

# Sexual dimorphism in the wing morphology of social vespid wasps – a case study on the genus *Polistes* Latreille using geometric morphometrics

(Hymenoptera: Vespidae)

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**Abstract.** The variation between the forewings of males and females of three species in the genus *Polistes* (Hymenoptera) was studied with the help of geometric morphometrics, to determine the extent of sexual dimorphism. Mantel statistics revealed a weak correlation between male and female data sets; however, Goodall's F-test and canonical variates analyses (using the Integrated Morphometric Package) indicated that there are indeed significant differences between the two sexes. Although visual analysis of the relative warp analysis plots of the two sexes and also CVA analysis plot indicated correlations between sexes of the same species, differences in the position of the clusters (or species) on the plots suggests that sexual dimorphism in wings is present. Results from the thin-plate spline analysis of the mean shape of the male and female data sets revealed which landmarks are responsible for the differences.

**Key words.** Geometric morphometrics, Hymenoptera, Vespidae, sexual dimorphism, *Polistes*, Iran, Middle East.

## Introduction

The Vespidae is a rather large family, represented in all parts of the world and consisting of six subfamilies and about 5000 known species (CARPENTER 1982). The social wasps (subfamilies Vespinae, Polistinae and Polybiinae) are undoubtedly one of the most conspicuous groups of insects. This is due to their moderate to large size, to the various combinations of rather bright black, white, yellowish, and reddish coloration, and to the fact that many of them construct their nests in or near areas of human habitation where they may at times be a great nuisance. Female social wasps are well known for their stinging ability and their sensitive nature when intruders approach their nests. Social wasps can be considered as generally beneficial through their habit of feeding their young with macerated caterpillars and similar food of animal origin. The nests of the social wasps are used only for a single year (BOHART & BECHTEL 1957). Members of subfamily Polistinae build nests of paper-like material made of chewed plant substances. They are social, living in small groups consisting of the offspring of one female, and they provide the nest with insects. *Polistes* is the only cosmopolitan genus of social wasps and, with 203 currently recognized extant species, one of the most speciose genera (CARPENTER 1996).

Although the morphology of the forewing in populations of one species of the genus *Polistes* has been studied previously by ABBASI et al. (2009), no analysis has been performed on the sexual dimorphism of this genus. This article aims to investigate the amount of varia-