

## International call for research proposals by The Norwegian Seafood Research Fund (FHF):

### Research projects to explore new possibilities to achieve an Atlantic salmon with salmon lice resistance

FHF is pleased to announce new grant funding for proposals by R&D institutions with the objective to **elaborate and document the potential for utilising genetic traits and mechanisms of salmon lice resistance in Pacific salmon as tools to achieve an Atlantic salmon with high or full salmon lice (*Lepeophtheirus salmonis*) resistance.**

**The total budget for the call is limited to NOK 40 million. More than one project may be considered for funding.**

Proposals must be in accordance with the FHF *Guidelines for project descriptions* (see link below).

Coordinated with FHF, The Research Council of Norway have announced a broader call on understanding the molecular mechanisms for lice/host interaction incl. genome- and marker assisted selection. If relevant, applicant must inform about plans to apply to this call and if so, give a short description of the potential interaction/synergy.

Proposals must be e-mailed to: [post@fhf.no](mailto:post@fhf.no), with the research reference 20/00055.

#### KEY DATES

- **Competition opens: 30 March 2020**
- **Submission deadline for applications: 22 June 2020 before CET 14:00**
- **Decisions on funding will be communicated by the end of August 2020.**

In case of needs for further clarifications regarding the call, applicants may contact FHF by e-mail [post@fhf.no](mailto:post@fhf.no). Any changes in the call text will be announced on [www.fhf.no](http://www.fhf.no) (same place as this call text), but no changes will be made after 15 May 2020 at CET 12:00.

#### Background and issues

The salmon louse (*Lepeophtheirus salmonis*) is currently the most challenging issue for the salmon aquaculture industry in the North Atlantic Region, not only as potential disease and fish welfare issues, but also as a parasite infesting wild stocks of salmonids. The industry is utilising a wide range of countermeasures in order to prevent and control lice infestations. These measures include shielding of net pens with skirts or utilising semi closed containment systems to prevent lice copepodites from finding the salmon, cleanerfish eating the lice, laser technology, application of pharmaceuticals through bath immersion treatments or oral administration, and different mechanical delousing technologies. Research projects for developing lice vaccines is ongoing, but so far with limited success.

From Pacific salmon it is well known that both coho salmon (*Oncorhynchus kisutch*) and pink salmon (*Oncorhynchus gorbuscha*) are resistant against salmon lice (*Lepeophtheirus salmonis*). This resistance is expressed as a response from the salmon to prevent successful attachment and/or development of salmon lice, and not as a tolerance for high infestation levels of lice.

The aquaculture industry has expressed interests in understanding the resistance traits of Pacific salmon. Together with new methodological, scientific opportunities for genetic engineering, e.g. CRISPR/CAS9 gene editing without transferring genes or gene elements, such understanding of the resistance traits can support exploring the potential for achieve an Atlantic salmon with increased or complete resistance against salmon lice. This will also imply a requirement for knowledge on the potential adaptations by the salmon lice to attach and develop also on «resistant» Atlantic salmon.

## Objectives

### Main objective

Elaborate and document the potential for utilising genetic traits and mechanisms of salmon lice resistance in Pacific salmon as tools to achieve an Atlantic salmon with high or full salmon lice (*Lepeophtheirus salmonis*) resistance.

### Subobjectives

1. Identify and document genetic traits and mechanisms responsible for the difference in salmon lice resistance in Atlantic salmon vs Pacific salmonid (coho and/or pink salmon)
2. Elaborate and document the potential for utilising the identified genetic traits and mechanisms of salmon lice resistance as tools to achieve an Atlantic salmon with high or full salmon lice resistance.
3. Conduct a risk evaluation on the possibilities for, and consequences of salmon lice adapting to Atlantic salmon with salmon lice resistance.

## Assumptions

In this context lice resistance is defined as the salmon response for preventing successful attachment and/or development by salmon lice, and not as an increased salmon tolerance for high infestations of salmon lice.

The call is restricted to utilisation of genetic traits and methods as basis for developing Atlantic salmon resistant to salmon lice.

The project plan must be structured into clearly defined phases, including relevant stop-go decision points. As a minimum there must be such decisions points between the three phases described in the objectives.

The generated knowledge should be published and be made publicly available.

Proposals must comprise a thorough overview of relevant existing knowledge, and clearly describe how this knowledge could create the basis for hypotheses to be tested in the project. It is also required to specify how the hypotheses are coordinated and/or linked to other known and relevant ongoing projects.

It is further required that the research proposals comprise information about other relevant proposals to be submitted/under submission to the Research Council of Norway, and how these proposals are coordinated and may complement each other.

Proposals must comprise a detailed budget, split according to work packages and phases, and showing the distribution between the partners and years. Hourly rates or percentage of employment costs per person should be specified.

See the FHF *Guidelines for project descriptions* for further details.

### Organisation

FHF will be the funder of the projects and an internal contact person will follow each project.

Project group: The R&D institution leading each project organise a team to conduct the research, with one specified project leader (CV must be attached to the proposal). The project leader and the research team must be identified in the proposal. All formalised cooperation must be described in detail and be documented by signed agreements.

Reference group: FHF will appoint a reference group with individuals from the salmon farming industry, with relevant knowledge related to the project hypotheses. A link to the mandate for reference groups for projects funded by FHF is enclosed. A plan for reference group meetings (in person and/or electronic meetings) and related costs must be included in the budget.

External scientific advisory group: FHF will appoint an independent, scientific advisory group, with a mandate to review and advise the scientific research and FHF during the project.

### Quality assurance

Proposals must comprise a description of the routines for quality assurance of the research.

### Evaluation:

Proposals will be evaluated on the following criteria (in prioritized order):

- Relevance to the call and potential for application of expected results
- Scientific quality, including proposed methods and statistics
- Quality of the proposal, including performing capacity and scientific record
- Economic frame
- Dissemination plan – to the industry and scientifically
- Affiliation to other relevant activities and projects
- Overall document quality

Proposals must include all relevant information needed to be assessed in accordance with the criteria listed above, and not more than 10 pages ex attachments.

### FHF reserves the right to:

- Reject proposals not relevant to the call
- Reject proposals not in conformity with formal requirements in the call and the FHF *Guidelines for project descriptions*
- Ask for clarifications before and during the evaluation
- Cancel the call or change the economic limit for funding if this have a justifiable basis, ie loss of expected income or other circumstances making it impossible to give the planned funding.
- Make a new call
- Ask successful applicants to cooperate if it is important for the scientific quality and chance for success
- Apply external expertise as part of the evaluation of proposals

**Process from proposals to decision:**

- Proposals will be assessed by FHF for the relevance to the call and conformity with formal requirements in the call and the *FHF Guidelines for project descriptions*
- Proposals will be evaluated by external experts advising FHF on relevance to the call, scientific quality and potential for application of expected results
- Proposals will be rated by FHF based on evaluation criteria scores, and the advices from the external experts
- FHF decide the proposals to be funded based on the evaluation, and potential specific prerequisites.
- Decisions on funding will be communicated to the relevant applicant, and a deadline for acceptance or refusal to proceed is given.
- Contract is signed between FHF and the R&D institution, based on the current *FHF Standard terms and conditions* (see link at the end of this call text).
- All applicants will be informed as soon as all funding decisions are final.

**Attachments:**

1. *FHF Standard terms and conditions*
2. *FHF Guidelines for project descriptions*
3. *FHF Mandate and guidelines for reference groups*

Attachments can be found here: <https://www.fhf.no/prosjekter/prosjektdokumenter/>