
*Ministry of Agriculture Jahad*
*Agricultural Research, Education*
*and Extension Organization*
*International Sturgeon Research Institute*

# International Sturgeon Research Institute

***RASHT – IRAN***
***2021***

IN THE NAME OF GOD

This is a booklet about **International Sturgeon Research Institute (ISRI),**

Prepared by **Dr. Hamid Reza Alizadeh Sabet** and **Mr. Hamed Yousefpour Pirbazari,**
under the supervision of **Dr. Tooraj Valinassab** and **Dr. Tooraj Sohrabi,**
Research staffs, Agricultural Research, Education, and Extension Organization (AREEO).

With cooperation of:

Dr Alireza Shenavar Masooleh,
Dr Mahmoud Mohseni,
Dr Shahram Abdolmalaki,
Dr Zabihollah Pajand,
Dr Ayoub Yousefi Jourdehi,
Dr Soheil Bazari Moghaddam,
Dr Mohammad Hasanzadeh Saber,
Mr Jalil Jalilpour,
Ms Bahareh Younes Haghighi.

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## About US

Sturgeons are one of the most commercially valuable fishes in the world that are found only in the northern hemisphere. About 27 species of Acipenceriformes are exist around the world, which six species are found in the Caspian Sea and connected rivers. History shows that more than 90% of the world's Caviar was produced from the Caspian Sea.Considering global investment attempts to produce meat and Caviar of Sturgeons,still Caspian Sea is the home for Caviar by the greatest diversity of Sturgeon's gene pool in the world.

Iranian Caviar is known as the most expensive fishery product in the International trade. Out of the 100 years' fisheries research in Iran, pertaining to the importance of Sturgeon issues in the unique habitat of the Caspian Sea, conservation and sustainable use of these species, International Sturgeon Research Institute (ISRI) was established.ISRI inaugurated on May 14th, 1994 by the former President of Iran, therefore ISRI upgraded and activated as a specialized Int. Institute in the field of Sturgeon. Conservation and restoration of Sturgeons that exist for about 250 million years and are popularly known as 'living fossils' is considered a national and scientific responsibility.

ISRI is located 25 Km far from Rasht in Guilan province adjacent to the Sefidroud River,very close to the Sturgeon hatcheries which are most important not only in Iran but also in the world.

Shahid Dr. Beheshti Sturgeon Hatchery (Rasht) and Dr. Yousefpour Sturgeon hatchery (Siahkal) affiliated to Iranian Fisheries Organization are focal points of Sturgeon fingerlings production centers in order to support national stocks rehabilitation plan.


Based on research outcomes, most Sturgeon stocks are threatened with extinction. Their catch in the caspian Sea has also decreased dramatically. Studies show that following key factors are responsible for the depletion of Sturgeon stocks:

1- Illegal catch and overfishing
2- Habitat degradation with disconnecting migration routes between the Caspian Sea and rivers by construction dams, barriers, sand mining, spawning grounds destruction and waterpollution .

Since ISRI establishment, several projects on applied research and basic sciences have been conducted by research department's senior staffs/laboratories/facilities and the outcomes made available through scientific publications and workshops, which provided help to facilitate resolve specific problems associated with the Fisheries-Aquaculture issues of Sturgeons. ISRI published scientific papers, research articles, books, also organized workshops, seminars, conferences, symposiums, and scientific attachments which provided advantages of International, regional and national activities to the exploitation procedure of Sturgeons and address to the management authorities for sustainable Sturgeon fisheries and aquaculture development.

## ISRI Strategies and Objectives

The main objectives of the institute are research on conservation and sustainable exploitation of Sturgeon stocks in the Caspian Sea and development of Sturgeon aquaculture by following national and international cooperation and collaboration. The ISRI serve as a reference center for Sturgeon research / nominated as NACA Lead center (Network of Aquaculture Centers in Asia-Pacific) and provided specific facilities for proposed research projects based on the following guidelines:

Stock assessment and rehabilitation of natural stocks and improvement in catch technology of Caspian Sea Sturgeons.
Ecology and genetic structure surveys of Sturgeons in natural and rearing conditions.

Physiology and Biochemistry studies of Caspian Sea Sturgeons to develop biotechnique of brood fish production and aquaculture protocols.

Enhancing artificial breeding programs and rehabilitation of Sturgeon stocks.

Genetic study, race improvement and biotechnology of Sturgeon.

Maintenance the established Gene Bank and Sperm Bank for Sturgeon.

Biotechnology of Sturgeon culture in inland and brackish waters.

Introducing formulated diets and culture systems to development aquaculture in inland waters particularly in the Caspian Sea.

Identification of pollutants in natural habitats of Sturgeons such a Viral, bacterial, fungal and parasitical diseases investigations

Planning and developing strategies in executive and research organizations towards conservation and rehabilitation of natural Sturgeon stocks and development of Sturgeon aquaculture.

Cooperation with international organizations to conserve valuable stocks of Sturgeons in the Caspian Sea and other endangered Sturgeon species in the world.

## Research Departments

1- **Aquaculture**
2- **Ecology**
3- **Fish Health and Diseases**
4- **Genetics and Biotechnology**
5- **Physiology and Biochemistry**
6- **Stocks Management**
7- **Sturgeon Research Station of Guilan**
8- **Research Technical Services**

# Aquaculture Department

## Introduction

Aquaculture department of ISRI has started its activity in 1994 in order to conduct scientific research Sturgeon diet requirements at various stages of development, includes larvae, fingerling, juvenile, grow out and brood stock.The main activities of the aquaculture department focus on investigation biotechnique of rearing different Sturgeon species to produce meat and Caviar. Also research on feed formulation, increasing production yield and reproduction in different rearing systems and identifying requirements, improving methods for Sturgeon rearing and propagation and producing eggs from different Sturgeon endemic/exotic species.

## Objectives

- Developing the best condition for rearing Sturgeons in fiberglas tanks ,concrete tanks ,and earthen ponds. , (Producing farmed Caviar from Ship sturgeon *( Acipenser nudiventris)*,Stellate sturgeon (Acipenser stellatus) Persian Sturgeon (*Acipenser persicus*) and Beluga *(Huso huso*).
- Research and investigation on the diversity of species and hybrid fishes/cross breeding in Sturgeon
- Feasibility study on Sturgeon farming in different regions in order to develop inland waters aquaculture sustainable development

- Optimum usage of rearing water by applying effluents reuse systems.
- Production of special diets for larvae, fingerling, juvenile and broodstock stages.
- Delivering scientific services on new methods of rearing and pre-maturation of Sturgeon breeders.
- Standardization of farms and preparing instructional manuals to expand aquaculture.
- Conducting joint projects with universities and research centers ,private sectors and extending the results of findings.

## Research and Training Services

- Developing Sturgeon rearing service.
- Providing applicable manual about rearing and artificial propagation.
- Instruction of Sturgeon rearing for farmers.
- Conservation of Sturgeon stocks and biodiversity aspects.
- Increasing yields through new aquculture methods.

## R and D programs

- Determining the feeding requirements of Sturgeons in all growth stages( larval, fingerling,juvenils, brood stocks).
- Using improved intensive rearing techniques for Sturgeon culture in different water resources.
- Developing pilot plant of farmed Caviar and meat production from Sturgeons.
- Developing Sturgeon Research Recirculating Aquaculture System(SR-RAS).
- Use of biofloc as a new technology and method to control water quality .

# Ecology Department

## Introduction

Ecology department of ISRI equipped by standard tools since 1994, for duties/missions invivo – invitro analysis.Both marine & Inlandwater ecosystems also aquaculture ecologic measurements are fields of research / instruction / extension activities.

Applied ecology, Environmental sciences, Fisheries / Biotechnology senior scientists are ecology arm of ISRI, for national, regional and international services.

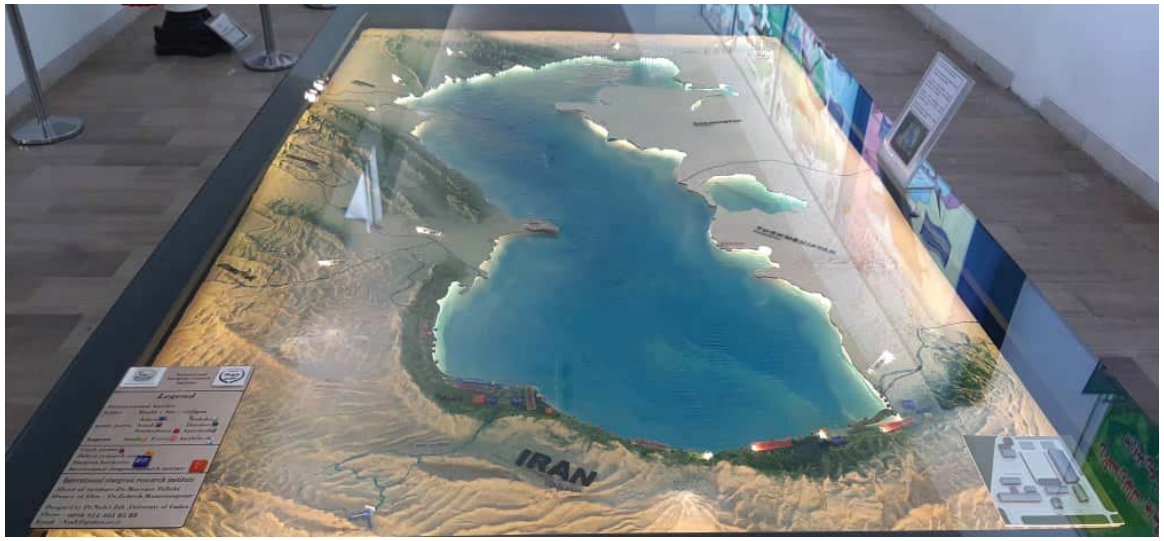
ISRI is owner of a research vessel (Caspian Explorer) in 2020 and hydrobiologic investigations support by Ecology department to carry out ISRI projects and research orders by Iranian / foreign parties.

## Objectives

- Sturgeons habitat measurements in connected rivers to south Caspian Sea e.g. spawning grounds, indeed in global scope via agreements with potential international fisheries research institutions.
- Feasibility studies and site selection for Sturgeon aquaculture development.
- Study on lifecycle and effects of biotic & abiotic variables on Sturgeons.
- Environmental monitoring services to aquaculture activities in response to maintain Sturgeon aquaculture sustainable.

## 3D printed model of Caspian Sea

- This model produced and installed in Ecology department in spring of 2020.
- By accurate depth dimentions, 3D print faciltated visual utilisation of whole Caspian picture, by scale of 1:150000.
- Sturgeon stocks rehabilitation centers mentioned on map and fisheries regions demonstrated as well.
- This190 × 110 table, is attractive for visiting students and scientists to ISRI.



## Research and Training Services

- Providing international expert services on Sturgeon habitat measurements.
- Hydrobiologic & hydrologic research on Sturgeon rearing ponds.
- Preparation and fertilization of Sturgeon rearing earthen ponds and control of algal bloom
- Organizing national & international workshops and experts summits on Sturgeon relevant subjects
- Phyco lab Set up for Live Food production and facilities for Polychaete (Nereis diversicolor) mass production
- Supervision postgraduate students/fellowships/sabbatical leaves for Iranian /international candidates in subjects of fisheries ecology, environmental sciences and marine biology.
- Tracking of released Sturgeons by radio tags/PIT tags and Sturgeon stocks enhancement research via joint projects with ISRI stocks managing department.

## Caspian Explorer Research Vessel Registration No. 6/4483

ISRI has access to Caspian Sea internal & coastal waters by recently completed nonconventional research vessel (Caspian Explorer) science March 2020. This fiberglass research vessel provide researchers with opportunities to study issues of biologic, chemical and physical science, geophysics and climate sciences and emerging interdisciplinary areas.

Caspian explorer by 380 hp power of main engine, 18.6 m length, 3.25 m depth and 5 m breadth, is equipped with bottom trawl fishing gear and relevant accessories in order to fish/Sturgeon stocks assessment surveys.

Lift net (conical net with electrical light attraction) for water depth research on dark conditions is installed and ready to operate as well.

One of the most important governing duties of ISRI is, to conduct fundamental & applied research in the field of recognizing hydrological & hydro biological surveys and monitoring of the unique-threatened-endangered stocks of Sturgeons in Iranian waters of the Caspian Sea. Caspian Explorer has organizational assignment for series of strategic research activities.

Caspian Explorer is prepared for research services on hydrology/hydrobiology/climate/oceanography investigations to all interested national, regional and international parties based on agreements.

## R and D programs

- Feasibility studies of water bodies or Sturgeon aquaculture.Safe corridor investigation in southern basin of the Caspian Sea for migration and releasing of Sturgeons.
- Monitoring planning for Sturgeon farms effluents Identification of biofouling and developing controlling tools.
- National Caspian Sea cruises for hydrologic & hydrobiologic studies of southern basin and in joint ventures with rest of littoral states of the Caspian Sea.
- Aquaponic, Biofloc, Recirculation Aquaculture System (RAS), physical-chemical measurements and calibration.
- Developing Research Stations/Laboratories for hydrochemistry and hydrobiology analysis based on national / international standards e.g. ISO/ IEC 17025.
- Environmental DNA research and development for tracking endangered Sturgeon species via interdisciplinary research frame and cooperation with ISRI Genetics & Stocks Management departments

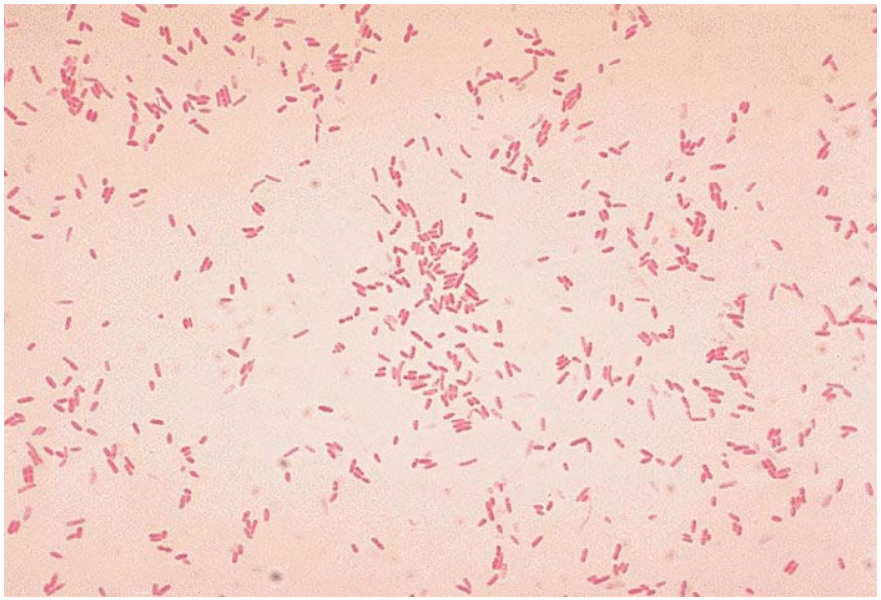
# Fish Health and Diseases Department

## Introduction

The ISRI Department of Fish Health and Diseases carried out research on the identification, prevention, and treatment of Sturgeon diseases since1998. This department has carried out joint projects with universities and research centers by experienced staffs. Experts of this department involved in national/international Sturgeon achievements and published scientific articles and reports on Sturgeon health and diseases.

## Objectives

- Participation in the investigation plan for Sturgeon diseases monitoring both in Caspian Sea habitat and land farms.
- Joint venture with Caspian Sea littoral countries for investigation/detection of Sturgeon diseases
- Research on mortality drivers, immune system,therapy of diseases by herbal sources replacement for chemical treatments and specifi vaccines development
- Organizing national and international workshops/seminars /symposiums on health and diseases of Sturgeon.



## Research and Training Services

- Introducing the appropriate methods for treating diseases in farmed Sturgeon.
- Introduction of the most appropriate methods for prevention of diseases in Sturgeon.
- Identification of infectious diseases using conventional methods and rapid detection methods.
- Investigation and diagnosis of predisposing factors and non-infectious pathogens of Sturgeon.
- Provide guidelines for health care and quarantine in the breeding procedure and culture of Sturgeon.

## R and D programs

- Infectious and noninfectious diseases studies in Sturgeons inland (freshwater) / Caspian Sea (brackish water) aquaculture.
- Improvement of health management in Sturgeon aquaculture systems.
- Study on nutritional diseases of Sturgeon in different rearing systems.
- Research on the production of Sturgeon vaccines
- Isolation and production of specific probiotics in Sturgeon.
- Determining the effects of herbal products on controlling pathogenic factors in Sturgeon.
- Investigating the effects of nanoparticles on the prevention and treatment of Sturgeon diseases.

# Genetics and Biotechnology - Gene Bank

## Introduction

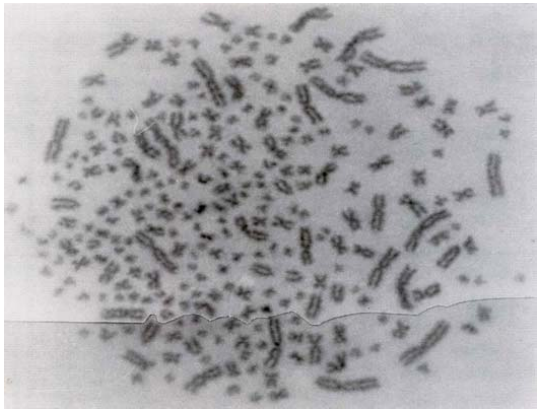
ISRI Genetics and Biotechnology Department ( GBD) established by 3 laboratories:

molecular genetics ,cytogenetic and tissue culture, (sperm cryo-preservation) Since ,1994.
Available equipments in ISRI-GBD:

- Thermocyclers (PCR machines)
- Real Time-PCR
- Electrophoresis / microcentrifuges
- -86˚c freezers
- Gel documentation unit
- Nano-drop Spectrophotometer
- Nitrogen tanks for spermcryopreservation
- Software for measuring speed and motion characteristics of sperm
- Programmable unit of sperm cryopreservation (Microscopes) phase contrast and dark field

## Objectives

- Karyotyping of Sturgeons
- Production of superior hybrids(Bester ,Big bester Belupars)
- ISRI-GBD carries out research and investigations on conservation and rehabilitation of genetic resources and facilitating increasing Sturgeon aquaculture potentials using techniques of genetic science.



* Production of all female and triploids Sturgeons (Genetics & Breeding) and study on sex determination system.
* Determining genetic sturcture the Caspian Sea Sturgeons and introducing molecular markers to separate various populations.

* Providing biotechnique of sperm cryopreservation for the Caspian Sea Sturgeons.
* Utilization of FISH (Fluorescent in Situ Hybridiztion technique for Sturgeons.
* Synthesis of growth hormone for *Huso huso.*
* Identifying important economic genes in Sturgeons and using them in Sturgeon aquaculture.
* Genetic management of Sturgeon breeders in aquaculture Tissue blood, fin, ovary, oocyte, liver,heart…of cultured sturgeons.
* Organizing specialized training workshops at regional,national and international levels.

## Research & Training Services

- Production of improved breeders through genetic instructions.
- Research on hybridization in order to expand domesticated species.
- Sperm cryopreservation of endangered species for rehabilitation of Sturgeon stocks.
- Study on commercial valuable population, species, and genes; utilizing them for Sturgeon rearing and finally genetic evaluation of farmed Sturgeon for conserving genetic diversity.
- Functional genomics studies in Sturgeon.

## R and D programs

- Applying biotechnology for enhancement of production and transferring important economic genes into Sturgeons.
- Separation and introducing molecular markers to identify species, populations and sex determin ation of Sturgeons.
- Production of new hybrids and pure lines (all female and all male).
- Contribution in Sturgeon aquaculture developm- ent through improving broods and preserving genetic diversity.
- Caspian Sea Sturgeons Gene Bank maintenance.

# Physiology and Biochemistry Department

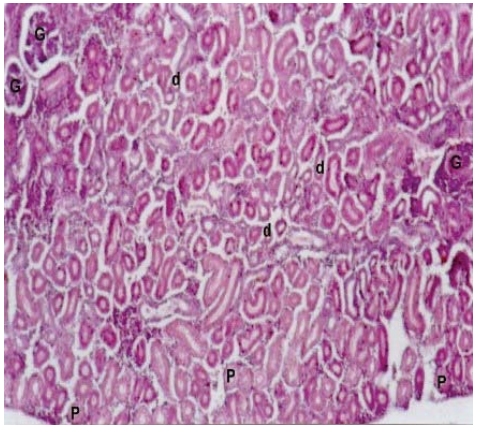
## Introduction

In ISRI physiology department, various functions of Sturgeons such as how to feed, breathe, move and what they are doing to survive are subjects of 25 years‘ research experience.How to adapt the living organism to environmental events such as moving to fin an appropriate position in nature, food, etc. how to work senses, practice the biological functions and how to connect mentioned factors to healthy and good growth of fis are inquiring.The main objective of physiology and biochemistry department is to achieve optimal and suitable conditions for the proliferation, feeding, growth, and survival of Sturgeon via carrying out related research projects with close collaboration with ISRI research departments.

## Objectives

The Department of Physiology and Biochemistry of the ISRI is equipped by Histology,Ecophysiology, Hematology and Biochemistry laboratory Indeed, senior experts are conducting research projects based on ISRI research plan. Artificial reproduction, sex determination, tissue pathology, nutritional physiology, evolutionary process of tissues, research on ecophysiology, reproductive physiology under natural and breeding conditions, and the possibility of oocyte and sperm extraction, osmotic and ionic regulation system.

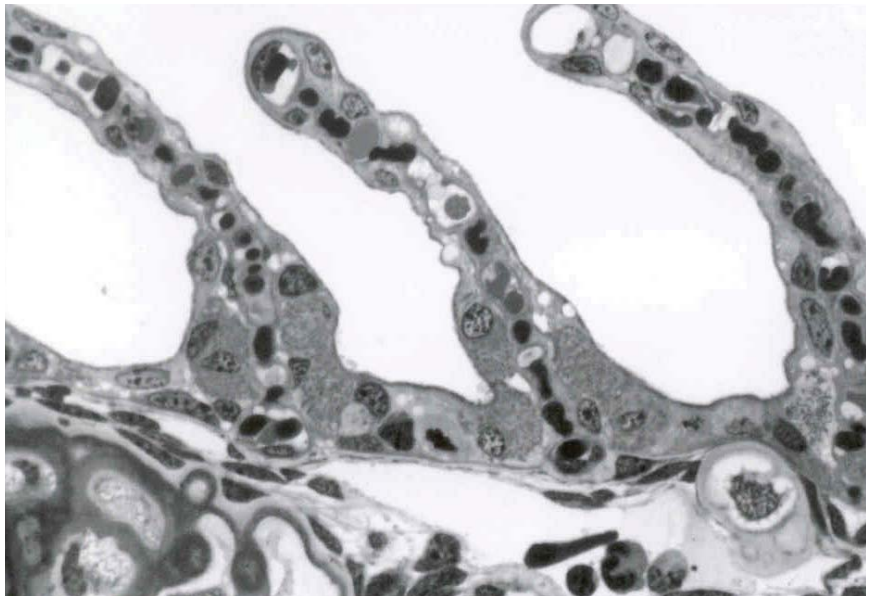
development ,immunophysiology, histology and pathology, hematology and biochemical issues were subjects of ISRI Physiology and Biochemistry department activities to approach answers for diverse relevant questions. A couple of examples listed below:

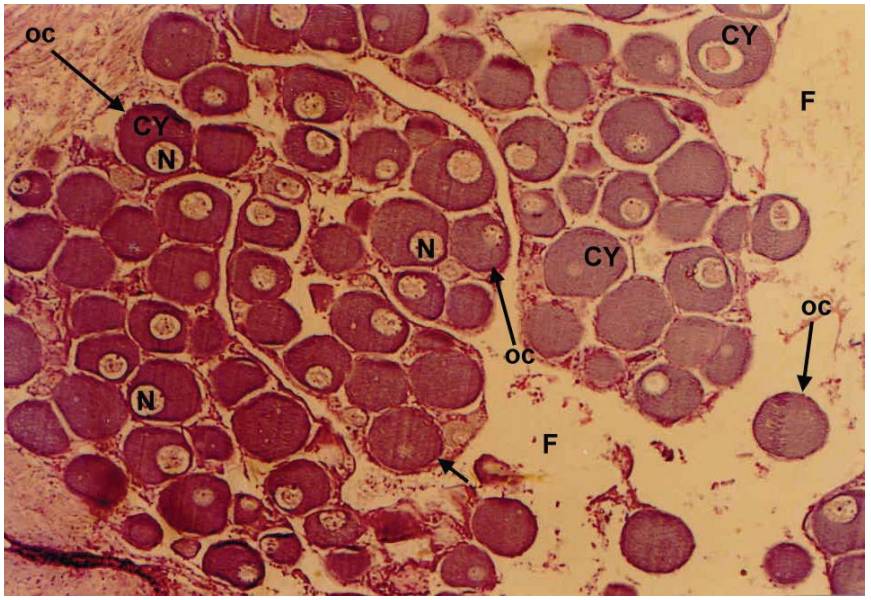



microscopic view of Persian Sturgeon kideny tissue

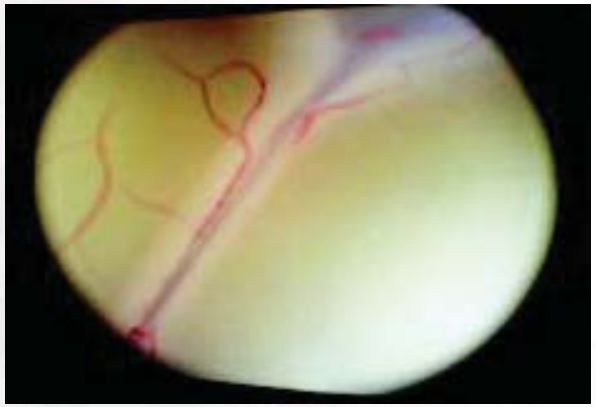
GnRH and adequate sex hormones levels for injection

Biotechnology of artificial propagation for broodstock breeding using microincision of oviduct method

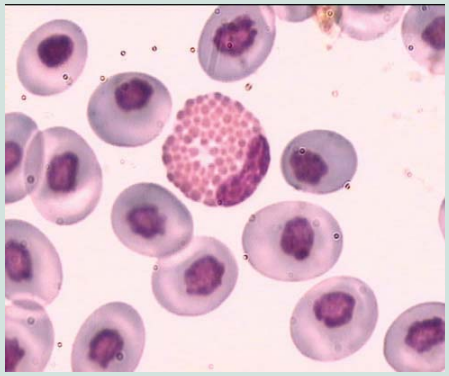




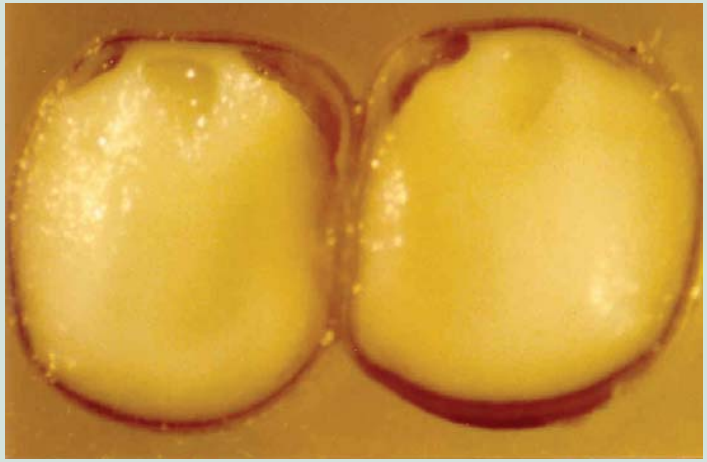

Preparation of tissue and pathology slides from all organs of aquatic animals in order to determine the health status and tissue abnormalities



Sex determination and
sex staging  Sturgeon broodstock
using laparascopy method




Perform all blood and biochemical tests of aquatic animals (cell count, hematocrit, hemoglobin, osmotic pressure, etc) to determine the health of aquatic animals.



Determining appropriate time for reproduction

National, regional and international workshops

## R and D programs

- Adapting of wild Sturgeon and larvae to farmed conditions for domestication purposes. Improving
- Sturgeon fingerling production

- Reducing sex maturity age in different Sturgeon species.
- Increase life of Sturgeon production .efficiency at different stages.
- Production of organic Sturgeon.
- Using new techniques for sexing and staging.
- Production of synthetic hormone for artificia prop-agation in Sturgeon.
- Effect of magnetic field on Sturgeon.
- Effect of photoperiod and light intensity on .Sturgeon( behavior,growth,survival,…)
- Physiologic behavior investigations in larvi-culture and fingerlings of Sturgeon.
- Obtaining caviar using live method
- Study on emberionic development stages in sturgeon, for adapting in different conditions salinity,temprature
- Sturgeon behavior, studies, migration, nutrition, reproduction.

# Stocks Management Department

## Introduction

Stock assessment provides information to guide fishery management, allowing managers to detect changes in the condition of fis stocks over time. ISRI stocks management department established in 1997 and carried out several projects on population biology, stock assessment, population modeling, and best-practice fishing.

## Objectives

- Estimation of Sturgeon stocks in the Caspian Sea.
- Monitoring of fishery and fishing activities  catch stations, fishery cooperatives and provide scientific technical support to improve catch.
- Determination of the most appropriate time, place and method of catch.
- Determination of the suitable place for  releasing of fingerlings and their migratory routes in the river, identify obsta cles that stand in their migratory route, residence time, rate survival of fingerlings in the river, and provide remedial solutions to the managing authorities.
- Database establishment for the catch, fishing efort, releasing Sturgeon fingerlings
- Scientific cooperation with riparian countries of the Caspian Sea in joint research cruises and regional stocks management activities in the Caspian Sea.



## Research Area

Population Dynamics and stock assessment of Sturgeon in the Caspian Sea.

## R and D Program

- Providing facilities for the continuous assessment of Sturgeon stocks.
- Determination Total Allowable Catch (TAC) of Sturgeon stock based on collaboration with Caspian Sea Bioresources Commission.
- Provide advice on the implementation and management of fisheries in order to maintain and optimize the exploitation of Sturgeon fishes in the Caspian Sea based on cooperation with the Caspian Sea Bioresources Commission.
- Determination of fishery return coefficient of Sturgeon based on collaboration with Caspian Sea Bioresources Commission.
- Providing plans for conservation of Sturgeon stocks in the rivers and Caspian Sea to increase their fishery return coefficient based on collaboration with Caspian Sea Bioresources Commission
- Study and determine the appropriate time and place of fishing in order to reduce the damage of the Sturgeon stocks.
- Study and determine the appropriate gears for catching Sturgeons.
- Supervision of methods, gears and time of exploitation of Sturgeon stocks.

## Research Outputs

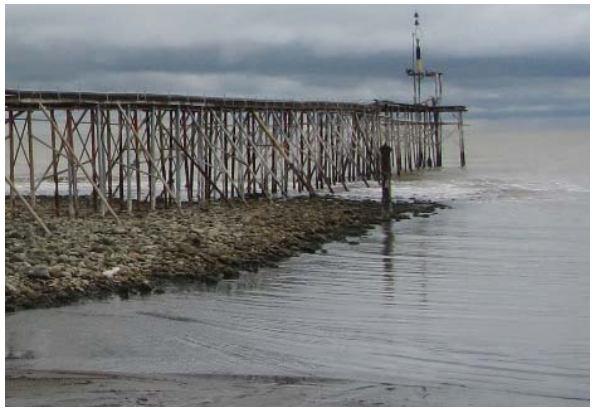
- Conduct joint marine surveys with Caspian littoral states to determine total abundance, biomass, and Total Allowable Catch for Sturgeon stocks.
- Determination of fishery returns of Sturgeon fingerling released into the rivers leading to the Caspian Sea using a Coded Wire Tag (CWT).
- Determination of the most appropriate time ,place and method of catch and inform the executive departments to improve catch and utilization of stocks.
- Collecting and recording of catch data based on biological characteristics of species ,time ,place ,and method of catch ,analyze population structure and provide reliable scientific guidelines to fishery authorities for decision making
- Determination of the suitable place for the release of fingerlings and their migratory routes in the river ,identify obsta cles that stand in their migratory route, residence time and percentage survival of fingerlings in the river and provide remedial solutions to the managing authorities.
- Implementation of 23 Sturgeon stock assessment marine cruises.
- Publishing more than 50 scientifi articles in Peer-Reviewed Journals.
- Preparing scientific reports on stock status, exploitation, illegal catch etc. and make these reports available to research organizations and fisheries authorities in the riparian countries of the Caspian Sea through the Caspian Sea Bioresources Commission.

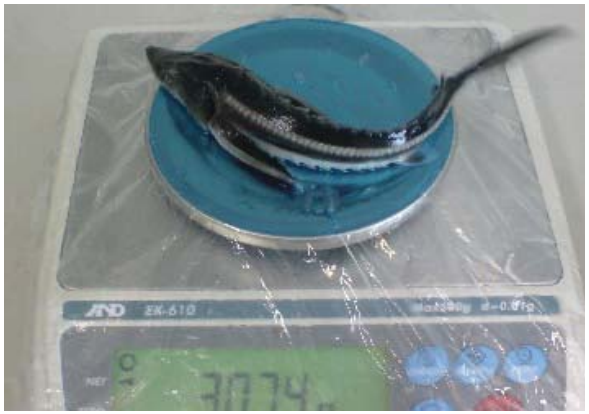
# Sturgeon Research Station of Guilan


## Introduction

The ISRI Sturgeon Research Station of Guilan is located at the coastal line of the south Caspian Sea. In a total area of 2.1 hectares, facilities provided for aquaculture of Sturgeon in terms of easier access to Caspian Sea brackish water. Since 2003, with the aim of creating a research/training site and pilot plant, Station constructed and equipped with Collaboration of the World Bank. Although series of research projects prepared in order to biotechnique finding of breeding challenges and Sturgeon aquaculture issues until the extracting of Caviar.

ISRI Sturgeon Research Station of Guilan has access to direct brackish water of the Caspian Sea and fiberglass / concrete tanks for diverse size / weight treatments of Sturgeon indeed broodstocks maintenance.





## Objectives

Research on biotechnique of rearing Sturgeon in fiberglass and concrete tanks by use of Caspian Sea brackish water Sturgeons. The broodstock , maintenance and treatment after micro incision Instruction of rearing Sturgeon and releasing of Sturgeon in upper growth stages to the Caspian Sea

Introduction of an educational, research and promotional model/site for the development of Sturgeon aquaculture and preparation appropriate conditions for the production of meat and Caviar, approach decreasing pressure on the natural stocks in the Caspian Sea

Introduction recenently developed employment opportunities and foreign exchange from the sale of Caviar and ecotourism development

Development of cooperation with international organizations to implement joint projects for the conservation of biodiversity and endangered species.

Collaboration with scholars/universities to conduct scientific projects and collaboration with other research aspects relevant to Sturgeon aquaculture in the brackish water of the Caspian Sea.




## Research / Training Services

* Sturgeon production yield increase through improved rearing methods .
* Instruction of Sturgeon rearing for farmers.
* Superiority/acceleration method of growth and feeding performance for Beluga in Caspian Sea brackish water compare with freshwater.
* Feasibility study for request parties in order to development of Sturgeon farming opportunities in lands of the Caspian Sea drainage.

## R & D programs

* Creating a site of live food production e.g. *Gammarus*, *Nereis* worm & etc. for the early feeding of Sturgeon fingerlings
* Domestication of wild Sturgeon for Aquaculture and sturgeon resources purposes.
* Frequently production of Caviar from Sturgeon without killing the fish.
* Sturgeon production in the pilot cage, treatment/ maintenance, and growing Sturgeon fingerling up to 500gr weight.
* Determining of feeding requirements of Sturgeon in larval and fry stages.
* Developing research and training site for basic and applied Sturgeon Science.

# Research Technical Services

## Objectives

This department has begun its activities from October 1996 in order to support and enhance scientific capbilities of the ISRI research departments and promotion of information and IT services. Now it continues the activities with five technical staffs for:

- Creating a consistent information system in the fields of Sturgeon researches.
- Exchange of information and achievements, communication with other fisheries and research centers on Sturgeons.
- Providing and exchanging of information for experts through the network.
- Training facilitation for experts.
- Enhancing technical knowledge of experts by new training methods.

## Duties of Research and Technical Service

- Information exchange and communication with internal and foreign research collaborative centers.
- Organizing special courses and workshops on different areas of Sturgeons with the participation of prominent Professors.
- Cooperation on publishing documents and organizing conferences and seminars on Sturgeon issues and fisheries sciences.
- Documenting and publishing the achievements resulted from implementing research projects.
- Establishment of data bank and banks of Iranian and Global scientific documents of Sturgeons
- Publishing and distributing scientific reports, handbooks, and brochures
- Organizing special scientific lectures and seminars in order to exchange scientific achievement
- Publishing of Institute annual report.
- Reporting and publishing of scientific achievements of researchers
- Organizing special fairs/exhibitions around the country.

## Documents and Library

- Cataloging and classification of Persian/English/Russian books and documents in the library.
- Recording and loaning library references and delivery services to experts and researchers.
- Acquisition of Persian and English books, papers and journals for special departments from annual book fairs.
- Collection of thesis, books and scientific references on different fisheries subjects to support research departments.
- Preparing and maintaining data bank in the fisheries area like CABI, ASFA, etc.
- Providing scientific and special papers from various data banks for ISRI research departments

## R and D Programs

- Increasing internet bandwidth, speed, and the possibility of satellite communications.
- Enhancing the quality and quantity of programs and systems.
- Organizing conferences and international workshops.
- Scientific cooperation with universities on subjects related to Sturgeons.
- Publishing brochure for informing the public and increasing the knowledge of society pertaining to importance of Sturgeon stocks conservation.

## ISRI Outstanding achievements

- Stock assessment of Sturgeons in the Iranian waters of the Caspian Sea .
- Production of farmed Caviar and obtaining eggs from spawners using microincision method Cryopreservation of Sturgeon sperms and creating Sturgeon sperm bank.
- Development of molecular markers to identify different Sturgeon populations, races, and species.
- Establishment of a gene bank, DNA bank and tissue bank of various Sturgeon species.
- Introduction of suitable hybrids to produce farmed meat and Caviar for aquaculture development. Development. of biotechnique of brood fish production and artificial breeding and rearing of various Sturgeon species.
- Development of formulated diets for use in Sturgeon feeding in different stages of growth.
- Identification of pathogenic parasites, fungi, and bacteria in Sturgeon.
- Development of biotechnique of live food production for use in Sturgeon feeding.
- Determination of heavy metal content in meat and Caviar in Caspian Sea Sturgeon.
- Marking and tracking Sturgeon fingerlings in the Iranian waters of the Caspian Sea.
- Application of radio tags to study natural reproduction of Sturgeons in the Sepidrood River.


# ISRI Host of ISS5

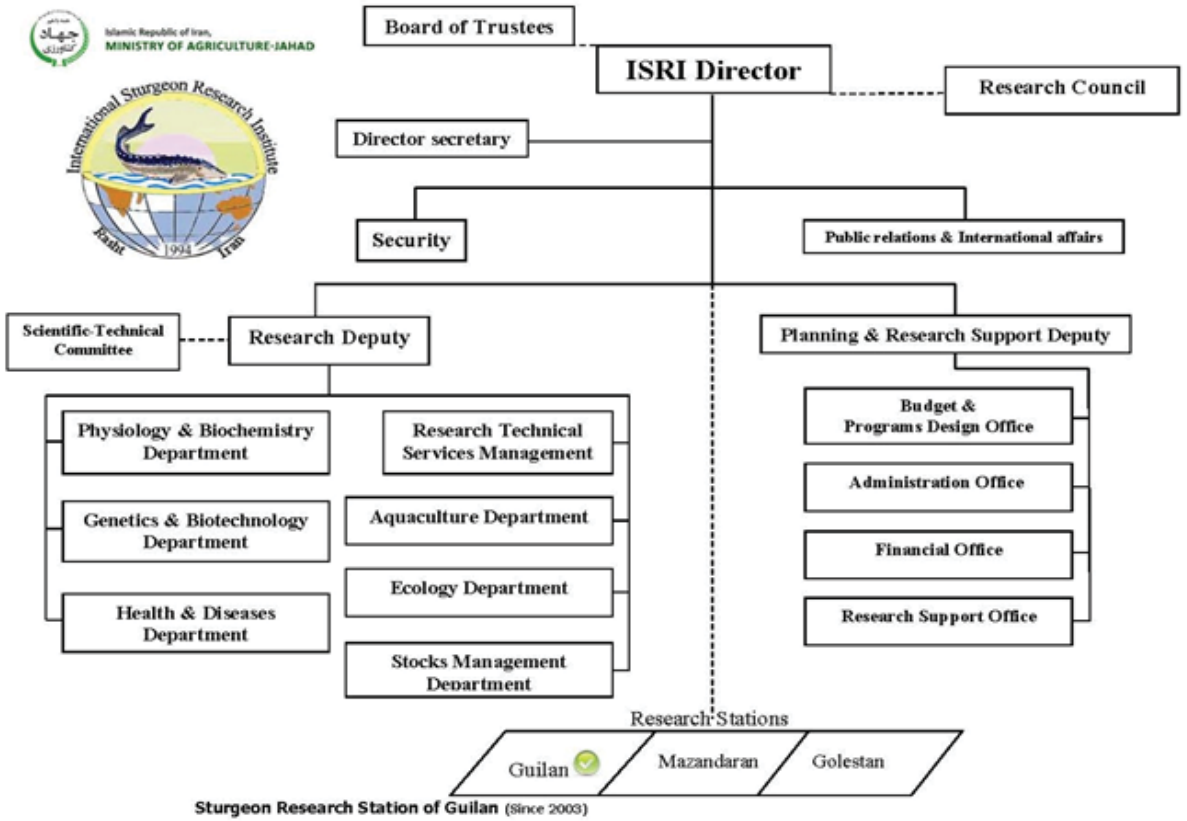
The 5th International Symposium on Sturgeons
A conference with major emphasis on conservation, environmental mitigation and sustainable use of the sturgeon resources DOI: 10.1111/j.1439-0426.2007.00921.x

**2005, Ramsar – IR Iran**

## ISRI Mission

To conserve the valuable Sturgeon stocks in the Caspian Sea and cooperate conservation of other endangered Sturgeon species in the world

# ISRI Chart


Islamic Republic of Iran,
MINISTRY OF AGRICULTURE-JAHAD
International Sturgeon Research Institute
Board of Trustees
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Scientific-Technical Committee
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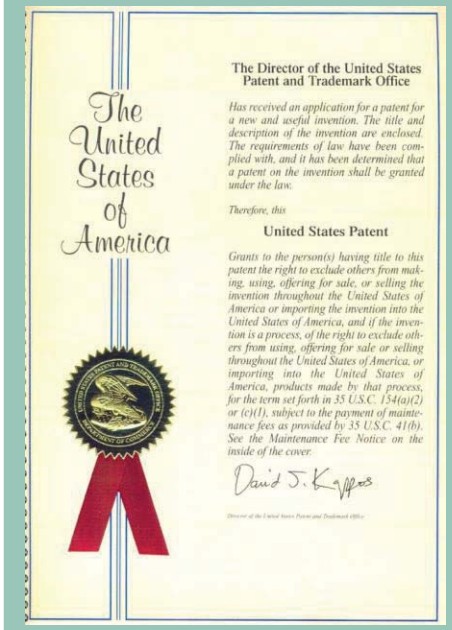
Genetics & Biotechnology Department
Aquaculture Department
Health & Diseases Department
Ecology Department
Stocks Management Department
Budget & Programs Design Office
Administration Office
Financial Office
Research Support Office
Research Stations
Guilan
Mazandaran
Golestan
Sturgeon Research Station of Guilan (Since 2003)

## Registered inventions and discoveries

| Row | Title of invention | Year |
|---|---|---|
| 1 | Formulation of combined GnRH and biotechnique of its application in artificial rearing of Sturgeon | 2005 |
| 2 | Formulation and biotechnique of artificial rearing of Sturgeon by synthetic GnR | 2006 |
| 3 | Production of farmed Caviar through broodstock making by farmed Sturgeons | 2006 |
| 4 | Biotechnique of egg removal in live fish through oviduct incision without lesion and sacrificing farmed Sturgeon breeders | 2006 |
| 5 | Biotechnique of artificial propagation and production of fingerlings by farmed Sturgeons using combined GnRH | 2006 |
| 6 | Broodstocking and sperm obtaind by farmed Sturgeons | 2006 |
| 7 | Chromosome mapping of Persian Sturgeon (*Acipenser persicus*) | 2006 |
| 8 | Production of a special diet for farmed Sturgeon broodstock and Caviar production | 2008 |
| 9 | Culture medium preparation for culture of white blood cells in Sturgeons | 2008 |
| 10 | Production of diet for Sturgeons in the larval stage | 2008 |
| 11 | Production of diet for Sturgeons in the growth stage | 2008 |
| 12 | Propagation and rearing of *Nereis diversicolor* | 2009 |
| 13 | Method for artificial breeding of Sturgeon (Us patent) | 2011 |

The first patent of Iran about Sturgeon in US patent entitled New method for artificial breeding and egg removal of farmed Sturgeon breeders for many times



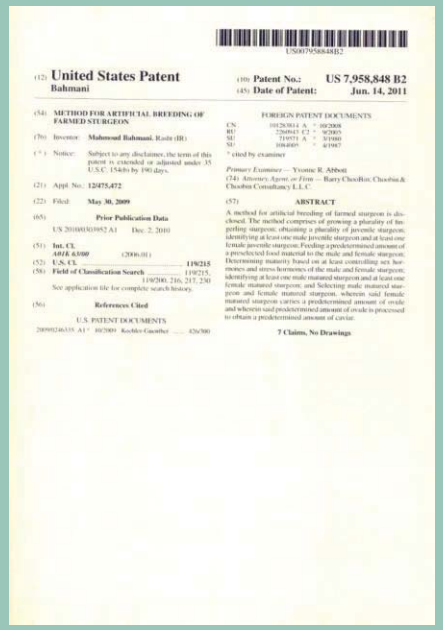
The Director of the United States Patent and Trademark Office

*Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.*

*Therefore, this*

United States Patent

*Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.*



US007958848B2

(12) **United States Patent**
**Bahmani**

(10) **Patent No.: US 7,958,848 B2**
(45) **Date of Patent: Jun. 14, 2011**

(54) **METHOD FOR ARTIFICIAL BREEDING OF FARMED STURGEON**

(76) Inventor: **Mahmoud Bahmani**, Rasht (IR)

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 190 days.

(21) Appl. No.: **12/475,472**

(22) Filed: **May 30, 2009**

(65) **Prior Publication Data**

US 2010/0303952 A1 Dec. 2, 2010

(51) **Int. Cl.**
**A01K 63/00** (2006.01)

(52) **U.S. Cl.** ..... **119/215**

(58) **Field of Classification Search** ..... 119/215, 119/200, 216, 217, 230

See application file for complete search history.

(56) **References Cited**

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*Primary Examiner* — Yvonne R. Abbott
(74) *Attorney, Agent, or Firm* — Barry Choobin; Choobin & Choobin Consultancy L.L.C.

(57) **ABSTRACT**

A method for artificial breeding of farmed sturgeon is disclosed. The method comprises of growing a plurality of fingerling sturgeon; obtaining a plurality of juvenile sturgeon; identifying at least one male juvenile sturgeon and at least one female juvenile sturgeon; Feeding a predetermined amount of a preselected food material to the male and female sturgeon; Determining maturity based on at least controlling sex hormones and stress hormones of the male and female sturgeon; identifying at least one male matured sturgeon and at least one female matured sturgeon; and Selecting male matured sturgeon and female matured sturgeon, wherein said female matured sturgeon carries a predetermined amount of ovule and wherein said predetermined amount of ovule is processed to obtain a predetermined amount of caviar.

**7 Claims, No Drawings**

ISRI is capable to organize short term and and PhD thesis research on propagation, rearing, hydrobiology, feeding, health, diseases, physiology and biotechnology, sex determination, and broodstock production on Sturgeons.

# Let Us Save Sturgeon

## Contact information

**P.O.Box:** 41635-3464, Rasht – IR
Iran **Tel:** +98 13 34500970 – 4
**Fax:** +98 13 34500976

***Ministry of Agriculture Jahad***
***Agricultural Research, Education and Extension Organization***
**International Sturgeon Research Institute**

**info.sturgeon@areeo.ac.ir**
**http//:sturgeon.areeo.ac.ir**


*Ministry of Agriculture Jahad*
*Agricultural Research, Education*
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