

Taxonomic Revision and Biogeography of Parasitoid Wasps of the Eulophid Subfamily Eulophinae (Insecta: Hymenoptera) of Java, Indonesia

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Parasitoid wasps of the subfamily Eulophinae (Hymenoptera: Chalcidoidea; Eulophidae) of Java and Bali (Indonesia) are taxonomically reviewed for the first time based on the specimens newly collected from many localities in Java and Bali using sweep netting, Malaise trapping, yellow-pan trapping and rearing from their hosts. All the three tribes (Elasmini, Cirrospilini and Eulophini) of the subfamily Eulophinae are recognized in the islands, but the tribe Elasmini comprising the single genus, *Elasmus*, was not treated in the present study not only because its species-level taxonomy is still very poorly resolved but also because its subfamily affiliation is still uncertain. Three genera of Cirrospilini and 19 genera of Eulophini are recognized in the islands and they included 14 genera as new records for the islands and 66 undescribed species. All of these genera are keyed and their diagnoses are revised together with summaries of their geographical distributions and notes on their biology based on references and my own observations.

A total of 110 species are recognized in Java and Bali: twelve species in tribe Cirrospilini (eight in *Cirrospilus*, two in *Trichospilus*, and two in *Zagrammosoma*), and 98 species in tribe Eulophini (twenty one in *Euplectrus*, five in *Euplectromorpha*, one in *Metaplectrus*, ten in *Platyplectrus*, two in *Stenopetius*, five in *Stenomesus*, one in *Alophomorphella*, two in *Diglyphomorpha*, two in *Euplectrophelinus*, one in *Necremnoides*, five in *Deutereulophus*, seven in *Diglyphomorphomyia*, six in *Elachertus*, one in *Eulophus*, one in *Eulophomorpha*, ten in *Pnigalio*, three in *Notanisomorphella*, one in *Hemiptarsenus*, and ten in *Sympiesis*).

Of the 110 species recognized for the eulophine faunas in Java and Bali, about 86% are new records for the islands and about 60% are undescribed species. Considering the species so far known for their world distribution pattern, eulophine species occurring in Java are mainly Oriental elements, a few species are Australian and a very small number of species is endemic, while several species that could have been artificially introduced with their hosts are worldwide in their distribution. While most of the genera occurring in Java and Bali are also found on the neighboring island, Lombok, and other islands of the Lesser Sunda and in the Papuan and Australian regions, at the species-level there is little overlap in the

eulophine fauna between Java (and Bali) and the areas east of Lombok.

The geological history and the climatic condition may have affected the current distribution patterns of eulophine wasps in Java and Bali. Based on the climatic and geological features, islands from Java to the Lesser Sunda Islands can be divided into the following subregions: West Java, Central Java, East Java, Bali and the Lesser Sunda Islands. Eulophine wasps are rich in the number of species in West Java, and the number of species occurring in each subregion reduces eastward from West Java to the Lesser Sunda Islands. Although our knowledge on the eulophine faunas in the continental Southeast Asia, Sumatra and Borneo is very limited, the current distribution patterns and species compositions of eulophine wasps in Java through the Lesser Sunda Islands suggest that the eulophine faunas in the islands may have been formed by eastward dispersal of the wasps from the continental Southeast Asia (including Malay peninsula) or Sumatra and/or Borneo and by speciation of some species endemic to the islands.

