aquaculture journal

Editorial

Aquaculture Journal: A New Open Access Journal

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Fishery production, considering both capture and aquaculture, is a major animal protein source for humans [1], and fish consumption has increased enormously in the last decades, averaging nowadays around 20 kg/person/year [2]. As capture fisheries have stagnated in the last decades, this increased availability of fish products for human consumption comes essentially from aquaculture. Indeed, aquaculture is the fastest-growing animal production sector in the world, with an annual growth rate, since 2000, averaging 5.3% [2]. Aquaculture production for human consumption has surpassed that of fisheries in 2016 and it is estimated that by 2030 it will represent circa 60% of the world's food fish consumption [2].

Aquaculture is, thus, fundamental to assure food security for the human population and to meet future population needs, both due to the expected increase in world population and also to the increased demand for fisheries expected of a wealthier society.

Aquaculture is also a major source of n-3 long-chain polyunsaturated fatty acids, which are proved to provide several health benefits for humans, namely protection against cardiovascular diseases, brain development, and some cancers. Aquaculture also provides high-quality and highly digestible protein and is a good source of minerals, including Se, I, Zn, Fe, and vitamins A and D.

Contrary to other animal production sectors in which production is based on a few species, aquaculture is highly diversified with more than 420 organisms being exploited [2]. Diversification of production is, thus, a major characteristic of aquaculture, and consumers seem to valorize this diversity. Nevertheless, 10 species are responsible for around 54% of aquaculture production, and 22 species account for around 75% of the total production [3,4].

Aquaculture concerns a high diversity of organisms, including fish, shellfish, echinoderms, mollusks, and algae, with very different life cycles, husbandry specificities, nutritional requirements, and disease problems [5]. Moreover, many aquaculture organisms also comprise larval stages in their life cycle, with specificities, regarding nutritional, physiological, and husbandry requirements, that are quite different from that of juveniles and on-growing animals, making the rearing process complex. This poses additional difficulties and specializations within the field.

Several aquaculture organisms still do not have all life cycle controlled and rely on wild broodstock for the obtention of eggs and juveniles. Until all life cycle is controlled, animals cannot be fully domesticated, and selective breeding cannot be pursued. This is of paramount importance, as the genetic selection of broodstock is expected to provide enormous gains in growth performance, feed utilization, and the selection of beneficial traits—for instance, regarding fillet yield or meat quality [6].

Aquaculture production also occurs in diversified environmental conditions, namely regarding water salinity (freshwater, brackish, and saltwater) and temperature (cold, warm, and tropical) under different rearing conditions (flow-through, ponds, and cages) and rearing sites (on-land, coastal, and off-shore).

Aquaculture technology has also different sophistication, depending on rearing intensity (extensive, intensive, super-intensive), water reuse and treatment (flow-through, water recirculation, closed-systems, bioflocs), or trophic integration (monoculture, polyculture, aquaculture–agriculture integration, multitrophic aquaculture, aquaponics, etc.).

Like any animal production system, aquaculture is susceptible to disease outbreaks due to bacteria, viruses, or parasites, which become more important with rearing intensification. Knowledge of such pathogens and how to control them understanding the animal's defense mechanisms and understanding how to improve disease resistance are also priorities.

Aquaculture relies both on fed animals, namely fish and crustaceans, which impact the environment due to feed losses and waste products (organic matter, nitrogen, and phosphorus), and extractive bivalves and algae, which perform an ecosystem service.

Most fed animals receive commercial compound feeds, with supplementary feeds and farm-made feeds being mainly restricted to low-value and semi-extensively reared animals [2]. Aquafeed use is expected to increase at an annual rate higher than that of aquaculture production in the forthcoming years [2,7]. Although aquafeeds have traditionally relied on marine ingredients, this is an unsustainable practice that is becoming overcome by the increased use of traditional and novel ingredients [8]. This is also a relevant topic, as such ingredients and diets may pose environmental and consumer acceptance issues [9].

Aquaculture is increasingly committed to guaranteeing environmental sustainability, and this implies increasing energy efficiency, reducing water needs, decreasing waste production, banning antibiotics and chemotherapeutic drugs, avoiding invasive species and loss of ecosystem genetic diversity, using feed resources more judiciously, reducing water use and arable land for producing feedstuffs, promoting a circular economy, reducing greenhouse gas emission, avoiding land-use modifications, and protecting sensitive habitats [10].

All this implies a broad range of scientific and technical competencies in many different fields. The *Aquaculture Journal* (ISSN 2673-9496) is a peer-reviewed open-access journal that aims to provide a new forum for publishing reviews, original research articles, and special issues, focusing on aquaculture-relevant topics. This is a broad-spectrum journal, covering, but not limited to, the following aquaculture-related topics: nutrition, physiology, reproduction, endocrinology, genetics, pathology, immunology, microbiology, husbandry, production systems, and aquatic environment, among others.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Béné, C.; Barange, M.; Subasinghe, R.; Pinstrup-Andersen, P.; Merino, G.; Hemre, G.-I.; Williams, M.J. Feeding 9 billion by 2050–Putting fish back on the menu. *Food Secur.* **2015**, *7*, 261–274. [CrossRef]
2. FAO. *The State of World Fisheries and Aquaculture. Sustainability in Action*; FAO: Rome, Italy, 2020.
3. Garlock, T.; Asche, F.; Anderson, J.; Bjorndal, T.; Kumar, G.; Lorenzen, K.; Ropicki, A.; Smith, M.D.; Tyeteras, R. A Global Blue Revolution: Aquaculture Growth across Regions, Species, and Countries. *Rev. Fish. Sci. Aquac.* **2020**, *28*, 107–116. [CrossRef]
4. Naylor, R.L.; Hardy, R.W.; Buschmann, A.H.; Bush, S.R.; Cao, L.; Klinger, D.H.; Little, D.C.; Lubchenco, J.; Shumway, S.E.; Troell, M. A 20-year retrospective review of global aquaculture. *Nat. Cell Biol.* **2021**, *591*, 551–563. [CrossRef]
5. Lucas, J.S.; Southgate, P.C.; Tucker, C.S. *Aquaculture. Farming Aquatic Animals and Plants*; John Wiley & Sons Ltd.: Hoboken, NJ, USA, 2019.
6. Gjedrem, T.; Rye, M. Selection response in fish and shellfish: A review. *Rev. Aquac.* **2016**, *10*, 168–179. [CrossRef]
7. Tacon, A.G.J. Trends in Global Aquaculture and Aquafeed Production: 2000–2017. *Rev. Fish. Sci. Aquac.* **2020**, *28*, 43–56. [CrossRef]
8. Oliva-Teles, A.; Enes, P.; Peres, H. *Replacing Fishmeal and Fish Oil in Industrial Aquafeeds for Carnivorous Fish in Feed and Feeding Practices in Aquaculture*; Davis, D.A., Ed.; Woodhead Publishing: Oxford, UK, 2015; pp. 203–233.
9. Hua, K.; Cobcroft, J.M.; Cole, A.; Condon, K.; Jerry, D.R.; Mangott, A.; Praeger, C.; Vucko, M.J.; Zeng, C.; Zenger, K.; et al. The Future of Aquatic Protein: Implications for Protein Sources in Aquaculture Diets. *One Earth* **2019**, *1*, 316–329. [CrossRef]
10. Boyd, C.E.; McNevin, A.A. *Aquaculture, Resource Use, and the Environment*; Wiley: Hoboken, NJ, USA, 2015.