12th International Symposium on Reproductive Physiology of Fish

"Reproductive science for aquaculture production and conservation"

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The fish drawings decorating the pages of the 12th ISRPF Program and Book of Abstracts are a kind contribution from ***Viotopos Publishers*** *(https://www.viotopos.com), and represent some of the major fish species used in aquaculture around the world. The were prepared specifically for the 12th ISRPF by* ***Mrs Thalia Zeimpeki****, whom we thank sincerely!*

Welcome to the 12th ISRPF!

Our Logo: The "**Phaistos Disk**", one of the oldest transportable text to be found to date, (still to be deciphered), has been excavated from the Phaistos Palace in Crete, and dates back to the Minoan Civilization (2nd millennium B.C.)

12th International Symposium on Reproductive Physiology of Fish
"Reproductive science for aquaculture production and conservation"

Dear colleagues,

It is with great pride and full understanding of the responsibility associated with the undertaking, that I welcome you to the **12th International Symposium on the Reproductive Physiology of Fish (12th ISRPF)** in Chersonissos, Crete, Greece, hosted by the Institute of Marine Biology & Biotechnology (IMBBC) of the Hellenic Center for Marine Research (HCMR). The symposium is **co-organized by the Municipality of Chersonissos** and the **Region of Crete,** where HCMR and the symposium venue are located.

Hospitality is a personal attribute of which we are very proud of in Greece and, in a way, one can say that it is encoded in our genes! This is attested by the fact that from the Classical Greek Pantheon, "**Zeus**", the God of Gods, was the one responsible for protecting guests and strangers! In fact, in the Greek language the word for "guest", "stranger" and "foreigner" is the same: **«ξένος», pronounced "*xénos*"**. And this multiplicity of meanings is reflected in the importance that Greeks, since Classical times, give on welcoming and caring for people they do not know, members of other cultures or cities, or travelers from distant places. Therefore, we will all do our best to welcome you in this event and host you in the best possible way!

I first attended the 4th ISRPF (1991) in Norwich, UK as an MSc student, and have not missed any of the subsequent symposia ever since! More than thirty years afterwards, having gained immensely, both professionally and personally, from attending these unique –in many ways- symposia and from my association with a great number of remarkable scientists and people, I took on the challenge of organizing this symposium, together with many colleagues-friends from Europe who are also loyal participants of the ISRPF. I did this, as a way to express my gratitude to this organization and to offer my services to this community of outstanding professionals and students, hoping to contribute to the continuation of the ISRPF. As Greece does not have a critical mass of researchers working in the area of fish reproduction, instead of a local organizing committee, we have set up a **European Scientific Program Committee**, which was responsible for (a) the development of the program, (b) the evaluation of the submitted abstracts and selection of oral presentations, and (c) the editing of a Special Issue in the journal General and Comparative Endocrinology.

We have maintained the traditional format of the ISRPF with **no parallel sessions**, which is one of the characteristics that make this conference a very successful one, enabling all participants to attend all presentations and follow all ensuing discussions. As usual, posters will be displayed throughout the whole meeting in a nearby specialized area, and two dedicated **Poster sessions** are also organized to allow presenters to explain their work fully to the participants.

Through the generosity of a number of sponsors, we have managed to provide some benefits to our students, such **as free registration to the group excursion and the symposium dinner.** These sponsors include IRIDA SA (an aqua feed production company), the Hellenic Aquaculture Producers Organization (HAPO), StavRAS Aquatic Solutions Ltd (an aquaculture consulting and equipment provider), Galaxidi Marine Farm SA (a hatchery and grow-out company of Mediterranean marine fish), the Region of Crete and the Municipality of Chersonissos. This symposium was always a great way for young aspiring students to meet the most eminent researchers from around the world, and develop professional and personal relationships with them, by being together and interacting -professionally during the sessions and socially during the lunches, dinner and excursion- for a whole week, in a single-session scientific conference.

At the conclusion of the 12th ISRPF, you are invited to submit your work for publication in a Special Issue that will be published by the journal **General and Comparative Endocrinology**, edited by **Mylonas, CC, Bobe, J, Piferrer, F** and **Schulz, R**. These colleagues will coordinate the review process, each according to his expertise in the specific area of the submitted manuscripts. We welcome any of you that have completed a project and are ready to disseminate the results, to consider submitting your manuscript for evaluation, which will follow the regular procedures of the journal. Previous such Special Issues from the ISRPF have been very successful and very well citied, as Dr. Deborah Power, one of the Editors-in -Chief, confirmed. **Submission will open in 1 June 2023 and the deadline is 31 August 2023.**

The scientific host of the 12th ISRPF is **the Institute of Marine Biology, Biotechnology and Aquaculture** of the **Hellenic Centre for Marine Research**, of which I am currently the director. The HCMR was established in 2001 by merging the Institute of Marine Biology of Crete (IMBC, a private institute established in 1985 in Heraklion, Crete) with the National Centre of Marine Research (NCMR, a public institute established in 1985 in Athens). The HCMR consists of three institutes, the other two being the Institute of Marine Biological Resources & Internal Waters and the Institute of Oceanography.

The IMBBC has facilities in Crete and mainland Greece (Anavyssos). Its headquarters and its main facilities are in the premises of HCMR in Crete, named "Thalassokosmos" (see picture below). The "Thalassokosmos" complex is located 15 km east of the city of Heraklion (and 15 km from the ISRPF venue) and includes the aquaculture facilities "Aqualabs" and the public aquarium "Cretaquarium". The IMBBC is the only European Union marine institute that operates a **pilot scale commercial net pen facility** (30 mT of annual production). The IMBBC is also unique in Europe in operating an **Underwater Biotechnological Park** near its premises. This is an open-sea underwater research facility (50,000 m^2), about 1 km off the coast of "Thalassokosmos" supporting multi-disciplinary research and technology demonstration.

The IMBBC has two Research Sectors, the Marine Biology & Biotechnology (**MB&B**) and the Aquaculture Sector (**AQUA**).

The **MB&B** Research Sector carries out work in the fields of genetics/genomics, bioinformatics, bioanalysis and biotechnology, marine biodiversity, and marine ecology and ecosystem management. Modern approaches are employed to assess biodiversity and ecosystem functioning in the marine realm, integrating field observation, documentation and collection, taxonomy, experimental setups, genetics/genomics and modeling.

The **AQUA** Research Sector carries out research in the fields of fish biology, reproduction, ethology, nutrition, pathology of all developmental stages (larvae to harvestable size), and in final product quality improvement and production technologies. Beyond the widely farmed species in the region, emphasis is also given in species diversification, in order to develop a profitable and sustainable aquaculture industry. **AQUA** and **MB&B** collaborate in various research areas, the most important being genetics/genomics of cultured fishes, integrated multitrophic aquaculture (IMTA) and the use of genetics and epigenetics to develop improved strains and broodstock management methods.

Currently, **IMBBC has 25 permanent researchers**, 16 Post-docs, 34 PhD, MSc and Undergraduate students, and 70 technicians and other personnel. More than 65% of the technicians are on contract, paid by research grants and private funding. Annual funding during the last 5 years came from competitive Greek (52%) and European Union (28%) grants, and 18% from private funds in the form of contract research and the provision of goods and services.

On behalf of the Scientific Program Committee, I would like to welcome you to the **12th ISRPF 2023 in Chersonissos, Crete, Greece** and wish you a great time, scientifically and socially.

Constantinos (Dinos) C Mylonas
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Scientific Program Committee

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Hervé Migaud, MOWI, Scotland
José Antonio Muñoz-Cueto, Uni of Cadiz, Spain
Francesc Piferrer, ICM-CSIC, Spain
Hanna Rosenfeld, NCM-IOLR, Israel
Rüdiger Schulz, Uni Utrecht, Netherlands
Berta Levavi-Sivan, Uni Jerusalem, Israel
Yonathan Zohar, IMET-Uni Maryland, USA

Sponsors

IRIDA SA is a feed production company, providing top-quality nutrition for aquatic farmed organisms. The company also provides end-to-end solutions for its customers and has recently invested in **Aquatic Biologicals SA**, a spin-off company of the Hellenic Centre for Marine Research producing autogenous vaccines and providing disease diagnostic services for the Greek aquaculture sector.

The **Hellenic Aquaculture Producers Organization (HAPO)** has a membership of 23 companies, which represent 80% of the Greek aquaculture production. The objective of HAPO is to promote its products to selected domestic and foreign markets.

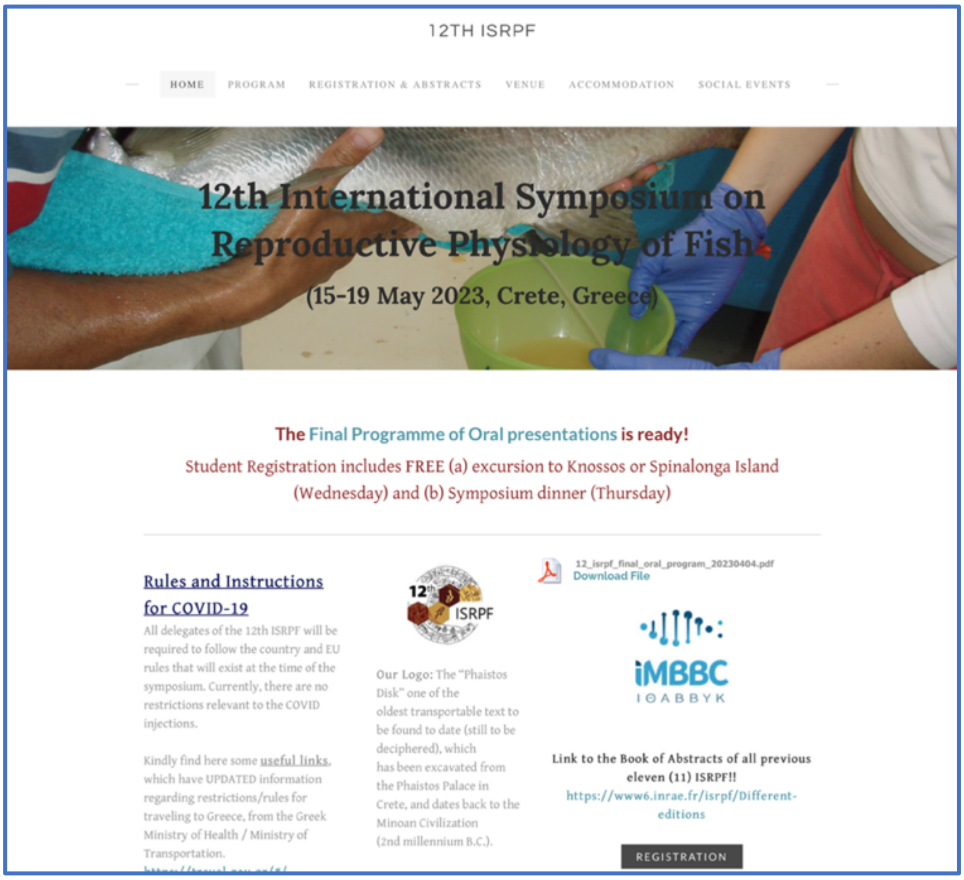
StavRAS Aquatic Solutions Ltd is a small aquaculture consulting and product provider based in Cyprus. The company specializes in the design, sourcing and construction of complete Recirculation Aquaculture Systems (RAS). In addition, **StavRAS** represents important aquaculture suppliers in the Eastern Mediterranean region, such as Fish Farm Feeder, Pentair, BernAqua, UltrAqua and others.

Galaxidi Marine Farm SA is a hatchery and grow-out company of Mediterranean marine fish operating for more than 30 years in the Corinthian Gulf. The company is the main producer of organic marine fish in Europe, and its products follow the most prestigious standards, such as NATURLAND, GLOBAL G.A.P and others.

The **Region of Crete** is one of the 13 regions of Greece. The island of Crete is the 5th largest in the Mediterranean Sea and the largest one in Greece. Crete is an important part of the economy and cultural heritage of Greece, preserving its own cultural elements. Between the years 3000-1400 BC, the Minoan civilization, one of the first civilizations of Europe, flourished on the island, with its main centers being Knossos and Phaistos. The island is very mountainous with three main mountain ranges, Dikti (Lasithi, 2148 m), Ida (Psiloritis, 2456 m) and the White Mountains (2454 m), which cross the island from east to west. About 3,5 million tourists visit the island every year, to enjoy what has been called "A continent in an island", due to its wide diversity of landscapes and ecosystems.

The 12th ISRPF is **co-organized with the Municipality of Chersonissos**. The Municipality of Chersonissos and its wider area has an important cultural heritage that is part of the place and its history, and reflects the culture and the physiognomy of the society. With the history of the area dating back to the pre-Minoan era, the area has a significant number of monuments complemented by modern cultural infrastructure, making up an integrated cultural network. The importance of the area's cultural resources is a dynamic element in the development of the area. The Municipality of Chersonissos has a rich natural environment, combining large mountain ranges, plains, rivers and gorges, creating a unique landscape. The coastal character of the area in combination with the constant changes of the landscape and the ideal climate of the region contributes to the existence and development of many species of flora and fauna.

The website of the 12th ISRPF (12isrpf.weeebly.com)



A screen-shot from the website of the 12th ISRPF during the preparation of the symposium. It will remain active for the next year, to inform everyone of issues related to the Special Issue in the journal General and Comparative Endocrinology, as well as the final Book of Abstracts.

General Information

Traveling to Crete and the 12th ISRPF

Since Crete is an island, you can arrive by airplane from Athens or directly from several European cities. The national airlines are **Aegean Airways and Olympic Airways** (affiliated with **Star Alliance**). Crete is also accessible daily by ferry from Athens (Piraeus Harbor) and the trip takes 9 hrs (21:30 - 06:30). The venue is 25 km from the **international airport of Heraklion** (also spelled Iraklio), **"Nikos Kazantzakis" (HER).**

From the airport in Heraklion, you can get to the venue in **Chersonissos** (Aldemar Knossos Royal Beach Resort,) by **bus** or **taxi**. You can also rent a car, from a large number of different companies (both International and local). **Be careful if you will drive yourself**. Greeks are notorious of being "adventurous" drivers, and the road system in Crete is not the best!

The **bus station** is located at the entrance of the airport site, at the right side of the traffic lights as you are looking away from the airport. The bus will get you from Heraklion Airport to Chersonissos in 45 minutes, and the ticket will cost €3-5. Tickets can be bought from the bus driver when boarding or in a ticket kiosk at the bus stop.

Taxis are available right at the exit from the airport building (arrivals). A taxi trip will last 25 minutes, and its cost is €40-50.

Crete

Crete is the 5th largest island in the Mediterranean, and one of the most popular vacation destinations in Greece, with more than 3 million tourists spending their summer holidays every year. Crete was home to one of the oldest civilizations in Europe (2700-1420 BC), the Minoan Civilization who gave the name to the continent (Europa).

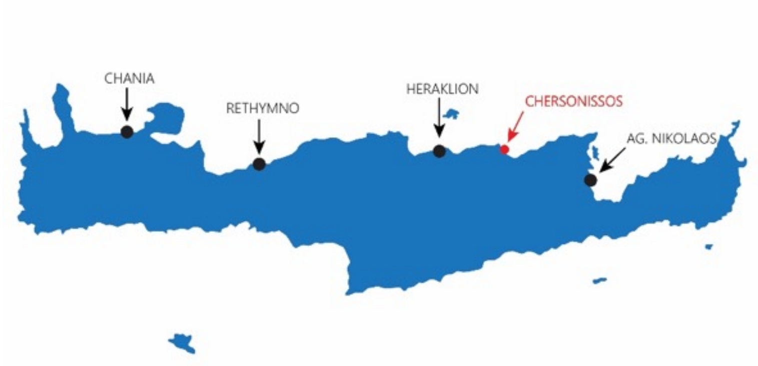
The island's tourism infrastructure caters to all tastes, including a very wide range of accommodation. The island offers large luxury hotels with complete facilities, swimming pools, sports and recreation, as well as smaller family-owned apartments, camping facilities and others. Visitors reach the island via two international airports in Heraklion and Chania (international charter and domestic flights starting May) or by boat to the main ports of Heraklion and Chania.

Popular tourist attractions include the archaeological sites of the Minoan civilization, the Venetian old city and port of Chania, the Venetian castle at Rethymno, the Gorge of Samaria, the small nearby islands of Chrysi, Elafonisi, Gramvousa, Spinalonga and the Palm Beach of Vai, which is the largest natural palm forest in Europe. The island has a number of gorges, such as the Samariá Gorge and Imbros Gorge. Many islands, islets, and rocks hug the coast of Crete. Some of the islands that can be visited are:

- Gramvousa (Kissamos, Chania) the pirate island opposite the Balos lagoon,
- Elafonisi (Chania), which commemorates a shipwreck and an Ottoman massacre,
- Chrysi island (Ierapetra, Lasithi), which hosts the largest natural cedar forest in Europe.

Chersonissos

Chersonissos (also spelled Hersonissos) is one of the oldest towns of Crete. It was first inhabited in the distant Minoan period, and in a former settlement, archeologists found a lot of valuable discoveries. The city has many sights, the main of which are the Roman port, Roman theater, Early Christian Basilica, and the Roman Fountain. At the same time, Chersonissos is the typical holiday seaside resort, with a nice series of beaches to discover, good restaurants and tavernas, bars, plenty of shops, souvenir stores and video game arcades for children. And of course, a very lively nightlife.



The Venue

Aldemar Knossos Royal Beach Resort is the Venue of the 12th International Symposium on Reproductive Physiology of Fish. This is a 5-star family resort, located in one of the most popular tourist areas of Crete.

It is located at the tip of the Annisaras Peninsula in the community of Chersonissos, with a beautiful beach right in front of it. Bathed in sunlight, calmed by the gentle waves of the Aegean Sea rests this idyllic and stylish resort. It is 25 km east of the Nikos Kazantzakis International Airport and the capital of the island Heraklion. Minoan-style architecture combined with recently refurbished rooms, gleaming swimming pools and lush gardens put the visitor in the perfect relaxing mood. Please visit www.aldemarknossosroyal.gr for more information.

Aldemar Knossos Royal Beach Resort's conference center has two large halls, tastefully decorated, and equipped with state of the art audiovisual and simultaneous interpreting systems. The conference hall can take 300 participants with appropriate projection and sound systems. The area for the poster session is separate and located 50 meters from the conference hall. The coffee breaks will take place around the Posters to facilitate their viewing.

Map of the Venue

The CRETAquarium at Thalassokosmos


The **CRETAquarium** belongs to the **Hellenic Center for Marine Research (HCMR)** and is located in the Thalassokosmos complex 15 km from the 12th ISRPF venue towards the city of Heraklion. Thalassokosmos is the largest complex for marine research, technology and entertainment in the Mediterranean area, and the **CRETAquarium** offers visitors a unique opportunity to explore the magnificent Mediterranean seaworld. From large predator sharks to small sea horses and spectacular jellyfish, the diversity of marine life is showcased against a backdrop of Cretan underwater seascapes, such as the rocks at Matala (South Crete) and the seabed at Vai (Southeast Crete).

The Mediterranean seascape comes to life in 62 different tanks varying in size from 125 to 900,000 L of sea water, totaling 1.8 million L in all. There are one hundred observation points for visitors to admire approximately 2,500 Mediterranean and tropical organisms. A full tour taking in all exhibits and species lasts about 2 hours.


After your Tour, you can visit the CRETAquarium gift-shop for gifts and souvenirs that will complete your visiting experience. It's name is «Octopus» and it addresses visitors of all ages. On the aquarium premises you will also find a snack bar / restaurant, and there is a long sandy beach in front of the aquarium, and several other beaches further east.

CRETAquarium is open to the public daily from 09:30am to 19:00pm

General entrance fee	**12 €**	Personal Audio Guide	**3€**
Children 5-17 and seniors over 65 years old	**6 €**	Virtual Reality experience	**5€**
Students (with ID)	**6 €**		

Social activities

Welcome reception – Sunday 14 May 2023 (19:00)

The ISRPF 2023 Welcome Reception will take place at the **Beach Restaurant** of the Aldemar Knossos Royal Beach Resort, which offers the ideal scenery for welcoming the participants to Crete and to see old friends and colleagues, and meet new students and young researchers! The Welcome Reception is **free for all participants**, courtesy of the Hellenic Aquaculture Producers Organization. We wil get to sample fish from the Greek aquaculture industry, courtesy of Galaxidi Marine Farm SA.

Group Excursion - Wednesday 17 May 2023 after lunch (13:30)

Wednesday afternoon is devoted to socializing and networking. Participants may visit some of the most important historical sites of Crete, at an extra cost for regular registrants (45-47€), but **free for students**, courtesy of IRIDA SA. There are two options available: the Knossos Palace (Heraklion Region) or Spinalonga Island (Lassithi Region).

<u>Guided tour to the Knossos Palace (the cradle of the Minoan Civilization)</u>

Amongst all the ancient monuments in Crete, Knossos is the archaeological site that is a must-see in order to understand the greatness of the Minoan Civilization (2000 BC). The tour takes you to the island's capital, Iraklio (Heraklion), and from there onto the village of Knossos where you will be led through the ruins of the ancient palace complex: the labyrinth, galleries and rooms of the Palace, and the Royal Palace of King Minos, the son Zeus (the God of Gods, in Greek Mythology) and Europa, who gave her name to our continent! Return to the hotel is after approximately 5 hours. The excursion includes transfers to/from Knossos Palace with luxury a/c coaches, a professional-official English-speaking guide per coach, and entrance fee and full guidance in Knossos Palace.

<u>Guided tour to Spinalonga Island (a Venetian fortress, an Ottoman village and a Leper colony)</u>

Participants will be picked up from the hotel and transferred to the town of Elounda and then with a 10 min boat ride across to the island of Spinalonga, which has an exceptionally interesting history. Once a Venetian Fortress built in 1579 and later an Ottoman village, in the 20th century it has become synonymous with human pain. In 1903, Spinalonga developed into a gathering place for people infected with Leprosy (Hansen's disease) from all over Crete, where they spent the rest of their life! Today, with the painful story forgotten, the colony is being restored and it offers a pleasant vist with spectacular scenery! After this nice visit the boat will bring participants back at Elounda or Ag. Nikolaos. The excursion includes transfers to/from Elounda with luxury a/c coach, a professional-official English-speaking guide per coach, boat ride to/from Spinalonga Island, and entrance fee and full guidance to the Island.

Symposium dinner – Thursday 18 May 2023, evening (19:00)

Due to the fact that the weather is not stable yet and the evenings are quite cool, the Symposium dinner will take place at a celebrations and event hall (Garden of the Senses, https://www.facebook.com/kiposaisthiseon/?locale=el_GR). The transfers between the venue and the hall will be done by coach, leaving the entrance of the venue (**Aldemar Knossos Royal Beach Resort**) at 19:00. One bus will depart from the hall to bring participants back to the hotel at 23:00. The remaining buses will depart from the restaurant between 24:00-01:00, depending on how the party goes!

The Symposium dinner is optional and at an extra cost for regular registrants (50€), but **free for students** (courtesy of IRIDA SA). We are sure that all will enjoy the hospitality and festive atmosphere in a local "γλέντι" (translated as "party", pronounced "glendi") with Cretan food and folk dances, so get your ticket too!

Instructions for Participants

Oral Presentations

A presenter's desk will be available near the registration desk. All presenters should submit their Oral presentation to the organizers, **the day before the presentation.** Bring your presentation (in Microsoft Powerpoint for **Windows not macOS**) saved in a USB memory stick. If you are using an Apple Mac computer to prepare your presentation at home, make sure that it runs well on a Windows-based computer, especially if you have videos or soundtracks.

The file should be labeled as "Oral **X_Lastname**_Session **Z**", where:
X = sequence number of the oral presentation, according to the Symposium Program,
Lastname = the last name of the presenter, and **Z** = Special session number

You should check your presentation in the presenter's desk computer, and make sure that all runs well. All presentations will be loaded in the projection computer the day before each Special Session, and no modifications can be made during the day.

See later, for suggestions/advice on preparing your oral presentation.

Poster presentations

The accepted size for the Posters is A0 upright (119 cm height x 84 cm width). The poster must be printed on gloss or matt paperor light fabric, but **not heavy canvas or rigid plasticize material**, which is too heavy to stay on the board! We will provide pins, double sided tape, and blue tag for putting up the posters. Posters should be placed on their corresponding board on Sunday 14 or at the latest Monday 15 May 2023 in the morning, and will be organized according to Special Session. Each Poster will be given a sequence number, and the boards will be numbered accordingly. Presenters having an odd number of poster (P1, P3 etc) should stand by and present their posters during the Tuesday 16 May 2023 Poster Session (I). Presenters having an even number of poster (P2, P4, etc) should stand by and present their posters during the Thursday 18 May 2023 Poster Session (II). Abstracts submitted late and after the conclusion of the Program, will be given a sequence number from 101 onwards, and will be displayed in a different location than the Special Session to which they are allocated, at the end of Special Session 9.

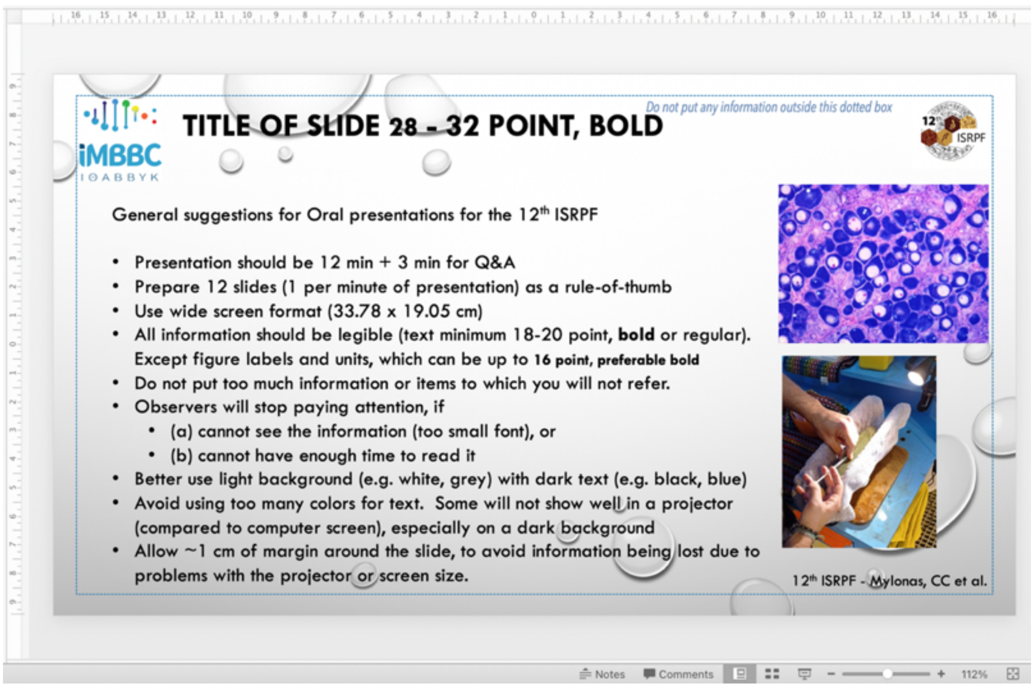
See later, for suggestions/advice on preparing your poster presentation.

Best Student Oral and Poster presentation

There will be two (2) awards for best **Student Oral Presentation** and two (2) awards for best **Student Poster Presentation**. The awards will also include a financial reward. The evaluation of the presentations will be made by the members of the Scientific Program Committee, and the announcement and award ceremony will be held on Friday 19 May 2023, during the closing session (18:00). To be easier for the evaluation committee members to identify student posters and oral presentations, these have been identified in the Program and Book of Abstracts (student). It is suggested that an identification symbol is added to the poster itself (next to the photo of the presenter), as well as to the opening slide of the oral presentation (next to the title of the presentation), such as the **one provided here** (graduation cap and diploma).

General suggestions for Oral presentations for the 12th ISRPF

- Presentation should be **12 min + 3 min** for Q&A
- Prepare 12 slides (1 per minute of presentation) as a rule-of-thumb
- For the **Title of slide use 28 or 32-point text, bold**
- Use wide screen format (33.78 x 19.05 cm)
- All information should be legible (**text minimum 18-20 point**, **bold** or regular). Figure labels and units, may be up to **16 point, preferably bold**
- Do not put too much information or items to which you will not refer.
- Observers will stop paying attention, if
  - (a) they cannot see the information (too small font), or
  - (b) cannot have enough time to read it
- Better use light background (*e.g.* white, grey) with dark text (*e.g.* black, blue)
- Avoid using too many colors for text. Some colours will not show well in a projector (compared to computer screen), especially on a dark background
- Allow ~1 cm of margin around the slide, to avoid information being lost due to problems with the projector or screen size. **See sample slide below:**

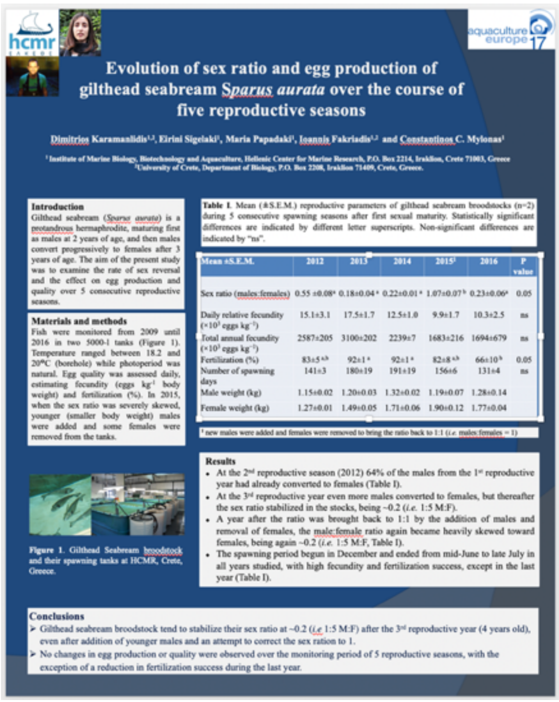


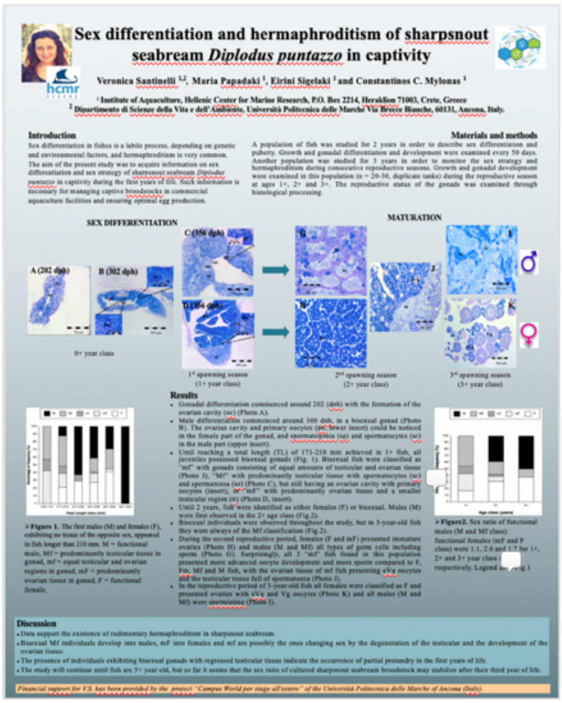
General suggestions for Poster presentations for the 12th ISRPF

The accepted size for the Posters is A0 upright (119 cm height x 84 cm width). The poster must be printed on gloss or matt paper (not canvas or rigid plasticize material, which is too heavy to stay on the board!) Posters should be placed on their corresponding board on Sunday 14 or at the latest Monday 15 May 2023 in the morning, and will be organized according to Special Session. Each Poster will be given a sequence number, and the boards will be numbered accordingly. We will provide pins, double sided tape, and blue tag for putting up the posters.

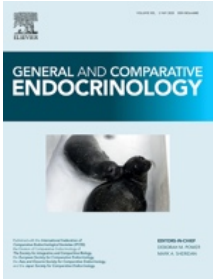
- Place a photo of the person **presenting the poster** next to the title. This will help participants find the presenter, if they want to discuss about the poster.
- For the **Title of the poster use >60-point text, bold**
- All information should be legible (text minimum 36 point, **bold** or regular). Except figure labels and units, which can be up to **28 point, preferably bold**
- Observers will often not stand at a Poster, if
    - (a) they cannot read the information easily (too small font), or
    - (b) there is too much information and too many details
- Use eye-cathing photos and graphics
- Focus more on the Objectives and less on the methods
- Results are often easier to be read, if in a bullet format
- Conclusions should be clear and well-supported by the data and statistical analysis
- Display the logos of the affiliated University/Research organization and the project funding the research
- Always acknowledge the funding agency and project contract number

See sample poster below:





Special Issue in the journal General and Comparative Endocrinology

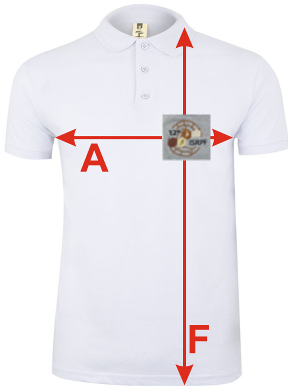


As in previous ISRPFs, we will have a Special Issue (SI) in the journal General and Comparative Endocrinology (GCE) with manuscripts from the Oral and Poster presentations of the 12th ISRPFs. The SI will be edited by Mylonas, CC., Bobe, J., Piferrer, F. and Schulz, R. Manuscript submission will be through the regular platform of GCE, **between 1 June 2023 and 31 August 2023**, with expected publication time the beginning of 2024. Manuscripts considered for publication should not necessarily include "endocrine" work or data, since the ISRPF includes research in all aspects of Fish Reproductive Physiology and not just endocrinology. However, they must come from work presented in the 12th ISRPF or by an author registered in the symposium presenting other work in the area of Fish Reproductive Physiology.

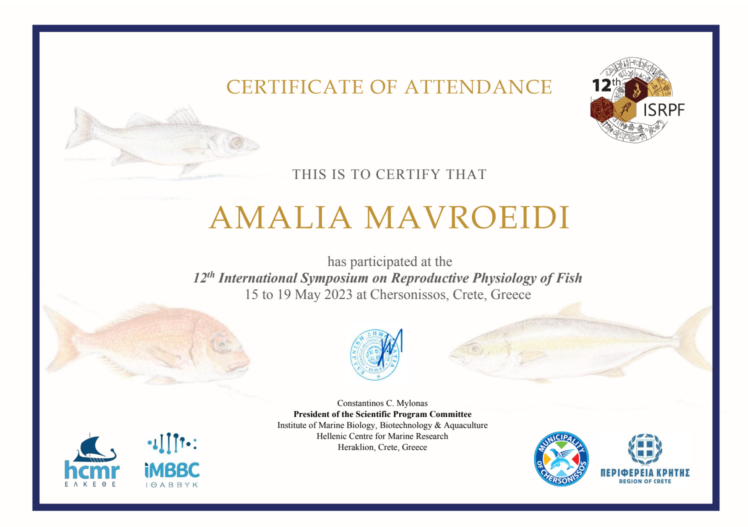
T-shirts

We have produced a Polo t-shirt with the logo of the symposium. The t-shirts will be available at the registration desk, beginning on Tuesday 16 May 2023 at a cost of 15 € each. There is only one color and a unisex-style, in sizes S, M, L, XL, 2XL, 3XL and 4XL, according to the chart below (in cm).

MK215	1/2 Pecho 1/2 Chest	Largo delantero Front length
SIZE	A	F
S	50	69
M	53	71
L	56	73
XL	59	75
2XL	63	77
3XL	66	80
4XL	69	83
5XL	72	86



A certificate of attendance will be sent by email to all participants, **after** the conclusion of the symposium.



Program at a glance

Sunday 14 May	Monday 15 May	Tuesday 16 May	Wednesday 17 May	Thursday 18 May	Friday 19 May
14:30 – 18:00 Registration	**08:30 – 09:00** Welcoming **Dr. Constantinos (Dinos) C. Mylonas**, HCMR, Greece	**09:00 – 10:00** **Plenary** by **Pr. Daniel Pauly**, UBC, Canada	**09:00 – 12:15** SS5. Climate change & anthropogenic impacts (10:30 -11:00 Coffee break)	**09:00 – 12:00** SS6. Reproduction in aquaculture (10:30 -11:00 Coffee break)	**10:00 – 13:00** SS8. Behaviour & pheromones (11:30 -12:00 Coffee break)
19:30 Welcome reception (dinner and drinks)	**09:00 – 10:00** **Plenary** by **Dr. Sylvie Dufour**, CNRS, France	**10:00 – 13:00** SS3. Oogenesis/ vitellogenesis & ovulation (11:00 – 11:30 Coffee break)	**12:15 - 13:30** Lunch	**12:00 - 12:15** Group Photo	**13:00 - 14:30** Lunch
	10:00 – 13:00 SS1. Sex determination & Differentiation (11:00 – 11:30 Coffee break)	**13:00 - 14:30** Lunch	**13:30 – 19:30** *Excursion to Knossos Palace (Heraklion) or Spinalonga Island (Lasithi)	**12:15 - 13:30** Lunch	**14:30 -17:30** SS9. Reproductive biotechnologies (16:00 -16:30 Coffee break)
	13:00 - 14:30 Lunch	**14:30-17:00** SS4. Spermatogenesis & spermiation		**13:30 - 16:00** SS7. Gamete & egg quality	**17:30 – 18:00** Summary **Birgitta Norberg**, IMR, Norway
	14:30-17:30 SS2. Brain- pituitary – gonad axis (16:00- 16:30 Coffee Break)	**17:00- 19:00** Poster 1 (Odd numbers) & Coffee break		**16:00 -18:00** Poster 2 (Even numbers) & Coffee break **19:00** *Symposium Dinner	**18:00 – 18:30** Closing **Dr. Constantinos (Dinos) C. Mylonas**, HCMR, Greece

*Optional and at additional charge but **free of charge** for students with valid University ID.

Session chairs and co-chairs, and State-of-the-art speakers

Special Session	Chair	Co-chair	State-of-the-art speaker
1. Sex determination and differentiation	Piferrer, Francesc	Chang, Ching-Fong	Shao, Changwei
2. Brain-pituitary-gonad axis	Levavi-Sivan, Berta	Golan, Matan	Golan, Matan
3. Oogenesis/vitellogenesis and ovulation	Rosenfeld, Hanna	Yilmaz, Ozlem	Yilmaz, Ozlem
4. Spermatogenesis and spermiation	Schulz, Rüdiger	Chauvigné, François	Crespo, Diego
5. Climate change and anthropogenic impacts	Norberg, Birgitta	Carnevali, Oliana	Servili, Ariana Moreira, Renata
6. Reproduction in aquaculture	Migaud, Hervé	Horvath, Akos	Akos Horvath
7. Gamete and egg quality	Bobe, Julién	Żarski, Daniel	Żarski, Daniel
8. Behaviour and pheromones	Duncan, Neil	Li, Weiming	Li, Weiming
9. Reproductive biotechnologies	Zohar, Yonathan	Yoshizaki, Goro	Yoshizaki, Goro

Program

Sunday 14th May 2023	
14:30 – 18:00	Registration
19:30	Welcome Reception

Monday 15th May 2023	
08:30 – 09:00	Welcoming **Mylonas, Constantinos (Dinos) C** President of Scientific Program Committtee
09:00 – 10:00	Plenary Talk 1 **Dr Dufour, Sylvie** *"A historical perspective of Fish Reproductiuve Physiology Research"*
10:00 – 11:00 **SS1.** **Sex determination and differentiation** Chair: Piferrer, Francesc Co-chair: Chang, Ching-Fong	Invited State-of-the-Art Presentation 1 **Shao, Changwei** *"Epigenetic regulation of sex determination and differentiation in fish: The interaction between genes and the environment"* Oral Presentation 1 **Srikulnath, Kornsorn** *"Exploring the genomic basis of sex determination in African catfish and bighead catfish"* Oral Presentation 2 **Patil, Jawahar G** *"Sex and sexability: A curious case of Gambusia holbrooki"*
11:00 – 11:30	Coffee Break
11:30 – 13:00 **SS1.** **Sex determination and differentiation** Chair: Piferrer, Francesc Co-chair: Chang, Ching-Fong	Oral Presentation 3 **Chakraborty, Tapas** *"Oct4 and sexuality in fish gonad; an understanding using medaka, Oryzias latipes"* Oral Presentation 4 **Murata, Ryosuke** *"Sex change evolution and signaling involving TIS cells in groupers"* Oral Presentation 5 **Sánchez-Baizán, Núria** (student) *"Effects of sex and temperature in the European sea bass epigenome"*

Monday 15th May 2023	
11:30 – 13:00 **SS1.** **Sex determination and differentiation** Chair: Piferrer, Francesc Co-chair: Chang, Ching-Fong	Oral Presentation 6 **Panthum, Thitipong (**student) *"Polygenic sex determination or recent emergence of a new sex determining region in the Siamese fighting fish (Betta splendens)"* Oral Presentation 7 **Bhandari, Ramji K** *"Methylome of medaka sperm and eggs and their reprogramming in post-fertilization stage embryos and primordial germ cells"* Oral Presentation 8 **Tseng, Peng-Wei** (student) *"The potential mechanism of sex change (secondary sex determination) in the protandrous black porgy, Acanthopagrus schlegelii"*
13:00 - 14:30	Lunch
14:30 – 16:00 **SS2.** **Brain-pituitary-gonad axis** Chair: Levavi-Sivan, Berta Co-chair: Golan, Matan	Invited State-of-the-Art Presentation 2 **Golan, Matan** *"Networking for reproduction: how direct cell-cell communication in the teleost HPG axis shapes its development and its output"* Oral Presentation 9 **Zmora, Nilli** *"Possible roles for GnRH3 in regulating pituitary organization in female zebrafish as revealed by neuronal ablation and single cell RNA sequencing"* Oral Presentation 10 **Wang, Bin** *"Gonadotropin-inhibitory hormone (GnIH) and its receptors in the European sea bass (Dicentrarchus labrax): intracellular signaling pathways and interaction with other neuroendocrine factors"* Oral Presentation 11 **Chen, Jie** (student) *"Somatostatin signaling is a key regulator in the allocation of metabolism to reproduction."* Oral Presentation 12 **Mennigen, Jan** *"Reproductive consequences of CRISPR/Cas9-Based avp knock-out in zebrafish (Danio rerio)"*
16:00 – 16:30	Coffee Break

Monday 15th May 2023	
16:30 – 17:30 **SS2.** **Brain-pituitary-gonad axis** Chair: Levavi-Sivan, Berta Co-chair: Golan, Matan	Oral Presentation 13 **Cohen Rothschild, Noam** (student) *"Characterization of a novel fast-growing zebrafish: a new approach to GH transgenesis"* Oral Presentation 14 **Andersson, Eva** *"Loss of fshr inhibits maturation in male Atlantic salmon"* Oral Presentation 15 **Galotta, Mariel** (student) *"Multi-tissue targeted DNA methylation analysis of gonadotropins in chub mackerel (Scomber japonicus) using a cost-effective sequencing method"* Oral Presentation 16 **Ferrão, Leonor** (student) *"Superoxidase dismutases in the European eel: characterization and expression in vivo under different temperature conditions"*

Tuesday 16th May 2023	
09:00 – 10:00	Plenary Talk 2 **Professor Pauly, Daniel** *"On the Direction of the Causal Arrow Linking Growth and Reproduction in Fishes"*
10:00 – 11:00 **SS 3. Oogenesis/vitellogenesis and ovulation** Chair: Rosenfeld, Hanna Co-chair: Yilmaz, Ozlem	Invited State-of-the-Art Presentation 3 **Yilmaz, Ozlem** *"Role of multiple vitellogenins in early development of fishes"*
	Oral Presentation 17 **Lewis, Blake** (student) *"Unpacking the egg's earliest life support system – identification of putative cortical alveoli proteins in zebrafish, Danio rerio"* Oral Presentation 18 **Tokumoto, Toshinobu** *"Phenotypic analysis of gene knock-out strains of highly upregulated genes during ovulation in zebrafish"*
11:00 – 11:30	Coffee Break
11:30-13:00 **SS 3. Oogenesis/vitellogenesis and ovulation** Chair: Rosenfeld, Hanna Co-chair: Yilmaz, Ozlem	Oral Presentation 19 **Bobe, Julién (replacing Janatti-Idrissi, Sarah)** *"Hippo pathway-mediated regulation of micropyle formation by microRNA 202 (miR-202) in the fish oocyte"* Oral Presentation 20 **Papadaki, Maria** (student) *"MicroRNAs are involved in ovarian maturation of greater amberjack (Seriola dumerili) under captivity"* Oral Presentation 21 **Thermes, Violette** *"Quantitative analysis of asynchronous oogenesis dynamics in fish: Application of a modern 3D analysis approach to an old problem"* Oral Presentation 22 **Sehgal, Neeta** *"Genes encoding for non-phosphorylated vitellogenin and choriogenin express during the early stages of oogenesis in the Indian freshwater murrel, Channa punctatus"*

11:30-13:00 **SS 3. Oogenesis/vitellogenesis and ovulation** Chair: Rosenfeld, Hanna Co-chair: Yilmaz, Ozlem	Oral Presentation 23 **Sempere, Laura** (student) *"Seeking for the relationship between body size and maturity in female European sea bass (Dicentrarchus labrax L.)"* Oral Presentation 24 **Gioacchini, Giorgia** *"New insights by Fourier Transform InfraRed (FTIR) Microspectroscopy on yolk composition, distribution and role in Mustelus mustelus a placentotrophic viviparous shark"*
13:00 - 14:30	Lunch
14:30 – 17:00 **SS 4. Spermatogenesis and spermiation** Chair: Schulz, Rüdiger Co-chair: Chauvigné, François	Invited State-of-the-Art Presentation 4 **Crespo, Diego** *"Follicle-stimulating hormone effects and the regulation of early spermatogenesis: from model to aquacultured fish species"* Oral Presentation 25 **Nóbrega, Rafael** *"Fsh regulates the proliferation of embryonic-like germ stem cells in adult zebrafish testes"* Oral Presentation 26 **Kjærner-Semb, Erik** *"Lack of vgll3a delays onset of sexual maturation in Atlantic salmon (Salmo salar) males"* Oral Presentation 27 **Diaz, Noelia** (student) *"European sea bass gene expression dynamics during spermatogenesis"* Oral Presentation 28 **Prat, Francisco** *"Expression of Gdnf-Gfra1-Ret system genes and nanos2 in the European seabass testis during the reproductive cycle and under unilateral orchiectomy (ULO) conditions"* Oral Presentation 29 **Zapater, Cinta** *"Involvement of the transcriptional coactivator Ncoa7 during initial stages of spermatogenesis in European sea bass (Dicentrarchus labrax)"* Oral Presentation 30 **Chauvigné, François** *"Differential regulation and function of two luteinizing hormone receptors during flatfish spermiogenesis"*

14:30 – 17:00 **SS 4. Spermatogenesis and spermiation** Chair: Schulz, Rüdiger Co-chair: Chauvigné, François	Oral Presentation 31 **Palaiokostas, Christos** *"A multi-omics study on male fertility in farmed Arctic charr (Salvelinus alpinus)"* Oral Presentation 32 **Bondarenko, Olga** *"The role of Ca2+ and pH in the regulation of trout spermatozoa motility"*
17:00 – 19:00	Poster 1 (Odd numbers) & Coffee break

Wednesday 17 May 2023	
09:00 -10:30 **SS5.** **Climate change and anthropogenic impacts** Chair: Norberg, Birgitta Co-chair: Carnevali, Oliana	Invited State-of-the-Art Presentation 5 **Servili, Arianna** *"Climate change impacts the reproductive neuroendocrine axis of fish"*
	Invited State-of-the-Art Presentation 6 **Moreira, Renata** *"The effects of aluminum, and water quality parameters, on the reproduction of Astyanax altiparanae (Characiformes: Characidae), a neotropical teleost"*
	Oral Presentation 33 **Sarih, Samira** *"Influence of temperature on early puberty of juvenile male European sea bass (Dicentrarchus labrax)"* Oral Presentation 34 **Yamamoto, Yoji** *"Multi-year field survey on the effects of environmental factors on the sex determination in the cobaltcap silverside Hypoatherina tsurugae"*
10:30 – 11:00	Coffee Break
11:00 -12:15 **SS5.** **Climate change and anthropogenic impacts** Chair: Norberg, Birgitta Co-chair: Carnevali, Oliana	Oral Presentation 35 **Piferrer, Francesc** *"Sex reversal in natural populations: types, causes and consequences"* Oral Presentation 36 **Devergne Jimmy** (student) *"Effect of climatic and estrogenic stress on the life cycle of an estuarine fish, Gasterosteus aculeatus"* Oral Presentation 37 **Lombó, Marta** *"Glyphosate exposure disrupts zebrafish spermatogenesis"* Oral Presentation 38 **Kestemont, Patrick** *"Reproductive physiology of zebrafish affected by contraceptive pill hormones: estetrol as an ecological alternative to ethinylestradiol?"* Oral Presentation 39 **Alix, Maud** *"Is teleost fecundity style a species-characteristic trait? – A re-evaluation of the ovulatory cycle of Atlantic cod (Gadus morhua) in a changing environment"*
12:15 - 13:30	Lunch
13:30 – 19:30	Excursion **Knossos Palace (Heraklion) or Spinalonga Island (Lasithi)**

Thursday 18 May 2023

09:00 -10:30 **SS6.** **Reproduction in aquaculture** Chair: Migaud, Hervé Co-chair: Horváth, Ákos	Invited State-of-the-Art Presentation 7 **Horváth, Ákos** *"Cryopreservation research in aquaculture: what the industry needs and what it doesn't"*
	Oral Presentation 40 **Geffroy, Benjamin** *"Can we sex fish using circulating miRNAs? a comparative study"* Oral Presentation 41 **Felip, Alicia** *"The relationship between the IGF system and the early onset of puberty in male and female European sea bass (Dicentrarchus labrax)"* Oral Presentation 42 **Kleppe, Lene** *"Effects of bmp15 mutation on gonad development and fertility in Atlantic salmon"* Oral Presentation 43 **Rosenfeld, Hanna** *"Aquaculture improvement toolkit for grey mullet (Mugil cephalus): broodstock management & production of all-female genetic lines"*
10:30 – 11:00	Coffee Break
11:00 – 12:00 **SS6.** **Reproduction in aquaculture** Chair: Migaud, Hervé Co-chair: Horváth, Ákos	Oral Presentation 44 **Beato, Silvia** (student) *"DNA methylation during early development in diploid and triploid European sea bass"* Oral Presentation 45 **Jéhannet, Pauline** (student) *"|Improving the artificial reproduction of the European eel to enhance larval quality"* Oral Presentation 46 **Vallainc, Dario** *"Flat-head grey mullet (Mugil cephalus) farming conditions for producing bottarga, histological, physiological and biochemical processes during gametogenesis"* Oral Presentation 47 **Fatsini, Elvira** *"The use of sand substrate modulates stress response and enhances maturation in Senegales sole females"*
12:00 – 12:15	**Group Photo**
12:15 - 13:30	Lunch

Thursday 18 May 2023	
13:30 – 16:00 **SS7.** **Gamete and egg quality** Chair: Bobe, Julién Co-chair: Żarski, Daniel	Invited State-of-the-Art Presentation 8 **Żarski, Daniel** *"Do non-genetic inheritance factors blur mechanisms responsible for egg quality?"* Oral Presentation 48 **Jeuthe, Henrik** *"Exploring the occurrence of DNA-fragmentation in sperm of different Swedish Arctic charr (Salvelinus alpinus) broodstocks and its impact on offspring viability"* Oral Presentation 49 **Niepagen, Nils** (student) *"Abnormal development after gastrulation: a novel egg quality parameter for Atlantic halibut (Hippoglossus hippoglossus) in aquaculture"* Oral Presentation 50 **Anderson, Kelli** *"A multi-omics approach to studying egg quality in flow-through and RAS-conditioned Tasmanian Atlantic salmon broodstock"* Oral Presentation 51 **Pšenička, Martin** *"Post-ovulatory oocyte aging leads to a significant PGC decline, which affects sexual differentiation."* Oral Presentation 52 **Félix, Francisca** (student) *"Supplemented melatonin did not confer extra protection to Senegalese sole spermatozoa during cryopreservation"* Oral Presentation 53 **Schaerlinger, Berenice** *"Feeding during the resting period and oogenesis is critical for successful reproduction in Eurasian perch (Perca fluviaitilis)"* Oral Presentation 54 **Samarin, Azin Mohagheghi** *"Molecular mechanisms of aging in fish oocytes"* Oral Presentation 55 **Gayo, Patricia** *"Evaluation of antioxidants on sperm quality in Senegalese sole"*
16:00 – 18:00	Poster 2 (Even numbers) & Coffee break
19:00	**Symposium Dinner**

Friday 19 May 2023	
10:00 -11:30 **SS8.** **Behaviour and pheromones** Chair: Duncan, Neil Co-chair: Weiming, Li	Invited State-of-the-Art Presentation 9 **Li, Weiming** *"Structure, function, and potential application of sea lamprey reproductive pheromones"* Oral Presentation 56 **Amano, Yuichi** (student) *"Using surrogate fish for eradicating invasive fish: Can surrogate triploid rainbow trout mate with their wild-type counterparts and produce lethal hybrids?"* Oral Presentation 57 **Oliveira, Rui** *"Coevolution of the oxytocin signaling pathway and reproductive behavior in African cichlids"* Oral Presentation 58 **Huertas, Mar** *"Olfactory sensitivity to conspecific odors released by striped bass (Morone saxatilis) during reproduction"* Oral Presentation 59 **Scaia, María Florencia** *"Two to tango: the importance of reproductive and hormonal variables in intrasexual aggression in Cichlasoma dimerus"*
11:30 – 12:00	Coffee Break
12:00 – 13:00 **SS8.** **Behaviour and pheromones** Chair: Duncan, Neil Co-chair: Weiming, Li	Oral Presentation 60 **Ashoori, Samyar** (student) *"Possible role of faeces in chemical communication in the Mozambique tilapia (Oreochromis mossambicus)"* Oral Presentation 61 **Sorensen, Peter** *"Acute olfactory sensitivity of bighead and silver carp to 9 sex steroids strongly suggests that novel mixtures of 21-carbon steroids function as species-specific priming pheromones in bigheaded carps"* Oral Presentation 62 **Siapazis, Christos** (student) *"Reproductive behavior and parental contribution of meagre (Argyrosomus regius) in aquaculture conditions"* Oral Presentation 63 **Fakriadis, Ioannis** *"Sound production in relation with breeding behaviour in meagre (Argyrosomus regius) in aquaculture conditions"*
13:00 – 14:30	Lunch

<table>
<tr><th colspan="2">Friday 19 May 2023</th></tr>
<tr><td rowspan="2">14:30 -16:00

SS9.
Reproductive biotechnologies
<u>Chair:</u> Zohar, Yonathan
<u>Co-chair:</u> Yoshizaki, Goro</td><td><u>State-of-the-Art presentation 10</u>
Yoshizaki, Goro
“Improved methods for long-term culture of germ cells capable of differentiating into eggs and sperm when transplanted into recipients”</td></tr>
<tr><td><u>Oral Presentation 64</u>
Moriya, Natsuko (student)
“Luteinizing hormone gene over-expression in pre-pubertal rainbow trout can induce sperm production within a short period.”

<u>Oral Presentation 65</u>
Lancerotto, Stefano (student)
“Gonadal maturation and spawning of hatchery-produced greater amberjack (Seriola dumerili) following administration of single-chain recombinant greater amberjack gonadotropins”

<u>Oral Presentation 66</u>
Duncan, Neil
“Sex-specific advance in pubertal maturation in response to in vivo application of recombinant Fsh and Lh to prepubertal meagre (Argyrosomus regius)”

<u>Oral Presentation 67</u>
Wong, Ten-Tsao
“Sterile salmonids produced by transient gene silencing and their applications in aquaculture and studying fish reproductive endocrinology.”</td></tr>
<tr><td>16:00 -16:30</td><td>Coffee Break</td></tr>
<tr><td>16:30 - 17:30

SS9.
Reproductive biotechnologies
<u>Chair:</u> Zohar, Yonathan
<u>Co-chair:</u> Yoshizaki, Goro</td><td><u>Oral Presentation 68</u>
Luckenbach, J Adam
“Investigation of approaches for sterility induction in sablefish Anoplopoma fimbria”

<u>Oral Presentation 69</u>
Nayak, Rigolin (student)
“Genome-wide comparative methylation analysis in zebrafish produced via surrogacy”

<u>Oral Presentation 70</u>
Gao, Linan (student)
“Replacement of mitochondria in sturgeon germline”

<u>Oral Presentation 71</u>
Ichida, Kensuke
Production of offspring derived from cryopreserved spermatogonia by surrogate broodstock in ayu (Plecoglossus altivelis)</td></tr>
<tr><td>17:30 – 18:00</td><td>Summary
Norberg, Birgitta</td></tr>
<tr><td>18:00 – 18:30</td><td>Closing
Mylonas, Constantinos (Dinos) C.</td></tr>
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List of Poster Presentations

SS1. Sex determination and differentiation		
P1	GEFFROY BENJAMIN	Genotype by environment interaction explain sex determination in the European seabass
P2	KOBAYASHI YASUHISA	Gonadal sex differentiation in the ovoviviparous red stingray (*Hemitrygon akajei*)
P3	DUNCAN NEIL	In vivo effect of recombinant Fsh and Lh administered to meagre (*Argyrosomus regius*) at the initial stages of sex differentiation.
P4	HAYASHIDA TAKAO	Gonadal sex differentiation in Pacific bluefin tuna (*Thunnus orientalis*)
P5	KATO YUSUKE (student)	Development of a molecular method to identify YY supermales of cobaltcap silverside, a fish with both genetic- and temperature-dependent sex determination
P6	SHAH MUJAHID ALI	Sturgeon embryo switched from holoblastic to meroblastic cleavage is viable but lacks primordial germ cells
P7	DALLA VALLE LUISA	New insights in zebrafish primordial germ cell survival and sex determination: the role of the autophagic protein Ambra1b
P8	INBARAJ R MOSES	Differential expression of sex reveal in brain and gonads of mullet (*Mugil cephalus*) at NGS transcriptome analysis

SS2. Brain-pituitary-gonad axis		
P9	DEGANI GAD	Sexual behavior and hormone gene expression in the Labyrinthici fish blue gourami (*Trichogaster trichopterus*) during reproduction
P10	PLANAS JOSEP	Endocrine patterns during sexual maturation in female Pacific halibut (*Hippoglossus stenolepis*)
P11	GÓMEZ ANA	In vivo effects of estradiol on the pituitary and testis of male European sea bass at different stages of spermatogenesis
P12	CHAUBE RADHA	Zebrafish NKBa modulated the Brain - pituitary - gonadal axis in female stinging catfish (*Heteropneustes fossilis*): An in vivo study
P13	HONJI RENATO MASSAAKI	Reproductive physiology of *Epinephelus marginatus* in captivity: hormonal therapies applied to the induction of sexual maturation in pre-spawning phase
P14	OHTA KOHEI	Molecular mechanism of sexual plasticity in a natural sex changing fish
P15	MUÑOZ-CUETO JOSE A.	Acute stress affects differentially the expression and daily variations of gonadotropin-inhibitory hormone (GnIH) and its receptor in the brain of the European sea bass (*Dicentrarchus labrax*)
P16	FAKRIADIS IOANNIS	Gonadotropin expression, pituitary and plasma levels during gametogenesis of wild and captive-reared greater amberjack (*Seriola dumerili*)

P17	NARWAL RITU (student)	Interaction of Gonadotropin Inhibitory Hormone with FSHβ and LHβ: in-vivo and in-silico analysis in Indian freshwater murrel (*Channa punctatus*)
P18	SAHU UMA BHARATI (student)	Insulin like growth factor 1 (IGF1) in the Hypothalamo-Pituitary-Gonadal-liver (HPG-L) axis: Gene expression and in silico analysis in the Indian freshwater catfish (*Heteropneustes fossilis*)
P19	COHEN OMER (student)	FSH Secretion and fish feeding are directly regulated by a novel regulator
P20	MARADONNA FRANCESCA	Central and peripheral control of reproduction in zebrafish Adenomatous Polyposis Coli (APC +/-) mutant line
P21	SEALE ANDRE	Sex-specific responses within the gonadotropic axis of Mozambique tilapia to growth hormone, prolactin, and luteinizing hormone
P22	BLANES-GARCIA MARTA (student)	The influence of specific recombinant gonadotropins on the initial stages of gametogenesis in male and female European eels (*Anguilla anguilla*)
P23	XU LAN	Single-cell RNA sequencing reveals the changes of gene expression in the pituitary of sterile female rainbow trout

SS3. Oogenesis/vitellogenesis and ovulation		
P24	GIMÉNEZ IGNACIO	Recombinant Fsh and Lh for the reproductive control of *Mugil cephalus* from previtellogenesis to fertilized tank spawning: hormonal inductions and transcriptomic analysis
P25	PALSTRA ARJAN	Six years of experimentation to optimize the artificial reproduction protocol for European eel: What worked and what didn't?
P26	GIOMMI CHRISTIAN (student)	Glyphosate chronic exposure impairs vitellogenesis and affects female zebrafish reproduction
P27	H SEHGAL NEETA	Structural modelling of vitellogenin C protein in the Indian freshwater murrel, *Channa punctatus*
P28	NAMGUNG JIN	The ovarian maturation changes during the main spawning season of largehead hairtail (*Trichiurus japonicus*) in Jeju Island from the Republic of Korea
P29	TICHOPÁD TOMÁŠ	Clonal gametogenesis is triggered by intrinsic stimuli in the hybrid's germ cells, but is dependent on sex differentiation
P30	YANG DEYING (student)	Potential role of Samd4 binding to cyp19a1a promoter involve in regulation of ovarian granulosa cells in the protogynous hermaphroditic ricefield eel (*Monopterus albus*)
P31	MARTA ANATOLIE (student)	The impact of genetic and karyotype divergence on gametogesis in laboratory obtained F1 hybrids of spined loach (Cobitis)
P32	LO NOSTRO FABIANA	The true life-history of a Neotropical invasive Characiform fish: to be or not to be an intersex species

P33	VAN DER KRAAK GLEN	Characterization of miRNAs in full grown follicles from the zebrafish ovary
P34	SURUGAYA RYOHEI (student)	Induction of ptgs2a and ptger3 expression in ovarian follicles is essential for ovulation in amur sturgeon (*Acipenser schrenckii*)

SS4. Spermatogenesis and spermiation		
P35	MASCOLI ALESSIA (student)	Steroidogenic activity of anti-Mullerian hormone in European male sea bass (*Dicentrarchus labrax*)
P36	POUSIS CHRYSOVALENTINOS	Testis mRNA expression in wild and hatchery-produced greater amberjack (*Seriola dumerili*).
P37	RODRIGUES MAIRA (student)	Thyroid hormone deficiency impairs male germ cell development: a cross talk between hypothalamus-pituitary-thyroid and gonad axes in zebrafish
P38	GÓMEZ ANA	Two genes coding for gonadal soma-derived factors act in early gametogenesis in European sea bass (*Dicentrarchus labrax*)
P39	NINHAUS SILVEIRA ALEXANDRE	Effect of dietary n-3 polyunsaturated fatty acids supplementation of *Astyanax lacustris* males on semen quality.
P40	ALEVRA ALEXANDRA(student)	Analysis of body composition of wild male *Mugil cephalus* in association with reproductive stage
P41	BLANES-GARCIA MARTA (student)	Evaluation of potential spermatogonia biomarkers genes in the European eel (*Anguilla anguilla*)
P42	SANCHIS NEREA (student)	A transcriptomic approach to the onset of spermatogenesis in the European sea bass

SS5. Climate change and anthropogenic impacts		
P43	GAZO IEVGENIIA	ATM and ATR kinases play an important role in sturgeon (*Acipenser ruthenus*) embryo survival and development
P44	HERRÁEZ ORTEGA MARÍA PAZ	Epigenetic effects of paternal exposure to BPA: DNA methylation in zebrafish germinal cells and F1 embryos
P45	GUERREIRO AMANDA	Influence of carbamazepine, a contaminant of emerging concern, on the reproductive axis of female lambari (*Astyanax lacustris*)
P46	BRANCO GIOVANA	Spermatogenesis in the neotropical fish *Astyanax lacustris* in response to the environmental changes
P47	VALCARCE DAVID G.	miRNA 29a is downregulated in progenies derived from chronically stressed males
P48	MORINI MARINA	Evolutionary scenario of temperature receptor TRPV (Transient Receptor Potential Vanilloid) family in metazoans with a special focus on “fish” species

P49	ROBLES VANESA	Paternal exposure to chronic stress impacts on the progeny: a molecular description of the altered biological processes
P50	CHEMELLO GIULIA	Ovary structural anomalies in the European sardine (*Sardina pilchardus*) in relation to health status and contaminants exposure.
P51	ZAPATER CINTA	In vitro evaluation of potential estrogenic compounds on estrogen receptors of European sea bass (*Dicentrarchus labrax*)
P52	GOPABANDHU MOHANTY SNEHASHISH (student)	Effects of Alkylphenol on the regulation of aromatase gene expression in the Indian stinging catfish (*Heteropneustes fossilis*)
P53	DE MELLO FERNANDA	Influence of high temperature on the gonadosomatic and hepatosomatic indices of neotropical fish *Astyanax lacustris*
P54	VERÍSSIMO-SILVEIRA ROSICLEIRE	Influence of high temperature on the testicular development of neotropical fish *Astyanax lacustris*

SS6. Reproduction in aquaculture		
P55	BOGEVIK ANDRÉ S	Production regime of Atlantic salmon (*Salmo salar*) broodstock recruits for optimal size at spawning and optimized incorporation of essential nutrients for egg and larvae quality
P56	MISHRA ABHA	Conservation strategy of butter catfish *Ompock bimaculatus*
P57	WYLIE MATTHEW	Induced spawning of silver trevally (*Pseudocaranx georgianus*; Carangidae) in captivity
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Fish species represented in the symposium

Common English name	**Scientific name**
amur sturgeon	*Acipenser schrenckii*
Atlantic halibut	*Hippoglossus hippoglossus*
Atlantic salmon	*Salmo salar*
bamboo leaf wrasse	*Pseudolabrus silboldi*
black rockfish	*Sebastes schlegelii*
blue gourami	*Trichogaster trichopterus*
butter catfish	*Ompock bimaculatus*
chub mackerel	*Scomber japonicus*
cobaltcap silverside	*Hypoatherina tsurugae*
common carp	*Cyprinus carpio*
dusky grouper	*Epinephelus marginatus*
European eel	*Anguilla anguilla*
European plaice	*Pleuronectes platessa*
European seabass	*Dicentrarchus labrax*
European sardine	*Sardina pilchardus*
flathead mullet	*Mugil cephalus*
gilthead seabream	*Sparus aurata*
greater amberjack	*Seriola dumerili*
grey triggerfish	*Balistes capriscus*
murrel	*Channa punctatus*
Indian freshwater catfish	*Heteropneustes fossilis*
Indian stinging catfish	*Heteropneustes fossilis*
Japanese anchovy	*Engraulis japonicus*
lambari	*Astyanax lacustris*
largehead hairtail	*Trichiurus japonicus*
meagre	*Argyrosomus regius*
medaka,	*Oryzias latipes*
Mozambique tilapia	*Oreochromis mossambicus*
Nile tilapia	*Oreochromis niloticus*
Pacific bluefin tuna	*Thunnus orientalis*
Pacific halibut	*Hippoglossus stenolepis*

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Common English name	**Scientific name**
rainbow trout	*Oncorhynchus mykiss*
red stingray	*Hemitrygon akajei*
ricefield eel	*Monopterus albus*
Senegalese sole	*Solea senegalensis*
Siberian sturgeon	*Acipenser baerii*
silver trevally	*Pseudocaranx georgianus*
spined loach	*Cobitis taenia*
spotted wolffish	*Anarhichas minor*
stinging catfish	*Heteropneustes fossilis*
sturgeon	*Acipenser ruthenus*
turbot	*Scophthalmus maximus*
tiger trout	*Salmo trutta* × *Salvelinus fontinalis*
Tokyo bitterling	*Pseudorhodeus tanago*
zebrafish	*Danio rerio*

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