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Methods for species delimitation in bumblebees: towards an integrative approach

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Delimitation of closely related species is often hindered by the lack of discrete diagnostic morphological character. The bumblebee taxonomy exemplifies this issue. There were many attempts to clarify bumblebee taxonomy by using alternative features to discrete morphological characters such as geometric morphometric, DNA, or eco-chemical traits. Nevertheless each approach has its own limitations. Recent studies have used a multisource approach to gather different lines of speciation evidence in order to draw a strongly supported taxonomic hypothesis in bumblebees. Yet, the resulting taxonomic status is not independent of selected evidences and of consensus methodology (i.e. unanimous procedure, majority, different weighting of evidence).

In this communication, we compare taxonomic conclusions for taxonomically doubtful species obtained from the commonly used lines of evidence for species delimitation in bumblebees. We ultimately aim to assess the usefulness of these evidence as components of an integrative decision framework to delimitate bumblebee species. This allows setting up an integrative decision framework to establish strongly supported species and subspecies status within bumblebees.