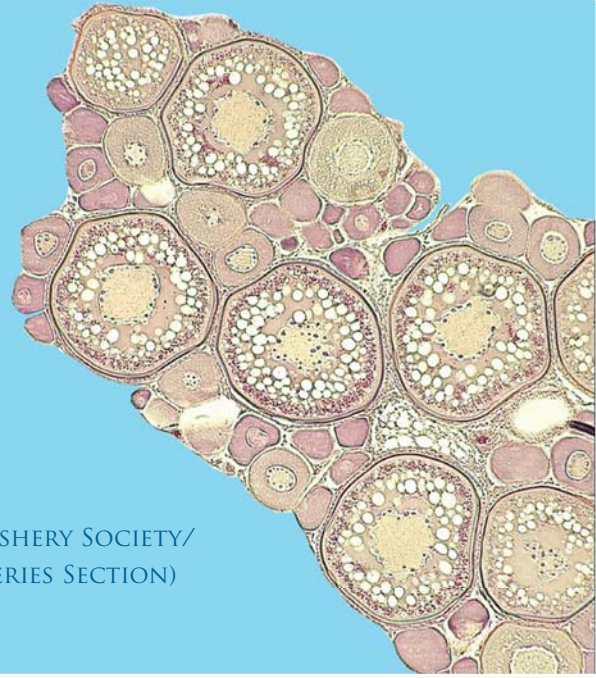


4TH WORKSHOP ON GONADAL HISTOLOGY OF FISHES

EL PUERTO DE SANTA MARÍA, CADIZ, SPAIN
16-19 JUNE 2009



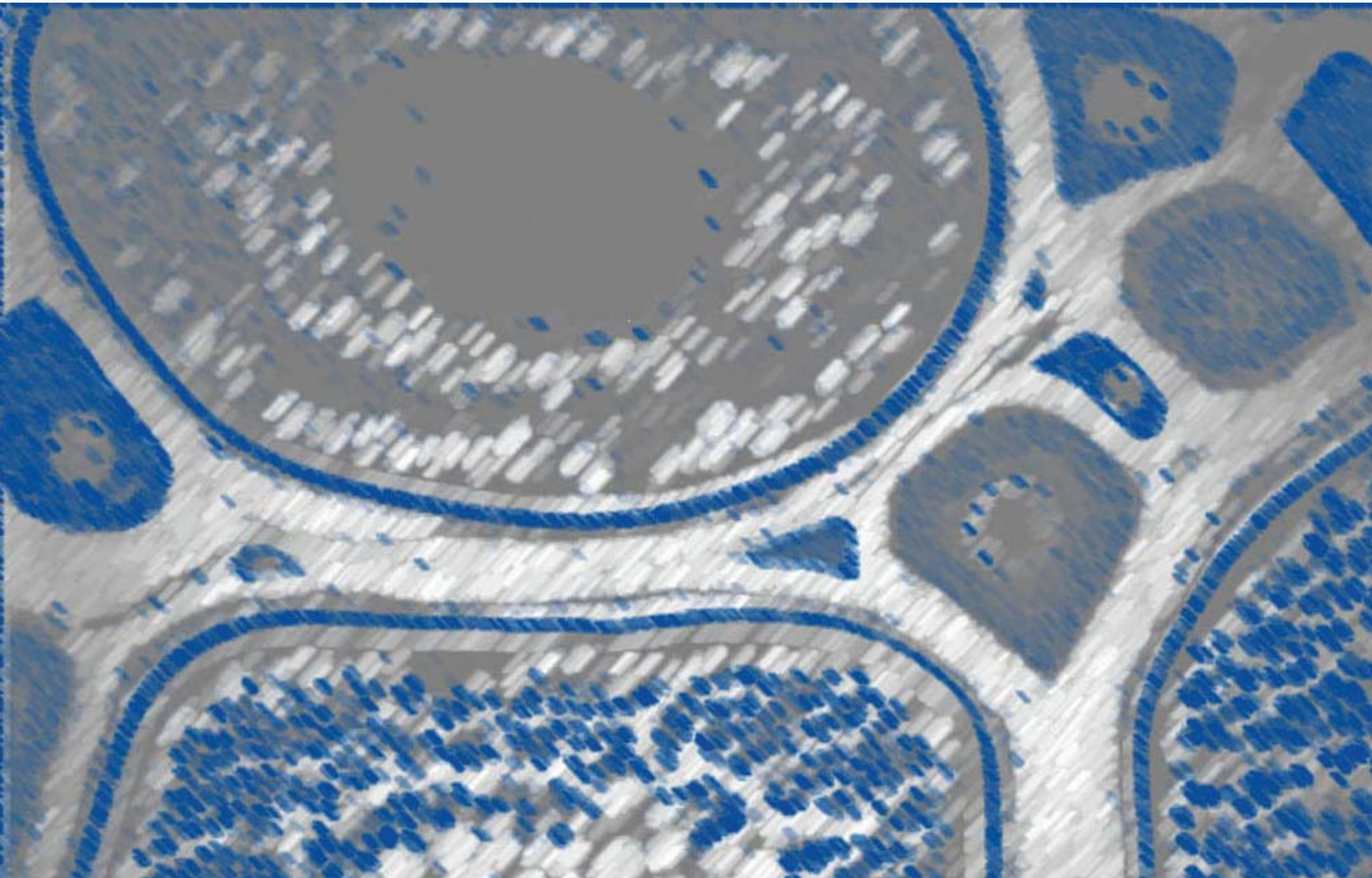
ORGANIZED BY
FRESH

(FISH REPRODUCTION AND FISHERIES)
COST ACTION FA0601

AFS/MFS

(AMERICAN FISHERY SOCIETY/
MARINE FISHERIES SECTION)

WORKSHOP PROGRAM &
ABSTRACTS



Workshop-Program-Overview

- Tuesday
16.6 Registration and workshop welcome
 Opening Keynote: The utility of gonadal histology in studies of fish reproduction and the subsequent management of fisheries and ecosystems. *Olav Sigurd Kjesbu*
- Theme session 1:
 Female and male reproductive strategies: Differences in gametogenesis across species. *Session Chairs: Fran Saborido-Rey & Hilario Murua*
 Oral presentations and Discussion
- Wednesday
17.6 Theme session 2:
 Characterization and differentiation among reproductive phases with an emphasis on fecundity types, skipped spawning and abnormalities.
 Session Chairs: Jonna Tomkiewicz & Rick Rideout
 Oral presentations and Discussion
 Poster session: Themes 1 and 2
- Thursday
18.6 Theme session 3:
 Determination of temporal patterns of reproductive activity.
 Session Chairs: Susan Lowerre-Barbieri & Konstantinos Ganiats
 Oral presentations and Discussion
 Poster session: Themes 3 and 4
- Friday
19.6 Theme session 4:
 Reproductive terminology and methodology.
 Session Chairs: Nancy Brown-Peterson & David Wyanski
 Oral presentations and Discussion

Program

Tuesday 16.6

- 08:30 Registration
- 09:45 Workshop welcome by **Fran Saborido-Rey**, Institute of Marine Research (CSIC), Spain. Chair of the COST Action: Fish Reproduction and Fisheries (FRESH)
Workshop objectives and goals by **Susan Lowerre-Barbieri**, Florida Fish and Wildlife Research Institute, USA. Representing American Fisheries Society (AFS) Marine Fisheries Section
- 10:00 Introduction of Keynote Speaker by **Jonna Tomkiewicz**, Technical University of Denmark (DTU Aqua), Denmark, Vice-chair of FRESH
Opening Keynote: **Olav Sigurd Kjesbu**, Institute of Marine Research, Norway.
The utility of gonadal histology in studies of fish reproduction and the subsequent management of fisheries and ecosystems.
- 11:00 Coffee break 

Theme session 1:

- Female and male reproductive strategies: Differences in gametogenesis across species. **Session Chairs: Fran Saborido-Rey & Hilario Murua**
- 11:20 Introduction to session by Hilario Murua. Presenters are indicated in bold
- 11:25 Session Keynote: Female reproductive strategies: An energetic balance between maturation, growth and egg production. **Fran Saborido-Rey**, Hilario Murua, Jonna Tomkiewicz and Susan Lowerre-Barbieri
- 12:20 Comparative analysis of reproductive strategy in three demersal fish species from Galician Shelf. **Rosario Domínguez-Petit**, Alexandre Alonso-Fernández, Dolores Dominguez-Vázquez and Fran Saborido-Rey
- 12:40 Three different hermaphroditic strategies on the Balearic Islands shelf (north-western Mediterranean sea). **Alexandre Alonso-Fernández**, Josep Alós, Rosario Domínguez-Petit, Amalia Grau, and Fran Saborido-Rey
- 13:00 Oviparous elasmobranchs: how different is their reproductive cycle from teleosts – the case-study of the thornback ray, *Raja clavata*. **Bárbara Serra-Pereira**, Ivone Figueiredo and Leonel Serrano-Gordo
- 13:30 Lunch 
- 14:30 Kinetics of oogenesis and spawning strategy of *Sardinella aurita* in the central Mediterranean Sea. **Adel Gaamour**, Hechmi Missaoui and Christian Deniel
- 14:50 The assessment of maturity stage in Greenland halibut (*Reinhardtius hippoglossoides*). **James Kennedy**, Agnes C. Gundersen, Åge S. Høines and Olav S. Kjesbu
- 15:10 Macroscopical and microscopical investigation in Kattegat cod (*Gadus morhua*)*. **Francesca Vitale**, Massimiliano Cardinale, Henrik Svedäng (*Replacing Svetlana Piyanova)

- 15:30 A comparative study of the early gonado- and gametogenesis in two European lamprey species (genera *Lethenteron* and *Lampetra*). **Marina V. Mosyagina**, Andrey A. Shildyaev, Sako B. Tuniev and Alexander M. Naseka
- 15:50 Ovarian structure and oogenesis in viviparous teleosts: poeciliids and goodeids. **Mari Carmen Uribe Aranzabal** and Harry Grier
- 16:10 Characterisation of the reproductive trait of female birdbeak dogfish, *Deania calcea* (Lowe, 1839), in Portuguese continental slope. **Rafaela Barros Paiva**, Ana Neves, Vera Sequeira and Leonel Serrano Gordo
- 16:30 Coffee break ☕
- 16:50 Plenary discussion.
- 18:00

Wednesday 17.6


Theme session 2:

Characterization and differentiation among reproductive phases with an emphasis on fecundity types, skipped spawning and abnormalities

Session Chairs: Jonna Tomkiewicz & Rick Rideout

- 09:00 Introduction to session by Jonna Tomkiewicz. Presenters are indicated in bold
- 09:05 Session keynote: Skipped spawning: A strategy for maximizing reproductive output in a variable environment. **Rick M. Rideout** & Jonna Tomkiewicz
- 10:00 The use of histology in defining the pattern of ovarian development and fecundity type in tropical marine teleost fishes. **Thierry Brulé**, Jorge Trejo-Martínez, Natalia Morales-López, Andy Mena-Loría and Teresa Colás-Marrufo
- 10:20 Investigating the fecundity type of the zygotrophic species *Helicolenus dactylopterus dactylopterus* (Delaroche, 1809). **Vera Sequeira**, Ana Neves, Rafaela Barros Paiva and Leonel Serrano Gordo
- 10:40 Histological study of hormonally induced spermatogenesis in European eel (*Anguilla anguilla*). **Tanja M.N. Kofoed**, Jonna Tomkiewicz and Jes S. Pedersen
- 11:00 Coffee break ☕
- 11:20 Stereology as a tool to assess reproduction strategy and fecundity of teleost fishes. **Rikke Hagstrøm Bucholtz**, Jonna Tomkiewicz, Johnnie Bremholm Andersen, Jens Randel Nyengaard and Hans Jørgen Gottlieb Gundersen
- 11:40 Quantification of ovarian follicles in bluefin tuna by two stereological methods. Lourdes Aragón, Guillermo Aranda, Agustín Santos and **Antonio Medina**
- 12:00 Pattern of previtellogenic oocyte recruitment into secondary growth phase in indeterminate reproductive style species. Maria Korta, Hilario Murua and **Olav S. Kjesbu**
- 12:20 Impact of mass atresia in reproductive ecology, maturity ogive, spawning migration and population dynamics on *S. mentella* and *S. marinus* in Icelandic waters. **Fran Saborido-Rey**, D. Garabana, A. Alonso-Fernandez, R. Domínguez-Petit and T. Sigurdsson

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- 12:40 The reproductive biology of female winter flounder (*Pseudopleuronectes americanus*): validating classification schemes to assess the importance of 'skip spawning'. **Mark J. Wuenschel**, Richard S. McBride, Grace M. Thornton and Paul Nitschke
- 13:00 Prevalence of intersex in eelpout (*Zoarces viviparus*) as an ecosystem status indicator. **Jonna Tomkiewicz** and Jakob Strand
- 13:30 Lunch 
- 14:30 Plenary discussion
- 16:00 Poster session Theme 1 and 2: Female and male reproductive strategies and
-18:00 phases, fecundity types, skipped spawning and abnormalities
See program for sessions below
Coffee break (to occur during poster session)

Thursday 18.6


Theme session 3:

Determination of temporal patterns of reproductive activity.

Session Chairs: Susan Lowerre-Barbieri & Konstantinos Ganiás

- 09:00 Introduction to session by Konstantinos Ganiás. Presenters are indicated in bold
- 09:05 Session keynote: Understanding temporal reproductive patterns in marine fish: a review of histological approaches and emerging methodology. **Susan Lowerre-Barbieri**, Konstantinos Ganiás, Hilario Murua, Fran Saborido-Rey and John Hunter
- 10:00 Importance of histological information in the assessment of Southern Stock of European hake. **Rosario Domínguez-Petit**, María Saínza, Luis Silva and Cristina Morgado
- 10:20 Gonad histology of vendace *Coregonus albula* in Lake Paravani, South Georgia. **Bella Japoshvili** and George Japoshvili
- 10:40 Quantification of seasonal follicular cycle of an indeterminate fish: the European hake model. Maria Korta and **Hilario Murua**
- 11:00 Coffee break 
- 11:20 Seasonality of the reproductive activity and resources allocation in the Iberian sardine. **Cristina Nunes**, Alexandra Silva and Konstantinos Ganiás
- 11:40 Contribution to the reproductive biology of Atlantic albacore (*Thunnus alalunga*, Bonaterre 1788). **David Macías**, Victoria Ortiz de Zárate and M^a Jose Gómez-Vives.
- 12:00 Histological examination of ovarian development of Anchovy (*Engraulis encrasicolus*) and Sardine (*Sardina pilchardus*) from the Agadir bay, Morocco Atlantic coast. **Youssef Snaiki** and Hassan Elouizgani
- 12:20 Revision of the spawning frequency estimates for the Bay of Biscay anchovy. **Andrés Uriarte**, Ana Alday and María Santos

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- 12:40 Ovarian dynamics and oocyte development rate in the Atlantic sardine, *Sardina pilchardus*. **Konstantinos Ganias**, Cristina Nunes, Theocharis Vavalidis and Yorgos Stratoudakis
- 13:00 Lunch 
- 14:30 Plenary discussion
- 16:00 Poster session Theme 3 and 4: Determination of temporal patterns of reproductive activity; and reproductive terminology and methodology
- 18:00 See program for sessions below
Coffee break (to occur during poster session)

Friday 18.6

Theme session 4:

Reproductive terminology and methodology

Session Chairs: Nancy Brown-Peterson & David Wyanski

- 09:00 Introduction to session by Nancy Brown-Peterson. Presenters are indicated in bold
- 09:05 Session keynote: A standardized terminology for describing reproductive development in fishes. **Nancy J. Brown-Peterson**, David M. Wyanski, Susan K. Lowerre-Barbieri, Francisco Saborido-Rey, Jonna Tomkiewicz and Beverly J. Macewicz
- 10:00 Saltwater Perciformes: from oogonia to pelagic eggs. **Harry J. Grier**, Mari Carmen Uribe and Reynaldo Patiño
- 10:20 Freshwater Ostariophysi: from oogonia to eggs. **Irani Quagio-Grassiotto**, Júlio César de Oliveira Santana, Talita Sarah Mazzoni, Gisleine F. França and Harry J. Grier
- 10:40 Spermatogonial stem cell candidates and their niche in zebrafish testes (*Danio rerio*). **Rafael Henrique Nóbrega**, Caaj Douwe Greebe, Samyra Maria dos Santos Nassif Lacerda, Luiz Renato de França and Rüdiger W. Schulz
- 11:00 Coffee break 
- 11:20 Standardization of methods and terminology applied in maturity determination of gadoids and other marine fish species in the Northeast Atlantic. **Jonna Tomkiewicz**, Rikke Hagstrøm Bucholtz and Fran Saborido-Rey
- 11:40 Staging haddock (*Melanogrammus aeglefinus*) ovaries: Implications for maturity indices, estimation of daily spawning timing, and field sampling practices. Katie A. Anderson, William Roumillat, Rodney A. Rountree and **Francis Juanes**
- 12:00 Switching POCs for POFs. **Harry J. Grier** and Irani Quagio-Grassiotto
- 12:20 Plenary discussion
- 13:20 Workshop summary and recap of publications process by **David Wyanski**, South Carolina Marine Resources Research Institute, USA
Closing remarks by **Fran Saborido-Rey**, Institute of Marine Research (CSIC), Spain.
- 13:30 End of Workshop

Poster session Themes 1 and 2 (Wednesday afternoon)

Theme 1: Female and male reproductive strategies: Differences in gametogenesis

Authors of even numbered posters are requested to be at their posters for the first hour of the poster session, and authors of odd-numbered posters are requested to be at their posters during the second hour of the poster session.

- Poster 1.1 Histological evaluation of gametogenesis in blackspot sea bream, *Pagellus bogaraveo*. **Natalia Jiménez-Tenorio**, Ana Rodríguez-Rúa and María Ángeles Bruzón
- Poster 1.2 Oogenesis and spermatogenesis in the common sole *Solea vulgaris* (Quensel, 1806) in the Gulf of Cádiz (SW Spain). **Ignacio Pozuelo**, María P. Yamuza and M^a Ángeles Bruzón
- Poster 1.3 Reproductive biology of garfish, *Belone belone* (Linnaeus, 1761) in the Middle eastern Adriatic Sea. **Barbara Zorica**, Gorenka Sinovcic and Vanja Cikeš Kec
- Poster 1.4 Reproductive characteristics of the black anglerfish, *Lophius budegassa* (Spinola, 1807) in the western Mediterranean. **Ana I. Colmenero**, Anna Bozzano, Laura Recasens and Pilar Sánchez
- Poster 1.5 Histological and macroscopic analysis of horse mackerel *Trachurus trachurus* (Linnaeus, 1758) ovaries from M' diq region (Mediterranean of Morocco). **Maha Kerkich**, M. Aksissou and J. A. Hernando
- Poster 1.6 Reproductive strategy of the mesopelagic, synchronous hermaphroditic species *Chlorophthalmus agassizii* (Bonaparte, 1840) in the Greek Ionian Sea. **Aikaterini Anastasopoulou** and John Haralabous
- Poster 1.7 Gonad morphology and hermaphroditism in sergeant major *Abudefduf saxatilis* (Linnaeus, 1758) (Pomacentridae). **June Ferraz Dias**, Helcy Lylian Nogueira Silbiger, Francisco Javier Hernandez-Blázquez and Eduardo Bessa
- Poster 1.8 Formation of the germinal epithelium during gonadal differentiation in *Cyprinus carpio* (Teleostei: Ostariophysi: Cypriniformes). **Irani Quagio-Grassiotto**, Talita Sarah Mazzoni and Harry J. Grier
- Poster 1.9 Characterization of zebrafish (*Danio rerio*) females as recipients for spermatogonial stem cell transplantation: a model to study stem cell plasticity in teleosts. **Caaj Douwe Greebe**, Rafael Henrique Nobrega and Rüdiger W. Schulz
- Poster 1.10 An immunohistochemical and ultra structural study of the spermatogenesis of *Helicolenus dactylopterus*. **Sílvia Vila**, Marta Muñoz and Margarida Casadevall

Theme session 2: Characterization and differentiation among reproductive phases with an emphasis on fecundity types, skipped spawning and abnormalities

Authors of even numbered posters are requested to be at their posters for the first hour of the poster session, and authors of odd-numbered posters are requested to be at their posters during the second hour of the poster session

- Poster 2.1 Reproductive biology of chub mackerel, *Scomber japonicus* (Houttuyn, 1782) males and females in the Middle Eastern Adriatic Sea. **Vanja Cikeš Kec**, Gorenka Sinovic and Barbara Zorica
- Poster 2.2 Reproductive strategy of the common wolffish, *Anarhichas lupus* L., in north-east Atlantic waters **Inger-Britt Falk-Petersen**
- Poster 2.3 Features of oogenesis in two species of the family Mullidae from the Nha Trang Bay, South China Sea, Vietnam. **Natal'ya Emel'yanova** and Dimitri Pavlov
- Poster 2.4 Effect of radiation on the reproductive system of freshwater teleost fishes – consequences of the Chernobyl Nuclear Power Plant Accident. **Natalya V. Belova** and Natalya G. Emel'yanova
- Poster 2.5 Size, age, and reproductive status of Atlantic bluefin tuna (*Thunnus thynnus*) from the Gulf of Mexico spawning grounds. **Jessica M. Knapp** and Molly E. Lutcavage
- Poster 2.6 Immature/Resting Macroscopic Misclassification: What happens with the European hake males (Southern stock case)? **Ana Maria Costa** and Patrícia Gonçalves
- Poster 2.7 Automatic software tool to determine fish fecundity by means of a computing aided image analysis and stereology on histological images. **Sonia Rábade**, Mariña Fabeiro, Dolores Dominguez-Vázquez, Alexandre Alonso Fernández, Eva Cernadas, Pilar Carrión, Nany Rufino, Arno Formella, Rosário Domínguez-Petit and Fran Saborido-Rey
- Poster 2.8 Counts of postovulatory follicles with the stereological disector method as a proxy of the realised fecundity in bluefin tuna. **Guillermo Aranda**, Lourdes Aragón, Agustín Santos, and Antonio Medina
- Poster 2.9 Aspects of the histological analysis of the batch fecundity on an example of the Rockall Bank haddock (*Melanogrammus aeglefinus*). E.A., Filina, **V.N. Khlivnoy** and V.I. Vinnichenko
- Poster 2.10 Nematode parasites (Philometridae) are present in wahoo, *Acanthocybium solandri*, ovaries but do not preclude spawning by the host. **Richard S. McBride**, Kristin L. Maki, and Micah Bakenhaster
- Poster 2.11 Withdrawn
- Poster 2.12 Intersex and other gonadal abnormalities in sturgeons from the Missouri River, USA. **Diana M. Papoulias**, Aaron J. DeLonay, Mark L. Wildhaber, Mandy L. Annis and Donald E. Tillitt

Poster session Themes 3 and 4 (Thursday afternoon)

Theme session 3: Determination of temporal patterns of reproductive activity

Authors of even numbered posters are requested to be at their posters for the first hour of the poster session, and authors of odd-numbered posters are requested to be at their posters during the second hour of the poster session

- Poster 3.1 Gametogenic cycle and first sexual maturity size of meagre, *Argyrosomus regius*, in the Gulf of Cadiz (SW, Spain). **M^a del Mar García-Pacheco** and M^a Ángeles Bruzón
- Poster 3.2 Re-evaluating size and age at maturity of southern flounder (*Paralichthys lethostigma*) using reproductive histology and otolith microchemistry. **Frederick S. Scharf**, William E. Smith and J. Christopher Taylor
- Poster 3.3 Reproductive patterns and sampling times for sentinel fish species used in environmental effects monitoring programs in Canada. **Timothy Barrett** and Kelly Munkittrick
- Poster 3.4 Preliminary data on the ovarian histological structures observed in black hakes (*Merluccius polli* and *M. senegalensis*) off Mauritania. **Lourdes Fernández-Peralta**, Francisca Salmerón, M^a Jose Gómez, Ramón García and David Macías
- Poster 3.5 Reproductive cycle, fecundity and maturity ogive of *Brycon guatemalensis* in Lake Cocibolca. A. Hernández and **F. Saborido-Rey**
- Poster 3.6 Timing of reproductive events in natural pike (*Esox lucius* L.) population. **Mirjana Lenhardt**
- Poster 3.7 Histological seasonal changes of testis in male of ocellate freshwater stingray *Potamotrygon motoro* at Rio Negro Basin, Amazonas State, Brazil. **Maria Lúcia Góes de Araújo** and Luiz Alberto dos Santos Monjeló
- Poster 3.8 Withdrawn
- Poster 3.9 Environmental influence in oocyte size, batch fecundity and egg biochemical content in *Engraulis ringens* off the Chilean coast. **Leonardo Castro**, Gabriel Claramunt, Elson Leal, María C. Krautz, Alejandra Llanos and Paola Moreno
- Poster 3.10 A model based method for estimating daily spawning fraction in *Engraulis ringens*. **Gabriel Claramunt**
- Poster 3.11 Ageing of postovulatory follicles in anchovy (*Engraulis encrasicolus*) by means of DEPM surveys data in the Strait of Sicily: a critical review. **Gualtiero Basilone**, Rosalia Ferreri and Fran Saborido-Rey
- Poster 3.12 Ageing of post ovulatory follicles and oocyte recruitment in Baltic sprat. **Holger Haslob**, Fran Saborido Rey and Gerd Kraus
- Poster 3.13 Effect of atresia in the spawning of *Helicolenus dactylopterus*. **Caterina Dimitriadis**, Marta Muñoz, Margarida Casadevall and Eulalia Delgado

Theme session 4: Reproductive terminology and methodology.

- Poster 4.1 Comparative analysis of the results from visual and histological estimation of Rockall haddock (*Melanogrammus aeglefinus*) maturity. **E.A. Filina**, V.N. Khlivnoy and V.I. Vinnichenko
- Poster 4.2 Development of a manual to determine gonadal maturity of herring (*Clupea harengus* L.). **Rikke Hagstrøm Bucholtz**, Jonna Tomkiewicz and Jørgen Dalskov
- Poster 4.3 Evaluating macroscopic maturity staging in *Centropristis striata* with photographic reassignment and histology. **Nikolai Klibansky** and Frederick S. Scharf
- Poster 4.4 Oogenesis in the American knifefish *Gymnotus cf. anguillaris* (Teleostei: Ostariophysi: Gymnotiformes). **Irani Quagio-Grassiotto**, Gisleine F.França and Harry Grier
- Poster 4.5 Staining techniques for the improvement of differentiation of immature and resting fish. D. Dominguez-Vazquez, **M. Fabeiro-Quinteiro**, S. Rábade-Úberos, A. Alonso-Fernández, R. Domínguez-Petit, R. Alpoim and F. Saborido-Rey
- Poster 4.6 A quick method for an easy identification of ovarian structures: the use of autofluorescence. **M. Fabeiro-Quinteiro**, S. Rábade-Úberos, D. Dominguez-Vazquez, A. Alonso-Fernández, R. Domínguez-Petit and F. Saborido-Rey
- Poster 4.7 Staging and ageing of the postovulatory follicles in *Engraulis ringens* from northern Chile. **Gabriel Claramunt**, Gustavo Herrera and Luis Cubillos

Scientific steering committee

Fran Saborido-Rey, Institute of Marine Research (CSIC), Spain
Nancy Brown-Peterson, University of Southern Mississippi, USA
Jonna Tomkiewicz, Technical University of Denmark (DTU Aqua), Denmark
Susan Lowerre-Barbieri, Florida Fish and Wildlife Research Institute, USA
Hilario Murua, AZTI Tecnalia, Spain
David Wyanski, South Carolina Marine Resources Research Institute, USA
María A. Bruzón, Fishing and Aquatic Research Center, Spain