

Figure S1 Field investigation area

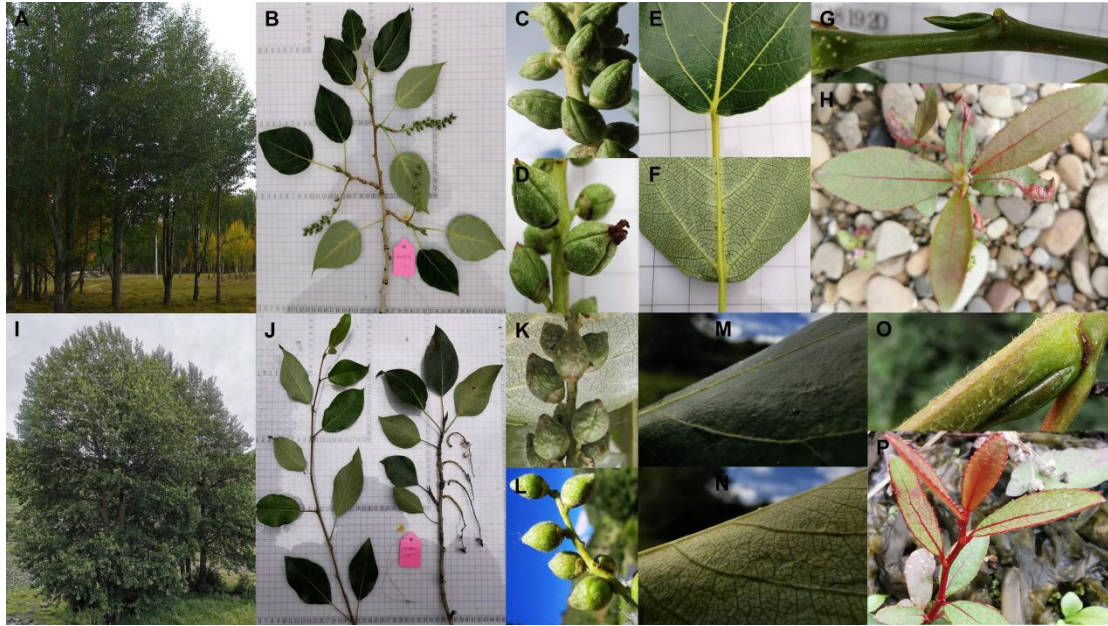


Figure S2 Habitats and specimens of *P. schneideri* var. *tibetica* and *P. kangdingensis*. (A–H) *P. schneideri* var. *tibetica*, (I–P) *P. kangdingensis*. (A, I) Habitats; (B, J) Specimens; (C, D, K, L) Capsule and infructescence; (E, F, M, N) Leaf and petiole; (G, H) Stem and bud. (H, P) Seedlings.

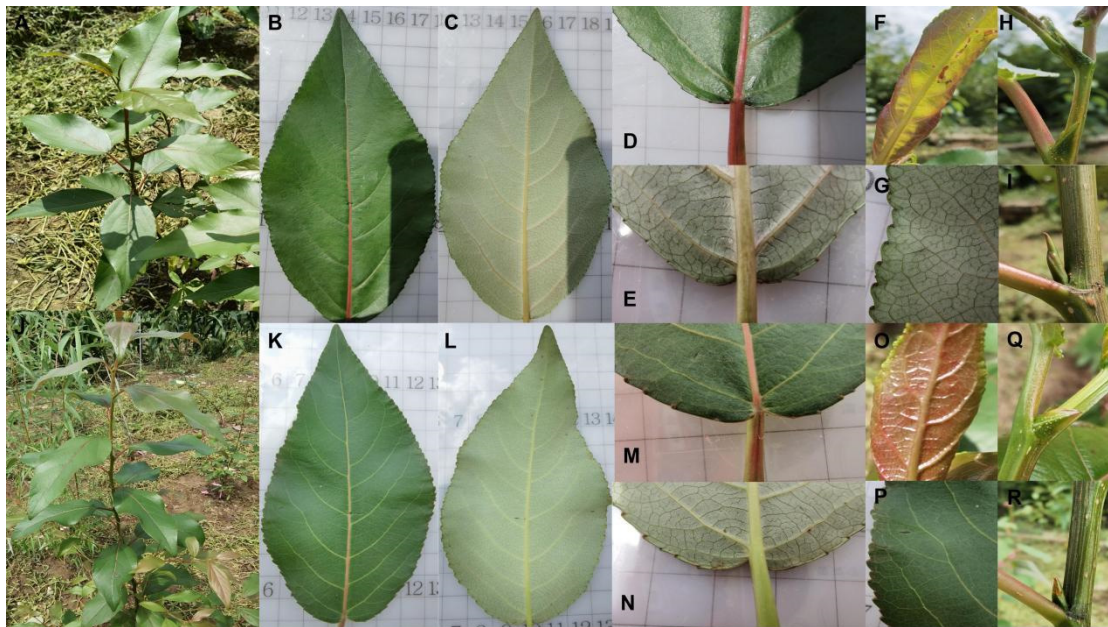


Figure S3 Cutting seedlings of *P. schneideri* var. *tibetica* and *P. kangdingensis*. (A–I) *P. schneideri* var. *tibetica*, (J–R) *P. kangdingensis*. (A, J) Cutting seedlings; (B, C, K, L) Front and back of the blade; (D, E, M, N) Petiole and leaf base; (F, O) Primary leaf; (G, P) Leaf edge serrated. (H, I, Q, R) Stem and bud.

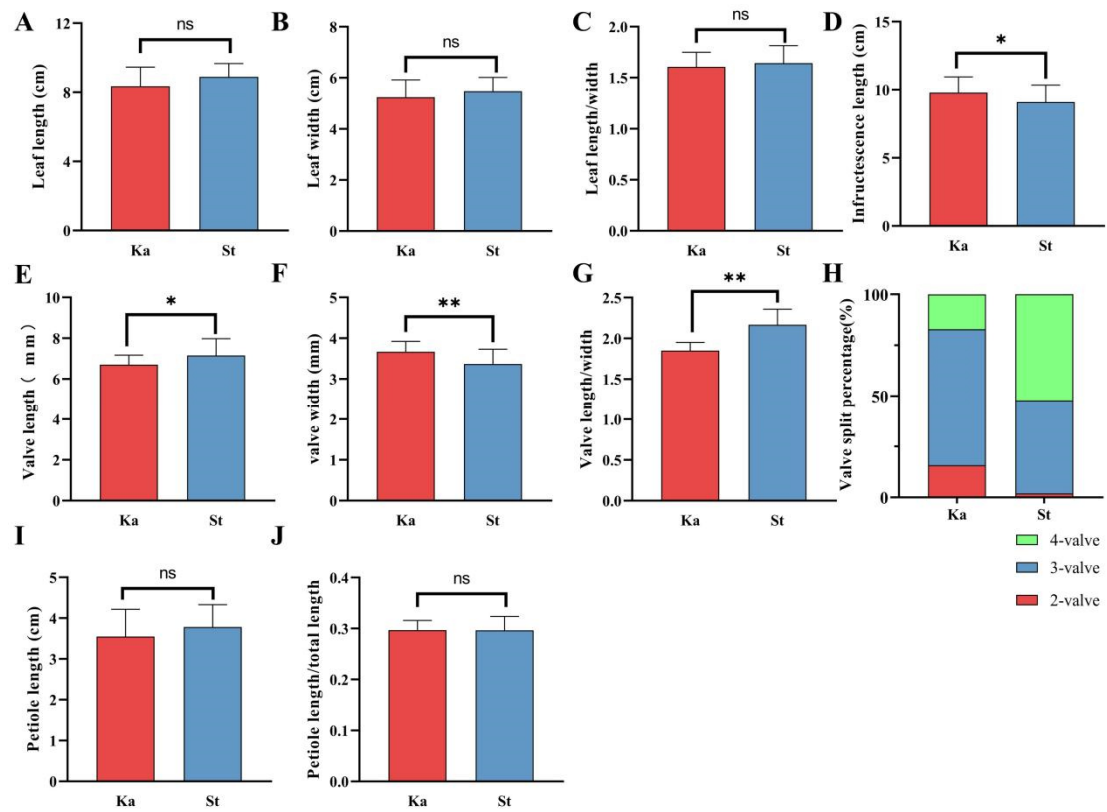


Figure S4 Comparison of morphological traits between two taxa. (A) Leaf length; (B) Leaf width; (C) Ratio of leaf length to leaf width; (D) Infructescence length; (E) Valve length; (F) Valve width; (G) Ratio of valve length to valve width; (H) Valve split percentage; (I) Petiole length; (J) Ratio of petiole length to leaf total length. *P. kangdingensis* (Ka) and *P. schneideri* var. *tibetica* (St).

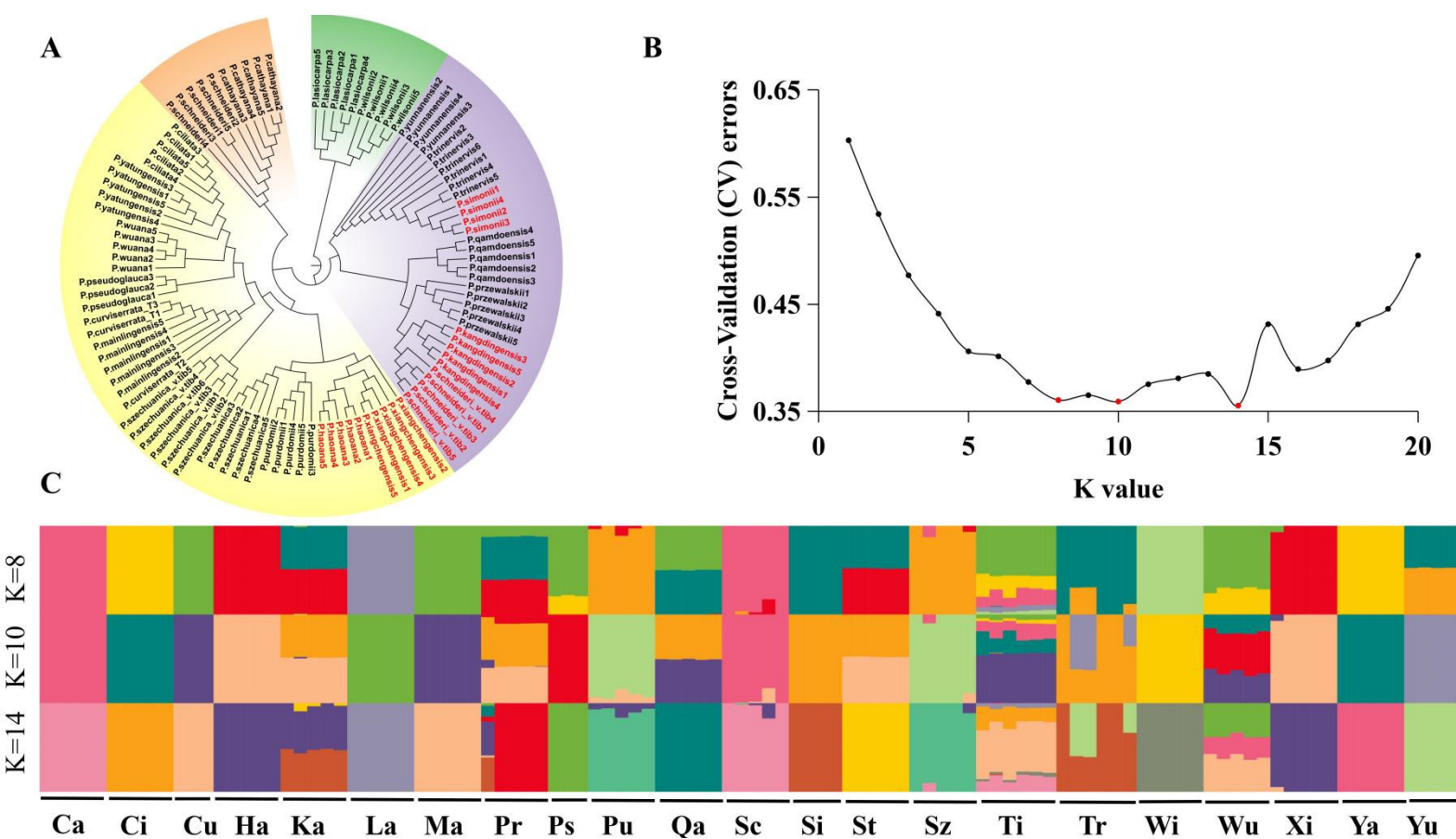


Figure S5 Phylogenetic relationship of poplar on the Qinghai-Tibet Plateau. (A) NJ phylogenetic tree; (B) Cross validation errors of K value from 2 to 20; (C) Genetic structure ($K=8, 10$ and 14). *P. cathayana* (Ca), *P. ciliata* (Ci), *P. curviserrata* (Cu), *P. haoana* (Ha), *P. kangdingensis* (Ka), *P. lasiocarpa* (La), *P. mainlingensis* (Ma), *P. przewalskii* (Pr), *P. purdomii* (Pu), *P. qamdoensis* (Qa), *P. schneideri* (Sc), *P. simonii* (Si), *P. schneideri* var. *tibetica* (St), *P. szechuanica* var. *tibetica* (Ti), *P. trinervis* (Tr), *P. wilsonii* (Wi), *P. wuana* (Wu), *P. xiangchengensis* (Xi), *P. yatungensis* (Ya), and *P. yunnanensis* (Yu).

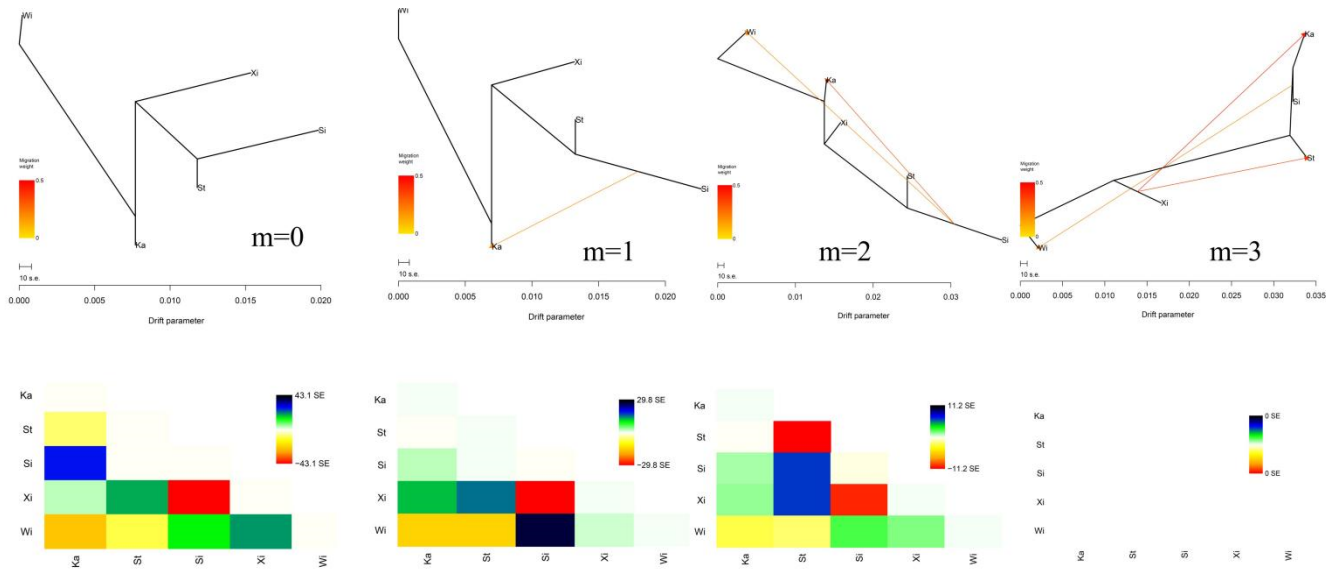


Figure S6 The ML phylogenetic tree with migration events. The results above were constructed by TreeMix for m from 0 to 3, and the arrows represent the direction of gene flow. Corresponding Residual error heat map of treemix model. *P. simonii* (Si), *P. xiangchengensis* (Xi), *P. kangdingensis* (Ka) and *P. schneideri* var. *tibetica* (St).

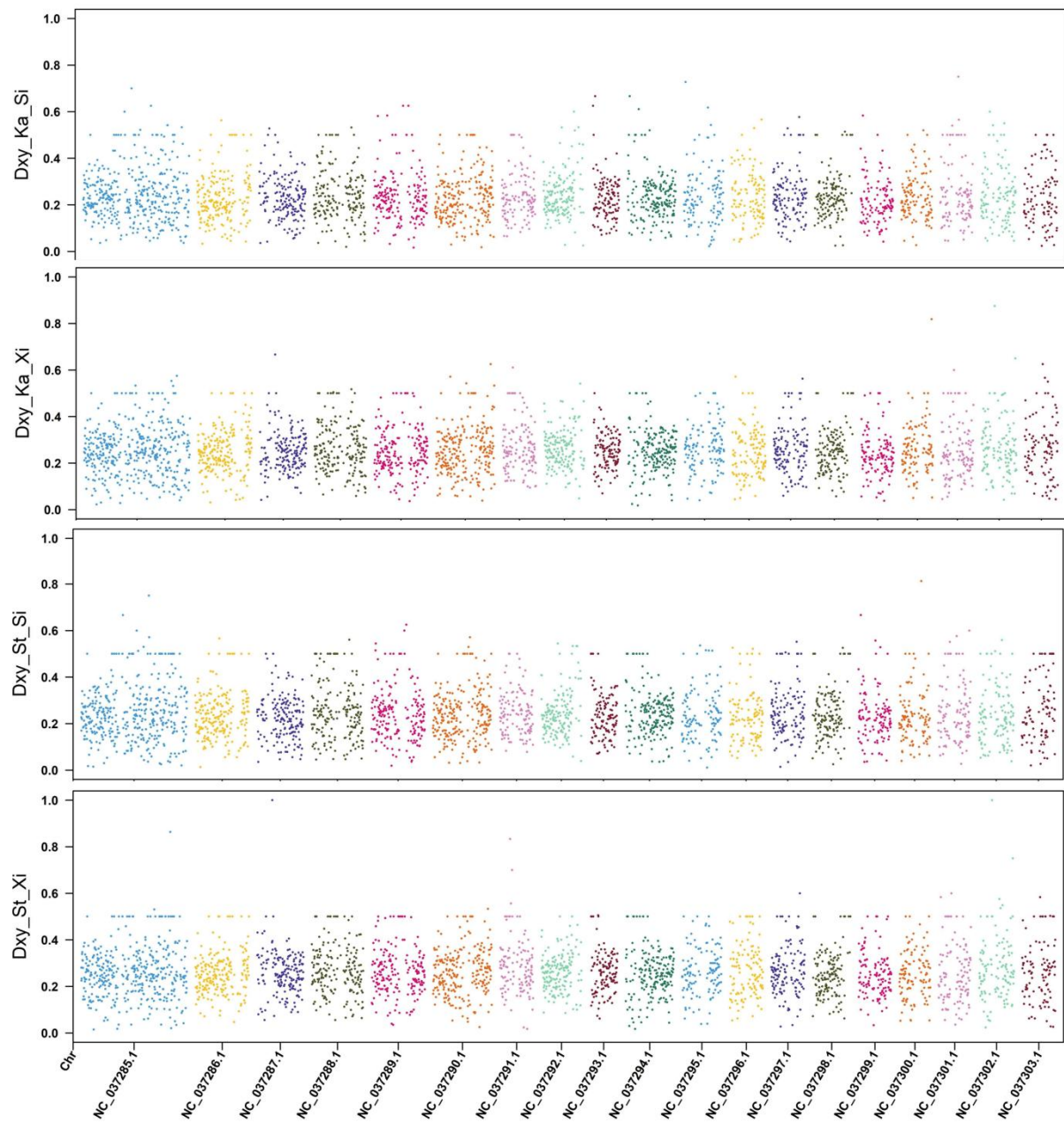


Figure S7 The distribution of absolute differentiation coefficients (D_{xy}) between two populations on the whole genome. *P. simonii* (Si), *P. xiangchengensis* (Xi), *P. kangdingensis* (Ka) and *P. schneideri* var. *tibetica* (St).

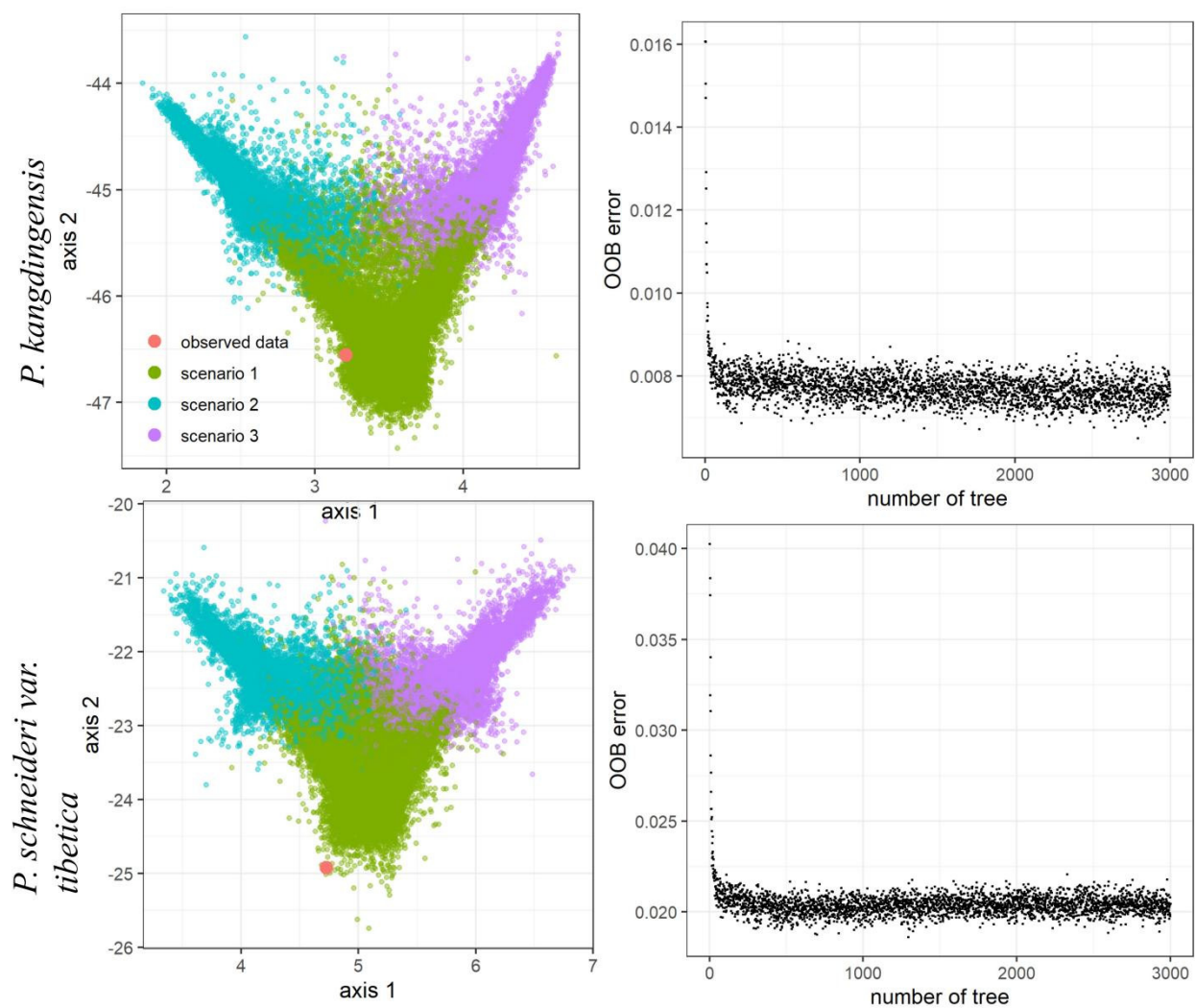


Figure S8 Simulated data projection and model error rate of three scenarios

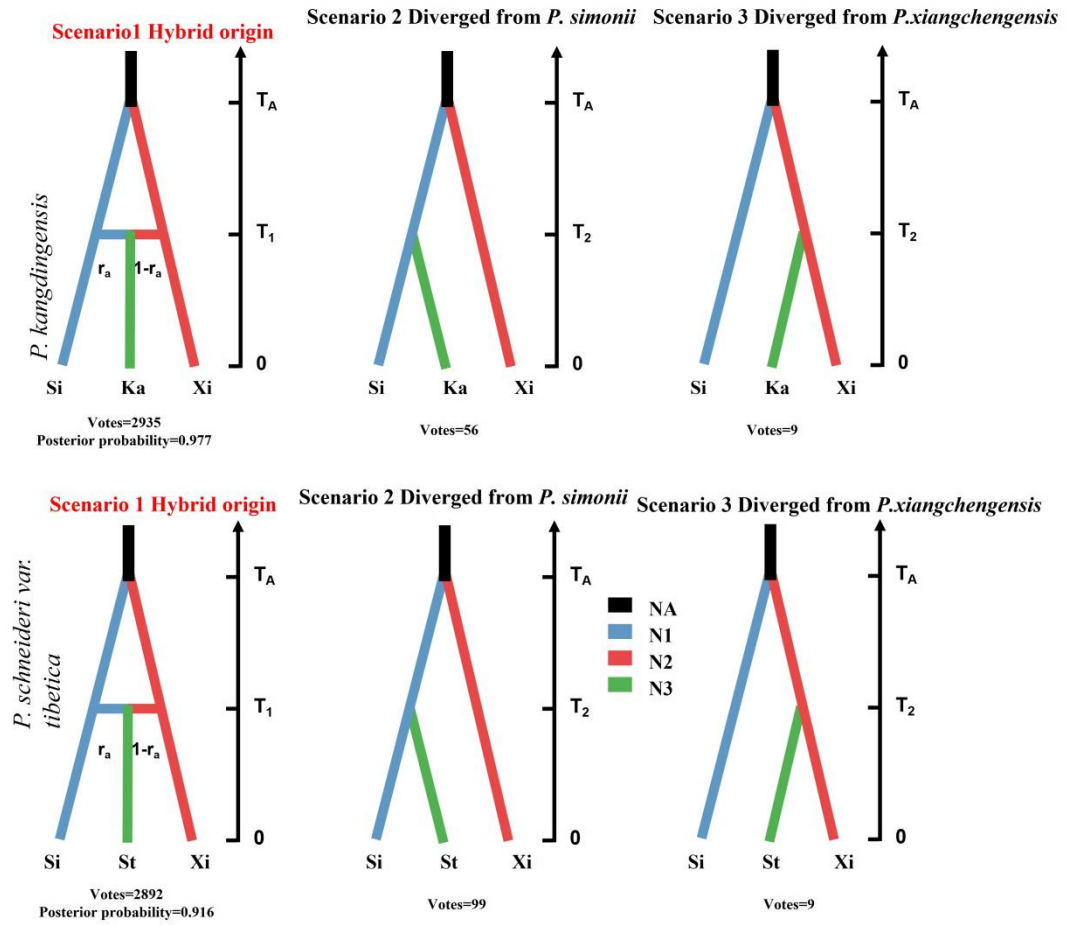


Figure S9 The three possible origin models of two taxa. The results above were constructed by DIYABC-RF, with their corresponding posterior probabilities and votes. *P. simonii* (Si), *P. xiangchengensis* (Xi), *P. kangdingensis* (Ka) and *P. schneideri* var. *tibetica* (St).

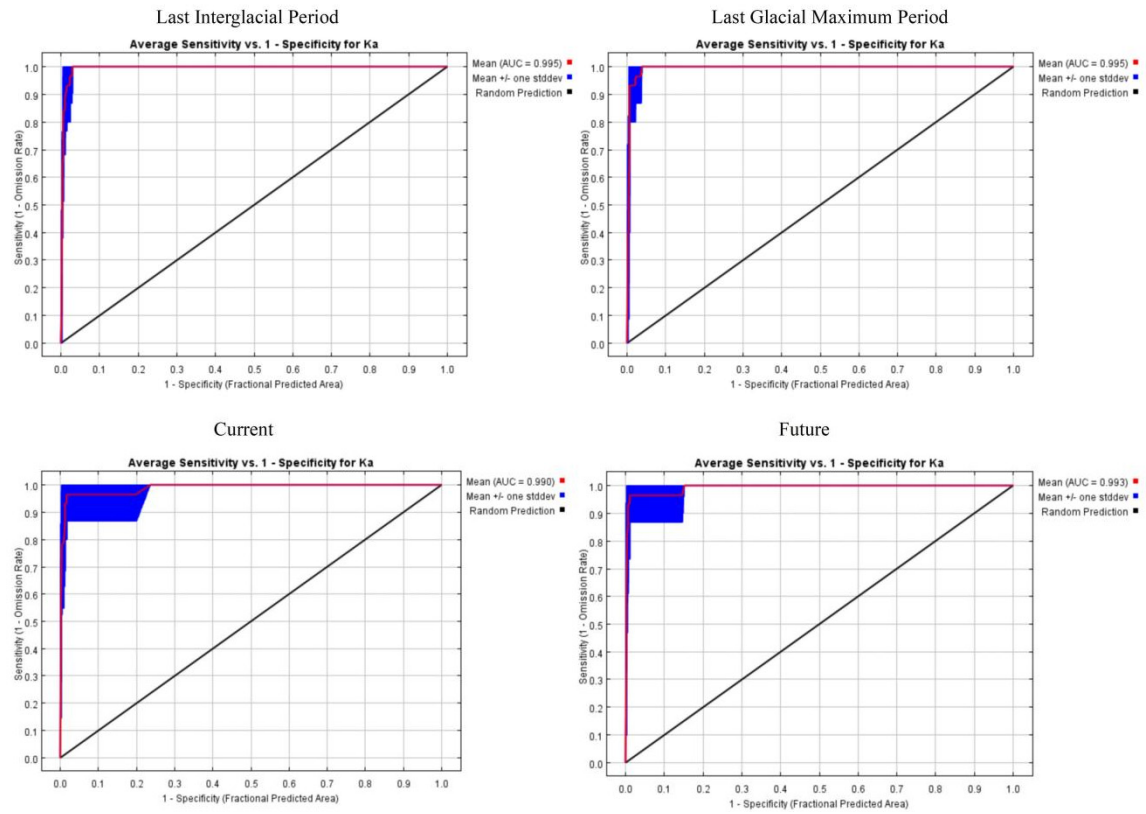


Figure S10 Evaluation of suitable distribution areas by MaxEnt software of poplar (*Ka* and *St*) in four periods