

Fig. 1 Map of the study sites in Poyang Lake



Fig. 2 Scatter plots for stable isotopic composition (*δ*13C, *δ*15N) of 57 species in Poyang Lake



Fig. 3 Scatter plots depicting the general relation between trophic differences (EDBEC, Euclidean distances between the ellipse centroids) and genetic distances of the 57 species



Fig. 4 Box plot of trophic differences (EDBEC) at different genetic distances showing the positive trend and flat relationship. Black lines represent trendlines. For the boxplots, lines indicate median, asterisks indicate mean, boxes indicate upper and lower quartiles, and whiskers indicate 1.5 quartile ranges. We colored box plot skyblue (genetic distances less than 0.24) and light grey (genetic distances larger than 0.24).

Fig. 5 Bar charts showing the number of species pairs at different trophic differences (EDBEC). We colored bar charts grey with EDBEC less than 6, and blue with EDBEC more than 6.



Fig 6. BI phylogenetic tree based on haplotypes of Cyt *b* gene sequences. Values on nodes before/after slash correspond to the support values for Bayesian inference and maximum likelihood (BI/ML) methods.



Fig 7. Comparison of stable isotopic composition (*δ*13C, *δ*15N) together with their sample size-corrected standard ellipse area (SEAc) for 7 Cultrinae species from all sites in the Poyang Lake. The 7 species are displayed with different colored symbols, respectively. The total area of the convex hull (TA) (dashed black lines) and corrected standard ellipse area (SEAc) represent the total niche space and core niche space occupied by species, respectively.



Fig 8. Box plots of trophic differences (EDBEC) for “SS, CRSESP, CRS, DRS” from 5 study sites in the Poyang Lake. Trophic differences between distantly related species (D) were significantly larger than closely related species (C) at an α = 0.05. For the boxplots, lines indicate median, boxes indicate upper and lower quartiles, and whiskers indicate 1.5 quartile ranges. Black dots are outliers. “SS” indicates “sister species”; “CRSESP” indicates “closely related species (excluding sister species)”; “CRS” indicates “closely related species”, which means “SS” + “CRSESP”; “DRS” indicates “distantly related species”.