



Figure 2. Morphological variation of the scaphium among serrasalmid fishes. Plot of major shape variation from first two axes of a principal components analysis (PCA) (A) and shape variation most associated with feeding ecology groups revealed by canonical variates analyses (CVA) (B). Phylogenetic relationships are indicated by branches connecting data points. Colored polygons indicate the morphospace area of three broad ecological groups. Shapes below plots represent scaphium morphology at the end points of the PCA and CVA axes, respectively. PCA showed overlap among the carnivores and frugivore-granivores along axis 1: both groups have a rounded anterior scaphium and a moderate ascending process and frugivore granivores possess broad variation along PC I. Rheophilic herbivores are separated from carnivores along PC I and from many of the herbivores along PC II. CVA (B) showed that rheophilic species were the most distinctive because of a square shaped anterior scaphium and longer ventral process (vertebral articulation). Carnivores and frugivore-granivores are less dissimilar because of shared shape features between *Serrasalmus elongatus* and frugivore-granivores. The effect of phylogenetic history is apparent in both morphospaces (A & B) in which closely related taxa often appear in a similar region. Ecological groups: red=carnivores, green=frugivore-granivores, blue=rheophilic herbivores.