Addressing a Duty to Preserve Biodiversity, Not Genetic Integrity

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Abstract: Rohwer and Marris (2015) question the existence of a prima facie duty to preserve genetic integrity leaving open the question of what we should preserve. Many of the arguments used to justify their position could set the platform to defend a duty to preserve the diversity of both wild and domesticated species. In times where agricultural land covers a third of world's land area and major efforts are undertaken to green urban areas a defense of biodiversity could benefit hugely by intelligently incorporating human-induced diversification. It still remains critical to assess in how far new introductions compensate for losses and here the insights of those defending genetic integrity are an important tool. By acknowledging the added value of human-induced biodiversity we could slow down massive extinction of domesticated and semi-wild varieties by giving these a greater space in human-made environments.

Rohwer and Marris (2015) question the existence of a prima facie duty to preserve genetic integrity, leaving open the question of what we – as humanity – should preserve and how. Interestingly, many of the arguments used to justify their position could set the stage to defend a duty to responsibly preserve the diversity of both wild and domesticated species.

The position on genetic integrity preservation the authors criticize sets little value on breed and other types of human-induced varieties. These varieties however add significantly to our world's biodiversity and possess in many instances not only commercial value but also incorporate a vast amount of our cultural heritage. Despite the potential and actual utility for humankind, as well as the enormous labor invested by hundreds of generations of farmers in breeding, human-induced biodiversity is facing the same fate of rapid erosion as species of solely natural origin.

In contrast to this trend, humans are continuously bringing new varieties into existence to counter evolutionary pressures and meet new needs. Although plant breeders and agronomists are generally aware of the dynamic nature of crop genetic resources, breed animals and ornamental varieties (van de Wouw, Kik, van Hintum, van Treuren, & Visser, 2010), it is unclear how far the newly introduced varieties manage to incorporate the richness lost as a consequence of further hybridization and the disappearance of varieties. Even when embracing the idea that human interferences are inevitable in the age of the Anthropocene and could play a positive role when carefully managed (Di Paola, 2015), it still remains indispensable to assess how far new introductions actually compensate

for losses, and here the insights of those defending genetic integrity are an important tool.

To address the fears of those defending genetic integrity, we can affirm by relying on Rohwer and Marris' examination that an overall assessment of losses and new arrivals to biodiversity should observe at least the following four considerations. First, we should place a stronger emphasis on protecting species that have survived thousands of years of evolutionary pressures and not merely focus on those who have shown potential to withstand current anthropogenic pressures or attract short-term commercial interests, otherwise we will never know the potential the lost species would have had to adapt to up- coming environmental conditions. In other words, the strength to survive current human interferences is an inadequate proxy to identify the importance of a species within an ecosystem or calculate its future value. Second, when assessing losses in biodiversity we should not only be concerned with the number of species and varieties lost, but also with reducing further losses in distinctiveness among the varieties and species that are left. Third, we should be more careful in directly or indirectly strengthening or weakening the fitness of individual varieties. And fourth, we should engage in larger efforts to preserve – either in situ or ex situ – varieties whose traits will get lost through hybridization.

Despite these dangers, why should we be more welcoming to human-induced diversification? In times where agricultural fields cover a third of the world's land area and major efforts are undertaken to green urban areas, a defense of biodiversity could benefit hugely by intelligently incorporating human-induced diversification as these areas are consciously managed. Depending on the policies pursued, cities and agricultural fields could secure a major role within in situ conservation efforts. As these places serve major human interests, conservationists could achieve greater successes when showing greater flexibility in regard to the maintenance and introduction of new species and varieties, even though such new introductions will jeopardize efforts to retain genetic integrity by allowing new forms of crossbreeds. Allowing people to satisfy up to a certain rational extent aesthetic and functional preferences can ensure wider participation in incorporating more species and varieties in cities and agricultural fields, for example, by expanding refuge areas, introducing more plants in and around buildings, and diversifying urban trees and hedgerows. By acknowledging the added value of human-induced varieties we could also slow down the massive extinction of domesticated and semi-wild varieties by giving these a greater space in human-made environments. While domesticated varieties are with their over ten thousand years of continuous breeding efforts on an evolutionary perspective extremely young, the enormous evolutionary trajectory and environmental pressures they have faced, makes them irreplaceable assets of incredible potential and actual value. In a world where we have failed to assign sufficient resources to preservation efforts it is better to retain at least a number of the domesticated relatives of a species than losing the species altogether.

This shift in reasoning could be crucial to address three goals environmentalists generally agree on: a reduction of the rate of extinction of species, the provision of ecosystem services, and improving resilience of human-made natural habitats (Sagoff, 2013).

Even if we agree with Rohwer and Marris´ arguments for rejecting the intrinsic badness of anthropogenic interferences, we should nevertheless acknowledge that human-induced changes are occurring much faster and at a higher rate than most non-anthropogenic perturbations. This calls for caution, and here those defending genetic integrity are right in underlining the dangers of reducing or overly increasingly the fitness of a species. How- ever, advocating the preservation of biodiversity by emphasizing that ecosystems should retain as much fitness as possible, has significant advantages over condemning anthropogenic interferences with genetic integrity altogether, given the enormous and unavoidable effect humans have on the planet. While human interference can very rapidly degrade ecosystems, humans are at the same time also able to enormously speed up the recovery of ecosystems and re-establish new living systems, with prominent accomplishments in the restoration of degraded soils (Félix, 2015). The discipline of agroecology has shown great successes in mimicking natural ecosystems and using that knowledge to design food production systems that harbor a large amount of biodiversity while showing greater resilience towards climate change, despite remaining a relatively underfinanced research area (Altieri, Nicholls, Henao, & Lana, 2015).

As a policy instrument, it is wiser to acknowledge and appreciate that we have a great number of concerned citizens all over the world that would readily harbor a number of species in the habitats they control or influence. Encouraging and advising these people to make environmentally advantageous decisions in regard to which species they choose to steward could increase participation in preservation efforts. We are inheriting a planet that was vastly exploited and degraded by previous generations, but this does not mean that people are unwilling to take individual action in harboring a wider variety of species in their homes and cities. The creation of such habitats comes with price that it will facilitate new types of hybridization that would not have occurred naturally and thus directly threat- en efforts to preserve genetic integrity. However, when properly guided, the sum of these individual actions could form a significant force within efforts dedicated to mitigate the loss of biodiversity and at the same time improve the resilience of urban and agricultural ecosystems.

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