

Hymenoptera parasitoids collected in southern of Goiás and western of Minas Gerais, Brazil

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Abstract

The fauna of parasitoids which are responsible for the natural control of these dipterous develops. Among the main natural enemies of insects pest are the parasitoids from the Braconidae, Chalcididae, Pteromalidae, Encyrtidae, Figitidae and other families. The objective of this study was to verify the families of parasitoids in forest areas in western of Minas Gerais and southern of Goiás Brazil. The material was collected using yellow pan traps and Malaise traps from February to October of 2002. The most collected families in both places were: Ichneumonidae and Braconidae.

Keywords: forest, traps, natural enemy, biocontrol, Brazil

Source: Journal Pensee, , v.76, p.357 - 361, 2014.

Introduction

The fauna of parasitoids which are responsible for the natural control of these dipterous develops. Among the main natural enemies of insects pest are the parasitoids from the Braconidae, Chalcididae, Pteromalidae, Encyrtidae, Figitidae and other families.

Since parasitoids occupy a superior trophic level, they act as determining factors on the population densities of their hosts due to the diversity of their physiological and behavioral adaptations (Gauld and Bolton, 1988). Besides, being natural enemies of pests they may be used in biological control programs (Marchiori et al., 2002; Perioto and Lara, 2003; Palmas-Santos and Perez-Maluf, 2012).

Among the order Hymenoptera parasitoids are the group with the greatest species richness, so much so that Eggleton (1990) emphasized that their diversity is so great that

the need for basic collections has preceded ecological observations. Insects are considered to be parasitoids if the carnivorous larvae develop by feeding on other arthropods, the so-called hosts (Clausen, 1940). Such occurrences are only found among holometabolous insects, thus suggesting that this is a more recent living habit (Gauld and Bolton, 1988).

The objective of this study was to investigate the families of the Hymenoptera parasitoids collected in areas of native forest, using Malaise traps and yellow buckets in western Minas Gerais and southern Goiás.

Material and Methods

The experiment was conducted at the Faculty of Agronomy Farm in southern of Goiás and the western of Minas Gerais in Alvorada Farm in the period February to October 2002. Sampling was weekly, with 10 yellow buckets traps placed at ground level and allocated at random to sample areas of native vegetation to pasture next studied a total of 5 buckets in the pastures and the woods 5. These traps were the spherical yellow plastic bowls approximately 30 cm in diameter and 12 cm height which was deposited a mixture of 2 liters of water, 2 ml of detergent and 2 ml of formaldehyde.

Three Malaise trap were built with fine mesh fabric bands of black cloth that intercept the insects, conducting them through two white fine mesh fabric bands up to the upper part of the apparatus where two 200 ml plastic flasks, connected to each other by a screw cap, were placed. The inferior flask, where the insects fell, contained a fixing liquid Dietrich solution: 600 ml 96° ethanol; 300 ml distilled H₂O, 100 ml 40% formaldehyde; and 20 ml acetic acid. These flasks were positioned to the North to allow higher insect attraction. Flasks were retrieved every 7 days and the trapped specimens were separated, using a fine mesh sieve, and stored in 70% ethanol until identification.

Results and Discussion

A total of 15827 specimens of parasitoids distributed in 8 superfamilies and 21 families were collected from February to October 2002, of which 10435 in Malaise traps and 5400 in the yellow buckets (Table 1). The smallest number of Individuals collected in the trap yellow buckets, either due to flooding caused by rainfall and the need for daily removal of the material and evaporation of liquid in hot areas.

A total of 9540 specimens were collected in western Minas Gerais with and 6287 in

southern Goiás. The number of individuals obtained in the western Minas Gerais was higher than in southern Goiás, although the collection methods were the same. Factors such as the quality and availability of resources, the host density, size and floristic composition of the sampled fragment may influence these results. The most abundant families were Ichneumonidae with 4562 and Braconidae with 2532 (Table 1).

The Ichneumonidae was the most frequent family collected in the yellow pan traps. Also, in the Malaise traps, the family Ichneumonidae was the most frequently found. The vast majority of Ichneumonidae are parasitoids of holometabolous insects and spiders (Hanson and Gauld, 1995). This was probably due to its parasitizing efficiency: its species are parasitoids on eggs, larvae, pupae or imagoes of other insects (Scatolini and Penteado-Dias, 1997)

The superfamily Chalcidoidea presented the highest diversity of families (10 families) in both trap types (Table 1). It was not possible to compare the quantity of species collected by the two types of traps due to the number of traps used. Although it was observed that the Malaise traps presented durability problems when exposed to sunlight, rain and wind for being made of a more fragile material (cloth).

These problems did not occur when the yellow pan traps were used. Thus, it is possible to conclude that Malaise are more efficient than yellow pan traps in sampling this group of parasitoids.

Greathead (1986) listed 393 species of parasitoids used in biological control of which 344 (87.0%) programs are Hymenoptera. Thanks to them has been achieved great savings in pest control programs (Greathead, 1986; Hanson and Gauld, 1995).

Malaise traps have been indicated for the capture of insects of the orders Hymenoptera, Diptera and Thysanoptera (Segade et al., 1997; Campos et al., 2000). Noyes (1989) working with yellow pan traps found that these traps are important in collecting specimens of some families of Hymenoptera of the parasitic series. Since these parasitoids are natural enemies of insect pests, the feasibility of their use as biological control agents on the fig is an encouraging possibility (Marchiori et al., 2002; Perioto and Lara, 2003; Palmas-Santos and Perez-Maluf, 2012).

The faunal survey of arthropods in today preserved areas is of great importance for you to serve as a parameter for comparison between areas modified by human actions

(Scatolini and Penteado-Dias, 2003).

Conclusion

The Ichneumonidae was the most frequent family collected in the yellow pan traps.

Also, in the Malaise traps, the family Ichneumonidae was the most frequently found.

The superfamily Chalcidoidea presented the highest diversity of families in both trap types.

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Table 1. List of families of parasitoids and frequency of individuals collected in western of Minas Gerais and southern Goiás using Malaise traps and yellow buckets in the period from February to October 2002.

Taxonomic Group	Southern of Goiás		Western of Minas Gerais	
	Yellow buckets	Malaise	Yellow buckets	Malaise
Bethyloidea:				
Bethylidae	139	515	232	449
Dryinidae	6	16	12	35
Megaspilidae	19	10	2	1
Ceraphranoidea:				
Ceraphronidae	99	3	61	10
Chalcidoidea:				
Agoanidae	2	6	4	2
Chalcididae	37	432	94	904
Encyrtidae	370	124	391	288
Eucharitidae	15	19	2	15
Eulophidae	119	170	203	355
Eupelmidae	71	105	49	60
Eurytomidae	9	18	7	5
Mymaridae	18	7	2	1
Pteromalidae	38	12	76	10
Torymidae	53	12	142	16
Cynipoidea:				
Figitidae	51	137	160	281
Evanoidea:				
Evaniidae	20	119	29	180
Ichneumonoidea:				
Braconidae	229	806	283	1214
Ichneumonidae	441	1546	351	2224
Platygastridae:				
Platygastridae	35	11	44	8
Scelionidae	49	14	169	17
Proctotrupoidea:				
Diapriidae	350	35	909	243
Total	2170	4117	3222	6318