Adaptive Management Based on the Habitat Change of Cibotium barometz under Synergistic Impact of Climate and Land Use Change —A Case Study of Guangxi, China

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Abstract

With the rapidly growing demand for medicinal plants globally, a sharp decline in the wild medicinal plant population. For rare, endangered, or overexploited species, cultivation is the only way to provide material without further endangering the survival of the valuable species. It is therefore essential to understand, 'how' and 'where' cultivation can be effectively implemented for dealing with conservation-related issues. Not only climate but also habitat loss stressors and, their synergistic effects matter in species redistribution and vulnerability. Climate change impact assessment without risks of land use change should mischaracterize the vulnerability and the spatiotemporal distribution of species. These imbalances place substantial limitations upon the ability to guide anticipative conservation actions and weigh the future outcomes of different policy or management options. Cibotium barometz is a highly demanded medicinal plant listed as a national key protected wild plant in China. For adaptive management, we assessed the suitable habitat change of C. barometz in Guangxi under the synergistic impact of climate and land use change by Maximum Entropy (MaxEnt) and Patch-generating Land Use Simulation (PLUS) models between the current and 2040 under three Shared Socio-economic Pathways (SSP) and proposed adaptive management countermeasure. Results indicate that altitude and BIO_18 are key environmental variables; suitable distribution area (SDA) shows a southwest-northeast and upload trend; the areas of cropland, forest, shrub, grassland, and barren are decreasing, water and impervious increasing; climate change accelerates the loss of C. barometz's habitat, SDA and suitable habitat for C. barometz is decreasing; the total area of suitable habitat is decreasing but the suitability degree is increasing. We propose an adaptive response to wild resource conservation based on the protected area system in southwestern in parallel with artificial cultivation in northeastern Guangxi. The study aims to provide insights into the sustainable utilization of endangered medicinal plants.

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