Response of distribution patterns of two closely related species in Taxus genus to climate change since last inter-glacial

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Abstract

Climate change affects the species spatio-temporal distribution deeply. However, how climate affects the spatio-temporal distribution pattern of related species on the large scale remains largely unclear. Here, we selected two closely related species in Taxus genus Taxus chinensis and Taxus mairei to explore their distribution pattern. Four environmental variables were employed to simulate the distribution patterns using the optimized Maxent model. The results showed that the highly suitable area of T. chinensis and T. mairei in current period was 1.964×105km2 and 3.074×105km2, respectively. The distribution area of T. chinensis was smaller than that of T. mairei in different periods. Temperature and precipitation were the main climate factors that determined the potential distribution of the two species. The centroids of T. chinensis and T. mairei were in Sichuan and Hunan province in current period, respectively. In the future, the centroid migration direction of two species was almost opposite. T. chinensis would shift towards southwest, while T. mairei towards northeast. Our results revealed that the average elevation distribution of T. chinensis was higher than that of T. mairei. This study sheds new insights into the habitat preference and limiting environment factors of the two related species and provides a valuable reference for the conservation of these two endangered species.

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