

InnoAquaTech

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RAS 500 – a small scale laboratory system for shrimp cultivation at the Institute of Oceanography, University of Gdansk

In June 2017 a small scale RAS laboratory system for shrimp cultivation was installed at the laboratory of the Institute of Oceanography, University of Gdansk, for the purpose of the InnoAquaTech project pilot 2 – “Farming shrimp in Poland: Increasing the potential of recirculating aquaculture systems”.

Purpose of the RAS 500 system

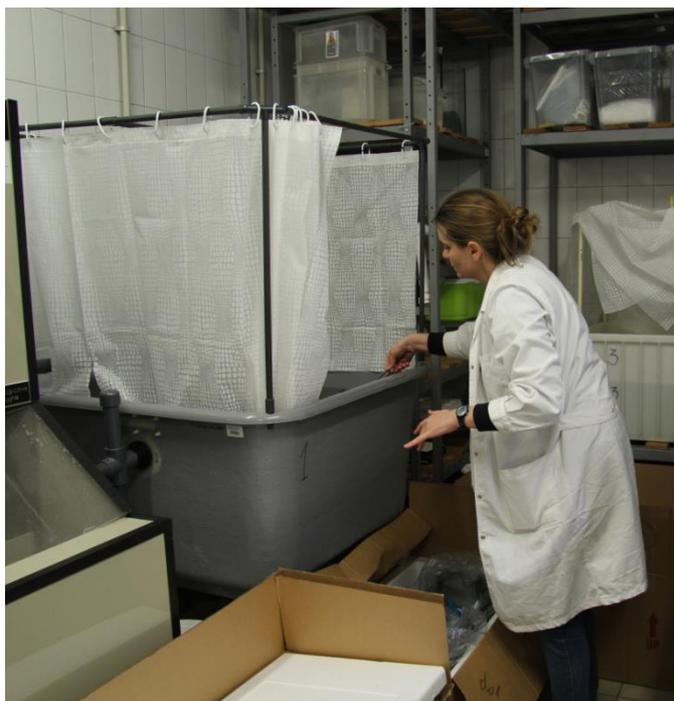
The RAS 500 has been specifically designed and installed by AquaMedic Poland Bartosz Blum for the cultivation of whiteleg shrimps in a closed recirculating system with a total water capacity of 500-1000 l. The main purpose is to conduct experiments which will determine how different factors in various combinations effect survival rates, basic physiological processes, protein content and weight gain of pacific white shrimps (*Litopenaeus vannamei*). Simultaneously data for recommendations on facility designs and shrimp cultivation will be collected and processed.

Since November 2017 young shrimp from Florida are swimming and growing in this laboratory and the first trials are ready to begin.



Transport box of *Litopenaeus vannamei*, at the Institute of Oceanography laboratory UG (left), and shrimps six days after the arrival in one of the tanks (right), photo Monika Normant-Saremba

Now the team working in the project is focused on the first trial: Growth and nutritional value of *Litopenaeus vannamei* cultivated on commercial diet.



InnoAquaTech team member Halina Kendzierska (left) and Monika Normant-Saremba (right) working on shrimps transport into the RAS system, photo Monika Normant-Saremba

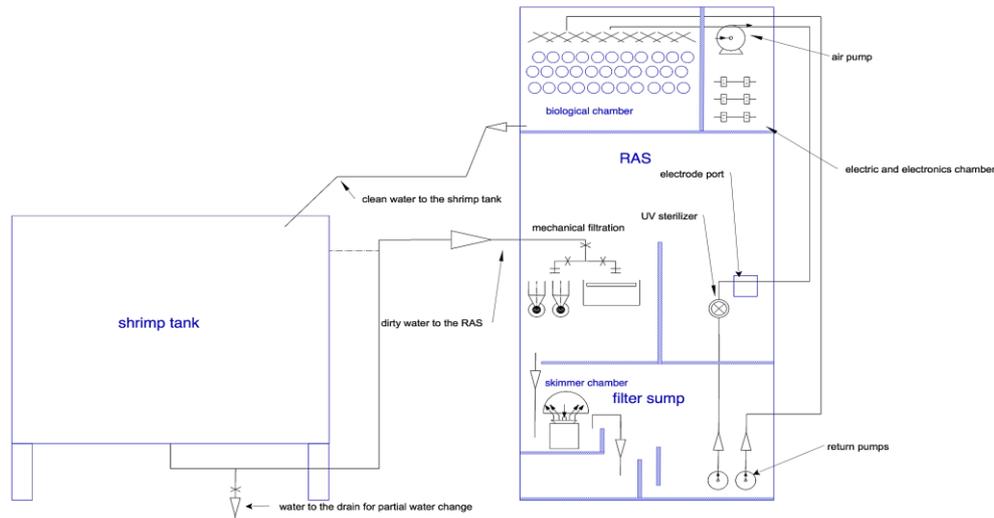
System design



RAS 500 – system design

RAS 500 consists of 3 separate tanks: water reservoir, treatment unit (containing: electric cabinet, electronic cabinet, mechanical filtration, protein skimmer, UV and ozone sterilization, biological chamber, heating, filter sump, aeration) and 500 l shrimp tank – source of the name “RAS 500”. In fact, there are two versions of the RAS 500, which differ in the biological filtration systems. One is using a trickling filter, the other uses a moving bed filter.

The system has been designed in a way, that evaporation of water is limited to minimum. The whole system is manufactured from corrosion and sea-water resistant materials. The advantageous utilization of gravity guarantees a very efficient water flow, that only requires one pump located in the filter sump. Parameters such as pH, redox, salinity, etc. of the circulating water are continuously monitored.



RAS 500 Water flow: Treated water flows into the shrimp tank. From the tank water flows back to the RAS sump through surface and bottom outflows. From the shrimp tank, water flows to the main unit. After mechanical cleaning of the water, the water flows to the skimmer chamber. After skimming, the water flows through the middle sump chamber. The last chamber is the main pump chamber. The pumps pump the water back to the biological chamber.

Analyses performed in this pilot:

- Mortality of shrimp (every day)
- Growth rate (based on total length and fresh weight measurements)
- Elemental composition (carbon, hydrogen and nitrogen contents)
- Calorific value (combustion calorimetry)
- Nutritional value and level of chemical contaminants

The data collected in these analysis are essential for SME service offers, such as the development of financing guidelines and the decision-support-tool for investors.

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