



Microgastrinae (Hymenoptera: Braconidae) collected from native forests and pasture in southern, Goiás, Brazil

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Abstract

The objective of this paper is to determine the species of Microgastrinae (Hymenoptera: Braconidae) that occur in the native vegetation and pasture. The experiment was undertaken at the “Fazenda da Faculdade de Agronomia” located in the municipality of Itumbiara, GO. Weekly collections were done using water traps at ground level, 5 placed at the pastures and 5 in the nearby native vegetation. These traps were made of yellow buckets measuring 30 cm in diameter and filled with 2 l of trap water, 2 ml of detergent and 2 ml of formaldehyde. Those collected in the native vegetation were: *Apanteles* sp., *Cotesia* sp., *Diolcogaster* sp., *Glyptapanteles* sp., *Promicrogaster* sp. and *Pseudapanteles* sp.

Key Words: Enemy natural, biocontrol, Native vegetation, Yellow water traps, Biocontrol.

1. Introduction

Hymenoptera is one of the largest orders of insects. The Hymenoptera are parasitoids that develop in immature stages of other arthropods. They are considered important in biological control insect pests (Askew, 1971).

The Braconidae are one of the largest Hymenoptera families, with approximately 40.000 species (Sharkey, 1993), divided into 45 subfamilies. The most common hosts of braconids are the larvae of Lepidoptera, Coleoptera and Diptera. (Goulet and Huber, 1993; Salgado-Neto, 2013).

They are considered keystone species for maintaining balanced communities that include them. The vast majority consists of primary parasitoids of other insects and is usually associated with only one host. Can be endoparasitoidic or ectoparasitoids, coinobiontes or idiobiontes. The most common hosts of the parasitoids Braconidae family are larvae of Lepidoptera, Coleoptera and Diptera. The family is divided into 43 subfamilies (Hanson and Gauld, 1995).

The Microgastrinae constitute the largest subfamily of Braconidae with a wealth of species, many of them important parasitoids of various pests (Hanson and Gauld, 1995). Microgastrinae endoparasitoidic are solitary or gregarious coinobiontes larvae of almost all the families of Lepidoptera (Gauld and Bolton, 1988).

Parasitoids are important regulators of insect populations and stand out as the main group of natural enemies in agricultural systems. Are dispersed in several families of insects and their adaptation to the parasitic mode of life is more diverse and abundant in Hymenoptera (Panizzi and Parra, 2009).

The objective of this paper is to determine the species of Microgastrinae (Hymenoptera: Braconidae) that occur in the native vegetation and pasture in southern of Goiás.

2. Material and Methods

The experiment was carried out at the Agronomy College Farm, located near the Paranaiba river shore, 5 km from downtown Itumbiara County, southern of Goiás. The farm has approximately 12 alqueires. The sampling area had 1.5 alqueires constituted of ciliary forest along the Paranaiba river, gradating to mesophytic semi-deciduous forest and savanna. The area had a background of selective deforestation and forest burning, and was circled by sugar cane cropping and pastures. The samplings were conducted weekly using 10 traps randomly placed at the soil level, totaling five traps in the pasture and five traps in the forests for each sampling. These traps consisted of yellow circular plastic containers with approximately 30 cm in diameter and 12 cm in height, containing a mixture of 2 l of water, 2 ml detergent, and 2 ml formaldehyde (Figure 1).



Figure 1. General appearance of yellow traps.

Southforest (1978), for both areas, according to the formula: $D=N_{\text{max}}/N$, where N =total number of individuals and N_{max} =number of individuals of the most abundant species.

3. Results and Discussion

In the 520 samplings performed during the period of January to December 1998, 67 specimens of Microgastrinae. From these individuals 73.6% were collected in the pastures and 26.4% in the forests (Table 1).

The higher number of specimens collected in pastures was probably due to an increase in attraction promoted by the traps in this area. In the forests, the trees canopy may have reduced incidence of sunlight thus reducing reflection of the yellow color of the containers. The Microgastrinae is probably the most diverse braconid subfamily of parasitoid wasps, yet its species diversity is far from being known (Fernández-Flores et al., 2013).

The number of females (62.0%) was higher than that of males (28.0%) in an approximate ratio of 2:1. This result was similar to that found by Scatolini and Penteado-Dias (1997) who studied the fauna of Braconidae Antonina and Colombo in the State of Paraná. in Spain, during the sampling period, 3.534 specimens of the Braconidae family were captured. Of these, 524 belonged to the Microgastrinae subfamily (14.82%), 364 of which were males and 160 were females (Pérez-Rodríguez, et al., 2013).

The frequency was higher in species *Glyptapanteles* sp. with 38.8% and the least frequent was *Promicrogaster* sp. 1.5%. Probably, this result demonstrates that the species *Glyptapanteles* sp. should be the most important natural enemy of Lepidoptera larvae in southern Goiás. Currently, the species of the New World are Microgastrinae in 44 genera (Hanson and Gauld, 1995). This study were collected only 13.6% of this total.

Table 1. Number of specimens of Microgastrinae (Hymenoptera: Braconidae) collected in yellow pan traps in the forest and pasture, in the Course of Agronomy Farm in the southern of January to December 1998.

Taxonomic Group	Pasture	Forest	Total
<i>Apanteles</i> sp.	18	1	19
<i>Cotesia</i> sp.	7	3	10
<i>Diolcogaster</i> sp.	2	4	6
<i>Glyptapanteles</i> sp.	19	7	26
<i>Promicrogaster</i> sp.	1	0	1
<i>Pseudapanteles</i> sp.	2	3	5
TOTAL	49	18	67

The higher number of specimens collected in pastures was probably due to an increase in attraction promoted by the traps in this area. In the forests, the trees canopy may have reduced incidence of sunlight thus reducing reflection of the yellow color of the containers. The Microgastrinae (Figure 2) is probably the most diverse braconid subfamily of parasitoid wasps, yet its species diversity is far from being known (Fernández-Flores et al., 2013).



Figure 2. General appearance of a parasitoid subfamily Microgastrinae.
Source: <http://stalemamezivot.blogspot.com.br/2010/09/microgastrinae.html>.

The diversity index (D) in parasitoid species was similar in pasture ($D=0.28$) than in the forest ($D=0.10$). Segundo Scatolini and Penteado-Dias (1997) .forests areas are places of refuge and emergence for these parasitoids. In the present scenario of agriculture, the destruction and fragmentation of natural habitats caused by the expansion of cultivated areas constitute the main causes of biodiversity change (Santos and Perez-Maluf, 2012).

The study of the diversity of the parasitic Hymenoptera (biomarkers) constitutes a tool for studies of the important degree of degradation and impacts suffered by natural ecosystems (Scatolini and Penteado-Dias, 1997).

This study represents the first occurrence of Microgastrinae for the state of Goiás.

4. Conclusion

The higher number of specimens collected in pastures was probably due to an increase in attraction promoted by the traps in this area. The number of females (62.0%) was higher than that of males (28.0%) in an approximate ratio of 2:1. The diversity index (D) in parasitoid species was similar in pasture (D=0.28) than in the forest (D=0.10).

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