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Families of parasitoids (Hymenoptera) associated with Diptera cyclorrhapha

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Abstract

The Hymenoptera Parasitica comprises insects of great economic importance, not only for useful species, but also for parasitoids. Parasitoids contribute significantly to the maintenance of the ecological balance of beings, preventing the excessive proliferation of so-called insect pests. This work was done to determine the families of parasitoids of Diptera Muscomorpha (Cyclorrhapha) in State of Goiás, Brazil, from 2000 to 2017 using various traps and substrates in the Cerrado Biome.

The Braconidae, the second most diverse family of Hymenoptera, includes more than 15,000 species, but species richness is estimated in 100,000. The insect size varies from 1 to 30 mm, excluding ovipositor and antennae. Braconids are cosmopolitan parasitoids of other insects such as Coleoptera, Diptera and Lepidoptera. These wasps have an important role in the population dynamics of phytophagous insects, with emphasis on biological control of agricultural pests.

The Pteromalidae are one of the biggest families of the superfamily Chalcidoidea, with approximately 3100 species. They may be solitary or gregarious, ectoparasitoids or endoparasitoids, primary or secondary parasitoids, or even predators. Most of them develop as solitary or gregarious ectoparasitoids in the larvae or pupae of Diptera, Coleoptera, Hymenoptera, Lepidoptera or Siphonaptera. The main contribution of pteromalids is their control over muscoid flies, especially the house-fly and the stable fly

The Diapriidae, includes species of parasitoids primary endoparasitoids of larvae-pupae or pupae of Diptera Cyclorrhapha (Calliphoridae, Muscidae, Sarcophagidae, Sphaercoeridae, Tachinidae and Tephritidae). Studies on the biology and life history of diapriids suggest that most of them are pupal parasitoids of Diptera, and all pupal parasitoids are by definition idiobionts. The family Diapriidae has many common species, little is known about the biology of these parasitoids. Oviposition may occur in the larva

or pupa of the host.

The family Chalcididae is cosmopolitan in distribution, and particularly diverse in tropical lowland areas. The family presently comprises about 1500 species distributed in nearly 90 genera. All Chalcididae are parasitoids of larvae or pupae of other insects, mostly Lepidoptera and Diptera, but also Coleoptera, Neuroptera, Diptera and Hymenoptera. Chalcididae may be ectoparasitoids or endoparasitoids. Most appear to be idiobionts; some are koinobionts.

The Eulophidae are primary parasitoids of concealed larvae, especially those inhabiting leaf mines. The best known species attack Lepidoptera, Coleoptera and Diptera. Other eulophids attack various gall-forming species of insects, eriophyid mites and also gall-forming and nematodes. Various other species collectively exhibit a great range of lifeways. Many species are facultative or obligate hyperparasitoids through other chalcids, braconids and ichneumonids. Several species of eulophid are important in biocontrol programmes throughout the world.

The Figitidae are parasitoids of Neuroptera and Diptera. The Figitidae, comprising approximately 110 genera and 15,000 species, is the most species-rich and abundant in the cynipoid family. However, relatively few taxonomic studies have been undertaken on the diverse tropical fauna and many species await description. Figitidae behave as primary parasitoids of dipterous larvae that develop in the feces of cattle and agricultural pests such as fruit flies is a larval parasitoid of Diptera.

The Encyrtidae (Hymenoptera: Chalcidoidea) is one of the most successful groups of insects used in biocontrol programs worldwide. Encyrtidae is a large family of parasitic wasps with about 3000 described species in about 450 genera. Most species of Encyrtidae are primary endoparasitoids of other arthropods or secondary parasitoids via other hymenopterous parasitoids. Among the koinobiont Encyrtidae. The hyperparasitoid females have two oviposition strategies: they can lay eggs in living parasitized aphids as in mummified aphids. Both strategies aim to attack the larvae of primary parasitoids.

The family Eurytomidae are mostly parasitoids of generally endophytic, tenant or phytophagous immature insects. Tenants can feed on gall material as well as galler material. Phytophagous can be galling, boring or feeding on seeds from a wide variety of plants. There are several types of idiobionte, cenobionte, solitary or gregarious parasitoids, kleptoparasitoids, facultative and non-optional hyperparasitoids and these

occur in several orders, such as Diptera, Coleoptera, Hymenoptera, Lepidoptera, Heteroptera and Orthoptera eggs (CLAUSEN 1940, GAULD & BOLTON 1988, GRISSELL & SCHAUFF 1990, HANSON & GAULD 1995, NOYES 1989).

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