



Figure S21. Screening of environmental indicators using gradient forest analysis and Pearson correlation. (a) Pearson correlation matrix of 19 bioclimatic variables at *Lonicera oblata* sampling sites. Red and blue indicate positive and negative correlations, respectively. Both bubble color intensity and size indicate absolute correlation strength (darker/larger = stronger correlation). (b) Importance ranking of the 19 bioclimatic variables based on gradient forest model. Variables are ordered left-to-right by decreasing importance weight. Temperature-associated variables are shown in dark blue; precipitation-associated variables in orange.