Effects of climate change on the distribution of wild *Akebia trifoliata*

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Abstract

Understanding the impacts and constraints of climate change on the potential geographic distribution of wild *Akebia trifoliata* is crucial for its sustainable management and economic development as a medicinal material or fruit. In this study, according to the first-hand information obtained on-the-spot investigation, the geographic distribution and response to climate factors of *Akebia trifoliata* were studied by the MaxEnt model and ArcGIS. The genetic diversity and population structure of 21 natural populations of *Akebia trifoliata* were studied by SSR markers. The results showed that precipitation and temperature were the two most important climatic factors that restrict the geographic distribution of *Akebia trifoliata*. Under the current climate scenario, the suitable growth regions of *Akebia trifoliata* in China were 91.7-121.9 °E and 21.6-37.5 °N. Combined with the evolutionary relationship and prediction results, 21 populations of *Akebia trifoliata* tended to migrate to the north. In the scenarios (SSP2-4.5, SSP3-7.0, and SSP5-8.5) of higher greenhouse gas emission concentration, the distribution area of *Akebia trifoliata* continued to expand, while in the low concentration greenhouse gas emission scenario (SSP1-2.6), the distribution area of *Akebia trifoliata* remained stable. The distribution center of *Akebia trifoliata* in China will shift to high latitude regions with the increase of temperature in the future. The results evaluated the impact of climate factors on the spatial distribution of wild *Akebia trifoliata*, displayed the possible changes of geographical distribution of *Akebia trifoliata* under different climate scenarios, and provided scientific evidence for durative protection and supervise of *Akebia trifoliata*.

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