AquaTechnica

# REVIEW PREPARATION TEMPLATE

**General considerations**

To submit a manuscript for evaluation you must be registered in the journal here: https://revistas.utm.edu.ec/index.php/aquatechnica/user/register and carry out the entire process through the platform. If you have problems, write to revistaaquatechnica@gmail.com.

*Reviews* are communications on a specific topic of interest to the journal, requested by the committee from a researcher who has extensive experience reflected in his or her publications. However, if a researcher needs to publish an uninvited review, he or she may submit the topic or topic along with a summary to the editorial board for consideration. They should not exceed 30 pages and should contain title, summary, keywords, introduction, descriptive and analytical sections, conclusions and future projections, acknowledgments (if any) and bibliographical references.

Manuscript in A4 size (no more than 15 pages) with side, top and bottom margins of 2.5 cm. The entire manuscript in Times New Roman 12, without indentation, without formats and with single spacing. All pages and lines of the document must be numbered from the beginning to the end of the manuscript.

Use a quote with the name of the author or authors and then the year in parentheses to present your findings, methodologies, arguments, etc., in a personalized way. Example: Rodríguez (2019) discovered… Rodríguez and Hernández (2020) concluded…. or Rodríguez *et al*. (2019) determined that… (when there are more than 2 authors, indicate *et al*. in italics). Do not use "&", but instead use "y" (Spanish), "e" (Portuguese) or "and" (English).

To present non-personalized findings, methodologies, arguments, etc., indicate the author and year at the end of the sentence; if the sentence is supported by several quotes, put them all in chronological order, separated by a comma (,). Example: High concentrations of polyunsaturated fatty acids have been determined in marine microalgae (Rodríguez 2019); or (Rodríguez 2019, Sánchez and Rodríguez 2020, Sánchez *et al*. 2021).

Use personal communication exposing the source: name, institution and month and year of the personal communication in parentheses, example: (Personal communication: Carlos Rodríguez, Instituto del Mar, Ecuador, July 2018).

To reference a figure, use the full word when referring to the description, example: In figure 1 we find..., or its abbreviation in parentheses when it precedes a description, example: The organisms cultured at 2 m reached the largest size (Fig. 1).

Figures and images must be no less than 300 dpi. In tables, avoid line spacing. The legends (tables above and figures below) must be in the original language of the manuscript when it is Spanish or Portuguese, with its translation into English, using Arabic numerals. They should

be included in the appropriate place in the body of the manuscript text, after being named for the first time.

Do not abbreviate scientific names, always complete and all in italics. Use commas to delimit decimals when text is in Spanish or Portuguese: example 3,23. Use point to delimit decimals when the text is in English: example 3.23.

The writing must be in the third person and in the past tense, referring to the research carried out.

To write the body of the manuscript, **replace the text of the guide, maintaining the style, font size, indentation and other formats, following the steps and indications in each of the sections of the manuscript.**

**After finishing, delete the comments that are on the right side, as well as all types of text and figures in the example.** In the description, use hierarchy of titles in the following order: **Subtitle**, ***subtitle***, subtitle, subtitle.

**FOLLOW THE EXAMPLE**

**Title:**
**Aquaculture in Latin America and the Caribbean: Progresses, opportunities and challenges**
**Acuicultura en América Latina y El Caribe: Progresos, oportunidades y desafíos**

**Short title:**

Aquaculture in Latin America and the Caribbean

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**ABSTRACT:** Aquaculture in Latin America and the Caribbean continues its progress, reaching a production of 2.9 MM Tons in 2017, valued at U$17,400 MM, dollars of 2018. However, the pace of growth has slowed down over time. In that year the region accounts for 3.7% of the volume of world crops, but a more relevant 7% of its value, as it works mainly with high-valued species. This reality contrasts with fishing landings that have declined sharply since the 1990s, implying that currently aquaculture crops account for 21% of total regional landing. A number of large and small-scale production models, oriented to the domestic market or exports, with States more or less active in the development processes coexist in this area, with varying levels of competitiveness, and with a widespread low consumption of fishery products per person, a level that is among the lowest in the world. The region has a great potential in aquaculture production, and currently turns its main R&D

efforts towards productive diversification with native species. It is also clear that several problems of governance, of relations with local and national communities, of litigation with other users of the waters and coastal borders, on the focus of applied research and on environmental issues, etc. still remain to be solved, conspiring with better crop performance, which should increase to about 4.9 to 5.5 MM Tons by 2030, a situation that involves a slowdown in recent production rates to annual growth of between 4% and 5% through that year. In a region whose aquaculture is still highly concentrated in no more than five countries and the same number of species, which has ample spaces and reasonable infrastructure, future opportunities are very broad and successes to be achieved will be closely linked with the implementation of measures that properly address the above-mentioned limitations, particularly those related to governance.

**Keywords:**
Aquaculture, Latin America, Opportunities, Challenges

## INTRODUCTION

Fishing and aquaculture have become important economic activities globally due to the favorable impacts they generate on the socioeconomics of the various regions where they are practiced. They are sources of food for human consumption, jobs and economic benefits, achieving a global production of 177.8 million tons in 2019, of which 52% corresponded to fishing and 48% to aquaculture. Tilapia is the second most important group of farmed fish, after carp (FAO 2021).

In Mexico, the national production of tilapia recorded in 2018 was 168,359 t, of which 31.3% corresponded exclusively to controlled aquaculture systems and the rest to fishing activities, which include aquaculture fisheries in reservoirs that are sustained thanks to the periodic planting of offspring. The average annual growth rate of tilapia production in Mexico in the last 10 years was 9.1. Tilapia production, due to its volume and value, was ranked third in national fishing production (Conapesca 2018)…….

## DESCRIPTIVE AND ANALYTICAL SECTIONS

### Organisms and culture conditions

……Globally, tilapia aquaculture production showed a marked upward trend from 2010 to 2019, as it grew from 2.6 million tons in 2010 to 4.5 million tons in 2019, which represented an increase of 72, 7%. The average annual production during this period was 3.8 million tons (FAO 2021), as shown in Fig. 2.

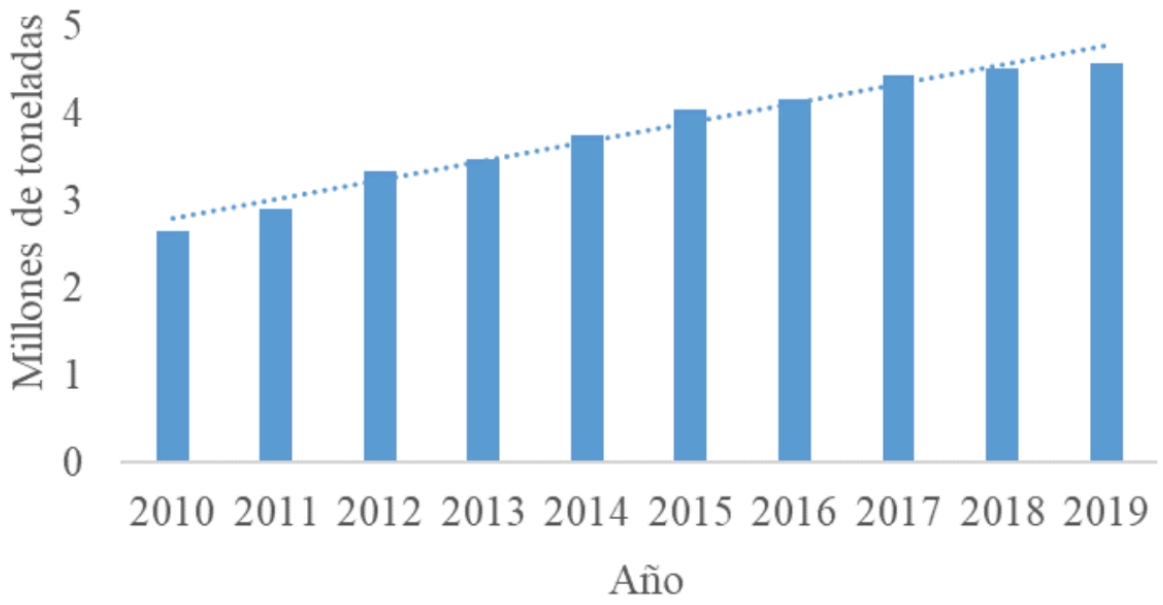


Figure 2. World tilapia production from 2010 to 2019 (FAO 2020; 2021).

For its part, tilapia production in Mexico from fishing and aquaculture also showed a marked upward trend, since in 2009 an estimated 77,009 t were recorded, while in 2018 the records reached 168,359 t. The highest production was recorded in 2016 with 182,952 t, while the average production was 120,900 t. The average annual growth rate of production in this period was 9.1% (Conapesca 2018), as seen in Fig. 3.

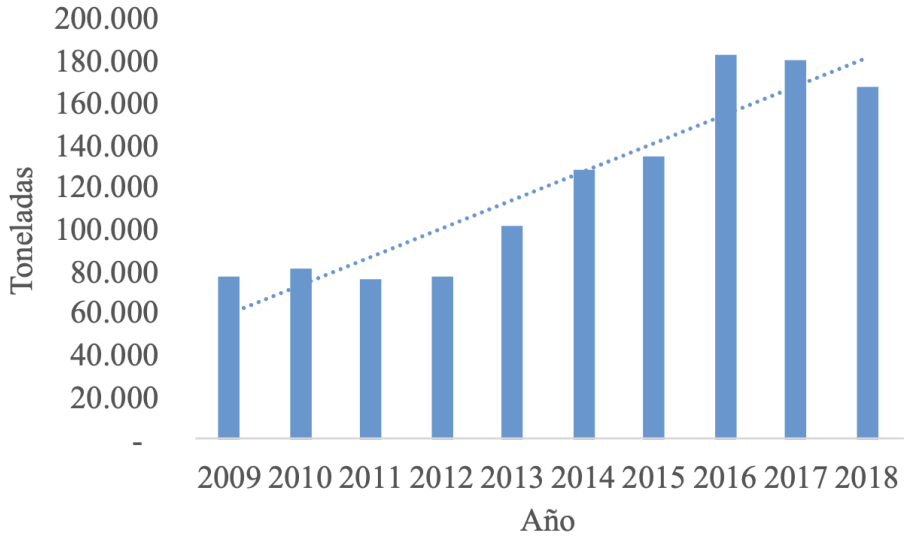


Figure 3. Tilapia production in México from 2009 ti 2018 (Conapesca 2018).

## CONCLUSIONS AND FUTURE PROJECTIONS

…Extensive and semi-intensive production systems stand out for their relevance, characterized by the small investment required, their low environmental impact and acceptable economic profitability, with productive planting scenarios of 3 and 4 ind./$m^2$ (30,000 and 40,000 per ha, respectively), with average individual sowing weight of 0.2 to 1.0 g, with grow-out cycles of 6 months, with average individual harvest weight of 500 g and

survival during cultivation of 50 and 66.6 %, which represents an estimated production of 7,500 and 10,000 kg per ha, respectively.

… To cover this productive deficit with sufficiency and opportunity, it is necessary to design a national strategy that ensures the current and future supply of this biological input. This strategy could include the reactivation of existing federal and state laboratories, as well as the construction of new specifically designed laboratories where modern technologies such as biofloc are applied, allowing cultivation at higher densities and larger sizes, with less use of water and dry feed, and using genetically improved strains.

**Declaration of conflict of interest of the authors**

The authors declare that they have no conflicts of interest related to this work.

**Authorship contribution statement**

Author 1: xxxxx; author 2 xxxxxx, Author 3: xxxxxx etc

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**REFERENCES**

*Examples:*

*Serial journals:*
Wurmann G. (2019). Acuicultura en América Latina y El Caribe: Progresos, oportunidades y desafíos. AquaTechnica 1(1):1-21. https://doi.org/10.33936/at.v1i1.2144

Southgate P., Beer A. (2000). Growth of blacklip pearl oyster (*Pinctada margaritifera*) juveniles using different nursery culture techniques. Aquaculture 187:97-104 https://doi.org/10.1016/S0044-8486(99)00392-0

Mazón-Suástegui J.M., Ruíz-Ruíz K.M., Parres A., Saucedo P.E. (2008). Combined effects of diet and stocking density on growth and biochemical composition of spat of the Cortez oyster *Crassostrea corteziensis* during hatchery culturing. Aquaculture 284:98–105. https://doi.org/10.1016/j.aquaculture.2008.07.022

*Book:*
Zar J.H. (2010). Biostatistical Analysis 5th edn. Pearson Prentice Hall, USA.

*Chapter in a book:*
Boltovskoy D., Xu M., Nakano D. (2015). Impacts of *Limnoperna fortunei* on man-made structures and control strategies: general overview. In: Boltovskoy, D. (Ed). *Limnoperna fortunei*, invading nature. Springer, New York, pp. 375-394.

*Theses and degree works**:***
Alvarado D. (2019). Food regime in juvenile Chame *Dormitator latifrons*. Undergraduate thesis, School of Aquaculture and Fisheries, Technical University of Manabí, Bahía de Caráquez, Ecuador.

*Extensive works (conferences):*
Caña P., Aponte A., Chung K., Lemus M. (2015). ARN/ADN en juveniles de *Cathorops spixii* (Pisces: Ariidae) en el Golfo de Paria, Edo Sucre, Venezuela. Foro Iberoam. Rec. Mar. Acui. VII: 519-529.

*Reference on line (only for institutional cases):*
FAO (2022). Programa de información de especies acuáticas *Crassostrea gigas*. https://firms.fao.org/fi/website/FIRetrieveAction.do?dom=culturespecies&xml=Crassostrea_gigas.xml&lang=es