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Comment

# Native species as goods

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## Introduction

We thank Tassin and Kull (2015) for their response to our article on human use of non-native species (Speziale et al. 2014), which we hoped would generate discussion. We are disappointed, however, that their comment does not contribute new ideas and focuses on the following topics already discussed in the literature: that non-native species may be more productive than natives, that there is a need to produce certain products all over the world, and that humans depend on non-native species. We are not saying these contentions are false; rather, our proposal goes beyond them. New strategies are needed to reduce the negative consequences of the use of non-native species (Driscoll et al. 2014).

In particular, Tassin and Kull "refute [our] idea of nativism," but *nativism* (a term they do not define) is not the focus of our proposal. They also contend there are "unaddressed consequence of the proposal." In fact, we addressed each of those consequences in our article. They also believe we confound *non-native* and *invasive species*, when we clearly differentiate them and their impacts. In answering their concerns, we followed the structure of their Comment.

## Native Culture and Nativeness

Tassin and Kull argue that non-native species can enrich local culture. This idea has been criticized as there is evidence that increasing use of non-native species may erode traditional knowledge when for example, native species are replaced with non-native species (Edwards & Heinrich 2006; Turner & Turner 2008). Eco-cultural restorations are being proposed to stop loss of knowledge of how to use native species (Turner & Turner 2008).

## Pragmatic Issues

Tassin and Kull say, " . . . from economic and food security points of view, native species tend to have lower productivity." We are not saying people should stop raising cattle or planting potatoes. In the context of a coming global food and fuel crisis, we recognize the possibility of controlling some non-native invasive species by using them. However, we suggest there are opportunities to slowly reconvert at least some elements of local economies. Newer studies than those the authors cite show that some native species may be as productive as non-native species (Cubbage et al. 2007; Piotto et al. 2010). Although native species may not always be as profitable as equivalent non-native species, they may still provide reasonable financial returns that can be increased through improved management (e.g., Cubbage et al. 2007; Piotto et al. 2010). Importantly, native species use reduces the negative effects produced by the use of non-native species (e.g., Lamb et al. 2005; Cassano et al. 2011).

Currently, there is a growing interest in ecologically based agriculture and silvopastoral systems. In Mexico, local communities maintain native maize diversity by locally growing different varieties at small scale for subsistence use and for trading in local or regional markets (Brush & Perales 2007). Traditional agroecological systems, a Neolithic legacy, have proven their effectiveness over time and are still used in the high Andes for cultivating native tubers such as potatoes (*Solanum tuberosum*), chenopods (*Chenopodium* sp. or *Atriplex* sp.), oca (*Oxalis tuberosa*), and ulluco (*Ulluco tuberosus*) (Altieri 2004). These systems are good examples of economic use of native species that protect biodiversity and ensure food sovereignty by focusing on local autonomy (Altieri 2004; Altieri & Toledo 2011). The current trend of increasing local markets and local production–consumption cycles

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(Altieri 2004; Altieri & Toledo 2011) could be improved by growing native species.

Tassin and Kull state that "... exploitation and husbandry of native species has potentially problematic implications for conservation." We agree that there are no globally perfect solutions, but there are many examples of native species use that do not threaten species or environments. In our article, some good examples we cite are discussed in Lamb et al. (2005) and Cassano et al. (2011). Contrary to what Tassin and Kull propose, monospecific forests of, for example, native *Nothofagus* species maintain higher biodiversity and are less prone to wildfires than non-native coniferous monocultures (Paritsis & Aizen 2008; Veblen et al. 2011). However, as we say in our article, before a species is used it is imperative to evaluate its potential conservation risks.

A good example of what we propose is exemplified in the case of the guanaco (*Lama guanicoe*). The guanaco, a native camelid, was one of the main staples for hunter-gatherer societies throughout the Holocene in southern South America (Fernández 2008). In South America, introduced red deer (*Cervus elaphus*) and livestock are used in traditional dishes at Patagonian restaurants, whereas the guanaco, which is a good quality meat, is not used (Lambertucci & Speziale 2011; Speziale et al. 2012). Guanaco consumption decreased with the introduction of cattle by European colonizers. The overvaluation and use of the non-native species negatively affected native species. Native guanacos, and vicuñas (*Vicugna vicugna*), also provide excellent wool and leather and are a tourist resource. Nonetheless, they are persecuted because they compete with non-native sheep and cattle used for the same purposes. Fortunately, recent projects to sustainably commercialize guanaco and vicuña are being developed successfully (http://www.alpacacollections.com or http://www.payunmatru.com/guanacos.html). We expect this will change the perception of ranchers toward these emblematic species.

There are analogous examples from around the globe. In Africa, raising and breeding of camels are of primary importance in countries such as Somalia and Ethiopia, where the use of camels for meat, milk, fiber, and leather products does not threaten this native species (Cardellino et al. 2005). Moreover, the use of camels is increasing given that traditional cattle and sheep ranching present sanitation problems (Cardellino et al. 2005). In Australia, increased use of native species in arts and crafts production would not threaten the resource and would have a positive economic effect on local communities (Altman & Whitehead 2003). Another emblematic case is Kruger National Park, where many goods derived from the protected area provide higher incomes, without harming native species, than use of protected the area for agriculture (Engelbrecht & Van der Walt 1993).

## Alternative Melting Pot Views

There is ongoing discussion regarding whether conservation professionals should care about the differences between native and non-native species (Davis et al. 2011), despite a large literature that shows the importance of these differences (e.g., Simberloff 2011). Following Tassin and Kull's extreme line of argument, if one accepts the integration of non-native species in cultural traditions and native landscapes, it implies that one accepts the eventual loss of native biodiversity and traditions. Acceptance of such a loss also raises ethical issues regarding the loss of knowledge of the use of native species, akin to the loss of an aboriginal language, both of which may be considered unacceptable. Given the long period it takes for some non-native species to fully reveal their impacts, it also seems unwise to ignore potentially unpredictable outcomes arising from the use of non-native species.

Tassin and Kull criticize our proposal by magnifying its possible draw backs, which we attempted to outline clearly. In Speziale et al. (2014), we call for scientific and social discussions focusing on the need to carefully consider the social overvaluation of non-native species; recognize the value of native species through research and education; and enhance the sustainable use of particular native species. Such discussions are only a first step and will probably have limited impact in the short term, but they may have substantial benefits in the long run. We suggest that local native species be valued above a small number of globalized species. Our proposal is not a recipe to be strictly followed for all native species or by every country as the negative effects of non-native species are unevenly distributed. However, when a non-native species is considered a resource, it entrains ecological and cultural consequences that are difficult to remediate (Lambertucci & Speziale 2011; Nuñez et al. 2012). In many instances, if the true value of native species were recognized, their conservation would be much more likely.

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