BioS Reports

Glimpse into the activities of the
Master's course "Biology in Society"

ISSUE 32

January 2025

ISSN 2940 - 4673

EXCURSIONS AND OTHER NEWS

Small insights in student's or professor's points of view, field trips, and other stuff we do.

What Topics are BioS Students Focusing on for the Thesis?

Layanne Abu-Bader

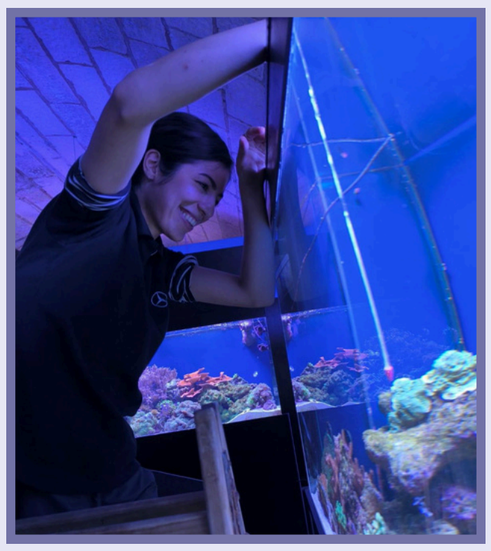
Although all students in the Master's Course 'Biology in Society' take the same classes in the first year, the subjects that we focus on during our lab rotations and thesis are vastly different. Here are the titles of some of the most recent theses submitted by BioS Students:

- *Dose-dependent effects of testosterone and normetandienone in intact male rats: histological and mass spectrometric analyses*
- *The role of oxygen and HIF2alpha in early placental development*
- *Influence of different hMSC-based in vitro cell culture system on cartilage regeneration*
- *Structural and mechanical characterization of tactile hair sensilla in the spider* Cupiennus salei
- *Understanding the role of MBOAT7-derived lipid mediators in development of NAFLD*
- *Development of tools to analyse morphometric characteristics of Baltic blue mussels* (Mytilus edulis, Mytilus trossulus) *along salinity gradients*
- *Female postmating transcriptional response and sex-biased gene expression in the bed bug* Cimex lectularius
- *Metabolomic analysis on periodontal samples from the biofluids saliva, gingival crevicular fluid (GCF) and Dental Plaque*
- *Development and validation of an alternative erythropoietin immunopurification method from urine*

EXCURSIONS AND OTHER NEWS

Lab Rotation: Marine Biology in Croatia

Asude Demir



Biology offers a broad spectrum of career and research opportunities, from classical laboratory work in microbiology and immunology, to positions in education or the government. During my advanced lab rotation, I aimed to explore one of these possibilities by gaining insight into marine biology and species conservation at the Aquarium of Pula, Croatia. Over two months, I engaged in different tasks, challenges, and responsibilities, particularly those involving animal care and ecosystem maintenance.

My work focused on breeding and monitoring corals and maintaining exhibition tanks. I learned how to ensure optimal water conditions for corals, such as regulating water flow, nutrient levels, temperature, and the presence of grazing organisms that keep algae in check. Additionally, I acquired practical knowledge about breeding jellyfish, zooplankton, and phytoplankton, as well as feeding routines for marine life and reptiles housed in the aquarium.

A significant highlight of my rotation was participating in the conservation project for the endangered noble pen shell (*Pinna nobilis*). Endemic to the Mediterranean, this species has faced a severe extinction threat since 2016, caused by the spread of *Haplosporidium pinnae*, a parasite that destroys the shell's digestive gland, leading to starvation. The noble pen shell plays a vital ecological role by filtering large quantities of seawater, enabling the growth of zooplankton and phytoplankton, which form the base of the marine food chain. The aquarium's conservation efforts include breeding *Pinna nobilis* with the aim of one day reintroducing these individuals into their natural habitats, helping to restore the balance of the Mediterranean ecosystem [1].

This experience provided a behind-the-scenes look at the dynamic environment of an aquarium, where scientific research, education, conservation, and business intersect. I am deeply grateful for the opportunity, the knowledge gained, and the dedicated marine scientists working tirelessly to preserve the beauty and biodiversity of the oceans.

ANIMALS AND MONEY

This part of BioS Reports unravels relationships between animals and the economy.

With Great Fish Comes Great Wealth: The Role of Koi in the Japanese Ornamental Fish Market

Konrad Skowronek

Striving for success, courage and endurance? Just get a Koi fish! This carp species combines all of these qualities in Japanese culture, which is part of what makes it so desirable. Ornamental fish, especially Koi, with their vibrant colours and distinct patterns, have created a lucrative breeding and trading industry worldwide. The highest-quality Koi sell for several thousand dollars, making them a major part of the ornamental fish market. Japanese farmers of the Niigata prefecture noticed the vibrant colours and patterns on the Koi fish, which were initially bred for food [1]. Extensive cross-breeding led to the development of Nishikigoi, or 'brocaded carp,' now known as Koi [2]. This has driven the global establishment of Koi as an ornamental fish species [3]. Now they are not only a symbol of cultural beauty but also a product that can reach significant prices. The Kohaku variety, for example, can sell for several hundred US$ [4]. In the following I will examine how Koi fish contribute to the global and to the Japanese economy.

The global Koi market was valued at US$2.3 billion in 2023 [5], while the global market for ornamental fish was valued at US$6.36 billion in 2023 [6]. Therefore, the Koi market accounts for 36-39 % of the total market value within this sector. In 2014, the ornamental fish market was dominated by two species that are cheaper and are seen more as ornamental fish for beginners: the guppy (*Poecilia reticulata*) and the neon tetra (*Paracheirodon innesi*), which together accounted for only 14 % of the total value [7]. This shift in the market value confirms that Koi have become increasingly important over the past few years. Prices for Koi depend on colour, pattern, and breed. For example, a 'Super Mango Sakai' female of 90 cm length was valued at €18.900 [8]. At the same time, a 'Hi Utsuri Shinoda' male of 51 cm was valued at €990 [19]. In auctions and markets, animals are usually sold within a price range of US$53 to US$560 [9]. In 2017, a Koi was sold for a record price of ¥200 million, approximately US$1.8 million [4]. These examples highlight the potential economic value of these ornamental fish.

How is Koi trade contributing to the Japanese economy? Japan had a nominal GDP of about US$5.01 trillion in 2021 [10,11]. The contribution of agriculture (including aquaculture) to Japan's GDP was approximately 0.95 % in 2021 (equivalent to US$47.6 billion) [12]. Sales revenue of the Asia-Pacific Koi industry has increased in recent years, reaching US$805 million in 2023. Japan contributed about 35 %, or US$281.75 million [12, 13]. The Koi industry in Japan therefore accounts for approximately 0.06 % of the agricultural sector, or 0.006% to the Japanese GDP. There are also indirect economic benefits such as Koi tourism, which provides the possibility to visit breeding facilities [14]. However, the financial impact may be small, since these tourist spots are mainly run by small companies and since the entire tourism market in Japan only contributes 1% to the GDP [15].

These calculations indicate that the Koi fish market has become a global industry of considerable size. Its significance is present both on a small scale such as in Japanese tourism, but also in the global market when compared to other popular species such as guppies. What once has been an important aspect of Japanese heritage has now become a global symbol of beauty and endurance, even transcending cultural and geographical boundaries.

Published by the Master's course Biology in Society | edited by Layanne Abu-Bader, Simon Schäfer, Sophie Merz | v.i.S.d.P. Klaus Reinhardt | ISSN 2940 - 4673

Follow us on Instagram! @biosreports