

Potential of crustacean production in RAS in Pomerania

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CROSS-BORDER DEVELOPMENT AND TRANSFER OF **INNOVATIVE** AND SUSTAINABLE
AQUACULTURE TECHNOLOGIES IN THE SOUTH BALTIC AREA (INNOAQUATECH)

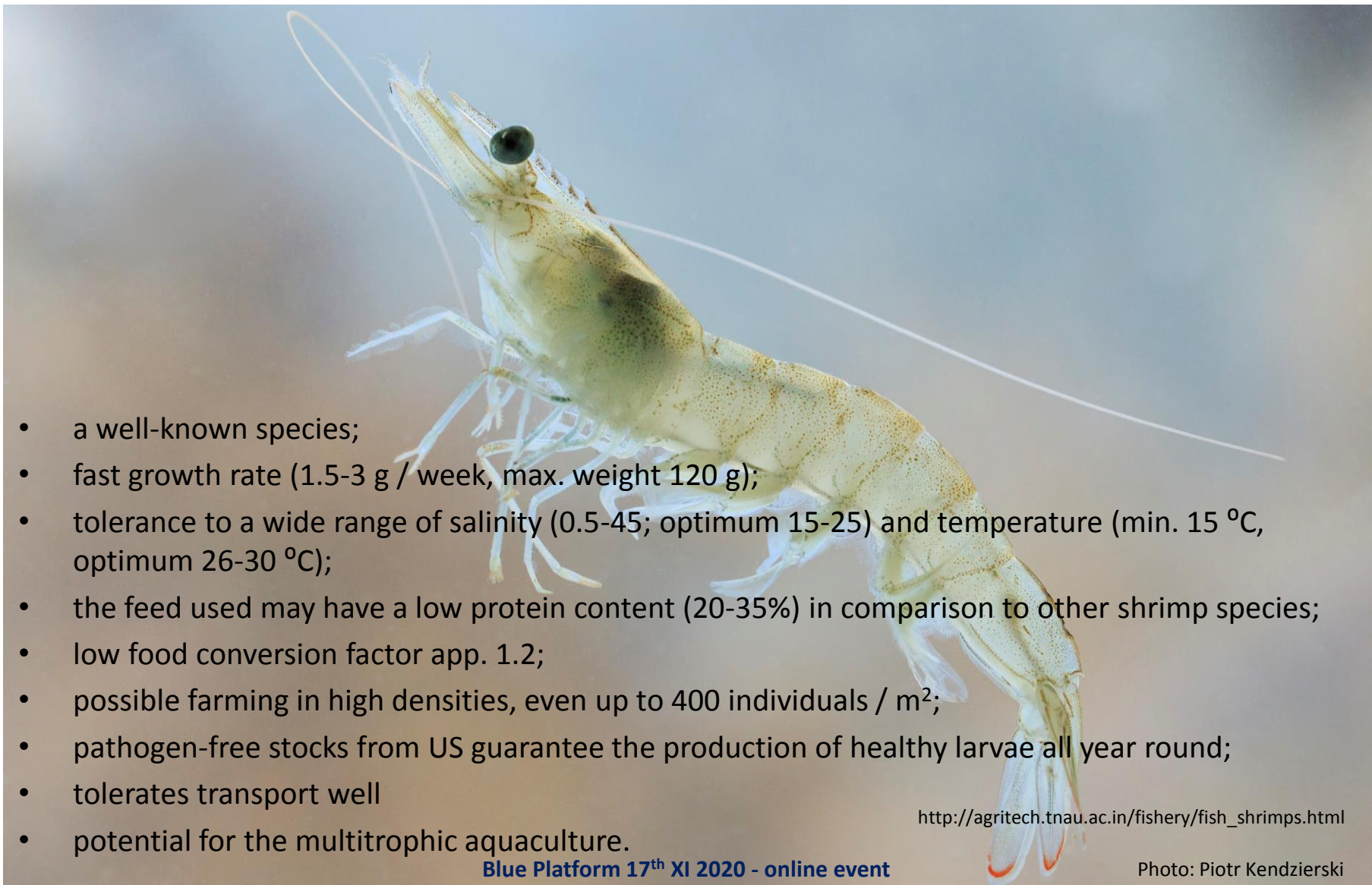
Demonstrating the sustainability and raising awareness for the possibility of crustacean production in RAS systems in Pomerania, Poland

Laboratory study - Growth and nutritional value of *Litopenaeus vannamei* from the small-scale laboratory culture



(LITO)PENAEUS VANNAMEI – WHITE-LEG SHRIMP

Blue Platform

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- a well-known species;
 - fast growth rate (1.5-3 g / week, max. weight 120 g);
 - tolerance to a wide range of salinity (0.5-45; optimum 15-25) and temperature (min. 15 °C, optimum 26-30 °C);
 - the feed used may have a low protein content (20-35%) in comparison to other shrimp species;
 - low food conversion factor app. 1.2;
 - possible farming in high densities, even up to 400 individuals / m²;
 - pathogen-free stocks from US guarantee the production of healthy larvae all year round;
 - tolerates transport well
 - potential for the multitrophic aquaculture.

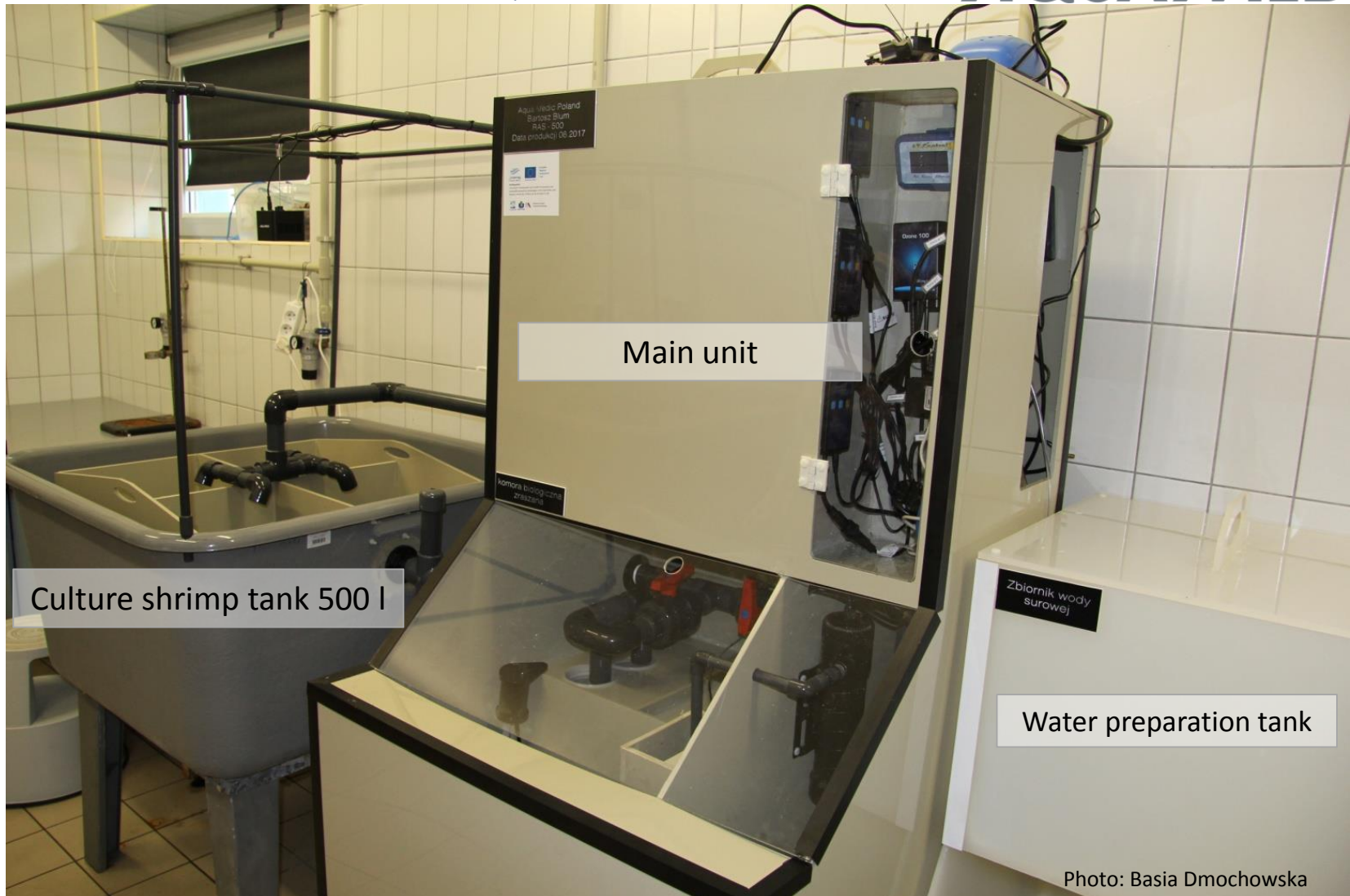
http://agritech.tnau.ac.in/fishery/fish_shrimps.html

SHRIMPS CULTIVATION CLOSED SYSTEM - RAS-500

Blue Platform

500 L RECIRCULATING AQUACULTURE SYSTEM

AQUAMEDIC



Main unit

Culture shrimp tank 500 l

Water preparation tank

THE FIRST EXPERIMENTAL SHRIMP FARM IN POLAND

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- post-larval stages shrimp (imported from the USA), SPF (*specific pathogen free*),
- ~ 500 per tank,
- temperature: 25 °C,
- salinity: 29 (Tropic Marin® ZooMix Sea Salt with high content of calcium and magnesium),
- light : dark phase 14 h: 10 h,
- food: Gemma Diamond 0.8-1.5 mm (Scretting, Norway) / CreveTec PL 1000 (Creve Tec, Belgium),
- feeding frequency: 6 times a day,
- control of water parameters (NH_4^+ , NO_2^- , NO_3^- , PO_4^{3-} , SiO_2 , pH, T, ρ , Red-Ox).

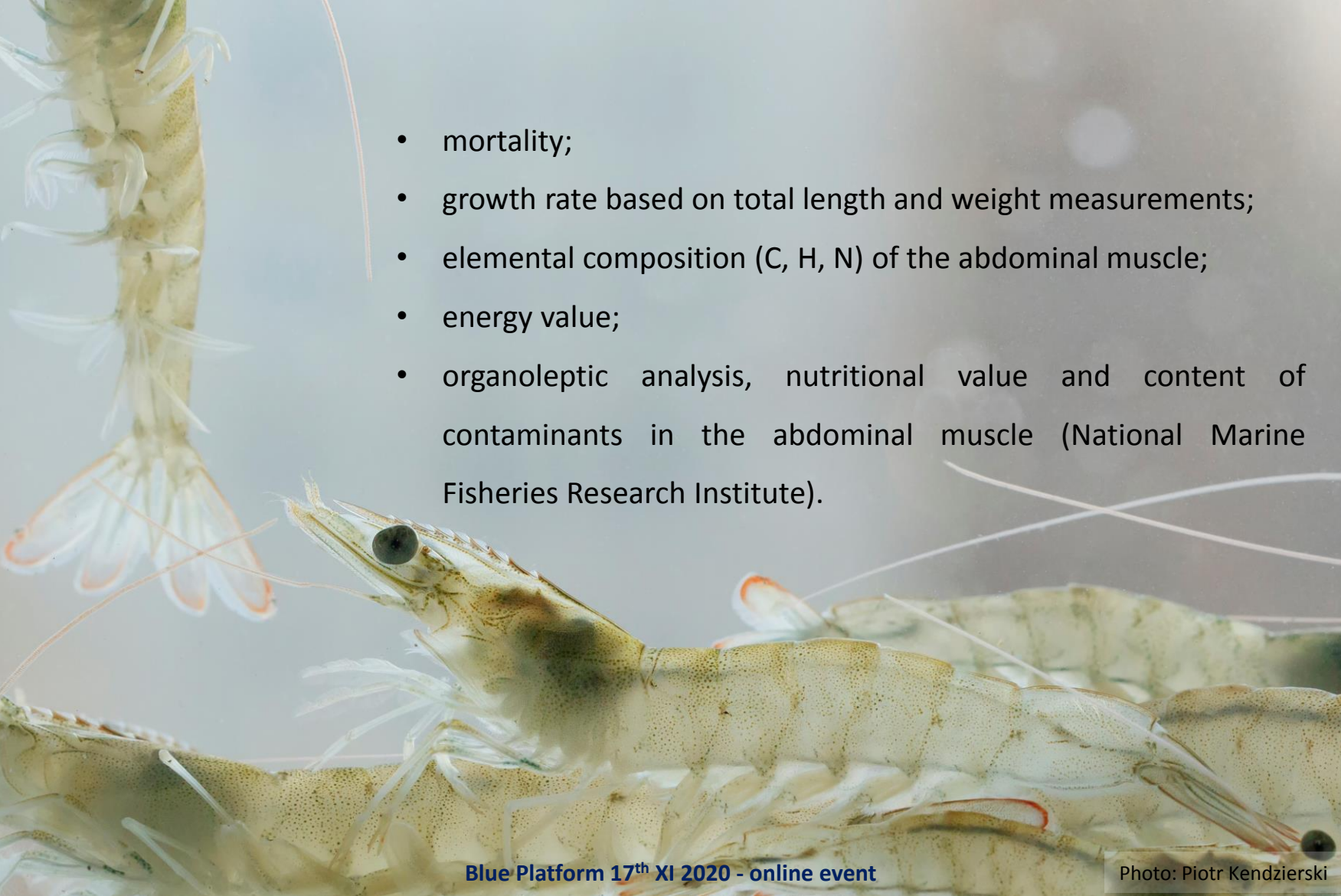


Photos: Basia Dmochowska



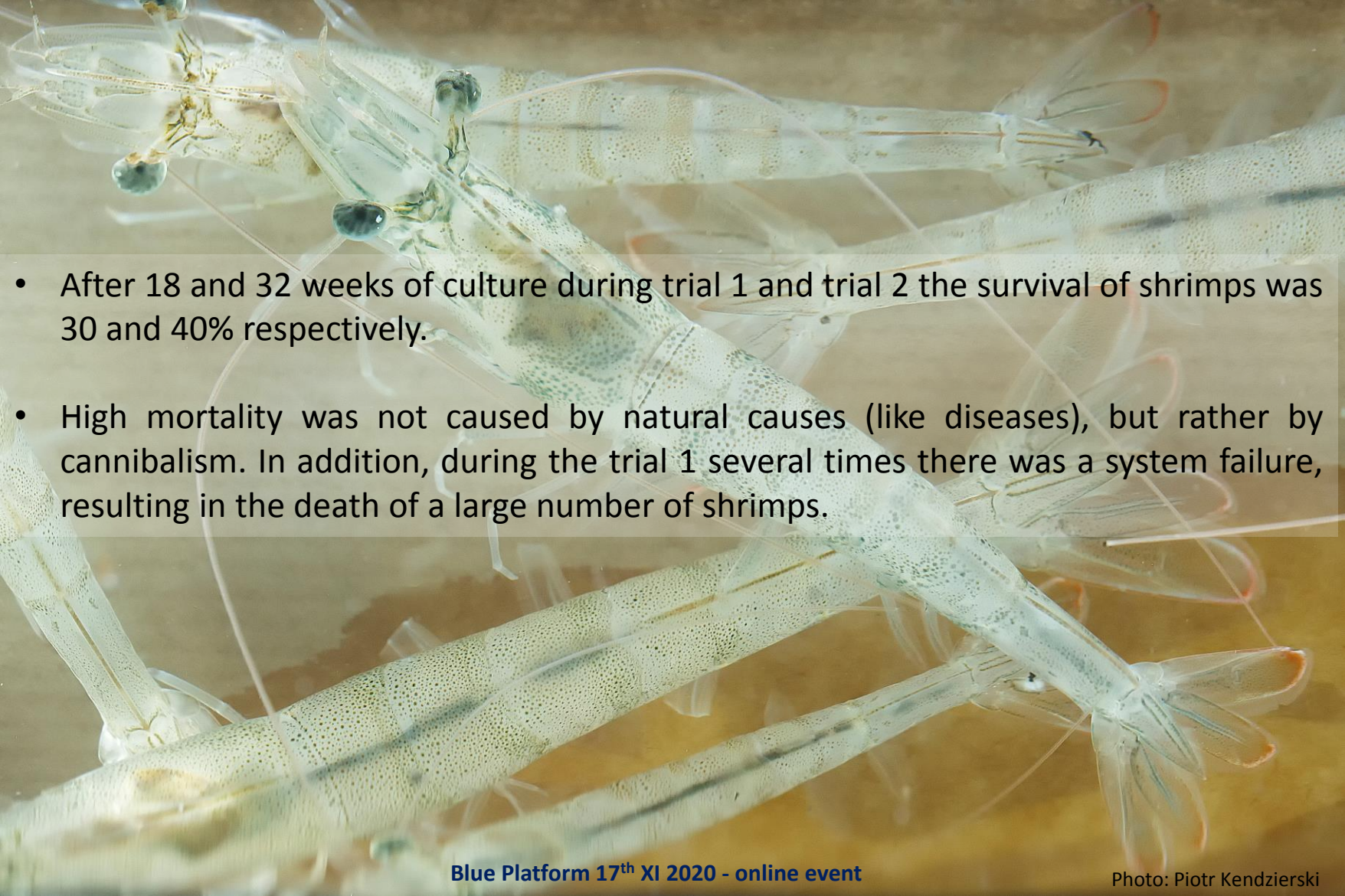
THE FIRST EXPERIMENTAL SHRIMP FARM IN POLAND

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- mortality;
 - growth rate based on total length and weight measurements;
 - elemental composition (C, H, N) of the abdominal muscle;
 - energy value;
 - organoleptic analysis, nutritional value and content of contaminants in the abdominal muscle (National Marine Fisheries Research Institute).

RESULTS - MORTALITY

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- A close-up photograph of several translucent shrimp, likely in a laboratory setting. The shrimp are light-colored with visible internal structures and are arranged in a cluster, overlapping each other. The background is a soft, out-of-focus brownish-yellow.
- After 18 and 32 weeks of culture during trial 1 and trial 2 the survival of shrimps was 30 and 40% respectively.
 - High mortality was not caused by natural causes (like diseases), but rather by cannibalism. In addition, during the trial 1 several times there was a system failure, resulting in the death of a large number of shrimps.

RESULTS - GROWTH RATE AND WEIGHT GAIN OF SHRIMPS

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TRIAL 1

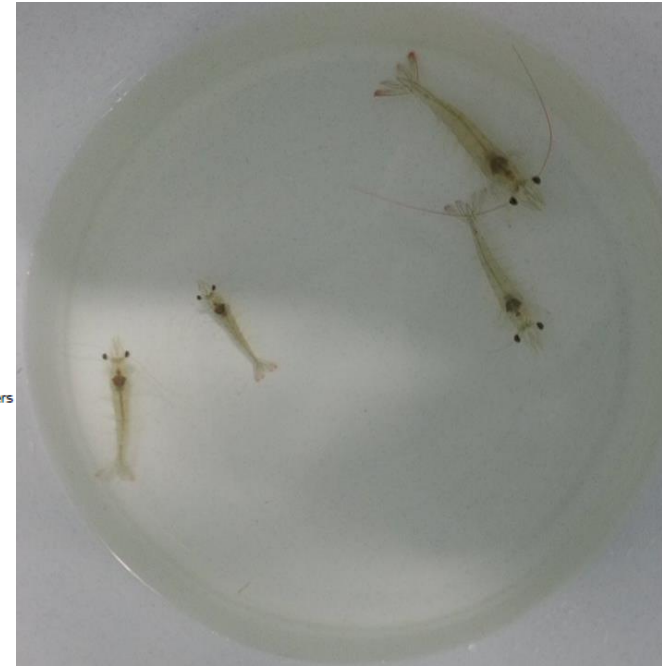
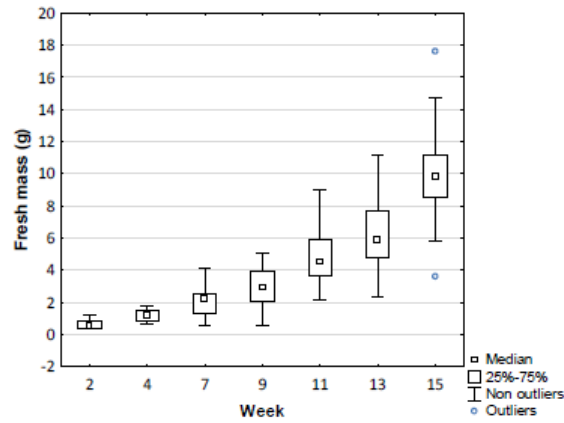
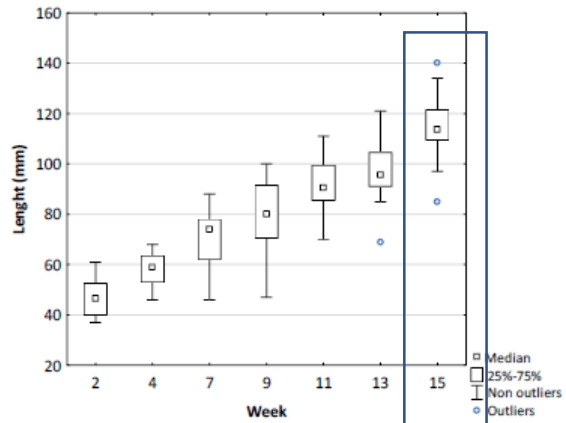
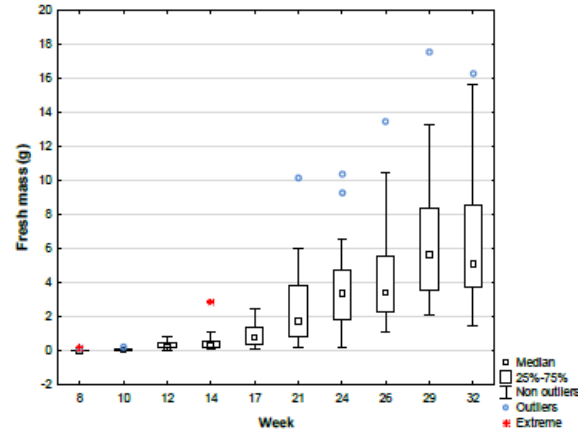
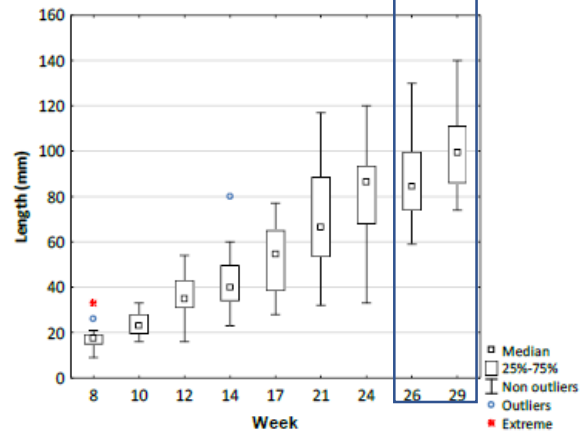


Photo: Patrycja Nowakowska

TRIAL 2



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RESULTS - GROWTH RATE AND WEIGHT GAIN OF SHRIMPS

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TRIAL 1

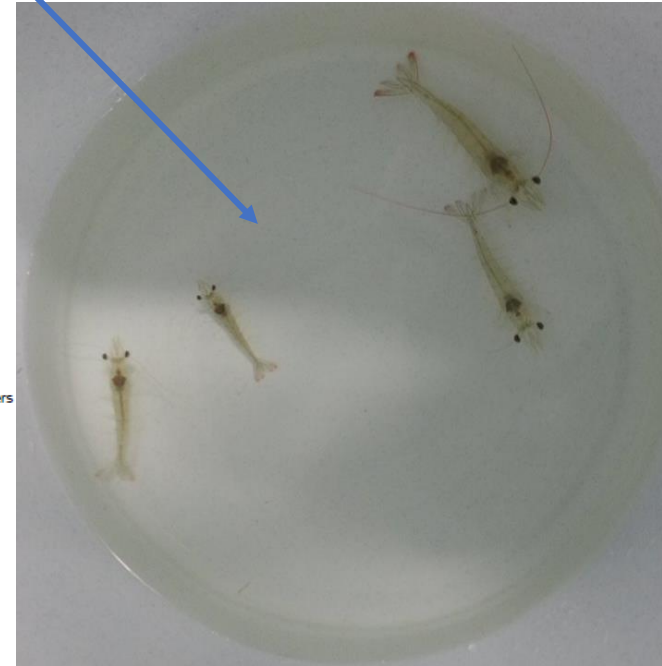
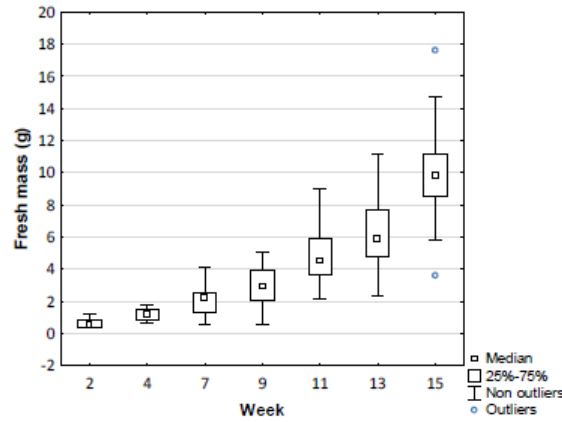
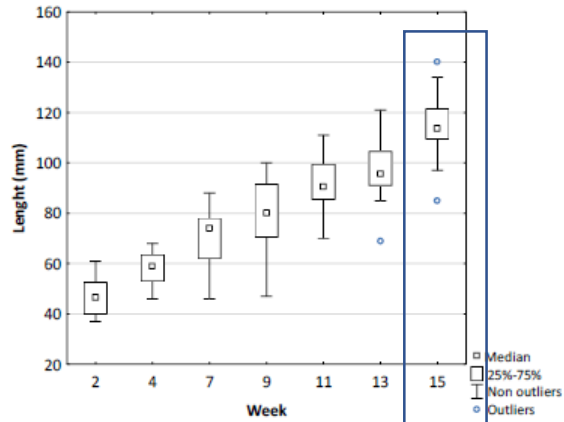
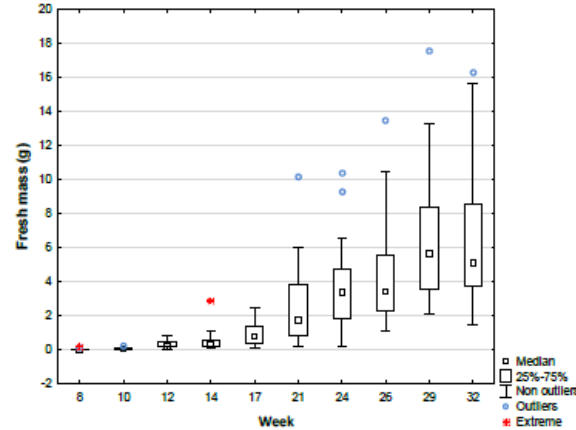
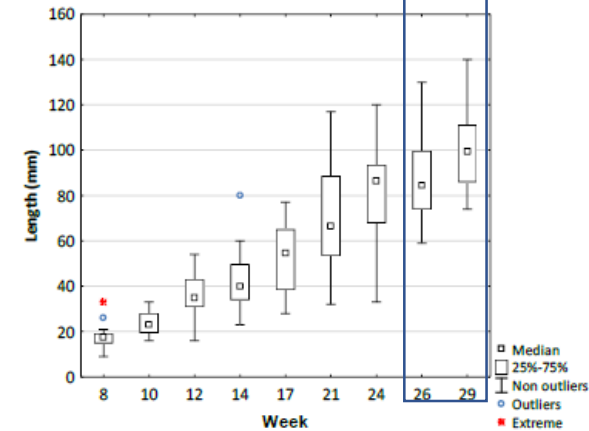


Photo: Patrycja Nowakowska

TRIAL 2



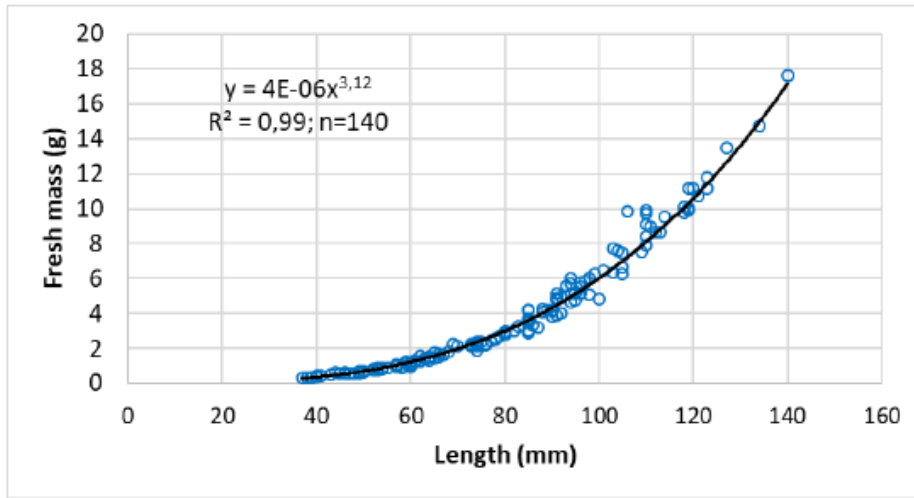
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RESULTS - THE LENGTH-FRESH MASS RELATIONSHIPS

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TRIAL 1



TRIAL 2

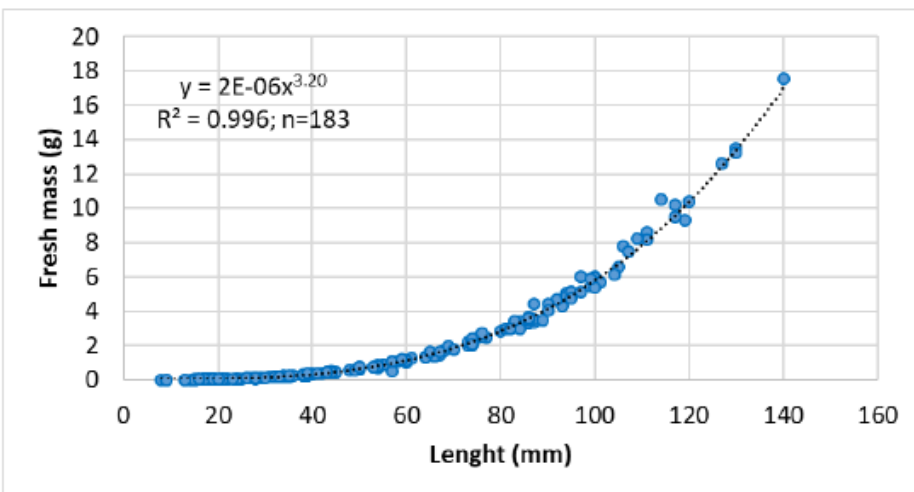


Photo: Halina Kendzierska

THE FIRST EXPERIMENTAL OF WHITELEG SHRIMP CULTIVATION IN POLAND - CONCLUSIONS

- The attempt to cultivate whiteleg shrimps (*Litopenaeus vannamei*) under experimental conditions in recirculating aquaculture system (RAS) from post-larval stages to the commercial size specimens was successful: in both trials shrimps survived transport, acclimation period to laboratory conditions and reached commercial size.
- The organoleptic analysis showed that the shrimps from the experimental RAS culture achieved good quality indicators.
- The analysis of elemental composition showed that the shrimps from the recirculating aquaculture system were characterized by higher level of EPA and DHA than the shrimps available on the market, allowing the placement of a nutritional health claim on a product.
- Detailed conclusions on technology, species, process of farming and market are included in individual chapters of report.

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Technical report

Deliverable 5.2

Evaluation of potential of crustacean production in RAS in Pomerania

University of Gdańsk

National Marine Fisheries Research Institute