



Full length article

## Consumer perspectives on theoretical certification schemes for the marine aquarium trade



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### ABSTRACT

Certification schemes are a component of sustainable industry development that can help empower consumers to support environmentally friendly and ethical commodities with their purchase decisions. At present, there is no unified certification scheme within the marine aquarium trade, limiting the capacity for consumers to differentiate sustainable products from others. To assess the extent to which consumers show preference for certified marine aquarium fishes (Teleostei) in the current market climate, an online survey of 510 marine aquarium consumers was conducted over a six month period to determine how certification schemes, presented under different themes, would influence their buying decisions when compared to other attributes of potential importance. Using a Likert five point scale, it was determined that consumers placed significantly higher importance on a certification theme of industry best practice ( $3.99 \pm 0.05$ ) than themes of environmental sustainability ( $3.77 \pm 0.05$ ) or supporting indigenous fishers ( $3.36 \pm 0.06$ ;  $F_{pseudo(14,7141)} = 212.08$ ,  $P < 0.01$ ). The only surveyed attributes of greater importance than industry best practice certification were a fish's health ( $4.81 \pm 0.06$ ), aquarium suitability ( $4.56 \pm 0.03$ ), and the fish species ( $4.21 \pm 0.04$ ). A high percentage of surveyed consumers were willing to pay a price premium for fishes that were certified under the themes of environmental sustainability (90.5%), adherence to industry best practice (91.0%), and supporting indigenous fishers (82.6%). This indicates potential for the absorption of the costs of implementing certification schemes by exporters, wholesalers, and retailers. Further analysis revealed consumer predispositions towards certain certification themes that may be helpful in establishing consumer confidence in future industry certification schemes.

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## 1. Introduction

Sustainable development is now a well-established business concept (Wynne, 1994; Lubin and Esty, 2010; Lorenz and Veenhoff, 2013; Lawley et al., 2016), though not without problems (Carrier, 2010; Büscher et al., 2012; Sampson et al., 2015). Certification schemes are often a component of sustainable development ideals designed to inform consumers about the processes involved in the supply of a particular commodity and in so doing, empower them to improve industry through their purchase decisions (Teisl et al., 2002; Leadbitter and Ward, 2007). Well known global schemes

include the Forest Stewardship Council (FSC) and the Marine Stewardship Council (MSC), which use the willingness of consumers to pay a premium for certified commodities to promote and expand environmentally sustainable and socially ethical modes of production of timber and seafood, respectively. For some MSC-certified fisheries, certification has been associated with economic benefits to fishers (Stemle et al., 2016) and environmental improvements occurring as a result of fishery certification (Gutiérrez et al., 2012; Martin et al., 2012). However, implementation of certification does not necessarily guarantee socio-economic or environmental improvement for a fishery (Jacquet et al., 2010; Tlustý, 2012; Bush et al., 2013; Christian et al., 2013) and much remains to be learned in increasing the potential for certification to evoke positive change.

The marine aquarium industry represents an ideal market for a similar type of certification programme (reviewed in Dykman, 2012). This industry collects millions of live marine fishes from their natural habitats, primarily from developing countries in the

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Indo-Pacific region, for the purpose of stocking public and private aquaria worldwide, with major markets in the United States, Europe, Australia, and Asia (Wabnitz et al., 2003; Rhyne et al., 2012). Although aquaculture and post-larval capture and culture supply markets with a small number of species (Moorhead and Zeng, 2010; Olivotto et al., 2011), the majority of marine aquarium fishes are still collected from the wild. Sustainably managed marine aquarium fisheries can provide income for some of the most economically marginalised people (Ferse et al., 2013; Madduppa et al., 2014; Schwerdtner Mánéz et al., 2014) and offer an alternative to more environmentally destructive livelihood activities (Wabnitz et al., 2003). Conversely, overexploitation of marine aquarium fishes can result in localised stock depletions and inflame social conflict between stakeholders (Yeeting and Pakoa, 2005; Miltz and Foale, 2017). Defining what is unsustainably harvested in many cases is easier than defining what is sustainably harvested, as there are clear data on declining stock trends and use of environmentally destructive collection practices involving anaesthetising chemicals (i.e., cyanide) or physical reef damage (Kolm and Berglund, 2003; Wabnitz et al., 2003; Kinch, 2004; Shuman et al., 2005; Reksodihardjo-Lilley and Lilley, 2007; Thornhill, 2012). Post-collection handling, holding, and transport to end markets creates further environmental and ethical concerns prompted by high percentages of rejected catch, establishment of nonindigenous fish populations, and supply-chain mortality (Erdmann and Vagelli, 2001; Schmidt and Kunzmann, 2005; Holmberg et al., 2015; Miltz et al., 2016). While efforts have been made and continue to be made to reform the trade through government regulation from within some source countries, capacity for enforcement is often weak (Erdmann, 2001; Wood, 2001; Ferse et al., 2013). Further, education alone is often not enough to initiate change at the supply end of the fishery due to socio-economic pressures that require maximising immediate financial returns (Rubec et al., 2001; Ferse et al., 2013; Miltz et al., 2016).

With the present century being afflicted with global declines in aquatic ecosystems, spurred by anthropogenic stressors and global climate change (Hughes et al., 2003; Bellwood et al., 2004), both the environmental and social impacts of the marine aquarium trade are matters of increasing concern. The potential impacts of the marine aquarium trade on coral reefs have come under increasing scrutiny by NGOs and government regulators given the high-profile nature of the trade (Thornhill, 2012; Miltz and Foale, 2017). However, not all avenues of marine fishes supply pose environmental or ethical concerns, as some supply lines and fisheries are both internally and externally regulated to the best available science (Roelofs and Silcock, 2008; Dee et al., 2014; Rossiter and Levine, 2014).

This leaves consumers as a potential target audience to evoke change in the industry. The market for marine aquarium organisms represents a generally unified, better educated and more informed segment of society (Alencastro, 2004; Shuman et al., 2004). The understanding of environmental issues exhibited by the majority of consumers in the aquarium trade (Alencastro, 2004; Murray and Watson, 2014) enables links between certification schemes and associated environmental and social benefits to be more easily achieved. Consumers are also incentivised to support certification schemes where, in addition to environmental and/or social benefits, the certified fishes are likely to be in better condition and may have improved survival in captivity (Hall and Bellwood, 1995; Rubec et al., 2001). In order for consumers to play a role in improving the marine aquarium industry with their purchase choices, consumers must first be able to differentiate the practices involved in bringing collected fishes to market.

At present, there is no unified certification scheme for marine aquarium fishes. The past failure of a certification system set up by the Marine Aquarium Council (MAC) (reviewed in Mathews-Amos and Claussen, 2009), as well as the presence of a number of com-

pany specific “eco-labels”, is likely to have caused confusion and decreased confidence towards certification schemes among consumers. While prior studies have proposed a certification scheme established with government support as the most effective way to move towards well managed marine aquarium fisheries (Murray and Watson, 2014), the extent to which consumers show preference for certified fishes in the current market climate remains uncertain.

In this paper, we questioned consumers regarding certification schemes that relate to aspects of regulating industry practice, concerning fishes (Teleostei), in the marine aquarium trade. Here we address certification in accordance with three major themes: (1) environmental sustainability, (2) revenue supporting indigenous fishers, and (3) industry best practice for fish handling and husbandry. Given that the effectiveness of any certification scheme depends on consumer acceptance, marine aquarium consumers (i.e., hobbyists) were surveyed on the importance of certification and how these three themes might impact their buying decisions compared to other attributes of potential importance. We then explore how insights from our study could contribute towards the design and implementation of industry-wide certification schemes.

## 2. Material and methods

### 2.1. Survey design and distribution

Informal consultations with various industry stakeholders (including fishers, exporters, retailers, consumers, government, and aquarium industry consultants) led to the development of a cross-sectional survey to evaluate the perceived importance and willingness of consumers to purchase fishes certified with respect to the three major themes addressed above. Use of broad certification themes was given preference over clearly defined certification standards to more accurately reflect the realities of certification marketing. While this approach runs the risk that surveyed consumers respond to a different set of perceptions than what the certification may specifically entail, the reality of certification marketing is that consumers are rarely presented with complete information that defines the specifics of a certification scheme at a point of sale (Lawley et al., 2016); further, the presentation of specifics in their entirety runs the risk of cognitive overload (Wells et al., 2011). This approach also ensures the results obtained from the survey reflect attitudes towards certification as a principle rather than reflect attitudes towards the specifics of the certification schemes, for which the majority of consumers are unlikely to be adequately equipped to judge the scientific appropriateness (Lawley et al., 2016).

Survey development was done through online survey design software ([surveymonkey.com](http://surveymonkey.com)). Eleven questions from a variety of formats were utilised; including multiple choice, Likert-type scales, and open ended response (see supplementary material online for survey). Two marine aquarium suppliers and an anthropologist, formerly employed by the MAC, pre-tested the survey before it was disseminated, to evaluate clarity and appropriateness for consumers.

The survey was accompanied by a cover letter explaining the research objectives under the pretext of what attributes were most important to consumers when purchasing a marine fish. Themes of sustainability, eco-certification, or certification schemes in general were omitted from the cover letter and advertising statements for the survey to prevent preconditioning of respondents. A statement of confidentiality and a request to provide electronic consent in the form of a yes/no question accompanied the survey. Incentive for completing the survey was offered by highlighting that

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