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Foreword

Alien species in aquaculture and fisheries

Although alien species have become the backbone of production in many parts of the world (De Silva et al., 2006), the contribution of aquaculture as a driver for their dispersion has rarely been assessed. This was one of the main aims of the EU project '*Impacts of Alien Species in Aquaculture*' (*IMPASSE*), which was funded under the EU Sixth Framework Programme for Research and Technological Development. Among the other goals, the *IMPASSE* project developed guidelines for environmentally sound practices for the introductions and translocations of species in aquaculture, a scheme of protocols for assessing the environmental and socio-economic risks associated with the use of alien species in aquaculture and fisheries, and guidelines on quarantine and management procedures (see http://www2.hull.ac.uk/science/biological_sciences/research/hifi/impasse.aspx).

The international conference and workshop on 'Managing Alien Species for Sustainable Development of Aquaculture and Fisheries' (*MALIAF*) was the final initiative of the *IMPASSE* project and aimed to provide an international, public forum for discussions by scientists and managers on sustainable aquaculture and fisheries. This dedicated issue, on 'Alien species in aquaculture and fisheries', presents 15 selected communications presented at the *MALIAF* conference, which was hosted by the University of Florence, Italy, on 5–7 November 2008.

The collection of papers presented at *MALIAF* highlights that the introduction of species beyond their natural range has a well documented history over the past 150 years, initially undertaken to enhance fisheries through the introduction of new species. However, with the rapidly expanding aquaculture industry, the number of species introduced for culture purposes has also increased, posing potential threats through escape to natural waters (Savini et al., 2000, this volume). Furthermore, introduction of live foreign species also results from the globalisation of transport, trade, travel and tourism (Copp et al., 2005) and the unprecedented accessibility of goods via the internet. Although many non-native species are beneficial to humans (e.g. Gozlan, 2008; Arbačiauskas et al., 2010, this issue), a relatively small, but significant, proportion of them becomes invasive (Wolter and Röhr, 2010, this issue) and produces far-reaching adverse impacts on native species and ecosystems (Britayev et al., 2010, this issue; La Porta et al., 2010, this issue; Kangur et al., 2010a, this issue; Kangur et al., 2010b, this issue). This can lead to significant economic losses and even pose risks to human health (Pimentel, 2000). Introduced species can change biodiversity, alter ecosystem processes, disrupt ecosystem services and the cultural landscape, act as vectors for novel diseases, and cause a myriad of other socioeconomic consequences for humans (McGinnity et al., 2003). As such, alien species are now considered the second most important cause of global change, surpassed only by habitat destruction.

One area of concern regarding the spread of invasive alien species is through the presently observed rapid growth of aquaculture practices (Musil et al., 2010, this issue; Savini et al., 2000, this issue) and fisheries (Winfield et al., 2010, this issue). To maintain and expand their markets, the aquaculture industry continues to innovate, developing new and cost-effective production methods. Novel species production is one market growth area (Arbačiauskas et al., 2010, this issue), with a continual search for fish, shellfish (e.g. Mollusca, Crustacea and Echinodermata), and plant species of well-known biology and application in extensive/intensive cultivation. The creation of new fisheries and aquaculture resources with these species in new locations presents several major challenges, including their potential ecological, environmental and economic impacts as well as their potential genetic impacts through interbreeding of farmed and wild stocks. This latter aspect is a particular concern as regards the release of genetically modified organisms. Therefore, vigilance is needed through the monitoring of species distributions (Carman et al., 2010, this issue) and the arrival of new species (Davis and Davis, 2010, this issue; Orrù et al., 2010, this issue). In many cases, little is known of the novel species (Minos et al., 2010, this issue), and indeed much remains to be learned of the environmental biology of long-standing species (Tarkan et al., 2010, this issue) and of native species responses to them (Berezina and Strelnikova, 2010, this issue). An additional risk associated with new organisms in aquaculture, particularly where no quarantine procedures are used, is the inadvertent introduction of non-target organisms associated with the target species, including parasites, pathogens, and viruses. This can considerably undermine the development and growth of new fishery resources and the maintenance of native species fisheries.

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