CONVENCIÓN SOBRE EL COMERCIO INTERNACIONAL DE ESPECIES AMENAZADAS DE FAUNA Y FLORA SILVESTRES

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Vigésimo tercera reunión del Comité de Fauna
Ginebra (Suiza), 19-24 de abril de 2008

Esturiones y peces espátula

EVALUACIÓN DE LAS METODOLOGÍAS DE VALORACIÓN Y SUPERVISIÓN UTILIZADAS PARA LAS ESPECIES DE ACIPENSERIFORMES DE STOCKS COMPARTIDOS ENTRE DIFERENTES ESTADOS DEL ÁREA DE DISTRIBUCIÓN

1. Este documento ha sido preparado por la Secretaría.

2. En la Resolución Conf. 12.7 (Rev. CoP14), sobre conservación y comercio de esturiones y peces espátula, la Conferencia de las Partes:

   ENCARGA al Comité de Fauna que, en colaboración con la Secretaría, las Partes interesadas, las organizaciones internacionales y los expertos competentes, vigile los progresos en las disposiciones pertinentes de la presente resolución y realice en un ciclo trienal, a partir de 2008, y utilizando información de años anteriores, una evaluación de las metodologías de valoración y supervisión utilizadas para los stocks de especies de Acipenseriformes con sujeción a lo dispuesto en el párrafo a),...

   y

   ENCARGA al Comité de Fauna que transmita al Comité Permanente sus recomendaciones sobre las medidas que deben adoptarse durante la supervisión de los progresos y el ciclo trienal de evaluación mencionados.

3. Cabe señalar a la atención del Comité los siguientes documentos de información general sobre las estrategias de conservación y los regímenes de gestión regionales (disponibles en el sitio web de la CITES en http://www.cites.org/eng/prog/Sturgeon/index.shtml):

   a) *Regional Program of the Caspian Littoral States on Joint Management, Conservation and Sustainable Use of the Caspian Sea Bioresources;*

   b) *Regional Strategy for the Conservation and Sustainable Management of Sturgeon Populations of the N-W Black Sea and Lower Danube*; y

   c) *Regional Strategy on Conservation Population of* Acipenser schrencki *and* Huso dauricus *and Sustainable Development in Heilongjiang (Armur) River.*

4. La Secretaría solicitó a la Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO) que revisara la metodología de reconocimiento, las evaluaciones de los stocks y el establecimiento de las capturas totales autorizadas para la pesca del esturión en el mar Caspio y su informe final se recibió en noviembre de 2004. Con la generosa asistencia de la FAO se tradujo al

ruso y se distribuyó a todos los Estados litorales del mar Caspio. Aunque el informe estaba destinado inicialmente a los Estados del área de distribución concernidos, la Secretaría puede ponerlo a disposición de cualquier grupo de trabajo establecido por el Comité de Fauna para examinar esta cuestión.

5. En el momento de redactar este documento (diciembre de 2007), los informes más recientes sobre las metodologías de valoración y supervisión de las especies Acipenseriformes de los stocks compartidos entre diferentes Estados del área de distribución (salvo en los que no se realizan capturas o exportación de caviar con fines comerciales) son los siguientes:

   a) Río Heilongjiang (Amur)

      Status Report on the Fishery Resources and its Management from the summary of the 16th meeting of the Sino-Russian Fishery Mixed Committee (Moscow, May 2006);

   b) Mar Caspio

      Regional programme on study of the distribution, abundance, stocks assessment, food supply and TAC determination of Caspian Sea sturgeons in 2007-2009 from the 26th session of the Commission on Aquatic Bioresources of the Caspian Sea (Almaty, November 2006).

   c) Mar de Azov

      Status of sturgeons stocks in the waters of Ukraine in 2006: The Azov Sea from 18th session of the Ukrainian-Russian Commission on the Problems of Fisheries in the Sea of Azov (Berdyansk, October 2006);

   d) Parte noroccidental del mar Negro y bajo Danubio

      i) *Status and management of sturgeon populations of N-W Black Sea and Lower Danube River in Romania during 2000-2006*. CITES Scientific Authority for Acipenseriformes of Romania, November 2006;

      ii) *Status of sturgeons' stocks in the waters of Ukraine in 2006: The Basin of the Black Sea*. State Committee for Fisheries of Ukraine, November 2006.

   En los Anexos 1 a 3 se adjuntan estos documentos, en el idioma en que fueron recibidos.

6. Además de supervisar los progresos en la aplicación de las disposiciones pertinentes de la Resolución Conf. 12.7 (Rev. CoP14), se invita al Comité a que determine la forma en que llevará a cabo, durante un ciclo trienal que comenzará en 2008, su evaluación de las metodologías de valoración y supervisión de las especies de Acipenseriformes de stocks compartidos entre diferentes Estados del área de distribución. Habida cuenta de que las recomendaciones del Comité de Fauna sobre las medidas que han tomarse a tenor de la precitada supervisión de los progresos y del ciclo trienal de evaluación trienal se someterán a la consideración del Comité Permanente, la Secretaría recuerda al Comité que el plazo límite para la presentación de documentos para su examen en la 57ª reunión del Comité Permanente es el 15 de mayo de 2008.

REGIONAL PROGRAMME ON STUDY OF THE DISTRIBUTION, ABUNDANCE, STOCKS ASSESSMENT, FOOD SUPPLY AND TAC DETERMINATION OF CASPIAN SEA STURGEONS IN 2007-2009

1. Grounds for conducting the All-Caspian survey: it is undertaken in compliance with the resolution of the 16-th Meeting of the Commission on Aquatic Bioresources of the Caspian sea (Protocol of December 6-8, 2001) and of the 18-th Meeting of the Commission on Aquatic Bioresources of the Caspian sea (Protocol of December 9-11 2002) and the CITES Standing Committee recommendations (Santiago, Chile November 1-2 2002, SC 47 Doc.11), resolution of the international workshop "Methods of sturgeon stocks assessment and their TAC determination" (Astrakhan, March 12-14 2003) and of the 23th session of the Commission on Aquatic Bioresources of the Caspian Sea (Protocol of November, 2005).

2. Program task.

i. To assess the abundance, commercial stocks and distribution of sturgeons populations in the different parts of the Caspian Sea under the present ecological conditions.

ii. To determine TAC (total allowable catch) of sturgeons for 2009-2011 using all available international methods of abundance and sturgeons stocks determination.

iii. To give recommendations on the conservation, reproduction scales and rational use of sturgeons populations in the Caspian Sea.

3. Programme Components

- To carry out the seasonal (winter, summer) trawl-acoustic surveys
- To determine: the species composition, peculiarities of sturgeons and other fish species distribution on the feeding grounds; to study the biological parameters of sturgeons populations (absolute and commercial length, weight, age, condition factor, and GSI etc.), correlation of the populations of sturgeons of different origins in the Caspian Sea on the taxonomic signs, genetic and antigenic markers;
- To estimate the hydrologo-hydrochemical regime and ecologo-toxicological condition;
- To estimate reception capacity of the coastal zones of the Caspian Sea in order to determine the scales of the introduction of sturgeons respondent to the state of the food supply;
- To estimate the physiological state of sturgeons on the physiologo-biochemical and morphofunctional parameters considering the ichthypathological characteristic of the populations and also the state of the food supply and food need of fish.

4. Method of the work.

4. 1 Representatives of all five Caspian littoral state will be present on the research vessels during the sea survey.

Russia carries out the survey in the Northern Caspian at the depths to 10m using scientific- research vessels of the Russian federation (KaspNIRKH). It is foreseen to use 2 scientific-research vessel (SRV) one of them is the shallow vessel. In the shallow water area of the Middle and Southern Caspian along the coasts of Azerbaijan and Iran at the depths to 10.0m the investigations are carried out on the shallow vessels belonging to these states. In the Northern, Middle and Southern Caspian in the water area along the coasts of the Russian Federation, Kazakhstan, Turkmenistan at the depths from 10.0 to 100.0m the investigations are conducted on 1-2 scientific-research vessels of Russia (KaspNIRKH). In the western part of the Middle and Southern Caspian along the Azerbaijanian coasts at the isobaths from 10.0 to 100.0 m the survey is carried out on the scientific-research vessel of the Islamic Republic Iran.

5. Trawl Surveys

Sampling station for trawl survey are designed in two procedures:

1. fixed equal distribution of station (KaspNIRKH) (Fig. 1)
2. stratified random design (FAO Rec.)

The grid of the catch stations is uniformly distributed (variant 1) and the randomized method (variant 2) on the investigated water area. One of the possible variants of such grid of stations in the Caspian Sea is shown on Fig. 1. The quadrates are numbered , the size of the quadrate is 7 miles (13 km) on the latitude and 10 –miles (18.5 km) on the longitude. One nautical mile is 1852 meters.

Total the number of stations on the Caspian Sea accounts for 450 including in the Northern Caspian-156 stations by 9-m trawl (69 in the Russian Federation; 87- in Kazakhstan), in the Northern, Middle Caspian-132 stations including 83 stations in the Russian Federation, 29 stations in Kazakhstan, 20 stations in Azerbaijan and in the Southern Caspian 162 stations (Turkmenistan- 42, Iran- 85, Azerbaiajn-35)-using 24.7-m trawl.

In the case of the emergency or defective trawling the result is not considered and the trawling is repeated. The decision on the repeated trawling carrying out is accepted by the heads of the group of the researchers and representative of the state in the waters of which the investigations are carried out.

All states use the unified protocol of sampling during the work.

Design, rigging and the work regime of the used trawls (Appendix 1).

The speed of trawling is 2.5 knots. The duration of the trawling is 30 minutes. The trawl survey is duplicated by the echo-sounder (hydroacoustic) survey at the depths of more than 10 meters.

For 9-m trawl at the standard rigging the horizontal opening is 5.8 m. At the speed of the trawling of 2.5 knots, the vertical opening is 1.0-1.5 m (Sokolov, Pavlov, Zakharov, 1973).

The catchability coefficient at the depths less than 10 m for 9-m trawl amount to: for Russian, Persian and Ship sturgeon-0.1, for stellate sturgeon - 0.07 and for beluga - 0.04 and are similar for the whole Caspian sea.

For 24.7-m trawl at the depths more than 10 m the distance between the leading edges of the ropes is 16.5-17.0 m at the vertical opening of 4.5- 5.0m. The catchability coefficients at the depths of more than 10 meters for 24.7m trawl are for Russian sturgeon, Persian sturgeon-0.22 (Mazhnik, Vlasenko et al, 2005; Zhuravleva, Romanov, 2005) and for stellate sturgeon and beluga- 0.1.

The trawlings are not carried out in the rocky places and in the places of other underwater obstacles as it is inevitable we can lose the trawl.

The trawl-acoustic works on the specification of the catchability coefficient of the different kinds of the trawls for all species of sturgeons at the different depths , the principle of investigations is given in Appendix 2.

Nets.

In order to specify th qualitative and quantitative composition and structure of sturgeons populations, study the vertical distribution and also for the development of the methodic base of the calculation of the abundance using the passive gears, in the shallow water area during the night time the order of the fixed two-walled and single-shell nets is put in the number of 15 pieces, made from the similar materials with the mesh size from 28 to 200 mm (28, 36, 40, 50, 60, 70, 80, 90,100, 110, 120, 140, 160, 180, 200). The length of the net is not more than 36.5 meters, the height of the board planting is 4.5-5.0 meter. The total length of the series is not more than 450-500m. The net series is put in the bottom variant in each 4-5 trawl stations.

The works connected with the determination of the abundance of sturgeons using the passive gears are lied in the fact that during the hydroacoustic investigations of the shallow water area of the northern part of the Caspian Sea the distribution and behavior of sturgeons are studied, the direction and speed of the vertical and horizontal migrations in the different day-time are revealed ,the catchability coefficients are investigated, the catches in the nets and in the bottom trawls are compared. The works on the

marking of sturgeons by the radio- and ultrasonic markers and the observation for their moving are conducted. The speed of sturgeons fish moving in the wild is determined. The sample and processing of the information are conducted under the standard method of VNIRO of the trawl-acoustic surveys carrying out (Guiding principle on the carrying out of the trawl acoustic surveys, 1984), under the guiding principles on the use of the hydroacoustic complexes and post processing systems. The underwater televideo observations are carried out along the whole length of the vessels investigation route in the places and at the area of the route where the transparency of the water (more than 5m) allows to conduct such observations . TV camera is mounted on the underwater equipment towed after the vessel. The videotape recording of all underwater transect falling into the zone of the visibility of the TV camera, is conducted on the digital carrier of the information.

Collection of the biological materials.

Each trawl and net catch is classified according to species, sturgeons (Russian and Persian sturgeons, beluga, stellate sturgeon, ship, sterlet, hybrids) are counted, measured and weighed while they are alive, tag available and disturbances are registered, anomalies in olfactory organs (AOO) and malformations are recorded. The classification of the Russian and Persian sturgeons is carried out according to morphological and genetic parameters. Sturgeons are subject to the total biological analysis (total and fork length, weight, sex, stage of gonad maturation, ecto- and endoparasites available, age). When the sturgeons catch is large (50 specimens and more), some specimens (determined by the Chairman of the working group and by the representative of the state in waters of which the survey is carried out) are only measured, weighed and released into the water body. All fish with AOO and fish of all size-weight and age groups are sampled for bioanalysis in direct proportion to their percentage in catch.

6. Hydroacoustic survey

The surveys in the Middle and Southern Caspian are carried out on SRV " Issledovatel Kaspiya" using the hydroacoustic complex EK-60 of the firm "Simrad" with the stationary installed antennas with the chipped ray for 38 and 120 kHz and with the navigation satellite system GPS connected to the computer. The surveys in the Northern Caspian are carried out on the SRV " Gidrobiolog" and "Meduza". The hydroacoustic equipment ASKOR-2 and fish-searching multi-functional panoramic echo-sounder-video plotter with the single-beam antennas for 200 kHz on the remote rod. The bottom trawls and variable-depth trawl with trawl sensors and trawl sound and also close-meshed inserts from the kilka small net are used for the species identification in order to record fish of all age groups.

Sampling and data processing is carried out according to the standard method of VNIRO and FAO concerning the conducting of the hydroacoustic surveys ("Instruction on GAS carrying out" Yudanov, Kalikhman, Tesler, 1984), instruction on the use of the EK-60 complex (Instruction manual, Simrad) and after-processing system BI-500 (Operation manual, Simrad): and with participation of Iranian scientist.

Calibration of the measuring tracts of the hydroacoustic system for the measuring of the total intensity of the echo sounders Sa and Target Strength (TS) in the absolute acoustic units (Sa- in the square metre per area unit, TS –in decibels). Calibration is made due to the "etalon" sphere – copper ball with the known value of the TS and located at the depths no less than 20-25 m.

Determination of the average value of $<TS>$ and acoustic section $<a>$ of the single hydrobionts of different species and sizes in the natural habitat (in situ) is carried out. At the same time the densities are caught by the trawl, the species and sized hydrobionts composition are determined and then comparing the obtained data on TS with the hydrobionts sizes in the catches, the dependences of the average values of TS on the length for the different hydrobionts species so-called the equation of the hydrobionts TS in situ are determined.

The surveys conducting on the standard scheme of the tacks: the echo-records are registered from the fish concentrations during the transits between the trawl stations with the integration intervals f 5 miles, the obtained data are kept on the hard disc of the computer and then they are copied on the laser discs.

The species identification (determination of the hydrobionts species composition) is carried out on the trawl catches and echograms. On the results of the species identification from the total echo-intensity Sa measured by the calibrated system, the component Sa_i for each species of i hydrobionts is extracted:

$$Sa = Sa + Sa_2 + Sa_3 + \ldots Sa_m,$$

where m- number of species in the density.

The determination of the size-weight composition for each species (size identification) is conducted. The size identification is carried out on the trawl catches. Then on the results of the size identification the values Saj from the hydrobionts densities of each species are calibrated in the units of the density according to the known equation (Dalen, Nakken, 1983):

$$<pji> = Pji\ Sa_i / (\sum Sa_i <\sigma_{ji}>) = C_{ji}\ Sa_i,$$

where $<pji>$- the average density of the hydrobionts concentrations of the size group j of species i in the number of the specimens per unit area , for example per square mile;

j- index of the size group , n- number of the size groups; i- index of the species (i=1.2 ...,m; t- species number); Pji- the portion of the hydrobionts of the j size of i species in the concentration, determining from the trawl catches;

$<\sigma ji>$- the average acoustic scattering in situ of the hydrobionts of j size of i species, determining on the results of the measurement of TS values of calibrated hydroacoustic system;

Sa_i- the total intensity of the echo-sounds from the hydrobionts density of i species;

Cji- the coefficient of the calibration of the echo-sounds Sa intensity, in the units of the hydrobionts density concentration of j size of i species.

The determination of the density and abundance of each species. Summing on all size groups the density concentrations of the hydrobionts of each species are calculated and the summing on the area the abundance is determined. The charts of the distribution are made on the obtained data.

7. Collection of hydrological and toxicological data

The sampling for the determination of the hydrologo-hydrochemical parameters of the water (temperature, salinity, absolute content of the oxygen, active reaction pH) is carried out at all stations with the standard horizons (0,10,25,50, 100,200m and the benthopelagic horizon- during the summer investigations; 0,50,100,200,m and the benthopelagic –during the winter investigations). The water transparency, direction and speed of wind air temperature is measured at each station.

Hydrological and hydrochemical works are methodically conducted in the following way: Water **temperature**: the measurement of the water temperature is carried out by the deep-diving thermometers TG, locating in the holder on the bathometer BM-48, which descend at the given horizon is kept 3-5 min, then they are shut and it is risen to the board where after the balancing of the parameters of the additional thermometers with the air temperature reading of the water temperature is taken. **Water salinity**: From the investigated horizon 0.3-0.4 l of water is taken from the bathometer and after the accumulation of the appointed number of samples the electroconductivity of the water is determined at the electrosalimeter GM-65 with the following recalculation of the salinity.

Dissolved oxygen. The method Vinkler is used. **Hydrogen index (pH).** 50-100 ml. of water are taken from the bathometer and pH is determined by pH-meter (HANNA,HACH). **Phytopigment ("a", "b", "c", pheophytin, carotinoid) :** the samples of the water in the vilume of 1-1.5 liters are filtered under the vacuum with the size of the pores about 1mkm with the preliminary deposit of the carbon magnesium and with the following freezing. The determination is carried out under the laboratory conditions at the spectrophotometer UV-1601"Shimadzu". Hydrological works can be carried out also using the STD-sound SBE-25, equipped with the sensors of the temperature, salinity , dissolved oxygen, pH.

The collection of the samples for the determination of the ecologo-toxicological parameters are carried out at the selective stations with the surface horizon (0.5m).

Extractable oil hydrocarbon (EOH): 1 liter of the water is poured into the bottle with the adding of 10ml of the tetra-chloride carbon and it is shaked. The phenol compounds: 0.5 liter of the water is

poured into the bottle and 10 tablets of KOH are added and it is shaked. **Polyaromatic hydrocarbons** and **chlorooganic pesticides** (PAH + COP): 1 liter of the water is poured into the bottle , 20ml of the hexane is added and shaked. **Heavy metals (HM):** 1 liter of the water is poured into the flask without fixation. Suspended substances (SS): 1.5 litre of the water is poured into the plastic sachet and frozen. Before the sampling the dish is thoroughly rinsed by the selective water. The data of sampling, place of sampling and the name of toxicants is stated on the label.

Biomaterials

Sturgeons. (10-25 specimens of each species): sturgeon (Russian and Persian), stellate sturgeon, beluga – The following samples are taken from each specimen: 1. muscles – from three sections of the fish body (head section, middle part of the body, caudal section); 2. liver – it is desirable to extract the whole liver without the gall-bladder (300 g.); 3. gonads – 300 g.; 4. gills – entirely from under the both plates.

Each organ is packed into a plastic sachet with a label, indicating morphological characteristics (size, weight, sex), date and region of catch.

All the samples of the biomaterial are kept and delivered in the frozen state.

8. Collection of hydrobiological data

Sampling of hydrobiological and trophological material is carried out in the Northern, Middle and Southern Caspian with the use of a standard grid of stations.

Samples of bacteria - and phytoplankton in the Northern Caspian are taken from the surface and near-bottom water horizons with the use of Ruthner bathometer. In the Southern areas of the sea the samples are taken with the use of BM-48 from standard horizons of 0, 10, 25, 50, 100 and 200 meters. The collected material is conveyed to the laboratory for further treatment.

Sampling of zooplankton in the Northern Caspian is carried out with a large Apstein net, D – 25 cm., gas-kapron № 58, totally. In the Middle and Southern Caspian - with a Jedy net, D – 36 cm., gas-kapron № 49 by standard horizons. Determination of the species composition is done in laboratory conditions with the help of binocular MBS-9.

Benthos sampling is done by means of the dredger "Ocean-50" up to 100-meter isobath.

Abundance, biomass and production of the bacterio-, phyto-, zooplankton and benthos and other hydrobionts are calculated on the base of the standard methods. For the specification of the average parameters of the biomass and calculation of the production of the hydrobionts the works are planned on the whole sea. The estimation of the food character, feeding, the speed of the gastrointestinal digestion of sturgeons is estimated on the unified method (Appendix 1). The abundance, average weight and biomass of fish, annual increases, species diversity of the dietary intake and percentage composition of the food of each age group, calorie content of the food organisms and fish is determined. The food individual daily and annual alimentary needs are calculated.

Soil is washed through sieve from the kapron gas №14. The bottom animals are separated from the soil using the method of the clarification according to the instruction on the sampling and processing of the zoobenthos (Romanva, 1983. Not more than 2 liftings are taken at each hydrbiological stations. The samples of the bacteriobenthos are selected by the bottom-grab"Ocean-50".

The soil is washed through the sieve made of kapron-gas № 14. Bottom animals are separated from soil by decantation method according to the manual on sampling and processing of zoobenthos (Romanova, 1983). Not more than 2 samplings (raisings) are done at each station.

Bacterio-benthos sampling is done by means of the dredger "Ocean-50".

Simultaneously, trophological sampling (alimentary canal) is carried out at all the ichthyological stations, where trawling is conducted. After full biological analysis sturgeon stomachs or entirely

sturgeons (juveniles) are extracted and fixed in formalin. All age groups of sturgeons beginning from the fingerlings up to the oldest specimens have to be included into the selection for the trophological analysis. The materials of investigations are used for the determination of the rate of the food supply provision and also one of the component on the determination of the reception capacity of the Caspian Sea. Sampling and processing of trophological materials is done according to "Methodical guidelines on studies of fish feeding and food relations in natural conditions" (VNIRO, 1974).

9. Collection of the physiological data.

The material for the investigation is carried out during the conducting of the complex surveys in the Northern, Middle and Southern Caspian on the board of the scientific-research vessels.

Sturgeons for the analysis are taken only from the trawl catches. The following samples : blood, stabilizing by the heparin and the blood for the serum, muscle and fin tissues from the front part of the body and liver, gonads, gills from the caught different sized sturgeons.

The blood of the investigated fish is necessary taken for the biological analysis in order to exclude the asphyxia and stress. The fin and muscle tissue samples are taken from the biological analysis. The blood taken for the serum is kept at the room temperature up to formation thrombus and appearance of the first signs serum and then put into the refrigerator per day. After that the serum is separated in such a way that there are no red corpuscles and then immediately it is analyzed on the content of the -lipoprotein and protein in it. The rest part is frozen in the plastic test-tubes. The blood stabilized by the heparin is analyzed for the content of the haemoglobin during 24 hours after taking.

The sample of the white muscle and liver are packed and preparing for the freezing. Another part of the muscles and liver and also the samples of the gonads and gills are fixed in the liquid of Buen and marked. The sample marking both at the freezing and at the fixation is carried parallel with the ichthyological samples. The samples for the physiological –biochemical investigations are taken from all fish which are subject to the complete biological analysis. The freezing and keeping of such samples is carried out at the temperature of not more than 18^0C. The fixed and frozen samples are brought to the laboratory for the analysis on the stationary equipments. The standard methods of the histological, biochemical, hematologic, immunochemical and molecular genetic and analyses are used for this. The samples which are not liable to the keeping are processed directly in the sea on the scientific-research vessels.

In connection with the use of the modern equipment of the diagnostics of the physiological state of fish organisms in the World practice foreseeing the life selection of the blood sample and tissue of the organs. (Appendix 1).

Interspecific and species differentiation of sturgeons is carried out on the base of the with immunogenetic markers the use of the molecular-genetic analysis. The level of the genetic heterogeneity on the composition of the haplotypes of the different sturgeons species is investigated using the RAPD-PCR analysis. (Appendix 1). Each of the harvested specimen is tested for the belonging to the Russian and Persian sturgeon and beluga, stellate sturgeon and hybrid is tested for the belonging to *the population of different origin (Ural river, Volga river, Cura river and other) .*

10. Collection of the ichthyopathological data.

The materials for the investigations are collected during the conducting of the complex scientific-research surveys in the Northern, Middle and Southern Caspian sea. It is necessary to collect 15 samples from sturgeons caught in the Northern Caspian; eastern and western parts of the Middle and Southern Caspian for the investigation of the parasitofauna. The number of the samples has to be 60 for the representative selection and reliable estimation of the qualitative and quantitative composition of sturgeons parasitofauna in all water area of the sea. Each sample includes gills, alimentary canal, liver, spleen and gonads from one specimen. Cutting of the internal organs is not admitted. Each sample without the preliminary ablution is packed in the separate polyethylene packet, make label (gills are packed separately). On each label it is stated the date, fish species, the area of the sampling, depth, gear. After this the samples are frozen and delivered to the laboratory of the fish disease in the frozen from.

It is necessary to carry out the report of sturgeons affected by the *Pseudotraheliastes stellatus* during the sampling in the sea. For this journal the specimens of sturgeons are recorded invaded by these parasites. In a similar way it is recorded the sturgeons in the body cavity of which *Amphilina foliacea* was found at the biological analysis. The presence of the tumours , other new formations or ulcerous part on the body of sturgeons are registered in the journal, the place of the affection is cut out, pack, put the standard label, freeze and deliver to the laboratory of the fish disease in the frozen form.

11.Terms of work:

Winter survey: January-March, - expedition work. April - data processing, May-June - writing and submitting of reports to the program.

Summer survey: July-August - expedition work. September-October - data processing, November - writing and submitting of reports to the program.

1. Statistical processing of the materials

All statistical data on hydrology, hydrobiology, hydrochemistry, genetics, physiology and stock assessment and any other information which are obtained during this survey will be analyzed according to international standard accepted methods *with the use of the modern computer statistic programs for the data processing: EXEL, STATISTIKA 6.0 and other.*

13.Special conditions:

The representatives of the scientific fisheries organizations of Turkmenistan, Azerbaijan, Kazakhstan, Russia and Iran will participate in all expeditions of the North, Middle and South Caspian sea.

Each Range State can nominate at least one and maximum two scientists to be present during the survey and each Range State is responsible for facilitating of relevant communication such as invitation letters and visa.

During preparation of sea survey if there would be any technical or logistic demand from any Range State it was agreed that to support such demand for example providing trawl, maps, design, nets, vessel, fuels, accommodations, etc.

The data processing and the report preparation is carried out jointly by the representatives of all Range States.

All the financial expenses for the interstate survey conducting can be paid by each Caspian Sea states on the base of the additionally agreed treaty and with the consideration of the share contribution of each state.

2. Works results:

After completion of the survey and performing all necessary analyses which will be prepared jointly by representatives of Range State the result will be communicated to each Range State and the Secretariat of the Commission in due time. In the appropriate Working group, the result will be discussed and after agreement will be presented to the Commission. The report has to include the results of the investigations components (item3) and also has to correspond to the goals of the conducted works, After the decision the report will be sent by the Secretariat of the Commission to the relevant international organizations such as CITES.

Estimation of the survey results has to include the following data:

- Sturgeons stocks and other hydrobionts state;
- Specific ratio of sturgeons of different origins;
- Comparative assessment of the sturgeon physiological and ichthyopathological condition;
- Hydrologo-hydrochemical regime and toxicological condition in the investigations areas;
- Food supply state and sturgeons food providing in the Caspian Sea;
- Total allowable catch on different regions of the Caspian Sea basin. (Appendix 1);
- Abundance and species of fish which the sea can feed and the optimum volumes of the artificial propagation of sturgeons;

- Recommendations for the artificial propagation of sturgeons considering the present ecological state of the habitat and rate of the provision with food supply.

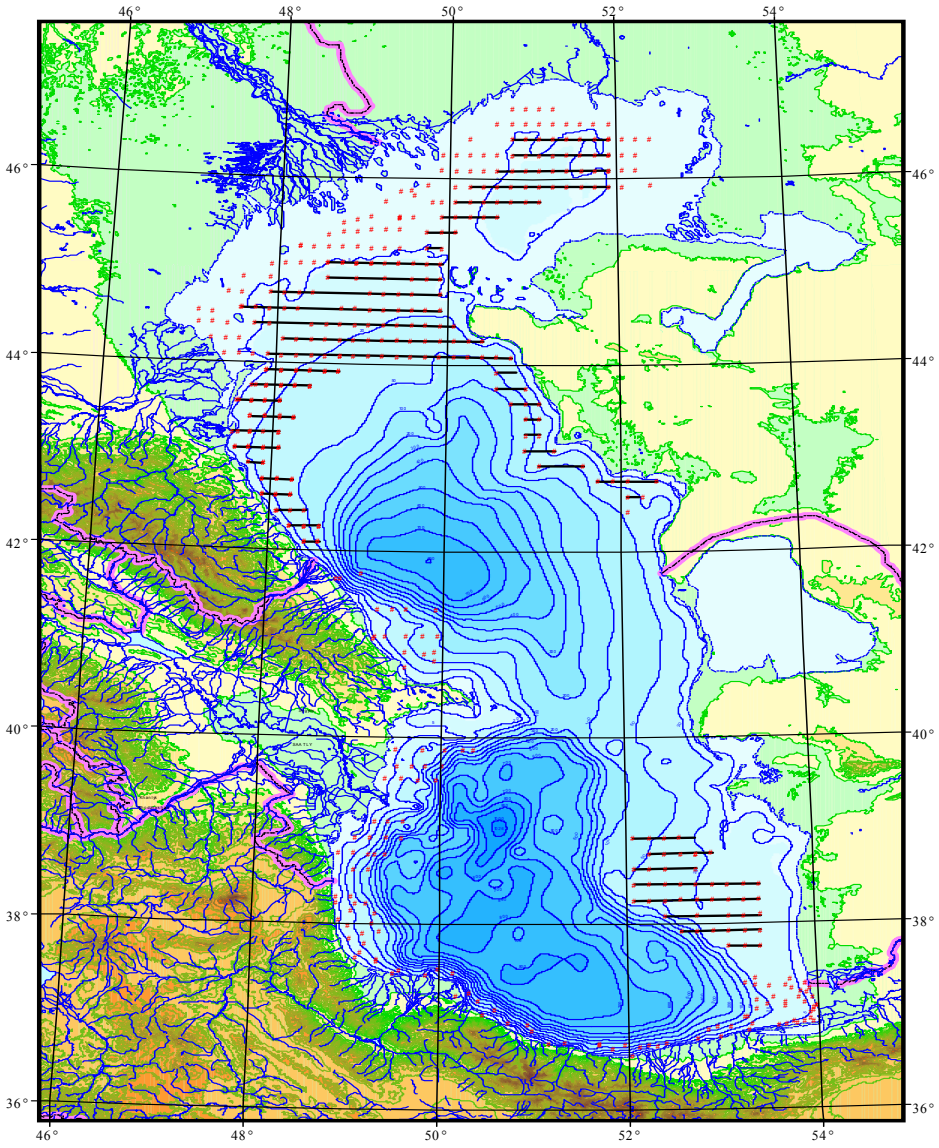


Fig1.
Grid of the trawling stations and hydroacoustic tacks in the Caspian Sea

Appendix 1

Methods of sampling and processing at the survey carrying out.

Oceanographic characteristics.

Measurement and determination of the hydrological and hydrochemical parameters are carried out under the methods:

1. Determination of water temperature, salinity and transparency – Guiding principle on the chemical analysis of the surface water of the land Semenov A.D. L., GMI., 1977;
2. PH determination – potentiometric method of the measurement of the active reaction pH (PND F 14.1:2:3:4. 121-97);
3. determination of the phytopigments – Spectrophotometric method with the use as the extractive substances – acetone (method UNESCO);
4. dissolved oxygen- Vinkler method RD 52.10.243-92;
5. determination of the extractive oil hydrocarbon (EOC)-with the use of the infra-red spectrophotometer IKS-40 (PND F. 14.16:2.5-95 etc.)
6. Determination of the Polyaromatic hydrocarbons (PAH)- method of the gas chromatography and mass spectrometer on the equipment QP-5000 of the firm "Shimadzu" (method of Drugov U.S. Rodin A.A. 1999. Ahuja S., 1989 and others);
7. heavy metals – at the atomic absorptive spectrophotometer AA -855 of the company "Yahaco" (PND F 14. 1: 2:4. 139-98);
8. chlorinated hydrocarbons – by means of their extraction by hexane and further determination by the method of gas-liquid chromatograph (method RD 52.24.412-95, Dawson R., Rilli J.P. 1977);
9. phenols – by the extrac- photometric method after steam distillation (PND F 14.1:2.105 – 97);

All these methods are the official documents for the conducting of the chemical analysis of the sea water.

Hydrobiological characteristics.

- phytoplankton – is a qualitative characteristics according to Proshkina-Lavrenko A.I., Makarova I.V. "Plankton alga of the Caspian sea". Moscow, "Science", 1968. Qualitative characteristics according to Usachev P.I. "Qualitative fluctuation of phytoplankton in the Northern Caspian", Works of the Oceanology Institute USSR , v.2. 1948;
- zooplankton – "Direction for plankton collecting and processing", Moscow. VNIRO, 1977;
- zoobenthos – " Methodic directions to the direction of benthos in the south Sea of USSR", Moscow, VNIRO, 1983;
- fish feeding – "Methodical manual for study of feeding and food relations of fish under natural conditions", Moscow, "Science" 1974.;

Polyaninova A.A., "Method of determination of receiving capacity in the Caspian Sea by juveniles of commercial fish species.", theses of reports of the International Conference on commercial oceanology, Moscow, 1977.

Investigations on the determination of the reception capacity of the Caspian Sea

The material on the providing fish with the food is the base of the calculation of the reception capacity of the sea. The number of food eaten by fish of each age group (daily, monthly, annual food allowance of fish feeding) is determined by the calculated way- method of the balance equality (Vinberg, 1956, Methodical recommendations...,1980). The experimental data collected during the carrying out of the scientific-research trips and literature data obtained earlier are the additional material for investigations.

For the determination of the daily food allowance (C) necessary for the adult mature fish the equation of the energy balance will be used

$$ = R + P + Pg + F$$

where C- daily food allowance in gr/specimen or joule/specimens day;

R-outgoings for energy exchange;

P-outgoings of energy for plastic exchange;

Pg- outgoings of energy for generative growth;

F- indigested part of the consumed food;

For the juveniles and immature fish outgoings for the generative growth are not recorded.

Outgoings for energy exchange (R) are estimated on the formula:

$$R = \frac{a \times 20{,}33 \times 24\, W^{k} \times 1{,}5}{g\, C_c}$$

where

a- coefficient, equal to the exchange at W= 1 (ml O/gr hour at 20^0C);
20,33- energy coefficient of the oxygen joule ml O_2;

W- fish weight, gr;

k- index of the rate indicating with which speed the exchange is changed at the increase of fish weight;

1,5- coefficient for the active exchange;

g-temperature correction of the exchange speed at 20^0 and at the given temperature;

C_c- energy equivalent of the raw substance of fish (joule/gr)

The next element of the equation of the energy balance (P) from the increase of the fish weight per day

$$P = C_w W$$

where

C_w-specific speed of the growth (t_2-t_1);

W- average weight of fish

Specific speed of the growth is calculated on the following equation

$$C_w = \frac{Lg W_2 - Lg\, W_1}{0{,}4343\,(t_2 - t_1)}$$

At the calculation of the food allowance of the mature fish it is necessary to have the data on the generative growth (Pg). These data are obtained by the weighing of the gonads. The last element of the balance equation (F) - indigested part of the food allowance. At the feeding of the animal food its value is taken as equal to 20%, mixed food -30-35, at the consumption of the vegetable food 40-50%.

The optimum volume of the artificial propagation of sturgeons is determined on the base of the modeling of dynamic of the generations abundance during the life cycle and food demand of the populations forming from the reared juveniles.

The following data are used for the calculation: temperature regime of the sea during the feeding period of each fish species in the different areas of the sea; the species diversity of the plankton and bottom animals , their biomass, coefficients of the invertebrate reproduction recording in the water strata and on the bottom during the complex surveys; abundance of fish on the age and their biomass; species diversity of the food allowance and percentage of the food composition of each age category; calorie content of the fodder and non-fodder organisms and fish.

The production of the invertebrate animals is calculated with the use of the coefficients of the reproduction (P/B coefficients) or as the sum of the gross biomass of the plankton and benthos eating fish. Both these methods are used in the work.

The collection of the materials is carried out in the Northern, Middle and Southern Caspian thus in order to obtain the more exhaustive picture of the habitat state and biota in spring, summer, autumn and winter. During the whole year 3-4 surveys are carried out covering the polygons on the water area of the Northern, Middle and Southern Caspian. In the investigations trips the collection of the materials on the fish food should be given consideration. The collection of the materials in the scientific-research trips is carried out on the special prepared unified working programs.

Commercial-ichthyological characteristics.

Trawl surveys in the Caspian Sea are carried out in accordance with "Temporary Method of conducting Ichthyological surveys in the sea and date processing for calculation of relative and absolute abundance of sturgeons." Astrakhan

The bottom trawls which work on the unified scheme are used in the record surveys in the Caspian Sea. (Fig. 1-2).

The 9-m bottom trawl is used in the coastal area of all states up to 10 meters. **The rigging of 9-m trawl:**

3. headline of 9 meters is equipped with 5- plastic floats with diameter of 200 mm, uniformly distributed from the center of the line;
4. foot rope equipped with the load with the weight of 30 kg uniformly distributed from the center of the line on the whole length;
5. thrust boards with the square of 0.55 m^2, weight -30 kg.

The 24.7-m trawl (the length of the headline on the net part):

a) headline is equipped with the plastic floats with diameter of 200 mm, 30 pieces , uniformly distributed from the center of the line;
b) foot rope (36.6 m) is equipped with the cable "Gerkules" on 0.2 m shorter the foot rope and soil-track bobbins in the number of 7 pieces with the weight on 5 kg. The cable of Gerkules is passed through the soil-track bobbins.
Sturgeons abundance is determined on the average catch, distribution water area, swept area and investigated gears catchability coefficient (trawl, nets).

Trawl surveys are conducted only in the day time, at that trawling duration for each station is 30 min. Decrease of trawl exposition is permitted in 3 times, up to 15-20 min. in exclusive cases, when catches are large. Velocity of trawling is 2,5 -3,0 of knots. The whole catch of sturgeons is recorded according to species, at that morphological anomalies and presence of ectoparasits are noted.

Length (absolute and commercial), weight, sex, maturation stages and gonads weight are determined, presence of endoparasites and their number, viscera anomalies, are registered, marginal ray of one of the pectoral fins is cut and dried for age composition determination when complete biological analysis is made.

In laboratory conditions rays' sawing is made by means of a special sawing device or electro fret-saw. Before examination the cut is moistened by the drop of toluol or xylol, that sharply clears the device and facilitates counting of age lays.

The method of the determination of the age was stated for the first time by O.V. Kler (1916) and improved by N.L. Chugunov (1926).

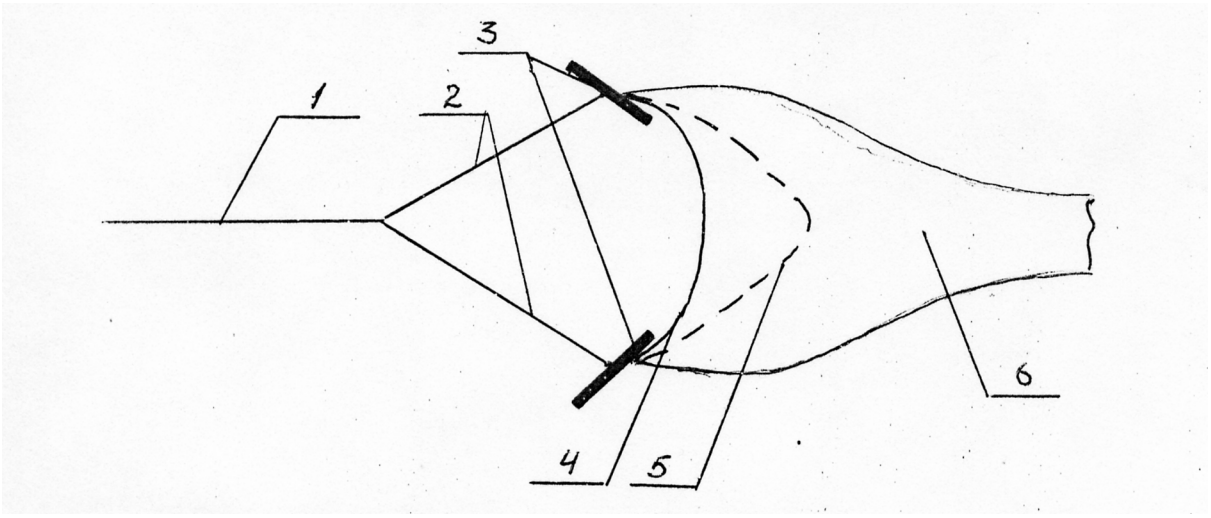
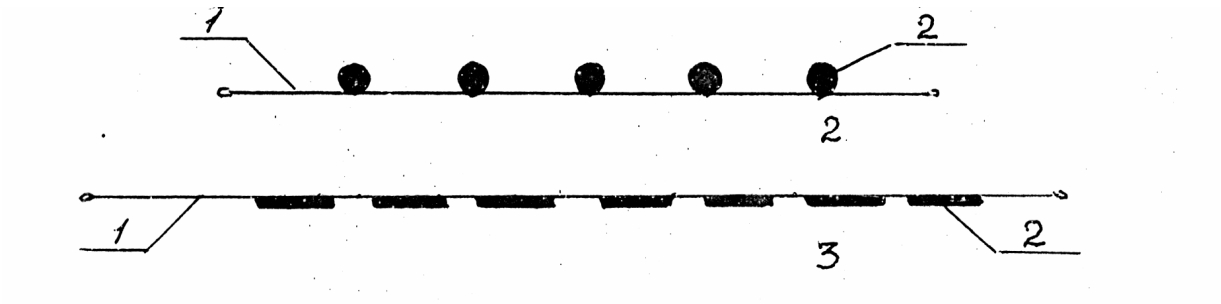


Fig. 1 Rigging of 9-m trawl (2-3).

1. Drag rope. 2. Bridle – (20 m each).3. Trawl doors – (0.55 sq. m with the weight of 30 kg) 4. Headline. 5. Bottom-line. 6. Trawl mouth.



Rigging scheme:

2.1. Headline of 9-m trawl. 2.2. 5 plastic floats 200 mm. in diameter .

3.1. Bottomline. 3.2. Chains with the total weight of 30 kg are evenly distributed along the whole line.

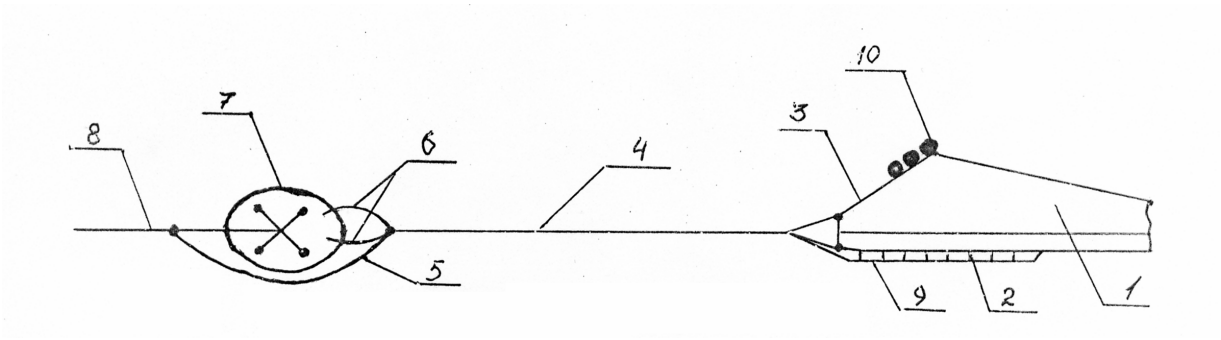
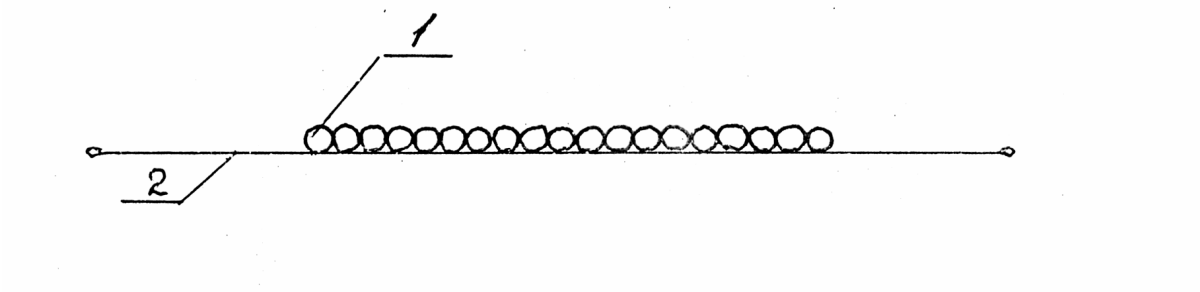


Fig. 2 Rigging of 24.7 m trawl.

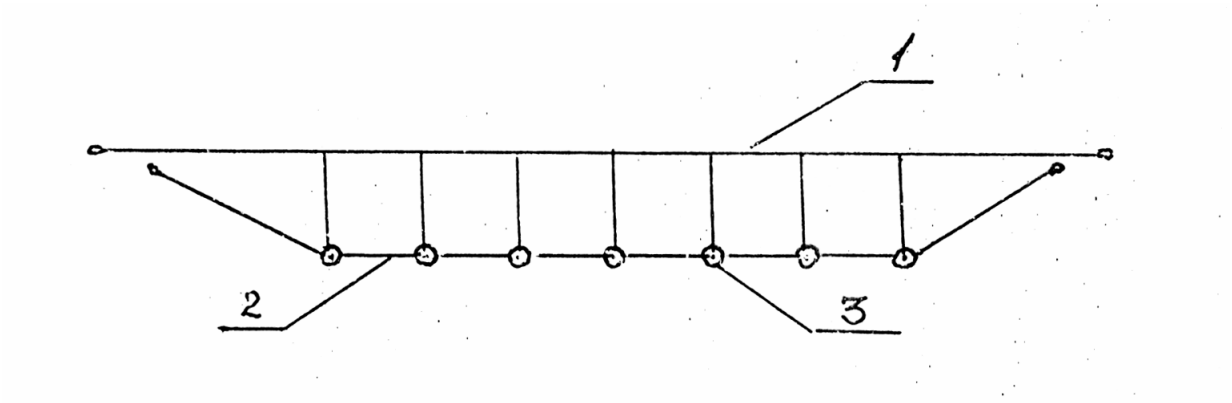
1. Trawl . 2. Bottomline. 3. Headline. 4. Cable – 50 m . 5. Connecting rope 6. Boards. 7. Trawl doors (2.5 or 3 sq. m) 8. Drag rope. 9. Rip line. 10. Floats



Rigging scheme of the headline of 24.7-m trawl.

1. Garland of 30 floats with 200 mm in diameter from the center of headline

2. Headline



Rigging of the bottom line.

1. Bottomline of 36.6 m.

2. The rope "Hercules" is 0.2 m shorter than the bottomline.

3. 7 bobbins fasten with chains are uniformly distributed throughout the bottomline.

Each bobbin weighs 5 kg. The rope "Hercules" is passed through the bobbins.

The equipments, apparatus and instrumentation used for the development of the method of the calculation of sturgeons abundance using the passive gears- two-walled fixed nets.

1. Navigation echo-sounder with the built in system GPS for the three-dimensional positioning of the marked fish (Lowrance LMS-350A)
2. Echo-sounder for the work on the shallow water area with the near-bottom echo-markers (CVS-888 (MA-E01); «Hondex-301»; Simrad «EY-M»; Lowrance X-45)
3. Ultrasonic markers with the external mount to the fish body
4. Equipment set for the registration of the ultrasonic markers
5. Under water digital video camera miniDV with the wide-angle nozzle to the object-glass

The collection and processing of the information are carried out under the standard method of VNIRO of the hydroacoustic survey carrying out (Guide principle on the hydroacoustic survey carrying out, 1984), instruction manual on the use of the hydroacoustic complexes and post processing systems. Besides the echo-recording of the fish concentrations is conducted on the whole route of the scientific-research vessels.

Physiological and ichthypathological characteristics.

Blood samples, from which serum medications are prepared at fishing places,as well as muscle tissue from the front part of the crop and liver, gonads and gills are taken from caught fish. These medications are marked and put in the frig for storing.

Under laboratory conditions the analysis of antigen composition of serum albumen is made, according to which belonging of fish of the given sturgeon species to this or that population or race is determined. Respiratory, protecting, regular- homeostatic systems, as well as morph functional state of liver and gonads are studied. Standard methods of histologic, hematologic and biochemical analyses are made.

- Methodic manual for making histologic researches of fish organs and tissues on water toxicology (elaborated by GosNIORKh, Leningrad, approved by the Fishery Ministry of USSR 1976).
- Methods of biochemical researches, Practice on biological chemistry "Vyshaya Shkola" , Moscow 1996. Estimation of antioxidant activity of blood plasma with the use of albumen lipoproteins. Laboratory affair 5. : Meditsina" 1988.
- Lukiyanenko V.I. Umerova Zh.G. Karataeva B.B. South Caspian sturgeon as a independent species of Acipenser.// Izvestya USSR. Biological series.- 1974. - 5. p. 736-739.
- Lukiyanenko V.I., Karataeva B.B. Kamshilin I.N. Season races of Volga-Caspian sturgeons. In connection with the problem of their reproduction and rational fishery. – Andropov. Izd-vo IBVV named after Papanin I.D. 1988, p. 191.

The diagnostics of the sexes and gonad maturity is possible to determine life-time on the base of the ultrasonography or ultrasonic scanning by the equipment of type FALCO-VET. Their marking by the electro markers of type TROVAN (France) is made for the following possibility of their identification at the carrying out of the trawl-net works in the sea and rivers of the Caspian basin.

The method of RAPD-PCR (Random Amplified Polymorphic DNA- Polymerase Chain Reaction) or the method of the accidental primers of the total DNA is one of the main methods in the investigations of the Russian and International genetics as it allows to get the unique electrophoregram for each form of DNA given the integral characteristics of the individual genotype (Maniatis, Frich, Sembruk, 1984; Barmintsev et al, 2002).

Barmintsev V.A., Chudinov O.S., Zelenina D.A., Muyge N.S., Volkov A.A., Kiseleva A.F. , Rastorguev S.M., Barmintseva A.E., Savchenko I.M. Problems pf the molecular-genetic identification of sturgeons in the Caspian Sea. In "Aquaculture of sturgeons": Materials of the reports of the III[rd] International of the scientific-practical conference. –Astrakhan, 2004, pp.147-152.

Maniatis T., Frich E., Sembruk J.The methods of the genetic engineering. The molecular cloning: Translation from English. –V., Mir, 1984-p.480.

- Under laboratory conditions in accordance with accepted methods in parasitology *(ichthyopathology)* (Byhovskaya-Pavlovskaya, 1985) after defrostation by the compression method with further microscoping the ichthyopathological analysis of received materials is conducted. The specific

identification of observed parasites is carried out according to the "Parasites identification of freshwater fish species of USSSR" (Byhovskaya-Pavlovskaya, and others, 1962) and "Parasites identification of freshwater fish species of USSSR fauna" (Bauer, 1987) by means of biological and stereoscopic microscopes.

Determination of the total allowable catch (TAC)

The annual determination of TAC of the Caspian sturgeons to be more exact the volumes of their harvest as the inescapable by catch at the fishing of the ordinary fish includes the following main stages:

1. The estimation of the sturgeons abundance in the sea is carried out on the results of the sea trawl surveys. The trawl surveys are conducted on the seasons : winter, spring. In the northern part of the sea the trawling is carried out by 9-m trawl from the vessel with the power of the propulsion engine of 150-300 h.p., in the middle and southern part of the sea we use the 24.7-m trawl from the vessels of the type SRTM-800 and RS-300. The speed of trawling is 2.5 knots. The duration of the trawling is 30 minutes. One trawling is made in each quadrate.

At present the catchability coefficients for 9-m trawl in the northern part in the shelf zone of the sea on Russian sturgeon, Persian sturgeon and ship is 0.1; on stellate sturgeon-0.07; on beluga-0.04 for all Caspian Sea. The catchability coefficients for 24.7-m trawl at the depths more than 10.0m are the following: for Russian and Persian sturgeon-0.22, for stellate sturgeon and beluga-0.1.

For 24.7-m trawl the catchability coefficients for sturgeon, stellate sturgeon and beluga are 0.1 for all Caspian Sea.

The trawl surveys are conducted on the adopted grid of stations, the quadrates are numerated (Table 1., Table 2 ,Fig.1). The value of the quadrate on the latitude is 10^0 (10 miles), on the longitude is 7 miles. One sea mile is 1852m.

Table 1

Number of trawling stations in the different water areas of the Caspian Sea on randomized method

State	Fishery zones	Depth (m)		
		2-10	10-100	Total
Azerbaijan Republic	1	4	16	20
	2	7	28	35
Total		11	44	**55**
Iran	1	5	17	22
	2	3	5	8
	3	2	9	11
	4	3	18	21
	5	21	2	23
Total		34	51	**85**
Kazakhstan Republic	1	87	-	87
	2	2	4	6
	3	1	22	23
Total		**90**	**26**	**116**
Russian Federation	1	67	2	69
	2	9	27	36
	3	2	45	47
Total		**78**	**74**	**152**
Turkmenistan	2	1	41	42
Total		**1**	**41**	**42**

Table 2

Number of trawling stations in the different water areas of the Caspian Sea (at the work using the method of the equal distribution of stations)

State	Water area	Depth, m	Total	Stations
		2-10	10-100	
Azerbaijan	Western shelf of the Middle Caspian	4	16	20
	Western shelf of the Southern Caspian	7	28	35
	Total			55
Kazakhstan	Eastern shelf of the Northern Caspian	**87**	-	**87**
	Deep water area of the Northern Caspian	2	4	6
	Eastern shelf of the Middle Caspian	1	22	23
	Total	**90**	**26**	**116**
Russia	Western shelf of the Northern Caspian	**67**	**2**	**69**
	Deep water area of the Northern Caspian	**9**	**27**	**36**
	Western shelf of the Middle Caspian (at Dagestan)	2	45	47
	Total	**78**	**74**	**152**
Turkmenistan	Eastern shelf of the Middle Caspian	1	41	42
	Total	**1**	**41**	**42**

1. **The main equation of the quantitative estimation** of fish populations in the sea is the following:

$$N = S_x : Kg,$$

where: N- total number of fish in the surveyed area, specimens;

S- area of its distribution, m^2;

g- the area of the zone of one fishing, m^2;

K- catchability coefficient of the gears;

x- average catch per one control trawling, specimens.

2. Total sturgeons stocks in the Caspian Sea is determined as the product of the calculated abundance and their average weight:

$$B_0 = N \cdot \omega,$$

where: B_0- total stock, th. tons;

N- calculated abundance of fish of the given species, specimens;

ω- average weight of the specimens, kg.

3. The estimation of the commercial stock. According to the Fishing Regulations females compose the commercial stock of beluga in the Caspian Sea they have the body length from 180sm and more:

$$B_{p3} = aN \cdot \omega,$$

where: B_{p3}- commercial stocks, th. tons,

a- the portion of fish having the length of the body $\geq$ 180sm (beluga) or $\geq$ 86sm (sturgeon and stellate sturgeon), portion unit;

N – calculated abundance of the population, specimens;

ω- average weight of the specimens, kg.

4. The estimation of the spawning part of the population. The calculation is made in accordance with the method of the fish number with the gonads of the III, III-IV maturity stages:

$$Bn = N_1 \cdot \omega_1 + N_1 \cdot \omega_2 + N_1 \cdot \omega_3,$$

where: Bn- spawning stocks, th. tons;

N_1, N_2, N_3- abundance of fish with the gonads of III,III-IV maturity stages;

$\omega_1 + \omega_2 + \omega_3$ – average weight of the specimens with the gonads of III,III-IV maturity stages.

5. The volumes of the spawning parts of sturgeons populations which have to enter the rivers of the basin are determined coming from the specimens stages of the gonad maturity feeding in the Caspian Sea. The population belonging of the fish is determined in the sea by immuno-genetic methods. The obtained data have to consider the assessments of the volumes of the spawning parts at the entering of the spawners into the spawning rivers.

6. TAC is calculated based on standard International methods as the allowable volume of the harvest from the spawning stock. The volume of the possible harvest for different sturgeons species is determined at the rate from 6 to 14%. (Malkin, 1999) from the commercial stock of the population spawning part feeding in the sea.

* ***Special conditions of the investigations methods use***: *In a case if the international standard method is proposed by one of the Caspian Sea states which is not used for the carrying out of the scientific-research works by the other states this method has to be discussed at the session of the Working group of the Commission on the aquatic bioresources of the Caspian sea and agreed for its use.*

Status of sturgeons' stocks in the waters of Ukraine in 2006

The Sea of Azov

In scientific literature the following sturgeon species are described for the Azov Sea: Russian sturgeon (osetr) - *Acipenser gueldenstaedtii*, stellate sturgeon (sevruga) - *Acipenser stellatus*, sterlet - *Acipenser ruthenus*, ship sturgeon - *Acipenser nudiventris* and beluga - *Huso huso*. In recent years it has not been recorded a capture of Ship Sturgeon individuals in this region; and sterlet occurs quite rarely only in Taganrog and Temryuk bays. Beluga is very rare in the Azov Sea at present and it is occurred individually. Stellate sturgeon is found a bit frequently. Only Russian sturgeon is occurred usually, however, at present it is found rather rarely.

Monitoring of sturgeons' populations status in the Sea of Azov is carried out, mainly, in the process of sea expedition surveys. The results of these surveys show that in 2006 the reduction in sturgeons' abundance and especially in the abundance of stellate sturgeon takes place (Table 1 and 2). Thus, typical for recent years depressive state of sturgeons' stocks in the Sea of Azov not only persists but also even aggravates. The percentage of adult individuals (reaching reproductive state) in 2006 in the population of Russian sturgeon makes up to 2 %, and the population of stellate sturgeon – up to 5 %. Such specific features of the age composition of the populations of these species also points at their unfavorable state.

The major results of research of Russian sturgeon and stellate sturgeon populations are given in the Tables 1 and 2.

Table 1

Major population parameters of Russian sturgeon in the Sea of Azov
(using YugNIRO and AzYugNIRO data)

Years	Sex ratio, %%		Age groups ratio, %%			Absolute abundance, thousand individuals	
	Males	Females	Beyond 9 years old	9-13 years old	More 13 years old	Total	Individuals of commercial size
2000	64	36	25	58	17	1520	12,7
2001	61	39	19	58	23	1123	17,5
2002	65	35	8	48	44	1820	21,4
2003	66	34	68	29	3	2328	-*)
2004	77	23	72	12	16	968	-*)
2005	-**)	-**)	99	1	0	523	-*)
2006	-**)	-**)	***)	***)	***)	290	-*)

Notes:

*) Catches of commercial sized individuals in the process of registration survey have been almost absent;

**) Due to the extremely scarce number of commercial sized individuals in catches the sex ratio has not been determined;

***) Due to the extremely scarce number of commercial sized individuals in catches age ratio is not given.

Table 2

Major population parameters of stellate sturgeon in the Sea of Azov
(using YugNIRO and AzYugNIRO data)

Years	Sex ratio, %%		Age groups ratio, %%			Absolute abundance, thousand individuals	
	Males	Females	Beyond 5 years old	5-9 years old	Over 9 years old	Total	Individuals of commercial size
2000	63	37	26	59	15	166	32,6
2001	68	32	35	55	10	252	37,4
2002	66	34	46	51	3	340	20,7
2003	61	39	48	52	0	446	-*)
2004	78	22	77	23	0	161	-*)
2005	-**)	-**)	94	6	0	38	-*)
2006	-**)	-**)	***)	***)	***)	4	-*)

Notes:

*) Catches of commercial sized individuals in the process of registration survey have been almost absent;

**) Due to the extremely scarce number of commercial sized individuals in catches the sex ratio has not been determined;

***) Due to the extremely scarce number of commercial sized individuals in catches age ratio is not given.

Natural reproduction of sturgeons in the rivers of Ukraine flowing into the Sea of Azov is absent. At the same time artificial reproduction takes place in Ukraine, its results being given in Table 3.

Table 3

Characteristics of artificial reproduction of sturgeons undertaken by Ukraine in the Sea of Azov

(AzYugNIRO data)

Years	Amount of reproduced juveniles, thousand individuals	
	Russian sturgeon	stellate sturgeon
2000	1324,9	0
2001	1245,0	0
2002	1325,0	0
2003	512,0	0
2004	514,0	0
2005	0	0
2006	49,5	0

Status of sturgeons' stocks in the waters of Ukraine in 2006

The Basin of the Black Sea

In the scientific literature for the northwestern Black Sea the following sturgeon species are given: Russian sturgeon, stellate sturgeon, beluga, ship sturgeon and common sturgeon - *Acipenser sturio*. Moreover, sterlet occurs individually in the Danube. For the recent years the cases of capture of ship sturgeon and common sturgeon have not been recorded for this region.

Russian sturgeon, stellate sturgeon and beluga are not so rare, however their abundance has been reduced greatly. By now they lost their commercial value but there are no grounds to speak on real threat to the existence of these species. Nevertheless, beluga as well as ship has been entered into the Red Book of Ukraine. As it was stated above, fisheries of these sturgeon species are prohibited. Their capture is carried out in small amounts for scientific purposes and for breeding.

All the mentioned species (except sterlet) are anadromous, the major areas of natural spawning areas are the rivers Danube and to less extent the Dnepr; earlier they reached the Southern Bug and Dniester. They spent the major part of their life cycle at sea. Earlier for monitoring of sturgeon populations in the northwestern Black Sea trawl surveys were undertaken in February - March. Unfortunately, due to the lack of funds special counting surveys of these species were not undertaken in the Black Sea in 2003-2005. In 2006 YugNIRO managed to arrange the counting trawl survey of sturgeons in this area. Unfortunately, due to various problems, the survey started with great delay and as a consequence only 11 trawling operations were made over the rather limited water area. Stellate sturgeon was found in catches, its average catch making 1.5 individual per 1 trawling hour. The body length of starred sturgeon made from 46 up to 105 cm. Only 1 Russian sturgeon of 125 cm long was captured in the process of survey. Beluga was absent in those catches at all. Thus, in spite of the limited number of counting trawling the outputs of this survey revealed that sturgeon stocks in the Black Sea are still at the depressive state.

The natural reproduction of sturgeons in this area at present is not extensive; the artificial reproduction of Russian sturgeon and stellate sturgeon is carried out by sturgeon-breeding plant located in Kherson on the river Dnepr. This plant has released 111743 individuals of Russian sturgeon, 6188 individuals of stellate sturgeon and 59602 individuals of sterlet to the natural habitat (lower Dnepr) in 2006.

The state of sturgeon populations in the Danube delta was studied by YugNIRO Odessa Center. There have been captured only 14 individuals of stellate sturgeon in the process of scientific catches in 2006. Their length was from 100 up to 114 cm, and the weight from 5 up to 9.5 kg. Gonads of these individuals were at the III – IV stages of maturity. There has been caught only one Russian sturgeon, and its weight was 12 kg.

In 2006 there have been registered cases of capture of sturgeons of younger age groups with nets in the avant-delta of the Danube. There were caught 4 individuals of beluga in July - August with body length of 20-97 cm. The number of stellate sturgeon juveniles was 27 individuals, their length being 57-86 cm; by-catch of this species was observed from May till October. By-catch of Russian sturgeon juveniles made 2 individuals of 93 and 101 cm long; they were caught in June - July. All these individuals were released alive to the water body.

All the given results point to the depressed state of sturgeon populations (of Russian sturgeon in particular) in the Ukrainian sector of the Danube.

Status Report on the Fishery Resources and its Management:

Acipenser schrenscki and *Huso dauricus* in Heilonjiang (Amur) River

7. Review of mainly measures regarding management and conservation of sturgeon stock in Amur River in China

Chinese government has made great efforts to protect sturgeon stock by means of limitation of fishing, habitat protection, encouragement of aquaculture, implementation of restocking program under the guarantee of laws, regulations and policy regarding sturgeons, as well as strengthening of international cooperation.

8. Setting up prohibited fishing areas and periods

Two round-year prohibited fishing areas covering 80 km river length was set in the reaches at Luobei and Sanjiangkou. Any fishing for Amur sturgeon and kaluga is fully prohibited round year in the two areas. The closed fishing in entire river in the Chinese part of Amur River are the two periods: 11 June – 15 July and 1 October – 20 October. Any harvesting activities are prohibited during these dates.

2. Setting harvest quota for Amur sturgeon and kaluga

Recent years we have set the harvest quota for sturgeons in Amur River at 80 – 100 metric tones according to the results of the assessment of sturgeon stock in Amur River. However, since the decline trend of sturgeon stock in Amur River has not been catabatic, we still take measures to ensure the limitation of harvest quota. They mainly include cutting down of numbers of fishing boats by means of being transferred fishing to aquaculture or to agriculture.

3. Setting up sturgeon hatcheries along Amur River and implementation of restocking program

Artificial breeding of Amur sturgeon was successful in 1958. To preserve sturgeons in the Amur River, a propagation & re-stocking station (hatchery) for Amur sturgeons was set up in 1988 at Qingdeli Farm, Tongjiang City, Heilongjiang. So far, the investment of the station has reached about USD 2.0 millions. The capacity of the breeding and rearing fry and fingerlings of sturgeon has reached over 1.5 million of individuals. The station has been involved in the sturgeon aquaculture while actively implemented re-stocking program under governments supports for many years. Besides the Qingdeli Sturgeon Hatchery, the fishery management authority of Heilongjiang has established three Amur sturgeon experiment and restocking stations in Luobei, Jiamusi, Tongjiang and Fuyuan to carry out the re-stocking of Amur sturgeon and kaluga. Appropriate departments of Chinese government have greatly supported re-stocking program of sturgeons in the Amur for years. By the incomplete statistics, investment was over USD 5 millions to the five hatcheries.

Table 1 list of hatcheries along Amur Rive in the Chinese part	
	Name of Hatchery
1	Luobei Sturgeon Restocking Station
2	Qingdeli Sturgeon Restocking Station
3	Tongjiang Sturgeon Restocking Station
4	Heilongjiang River Endemic Fish Institute (Jiamusi)
5	Fuyuan Sturgeon Restocking Station

Accumulatively, 10 millions of larvae and fingerlings reproduced by artificial propagation have been stocked into Amur River since 1989. Generally, the stocked size and number, as well as the proportion of roe used to restocking were increased year by year (Table 2 and Table 3).

Table 2 numbers of roe from wild fish of *A. schrenckii* and *H. dauricus*, and their proportions used to restocking

year	total roe from wild fish (million)	number of roe used to artificial propagation (million)	ratios of total roe to the aquacultured roe (%)	numbers of roe used to restocking (thousand) / ratios of totally collected roe to restocked roe(%)
1999	370.00	10.00	2.78	No data
2000	352.00	12.00	3.41	No data
2001	338.00	18.00	5.33	187.5/0.055
2002	270.00	18.00	6.67	65.0/0.024
2003	269.60	20.00	7.42	250.0/0.093
2004	260.00	20.00	7.69	188.0/0.072
2005	256.00	19.00	7.42	625.0/0.244
2006	246.50	18.00	7.30	250.0/0.101

Table 3 Restocking numbers of offspring from artificial propagation of wild *A. schrenckii* and *H. dauricus* in the Chinese part of Amur River during 1989 and 2006

year	Number of restocking larvae or fingerlings (thousand)	size (TL, cm)
1989-2000	7400	3 – 5
2001	150	3 – 5
2002	50	>5
2003	200	>5
2004	150	>5
2005	500	>5
2006	200	>5
total	8650	>5

9. Setting up broodstock reserve and nature reserve for Amur sturgeon and kaluga

In order to protect the declining stock of A. schrenckii and H. dauricus, A broodstock reserve with area of 500 hm2 for Amur sturgeon was set up in the Dalijia Lake at Fuyuan under the investment of Ministry of Agriculture of PRC in 2000 while a broodstock reserve for kaluga was set up at Tongjiang. Total 200 thousands of juveniles of Amur sturgeon and kaluga were stocked into the reserves. Monitoring showed that the stocked fish grow well. At the same time, to protect sturgeon stock in the Amur River system and their habitats, two natural reserves were established in the Huha River at Huma County and in the Xunbila River at Xunke County, which both are a tributary in the upper party of the middle reaches of Amur River. They are National Nature Reserve of Huma River of Heilongjiang and Provincial Nature Reserve of Xunkela River of Heilongjiang. According to the Nature Reserve Regulations of PRC, the reserves have more strictly been protected.

10. Law and policy guarantee on conservations of Amur sturgeon and kaluga in Amur River region

5.1 Policy, law and regulations

National level:

In 1986, National People's Commission (NPC) promulgate a law of 'Fisheries Law of the People's Republic of China', which was amended in 2000.

In 1988, standing committee of NPC promulgate a law entitled 'Law of the People's Republic of China on the Protection of Wildlife'.

In 1989, the State Council of the People's Republic of China promulgates a " The National Catalog of Protected Wildlife in the People's Republic of China".

In 1993, Ministry of Agriculture of the People's Republic of China (MOA) promulgate 'Implemental Regulation on Aquatic wildlife Protection of the People's Republic of China".

In 1999, MOA promulgate "Regulation on special license of Aquatic wildlife utilization of the People's Republic of China".

In 1994, The People's Republic of China and Russia signed 'Protocol on Fisheries Resources Conservation, Regulation and Multiplication in Border Areas of Heilongjiang (Amur) River and Wusuli River of The People's Republic of China and the Russian Federation'.

According to the law and regulations listed above, the sturgeon and kaluga in Amur river received recognition as the important aquatic wildlife listed in the national protection catalog, and the administration of which was refer to the species under second class state protection.

Local Government level:

"The Heilongjiang Ordinance on Protection of the Propagation of Fisheries Resources" was issued in 1982, which was the pioneer regulation issued by the local government. More regulations and government documents in this aspect were issued since then.

"Emergencies notification on neatening the fishing and trading order of Amur sturgeon, Kaluga, salmon and caviar" was promulgated on May 9, 1989 and on May 5, 1990.

"Notification on checking and ratifying fishing license and sturgeon catching quotas in Heilongjiang region" was promulgate on May 26, 1989.

"The Provisions on fisheries resources protection in the Heilongjiang Province" was issued in 1999, which replace "The Heilongjiang Ordinance on Protection of the Propagation of Fisheries Resources" as the most important administration policy operated in this area now.

In 2001, there were three important notifications issued in one month to enforce more strictly control and management on the Amur Sturgeon and Kaluga utilization. The notification presents more detailed operable protective measures based on the "The Provisions on fisheries resources protection in the Heilongjiang Province". The special license system on catching, breeding, propagating, processing, trading and the quotas limitation in 2001 were included in the notification. According to the provisions, the imposition used on stock recovery was charged on the enterprises which make use of the resource.

5.2 Protective Measures Taken in detail

5.2.1 Regarding control of harvesting

According to the article 16 in the "Law of the People's Republic of China on the protection of Wildlife", "the hunting, catching or killing of wildlife under special state protection shall be prohibited. Where the catching of fishing of wildlife under first class state protection is necessary for scientific research, domestication and breeding, exhibition or other special purposes, the unit concerned must apply to the department of wildlife administration under the State Council for a special hunting and catching license, where the catching or hunting of wildlife under second class state protection is intended, the unit concerned must apply to the relevant department of wildlife administration under the government of a province, an autonomous region or a municipality directly under the central government for a special hunting and catching license".

According to the article 22 in the "Fisheries Law of the People's Republic of China", "Following the principle of keeping the allowable catch lower than the increase of the fishery resources, the State determines the total allowable catch of the fishery resources and applies a quota system for fishing". "The administrative department for fisheries under the State Council and such departments under the people's governments of provinces autonomous regions and municipalities directly under the central government shall strengthen their supervision over and inspection of the implementation of the quota

system for fishing. For those who exceed the quotas allocated by the authorities at the next higher level, their quotas for the following year shall be reduced accordingly". Article 30 prescribes that "the use of explosives, poisons, electricity and any other means in fishing that impairs the fishery resources is prohibited. The manufacture, sale and use of banned fishing gear are prohibited. Fishing in restricted areas and during closed seasons is prohibited". "The administrative department for fisheries under the State Council and such departments under the People's governments at or above the county level shall designate species for special protection, and specify the allowable amount for fishing of such species, the restricted fishing areas and closed seasons, the restricted fishing areas and closed seasons, the fishing gear and methods to be banned or restricted, the minimum mesh sizes, as well as other methods for the protection of the fishery resources."

In Heilongjiang Province, some provisions was enforced by the local government in order to protect the natural sturgeon resource:

Fishing gear: Fishing gear and fishing method will be under strictly inspected and limited by the local administrative department when issuing specific sturgeon fishing license.

Fishing area: Restricted fishing areas are specified and 17 important fish areas which are out of the above restricted fishing areas are designated by the local administrative department in the "Provisions on fisheries resources protection in the Heilongjiang Province."

Fishing season and fishing quotas limitation:

Sturgeon and Kaluga fishing was prohibited in the closed season, which is about 55 days in Heilongjiang areas from June 11 to July 15 and from October 1 to October 20. The fishing quotas limitation was specified as 347t in 1989, and the actual harvest production was controlled to 286t at that year, and the harvest production declined and fluctuated around 140t each year since then because of the enforcement management. According to the relevant local provisions, the sturgeon and Kaluga fishing production should be arranged out of the closed season, and the fishing activity will be stopped when the fishing yield was found to reach the quotas limitation.

Fishing standards in sizes:

The allowable fishing sizes was specified in sturgeon and Kaluga, which is more than 2 meters in length (or 65 kg in weight) for and Huso dauricus and 1 meter in length (or 4 kg in weight) for Acipenser schrencki. Any capture of the specimen below the size or weight limitation standards must be free back to the river without any hurting.

Illegal Fishing: According to the article 33 in the "Law of the People's Republic of China on the protection of Wildlife", "if anyone, in violation of the provisions of this law, hunts or catches wildlife without a hunting license or in violation of the prescriptions of the hunting license, his catch and

unlawful income shall be confiscated and he shall be fined by the department of wildlife administration and, in addition, his hunting gear may be confiscated and his hunting license revoked." There are more severe punitive articles listed in the "Criminal Law of People's Republic of China" in this aspect.

5.2.2 Regarding trade

According to the article 22 in the "Law of the People's Republic of China on the protection of Wildlife", "The sale and purchase of wildlife under special state protection or the products thereof shall be prohibited. Where the sale, purchase or utilization of wildlife under first class state protection or the products thereof is necessary for scientific research, domestication and breeding, exhibition or other special purposes, the unit concerned must apply for approval by the department of wildlife administration under the State Council or by a unit authorized by the same department, where the sale, purchase or utilization of wildlife under second class state protection or the products thereof is necessary, the unit concerned must apply for the approval by the department of wildlife administration under the government of the relevant province, autonomous region or municipality directly under the Central Government or by a unit authorized by the same department". The article 23 prescribes that "The transportation or carrying of wildlife under special state protection or the products thereof out of any county must be approved by the department of wildlife administration under the government of the relevant province, autonomous region or municipality directly under the Central Government, or by a unit authorized by the same department." Article 24 prescribes that "the export of wildlife under special state protection or the products thereof, and the import or export of wildlife or the products thereof, whose import or export is restricted by international conventions to which China is a party, must be approved by the department of wildlife administration under the State Council or by the State Council, and an import or export permit must be obtained from the state administrative organ in charge of the import and export of the species which are near extinction, The Customs shall clear the imports or exports after examining the import or export permit". Article 35 prescribes that "If anyone, in violation of the provisions of this Law, sells, purchases, transports or carries wildlife under special state or local protection or the products thereof, such wildlife and products and his unlawful income shall be confiscated by the administrative authorities for industry and commerce and he may concurrently be fined. If anyone, in violation of the provisions of this Law, sells or purchases wildlife under special state protection or the products thereof, and if the circumstances are serious enough to constitute a crime of speculation or smuggling, he shall be prosecuted for criminal responsibility according to the relevant provisions of the Criminal Law". Article 36 prescribes that "If anyone illegally imports or exports wildlife or the products thereof, he shall be punished by the Customs according to the Custom Law; If the circumstances are serious enough to constitute a crime, he shall be prosecuted for criminal responsibility in accordance with the provisions of the Criminal Law on the Crimes of smuggling." There are also a lot of punitive article included in the "Criminal Law of the People's Republic of China" in this aspect.

5.2.3 Regarding control of exports

Since the Amur sturgeon and Kaluga was listed in the CITES appendix II in 1997, the sales, trading,

utilization, export and import of Amur sturgeons and its byproducts were all under strictly control and management by the administrative department under the State Council according to relevant law and regulations.

Article 24 in the "Law of the People's Republic of China on the protection of Wildlife" prescribes that "the export of wildlife under special state protection or the products thereof, and the import or export of wildlife or the products thereof, whose import or export is restricted by international conventions to which China is a party, must be approved by the department of wildlife administration under the State Council or by the State Council, and an import or export permit must be obtained from the state administrative organ in charge of the import and export of the species which are near extinction, The Customs shall clear the imports or exports after examining the import or export permit". There are more articles involved in this aspect in the 'Implemental Regulation on Aquatic wildlife Protection of the People's Republic of China" and the "Regulation on special license of Aquatic wildlife utilization of the People's Republic of China".

At present, the certifications for the export and import permits was issued by the unit with the authorization. The working process is consistent with the system of licensing or registration of exporters and/or re-exporters for trade in specimens of Acipenser schrencki and huso dauricus prescribed by CITES Animal Committee but with the different terminology. It is easy to use international nomenclature into our work to normalize the sturgeon trading administration worldwide.

5.2.4 Regarding the labeling

The design of Chinese labeling system for export and import of caviar products started in 1998, and the label had been used in previous years, from the year of 2006, a newly designed label with LP code will be used for the artificial products, however, it will also be used for the products from the wild in future, this newly designed code not only contains all the information required by the Resolution CoP 12.7(Rev. CoP 13), but also LP code which contains the information such as importer, exporter, species, quantity etc, this provide the relevant authority a new way to verify the information through the contact with Chinese Management Authority of Cites or in future by a electronic device – LP code reader. This label system have been fully put into used for all domestic management due to the two year of zero quota on international trade of caviar

II. Stock assessment of Amur sturgeon (*Acipenser schrenckii*) and kaluga (*Huso dauricus*)

11. Methods

12. Field investigation locations

We set nets and collected specimens in the reaches at Fuyuan (I), Qingdeli (II), Tongjiang(III), Luobei(IV) and Jiaying (V). The locations are showed in the figure 1.

Figure 1 Sampling locations in the reaches of Chinese part in Amur River for *Acipenser schrenckii* and *Huso dauricus*. The I to V show locations of each fixed monitoring station for *Acipenser schrenckii* and *Huso dauricus*.

1.2 Field investigation period

April to November from 1999 throughout 2006

1.3 Investigation and statistic methods

We set fixed monitoring stations and collected data of unit catches by fishing boat with drift net or fixed net. By counting the ratios of *A. schrenckii* and *H. dauricus* in the catches in each station a day, we determined the catches per net a day in specific fixed station (CPUE_x01). In order to reduce the bias due to low proportion of sturgeons in catches, we use the daily accumulative CPUE_a (CPUE_x01+ CPUE_x02+ CPUE_x03+…+ CPUE_xn) to determine CPUE_r1 in the certain reach in a harvest season. The certain year CPUE was calculated by the balanced CPUE. The number of fishing boats was controlled by local fishing law enforcement authorities. We only calculated the legal fishing boats with special permits for sturgeon harvest.

We collected sturgeon specimen in wider locations to measure biological characteristics such as total length (TL), body weight (BW), sex (only for adults) as well as age which was determined by observing pectoral fin ray.

Table 4 Locations and numbers of sampling sites

reaches	numbers of sampling sites	numbers of fixed monitoring stations	Harvest time	
Zhaoxing	2	1	spring	Autumn
Luobei	5	2	spring	Autumn
Qingdeli	6	2	spring	Autumn
Fuyuan	3	1	spring	Autumn
Total	16	6		

Note: The harvest period was ranged from 1 May to 10 June in Spring, and from 6 July to 30 September in Autumn. The accumulative duration in harvest was 87 days for each year.

2. Results

2.1 Geographic distributions of Amur sturgeon and kaluga

The investigations during 1999 and 2006 show that the two species of *A. schrenckii* and *H. dauricus* were mainly distributed in the reaches at Fuyuan, Qingdeli, Tongjiang, Zhaoxing (Jiaying) and Luobei. They were more abundant in lower parts, i.e. Fuyuan. The less occurred or none in the upper part of the reaches in the Chinese part of Amur River. However, in 20005 we found some juveniles (TL 25 – 30 cm) and an adult (TL180 cm, BW30 kg) of *A. schrenckii* in Songhuajiang River, where sturgeon had ever been believed near pathless. (Note: this female was artificial propagated and 50 thousand offspring were gained and re-stocked into river). Also, a 7.8 kg Amur sturgeon was caught in the section at Jiamusi in the Songhuajiang River. It seems that the sturgeon stock is restoring in the river.

2.2 Harvest and CPUE of Amur sturgeon and kaluga

Table 5 Harvest documentations and CPUE of *A.schrenckii* and *H. dauricus*

Year	Annual harvest (kg)	Fishing boat (n)	Fishing days (d)	River length in fishing (km)	CPUE (kg per boat per day per km)
1999	136000	1053	87	612	0.002425715
2000	141000	626	87	612	0.004230329
2001	112000	470	87	612	0.004475582
2002	106000	429	87	612	0.004640640
2003	106000	384	87	612	0.005184465
2004	72000	345	80	500	0.005217391
2005	72000	345	80	500	0.005217391
2006	65000	345	65	500	0.005161803

Above table shows that catches per fishing effort were stable or slightly risen. The decrease of harvests after 2001 should be caused by the reducing of fishing boats in the same period. Thus, catches could be maintained at 80 – 100 tones.

2.3 Population structure in catches of Amur sturgeon and kaluga

Table 6 Composition of total length (TL), body weight (BW) and age in catches of *A.schrenckii*

	2002 n=60			2003 n=70			2004 n=72			2005 n=60			2006 n=93		
		mode			mode			mode			mode			mode	
	range	range	%	range	range	%	range	range	%	range	range	%	range	range	%
TL (cm)	60 - 210	120 - 160	46.7	94 - 190	120 - 170	70.0	35 - 230	80 - 180	87.5	38 - 210	100 - 200	71.7	40 - 210	90 - 180	87
BW (kg)	13. 8 - 57.0	5 - 20	48.3	14. 0 - 65.0	7 - 25	61.4	0.22-68.0	4 - 35	88.9	15. 19 - 51.0	3 - 35	83.3	16. 22 - 60	3.5 - 35	88
Age (y)	5 - 40	8 - 20	71.7	8 - 41	9 - 22	64.3	2 - 45	13 - 24	68.1	2 - 42	15 - 28	71.7	3 - 40	11 - 24	79

Table 6 shows that the population structure from the catches had no big differences during the past five years. However, we found that subadults or juveniles occurred in 2005 and 2006. Also, it was found that the first reproductive fish began to increase in the last three years and massive juveniles occurring in the reaches at Tongjiang and Fuyuan. These imply that the stock of *A. schrenckii* in the Amur River has been well protected or the restocking has become effective.

Table 7 Composition of total length (TL), body weight (BW) and age from catches of H. dauricus

	2002 n=30			2003 n=34			2004 n=50			2005 n=44			2006 n=36		
		mode			mode			mode			mode			mode	
	range	range	%	range	range	%	range	range	%	range	range	%	range	range	%
TL (cm)	72 - 390	192 - 315	83.3	58 - 365	160 - 260	73.5	40 - 361	160-310	84	35 - 361	169 - 300	79.5	32 - 295	165 - 270	80.6
BW (kg)	3.75 - 470	60 - 260	76.7	0.75-15.5	50-213	70.6	0.5-315	40-290	80	17 - 410	40 - 280	75.0	18. - 347	37.5 - 210	80.6
Age (y)	6 - 54	23 - 37	70	2 - 38	14 - 28	70.6	2 - 38	17 - 30	72	2 - 39	15 - 29	75.0	2 - 35	14 - 33	83.3

The figure 7 shows that fish ages since 2003 were about ten years younger than those in 2002, and some juveniles were found since 2003. We observed the occurrences of Kaluga juveniles in all reaches from Luobei throughout to Fuyuan, but more abundant in reaches at Luobei and Fuyuan (see table 5). We found 2 juveniles at 2 years old with TL59cm and 48cm, and BW 750 g and 560g, respectively. The fact that the young fish has become predominant shows that the stock has become recovered according to the biological characteristics of *H. dauricus*.

Table 8 statistic data of young kaluga found in Luobei section of Amur River since 2003

No.	TL(cm)	BW(g)	Age(y)	No.	TL(cm)	BW(g)	Age(y)
1	33.5	195		13	32.4	132	2
2	40	295		14	35	175	2
3	37	285		15	35	185	
4	40	310		16	29	75	
5	38	310		17	43.5	310	
6	34.5	200		18	42	296	
7	40.5	300		19	36	150	
8	41	300		20	36.5	150	
9	33	190		21	35	100	
10	39	275	2	22	29	75	
11	42	295		23	27	75	
12	81	2200	4				

Table 9 Sexual ratios (female:male) in catches of *A. schrenckii* and *H. dauricus* in the last five years

Species	2002	2003	2004	2005	2006
A. schrenckii	1.0:2.6	1.0:1.8	1.0:2.0	1.0:2.8	1.0:1.7
H. dauricus	1.0:2.4	1.0:1.5	1.0:2.5	1.0:1.2	1.0:1.3

Table 10 Fecundities in catches of *A. schrenckii* and *H. dauricus* in the last five years (×10000 eggs)

Species	2002 (range / mean)	2003 (range / mean)	2004 (range / mean)	2005 (range / mean)	2006 (range / mean)
A. schrenckii	7.35-98.70 /34.40	11.40-129.20 /38.50	8.25-92.00 /36.40	7.40-72.40 /32.50	6.70-52.0 /24.80
H. dauricus	51-440 /152.5	42-414 /168	56-408 /153.7	27-426 /149.6	25.5-336 /119.3

The table 9 and table 10 show that generally both sexual ratio and fecundity of the two species had no obvious variation in the last five years even if some changes happened in hydrological and associated environmental conditions in Amur River.

III. Effects of sturgeon aquaculture on the wild sturgeon stock in Amur River

19. Status of sturgeon aquaculture in China

The preliminary success of artificial breeding of *A. schrenckii* was firstly made in 1953 in China by collection of wild brood fish in the river. However, the progress of artificial propagation of Amur sturgeons has been stagnant until the first sturgeon hatchery was built at Qingdeli in 1988. Meanwhile, a great progress on artificial breeding was made in Yangtze River for stock enhancement of Chinese sturgeon (*Acipenser sinensis*). The relevant technology was transferred to Amur sturgeon and kaluga. The original purpose of sturgeon aquaculture used to be stock enhancement only. With advance in sturgeon aquaculture technology, sturgeons became a new target for commercial farming in the last ten year. Thus, Amur sturgeon, kaluga and their hybrids became the major cultured species of sturgeons due to their well economic features. Annual quantity of cultured sturgeons had reached at 5000 metric tones in 1999 and at approximately 10000 tones in 2005 (Wei et al., 2004; Sun, et al. 2006). It was estimated that the proportion of quantity of *A. schrenckii, H. dauricus* and their hybrids was over 50% (Wei et al. 2004; Sun 2006). With the success of the full-hatchery breeding since 2003, the full-hatchery broodstock of *A. schrenckii* has begun to replace the wild stock of the species for commercial aquaculture. It has surely reduced the pressure of fishing on the wild population of sturgeons in Amur River.

2. Effects of sturgeon aquaculture on the wild sturgeon stock in Amur River

Sturgeon aquaculture has both positive and negative effects on wild sturgeon stock. If we wisely use it, it will be a sound tool in sturgeon conservation. The technology involved in sturgeon breeding and culture is a basis of restocking or species preservation. Also it is a sound approach to recover endangered species of sturgeons through hatchery & restocking operation. If a sufficient quantity of full-hatchery stock with a complete-ages (such as from 1 year old throughout 10 years old) is established, the stock will makes a sustainable industry of sturgeon farming without relying on wild population of sturgeons.

As the sturgeon farming has become very popular in China since 1998, both governments and sturgeon farms gradually began to realize the importance of completion of the full-hatchery breeding and preservation of a certain number of adult sturgeons to prevent from the wild stock collapse. Therefore, the proportion of seedling from full-hatchery brood stock has been increased year by year since 2003. The ratio reached at about 50% in 2006 (see figure 2). For instance, over 1000 millions of fry of *A. schrenckii* were reproduced from the full-hatchery breeding in China in 2006. We predict that the full-hatchery stock will completely replace the wild stock for commercial farming of sturgeons in China in the near future.

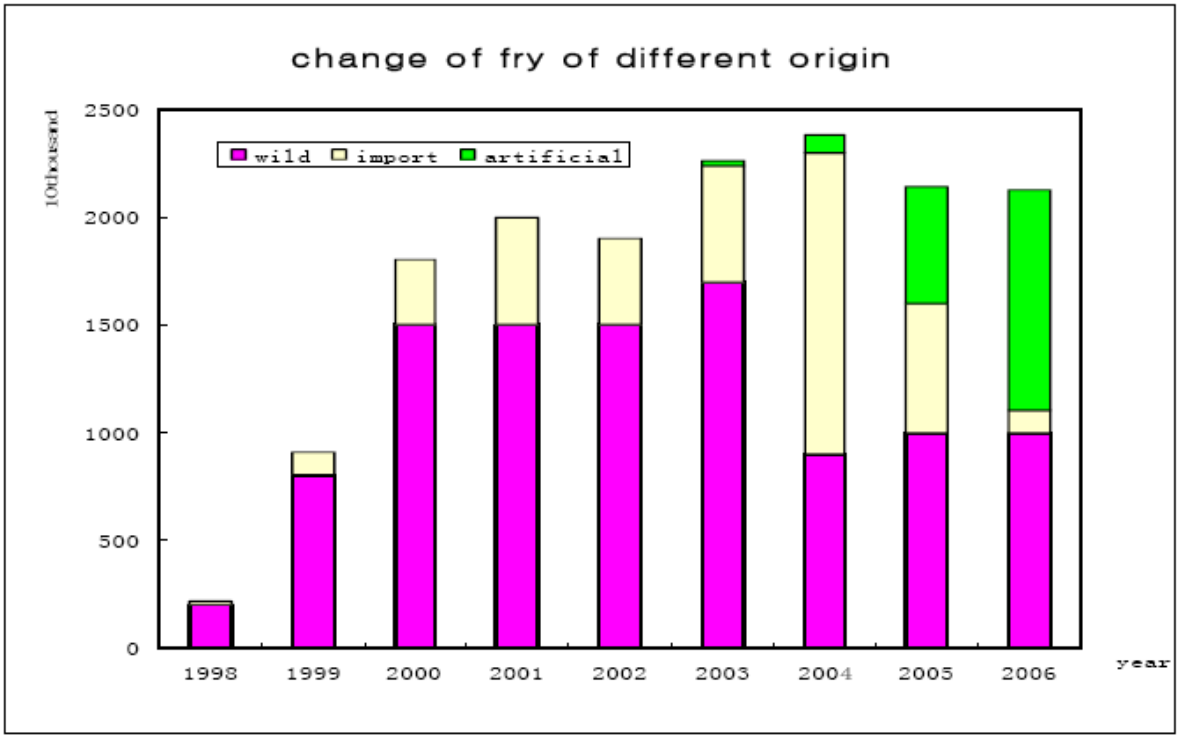


Figure 2 Proportion variations of fry from different origins during 1998 – 2006 (data source: Sun 2006, the sturgeon culture in China for 15 years, a presentation in the Second International Symposium on Biodiversity Conservation and Management in Large Rivers in the Northeast Asia and the Northwest America, 26-28 September 2006, Harbin, China)

IV. Criteria in determination of export quota of caviar

We take the following principle or criteria to determine export quota of caviar:
Fishing quota = matured individuals + un-matured individual

Matured females = females for caviar processing + females for breeding

Caviar production = export quota + domestic consumption caviar = harvest yield × ratio of caviar from body weight

Fishing quota should be based on stock assessment and should be obviously negative impacts on sustainability of the wild stock of the species

As we knew the parameters from above statements and from scientific references, we make calculations as follows:

Parameter determination

According to the information and analysis above, nine of parametmers are determined as follows:

1. Total catch quotas (P)=80,000kg (*Acipenser schrenckii*＋*Huso dauricus*)
2. Sex ratio of *A. schrenckii*， male:female=m:1=1.5:1;
3. Sex ratio of H. dauricus， male:female=n:1=1:1;
4. Average weight of the spawning population of A. schrenckii, male(Wsm)=16.6kg, female (Wsf)=22.5kg， SGI (is)=23.5%;
5. Average weight of the spawning population of A. schrenckii, male(Wdm)=219.7 kg， female (Wdf)=230.9kg， SGI (id)=14.0%;
6. Caviar yield of A. schrenckii: Caviar yield of H. dauricus = r:1 = 0.80:1;
7. Mature fish : total fish =90%; the turnoff ratio of caviar processing =90%.
8. Mature fish for caviar production : mature fish for breeding = 1 : 1
9. Mature Amur sturgeon for caviar production : mature Amur sturgeon for breeding = 6 : 4
   Mature kaluga for caviar production : mature kaluga for breeding = 6 : 4

Formulation

If the catch quota of A. schrenckii in number is Ns, and of H. dauricus is Nd, then

The catch quota in number of female A. schrencki = [1/(m+1)]×Ns,

the catch quota in number of female H. dauricus = [1/(n+1)]×Nd,

Caviar yield of A. schrenckii = Wsf×[1/(m+1)]×Ns×is (kg),

Caviar yield of H. dauricus = Wdf×[1/(n+1)]×Nd×id (kg),

And Caviar yield of A. schrenckii: Caviar yield of H. dauricus = r:1,

Solution Ns:Nd＝Wdf×id×r×(m＋1) : Wsf×is×(n＋1).

If Ns+Nd=Nt, and Ns:Nd=s, then

Ns=[s/(s+1)]×Nt, Nd=[1/(s+1)]×Nt,

The male number of A. schrenckii =[s/(s+1)]×Nt×[m/(m+1)],

The male number of H. dauricus =[1/(s+1)]×Nt×[n/(n+1)]

The female number of A. schrenckii =[s/(s+1)]×Nt×[1/(m+1)],

The female number of H. dauricus =[1/(s+1)]×Nt×[1/(n+1)]

$$P=Wsm\times[s/(s+1)]\times Nt\times[m/(m+1)]+Wsf\times[s/(s+1)]\times Nt\times[1/(m+1)]+Wdm\times[1/(s+1)]\times Nt\times[n/(n+1)]+Wdf\times[1/(s+1)]\times Nt\times[1/(n+1)]$$

Solution:

$$Nt=P/\{Wsm\times[s/(s+1)]\times[m/(m+1)]+Wsf\times[s/(s+1)]\times[1/(m+1)]+Wdm\times[1/(s+1)]\times[n/(n+1)]+Wdf\times[1/(s+1)]\times[1/(n+1)]\}\quad(1)$$

Caviar yield of A. schrenckii (kg)＝

$$Wsf\times is\times[s/(s+1)]\times Nt\times[1/(m+1)]\times80\%\times90\%\quad(2)$$

Caviar yield of H. dauricus (kg)＝

$$Wdf\times id\times[1/(s+1)]\times Nt\times[1/(n+1)]\times80\%\times90\%\quad(3)$$

Results

As the relevant parameters in above are input in the equation (1), (2), (3) respectively, results are obtained as follows:

The total catch quota in number (Nt) for both *A. schrenckii* and *H. dauricus* will be 1876 induviduals for 2007, in which include 1612.14 of *A. schrenckii* (Ns) and 264 of *H. dauricus* (Nd). The export quota of caviar is determined as 1657.40 kg and 2072.39 kg for *A. schrenckii* and *H. dauricus*, respectively, in which excluded 40% of fish for breeding.

From the results calculated, the export quota of caviar both for *Acipenser schrencki* and *Huso dauricus* is lower than the proposal in the Russia-China Agreement o export quota of caviar (see appendix table).

(Prepared by Dr. Wei Qiwei, Yangtze River Fisheries Research Institute, Chines Academy of Fishery Science)

Appendix:

China-Russia agreement on export quota of sturgeons in Amur River for the year 200

Items	Export quota of caviar (metric ton)
China	4.46
Huso dauricus	2.56
Acipenser schrenckii	1. 9
Russia	4.46
Huso dauricus	2.56
Acipenser schrenckii	1. 9

CITES S.A. for Acipenseriformes of Romania

Table 1: Status and management of sturgeon populations of N-W Black Sea and Lower Danube River in Romania during 2000 - 2006

Species	Year	Fishery indepen-dent data	Fishery dependent data			Status of spawning stock of the year	Catch quota proposal for the next year
		JPI * [CPUE]	Sex ratio** ♀ / ♂ [%]	First -/ second -/ third time / fourth time/ ... spawners [%]***	Fishery management & Other information****		
Acipenser gueldenstaedti	2000	0.75	-	-	Poor reporting of catches	Good recruitment▼	No adaptive management
	2001	0.167	-	-	Poor reporting of catches Catches assessed by RRA*****	Low recruitment	Reduced with 8 %
	2002	0.302	73 / 23	4.5% - I ; 14% II - III ; 57% IV ; 24,5 % V & > V	Incomplete & biased reporting of catches	Modrate recruitment	Reduced with 15 %
	2003	0	83 / 17	0 % I ; 24 % II ; 52 % III / 16 % IV ; 8 % V & > V	In May - July catches upstream of rKm 141 not reported	Low % of males . Lack of first time spawners . Low / No recruitment	Reduced to only 13 % of year 2003
	2004	0.073	71 / 29	Mostly old fish (N = 6) (15 – 21 yars old)	Very probably there were fish not reported by fishermen. Improved, medium scale supportive stocking program planned for 2005.	Low natural recruitment.	Unchanged

2005	0,091	25 / 75	Mostly old fish (N = 6)	Danube River has been stocked with: - 2,500 one year old Danube sturgeon (Mean TW = 250 g), individually tagged with CWT, and - 1000 YOY Danube sturgeon (mean TL = 6.4 cm / mean TW = 1.21 gr). Fish used for artificial spawning were individually tagged (Floy T-barr Tag) and released in the Danube River. Supportive stocking programme to be continued a limitted period of time (10 years).	Very low natural recruitment.	Zero comercial catch quota. Allowed the capture of maximum 12 specimens of live fish for supportive stocking programme and aquaculture. After artificial spawning all brood fish to be tagged and released in the Danube River.

	2006	0	No information	No information	Special permits were issued by NAFA to 5 companies / fishermen organisations but no specimen was legally captured / reported. Due to lack of broodfish, in 2005 there was no artificial proppagation of this species and no supportive stocking in the Danube River.	No natural recruitment. Critically endangered species.	Commercial catch quota st to zero. Allowed the capture of maximum 12 specimens of live fish for supportive stocking programme and aquaculture. All brood fish to be PIT tagged and released back in the Danube River, not later than 1 week after artificial spawning.

Acipenser ruthenus	2000	3.125	Species disregarded by fishery management authorities. No reporting of catches required	Species captured but not reported in the catch statistics;	Very good recruitment	No adaptive management
	2001	0.208		Year 2001 - catches assessed by RRA	Existing recruitmnt	First time catch quota established at 0.5 t
	2002	1,279			Good recruitment	Increased with 38%
	2003	1.743	Lack of fishery dependent data .	2003 - 2006 - species captured but mostly not reported due to management fault.	Very good recruitment	Increased with 120 %
	2004	2.244	Still no fishery dependent data available.		Very good recruitment	Unchanged

	2005	13,182	First captures reported by professional fishermen (N= 8) Many fish unreported by professional fishermen.		Very good natural recruitment	Unchanged
	2006	0	Many fish captured but unreported by fishermen fishing without authorisation.	Improper / weak enforcement of conservation regulatins adopted in 2006 for all sturgeon species	No natural recruitement (possibly due to exceptionally high water level / water discharge during April and May)	Zero commercial catch quota. Allowed the capture of 60 specimens of live fish to be artificially reproduced for aquaculture.

Acipenser stellatus	2000	1.375	-	-	Poor reporting of catches	Low to moderate natural recruitment.	No adaptive management
	2001	0.625	-	-	Poor reporting of catches; Catches assessed by RRA*****	Low natural recruitment.	Reduced with 6 %
	2002	0.069	37 / 63	**Males:** (N = 116) 17% I ; 49% II ; 26% III ; 10 % IV ; 7 % V & > V **Females:** (N= 19) 52% I ; 37 % II ; 11 % III	Incomplete & biased****** reporting of catches	Low ecruitment. Balanced age class distribution in both sexes.	Reduced with 18 %
	2003	0.166	31 / 69	**Males** (N = 137) 23 % I ; 58 % II ; 14 % III ; 5 % IV & > IV **Females:** (N = 166) 15 % I ; 27 % II ; 32 % III ; 16 % IV / 10 % V & >V	In May - July catches upstream of rKm 141 not reported	Low natural recruitment. Unbalanced sex ratio. Balanced age class distribution in both sexes.	Reduced with 10 %. Need for improved enforcement of regulations & quota.
	2004	0.185	31 / 69	**Males** (N=82) 46% I; 47% II; 4 % III; 3 % IV & > IV **Females** (N=37) 38% I; 39% II; 15 % III; 8 % IV & > IV	Very probably there were fish not reported by fishermen. Improved, medium scale supportive stocking program planned for 2005.	Low natural recruitment. Unbalanced sex ratio. Balanced age class distribution in both sexes.	Unchanged

2005	1,273	22 / 78	**Males :** (N=76) 30% I; 30% II; 33 % III; 7 % IV & > IV **Females:** (N=7) Impossible to estimate age class structure	Improved **supportive stocking programme** has been implemented in Romania for the first time. Danube River has been stocked with: - 8,100 YOY (Mean TL = 15 cm), individually tagged with CWT, and 18,000 YOY (mean TL = 5,7 cm). Both cathegories of YOY were obtained from an effective number of broodfish / generation to achieve a generational effective population size $N_{e(GEN)}$= 100 and an inbreeding rate / generation ΔF max = 0,50 % . Some of the fish used for artificial spawning were individually tagged (Floy T-barr Tag) and released in the Danube River. Supportive stocking programme to be continued a limitted period of time (8 years).	Low to moderate natural recruitment. Slightly unbalanced sex ratio.	Reduction of quota to the mean of effective catches during 2003 – 2005, i.e. a reduction with 68.25 %. After artificial spawning all brood fish to be tagged and released in the Danube River.

	2006	0	39 / 61	**Males :** (N=20) 65% I; 35 % II **Females:** (N=13) 100% I	Stocking programme funded in year 2006 by NAFA: 53,300 YOY (TL ≥ 20 cm; TW ≥ 20 g) individually tagged with CWT stocked in November 2006 two different locations in the Danube River (Km 44 Borcea branch and Km 152 Galati). Monitoring of their survival will be funded in 2007 by CITES MA.	No natural recruitement (possibly due to exceptionally high water level / discharge during April & May)	Zero commercial catch quota. To be allowed capture of 35 live broodfish for supportive stocking programme and aquaculture. Within maximum one week after artificial reproduction, all broodfish to be PIT tagged and released in the Danube River.

Acipenser nudiventris	2000	-	-	-	No information	Population highly endangered. Need for urgent regional captive breeding & reintroduction programme.	-
	2001	-	-	-	RRA by DDNI Tulcea revealed at least 13 specimens captured during 1993 - 2001		Proposed catch for captive bereding
	2002	-	-	-	At least one specimen (male) captured in RO	International captive breeding & reintroduction project submittted to DEFRA – Darwin Initiative / UK (proposal rejected Dec. 2005)	Proposed catch for captive bereding
	2003 2004 2005 2006	-	-	-	No information on catches		Proposed catch for captive bereding Substantial award for fishermen to be paid by NAFA Romania
Huso huso	2000	7.375	-	-	Poor reporting of catches	Good natural recruitment.	No adaptive management
	2001	1.625	-	-	Poor reporting of catches; Catches assessed by RRA*****	Low natural recruitment.	Reduced with 13 %
	2002	1.744	53 / 47	Age class distribution not assessed. Normal length distribution in both sexes, suggesting balanced age class distribution	Reporting of catches much better than in other species (due to large size of fishes).	Low natural recruitment. Balanced sex ratio. Balanced age class distribution in both sexes.	Increased with 13 %

	2006	0.5	28 / 72	Males (N= 5): 100 % II Feamales (N=5): 50 % II & III 50 % IV & V	Stocking programme funded in year 2006 by NAFA: 12,500 YOY (TL ≥ 30 cm; TW ≥ 100 g) individually tagged with CWT stocked in November 2006 in three different locations in the Danube River (Km 44 Borcea branch and Km 100 Isaccea and Km 8 St. George). Monitoring of their survival will be funded in 2007 by CITES MA.	Lowest natural recruitemt during the last 7 years. Only one single grouping of downstream mooving YOY. Capture was allowed only with special authorisation issued by NAFA for 39 specimens for restocking and aquaculture. There was no first spawning fish (born in 1991 / 1992). All broodfish captured in 2006 was born before 1990.	Zero commercial catch quota. To be allowed capture of 10 live broodfish for supportive stocking programme and aquaculture. Within maximum one week after artificial reproduction, all brood fish to be PIT tagged and released in the Danube River.

* Juvenile Production Index expressed in CPUE [No of YOY sturgeon captured in a 96 ml long trammel net drifting over a surface of aprox 8 ha of Danube River bottom at river Km 120]

▼ recruitment is assessed based on the JPI (assuming that 1.5 - 2 month old YOY sturgeons form the recruits of the current year class)

** (% females / % males)

*** First time spawning individuals (**I**), second time spawning individuals (**II**), ... Fifth and more than fifth time spawning individuals (V & > V)

****2000 - No. of fishermen not controlled; poor law enforcemnt; Poor catch statistics. DDNI Tulcea started monotoring of Juvenile Production Index

2001 - First annual national workshop on management of sturgeon stocks under CITES (Dec.)

Poor law & regulation enforcement outside the Danube Delta Biosphere Reserve (**DDBR**) (upstream of rKm 141)

2002 - Compulsory tagging and reporting of all sturgeons landed in Romania implemented for the first time. Law enforcement still problematic.

National workshop on management of sturgeon stocks under CITES organised twice / year (Sept. & Dec.)

Catch quota expressed only in [Kg] resulted in under-reporting of weight of fish.

Age determined in 127 specimens of A. stellatus

2003 - All fishing zones concessioned to private companies (by end of April downstream rKm 141 and only by 1 August upstream rKm 141).

Law enforcement increasingly improved during the second half of the year.

July 5, 2003 - launching of web page "Sturgeons of Romania and CITES" (http://rosturgeons.danubedelta.org)

On line reporting of catches functional still only in DDBR.

National workshop on management of sturgeon stocks under CITES organised twice / year (26 Aug.. & 8 Dec.)

Catch quota expressed in [Kg] and in [No of specimens] > practice of under-reporting of weight of fish visibly reduced / abandoned

Age determined in 12 specimens of *A. gueldenstaedti*; 25 specimens of *Huso huso* and 194 speciemns of *A. stellatus* (N_{Total} = 231 specimens)

2004 – Web page "Sturgeons of Romania and CITES" (http://rosturgeons.danubedelta.org) was visited over 900 times (230 visitors of 14 countries, 700 visitors of Romania).

National workshops on management of sturgeon stocks under CITES held in Tulcea on 25 August and 4 November. National Action Plan on implementation of Regional Conservation Strategy was adopted during the first workshop.

Fishing companies having concession of fishing zones for sturgeons improved guarding of fishing sites.

Lack of export quotas during the first 8 month of the year disrupted normal fishery management practices (fishermen were not paid; local black market was thriving).

On line reporting of catches was functional at both fishery management authorities (DDBR - Tulcea and NCFM - Bucharest).

Age determined in 6 specimens of *A. gueldenstaedti*; 27 specimens of *Huso huso* and 119 speciemns of *A. stellatus* (N_{Total} = 152 specimens)

Experimental supportive stocking of Danube River with fingerlings (one month old) of beluga (10 000) and Russian sturgeon (10 000).

2005 - Improved supportive stocking programme implemented in Danube sturgeon and stellate sturgeon. YOY were produced according to the spawning & breeding protocol outlined in Annex A to the Regional strategy of year 2003. Most of fish stocked in the Danube River were rised to mean individual TL = 15 cm and were tagged using Coded Wire Tags (**Fig. 11**). Number and characteristics of fish stocked are shown in **Table 1**.

2006 - **Catches** decreased in Romania from 37.5 tons in year 2002 to 11.8 tons in year 2005 (**Fig. 12**). Following a series of consultations initiated by CITES SA for *Acipenseriformes* and the national Agency for Fishing and Aquaculture (NAFA), the Ministry of Agriculture and that of Environment issued (4 May 2006) a joint **Order for the conservation of wild sturgeons and development of sturgeon aquaculture in Romania**. Following this regulation the catch and export quotas requested by Romania for the year 2006 in November 2005 were not distributed. Companies and fishermen organizations owing sturgeon hatcheries or having a contract with a hatchery were issued 5 special authorizations to capture 225 specimens of the five sturgeon species. Only 33 stellate sturgeons and 7 beluga sturgeons were captured alive, used for artificial propagation and partially released in the Danube River tagged using T-barr tags. It is expected that by the end of 2006 NAFA will purchase PIT tagging equipment to be used for the tagging and subsequent releasing of wild brood fish kept alive in holding tanks and earthen ponds at the hatcheries of Tamadau, Isaccea and Brates / Galatz.

The **age class structure** of beluga and stellate sturgeons captured alive in 2006 (Fig. 5 and 9) was indirectly determined using regression formulas computed from SL – Age regression plots constructed for 46 beluga (Fig. 4) and 389 stellate sturgeon (Fig. 8) specimens captured during 2003 –2005. These had been sampled for bony pectoral fin rays and their age determined on sections. The results confirmed the effects of a long series of years of overfishing (1990 - 2000) in stellate sturgeons, which lead to gradual decreasing of age a first reproductive maturity in this species from 7 – 8 years to only 4 – 5 years (Fig. 9). Also, all beluga sturgeons captured alive in 2006 were second time spawnres (all males) and II - to V - time spawers in females, confirming our prevission made in January 2006, when we recommended a 10 year ban on commercial catches, allowing only a small number of wild broodfish to be captured alive, PIT tagged and relased alive in the river after artificial propagation.

In 2006 NAFA has funded the **suppotive stocking programme** of the Danube River with young beluga and stellate sturgeons worth 1 milion Euro. Prior stocking in four different locations in the Danube River all young beluga (12,500) and stellate sturgeons (53,300) were individually tagged using CWT (Table 1 and Fig. 11).

As recommended by experts participating at the **third Regional Meeting on sturgeons**, held in Sarulesti / Romania (22 – 23 june 2006), the CITES MA accepeted to organize in 2007 the monitoring of survival of CWT tagged YOY stocked in 2005 and 2006. The results will be shared with partner countries and used to adopt common / harmonized stocking procedures in our region.

Due to exceptionally high water level / discharge of the Danube River in April and May and lack of brood fish **no other sturgeon species than beluga spawned and recruited naturally in year 2006**. Even in beluga sturgeon the natural recruitment recorded was the lowest during the last 7 seven years (Fig. 10), confirming the necessity of inclusion of this species in the supportive stocking programme of this year.

Finally, the construction of the **Monitoring Station** for migratory fish (sturgeon and Danube shad) started in November 2006 at Isaccea (Danube Km 100) and is scheduled to be finalized by October 2007. All funding for the planing and construction of this station (about 285,000 Euro) was alocated from the annual budget of the Ministry of Environment and Waters Management of Romania.

The **annual meeting of stakeholders** involved in sturgeon conservation and management was held on 16th of November 2006 in Bucharest at the CITES MA / Minstry of Environment and Waters Management. The **criteria for issuing by NAFA the fishing authorizations** in year 2006 were questioned and propsal made to reduce in 2007 the number of fish to be captured and the number of companies authorised from 5 to only 3. Also it was decided to limit the fishing period to only two month (15 Febr – 15 April) and the fishing sites to a few river sectors of 1- 2 km length, were fishing will be closed for all other species, except live sturgeons for the stocking and aquaculture programme. The Fishing Inspectors of NAFA will continuosly monitor the fishing in these sectors , PIT tag and record all fishes as they are captured alive. These last measures were adopted to correct the the deficiencies in implementation of regulations heavily criticized by all participants.

In September 2006, the CITES SA for Acipenseriformes has prepared (in Romanian) and distributed to all stakeholders two folders : (i) "Danubian sturgeons and Romania in the European Union?" and (ii)"A future for the sturgeons of Romania".

***** Rapid Rural Apraisal (based on interviews with fishermen)

****** Biased reporting of biometrical characteristics in stellate sturgeon (*A. stellatus*) during 2002 was corrected in 2003 by introducing expression of catch quota in [Kg] and [No. of specimens].

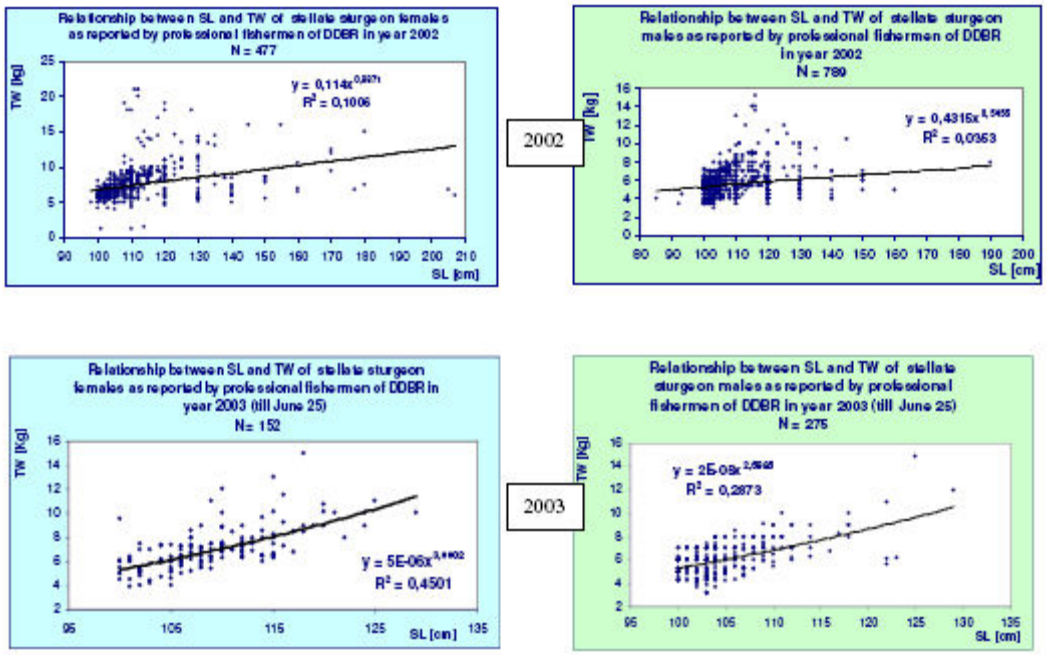


Figure No. 1: Length (SL) - weight (TW) distribution in males (right) and females (left) of stellate sturgeon captured and reported in DDBR in year 2002 (up) and 2003 (down). Note in 2002 biased under- reporting of most length, as between 100 - 110 cm (minimal length), and TW, as between 5 - 6 Kg.

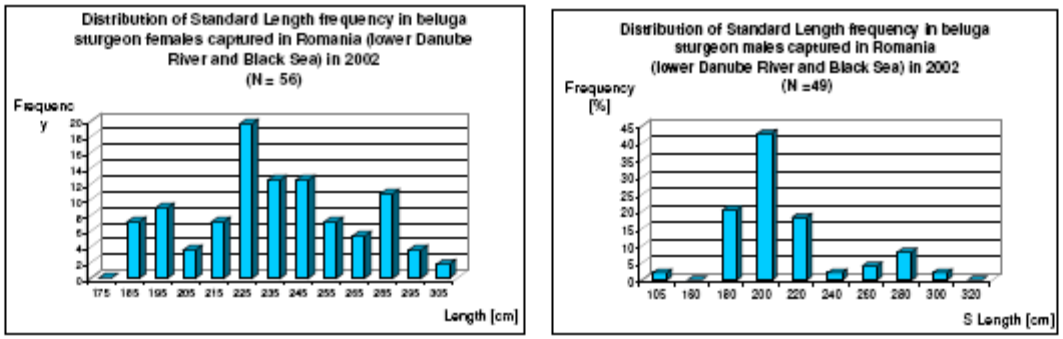


Figure No. 2: Distributions of Standard Length classes in beluga surgeons captured in Romania in 2002.

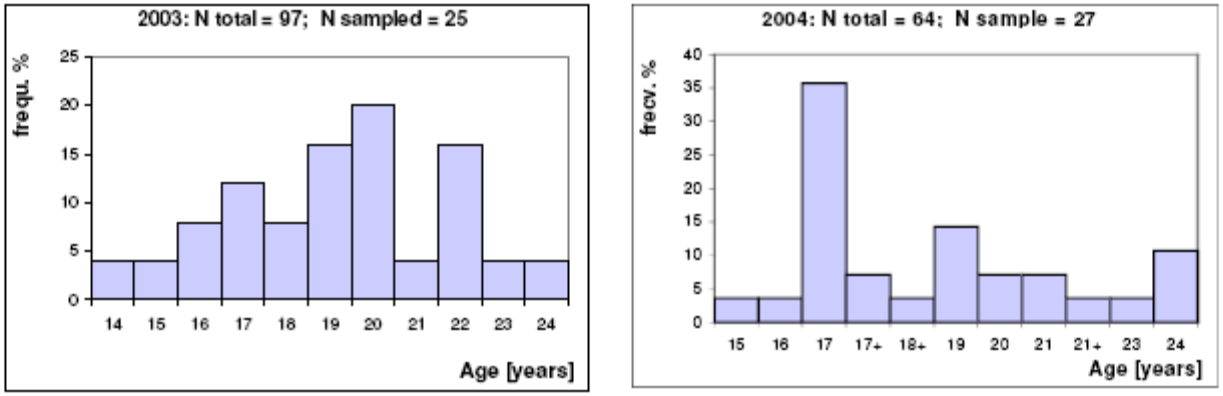
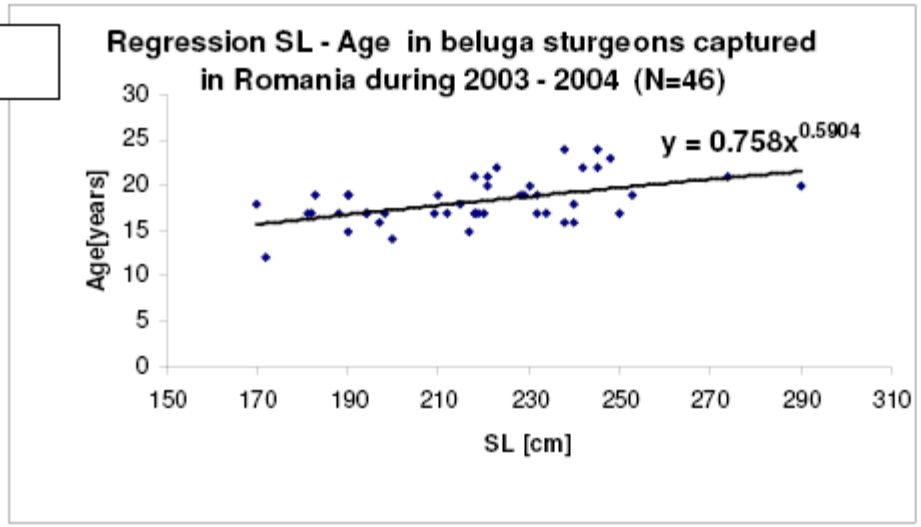
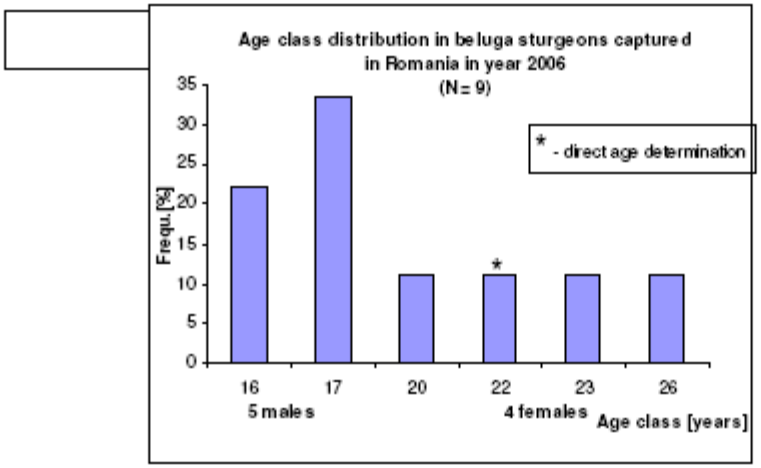


Figure No. 3: Age class structure in beluga surgeons (mixed sexes) captured in Romania in 2003 & 2004


Regression SL - Age in beluga sturgeons captured in Romania during 2003 - 2004 (N=46)
y = 0.758x^0.5904
Age[years]
SL [cm]
0
5
10
15
20
25
30
150
170
190
210
230
250
270
290
310


Age class distribution in beluga sturgeons captured in Romania in year 2006
(N= 9)
* - direct age determination
Frequ.[%]
0
5
10
15
20
25
30
35
16
17
20
22
23
26
5 males
4 females
Age class [years]

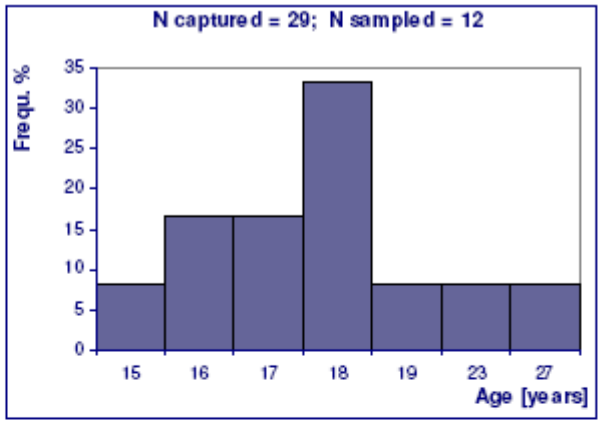


Figure No. 6: Age class structure in Danube surgeons (mixed sexes) captured in Romania in 2003.

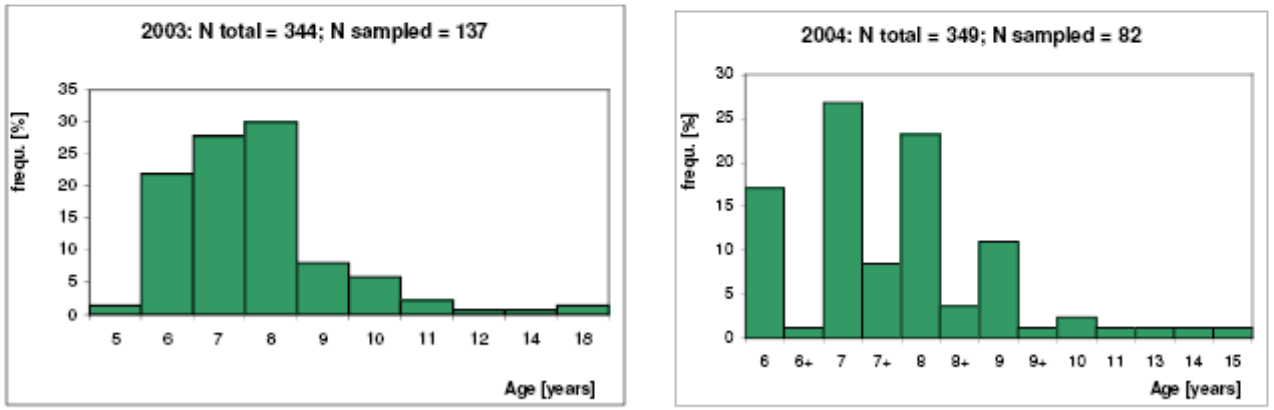
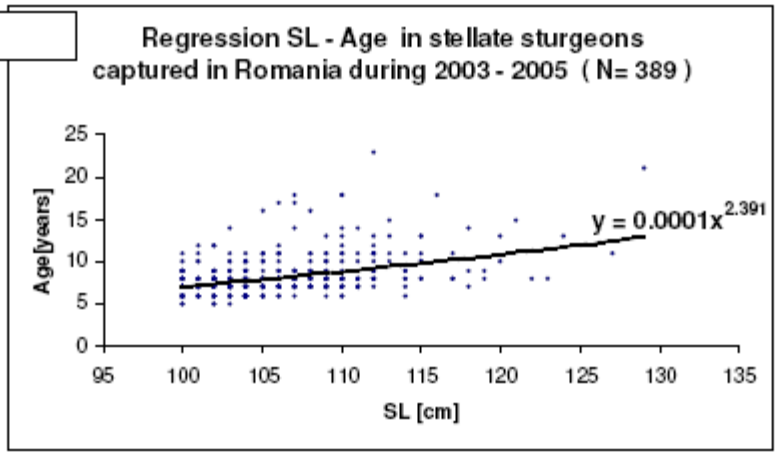
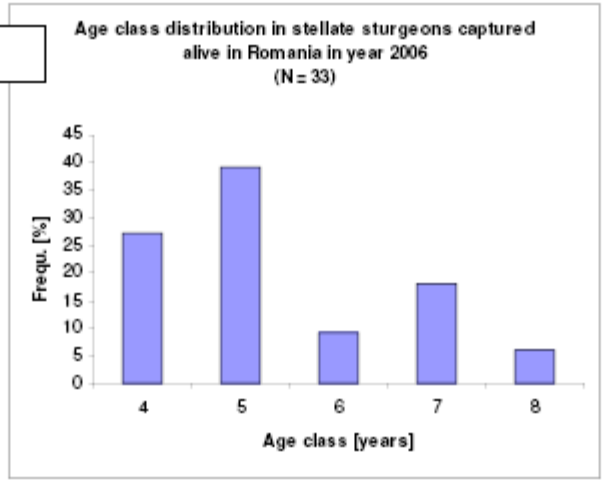


Figure No. 7: Age class structure in female stellate surgeons captured in Romania in 2003 & 2004


Regression SL - Age in stellate sturgeons
captured in Romania during 2003 - 2005 (N= 389)
Age [years]
SL [cm]
y = 0.0001x^2.391
0
5
10
15
20
25
95
100
105
110
115
120
125
130
135


Age class distribution in stellate sturgeons captured
alive in Romania in year 2006
(N = 33)
Frequ. [%]
Age class [years]
0
5
10
15
20
25
30
35
40
45
4
5
6
7
8

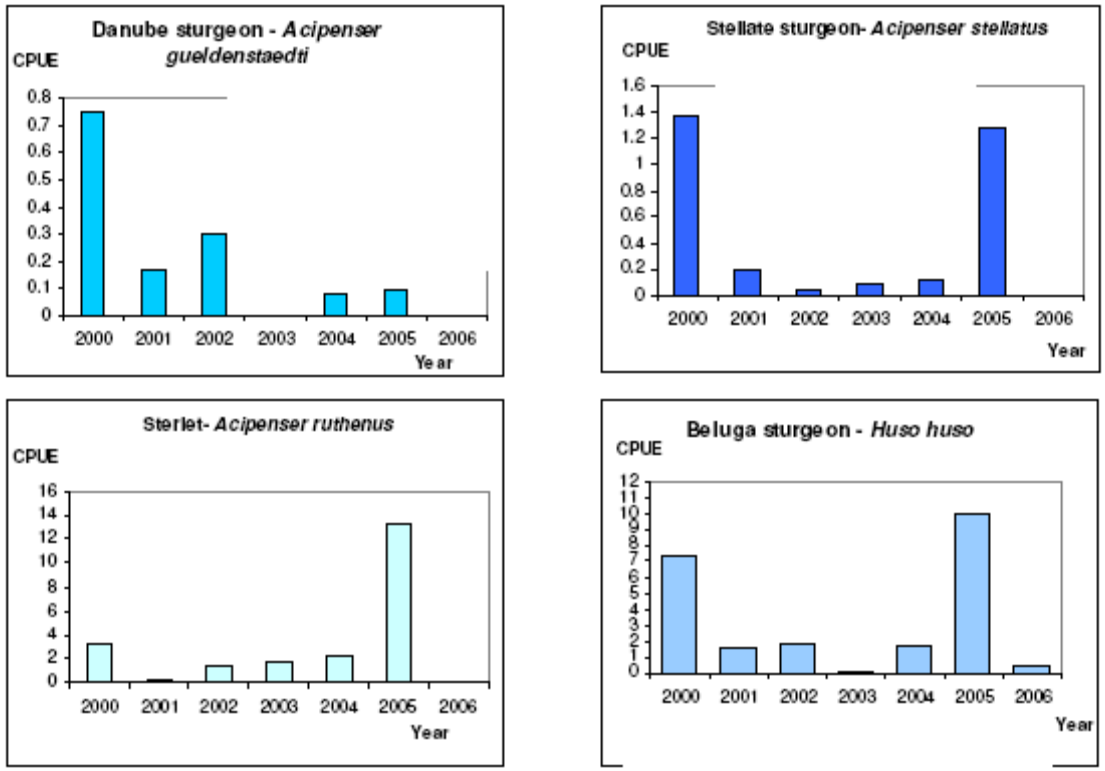


Figure 10 : Natural recruitemnt of diffrerent sturgeon species in the lower Danube River during 2000 – 2006 assessed by monitoring downstream migration of YOY at river Km 119 [represented as Juvenile Production Index (JPI) graphs]

CPUE – catch per unit of fishing effort [No of YOY captured by fishing with a 96 m long, 20 mm mesh sized trammel net drifted over 850 m stretch of the Danube River at river km 119]

Figure 11: Tagging of a YOY stellate sturgeon and a location (blue arrow) of Coded Wire Tag implanted in the pectoral fin of the same fish.

Codes used were :

Code 1: 23 – Europe - miscellaneous countries code
Code 2: 68 - Romania
Data 1 : **Year 2005** (in the right pectoral fin) : Agency - 01 or 02 - ARBDD Tulcea; - 03 or 04 – CNAFP Bucharest
Year 2006: Hatchery Tamadau 03 ; 04; 15 ; 16
Hatchery Brates 02; 23, 24
Hatchery Isaccea 05
Data 2: Sequential numbers: Δ00001 ÷ Δ10000 individual tag number of the fish

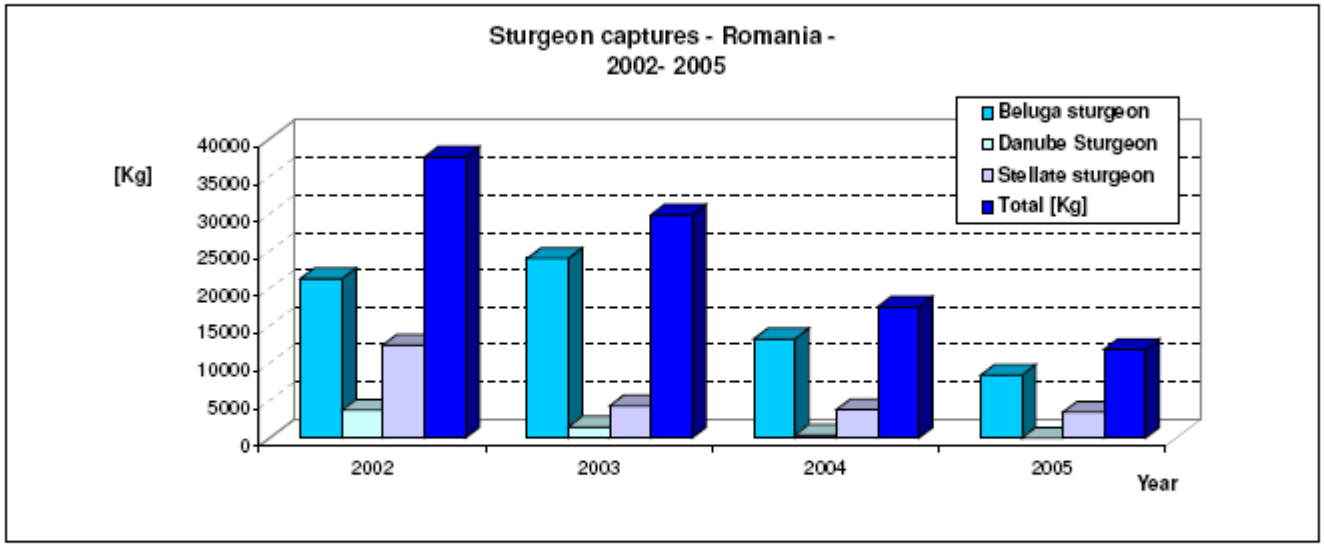


Figure 12: **Catches decreased in Romania from 37.5 tons in year 2002 to 11.8 tons in year 2005**