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Fossils and early diversification of bees

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Phylogenetic relationships among and within the major groups of bees were recently reconsidered using extensive molecular and morphological datasets. The next step in the study of bee evolution will consist in estimating the antiquity of nodes within the inferred topologies. Calibration and taxonomic attributions of fossils are often difficult because descriptions and phylogenetic analyses are mainly based on a small data set of available discret morphological characters. By integrating robust phylogenetic signal, shapes of rigid structures can help palaeontologists to support their taxonomic hypothesis. Here we studied taxonomic attribution of bee fossils by analysing wing shape of fossil and contemporary taxa. We performed Geometric Morphometrics analyses based on 19 landmarks. Ordination methods (CVA and LDA) were successful to discriminate tribes. Taxonomic assignments of fossils based on Mahalanobis distances do not confirm their previous taxonomic attribution. We processed and compared new molecular clock analyses with both taxonomic attribution (previous and present).