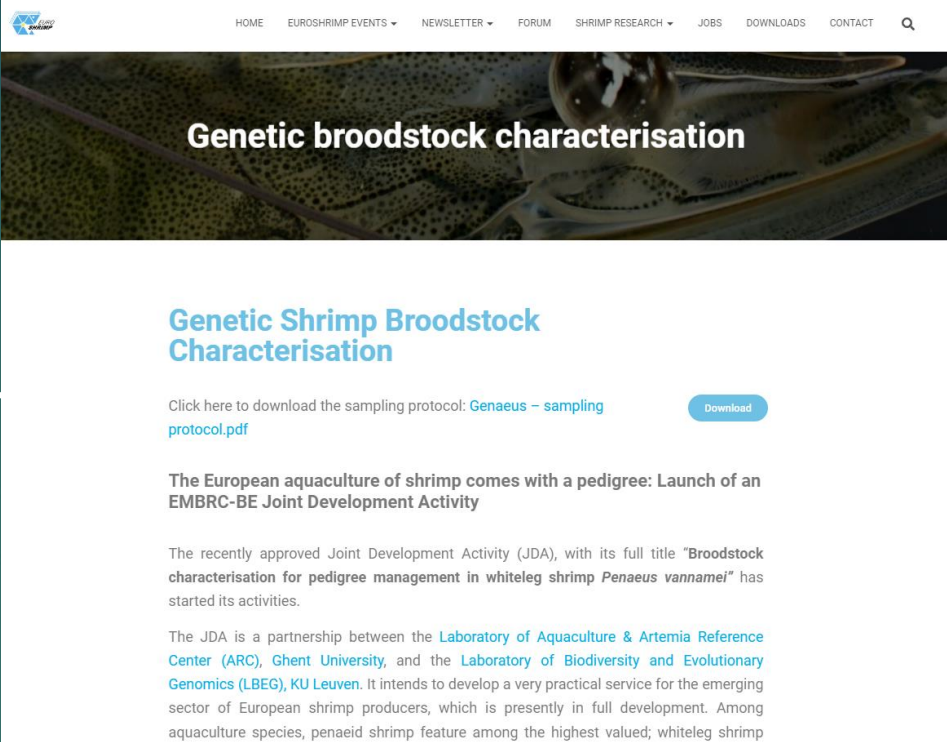


Genaeus – beyond

- ▶ Decrease the reliance on PL import
- ▶ Increase survival and growth performance
 - ▶ enhance robustness of shrimp against diseases
- ▶ Relevant service for hatchery initiatives and shrimp producers

Data collection

- ▶ Samples from European farm population
 - ▶ Different batches, generations, broodstock
- ▶ Some already sent samples
 - ▶ Need more!
 - ▶ **We encourage you to contribute**



The screenshot shows a website header with navigation links: HOME, EUROSHRIMP EVENTS, NEWSLETTER, FORUM, SHRIMP RESEARCH, JOBS, DOWNLOADS, CONTACT, and a search icon. The main heading is "Genetic broodstock characterisation". Below it, there is a sub-heading "Genetic Shrimp Broodstock Characterisation" and a link to download a sampling protocol: "Click here to download the sampling protocol: [Genaeus – sampling protocol.pdf](#)". A "Download" button is also present. The text below describes the launch of an EMBRC-BE Joint Development Activity for pedigree management in whiteleg shrimp *Penaeus vannamei*, mentioning a partnership between the Laboratory of Aquaculture & Artemia Reference Center (ARC) at Ghent University and the Laboratory of Biodiversity and Evolutionary Genomics (LBEG) at KU Leuven.



Sampling

- ▶ Protocol available online
- ▶ Sample multiple generations, families, shipments
- ▶ Deadline: end of November
- ▶ Materials and transport are free of charge

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Genetic broodstock characterisation

Genetic Shrimp Broodstock Characterisation

Click here to download the sampling protocol: [Genaeus – sampling protocol.pdf](#) [Download](#)

The European aquaculture of shrimp comes with a pedigree: Launch of an EMBRC-BE Joint Development Activity

The recently approved Joint Development Activity (JDA), with its full title "Broodstock characterisation for pedigree management in whiteleg shrimp *Penaeus vannamei*" has started its activities

Genaeus – Invitation to contribute samples

KU LEUVEN **UNIVERSITEIT GENT** **EMBRC EUROPEAN MARINE BIOLOGICAL RESOURCE CENTRE**

GENETIC BROODSTOCK CHARACTERISATION FOR PEDIGREE MANAGEMENT IN WHITELEG SHRIMP - GENAEUS

SAMPLING PROTOCOL

MATERIALS

1. Sampling box and kit [we can ship if necessary]
2. Cryotubes of 1.5 ml (with screw cap) [we can ship if necessary]
3. Surgical scissors and tweezers
4. Analytical grade (pro analysis) ethanol 95% (absolutely don't use technical grade ethanol)
5. Ruler (up to 1 mm) and balance (up to 1 g)
6. Gloves

SAMPLES

1. Collect preferably live/freshly caught shrimp. Frozen animals are also possible if sampled correctly and kept at -20°C at all times.
2. The aim is to sample if possible 3 different groups (batches/shipments/families)
3. A representative sample from a group consists of either 30 individual postlarvae or (up to) 30 broodstock (in which case the second pleopod is sampled).
4. Particularly interesting are groups of related animals (for example two parents and 20 of their progeny).
5. **Shrimp need to be sampled individually and stored in separate vials; do not pool shrimp!**
6. Make use of the sampling sheet attached to document the samples.

What is in it for you?

- ▶ Feedback on genetic background of your animals
 - ▶ Family structure
 - ▶ Origin
 - ▶ Genetic differences within and between
 - ▶ Batches of same origin
 - ▶ Batches of different origin
 - ▶ Generations
 - ▶ ...
- ▶ Guaranteed confidentiality on individual farms
- ▶ Link with issues?
 - ▶ Husbandry is perfect
 - ▶ Transport was perfect
 - ▶ Handling and feeding is finetuned
 - ▶ *“something wrong with this batch?”*

Take home message

Have your shrimp genotyped for sustainable broodstock management!

Genaeus - contacts

- ▶ Lab of Aquaculture & Artemia Reference Center (ARC) from Ghent University, Belgium → <https://www.aquaculture.ugent.be>
 - ▶ Vincent Vermeylen → vincent.vermeylen@ugent.be
 - ▶ Prof. Dr. Ir. Peter Bossier → peter.bossier@ugent.be

- ▶ Lab of Biodiversity and Evolutionary Genomics (LBEG) from Leuven University → <https://bio.kuleuven.be/eeb/lbeg>
 - ▶ Prof. Dr. Filip Volckaert → filip.volckaert@kuleuven.be

