Abstract

The Neogene geologic processes and climatic changes had tremendous impact on evolution of biota in different regions of Northern Hemisphere (NH). The Qinghai-Tibetan Plateau (QTP) was a central part of these processes. Migrations from the QTP to other temperate regions represent one of the main biogeographic patterns for Northern Hemisphere. However, this 'out-of-QTP' hypothesis has never been tested through a phylogeographic analysis of a widely distributed species and the ages and routs of these migrations are largely not resolved. On the other hand, climate change played an important role in shaping the amount and structure of intraspecific genetic diversity, which provide the main basic substrate for any evolutionary change. Therefore, a detailed understanding of the effects of historic climate alterations on intraspecific genetic diversity can provide valuable insights into the evolutionary consequences of past climate changes and predicting the likely direction of global warming effects on sustainability of extant populations and species. In this thesis, I first studied the phylogeography of *Hippophae rhamnoides* to test the 'out-of-QTP' hypothesis (Chapter II). Then, I performed phylogenetic, dating and biogeographic analyses of the genus *Hippophae* (Chapter III). Finally, I studied the correlation between genetic diversity and changes in climatic niche suitability of *H. rhamnoides* ssp. *sinensis* (Chapter IV). The phylogeographic analyses supported an 'out-of-QTP' hypothesis for *H. rhamnoides* followed by allopatric divergence, hybridization and introgression. The biogeographic analyses of *Hippophae* highlighted the impact of different stages in uplift of the QTP and Eurasian mountains and climatic changes in the Neogene on diversification and range shifts in highland flora on the continent. Patterns of genetic diversity in *H. rhamnoides* ssp. *sinensis* suggested strong impact of historical climatic niche suitability and both extent and direction of changes in niche suitability throughout the Late Quaternary on current within-population genetic diversity in this pioneer plant species.