



CURRICULUM VITAE PROF. GENCIANA TEROVA

GENERAL

- Current employment situation: Associate Professor at the Department of Biotechnologies and Life Sciences, University of Insubria, Varese, Italy.
- Spoken languages, besides Italian: English (professional level), Albanian (native speaker).

EDUCATION AND QUALIFICATION

- July 1989: Degree in Biology at the University of Tirana, Albania. Thesis: "Mosaicism in the human gonosomal anomalies".
- December 1994: The Degree in Biology, obtained from the University of Tirana, was recognized as equivalent to the Degree in Biological Sciences issued by the Universities of the Italian Republic.
- May 1998: PhD in Animal Sciences, obtained at the Department of Sciences of Animal Production of the University of Basilicata, Potenza, Italy. Thesis: "Biological availability of some stable derivatives of L-ascorbic acid and their functions in the ontogenesis of fish reared in intensive aquaculture conditions".
- May 2010 - Certificate of professional competence (IDONEITA') as "Full Professor in Animal Science and Technology" after having successfully passed the tests for the examination necessary for the award of the certificate. The comparative evaluation procedure (DRN 690 of 20.05.2008) was organised by the Faculty of Veterinary Medicine, University "Alma Mater Studiorum" of Bologna, for the scientific area AGR20-Zooculture. Validity of the certificate: May 2010 – May 2015
- January 2014 - Certificate of professional competence (Scientific Habilitation) as "Full Professor in Animal Science and Technology" after having successfully passed the tests for the examination necessary for the award of the certificate. Validity of the certificate January 10th, 2014 - January 10th, 2020.
- March 2015 - Obtained the certificate of professional competence (Scientific Habilitation) as "Associate Professor in Molecular Biology" after having successfully passed the tests for the examination necessary for the award of the certificate. Validity of the certificate March 24th, 2015 - March 24th, 2021.

ACADEMIC EMPLOYMENT AND STAGES

- 1990 to 1993 - Researcher at the Faculty of Veterinary Science, Department of Physiology and Biochemistry of Domestic Animals, University of Agriculture in Tirana, Albania.
- 1- 31 May 1993 – Fellowship for a research stage at the Department of Sciences of Animal Production of the Faculty of Agriculture at the University of Basilicata in Potenza, Italy.

- 1 September - 30 November 1993 – European Community/TEMPUS fellowship for a research stage at the Department of Sciences of Animal Productions, Faculty of Agriculture, University of Basilicata, Potenza, Italy.
- December 1993 - November 2000: Research (as a volunteer) at the Department of Sciences of Animal Production of the University of Basilicata in Potenza, Italy.
- May 1995, stage at HAKI- Fish Research Institute in Szarvas, Hungary.
- February 1998, stage at Ohio State University, School of Natural Resources, Columbus, USA.
- November 2000: Permanent Position as University Scientific Researcher, at the Department of Sciences of Animal Production, Faculty of Agriculture, University of Basilicata in Potenza, Italy.
- May 2001, stage at the Sheffield University, England.
- October 2003 to present: Scientific Researcher at the Department of Biotechnology and Life Sciences of the University of Insubria in Varese, Italy. Website address: <http://www.dbsm.uninsubria.it/acqua/index.htm>

SCIENTIFIC ACTIVITY

From January 1990 to November 1993, G. Terova had a permanent position as scientific researcher at the University of Agriculture of Tirana (Albania), Faculty of Veterinary Sciences, Department of Physiology and Biochemistry of Domestic Animals. During those years, she carried out research on the production levels of thyroid hormones in domestic breeds of dairy cows in relation to the season and milk production.

From April to May 1993 she obtained a fellowship to study at the Dep. of Sciences of Animal Production of the University of Studies of Basilicata in Potenza, Italy. Here she took part in a research on the thyroid hormones levels in goats, quantified by immune-enzymatic method ELISA.

From September 1st to November 30th 1993 she obtained a fellowship from the European Community/TEMPUS for a research stage in aquaculture at the Dep. of Sciences of Animal Production of the University of Studies of Basilicata in Potenza, Italy. Here, she took part in a research program on fish farming facing a study related to the presence of nitrous nitrogen in the water.

On November 1994, she started a study on the role of Vitamin C in the diet of intensively farmed fish, entitled: "Biological availability of stable derivatives of L-ascorbic acid and their functions in the ontogenesis of fish reared in intensive aquaculture conditions". The research which was funded by an EU project was carried out in collaboration with the HAKI Institute of Szarvas, Hungary. One of the working packages of this project became the topic of G. Terova's PhD thesis. During the project, she cooperated directly with researchers of the Hungarian team, as well as with other US and European teams involved in similar researches. The dynamics of Vitamin C in the digestive tract of fish, the intestinal absorption of different commercial forms of ascorbate, and the bioavailability of ascorbate mono- and polyphosphate were studied. The ascorbate requirements in the diet of some farmed fish species such as sea bass, gilthead sea bream, and sturgeon under normal and stress conditions, were also studied as well as the dynamics of Vitamin C transfer from broodstock to the embryo, and the role of Vitamin C in collagen synthesis during the early stages of fish development.

After obtaining the PhD degree (April 1998) and up to November 2000 when she obtained a permanent position as "University Researcher" at the Dep. of Sciences of Animal Production of the University of Basilicata in Potenza, Italy, G. Terova continued her research at the same University as a volunteer. During this period, she took part in a research project entitled: "Study on euryhaline fish adaptation to hyperoxia and hypercapnia, for the optimization of the zootechnical management" that was funded by the Italian Ministry of Fisheries and Aquaculture (MIPA). In this project, she was

in charge of the experiments in a pilot plant and of the laboratory analysis of different physiological biomarkers in fish. In particular, she studied fish respiratory, acid-base, and immune responses to dissolved O₂ and CO₂ gas concentrations.

On 2003, Dr. Terova moved to Varese, at the University of Insubria. In this new research/academic environment, she started to use a molecular biology approach in fish physiology studies, by focusing her research interests principally on functional genomics. Accordingly, she worked on the molecular cloning and sequencing of several (more than 100) genes, which are known to be involved in the physiological response to various nutritional and environmental factors in fish species such as *Dicentrarchus labrax*, *Perca fluviatilis*, *Thunnus thynnus*, *Salmo trutta*, *Sparus aurata*, and other teleosts. The isolated cDNA sequences (more than one hundred) have been deposited in the GeneBank database: website address: <http://www.ncbi.nlm.nih.gov/>).

She continues to work on the identification and characterization of molecular biomarkers related to productive traits (growth, lipid metabolism, diseases and stress resistance) in different marine and freshwater teleosts. The ultimate goal of this research is to develop new bio-technological tools for the sustainable development and validation of new fish feeds, using safe alternative raw materials and additives to improve the overall performance and health status of farmed fish, also preserving the nutritive value of marked fish.

Recently, the scientific activity of Prof. Terova is focused on the study of fish intestinal microbiome by a metagenomic approach. The aim is to assess the effects of nutrition and genetic background on the functional microbiota, i.e, how changes in microbiota species diversity and richness are associated to changes in the transcriptome of the intestinal microbiota and secondly on host transcriptomics.

This research activity has been carried out in the framework of several projects funded at national, regional and European level, as well as through contracts with private companies. Of particular relevance is her participation as Head of Research unit in the European projects such as Horizon 2020 AquaIMPACT - Genomic and nutritional innovations for genetically superior farmed fish to improve efficiency in European aquaculture as well as in other projects such as "Fine Feed for Fish (4F)", funded by AGER (<http://www.progettoager.it/>), "Microalgae and yeasts sustainable fermentation for high quality fish feed formulation (MYSUSHI)" funded by Cariplo Foundation (<http://www.mysushibiotech.com/it/>); "Insect bioconversion: from vegetable waste to protein production for fish feed (InBioProFeed)" funded by Cariplo Foundation; and "Epigenetics and Periconception Environment" funded by European Cooperation in Science and Technology - COST Action FA1201.

RESEARCH PROJECTS (last 5 years)

Title: Horizon 2020 AquaIMPACT - Genomic and nutritional innovations for genetically superior farmed fish to improve efficiency in European aquaculture. Activity: DT-BG-04-2018. Call: H2020-BG-2018-1; Type of Action: IA; Number: 818367; Duration: 2018-2022. EU funding received by the consortium: 6150K€. Role: Head of the Research Unit.

Title: Fine feed for fish-4F. Granted from AGER (<http://www.progettoager.it/>). Call "Acquacultura". Rif. nr. 2016-01-01. Total contribution paid: 784K€. Duration: November 1, 2016- November 1, 2019. Role: Head of the Research Unit.

Title: Microalgae and yeasts sustainable fermentation for high quality fish feed formulation (MySushi, <http://www.mysushibiotech.com/it/>). Funded by "Fondazione Cariplo". No. 2015-0395. Call: "Ricerca integrata sulle biotecnologie industriali e sulla bioeconomia". Rif. nr. 2015-0395. Total contribution paid: 285K€. Duration: April 1, 2016- April 1, 2019. Role: Head of the Research Unit.

Title: Insect Bioconversion: from vegetable waste to Protein production for fish Feed (InBioProFeed). Funded by "Fondazione Cariplo". No. 2014-0550. Total contribution paid: 300K€. Duration: March 1, 2015- March 1, 2019. Role: Head of the Research Unit.

Title: Seventh Framework Programme of the European Community-THEME [KBBE.2011.1.2-11] [Aquaculture feeds and fish nutrition: paving the way to the development of efficient and tailored sustainable feeds for European farmed fish]—Project acronym: ARRAINA. Project Full Title: "Advanced Research Initiatives for Nutrition & Aquaculture" Grant agreement no: 288925. Duration: January 1, 2012- January 1, 2017.

SCIENTIFIC PUBLICATIONS E CITATIONS ACCORDING TO SCOPUS

Prof. Terova has authored over **100** scientific articles published on international peer-review journals during the years 1998-2017, 11 book chapters in English and Italian and more than 100 oral communications presented at international and national congresses/conferences. According to SCOPUS database, Genciana Terova has an **H index of 24** (as of August 30, 2019) and her articles has been cited in 1732 articles published in scientific journals indexed on SCOPUS.

ORCID: <http://orcid.org/0000-0002-7532-7951>

Researcher ID: <http://www.researchid.com/rid/G-1779-2010>

SCOPUS database Search Results (as of August 30, 2019):

Genciana Terova number of publications (1998-2019):105

Total citations: 1755

H index: 24

EDITOR ACTIVITY

Prof. Terova is EDITOR of the Section "Nutrition and Physiology" of the International scientific journal "Fisheries and Aquatic Sciences" (<http://fas.biomedcentral.com/>) and

REVIEWER for the following journals: Anatomia Histologia Embryologia; Biology Letters; BMC Genomics; BMC Molecular Biology; Cell and Tissue Research; Comparative Biochemistry and Physiology, Part, A,B,D; DNA Sequence; Fish and Shellfish Immunology; Fish Physiology and Biochemistry; Food Chemistry; Gene; Journal of Experimental Marine Biology and Ecology; Journal of Fish Biology; Peptides; Proteome Science; Proteomics.

LECTURING ACTIVITY

From 1991 to 1993 she was lecturing Physiology of Domestic Animals at the Faculty of Veterinary Medicine, Agricultural University of Tirana.

In the years 1994-2010 she was in charge of courses of Physiology of Domestic Animals, Livestock Ecology, Ichthyology, Aquaculture, and Fundamentals of Animal Feeding at the Dep. of Sciences of Animal Production, Faculty of Agriculture, University of Basilicata, Potenza, Italy.

Since 2010 she is lecturing Animal Biotechnologies, Animal Production Biotechnologies, and Food Biotechnology at the University of Insubria in Varese, Italy.

She has also been supervisor of several Master of Sciences, and 7 PhD theses.

LIST OF PUBLICATIONS INDEXED ON SCOPUS (LAST 5 Years):

1. Torrecillas, S., **Terova, G.**, Makol, A., Serradell, A., Valdenegro, V., Gini, E., Izquierdo MS., Acosta, F., and Montero, D. (2019). Effects of dietary phytogenics and galactomannan oligosaccharides in low fish meal and fish oil-based diets on gut health and disease resistance in European sea bass (*Dicentrarchus labrax*). PlosOne (in press).
2. Xu, H., Turkmen, S., Rimoldi, S., **Terova, G.**, Zamorano, M.J., Afonso, J.M., Sarih, S., Fernández-Palacios, H., Izquierdo, M. (2019). Nutritional intervention through dietary

- vegetable proteins and lipids to gilthead sea bream (*Sparus aurata*) broodstock affect the offspring utilization on low fishmeal-fish oil diet. AQUACULTURE (in press).
3. Ceccotti, C., Al-Sulaivany, B.S.A., AL Habbib, O.A.M., Saroglia, M., Rimoldi, S., **Terova, G. (2019)** Protective effect of taurine from ROS production during forced swimming condition in European seabass (*Dicentrarchus labrax*). ANIMALS 9, 607-623. <https://doi.org/10.3390/ani9090607>.
 4. Cappelozza, S., Leonardi, G., Savoldelli, S., Carminati, D., Rizzolo, A., Cortellino, G., **Terova, G.**, Moretto, E., Badaile, A., Concheri, G., Saviane, A., Bruno, D., Bonelli, M., Casartelli, M., Tettamanti, G. (2019). A first attempt to produce proteins from insects by means of a circular economy. ANIMALS 9(5), 278. <https://doi.org/10.3390/ani9050278>
 5. Rimoldi, S., Gini, E., Iannini, F., Gasco, L., **Terova, G. (2019)**. The effects of dietary insect meal from *Hermetia illucens* prepupae on autochthonous gut microbiota of rainbow trout (*Oncorhynchus mykiss*). ANIMALS, 9(4), 143. <https://doi.org/10.3390/ani9040143>
 6. Bistoletti, M., Caputi, V., Baranzini, N., Marchesi, N., Filpa, V., Marsilio, I., Cerantola, S., **Terova, G.**, Baj, A., Grimaldi, A., Pascale, A., Frigo, G., Crema, F., Giron, MC., Giaroni, C. (2019) Antibiotic treatment-induced dysbiosis affects BDNF and TrkB expression differently in the brain and in the gut of juvenile mice. PLOS ONE 14(2): e0212856. <https://doi.org/10.1371/journal.pone.0212856>
 7. **Terova, G.**, Rimoldi, S., Ascione, C., Ceccotti, C., Gini, E., Gasco, L. (2019) Rainbow trout (*Oncorhynchus mykiss*) gut microbiota is modulated by insect meal from *Hermetia illucens* larvae in the diet. REVIEWS IN FISH BIOLOGY AND FISHERIES (on line) <https://doi.org/10.1007/s11160-019-09558-y>
 8. Rimoldi, S., Gliozheni, E., Ascione, C., Gini, E., **Terova, G. (2018)** Effect of a specific composition of short- and medium- chain fatty acid 1-Monoglycerides on growth performances and gut microbiota of gilthead sea bream (*Sparus aurata*). PEERJ 6:e5355; DOI 10.7717/peerj.5355. <https://peerj.com/articles/5355/>
 9. Ceccotti, C., Giaroni, C., Bistoletti, M., Viola, M., Crema, F., **Terova, G. (2018)** Neurochemical characterization of myenteric neurons in the juvenile gilthead seabream (*Sparus aurata*) intestine. PLoS ONE 13(8): e0201760. <https://doi.org/10.1371/journal.pone.0201760>
 10. **Terova, G.**, Rimoldi, S., Izquierdo, M., Pirrone, C., Ghrab, W., Bernardini, G. (2018) Nano-delivery of trace minerals for marine fish larvae: influence on skeletal ossification, and the expression of genes involved in intestinal transport of minerals, osteoblast differentiation, and oxidative stress response. FISH PHYSIOLOGY AND BIOCHEMISTRY. Vol 44, Issue 5, pp 1375–1391. <https://dx.doi.org/10.1007/s10695-018-0528-7>
 11. Rimoldi, S., **Terova, G.**, Ascione, C., Giannico, R., Brambilla, F., (2018). Next generation sequencing for intestinal microbiota characterization in rainbow trout (*Oncorhynchus mykiss*) fed animal by-product meals as an alternative to fishmeal protein sources. PLoS ONE 13(3): e0193652. <https://doi.org/10.1371/journal.pone.0193652>
 12. Forchino, A., Brambilla, F., Rimoldi, S., Saroglia, M., **Terova, G. (2018)**. The application of two benthic indices to investigate the effects of land-based fish farms in coastal transitional ecosystems: two case studies in Tuscany region (Italy). AQUACULTURE INTERNATIONAL. Vol. 26, Issue 2, pp 543–555 ISSN: 09676120. <https://doi.org/10.1007/s10499-017-0224-0>
 13. Domínguez, D., Rimoldi, S., Robaina, L., Torrecillas, S., **Terova, G.**, Zamorano, M.J., Karalazos, V., Hamre K., Izquierdo, M. (2017). Inorganic, organic, and encapsulated minerals in vegetable meals based diets for *Sparus aurata* (Linnaeus, 1758). PEERJ 5:e3710-e3731. ISSN: 2167-8359. <https://doi.org/10.7717/peerj.3710>
 14. Pérez-Sánchez, J., Terova G., Simó-Mirabet, P., Rimoldi, S., Ole Folkedal, O., Calduch-Giner, J. À., Olsen, R.E., Sitjà-Bobadilla, A. (2017). Skin mucus of gilthead sea bream

- (*Sparus aurata* L.). Protein mapping and regulation in chronically stressed fish. FRONTIERS IN PHYSIOLOGY. 8: 34. <https://doi.org/10.3389/fphys.2017.00034>
15. Kwasek, K., Rimoldi, S., Cattaneo, AG., Parker, T., Dabrowski, K., Terova, G. (2017). The expression of hypoxia inducible factor-1 α gene is not affected by low oxygen conditions in yellow perch (*Perca flavescens*) juveniles. FISH PHYSIOLOGY AND BIOCHEMISTRY Vol. 43, Issue 3, pp 849-862. <http://dx.doi.org/10.1007/s10695-017-0340-9>
 16. Izquierdo, M., Ghrab, W., Roo, J., Hamre, K., Hernández-Cruz, C.M., Bernardini, G., **Terova, G.**, Saleh, R. (2017) Organic, inorganic, and nanoparticles of Se, Zn, and Mn in early weaning diets for gilthead seabream (*Sparus aurata*; Linnaeus, 1758). AQUACULTURE RESEARCH. Vol. 48, Issue 6, pp 2852-2867. <http://dx.doi.org/10.1111/are.13119>
 17. **Terova, G.**, Díaz, N., Rimoldi, S., Ceccotti, C., Gliozheni, E., Piferrer, F. (2016). Effects of sodium butyrate treatment on histone modifications and the expression of genes related to epigenetic regulatory mechanisms and immune response in European sea bass (*Dicentrarchus labrax*) fed a plant-based diet. PLoS ONE 11(7): e0160332. <http://dx.doi.org/10.1371/journal.pone.0160332>
 18. Rimoldi, S., Finzi, G., Ceccotti, C., Girardello, R., Grimaldi, A., Ascione, C., **Terova, G.** (2016) Butyrate and taurine exert a mitigating effect on the inflamed distal intestine of European sea bass fed with a high percentage of soybean meal. FISHERIES AND AQUATIC SCIENCES. 19:40. <http://dx.doi.org/10.1186/s41240-016-0041-9>
 19. **Margheritis, E.**, Imperiali, F.G., Cinquetti, R., Vollero, A., **Terova, G.**, Rimoldi, S., Grimaldi, A., Bossi, E. (2016) Amino acid transporter *B⁰AT1* (*scl6a19*) and ancillary protein: impact on function. PFLÜGERS ARCHIV - EUROPEAN JOURNAL OF PHYSIOLOGY. Vol 468, Issue 8, pp 1363–1374. <http://dx.doi.org/10.1007/s00424-016-1842-5>
 20. Rimoldi, S., **Terova, G.**, Zacccone, G., Parker, T., Kuciel, M., Dabrowski, K. (2016). The effect of hypoxia and hyperoxia on growth and expression of hypoxia-related genes and proteins in spotted gar *Lepisosteus oculatus* larvae and juveniles. JOURNAL OF EXPERIMENTAL ZOOLOGY. PART B. MOLECULAR AND DEVELOPMENTAL EVOLUTION. 326B:250–267. <http://dx.doi.org/10.1002/jez.b.22680>
 21. Castellini, C., Dal Bosco, A., Mattioli, S., Davidescu, M., Corazzi, L., Macchioni, L., Rimoldi, S., **Terova, G.** (2016) Activity, expression and substrate preference of the $\Delta 6$ -desaturase in slow- or fast-growing rabbit genotypes. JOURNAL OF AGRICULTURE AND FOOD CHEMISTRY. Vol 64 (4), pp 792–800. <http://dx.doi.org/10.1021/acs.jafc.5b05425>
 22. Rimoldi, S., Benedito-Palos, L., **Terova, G.**, Perez-Sanchez, J. (2016) Wide-targeted gene expression approach to infer the tissue-specific molecular signatures of lipid metabolism in fed and fasted fish. REVIEWS IN FISH BIOLOGY AND FISHERIES. Vol.26:93-108. <http://dx.doi.org/10.1007/s11160-015-9408-8>
 23. Montero, D., **Terova, G.**, Rimoldi, S., Betancor, M.B., Atalah, E., Torrecillas, S., Caballero, M.J., Zamorano, M.J., Izquierdo, M. (2015) Modulation of the expression of components of the stress response by dietary arachidonic acid in European sea bass (*Dicentrarchus labrax*) larvae. LIPIDS. Vol. 50. Issue 10: 1029-1041. <http://dx.doi.org/10.1007/s11745-015-4057-1>
 24. Rimoldi, S., Lasagna, E., Sarti, F.M., Marelli, S.P., Cozzi, M.C., Bernardini, G., **Terova, G.** (2015) Expression profile of six welfare-related genes in two chicken strains reared under heat stress conditions. META GENE. Vol 6:17-25. <http://dx.doi.org/10.1016/j.mgene.2015.08.003>

25. Roncarati A., Gasco, L., Parisi, G., **Terova, G.** (2015). Growth performance of common catfish (*Ameiurus melas* Raf.) fingerlings fed mealworm (*Tenebrio molitor*) diet. JOURNAL OF INSECTS AS FOOD AND FEED. Vol 1, Issue 3: 233-240. <http://dx.doi.org/10.3920/JIFF2014.0006>
26. Rimoldi, S., Bossi, E., Harpaz, S., Cattaneo, A.G., Bernardini, G., Saroglia, M., **Terova, G.** (2015). Intestinal B0AT1 (SLC6A19) and PEPT1 (SLC15A1) mRNA levels in European sea bass (*Dicentrarchus labrax*) reared in fresh water and fed fish and plant protein sources. JOURNAL OF NUTRITIONAL SCIENCE. Volume 4, e21 (13 pages) <http://dx.doi.org/10.1017/jns.2015.9>. PubMed ID:26097704
27. Montero, D., **Terova, G.**, Rimoldi, S., Tort, L., Negrin, D., Zamorano, M.J., Izquierdo, M. (2015) Modulation of adrenocorticotrophin hormone (ACTH)-induced expression of stress-related genes by PUFA in inter-renal cells from European sea bass (*Dicentrarchus labrax*). JOURNAL OF NUTRITIONAL SCIENCE. vol. 4, e16, (13 pages). <http://dx.doi.org/10.1017/jns.2015.6>