

Carmen García-Comas Rubio

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Nokendai, Yokohama, Japan
Place and date of birth: Oviedo (Spain), 30th July 1979

RESEARCH EXPERIENCE

September/2013-

Postdoctoral position at JAMSTEC, Yokohama, Japan

Employer: S. Lan Smith

Integrating a team developing an optimality-based plankton ecosystem model. My role is on the data analyses to develop and test ideas and to support model testing. Data analyses include diversity of functional traits and species of copepods, plankton individual size structure, and trophic structure from stable isotope measurements.

Sept./2010-July/2013:

Postdoctoral position at the IONTU, Taipei, Taiwan

Employer: Chih-hao Hsieh

Work focused on studying the plankton size-based community organization. I performed spatio-temporal analyses of plankton size spectra in the East China Sea (FlowCAM-ZooSCAN: from nano- to mesoplankton). Specifically, I statistically explored the effect of size diversity of predators and prey on biomass transfer.

Feb./2010-March/2010: **Employed by Hydroptic (ZooSCAN manufacturer)**

Training researchers at the Oceanography Center of Cyprus, Institute of Marine Sciences (METU) in Turkey, Marine Biology Station of Slovenia and SZN in Italy. Producing technical reports for the company, and a user-friendly manual for public outreach (available at www.zooscan.com).

Nov./2005-Nov./2009:

Ph.D project

Collaboration between LOV (CNRS,France) and SZN (Naples, Italy)

Supervisors: Lars Stemmann and Grazia Mazzocchi

Thesis title: **Climate change and copepod size distribution:**

Comparison of 2 coastal long-term series in the Western Mediterranean Sea

We scanned Monthly *time series* spanning 30 and 20-years with the ZooSCAN prototype. I produced datasets containing the abundance of zooplankton taxa at coarse resolution and copepod individual size (NB-SS). I applied an array of statistical tools to analyze both time series and their relationships with environmental forcing.

March-September/2005: Internship at PML (Plymouth, U.K.)

Supervisors: Delphine Bonnet and Roger Harris

Experimental work on egg production related to copepod female fitness. The work involved taxonomic sorting of mature females of several common species, isolating and controlling the hatching rate of their eggs, CHN, weight and length measurements of individual females and their eggs. I also collaborated to the routine maintenance of the L4 time series.

July-November/2004: Professional Training at IEO (Gijón, Spain)

Supervisor: Luis Valdés

Routine sampling and sample processing for the RADIALES monthly monitoring program, phytoplankton taxonomy and climate change bibliographic report.

July-August/2004: Volunteering for a marine mammal survey (Asturias, Spain)

Observer from a sailing boat.

SCIENTIFIC SKILLS

- Theoretical Ecology
- Advanced data analyses
- Experience with big data
- Matlab programming
- R programming
- ZooSCAN handling
- FlowCAM handling
- Plankton taxonomy at genus level
- Fieldwork and laboratory

EDUCATION

July/2010: Ph.D degree

Examiners: Professor Philip C. Reid and Dr. Adriana Ianora (no mark)

2004: BSc. in Biology (Environment & Ecology), Universidad de Oviedo, Spain (Final mark: 1.85)

Other education:

- ‘Recent advances in spatial analysis of multivariate ecological data: Theory and practice’ (National Dong Hwa University, Taiwan, 2013; Instructur: Pierre Legendre; Hours: 40)
- ‘Statistics and introduction to R programming’ (OU, SZN, Italy, 2008; Instructors: Laurent Dubroca & Christophe Brunet; Hours: 15)
- ‘Multidimensional exploratory ecosystem analysis’ (LOV, France, 2006; Instructors: F. Ibanez, J.-P. Labat & S. Gasparini; Hours: 80)
- ‘Climate change impacts on marine ecosystems’ summer school (Eur-oceans-NATO, Turkey, 2007; Hours: 40)

Fluent in English, French and Italian. Beginner of Japanese and Chinese. Spanish mother tongue.

FELLOWSHIPS

- 2005-2008 *Eur-Oceans PhD fellowship*; project number: WP4-SYSMS-1070
- 2005 *Leonardo da Vinci traineeship* at PML, U.K. (promoting working mobility in Europe)
- 2001-2002 *Socrates-Erasmus Scholarship*, “Università degli studi di Napoli Federico II”, Italy

FIELDWORK

- 14-26 July/ 2016 (FRA, Japan): WA1607A cruise; plankton sampling for A-line time series (C.S.: Daisuke Hasegawa)
- July/ 2014 (NTU, Taiwan): Nocturnal coastal sampling of fish larvae (P.I.: Hui-Yu Huang)
- July-Nov./ 2004 (IEO, Spain): Monthly coastal plankton sampling for Radiales time series
- July-Aug./ 2004 (Asturias, Spain): Coastal observation of cetaceans from a sailing boat

PUBLIC OUTREACH

Publications:

1. **García-Comas, C.**, A. R. Sastri, L. Ye, C.-Y. Chang, F.-S. Lin, M.-S. Su, G.-C. Gong and C.-H. Hsieh. 2016. Prey size diversity hinders biomass trophic transfer and predator size diversity promotes it in planktonic communities. *Proceedings of the Royal Society B* (doi: 10.1098/rspb.2015.2129).
2. **García-Comas, C.**, Y.-C. Lee, C.-Y. Chang, G.-C. Gong and C.-H. Hsieh. 2016. Comparison of copepod species-based and individual-size-based community structuring. *Journal of Plankton Research* 38 (4): 1006-1020.
3. **García-Comas, C.**, C.-Y. Chang, L. Ye, A. R. Sastri, Y.-C. Lee, G.-C. Gong and C.-H. Hsieh. Mesozooplankton size structure in response to environmental conditions in the EastChina Sea: How much does size spectra theory fit empirical data of a dynamic coastal area? 2014. *Progress in Oceanography*, 121: 141-157.
4. Ye L., C.-Y. Chang, **C. García-Comas**, G-C Gong and C.-H. Hsieh. Increasing zooplankton size diversity enhances the strength of top-down control on phytoplankton through diet niche partitioning. 2013. *Journal of Animal Ecology*, 82: 1052-1061.
5. Vandromme P., L. Stemann, **C. García-Comas**, M. Picheral, S. Colbert, L. Berline, J-M. Guarini and G. Gorsky. 2012. Assessing biases in computing size spectra of automatically classified zooplankton from imaging systems: A case study with the ZooScan integrated system. *Methods in Oceanography*, 1-2: 3-21.
6. Berline L., I. Siokou-Frangou, I. Marasović, O. Vidjak, M.L. Fernández de Puelles, M.G. Mazzocchi, G. Assimakopoulou, S. Zervoudaki, S. Fonda Umani, A. Conversi, **C. García-Comas**, F. Ibanez, S. Gasparini, L. Stemann, G. Gorsky. 2012. Intercomparison of six Mediterranean time series. *Progress in Oceanography*, 97: 76-91.
7. Mazzocchi, M., L. Dubroca, **C. García-Comas**, I. Di Capua and M. Ribera d’Alcalà. 2012. Stability and resilience in coastal copepod assemblages: the case of the Mediterranean long-term ecological research at station MC (LTER-MC). *Progress in Oceanography*, 97: 135-151.
8. **García-Comas, C.**, L. Stemann, F. Ibanez, S. Gasparini, M.G. Mazzocchi, L. Berline, M. Picheral and G. Gorsky. 2011. Zooplankton long-term changes in the NW Mediterranean Sea: Decadal periodicity forced by large-scale atmospheric changes. *Journal of Marine Systems*, 87 (3-4): 216-226.

- Gorsky, G., M.D. Ohman, M. Picheral, S. Gasparini, L. Stemann, J.-B. Romagnan, A. Cawood, S. Pesant, **C. García-Comas** and F. Prejger. 2010. Digital zooplankton image analysis using the ZooScan integrated system. *Journal of Plankton Research*, 32 (3): 285-303.

Communications:

Oral presentation:

- Using observational data to explore the role of functional traits on plankton community structuring and functioning (Marine Ecosystem Modelling Symposium; 17-18 Nov. 2016; Tokyo University AORI, Chiba, Japan) (**C. García-Comas**)
- Expanding our Knowledge on Copepod Community Structure in Subarctic and Subtropical Communities as Revealed by the Species Functional Traits (JpGU 2016; 22-26 May, Chiba, Japan) (**C. García-Comas et al.**)
- Functional vs. Species Diversity in Subarctic & Subtropical Copepod Communities of North Pacific (JOS 2016; 14-18 March, Tokyo, Japan) (**C. García-Comas et al.**)
- Contrasting relationships between functional and species diversity in subarctic and subtropical communities across the western North Pacific. *Ocean Science Meeting* (26 Feb. 2016, New Orleans, USA). (**C. García-Comas et al.**)
- New models of the flexible response of plankton ecosystems: From theory to practical implementation. Japan Geoscience Union Meeting (24 May 2015, Tokyo, Japan). (L. Smith, C. Yoshikawa, Y. Sasai, B. Chen and **C. García-Comas**)
- Dynamic relationship of functional diversity with species diversity in copepod communities across the Oyashio-Kuroshio oceanic front, western subarctic north Pacific. *ASLO Aquatic Science Meeting* 2015 (26 Feb. 2015, Granada, Spain) (**C. García-Comas et al.**)
- Latitudinal gradient of copepod diversity in the northwest Pacific and the dynamic relationship of functional diversity with species diversity. *4th Taiwan-Japan Ecology Workshop* (15 Nov. 2014, Hualien, Taiwan) (**C. García-Comas**)
- Size diversity of plankton: its importance on ecosystem functioning. *Advances in the Plankton Ecosystem Model and the Evaluation of Biodiversity Workshop* (21 October 2014, Tokyo, Japan) (C.-h. Hsieh and **C. García-Comas**)
- The Dao of plankton diversity: Can we understand the seen in terms of the un-seen? *Advances in the Plankton Ecosystem Model and the Evaluation of Biodiversity Workshop* (21 October 2014, Tokyo, Japan) (S.-L. Smith and **C. García-Comas**)
- Mesozooplankton size structure in response to environmental conditions in the East China Sea. *International mini-workshop on the Western Pacific Biogeochemical Environment Variability* (4th Feb. 2014, Yokohama, Japan) (**García-Comas et al.**)
- Increasing zooplankton size diversity enhances the strength of top-down control of phytoplankton through diet niche partitioning. *Ocean Science Meeting* (20 Feb. 2014, Honolulu, USA) (L. Ye, C.-Y. Chang, **C. García-Comas et al.**)
- Plankton size structure as indicator of community organization: Testing theoretical assumptions with empirical measures of a very dynamic coastal environment. *ASLO Aquatic Science Meeting* (07 July 2012, Otsu, Japan) (**García-Comas et al.**)
- Zooplankton response of NW Mediterranean hydroclimatic changes from 1966 to 2010. *5th International Zooplankton Production Symposium* (15 March 2011, Pucon, Chile) (P. Vandromme, L. Stemann, **C. García-Comas et al.**)

16. Does fit mean reproductive? *5th International Zooplankton Production Symposium* (17 March 2011, Pucon, Chile) (D. Bonnet, **C. García-Comas** and R. Harris)
17. Copepod size spectra analysis of two multi-decadal time series in the Mediterranean Western Basin. *ASLO Aquatic Science Meeting 2009* (27 January 2009, Nice, France) (**García-Comas et al.**)
18. Intercomparison of zooplankton time series at six stations in the Mediterranean. *ASLO Aquatic Science Meeting 2009* (27 January 2009, Nice, France) (Berline et al.)
19. Are gelatinous predator concentrations still increasing in the North West Mediterranean Sea? *ASLO Aquatic Science Meeting 2009* (27 January 2009, Nice, France) (Stemmann et al.)
20. ZooScan applications: Data validation, time series analyses, usefulness for multi-net sampling. *ZooScan Training Course* (12 December 2008, Nice, France) (**C. García-Comas et al.**)
21. Effect of three different nets on the estimates of size spectra, abundance and biovolume of mesozooplankton communities. *Joint WGZE/CIESM Workshop to compare Zooplankton Ecology and Methodologies between the Mediterranean and the North Atlantic (WKZEM)* (27 October 2008, Heraklion, Greece) (**C. García-Comas et al.**)
22. The 2003 heat wave and marine plankton communities. *Joint WGZE/CIESM Workshop to compare Zooplankton Ecology and Methodologies between the Mediterranean and the North Atlantic (WKZEM)* (30 October 2008, Heraklion, Greece) (Piontkovski et al.)
23. Climate change and copepod size spectra: Comparison of two coastal long-term series in the western Mediterranean Sea. *Eur-oceans Final Meeting* (25 to 27 November 2008, Rome, Italy) (**C. García-Comas et al.**)
24. Retrospective analysis of zooplankton decadal time series in the Western Mediterranean Sea using an automated imaging system. *1st International symposium Effects of Climate Change on the World's Oceans* (May 2008, Gijon, Spain) (G. Mazzocchi et al.)
25. Long-term copepod variability in the coastal Ligurian and Thyrrenian seas (Mediterranean). *4th International Zooplankton Production Symposium* (28 April to 01 May 2007, Hiroshima, Japan) (**C. García-Comas et al.**)

Poster presentation:

1. Species-level functional traits structure subarctic communities but not subtropical communities of copepods (5th Japan-Taiwan Ecology Workshop; 12-14 November 2016, Kyoto, Japan) *Best poster presentation awarded.*
2. Expanding our Knowledge on Copepod Community Structure in Subarctic and Subtropical Communities as Revealed by the Species Functional Traits (ICES/PICES 6th Zooplankton Production Symposium; 9-13 May 2016, Bergen, Norway)
3. Prey size diversity hinders biomass trophic transfer and predator size diversity promotes it in planktonic communities (ICES/PICES 6th Zooplankton Production Symposium; 9-13 May 2016, Bergen, Norway)
4. Exploring the variability and role of functional diversity on copepod communities of the western subarctic north Pacific. *PICES Annual Meeting* (Sept. 2014, Yeosu, Korea) (**C. García-Comas et al.**)
5. Exploring the variability and role of functional diversity on copepod communities of the western subarctic north Pacific. *IMBER 'Future Oceans' Conference* (June 2014, Bergen, Norway) (**C. García-Comas et al.**)
6. Predator and prey size diversity effects on biomass transfer efficiency in planktonic ecosystems. Ocean Science Meeting (Feb. 2014, Honolulu, USA) (**C. García-Comas et al.**)

7. Predator-prey mass ratio of marine zooplankton is determined by resource availability. *Ocean Science Meeting* (Feb. 2014, Honolulu, USA) (P.-C. Ho et al.)
8. Signals of Change in the Mediterranean and Black Seas: Multi-lateral Initiatives. *ASLO Aquatic Science Meeting 2009* (January 2009, Nice, France) (B. S. Galil et al.)
9. Zooplankton size spectra. Part I: From data to models. *ASLO Aquatic Science Meeting 2009* (January 2009, Nice, France) (P. Vandromme et al.)
10. Long-term evolution of pteropod populations in the bay of Villefranche. *ASLO Aquatic Science Meeting 2009* (January 2009, Nice, France) (S. Comeau, G. Gorsky, **C. García-Comas** et al.)
11. Impact of climate and anthropogenic forcing on diversity, size spectrum and abundance of functional groups of Mediterranean zooplankton. *Eur-oceans kicking-off meeting* (15 to 16/03/2006, Barcelona, Spain) (**C. García-Comas**)

Short communication:

- Impact of climate and anthropogenic forcing on diversity, size spectrum and abundance of functional groups of Mediterranean zooplankton. *Eur-oceans Newsletter* 5, November 2006

Technical manuals:

- ZooSCAN short user-manual (2010) (**C. García-Comas**)
- Short manual to scan and process samples using the ZooSCAN (2013) (**C. García-Comas** & M. Picheral)
- Short manual to scan and process samples. ZooSCAN (2014) (M. Picheral, **C. García-Comas**, C. Desnos, Elineau, B. Romagnan)

SUPERVISION AND TEACHING EXPERIENCE

- Training on ZooSCAN and related techniques to several students and international researchers
- Co-supervision of two undergraduate projects (supervisor: L. Stemmann)
 - ‘Effect des changements hydroclimatiques sur le zooplankton en Méditerranée nord occidentale’ by O. Dahan and ‘Intercalibration of two zooplankton nets with the ZooScan’ by Marine Gouezo.
- Informal supervision of several undergraduate students at IONTU (supervisor: C.-h. Hsieh)
- Dimension reduction methods (3 h. lesson of ‘Computer Intensive Statistics in Ecology’ for graduate students at NTU; coordinator: Chih-hao Hsieh)

Reviewer for: Limnology and Oceanography, Marine Ecology Progress Series, Zoological Studies, Current Zoology, Chemistry and Ecology