

Figure 1. Clades' distributions based on occurrence records for *Scutiger boulengeri*. Map showing the Tibet regions including main Mountains and main Rivers. Abbreviations: YTR: Yarlung-Tsangpo River; NR: Nu River; LCR: Lancang River; JSR: Jinsha River; YLR: Yalong River; DDR: Dadu River; MR: Min River; YTZR: Yangtze River; YR: Yellow River; Mts.: Mountains.

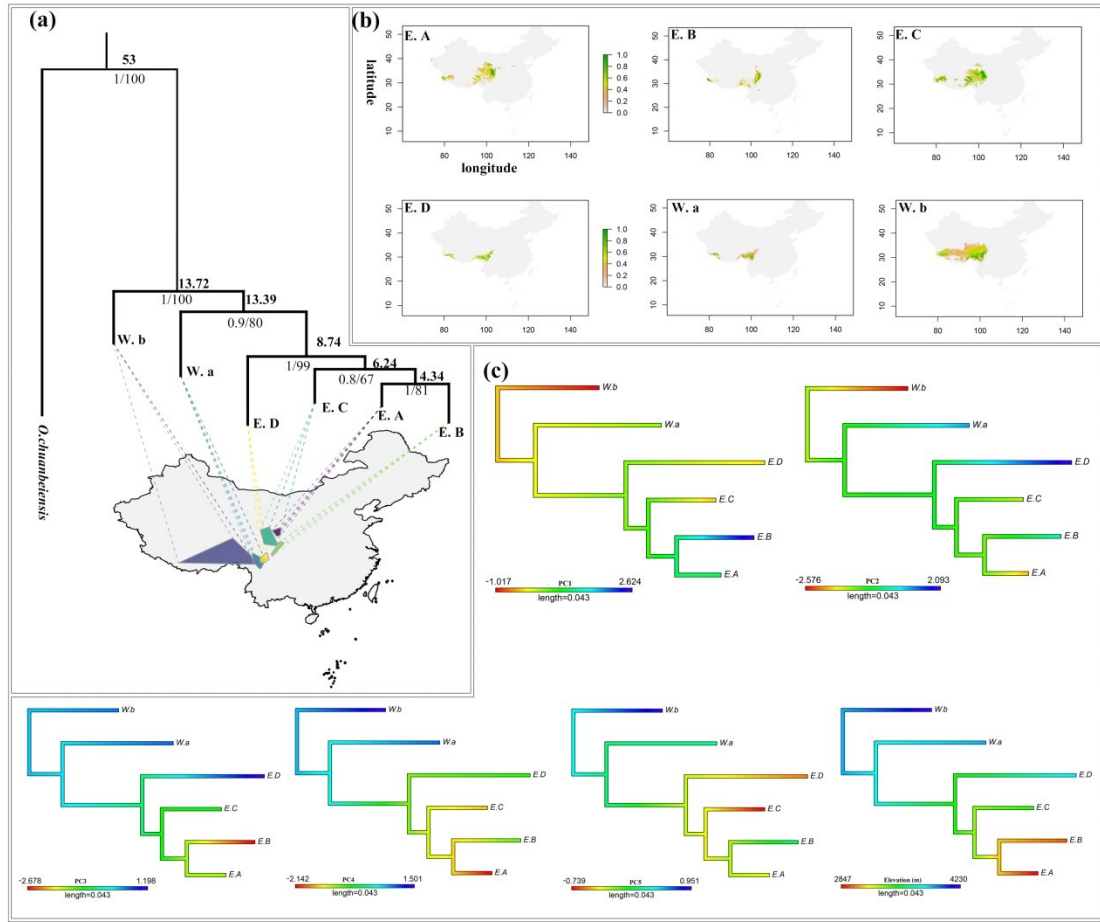


Figure 2. (a): Phylogenetic relationships and geographic distributions in Minimum convex polygon (MCP) and the suitable range of six clades in *S. boulengerii*; supporting values of BI and ML labeled on branches; divergence time (Ma) of dated tree in bold; **(b):** The suitable habitat range prediction map for each clade; **(c):** Ancestral state reconstructions of main climatic PCs and Elevation, colors of branches reflect values of PCs and elevation interpolating the states along each edge.

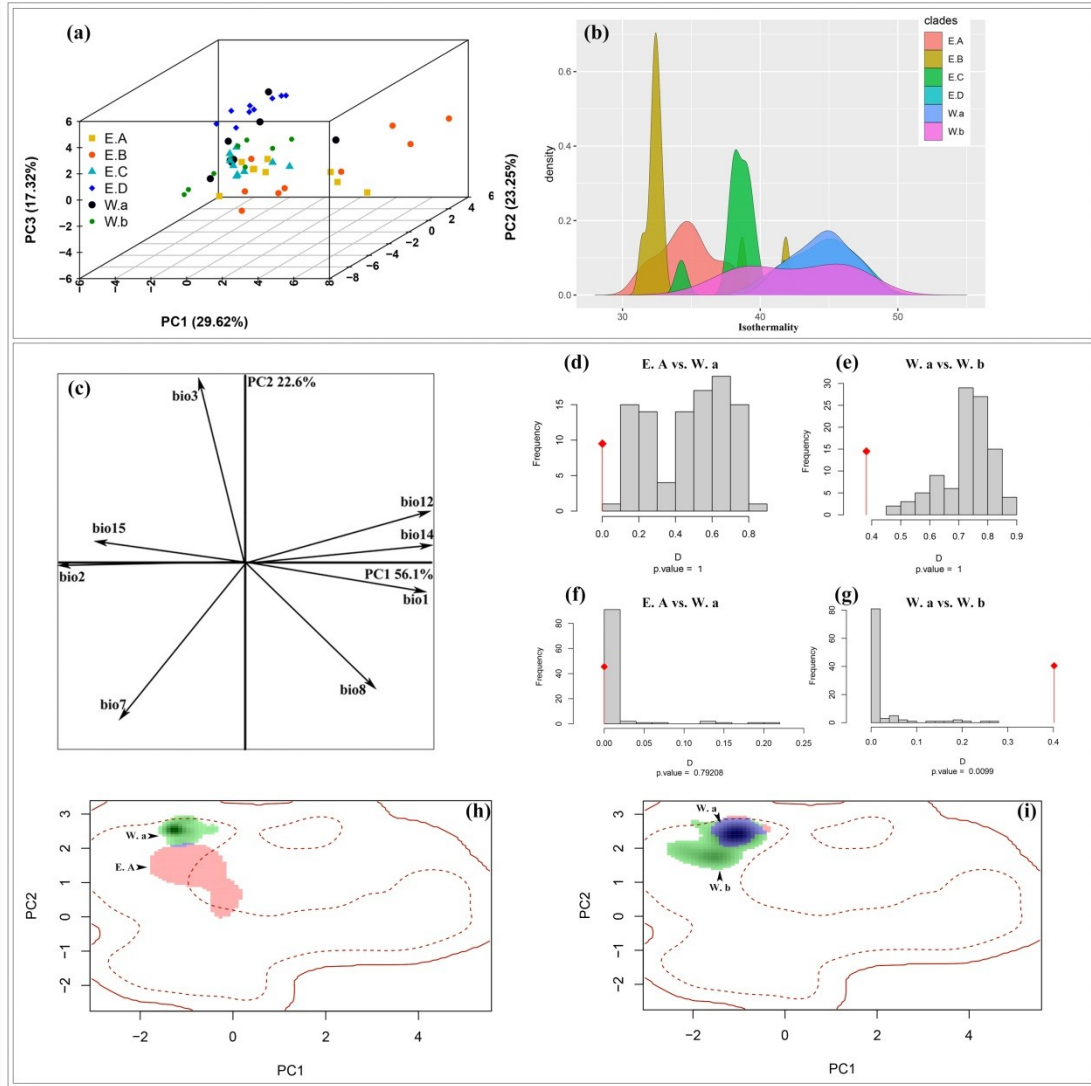


Figure 3. (a): Three dimensional principal component analysis (3D-PCA) of climate variables across six clades within *S. boulengeri*; (b): Predicted occupied niche of Isothermality across six clades within *S. boulengeri*; c: Correlation and contribution of each variable to the first two components of the PCA-env; (d)-(e): Histograms of niche equivalency distributions, diamond lines represent observed values; (f)-(g) Histograms of niche similarity distributions in bi-directions; (h)-(i): Two pairwise comparisons of niche dynamic between native and shifted ranges in environmental space depicted by the first two axes of a principal component analysis, calibrated on the entire range of conditions available in China (red solid lines). Niche expansion, overlap and unfilling situations are stacked in the environmental space for each clade. Green areas represent climates only occupied in the native range and blue indicate

climates occupied in both the native and non-native range, while red areas indicate niche expansion in the shifted range. Shading indicates the density of occurrences of the species by cells in the native range. The solid and dashed contour lines illustrate, respectively, 100% and 50% of the available environment in the native range.