



**8th International Workshop
on the Biology of Fish Gametes**

20-23 September 2022

Gdańsk, POLAND

CONFERENCE PROGRAM

**8th International Workshop
on the Biology of Fish Gametes**

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Andrzej Ciereszko

Members of the International Scientific Committee

(in alphabetic order)

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Julien Bobe (France)
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Oliana Carnevali (Italy)
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Prefeace

The 8th International Workshop on the Biology of Fish Gametes is a continuation of previous excellent meetings of the scientific community having interest in gametes and reproduction-related technologies of aquatic organisms. The first Workshop was held in Vodňany (Czech Republic) back in 2007 and has since been followed up every two years with wonderful and inspiring events in Valencia (Spain), Budapest (Hungary), Faro (Portugal), Ancona (Italy) and Vodňany (10th anniversary event). The last event took place in Rennes (France) in 2019 where its organization was passed on to the Polish team of Institute of Animal Reproduction and Food Research of Polish Academy of Sciences. Initially, the meeting was planned to be organized in 2021, but it was later postponed due to the unprecedented global and tragic pandemic of COVID-19 whose long shadow is still being felt right now, together with another tragic event – an invasion of Ukraine by Russia, affecting the overall functioning of Central and Eastern Europe. However, after many reconsiderations and consultations with the International Scientific Committee, the Organizing Committee has decided to proceed and to organize the 8th edition of this meeting in September 2022 in a traditional fashion – in-person. We believe that face-to-face interactions at this particular conference are vital for integrating our scientific community which catalyzes the generation of new ideas, networks, and collaborations. Most importantly, after the difficult period of remote meetings we are looking forward to seeing our friends and colleagues as well as to meet new enthusiasts of fish gametes biology.

Having in mind the surrounding circumstances we were astonished by the great response of the scientific community to the announcements on the organization of this meeting and are deeply satisfied by receiving of 91 abstracts from 14 countries. Out of these, 40 abstracts were selected for oral presentations which are planned to be presented during 6 scientific session, including biotechnology and biotechniques, gametogenesis, gamete quality, gamete biology, fertilization and development, and gamete storage and cryopreservation. We are deeply honored to include in the program of this conference contributions of excellent, highly devoted and passionate scientists from the field. And we are happy that this event will be enriched by a plenary talk from Katsutoshi Arai from Hokkaido University, who has been involved in Fish Gametes workshops from the very beginning, as well as Ibon Cancio from University of the Basque Country (Spain) and Audrey Laurent from INRAE LPGP (Rennes, France) who kindly agreed to take part in building our exciting program. We are sure these talks will become inspiring for all of the members of our unique community.

Our ambition is to make your time in Poland fruitful, inspiring and pleasant.

So, welcome to Poland! Let's have some science-based fun together.

Andrzej Ciereszko

Daniel Żarski

**8th International Workshop
on the Biology of Fish Gametes**

Meet the Honorary Speakers

Prof. Katsutoshi Arai

Plenary Lecturer



About me

My research life began in studying salmonid hybrids on 1970's. I performed cross-breeding using as many salmonid species as possible and then classified the resultant progeny into viable and inviable hybrids. Then, I analyzed enzyme genotypes and chromosomes in these hybrid embryos to understand genetic mechanisms underlying survival potential and developmental capacity. In 1980's, I combined hybrid studies and chromosome manipulation techniques and showed that artificial allotriploidization drastically increased survival potential of inviable hybrids to produce aquaculture breed.

From 1990's to present, chromosome manipulation techniques were studied for production of sterile triploids with outperformed growth in abalone as well as all-female population of flatfish. Production of gynogenetic, androgenetic or polyploid progeny also contributed to estimate sex determination in flatfish, pufferfish, sturgeon and zebrafish.

In 21th century, research interest was shifted to natural polyploid and asexual fishes. Using natural fertile gametes of natural tetraploid dojo loach (Cobitidae), various kinds of auto- and allopolyploids were produced to analyze their reproductive characteristics. Mechanisms responsible for atypical reproduction such as unreduced gamete formation and natural cloning by gynogenesis have been investigated using natural clone dojo loach from the eastern part of Hokkaido, Japan by various experimental, genetic and cytogenetic approaches.

Prof. Ibon Cancio

Keynote Speaker



About me

I am a Professor in Cell Biology in the University of the Basque Country. I did my MSc at the University of Wales (UK) and European PhD at the University of the Basque Country, with research stays in Universities of Amsterdam, Heidelberg and Leuven. I coordinated the MSc degree Environmental Contamination & Toxicology for 10 years at the University of the Basque Country.

I am currently a researcher of the consolidated research group Cell Biology & Environmental Toxicology in the Plentzia Marine Station of the University of the Basque Country, participating in over 55 regional, national and European research projects. My research focuses in the cell/molecular biology of fish sex differentiation and molecular biomarkers of endocrine disruption, mainly xenoestrogenicity. So in principle I am a cell biologist with a foot in ecotoxicology and another one in the study of fundamental processes associated to development, reproduction and aquaculture.

Personally I like Rock and Roll and enjoy a goof rugby match, especially if Wales is playing. And when comes to reproduction, but this time mammalian, I am a father of two children.

Dr. Audrey Laurent

Keynote Speaker



About me

I did my PhD and first post doc working on very early development in xenopus and mouse. I mainly studied a family of transcription factors (Pbx and Meis/Prep), which were famous as hox co-factors, doing expression profiles and gene invalidation to show that these proteins actually have unexpected roles in early development, such as the control of chromatin compaction or the maintenance of genome integrity. I also worked on mouse ES cells to develop *in vitro* differentiation assays and ChIP experiments.

I came back to France for a second post-doc where I discovered 'omic' approaches. Combining RNAseq and ChIPseq I studied the epigenetic reprogramming of human breast cancer cells upon the modulation of methylation.

Since 4 years I am working at the Laboratory of Fish Physiology and Genomics of INRAE in Rennes, France, where I am developing research on fish gametes epigenetics.

**8th International Workshop
on the Biology of Fish Gametes**

Conference Program

General Program Grid of the Conference

	20.09	21.09	22.09	23.09
9.00-9.20	Opening ceremony	Keynote	Keynote	
9.20-9.40	Plenary lecture	Fertilization and Development	Gamete storage and cryopreservation	Gamete storage and cryopreservation (<i>continued</i>)
9.40-10.00				Coffee break
10.00-10.20	Coffee break	Coffee break	Coffee break	Gamete storage and cryopreservation (<i>continued</i>)
10.20-10.40				Coffee break
10.40-11.00				Gamete storage and cryopreservation (<i>continued</i>)
11.00-11.20				Closing ceremony
11.20-11.40	Biotechnology & biotechniques	Fertilization and Development (<i>continued</i>)	Gamete storage and cryopreservation (<i>continued</i>)	
11.40-12.00				Lunch break
12.00-12.20		Gamete biology		
12.20-12.40				
12.40-13.00				
13.00-13.20	Lunch break	Lunch break	Lunch break	
13.20-13.40				Lunch break
13.40-14.00				
14.00-14.20	Gametogenesis	Gamete biology (<i>continued</i>)	Free time / preparation for excursion	
14.20-14.40				
14.40-15.00				
15.00-15.20	Coffee Break	Coffee Break		
15.20-15.40				
15.40-16.00		Group photo		
16.00-16.20	Gametes quality	POSTER SESSION	Excursion to Malbork Castle + Gala Dinner (shuttle at 15.30)	
16.20-16.40				
16.40-17.00				
		Student's reception		

CONFERENCE SCHEDULE

TUESDAY, 20 SEPTEMBER 2022

9.00-9.20 Welcome and opening ceremonies

PLENARY LECTURE

9.20-10.00 **Arai K.**: Chromosomally manipulated and naturally occurred polyploid and unisexual fish: lessons from the dojo loach (*Misgurnus anguillicaudatus*).....pp. 15 [O1]

10.00-10.40 Coffee break

SESSION 1:

BIOTECHNOLOGY AND BIOTECHNIQUES

Chairman: Martin Pšenička & Elvira Fatsini

10.40-11.00 **Nayak R.**, Franěk R., Šindelka R., Pšenička M.: Enhancement of zebrafish gamete production in a big body sized giant danio by germ cell transplantation.....pp. 17 [O2]

11.00-11.20 Goupil A.-S., Kica S., Terenne T., Goardon L., Depince A., Labesse C., Lareyre J.-J., **Labbé C.**: Cryopreservation of rainbow trout germinal stem cells: application in aquaculture to restore both spermatozoa and oocytes from valuable genotypes.....pp. 18 [O3]

11.20-11.40 Bhat I.A., **Dubiel M.**, Jónsson Z.O., Rodriguez E.: Molecular biology tools for sterile salmon production.....pp. 19 [O4]

11.40-12.00 **Fujimoto T.**, Kawamura Y., Nishimura T., Arai K.: Tetraploidization recovers fertility in sterile inter-group hybrid males of dojo loach.....pp. 20 [O5]

12.00-12.20 **Ocalewicz K.**: Quality of rainbow trout eggs and efficiency of androgenesis and gynogenesis.....pp. 21 [O6]

12.20-12.40 **Kitanović N.**, Marinović Z., Pataki B., Mészáros G., Saho S., Urbányi B., Horváth Á.: Optimization of culture media for *in vitro* maturation of common carp ovarian follicles.....pp. 22 [O7]

12.40-13.40 Lunch break

SESSION 2:

GAMETOGENESIS

Chairman: Juan Asturiano & Joanna Nynca

13.40-14.00 **Oliveira C.C.V.**, Fatsini E., Santos T., Hubbard P., Velez Z., Cabrita E.: Kisspeptin treatment induced reproductive traits during puberty and altered chemical communication in Senegalese sole.....pp. 24 [O8]

14.00-14.20	Giommi C. , Zanardini M., Maradonna F., Habibi H.R., Carnevali O.: Insights on reproductive gender specific toxicity induced by glyphosate chronic exposure in <i>Danio rerio</i> adults.....pp. 25 [O9]
14.20-14.40	Roza de Abreu M., Janati Idrissi S., da Mello F., Guyomar C., Nguyen T., Pšenička M., Herpin A., Thermes V., Seitz H., Bobe J. : Hippo pathway-mediated regulation of micropyle formation by micro RNA 202 (miR-202) in the fish oocyte.....pp. 26 [O10]
14.40-15.00	Nobrega R.H. , Doretto L.B., Thomas M., Chenais N., Lareyre J.-J.: FSH regulates the proliferation of embryonic-like germ stem cells in adult zebrafish testes.....pp. 27 [O11]
15.00-15.40	Coffee break

SESSION 3:

GAMETES QUALITY

Chairman: *Julien Bobe & Taina Rocha De Almeida*

15.40-16.00	Momin M. , Memiş D.: Effect of <i>Moringa oleifera</i> supplemented diet on the sperm quality of male rainbow trout (<i>Oncorhynchus mykiss</i>).....pp. 29 [O12]
16.00-16.20	Ljubobratović U. , Kitanović N., Milla S., Marinović Z., Fazekas G., Stanivuk J., Žarski D., Horváth Á.: Predicting the egg quality based on the oocyte diameter and <i>in vitro</i> maturation in domesticated pikeperch (<i>Sander lucioperca</i>).....pp. 30 [O13]
16.20-16.40	Valcarce D.G., Riesco M.F., Cuesta L., Martínez-Vázquez J.M., Robles V. : Unpredictable chronic stress alters behaviour, sperm quality and NMD pathway in zebrafish.....pp. 31 [O14]
16.40-17.00	Félix F. , Gallego V., Mendes A., Soares F., Vera L., Cabrita E., Oliveira C.C.V.: Species-specific melatonin patterns in fish seminal plasma.....pp. 32 [O15]

WEDNESDAY, 21 SEPTEMBER 2022

PLENARY KEYNOTE

9.00-9.40	Cancio I. , Bir J., Nzioka A., Rojo-Bartolomé I., Ortiz-Zarragoitia M., Diaz de Cerio O.: It takes two to tango and if you are a fish oocyte you will also need enough ribosomes.....pp. 34 [O16]
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SESSION 4:

FERTILIZATION AND DEVELOPMENT

Chairman: *Oliana Carnevali & Marta Lombo*

9.40-10.00	Bernáth G. , Láng Z.L., Várkonyi L., Fodor F., Nagy B., Bodnár A., Koltai T., Csókás E., Molnár J., Csorba B., Csenki-Bakos Z., Ivánovics B., Szári Z., Urbányi B., Bokor Z.: The growth performance of pond reared larvae propagated using cryopreserved sperm in common carp (<i>Cyprinus carpio</i>).....pp. 36 [O17]
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10.00-10.20	Gazo I. , Naraine R., Franěk R., Dietrich M.A., Flajshans M., Šindelka R., Pšenička M.: DNA damage response in sturgeon (<i>Acipenser ruthenus</i>) embryo: link between phenotype and transcriptome.....pp. 37 [O18]
10.20-11.00	Coffee break
11.00-11.20	Shah M.A. , Saito T., Pšenička M.: Sturgeon (<i>Acipenser</i>) represents the evolutionary transition from the holoblastic to meroblastic cleavage pattern and unique gut development.....pp. 38 [O19]
11.20-11.40	Nagy B. , Bokor Z., Csorba B., Várkonyi L., Molnár J., Bartucz T., Láng Z.L., Ittzés Á., Ittzés I., Urbányi B., Bernáth G.: The investigation of the differences in artificial propagation and larvae development by four different goldfish types (<i>Carassius auratus</i>).....pp. 39 [O20]
11.40-12.00	Chemello G. , Cerrone G., Tavolazzi V., Donato F., Tiralongo F., Carnevali O., Gioacchini G.: Reproductive biology of the European sardine (<i>Sardina pilchardus</i>) in the Adriatic Sea, an integrated study evaluating ovary structural and morphological integrity within an entire reproductive cycle.....pp. 40 [O21]

SESSION 5:**GAMETE BIOLOGY***Chairman: Elsa Cabrita & Luz Pérez*

12.00-12.20	Boryshpolets S. , Dzyuba B., García-Salinas P., Gallego V., Sotnikov A., Asturiano J.F.: Sperm behaviour and motility in <i>Elasmobranch</i> species: the role of viscosity.....pp. 42 [O22]
12.20-12.40	Rusco G. , Esposito S., Di Iorio M., Antenucci E., Roncarati A., Iaffaldano N.: The effectiveness of ovarian fluid on spermatozoa performances in Mediterranean brown trout wild population (Molise region - Italy).....pp. 43 [O23]
12.40-13.40	Lunch break
13.40-14.00	Kholodnyy V. , Dzyuba B., Cosson J., Boryshpolets S.: The kicker, the hugger and the catcher: ovarian fluid specifically determinates gametes encounter in rainbow trout, sterlet and common carp in line with their reproductive behaviour.....pp. 44 [O24]
14.00-14.20	Króli J. , Krejszef S., Palińska-Żarska K., Żarski D.: Effect of light colors on spermiation and sperm kinetics parameters during out of season reproduction in pond-reared Eurasian perch (<i>Perca fluviatilis</i> L).....pp. 45 [O25]
14.20-14.40	Ferrão L. , Blanes-García M., Pérez L., Asturiano J.F., Morini M.: First description of superoxidase dismutase multigene in European eel males: expression <i>in vivo</i> under different environmental conditions.....pp. 46 [O26]
14.40-15.00	Kodzik N. , Ciereszko A., Szczepkowski M., Karol H., Judycka S., Malinowska A., Świdarska B., Dietrich M.A.: Proteomic analysis of Siberian sturgeon seminal plasma through shotgun and gel-based methods.....pp. 47 [O27]
15.00-15.40	Coffee break

15.40-16.00 Photo of Participants

16.00-17.00 POSTER SESSION

19.00-23.00 Student reception

THURSDAY, 22 SEPTEMBER 2022

PLENARY KEYNOTE

9.00-9.40 **Laurent A.**: Epigenetics in fish gametes: sensitivity to environmental clues and transgenerational acclimation.....pp. 49 [O28]

SESSION 6:

GAMETE STORAGE AND CRYOPRESERVATION (Part I)

Chairman: Ákos Horváth & Sylwia Judycka

9.40-10.00 **EL Kamoun M.**, Brionne A., Laurent A., Labbé C.: Cryopreservation affects cellular quality but not DNA methylation profile in rainbow trout spermatozoa.....pp. 51 [O29]
10.00-10.20 Sotnikov A., Urbansky A., Alsved J., Boryshpolets S., Rodina M., **Dzyuba B.**: Sperm fractionation in fishes: density gradient centrifugation and microfluidic separation approaches for cryopreserved samples.....pp. 52 [O30]

10.20-11.00 Coffee break

11.00-11.20 **Cheng Y.**, Vechtova P., Samarin A.M., Samarin A.M., Brionne A., Zhang S., Linhartová Z., Xin M., Schumacher F., Sterba J., Labbé C., Linhart O.: Effect of short-term storage sperm in common carp (*Cyprinus carpio*) on sperm DNA methylation and epigenetic inheritance level in embryos.....pp. 53 [O31]

11.20-11.40 **Blanes-García M.**, Marinović Z., Šćekić I., Lukić J., Ferrão L., Morini M., Urbányi B., Horváth Á., Asturiano J.F.: Cryopreservation of the testicular tissue and xenotransplantation of European eel (*Anguilla anguilla*) spermatogonia...pp. 54 [O32]

11.40-12.00 **García-Salinas P.**, Gallego V., Asturiano J.F.: Next steps on the application of techniques for the control of reproduction of chondrichthyan species.....pp. 55 [O33]

12.00-12.20 **França T.S.**, González-López W.A., Sanchez M.P., Pérez L., Mañanós E.L., Felip A., Gómez A., Asturiano J.F.: Protocol optimization for sea bass sperm cryopreservation and assessment of post-thawing dilution to prolong sperm usefulness in aquaculture Mediterranean species.....pp. 56 [O34]

12.20-12.40 **Li N.**, Gavin-Plagne L., Francke S., Goardon L., Labbé C., Schmitt E.: Effect of an antibiotic-free medium on milt motility and fertility of rainbow trout semen after mid-term storage at 4°C.....pp. 57 [O35]

12.40-13.40 Lunch break

13.40-15.30 Free time

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- 15.30-17.00 Shuttle to Malbork (departure from the conference venue)
- 17.30-23.00 Castle sightseeing and Gala Dinner (Malbork Castle)

FRIDAY, 23 SEPTEMBER 2022

SESSION 6:

GAMETE STORAGE AND CRYOPRESERVATION (Part II)

Chairman: Catherine Labb   & Victor Gallego

- 10.00-10.20 **Gao L.**, Shah M.A., Fran  k R., P  senick  ka M.: Replacement of maternal germ plasm in sturgeon.....pp. 59 [O36]
- 10.20-10.40 **Samarin A.M.**, Schumacher F., Kleuser B., Waghmare S.G., Policar T., Linhart O., Samarin A.M.: Embryos produced from post-ovulatory aged oocytes in common carp (*Cyprinus carpio*) exhibit aberrant epigenetic modifications of global DNA hydroxymethylation.....pp. 60 [O37]
- 10.40-11.20 Coffee break
- 11.20-11.40 **Waghmare S.G.**, Samarin A.M., Samarin A.M., Danielsen M., M  ller H.S., Policar T., Linhart O., Dalsgaard T.K.: Histone modifications during oocyte ageing in common carp (*Cyprinus carpio*).....pp. 61 [O38]
- 11.40-12.00 **Horv  th   .**, Pataki B., M  sz  ros G., Staszny   ., Marinovi   Z., Kitanovi   N., Urb  nyi B.: Investigation of inherited cryoresistance in zebrafish and common carp.....pp. 62 [O39]
- 12.00-12.20 **Duarte D.**, Anjos C., Fatsini E., Matias D., Cabrita E.: Transcriptomic characterization of *Crassostrea angulata* cryopreserved D-larvae..pp. 63 [O40]
- 12.20-13.00 Studend Award & Closing ceremony
- 13.00-14.00 Lunch break

POSTER SESSIONS

SESSION 1:

BIOTECHNOLOGY AND BIOTECHNIQUES

- Rożyński R.**, Kuciński M., Dobosz S., Ocialewicz K.: Application of UV-irradiated rainbow trout (*Oncorhynchus mykiss*) spermatozoa to induce gynogenetic development of the European grayling (*Thymallus thymallus*).....pp. 65, [P1]
- Szabó T.**, Radics F., Borsos Á., Fodor B., Müller T., Urbányi B., Horváth L.: Evaluation of the efficacy of acetone-dried common carp pituitary during induced breeding of African catfish (*Clarias gariepinus*) after an extremely long-term storage.....pp. 66, [P2]
- Riesco M.F., Valcarce D.G., **Herráez M.P.**, Rodríguez J.L., Robles V.: Effects of human-animal interaction during Senegalese sole culture on stress, growth and sex steroid hormone levels.....pp. 67, [P3]
- Fatsini E.**, Almeida M., Laizé V., Oliveira C., Cabrita E.: A feasible method for Senegalese sole spermatogonia enrichment.....pp. 68, [P4]
- Cabrita E.**, Pachiarini T., Fatsini E., Sarasquete C., Herráez M.P.: Evaluation of spermatogonia damage after cryopreservation.....pp. 69, [P5]
- Kitanović N.**, Balogh R., Marinović Z., Kovács B., Csenki Z., Urbányi B., Horváth Á.: Steps towards establishing a primary culture of zebrafish previtellogenic ovarian follicles.....pp. 70, [P6]
- Marinović Z., **Kitanović N.**, Urbányi B., Horváth Á.: Revisiting fixation of testicular tissue as an important prerequisite for morphological investigations.....pp. 71, [P7]

SESSION 2:

GAMETOGENESIS

- Chenais N.**, Nobrega R.H., Thomas M., Porcon B., Branthonne A., Burel A., Dupont A., Gouttefangeas F., Lareyre J.-J.: Testicular organoids in teleost fish: current progress and perspectives.....pp. 72, [P8]
- Filippi S.**, Cardillo C., Carnevali O., Gioacchini G.: Oogenesis impairment in Swordfish (*Xiphias gladius*) caught in central Adriatic Sea: differences between mature and immature females.....pp. 73, [P9]
- Janati Idrissi S.**, Roza de Abreu M., Pšenička M., Bobe J.: Fine phenotyping of the micropylar cell in medaka.....pp. 74, [P10]
- Nynca J.**, Malinowska A., Świderska B., Wiśniewska J., Słowińska M., Dobosz S., Ciereszko A.: Proteomic portrait of rainbow trout ovary in response to triploidization.....pp. 75, [P11]
- Gioacchini G., Carli S., De Santis L., Clementoni F., Marisaldi L., Notarstefano V., Chemello G., **Carnevali O.**: Structural and macromolecular characterization of *Mustelus mustelus* gametogenesis: new insights by coupling histology with fourier transform infrared microspectroscopy.....pp. 76, [P12]
- Fajkowska M.**, Rzepkowska M.: Dietary phytoestrogens effect on sex-ratio and key sex-related genes expression in sturgeon.....pp. 77, [P13]
- Rzepkowska M.**, Fajkowska M.: Pathologies of sturgeon gametogenesis.....pp. 78, [P14]

SESSION 3:

GAMETES QUALITY

- Dziewulska K.**, Garniarek M., Kowalska-Góralska M.: Effect of two copper nanoproducts and the ionic form on rainbow trout (*Oncorhynchus mykiss* W.) spermatozoa motility.....pp. 79, [P15]

- Bondarenko O.**, Herrera F., Mraz J., Knowles J., Boryshpolets S.: Motility and volume regulation of pikeperch (*Sander lucioperca*) spermatozoa under different osmotic and ionic conditions.....pp. 80, [P16]
- Fedorova G., Randak T., **Boryshpolets S.**: From brain to sperm: how psychoactive pollutants can affect fish sperm function.....pp. 81, [P17]
- Fedorova G.**, Grabic R., Boryshpolets S.: Novel mass spectrometry-based methods for the assessment of sperm quality.....pp. 82, [P18]
- Blanes-García M.**, García-Salinas P., Morini M., Pérez L., Asturiano J.F., Gallego V.: Evaluation of osmotic pumps as a method to induce sexual maturation in European eel (*Anguilla anguilla*) males and females.....pp. 83, [P19]
- Hernández A., Gil F., Sousa-Santos C., Cabrita E., Guerreiro P.M., **Gallego V.**: Evaluation of the reproductive traits of captive breeding populations of endangered leuciscid species from the Iberian Peninsula.....pp. 84, [P20]
- Król J.**, Hliwa P., Krejszeff S., Palińska-Żarska K., Żarski D.: Comparative analysis of semen quality between sex reversed females (nXX), androgen treated males (nXY) and normal males (XY) of Eurasian perch (*Perca fluviatilis* L.).....pp. 85, [P21]
- Nynca J.**, Żarski D., Malinowska A., Świderska B., Bobe J., Ciereszko A.: Aging of pikeperch eggs induces changes in the expression of proteins involved in genome stability and egg quality.....pp. 86, [P22]
- Fatsini E.**, Oliveira C., Félix F., Duarte D., Anjos C., Cabrita E.: Vitamins diet supplementation enhances sperm quality in gilthead sea bream.....pp. 87, [P23]
- Modesto T., Fernandes B., Pinto G., **Cabrita E.**: Effect of accessory glands on sperm performance of Lusitanian toadfish (*Halobatrachus didactylus*).....pp. 88, [P24]
- Araújo J., Rodrigues D., Soares F., Candeias-Mendes A., Pousão-Ferreira P., **Cabrita E.**: Optimization of reproductive techniques for sea urchin (*Paracentrotus lividus*) *in vitro* reproduction.....pp. 89, [P25]
- Oliveira C.C.V., Fatsini E., Félix F., Duarte D., Anjos C., Ramos-Judez S., Beirão J., Manchado M., Castro C., Serradeiro R., **Cabrita E.**: Comparative study on sperm quality in three flatfish species: halibut, Senegalese sole and turbot.....pp. 90, [P26]
- Cejko B.I.**, Krejszeff S., Dryl K.: Optimization of the measurement of ide (*Leuciscus idus*) sperm motility using CASA system.....pp. 91, [P27]
- Rocha De Almeida T.**, Klopp C., Król J., Ljubobratovic U., Palińska-Żarska K., Bobe J., Żarski D.: Deregulated proteolysis, RNA degradation and DNA damage among potential causes for loss of egg quality during egg aging in pikeperch (*Sander lucioperca*).....pp. 92, [P28]

SESSION 4:**FERTILIZATION AND DEVELOPMENT**

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		20.09	21.09	22.09	23.09
9.00-9.20	Opening ceremony		Keynote	Keynote	
9.20-9.40	Plenary lecture				
9.40-10.00			Fertilization and Development	Gamete storage and cryopreservation	
10.00-10.20	Coffee break				Gamete storage and cryopreservation (continued)
10.20-10.40			Coffee break	Coffee break	
10.40-11.00					Coffee break
11.00-11.20	Biotechnology & biotechniques		Fertilization and Development (continued)	Gamete storage and cryopreservation (continued)	Gamete storage and cryopreservation (continued)
11.20-11.40					
11.40-12.00			Gamete biology		
12.00-12.20					
12.20-12.40					
12.40-13.00	Lunch break		Lunch break	Lunch break	Closing ceremony
13.00-13.20					
13.20-13.40					Lunch break
13.40-14.00					
14.00-14.20	Gametogenesis		Gamete biology (continued)	Free time / preparation for excursion	
14.20-14.40					
14.40-15.00					
15.00-15.20	Coffee Break		Coffee Break		
15.20-15.40					
15.40-16.00			Group photo		
16.00-16.20	Gametes quality		POSTER SESSION	Excursion to Malbork Castle + Gala Dinner (shuttle at 15.30)	
16.20-16.40					
16.40-17.00				Student's reception	

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