Preface

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This issue contains the selected papers presented at the Conference “Domestication in Finfish Aquaculture” which was fully funded by the budget of the InnovaFish project (OR14-61724-OR1400003/09/10/11). The conference, organized by the Department of Lake and River Fisheries, University of Warmia and Mazury in Olsztyn, Poland, in co-operation with the European Aquaculture Society (EAS), Institute of Animal Reproduction and Food Research of the Polish Academy of Sciences in Olsztyn and Bio-Warmia sp. z o.o., was held between October 23 and 25, 2012 in Olsztyn and Mrągowo, Poland.

The issue of domestication in aquaculture has been dealt with increasingly frequently in recent years. This has been caused by the scarcity of data on the effect of domestication on the effectiveness of individual stages of production, with some of those published data contradicting others. For example, on the one hand, fish growing in the natural environment are known to produce better quality gametes compared with domesticated fish. On the other hand, the efficiency and reproducibility of artificial reproduction of the barbel, *Barbus barbus*, caught in the natural environment, are extremely low compared with the artificial reproduction of inbreeding shoals. Moreover, the very concept of domestication—what it is and how it should be examined—is not completely clear. An in-depth analysis of the issue has revealed several concepts of domestication, with different definitions of domesticated fish. This made the issue quite unclear and difficult to deal with. Therefore, it was very important to open discussion about it since each fish breeder and scientist conducting research in aquaculture is likely to come across the problem sooner or later.

Two essential areas can be identified in aquaculture, within which the issue of domestication should be analysed quite differently. One is commercial aquaculture, where the effect of domestication is positive to a certain extent. This mainly applies to behavioral changes and the basic physiological factors (growth rate, absorbability of compound feed, full reproduction control, etc.). Obviously, the benefits decrease as the inbreeding within the shoal progresses, where disadvantageous traits can be exposed (e.g., deformations,

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reproductive anomalies). However, there is no clear information which could enable controlled use of the results of domestication for effective production. However, it seems highly probable that such control would be a very useful tool for breeders, which could decrease production costs, thereby boosting the production effectiveness.

On the other hand, the effect of domestication is highly undesirable in sustainable aquaculture, when stocking material is produced for species restitution. However, as in the barbel, it is difficult to avoid the formation of domesticated breeding shoals, which can be used in effective support for natural recruitment without interfering in wild shoals (by mass catching of spawners). However, it must be realized that such actions should be subjected to genetic control (line purity, as large a gene pool as possible, etc.); they should also be adapted to life outside the human-controlled environment. There is only limited data available on the subject, and there is no information on potential procedures of shoal management of ecologically valuable fish species or indicating the benefits and threats of domestication, whereas there is great need to manage many populations (each one separately, after individual needs are taken into account), which are under serious threat. Moreover, the knowledge of breeding techniques and procedures which can contribute to increasing the effectiveness of production of species being brought back to nature is also limited.

With the current model of aquaculture which pursues two extremely important goals (commercial and sustainable), domestication required broader discussion, involving scientists and breeders who face the issue in their everyday work. It is important to take up the challenge and look for a balance between food production and the needs of the natural environment, while keeping such business economically viable. Knowledge of fish domestication is necessary to achieve this.

The main theme of the Conference “Domestication in Finfish Aquaculture” brought in total 102 participants from 16 countries, where 27 oral and 75 poster presentations were presented. During the conference four sessions, chaired by the members of the Scientific Committee, were organized:

1. “Effectiveness of reproduction of fish species under the domestication process and Larviculture effectiveness” chaired by Patrick Kestemont and Andrzej Mamcarz.
2. (in two parts): “Gamete and larval quality” and “Stress response and resistance” chaired by Andrzej Ciereszko and Ákos Horváth.
3. “General aquaculture techniques and genetic diversity in commercially cultured species for restocking” chaired by Béla Urbányi and Julia Lynne Overton.
4. “Reproductive performances and other aspects of aquaculture” was chaired by Pascal Fontaine and Tomáš Polícar.

The program was also supplemented with two presentations of invited speakers. The first, Welcoming lecture, was given by invited speaker Fabrice Teletchea (France). During his lecture, Fabrice Teletchea introduced a new classification comprising five levels of domestication (with 1 being the least to 5 being the most domesticated). During this lecture, it was emphasized that the problem of domestication in aquaculture has created many ambiguities in the world literature and that his concept of classification may significantly contribute to a better understanding of this process and helps the scientific audience reconsider “fish domestication” in a different way. In his conclusion, he expressed his hope that this classification would allow for an open discussion on the problem of domestication and contribute to future approaches in fish production. The second, Plenary lecture was given by Martin Bilio (Germany). Dr. Martin Bilio was the first president of the European Aquaculture Society and has recently published several

articles on domestication in aquaculture. Martin Bilio in his presentation focused mainly on the importance of the intercontinental transfer of species for domestication in aquaculture. In a very good set of data, he presented the successful and unsuccessful trials of the domestication of fish species out of the range of their natural occurrence. He pointed out the possible reasons for those failures and successes and indicated that the domestication of fish is much harder than mammals, which he used as an example.

Along the conference programme, all the participants and invited guests were taken to the Aquaculture and Ecological Engineering Centre (AEEC) of the Faculty of Environmental Sciences of University of Warmia and Mazury in Olsztyn (Poland), which is the new research facilities dedicated specifically for aquacultural research activity as well as environmental engineering. During the short visits, participants were able to tour laboratories combining regular laboratory equipment (microscopic, histological, molecular etc.) with modern recirculating aquaculture systems of various constructions allowing for experimental and fully controlled reproduction and rearing (larvae and juveniles) of many freshwater, and even marine, fish species.

During the Conference, a submission of manuscripts to Special Issue of Aquaculture International journal, contained the data presented during the Conference, was opened for all the presenting authors. Due to the high number of manuscripts submitted (60 manuscripts) the evaluation process had to be proceeded in two steps. Initially, during the prereview screening process, Guest Editors of the Special Issue (Andrzej Mamcarz and Dariusz Kucharczyk) rejected 25 % of the manuscripts. In the second step, the remaining manuscripts were subjected to regular evaluation process in Aquaculture International journal, where at least two anonymous reviewers had given their recommendation honored to present in this special issue of Aquaculture International 30 the highest quality articles among all of the submitted. We believe that this issue will become a small “brick” contributing to the development of finfish aquaculture, where the domestication is already one of the key factors directly affecting effectiveness of production. We would like to also sincerely thank to all of the reviewers, who made tremendously hard work with all the submitted manuscripts. Without their valuable contribution, we would not be able to ensure such high-quality papers, which were finally incorporated in this issue.

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