

# Coincident evidence demonstrates evolutionary aspects and the potential expansion of *Rubus geoides* under climate change

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## Abstract

According to the IPCC, the observed and projected changes in temperature and precipitation patterns are changing. There is a need to know the probable states of vegetation in the future to ensure meeting the goals of sustainable development of productive activities promoted by the United Nations. Our model species, *Rubus geoides* Sm, is distributed in many places in the southern Patagonia region. Since the first European settlements the distribution of this species has become more restricted, because of overgrazing and the change of land use by mining, forestry, livestock, expansion of cities, and the interest in functional and nutraceutical food that makes people harvest fruits directly from natural populations. We use a multidisciplinary approach by the union of scientific knowledge from morphology, genetics, and niche modeling to establish the dynamics of the species in the past and under future climate change scenarios. This effort can help determine the state of vegetation resources and give them the tools for decision-makers for conservation and management efforts and their food potential under climate change scenarios. Our results showed a significant difference in blooming among populations revealed by gene flow from specific populations. Also, we observed moderate genetic differentiation among populations, mixed ancestry in some populations, private alleles in specific sites, and species expansion demonstrated by the genetic analysis and the potential distribution model. This paper discusses the evolution of this species, considering the dispersal after the last glacial maximum (LGM) and which challenges we have in front of the change in land use and the future of this species in this changing climate.

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