

PROGRESS REPORT OF THE “STURGEON CULTURE” WORKING GROUP

During the Second Meeting of NACEE Directors held in Astrakhan (Russian Federation) on 8–9 September 2005, the participants agreed to bring out sturgeon culture as one of the subjects of the NACEE joint activities. The “BIOS” Research and Production Center for Sturgeon Breeding was elected the Lead Institution in this field of research. Initially, 12 institutions wished to participate in the “Sturgeon Culture” Working Group:

1. The Stanisław Sakowicz Inland Fisheries Institute (Poland);
2. Animal Commodities Department, Ministry of Agriculture of the Slovak Republic (Slovak Republic);
3. Institute of Genetics and Cytology of the National Academy of Sciences of Belarus (Belarus);
4. Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences (Ukraine);
5. Research and Design Technological Center “Tekhrybvod” (Ukraine);
6. Institute of Fisheries and Aquaculture (Bulgaria);
7. All-Russian Research Institute of Freshwater Fish Farming “VNIIPRKH” (Russian Federation);
8. Department of Aquaculture and Biological Resources, Astrakhan State Technical University (Russian Federation);
9. All-Russian Research Institute of Fisheries and Oceanography “VNIRO” (Russian Federation);
10. “BIOS” Research and Production Center for Sturgeon Breeding (Russian Federation);
11. Research Institute for Fisheries, Aquaculture and Irrigation “HAKI” (Hungary);
12. State Research and Production Center of Fisheries “Gosrybtsentr” (Russian Federation).

In late October 2005, the “BIOS” Center offered all the above-stated institutions to fill in a special questionnaire with suggestions for joint activities in research and technological development in order to develop the coordination programme of the “Sturgeon Culture” Working Group.

Unfortunately, not all the institutions answered the questionnaire, even though the deadline was prolonged till December 2005. Thus, nine institutions from six countries were accepted into the “Sturgeon Culture” Working Group, namely:

- The Stanisław Sakowicz Inland Fisheries Institute (Poland);
- Institute of Genetics and Cytology of the National Academy of Sciences of Belarus (Belarus);
- Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences (Ukraine);
- Institute of Fisheries and Aquaculture (Bulgaria);
- All-Russian Research Institute of Freshwater Fish Farming “VNIIPRKH” (Russian Federation);
- All-Russian Research Institute of Fisheries and Oceanography “VNIRO” (Russian Federation);
- “BIOS” Research and Production Center for Sturgeon Breeding (Russian Federation);
- Research Institute for Fisheries, Aquaculture and Irrigation “HAKI” (Hungary);
- State Research and Production Center of Fisheries “Gosrybtsentr” (Russian Federation).

The aim of this report on the progress of the “Sturgeon Culture” Working Group is to highlight the following points:

1. Recent R&D work
2. Evaluation of resources
3. Evaluation of personnel
4. International collaboration
5. Suggestions for joint activities.

1. Recent R&D work

A survey of research work of the nine above-stated institutions in sturgeon breeding showed that 40 research projects were accomplished between 2001–2005, totaling US\$2.4 million. Twenty-six of those projects are of Russian institutions (VNIRO, VNIIPRKH, Gosrybtsentr and BIOS) for a total of US\$2 million, including 17 projects of BIOS costing US\$1 million. It is important to note that almost all of these projects were state-ordered and state-funded through ministries, agencies or national academies. International grants are missing, with an exception of the BISTRO/Tacis project “Development of sturgeon breeding in the Caspian Sea” with a budget of US\$58.5 thousand, accomplished by the “BIOS” Center in 2001. Very few research projects were done by contracts with private businesses. Another exception here is again the “BIOS” Center with 6 projects contracted with joint stock companies for a total of US\$188 thousand.

The main trends of R&D and practical work are:

1. Formation of broodstocks of sturgeons and paddlefish
2. Artificial reproduction of sturgeons
3. Market sturgeon rearing
4. Genetic and biological research in sturgeon breeding.

The following works have been identified as the most important:

1.1 Research work on formation of broodstocks of sturgeon and paddlefish is carried out by five NACEE institutions (in Ukraine – the Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences and in Russian Federation – VNIIPRKH, VNIRO, Gosrybtsentr and BIOS). Sturgeon broodstocks are also being formed at HAKI and The Stanisław Sakowicz Inland Fisheries Institute. Juvenile and mature brood stocks of paddlefish are being formed in Ukraine. In Russian Federation research is carried out on juvenile and mature broodstock formation of sturgeons in ponds (BIOS), broodstock formation of Siberian sturgeon in geothermal waters (Gosrybtsentr), biological foundations for the use of juvenile and mature broodstock of Sakhalin (green) sturgeon (VNIRO), methods of accelerated formation and fisheries biological monitoring of sturgeon broodstocks in commercial fish farming (VNIIPRKH).

1.2 Research on artificial reproduction of sturgeons is carried out in Ukraine, Bulgaria, Poland, Hungary and Russian Federation. The research fields are: replenishment of sterlet populations in Ukrainian rivers (Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences); optimization of the biotechnology of artificial reproduction of the Ob-Irtysh sturgeon, increasing the efficiency of fish farms (Gosrybtsentr); development of fisheries biological justifications of sturgeon reproduction farms in Turkmenistan, Kazakhstan and Russian Federation (BIOS); study of possibilities for active preservation of common sturgeon (*Acipenser sturio*) in preparation for the restitution of this species in Poland (The Stanisław Sakowicz Inland Fisheries Institute). Bulgarian and Ukrainian institutions develop biological justifications for the introduction of paddlefish into inland waters of their countries.

1.3 Research on market sturgeon rearing is carried out in Ukraine (development of efficient processes for market sturgeon breeding and paddlefish seed and market production), in Poland (improvement of sturgeon rearing methods), in Russian Federation (development of scientific and practical fundamentals of efficient market sturgeon production in lake-type reservoirs and in net cages as applied to Southern Russian Federation).

1.4 There are very few genetic and biological studies, and most of them are limited to the creation of genetic collections (in Hungary – HAKI, in Poland – The Stanisław Sakowicz Inland Fisheries Institute, in Russian Federation – VNIRO, VNIIPRKh, BIOS). Interesting research was done by VNIRO in 2005: “Study of DNA polymorphism of the unique Sakhalin (green) sturgeon broodstock for molecular genetic certification of breeders”. The Institute of Genetics and Cytology of the National Academy of Sciences of Belarus is also worth mentioning, which had a two-year research (2000–2001) on antimutagenic protection mechanisms in sterlet.

The current R&D activity is analysed in the following table:

Activity	Institutions								
	HAKI (Hungary)	VNIIPRKh (Russian Federation)	The Stanisław Sakowicz Institute (Poland)	VNIRO (Russian Federation)	Institute of Fisheries and Aquaculture (Bulgaria)	Institute of Genetics and Cytology (Belarus)	Institute for Fisheries (Ukraine)	Gosrybtsentr (Russian Federation)	BIOS Center (Russian Federation)
Broodstock keeping	X		X	X			X	X	X
Monitoring of natural populations				X			X	X	
Young sturgeon rearing	X	X	X	X			X	X	X
Artificial reproduction and acclimatization	X		X	X	X		X	X	X
Selection and pedigree activities			X				X	X	X
Gene pool collection	X	X	X	X					X
Research in genetics			X	X		X	X		
Research in physiology	X	X	X					X	X
Research in ichthyopathology	X	X	X				X	X	X
Feeds and feeding		X					X	X	X
Domestication								X	X

2. Evaluation of resources

Based on the information received from the institutions of the “Sturgeon Culture” Working Group, we can conclude that almost all of them have the required scientific, laboratory and production areas, though the laboratories are equipped differently. The best equipped are the laboratory facilities of the Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences, where they have labs of reproduction and rearing of valuable species, ichthyopathology, selection and genetics, environmental studies, feeds and feeding. This institution is also establishing an aquacultural biotechnological laboratory (for DNA studies),

and the first special frozen bank of fish eggs in Ukraine. For comparison, the Institute of Genetics and Cytology of the National Academy of Sciences of Belarus has only a specialized lab of molecular genetics; The Stanisław Sakowicz Inland Fisheries Institute (Poland) has a special water test lab for biological research. The rest of the institutions are more or less equipped with the required labs and instrumentation.

The evaluation of production resources showed that all institutions have the required areas of incubation, tanks, ponds, net cages, aquariums for breeding and rearing of sturgeons. Recirculation systems are available at some institutions: the Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences, the Institute of Genetics and Cytology of the National Academy of Sciences of Belarus, HAKI, VNIRO and BIOS. Water sources are rivers, lakes, underground water wells including geothermal waters (Gosrybtsentr). The Stanisław Sakowicz Inland Fisheries Institute uses effluent waters of power stations.

The objects of research and market production are almost all pure-bred sturgeon species: beluga, Russian sturgeon, Siberian sturgeon (Lena and Ob populations), sterlet and their hybrids: three strains of bester, Russian x Siberian sturgeons, etc. It should be noted that several institutions are involved in research and formation of broodstocks of rare and endangered sturgeon species: Sakhalin sturgeon is studied at VNIRO, stellate sturgeon and ship sturgeon are studied at BIOS, sharp-nosed sturgeon and hybrids of Siberian x Sakhalin sturgeon are studied at The Stanisław Sakowicz Inland Fisheries Institute. Some institutions (Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences, Institute of Fisheries and Aquaculture (Bulgaria) and HAKI) find a special interest in studying and industrial development of paddlefish production, while the biggest paddlefish stock in Russian Federation has been formed at the BIOS Center.

3. Evaluation of personnel

Regarding the staff in sturgeon breeding, we should take note of a relatively low number of specialists in this field with the exception of VNIRO (17 specialists) and BIOS (69 specialists).

The least specialists in sturgeon breeding are employed at the Institute of Genetics and Cytology of the National Academy of Sciences of Belarus (one person), Institute of Fisheries and Aquaculture, Bulgaria (three persons), and HAKI (four persons).

The average age of all staff at all the institutions is 47 years, the youngest and the oldest being at the BIOS Center (21 and 69 years, respectively). The highest number of specialists with degrees of Doctor or Candidate of Science are present at VNIRO (12 persons), VNIIPRKH (nine persons) and BIOS (nine persons). The highest average experience with sturgeons is noted at VNIRO (15.6 years), HAKI (13.5 years) and BIOS (12 years).

The average age of personnel, being close to 50 years, indicates the importance of hiring and training of young staff, so that the valuable experience accumulated by the previous generations is not lost. Staff training is closely connected with participation in different training courses and seminars held by other organisations, including NACEE members. One of the constraints of participation in international events is the lack of the knowledge of English, though some researchers can read English with dictionaries and speak simple patterns.

Important for communication is that many specialists of non-Russian institutions as the Institute of Fisheries and Aquaculture (Bulgaria), The Stanisław Sakowicz Inland Fisheries Institute, HAKI, as well as the Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences and the Institute of Genetics and Cytology of the National Academy of

Sciences of Belarus can speak fluent Russian with their Russian colleagues. Researchers of several institutions can also speak or read German or Spanish.

The table below gives an overall description of the staff:

Institution	Number of researchers or experienced staff	Higher professional education	Candidates or Doctors	Average age	Average experience (years)
HAKI (Hungary)	4	3	3	52	13.5
VNIIPRKH (Russian Federation)	12	12	9	55	–
The Stanisław Sakowicz Institute (Poland)	9	6	2	~38	8.5
VNIRO (Russian Federation)	17	17	12	45	15.6
Institute of Fisheries and Aquaculture (Bulgaria)	3	3	3	44	–
Institute of Genetics and Cytology (Belarus)	1	1	1	50	10
Institute for Fisheries (Ukraine)	7	7	4	~48	~10
Gosrybtsentr (Russian Federation)	6	6	2	~45	~7
BIOS (Russian Federation)	69	28	9	35	12

4. International collaboration

An survey of the international activity of the institutions in sturgeon breeding showed that all of them have international experience in terms of joint research projects and exchange of scientists and specialists, while the exchange of biological materials is less developed. It is well illustrated in the following table:

Institution	Joint Research	Exchange of scientist	Exchange of materials
HAKI (Hungary)	Russian Federation	_____	_____
VNIIPRKH (Russian Federation)	Hungary, China, Vietnam	USA, France	China
The Stanisław Sakowicz Institute (Poland)	Russian Federation, Ukraine	Ukraine	Russian Federation
VNIRO (Russian Federation)	Czech Republic, Spain, France	Czech Republic, Spain, USA, Korea	_____
Institute of Fisheries and Aquaculture (Bulgaria)	_____	Russian Federation	_____
Institute of Genetics and Cytology (Belarus)	Russian Federation	Czech Republic, Hungary, China, Russian Federation	_____
Institute for Fisheries (Ukraine)	Poland	Hungary	Poland
Gosrybtsentr (Russian Federation)	_____	Belgium	Poland
BIOS (Russian Federation)	Germany, Kazakhstan	Greece, Bulgaria, Germany, Iran, China	China, Germany, Bulgaria, Slovakia, Latvia, Kazakhstan, USA, Ukraine, Belarus, Poland, Hungary

It is interesting to note that about 50% of all good partnership in joint research and exchange of specialists is with NACEE members. Today we have to widen and to improve this partnership. It should be also noted that only five of the nine institutions of the “Sturgeon Culture” Working Group have experience in exchange of biological material. Among them, the BIOS Center alone delivers sturgeon seed to 11 countries, only four of which are NACEE members. Thus, we have to intensify our activity in this field, as we see the need for the exchange of biological material and a high available potential.

5. Suggestions for joint activities

5.1 Collaboration in joint research

Based on the study of the resources and personnel, as well as the experience of institutions in sturgeon breeding research, we developed suggestions for the following joint project activities:

No.	Project description	Participants	Results
5.1.1.	Innovative development of aquaculture and its applied aspects for integrated and sustainable use of bioresources of water ecosystems, their functioning, preservation and rehabilitation.	All NACEE members	Finding of biological production resources of regional fisheries funds for aquaculture (culture-based fisheries, ponds, net cages, industrial production). Recommendations on bio-economical models of resource-saving and competitive technologies of aquaculture production.
5.1.2.	Molecular genetic and genetic engineering work in sturgeon-breeding.	Institute of Genetics and Cytology of the National Academy of Sciences of Belarus VNIRO HAKI BIOS	Creation of a genetic collection of sturgeon broodstock DNA for different purposes (reproduction, market production, collections). Methods of DNA diagnostics of useful sturgeon traits. Express molecular genetic methods for determination of hybrids in multi-species sturgeon stocks at fish farms. Materials on the genetic variety of sturgeon brood stocks at fish farms. Methods of selection of immunological disease-resistant breeders with application of DNA diagnostics.
5.1.3.	Creation of a frozen gene bank of sturgeons and paddlefish.	Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences Institute of Genetics and Cytology of the National Academy of Sciences of Belarus HAKI	Bank of eggs and heterogeneous material of sturgeons and paddlefish. Population genetic methods of material selection for the frozen bank.

No.	Project description	Participants	Results
5.1.4.	Monitoring of morphological, biological, physiological and biochemical characteristics of the selection and pedigree material of sturgeon and paddlefish under various rearing conditions.	BIOS Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences The Stanisław Sakowicz Inland Fisheries Institute HAKI VNIRO Gosrybtsentr Institute of Fisheries and Aquaculture (Bulgaria)	Creation of a database on the biological, physiological and biochemical condition of cultured species. Morphological and biological characteristics of domesticated breeders and multi-aged juveniles grown from fish of natural or artificial populations. Physiological and biochemical characteristics of organs and tissues of sturgeons and paddlefish grown artificially and in nature. Norms of physiological and immune condition, vitality, optimal size and weight of juvenile sturgeons and paddlefish as seed for market production farms and natural water bodies.
5.1.5.	Improvement of domestication methods for sturgeons of natural populations and methods of physiological and biochemical quality testing of artificially kept breeders.	BIOS Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences HAKI VNIRO Gosrybtsentr	Morphophysiological and genetic criteria of selection for domesticated stocks. Methods of life-saving sex determination, obtaining of eggs and post-operational rehabilitation. Methods of transfer of domesticated fish to artificial feeds and feeding. Artificial feed formulas according to the biology and sex of domesticated fish. Technological keeping and feeding parameters of domesticated breeders depending on their designation and rearing conditions. Economic efficiency of domesticated stock formation with multiple turnover.
5.1.6.	Development of methods for earlier maturation of breeders, either domesticated or from own broodstock.	BIOS VNIRO	Methods of earlier maturation of breeders, either domesticated or from own broodstock.
5.1.7.	Improvement of artificial feed formulas for sturgeons with application of biologically active agents, premixes and immune protectors.	BIOS Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences Institute of Genetics and Cytology of the National Academy of Sciences of Belarus HAKI VNIRO VNIIPRKH	Ways to apply antimutagenes, growth promoters, antioxidants and antistressors in aquaculture.

No.	Project description	Participants	Results
5.1.8.	Development of methods to produce sturgeons for caviar.	HAKI BIOS VNIRO VNIIPRKH The Stanisław Sakowicz Inland Fisheries Institute	Fisheries biological norms, technological and technical support.

These suggestions are preliminary and open for your corrections.

5.2 Economic collaboration

The following economic collaboration based on institutional capacities is suggested hereby for your consideration.

5.2.1.	Delivery of multi-aged seed of sturgeons, their hybrids, and paddlefish.	BIOS HAKI VNIIPRKH	Eggs, larvae, juveniles.
5.2.2.	Survey of the epizootic condition of sturgeon farms of Central and Eastern Europe, and development of measures to fight diseases with modern methods, vaccines and medications.	BIOS VNIIPRKh	Expert opinion on condition of sturgeon farms of Central and Eastern Europe. Plan of actions to fight fish diseases.
5.2.3.	Delivery of complete feeds and supplements for different sturgeon species and hybrids.	BIOS VNIRO	Mixed feeds and supplements.
5.2.4.	Inspection of fish farms to develop fisheries biological justifications and business plans for various aquaculture trends (culture-based fisheries, pond, net cage, industrial).	BIOS VNIRO	Expert opinions, fisheries biological justification and business plan for a certain trend of aquaculture.
5.2.5.	Exchange of sturgeon and paddlefish genetic material to form heterogeneous ichthyological material for aquaculture with observation of international regulations.	All NACEE members	Formation of a gene pool of sturgeons and paddlefish.

5.3 Collaboration in information and advanced training.

A survey of the provided information showed that all the institutions have fair scientific libraries, organise and hold international symposiums and conferences on sturgeon breeding, organise staff training and retraining, exchange scientists and specialists, but these activities do not work directly enough among NACEE members. For example, while the “BIOS” Center holds annual seminars on sturgeon breeding and international conferences “Sturgeon Aquaculture: Achievements and Prospects for Development” (once per 2 years), we do not see many NACEE institutions taking part in them. In this respect, The Stanisław Sakowicz Inland Fisheries Institute suggests holding of conferences on sturgeon breeding annually in different countries, hosted by institutions of the “Sturgeon Culture” Working Group; for 2007 it was suggested to hold such a conference in Poland. We think that this suggestion is

interesting and requires discussion. We also highlight the importance of scientific literature exchange, and offer every institution to submit a list of available materials.

Further on, we would like to pay more attention to the development of the NACEE web page, the subsections of which would be dedicated to the work of the four Working Groups, including “Sturgeon Culture”. This page could be used for description of these groups (members, activities) and as an information board for the members (joint projects, announcements of training courses, seminars, etc.).

5.4 Suggestions for research trends

In conclusion, we come forth with the following suggestions for research trends in sturgeon culture. These trends are identified as priorities based on the study of the previous activities, estimation of resources and personnel, and suggestions from the institutions, as well as the topicality of the objectives. There are 12 of them:

1. Determination of guidelines for physiological and immune status, vitality, optimum size-and-weight characteristics of sturgeon and paddlefish juveniles used as seed for market production farms and for stocking in natural water bodies;
2. Scientific support for the formation of collection stocks of sturgeons and paddlefish, creation of frozen banks of reproduction products;
3. Development of an express method for earlier sex determination in sturgeons;
4. Development of methods of accelerated maturation of sturgeons in aquaculture for earlier production of caviar;
5. Reintroduction of extinct sturgeon species into their natural habitat;
6. Anesthetics in sturgeon breeding;
7. Biology of rare and endangered sturgeon species in their natural habitat;
8. Definition of morphological, biological, physiological and biochemical characteristics of pedigree material of sturgeons and paddlefish;
9. Development of regulations for the formation of domesticated juvenile and spawning broodstocks;
10. Improvement of artificial feed formulas for sturgeon with application of biologically active agents, premixes and immune protectors;
11. Study of sturgeon diseases in aquaculture and the development of preventive treatment,
12. Creation of a catalogue of produced species and hybrids of sturgeons.

We suppose that the above-stated topics could be formed as a programme of research and technical collaboration between the members of the NACEE “Sturgeon Culture” Working Group to be implemented also by joint participation in international grants. These research trends could be as well forwarded to international funds for financial support.

REPORT OF THE AD HOC MEETING OF THE “STURGEON CULTURE” WORKING GROUP

The ad hoc meeting of the “Sturgeon Culture” WG was held on 28 September 2006, in Dubrovnik/Slano in the framework of the Third Meeting of NACEE Directors.

Seven of the nine member-institutes of the “Sturgeon Culture” Working Group participated in this meeting:

1. Lidiya Vassilieva (“BIOS” Center – lead institute, Astrakhan, Russian Federation)
2. Aliaksandr Slukvin (Institute of Genetics and Cytology of the National Academy of Sciences of Belarus, Minsk, Belarus)
3. Liliana Hadjinikolova (Institute of Fisheries and Aquaculture, Varna, Bulgaria),
4. Alexandr Litvinenko (“Gosrybtsentr”, Tyumen, Russian Federation)
5. Vitaliy Bekh (Institute for Fisheries of the Ukrainian Academy of Agricultural Sciences, Kiev, Ukraine)
6. Boris Kotenev (VNIRO, Moscow, Russian Federation)
7. Laszlo Varadi (HAKI, Szarvas, Hungary)

Representatives of the following institutes of the “Sturgeon Culture” WG were absent:

1. The Stanislaw Sakowicz Inland Fisheries Institute, Olsztyn-Kortowo, Poland
2. VNIIPRKH, Moscow Province, Russian Federation

Representatives of six more NACEE institutes expressed their wish to join this Working Group:

1. Otomar Linhart (Research Institute of Fish Culture and Hydrobiology, University of South Bohemia, Vodnany, Czech Republic)
2. Neculai Patriche (Institute of Research and Development for Aquatic Ecology, Fishing and Aquaculture, Galati, Romania)
3. Galina Curcubet (Fisheries Research Station, Chisinau, Moldova)
4. Isaak Sherman (Faculty of Hydrobiological Resources and Aquaculture, Kherson State Agrarian University, Kherson, Ukraine)
5. Viktor Konchits (Institute of Fisheries of the National Academy of Sciences of Belarus, Minsk, Belarus)
6. Viktor Cristea (Department of Fishing and Aquaculture, “Dunarea de Jos” University, Galati, Romania)

The members of the “Sturgeon Culture” WG found that the establishment of the Working Group had been reasonable, and that the year 2006 had shown good opportunities for collaboration. The initiative of the lead institution of the WG to distribute a special questionnaire among the members was approved, and the generalized analysis of the received data and suggestions presented by Lidiya Vassilieva aroused great interest (see Annex 6.1, Progress Report of the “Sturgeon Culture” Working Group).

In the context of the suggestion made at the general meeting of the Board of Directors concerning the project “Study of the current status and development of the strategy of aquaculture development in countries of Central and Eastern Europe for the period up to 2020-2030”, the members of the “Sturgeon Culture” WG put forward an idea to make the relevant review in the field of sturgeon breeding, which will become part of the above-mentioned big project.

The analysis of the data provided by the members of the WG “Sturgeon Culture” revealed 12 titles of possible joint R&D projects.

The following conclusions were made at the meeting:

- a) All the above-mentioned institutes wishing to join the “Sturgeon Culture” WG will be offered to fill in a special questionnaire, and the data shall be used to decide on their admittance.
- b) “BIOS” institute will coordinate the works on preparation of the review in the field of sturgeon breeding within the framework of the project “Study of the current status and development of the strategy of aquaculture development in countries of Central and Eastern Europe for the period up to 2020–2030”. “BIOS” will develop the structure of the review and make a list of questions for the WG members (in the form of an upgraded questionnaire). The first stage of the work will be a review of the status of sturgeon breeding (R&D and market production) at the institutes of the “Sturgeon Culture” WG. This review will be presented at the Fourth Meeting of NACEE Directors. The second stage of the work will be the elaboration of the development strategy of sturgeon breeding in CEE countries.
- c) The information base of the “Sturgeon Culture” WG will be annually updated and complemented; institutes will exchange data on the available professional literature. A subsection on the “Sturgeon Culture” WG will be created on the NACEE webpage, where general information on the WG, current news, planned scientific conferences, exhibitions, and seminars will be published. “BIOS” will be responsible for preparation and updating of this subsection.
- d) Possibilities of joint R&D works will be searched for.
- e) The following four titles of projects will be primarily submitted for international grants:
 1. Project of sturgeon rehabilitation and reintroduction in European rivers.
 2. Creation of a catalogue of species and hybrids of sturgeons in production.
 3. Development of methods of accelerated maturation of sturgeons in aquaculture for earlier production of caviar.
 4. Scientific support for the formation of collection stocks of Acipenseriformes.