Upward Shifts in Ageratina adenophora Global Distributions in Response to Future Climate Change Scenarios

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Abstract

Aim: Invasive alien species (IAS) threaten ecosystems and humans worldwide, and future climate change may accelerate the expansion of IAS. Predicting the suitable distributions of IAS can prevent their further expansion. Ageratina adenophora is a invasive weed over 30 countries in tropical and subtropical regions. However, the potential suitable distribution of A. adenophora remains unclear along with its response to climate change. This study explored and mapped the current and future potential distributions of Ageratina adenophora. Location: Global Taxa: Asteraceae A. adenophora (Spreng.) R.M.King & H.Rob. Commonly known as Crofton weed. Methods: Based on A. adenophora occurrence data and climate data, we predicted its potential distribution of this weed under current and future (four RCPs in 2050 and 2070) by MaxEnt model. We used ArcGIS 10.4 to explore the distribution characteristics of this weed and the 'ecospat' package in R to analyse its altitudinal distribution changes. Results: The area under the curve value (>0.9) indicated excelled model performance. Among environment factors, Mean Temperature of Coldest Quarter contributed most to the model. Globally, the suitable habitat for A.adenophora invasion decreased under climate change scenarios, although regional increase were observed, including in six biodiversity hotspot regions. The potential suitable habitat of A.adenophora under climate change moved toward regions with higher elevation. Main Conclusions: Temperature was the most important variable influencing the distribution of A. Adenophora. Under the background of warming climate, the potential distribution range of A.adenophora will shrink globally but increase regionally. The distribution of A.adenophora will shift toward higher elevation under climate change. Mountain ecosystems are of special concern as they are rich in biodiversity and sensitive to climate change, and increasing human activities provide more opportunities for IAS invasion.

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