ZEBRAFISH HUSBANDRY ASSOCIATION: AVAILABLE RESOURCES FOR THE COMMUNITY

1ST NORDIC ZEBRAFISH & MEDAKA CARE WORKSHOP

Oslo, February 7, 2018

WHAT IS THE ZEBRAFISH HUSBANDRY ASSOCIATION?

ZHA Mission

- Promote and develop zebrafish husbandry standards through education, collaboration, and publication
- Promote professional development through social and educational functions
- Sponsor and provide educational and training programs for members and others for care, handling and research of zebrafish

Zebrafish Husbandry Association

HISTORY OF THE ZHA

- New England Zebrafish Husbandry Association (NEZHA) is formed (2005-2006).
- Name change to Zebrafish Husbandry Association (2007-2008).
- Became affiliate organization with World Aquaculture Society (2009).
- Became American Association for Laboratory Animal Science affiliate (2010)
- First annual meeting and peer review session at WAS (2010)
- New ZHA website, LinkedIn page, started newsletter Stripes, established webinar series (2014)
- Sponsoring events and outreach: Zebrafish Husbandry Education Online Course, Australia and New Zealand Husbandry Conference (2016)
- Provide funding opportunities for members (2017)

MEMBERS

Individual: 305
Institutional: 32
Vendor: 20

MEMBERSHIP BENEFITS

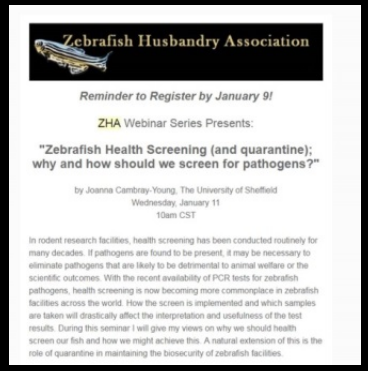
- Complete access to our webpage www.zhaonline.org which includes:
  - Past ZHA meetings with access to download presentations
  - List of valuable publications related to zebrafish husbandry and aquaculture
  - ZHA discussion forum
  - Our new resources section
- Registration discount to Aquaculture America
- Voting privileges for the executive board
- Access to all ZHA Webinar Series presentations and ZHA newsletters

Individual Membership	**Institutional Membership**	**Vendor Membership**
$30.00 per year	$150.00 per year	$250.00 per year

VENDOR MEMBERS

HOW DO WE ACCOMPLISH OUR MISSION?

- Website **www.zhaonline.org**
- Webinars
- Attending Meetings/Conferences
- Working Groups
- Community Surveys
- Newsletter



WEBSITE - **www.zhaonline.org**

Zebrafish Husbandry Association

HOME | ABOUT US | MEMBERSHIP | RESOURCES | UPCOMING EVENTS | VENDORS | LINKS

- Zebrafish Basics
- Protocol Database
- Zebrafish Husbandry Publications >
- Research Funding Opportunities
- Webinar Series
- Do It Yourself Corner
- Newsletter
- Presentations >
- Surveys
- Working Groups
- Discussion Forum
- Job Opportunities
- Facility Tour Contacts

Mission Statement:

The Zebrafish Husbandry Association is a non-profit organization devoted to promoting and developing zebrafish husbandry standards through:

EDUCATION - COLLABORATION -PUBLICATION

Get Involved

News and A ts

9/14/2017

Zebrafish Husbandry Association Call for S

The Zebrafish Husbandry Association is pleased to announce our annual Call er-reviewed portion of the Annual Zebrafish Husbandry Workshop sponsored by Aquaneering and being held in conjunctio ety conference in Las Vegas, NV on February 20 – 21, 2018.

WEBINARS

30-60 Minute Online Lectures

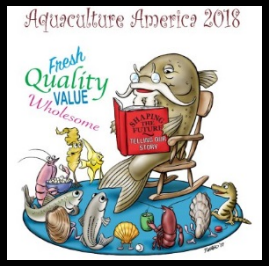
2017

- Special Webinar on Fish Health
  - Factors Influencing Egg Size- Dante D'India, Harvard Medical School, USA
  - Heavy Metal Contaminated Diet Affects Survival, Health, and Development of Larval Zebrafish- Marc Tye, University of Minnesota, USA
  - Fish Health and Biosecurity- Dr. Charles Innis, New England Aquarium, USA

- Zebrafish Health Screening (and Quarantine)
  - Why and How We Should Screen for Pathogens- Joanna Cambray-Young, The University of Sheffield, UK

MEETINGS AND CONFERENCES

- CALAS Symposium, Calgary, Canada
- Charles River Short Course, Foxwoods, CT, USA
- Hands-On Workshop on Advancing Zebrafish Health Programs, Lisbon, Portugal
- European Zebrafish Meeting, Budapest, Hungary
- Zebrafish Disease Models, San Diego, CA, USA
- MDI Biological Laboratory Health and Colony Management of Laboratory Fish, Bar Harbor, ME, USA
- Annual International Zebrafish Husbandry Course, Buguggiate, Italy
- AALAS, Austin, TX, USA
- Zebrafish Husbandry Workshop, Las Vegas, NV, USA
- International FishMed Conference on Zebrafish Research, Warsaw, Poland
- European Zebrafish PI Meeting, Lisbon, Portugal

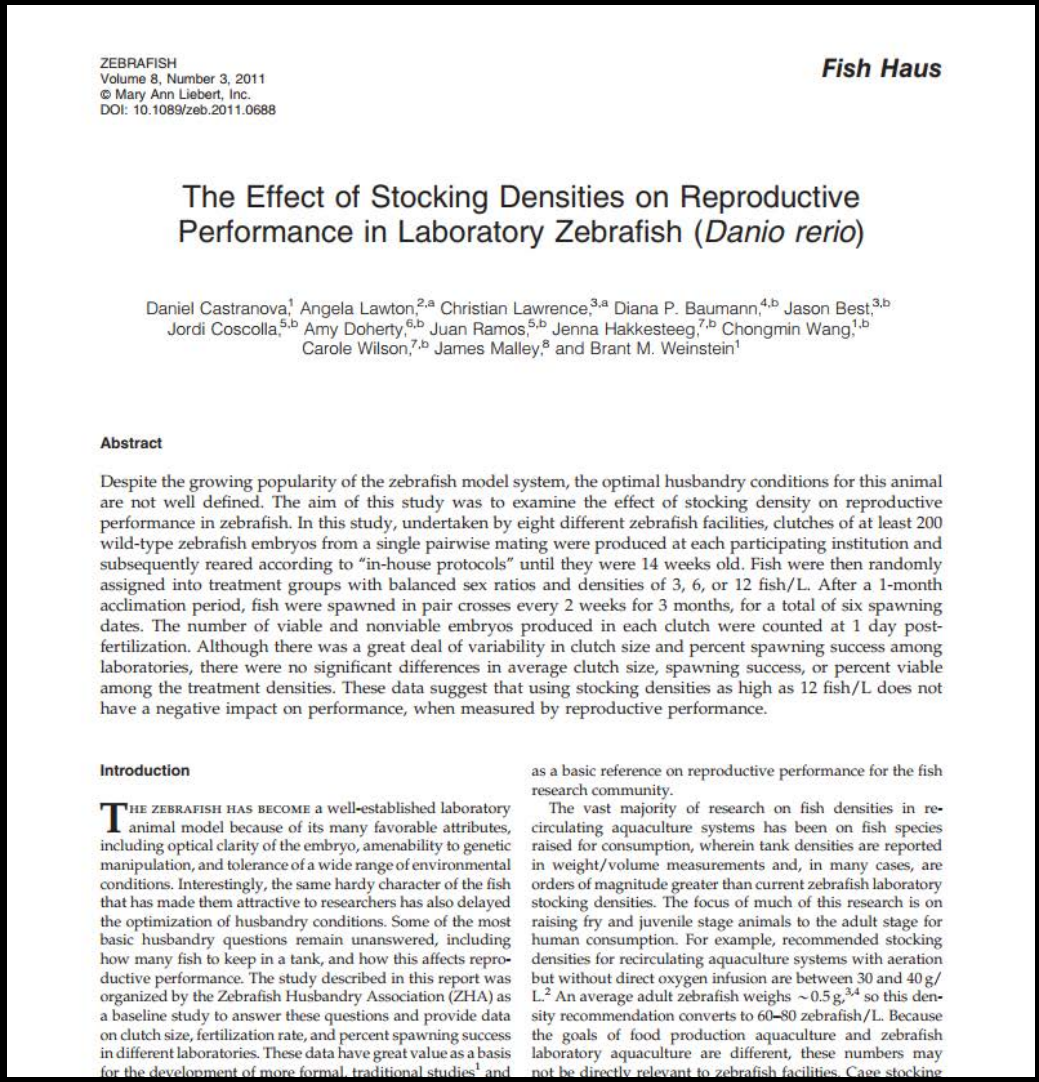


WORKING GROUPS

Investigating Questions in Zebrafish Husbandry

- Larval Rearing
- Reproduction & Spawning
- Nutrition
- Water Quality
- Health Management
- Welfare and Behavior

Interested in starting a working group?
Contact Admin@zhaonline.org



ZEBRAFISH
Volume 8, Number 3, 2011

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The Effect of Stocking Densities on Reproductive Performance in Laboratory Zebrafish (*Danio rerio*)

Daniel Castranova,[1] Angela Lawton,[2,a] Christian Lawrence,[3,a] Diana P. Baumann,[4,b] Jason Best,[3,b] Jordi Coscolla,[5,b] Amy Doherty,[6,b] Juan Ramos,[5,b] Jenna Hakkesteeg,[7,b] Chongmin Wang,[1,b] Carole Wilson,[7,b] James Malley,[8] and Brant M. Weinstein[1]

Abstract

Despite the growing popularity of the zebrafish model system, the optimal husbandry conditions for this animal are not well defined. The aim of this study was to examine the effect of stocking density on reproductive performance in zebrafish. In this study, undertaken by eight different zebrafish facilities, clutches of at least 200 wild-type zebrafish embryos from a single pairwise mating were produced at each participating institution and subsequently reared according to "in-house protocols" until they were 14 weeks old. Fish were then randomly assigned into treatment groups with balanced sex ratios and densities of 3, 6, or 12 fish/L. After a 1-month acclimation period, fish were spawned in pair crosses every 2 weeks for 3 months, for a total of six spawning dates. The number of viable and nonviable embryos produced in each clutch were counted at 1 day post-fertilization. Although there was a great deal of variability in clutch size and percent spawning success among laboratories, there were no significant differences in average clutch size, spawning success, or percent viable among the treatment densities. These data suggest that using stocking densities as high as 12 fish/L does not have a negative impact on performance, when measured by reproductive performance.

Introduction

THE ZEBRAFISH HAS BECOME a well-established laboratory animal model because of its many favorable attributes, including optical clarity of the embryo, amenability to genetic manipulation, and tolerance of a wide range of environmental conditions. Interestingly, the same hardy character of the fish that has made them attractive to researchers has also delayed the optimization of husbandry conditions. Some of the most basic husbandry questions remain unanswered, including how many fish to keep in a tank, and how this affects reproductive performance. The study described in this report was organized by the Zebrafish Husbandry Association (ZHA) as a baseline study to answer these questions and provide data on clutch size, fertilization rate, and percent spawning success in different laboratories. These data have great value as a basis for the development of more formal, traditional studies[1] and as a basic reference on reproductive performance for the fish research community.

The vast majority of research on fish densities in re-circulating aquaculture systems has been on fish species raised for consumption, wherein tank densities are reported in weight/volume measurements and, in many cases, are orders of magnitude greater than current zebrafish laboratory stocking densities. The focus of much of this research is on raising fry and juvenile stage animals to the adult stage for human consumption. For example, recommended stocking densities for recirculating aquaculture systems with aeration but without direct oxygen infusion are between 30 and 40 g/L.[2] An average adult zebrafish weighs ~0.5 g,[3,4] so this density recommendation converts to 60–80 zebrafish/L. Because the goals of food production aquaculture and zebrafish laboratory aquaculture are different, these numbers may not be directly relevant to zebrafish facilities. Cage stocking

COMMUNITY SURVEYS

brafish Husbandry Associati

Zebrafish Community Survey- The Environment (2017)

This survey is designed to anonymously poll the zebrafish community in order to capture a current snapshot of the environmental parameters in the laboratory. Thank you for participating. The results of this community survey will be made available on zhaonline.org

Stocking Density

What is your stocking density for embryos?

Your answer

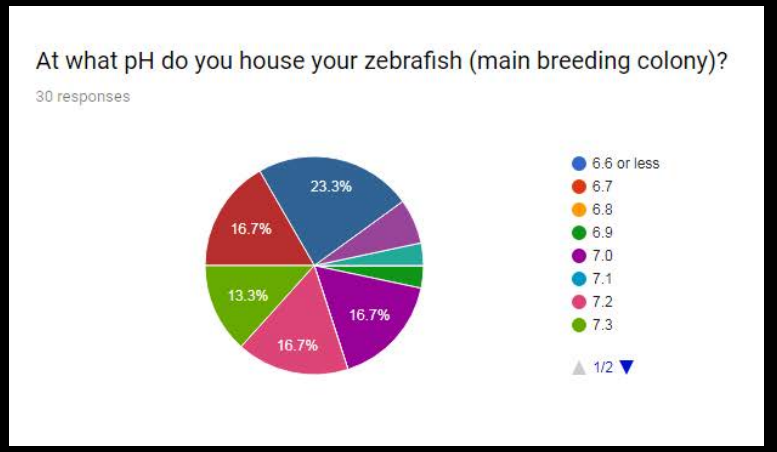
What is your stocking density for larvae?

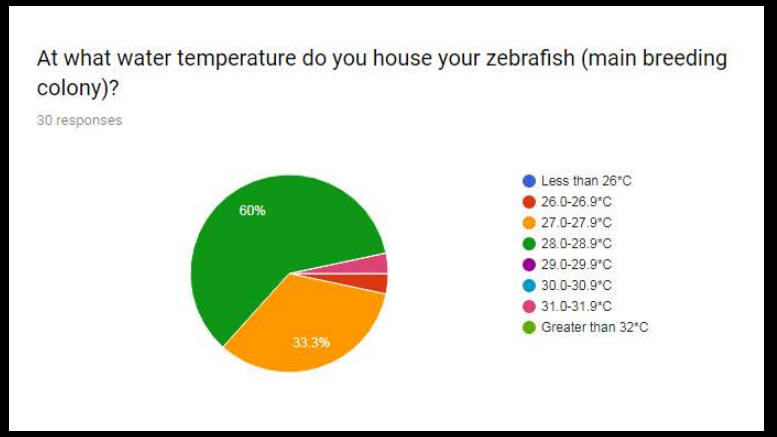
Your answer

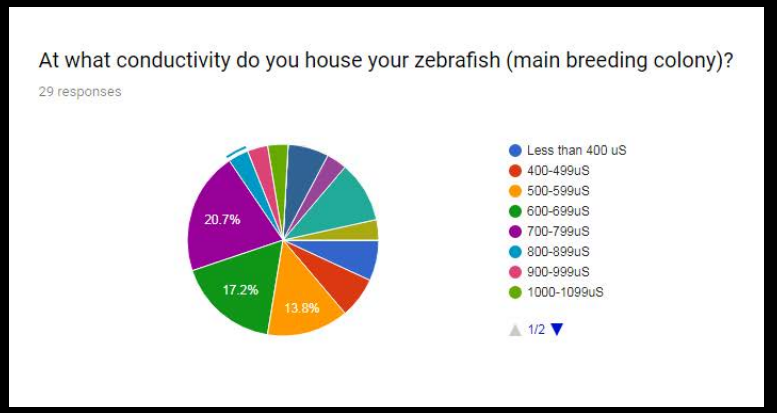
What is your stocking density for adults?

Your answer

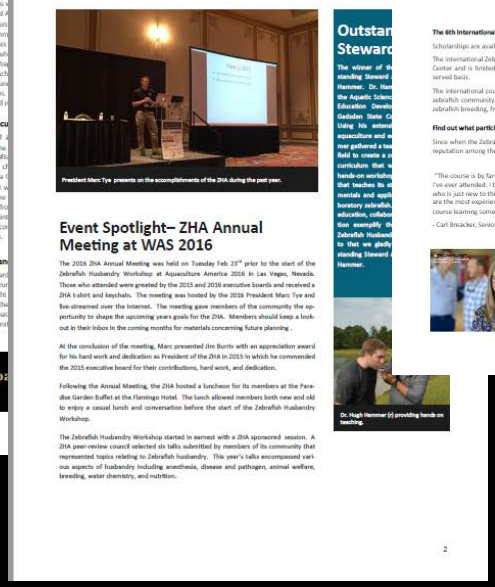
What size tanks do you house your larvae?





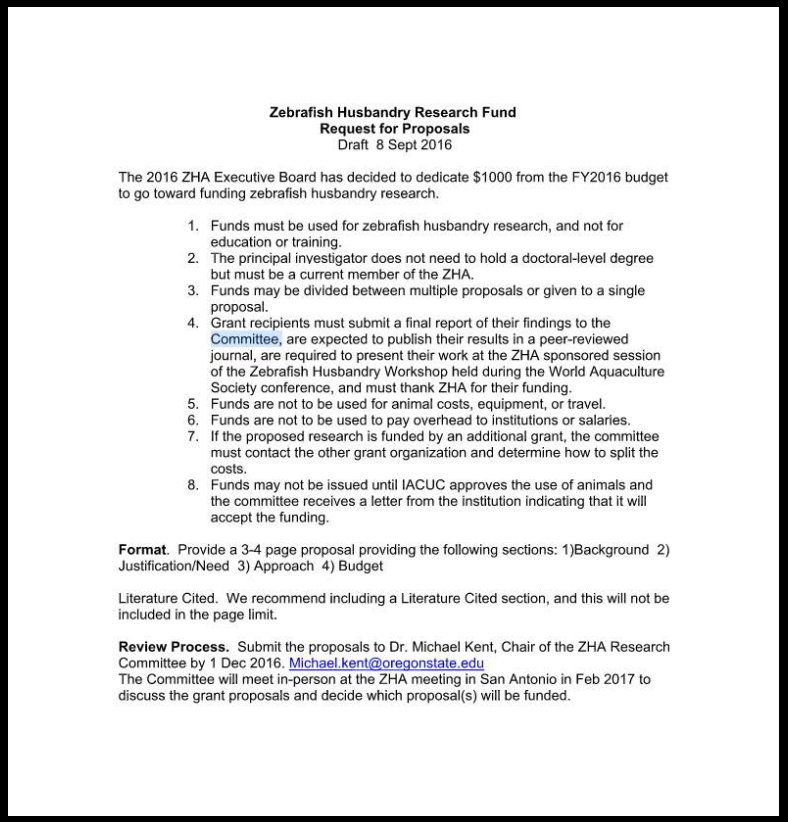


NEWSLETTERS



FUNDING OPPORTUNITIES

- Research Funding Committee
- Zebrafish Husbandry Workshop Peer Review Session Award for selected presentations
- New funding programme being prepared in 2018
- Look for other partnerships in the near future!



Zebrafish Husbandry Research Fund
Request for Proposals
Draft 8 Sept 2016

The 2016 ZHA Executive Board has decided to dedicate $1000 from the FY2016 budget to go toward funding zebrafish husbandry research.

1. Funds must be used for zebrafish husbandry research, and not for education or training.
2. The principal investigator does not need to hold a doctoral-level degree but must be a current member of the ZHA.
3. Funds may be divided between multiple proposals or given to a single proposal.
4. Grant recipients must submit a final report of their findings to the Committee, are expected to publish their results in a peer-reviewed journal, are required to present their work at the ZHA sponsored session of the Zebrafish Husbandry Workshop held during the World Aquaculture Society conference, and must thank ZHA for their funding.
5. Funds are not to be used for animal costs, equipment, or travel.
6. Funds are not to be used to pay overhead to institutions or salaries.
7. If the proposed research is funded by an additional grant, the committee must contact the other grant organization and determine how to split the costs.
8. Funds may not be issued until IACUC approves the use of animals and the committee receives a letter from the institution indicating that it will accept the funding.

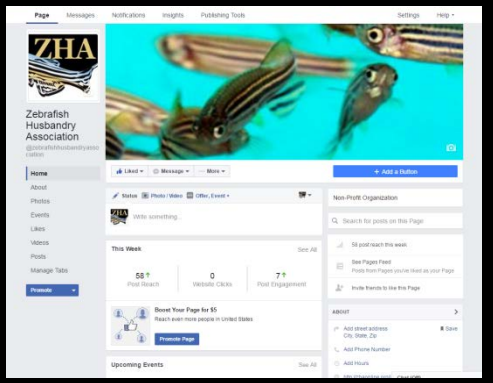
Format. Provide a 3-4 page proposal providing the following sections: 1)Background 2) Justification/Need 3) Approach 4) Budget

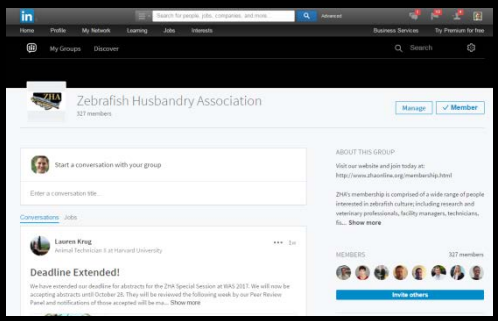
Literature Cited. We recommend including a Literature Cited section, and this will not be included in the page limit.

Review Process. Submit the proposals to Dr. Michael Kent, Chair of the ZHA Research Committee by 1 Dec 2016. Michael.kent@oregonstate.edu
The Committee will meet in-person at the ZHA meeting in San Antonio in Feb 2017 to discuss the grant proposals and decide which proposal(s) will be funded.

SOCIAL MEDIA

- Facebook.com/zebrafishhusbandryassociation
- Twitter.com/ZHAonline @ZHAonline
- www.linkedin.com





HOW CAN THE ZHA SERVE YOUR LAB?

Email - **Admin@zhaonline.org**

Champalimaud Foundation

Impact of Dry Feeds on Zebrafish Growth and Reproductive Performance

Ana Catarina Certal, PhD

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congento

Lisb@20[20]

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Champalimaud Centre for the Unknown (CCU)

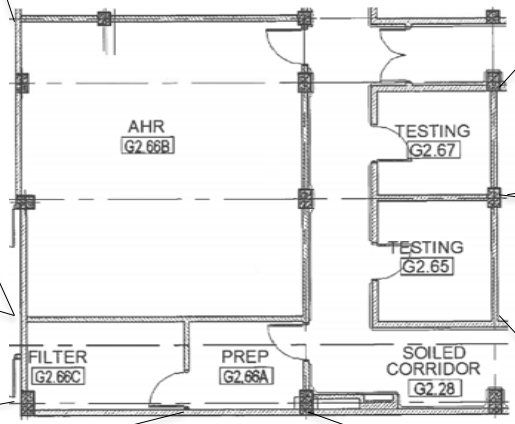
Neuroscience and Cancer Research

Cancer Clinical Centre

CCU Fish Platform – est. Oct 2011

Holding room with partially automated feeding

Experimental room with 3 microinjection stations + fluorescence scope



Filter room

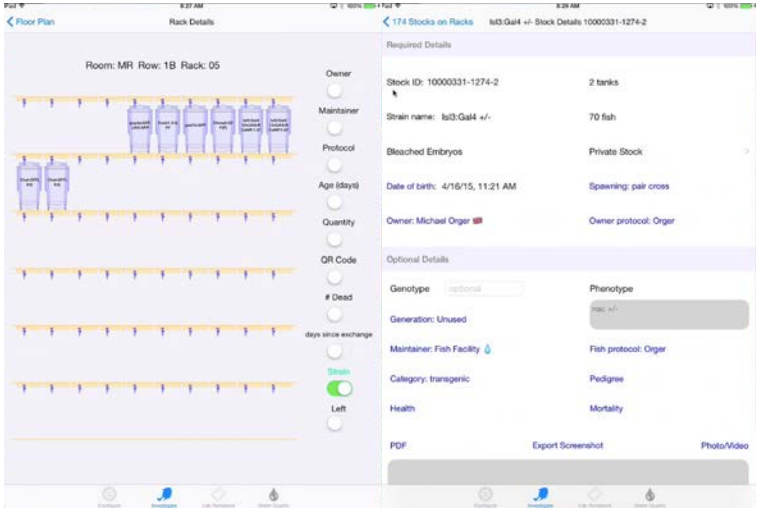
2-Risk level quarantine

Feed prep room

CCU Fish Platform

CORE

- ✓ Production of healthy fish for research (current capacity: ~45,000 fish; expandable up to ~70,000 fish) - CONGENTO
- ✓ Fish husbandry
- ✓ System maintenance
- ✓ Live feed production (rotifers and artemia)
- ✓ Database implementation and management (D^2)
- ✓ Health program
- ✓ Embryo bleaching



ADVANCED

- ✓ Fish crosses
- ✓ Complex line maintenance
- ✓ Embryo microinjection
- ✓ Generation of new transgenic lines
- ✓ Development and coordination of genetic screens
- ✓ Advanced training & share of knowledge events – accreditation courses, Husbandry 2014, CRISPR 2015, Health 2017
- ✓ **Continuous development and implementation of new SOPs**/services – IVF, sperm cryo, genotyping
- ✓ To promote and facilitate research activities within the facility – design and set-up exp. rooms
- ✓ Development of on-demand gene editing technologies (CRISPR)

First study – choosing the best diet without live feeding as first feed

3 Commercial dry feeds:

- Gemma Micro – Skretting
- Larval AP – Ziegler
- ZM – Zebrafish Management

3 Feeding regimes:

- Dry only
- Dry + Live (Artemia + dry feed after 9 dpf)
- Control (Artemia only after 9 dpf)

M&Ms

- 3 fish strains: AB, Nacre, Tg(HuC:GCamp5G)
- 100 fish per experimental group
- 3 pellet sizes

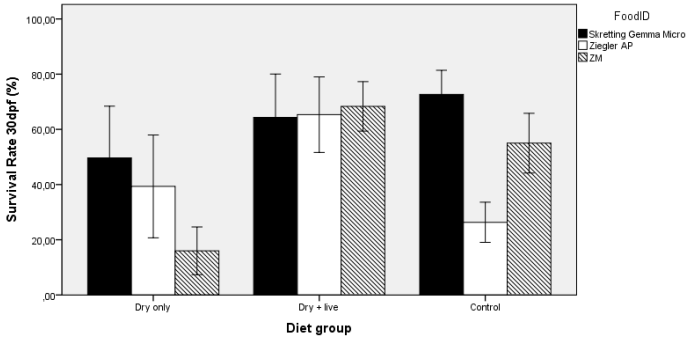
Assessment

- Survival (30 and 90 dpf)
- Growth (fork-length)
- Breeding (fecundity + embryo viability)

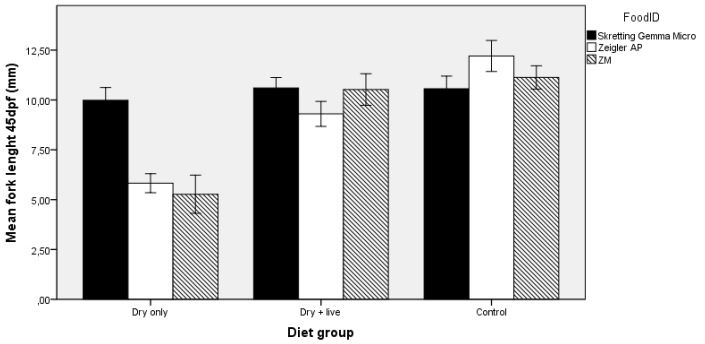
M. Farias, A.C. **Certal** (**2016**) Int J Mar Biol Res 1(1): 1-8

First study – choosing the best diet without live feeding as first feed

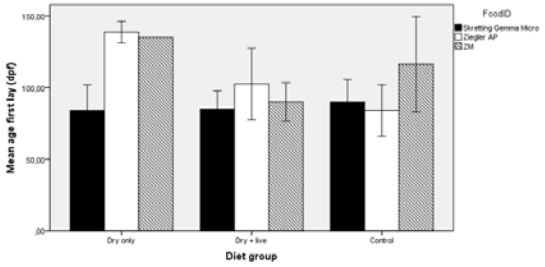
Survival



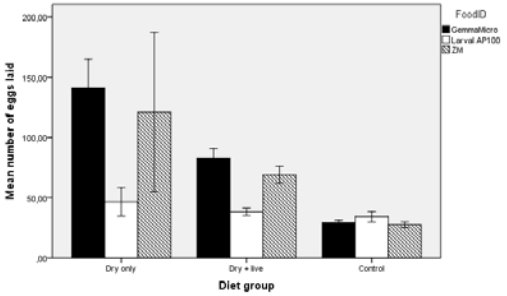
Growth



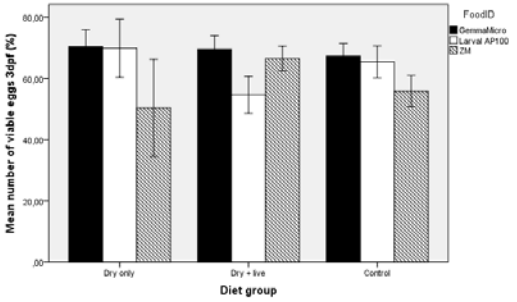
Spawning Age



Fecundity



Embryo Viability

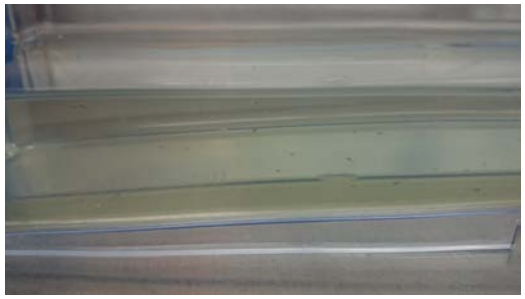


- ✓ Gemma Micro was the only feed presenting a global alternative to live feeds during all stages – **production method − COLD EXTRUSION**
- ✓ Gemma Micro can fully substitute Artemia in later growth phases showing improved breeding features

M. Farias, A.C. **Certal** (**2016**) Int J Mar Biol Res 1(1): 1-8

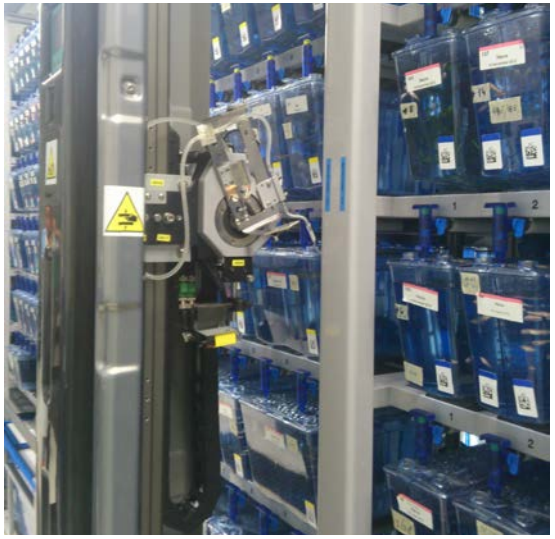
Live first feeds - Rotifers do it better

Rotifer Stock Culture



Rotifer-Larvae Polyculture

Rotifer O/N Feed-out Culture

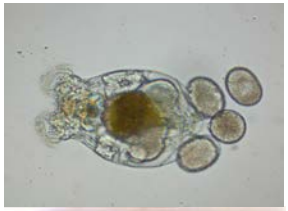


Fry-Juvenile Feeding

- ✓ 30% daily harvest (working days)
- ✓ No harvest at weekends/holidays
- ✓ Automated feeding

Feeding Protocol

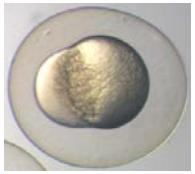
- ✓ Larvae-Rotifer Polyculture during 3 days (5-8 dpf)
- ✓ Rotifers (2x) + Gemma 150 (2x) 9-60 dpf
- ✓ Artemia (1x) + Gemma 300 (2x) 61-90 dpf
- ✓ Artemia (1x) + Gemma 500 (1x) >90 dpf

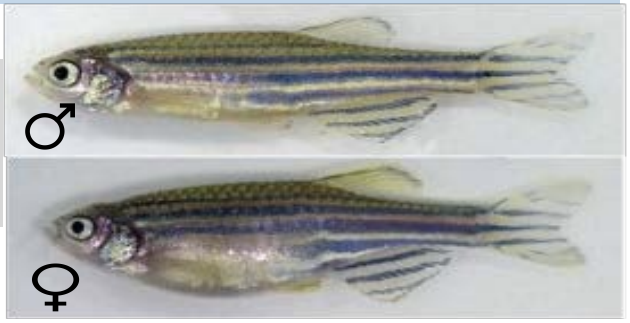


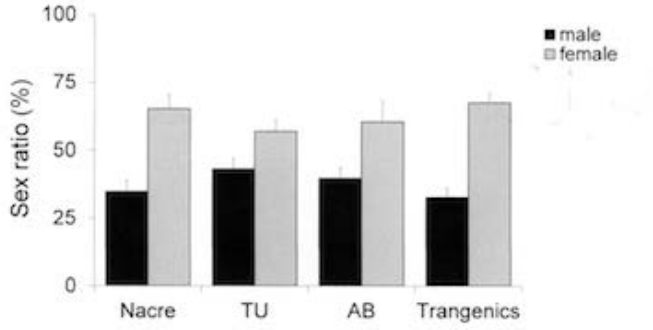
15 min **48 h** **5 days** **60 days @ 10 fish/L**

Fertilization

CCU Fish Platform







Champalimaud Foundation

congento

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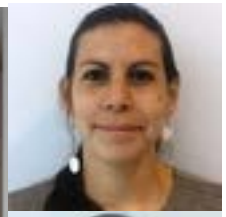
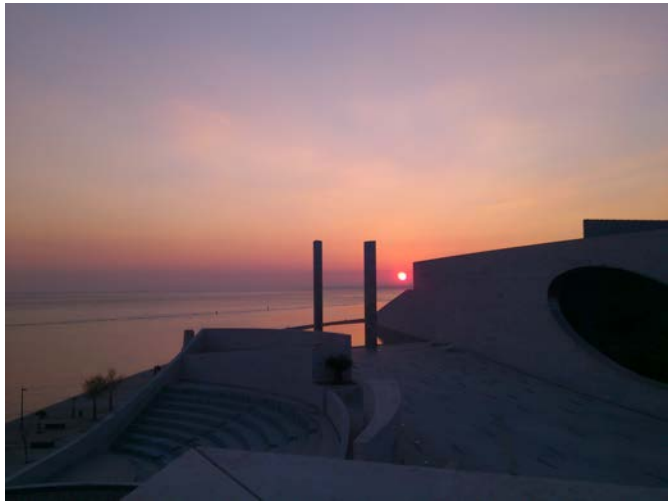
Current Staff:
Sandra Melo
Joana Monteiro
Seidy Semedo
Carolina Cabrera
Rita Almeida



Former Staff:
Matheus Farias
Telma Costa



Researchers:
Michael Orger lab
Gonzalo de la Polavieja lab
Miguel Godinho-Ferreira lab
Rui Oliveira lab