

**Code S1** The code for developing a multivariate random forests (MRF) in R. Abbreviations in the code are as follows: data.csv in line 1, dataset which include response variables and explanation variables; randomForestSRC in line 2, a package used for running MRF; from EE\_H10 to W\_H10 in line 3, tree height data at each testing site; from WIDif to AutSRDif in line 4-5, difference of explanatory variables between each testing site and seed provenance (WIDif, warmth index; TMCDif, monthly mean daily minimum temperature of the coldest month; PRSDif, precipitation during summer; MSDDif, maximum snow depth; WinSRDif, solar radiation in winter; SprSRDif, solar radiation in spring; SumDif, solar radiation in summer; AutSRDif, solar radiation in autumn).

```
d<- read.csv("data.csv")
library(randomForestSRC)
MRF<- rfsrc(cbind(EE_H10, EN_H10, ES_H10, N_H10, S_H10, SS_H10,
W_H10)~WIDif+TMCDif+PRSRDif+MSDRDif+WinSRDif+SprSRDif+SumSRDif+AutSRDi
f, data=d, tree.err = TRUE, ntree=200, importance=TRUE, na.action="na.impute")
```