RAINBOW TROUT EGGS 2018

Start material with the best potential for growth, survival and fillet quality

AquaGen
seeds of vitality and profitability
AquaGen carries out several selections of broodstock at different stages before the final selection is allowed to produce eggs for the farmers. The selection process occurs both at the family- and individual level.

AquaGen supplies rainbow trout which is bred since the 1970s. How long the different traits have been selected for, as well as the intensity of the selection is very important for the total progress which today’s products represent.

At the present time a total of more than 12 traits are recorded from 200 families. A comprehensive recording program ensures progress in these desirable traits while at the same time minimalizing the risk of unwanted or unexpected side effects.

Since 2015 AquaGen has implemented new modern technology called Marker Assisted Selection. Based on this new technology platform we are able to directly select parents to be used in egg production that possess a specific genetic marker (QTL) that are highly associated with resistance to the viral disease IPN. From 2017 we have also offered selection for two QTLs for resistance to the bacterial disease caused by Flavobacterium psychrophilum.

Traits which are selected using genetic markers will not be in a competitive relationship with other traits. This means that we emphasize the trait growth (traditional selection) to a greater degree and at the same time get IPN- and flavobacteriosis resistance in addition.

AquaGen has in cooperation with the US Department of Agriculture (USDA), developed the world’s most powerful “search tool” to find broodstock with genes that make them suitable to meet the biological challenges the rainbow trout industry faces. This so-called SNP chip can analyze up to 55,000 genetic markers per fish which are then correlated with the desired traits. The size and quality of the SNP chip are crucial for what can be achieved by adopting QTLs and genomic selection, which is now at full speed into the most professional breeding programs related to agriculture and aquaculture.

Further documentation on the products can be found here: http://aquagen.no/en/products/trout-eggs/product-documentation-for-rainbow-trout/

![Graph](Image)

*Figure 1. The main traits measured, selected and controlled in the breeding program (nucleus) of rainbow trout (Oncorhynchus mykiss L.) are set up in relation to the year of implementation and which selection methods that are used for the different traits.*
Biosecurity and quality control

Fish health surveillance in AquaGen is carried out through the entire life-cycle of the fish. In the final nine months before stripping the monitoring is intensified. This includes comprehensive autopsy and screening of all brood fish populations in the AquaGen system.

Production is monitored by both internal and external fish-health personnel, and by government and private entities. AquaGen is certified according to GLOBAL GAP (food safety, environmental protection, fish welfare, and health, safety and welfare for employees), RSPCA (animal welfare), ISO 9001:2008 (quality leadership) and Code-EFABAR (good practice within animal farm breeding and reproduction).

AquaGen’s brood fish populations are routinely screened for IPN virus, PD virus, ISA virus and BKD bacteria throughout the production phase.

Individual testing of parents at stripping can also be performed on demand.

Relevant health information of broodstock, eggs and fry are documented in a separate HEALTH resume and enclosed all deliveries.

Delivery time

In the egg season of 2017 AquaGen will deliver eggs for five months. The broodstock is raised in seawater.

Ordering time limit

From the 2017 egg season the product range in AquaGen was expanded with two new products, adapted to the current challenges the industry is facing. This places great demands on planning and logistics associated with testing and selection of broodstock and the production and distribution of eggs.

We produce eggs by order and it takes a minimum of four weeks from the eggs are fertilized until they are ready for dispatch. To meet egg orders in terms of quality, quantity and delivery time, we urge therefore our customers to make reservations as early as possible and no later than ten weeks before the desired delivery. Depending on the results of genotyping of the season’s broodstock, certain types of products may have limited availability.

Should there be a requirement for unexpected additional eggs, due to operating accidents, diseases or lack of capacity in customers own facilities, AquaGen often has the ability to help out with deliveries in such situations.
Product overview for rainbow trout eggs 2018

All broodstock undergo initially a traditional family selection based on information from over 12 measured traits. After the best broodstock candidates have been selected on this level, in which the growth feature is extra weighted, samples are taken for DNA analysis and search for genetic markers (QTLs) associated with different traits is performed.

Underneath is an overview of the product types and qualities they are selected for both without the use of QTL selection (Ova) and with the use of QTL selection (QTL innOva®). After the main product is chosen, we also provide various treatments of the broodstock/eggs.

<table>
<thead>
<tr>
<th>Product name</th>
<th>QTL-selection</th>
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<tbody>
<tr>
<td>AquaGen® Rainbow</td>
<td></td>
</tr>
<tr>
<td>Ova</td>
<td></td>
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<tr>
<td>QTL-innOva® IPN</td>
<td>●</td>
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<tr>
<td>QTL-innOva® FLAVO</td>
<td>●</td>
</tr>
<tr>
<td>QTL-innOva® IPN/FLAVO</td>
<td>● ●</td>
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Additional treatment of brood fish and eggs

After the egg type is selected, one or more treatments of the brood fish/eggs can be chosen:

- **AquaGen® Rainbow GREEN STERILE**
  Sterilization of eggs which after pressure treatment on recently fertilized eggs makes the fish sterile. This procedure can be done on all types of eggs listed above.

- **AquaGen® Rainbow ALL FEMALE**
  Milt from verified transformed female brood fish instead of normal male brood fish are used. The offspring will be female fish only.

**VIRUS TESTING**

Individual testing of female- and male brood fish at the time of stripping can be performed. Brood fish free from virus are then used in the egg production only.