

Наименование проекта: Creation of a cryobank of reproductive cells of valuable fish species in Kazakhstan.

Актуальность: At the moment, cryotechnologies are strategically important, including anti-crisis technologies for solving problems related to the conservation of fish genetic biodiversity. Progress in the development of cryotechnologies will expand the scope of their use in aquaculture and fish farm, will allow to maintain the genetic diversity of commercial fish herds at the appropriate level, stabilize their reproduction and thereby contribute to sustainable fishing, and will create prerequisites for the growth of production of fish and other hydrobionts in marine and freshwater aquaculture farms. The use of cryopreservation of reproductive products at artificial reproduction farms, as well as at aquaculture enterprises, will allow to obtain genetically heterogeneous offspring, reduce the area and costs of keeping males, thereby allow to increase the production herd of females. The application of cryopreserved reproductive products is possible at any time, without the risk of untimely maturation of producers or receiving reproductive products of poor quality from them

Цель: The goal of the project is to adapt advanced cryopreservation methods and to create a cryobank of genetically pure biomaterials to preserve the gene pool of valuable fish species in Kazakhstan.

Ожидаемые и достигнутые результаты:

1) According to the results of scientific research on the project, 2 articles will be published in peer-reviewed scientific publications indexed in the Science Citation Index Expanded of the Web of Science database with percentile on the CiteScore in the Scopus database at least 35; at least 3 articles in a peer-reviewed foreign or domestic publication recommended by COCSON.

2) A collection of recommendations will be developed in a book form on the technology of cryopreservation of reproductive cells of valuable fish species, aimed at the development this direction in fish farms in Kazakhstan.

3) Scientific and technical solutions, cryopreservation technologies available in published resources will be analyzed, then a patent search will be conducted and 2 applications for a Kazakhstan patent will be submitted on the subject applied for the grant.

The adaptation of advanced methods of cryopreservation of reproductive cells of sturgeon (Russian sturgeon), pikeperch (male valuable fish species of Kazakhstan) has begun. Collected biomaterials of various species of valuable fish, such as sturgeon (Russian sturgeon), pikeperch, in order to preserve the biological diversity and the gene pool of the fish fauna of Kazakhstan. Collected at least 500 samples. Genetic analysis of mitochondrial genes CO1 and D-loop was carried out to clarify the taxonomic affiliation of the analyzed fish (pikeperch and sturgeon - Russian sturgeon), as well as analysis of genetic variability by microsatellite nuclear DNA markers. In total, 30 samples of each species were taken. The creation of a cryobank of reproductive cells of valuable fish species has begun.

Two articles was published in a peer-reviewed national edition recommended by KOKSON.

1. А. С. Асылбекова, Г. К. Баринова, Г. А. Аубакирова, А. Д. Мусина. ТҰҚЫНЫҢ МОЛЕКУЛАЛЫҚ-ГЕНЕТИКАЛЫҚ ТАЛДАУЫ // Вестник науки Казахского агротехнического университета им. С.Сейфуллина (междисциплинарный). - 2022. - №3 (114). –Ч.1. - Б. 211-221

[https://doi.org/10.51452/kazatu.2022.3\(114\).1164](https://doi.org/10.51452/kazatu.2022.3(114).1164)

2. А.С. Асылбекова, Г.К. Баринова, Г.А. Аубакирова, А.Б.Маханбетова, Ж.Б. Куанчалеев, С.Е. Мусин, А.Д. Мусина. Кримоконсервация репродуктивных клеток самцов русского осетра // Вестник КазНУ. - 2022. - №3 (92). – Ч.1. – Б. 132-138

<https://doi.org/10.26577/eb.2022.v92.i3.011>

Члены исследовательской группы:

1) Asylbekova Ainur Serekrayevka, Project Manager, Candidate of Agricultural Sciences, orcid.org/0000-0002-5327-8642

2) Konstantin Kovalev, candidate of biological sciences, foreign expert.

3) Kuanchaleev Zhaksygalı Batyrgaleevich, co-leader of the project, orcid.org/0000-0001-9032-6861

4) Aubakirova Gulzhan Amanzholovna, PhD, Associate Professor, orcid.org/0000-0003-0490-7905

5) Barinova Gulnaz Kaldybaevna, candidate of biological sciences, orcid.org/0000-0002-0795-0354

6) Musin Suyundyk Yerlanovich, Master of Agricultural Sciences, orcid.org/0000-0003-3006-6628

7) Musina Ainura Daniyarovna, Master of Agricultural Sciences, orcid.org/0000-0002-3860-3240

Список публикаций и патентов опубликованные в рамках данного проекта: (со ссылками на них):

А.С. Асылбекова, Г.К. Баринова, А.Б. Маханбетова, Б.С. Сейсенов, А.Д. Мусина / КРИОКОНСЕРВАЦИЯ РЕПРОДУКТИВНЫХ КЛЕТОК САМЦОВ КАРПА // Вестник КазНУ. Серия биологическая. – 2021. - №4. – С. 110-118. <https://doi.org/10.26577/eb.2021.v88.i3.11>

Информация для потенциальных пользователей: The use of cryopreserved sperm for reproduction of various types of fish is very effective, because it allows to get a large physiologically full material. Fish obtained with using defrosted sperm have better survival rates, growth rate, fecundity, and physiological and biochemical indicators, compared to those obtained by traditional methods, due to the selective action of low liquid nitrogen temperature.

Calculations have shown that the economic effect of using sturgeon genetic material stored in low-temperature banks is pronounced in comparison with the long-term maintenance of a large number of males in fish farms, despite the specialization of the aquaculture enterprise.

Дополнительная информация: The application of frozen-thawed reproductive products of various species of fish with a known genotype will allow to form highly productive broodstocks of fish, cross geographically distant herds, as well as fish that spawn at different times, and preserve natural and domesticated fish populations.

In the environmental aspect, the development of using of cryotechnologies in fish farming will not only alleviate the anthropogenic press from the ichthyofauna of natural reservoirs, by reorienting the technology and timing of artificial reproduction of spawning but also increase the genetic quality of products by controlling the technological process. производимой продукции путем контроля технологического процесса.