Using species distribution modeling to improve conservation of medicinal plants in Southwest China

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Southwest China represents a global biodiversity hotspot [1,2], it is generally defined as the area that includes the Sichuan, Yunnan, Guizhou, Tibet and Chongqing [3]. This area is known as the “kingdom of plants”. Its complex and diverse topography, and varying climates, provide a partial explanation for the high biodiversity. So far, 25998 species and intraspecific taxa have been recorded [4]. The medicinal flora of Southwest China is composed of approximately 5751 species, representing 80% of China’s medicinal flora [5]. While, the rich medicinal flora are under considerable conversion pressure with expanding human destructive exploration activities and economic development. Conservation strategies based on the geographic patterns of medicinal plant species richness, including the identification of meaningful floristic regions and priority areas for conservation, could improve the effectiveness of policy and management of medicinal flora in this area.

In this research, we produce distribution models at app. 10 km² resolution for 5751 medicinal plant species, using geo-referenced herbarium collections from this area, corrected for spatial bias using a null model, and detailed environmental variables, also using Bioclim model to predict the potential distribution areas for medicinal plants. As a results, we identified five important aspects of medicinal plant species distribution in Southwest China: (1) medicinal species diversity hotspots; (2) major medicinal floristic rich regions, using a cluster analysis of species presence/absence; (3) priority areas for medicinal plants conservation based on the concept of the ‘irreplaceability’ value of planning units; (4) the percentage remaining natural forest among the medicinal species rich and conservation priority areas, to assess the level of endangerment and (5) the estimated potential distribution with the climate data combined with the specimen records under the global warming image. Our maps provide clear priorities for the development of a sustainable and feasible biodiversity conservation strategy for medicinal plants in Southwest China.

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