Egyptian Journal of Biological Pest Control, 21(2), 2011, 155-158

Survey and Abundance of Common Ichneumonid and Braconid Parasitoid Species at Latakia Governorate, Syria

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(Received: July 28, 2011 and Accepted: August 30, 2011)

ABSTRACT

A survey of common parasitoid wasp species and their relative abundances was conducted in apple orchards at Aramo and Rabia, Latakia Governorate, Syria during 2009-2011. Weekly catches were collected, using Malaise traps, were classified and identified. A total of ten species belong to the superfamily Ichneumonoidea were recorded in the two locations. The species belong to two families; Ichneumonidae and Braconidae and eight subfamilies; Cremastinae, Campopleginae, Ichneumoninae, Pimplinae, Cylloceriinae, Braconinae, Agathidinae, Meteorinae, Cheloninae. The 4 identified braconid species belong to 4 subfamilies and 4 genera, while the 6 ichneumonid species belong to 5 subfamilies and 6 genera. Collected specimens were identified by the authors.

Key words: Survey, parasitoid species, Ichneumonidae, Braconidae, apple orchards, Latakia, Syria.

INTRODUCTION

Ichneumonoidea is one of the largest groups of parasitic insects and by far the most well known hymenopteran parasitoids, with over 100,000 species known as primary parasitoids that parasitize harmful insect pests. It probably ranks first in effectiveness of reducing or holding in balance numerous phytophagous pests. Dominant families are Ichneumonidae and Braconidae (Clausen 1940). Ichneumonidae is the largest family in the Hymenoptera, and one of the largest in the Insecta, with >60,000 species. This family is a cosmopolitan that occurs worldwide, with more species in cool moist climates than in warm dry ones (Wahl & Sharkey 1993). The eastern Palearctic and eastern Nearctic are especially rich in species. Most ichneumonids are primary parasitoids and hyperparasitic species are rare. The family includes endo- and ectoparasitic species. The endoparasitic species do not paralyze their hosts and attack free-living hosts while the ectoparasitic species paralyze their hosts and attack endophagous hosts. Almost all major orders and all living stages serve as hosts for ichneumonids. There has been limited success in biological control, although many species of ichneumonids have been tried. Family Braconidae is the second largest family of the order Hymenoptera, The family occurs also worldwide with more than 40,000 species. Wahl and Sharkey (1993) compared the family Ichneumonidae with Braconidae and noted that in ichneumonids the forewing has the vein 2m-cu present, in few species and present also in the braconid subfamily Apozyginae. Vein 1/Rs+M is absent. This forms the compound cell 1M+R1 (vein present in ca. 85% of Braconidae). The hind wing has vein 1r-m opposite or apical to the separation of veins R1 and Rs (basal in Braconidae). The metasomal tergum 2 is usually separated from 3 and their junction is flexible (tergum 2 is fused with 3 in the Braconidae). Identification of insect species fauna is the first step for successful establishment of biological control and IPM programs (Yarpuzlu *et al*, 2008). Braconidae has been used extensively and very successfully in biological control of insect pests (Wharton, 1993).

In Syria, taxonomy of this super-family is still incomplete and needs more studies to be done. Available literatures showed that no work has been done concerning the survey of common parasitoid species belong to the super-family Ichneumonoidae.

The aim of this study was to survey the relatively most common braconid and ichneumonid parasitoid species as well of estimating their abundances in some apple orchards at Latakia Governorate, Syria.

MATERIALS AND METHODS

A survey of common ichneumonid parasitoid species was carried out at two apple orchards at Aramo and Rabia, Latakia Governorate, Syria from June 2009 to May 2011. Sampling was conducted using Malaise traps. One trap was placed at the center of each of the two experimental locations. The malaise traps usually capture flying insects by interception. Those were built with black cloth bands that intercept the insects leading them through two white bands up to the upper part where two plastic flasks were attached and connected to each other by a screw cap. The lower flask contained a fixing liquid where the insects fall and die. The flasks were directed towards the north direction for better attraction of the parasitoid wasps (Mahmoud *et al*, 2009). Specimens were collected weekly using a fine mesh sieve. Collected specimens were killed by ethyl acetate, mounted on triangular

labels and examined by a stereoscopic binocular microscope. The specimens were identified by the first author.

Numbers and seasonal abundance of each of the collected parasitic species/ location/ year were recorded. Identification of specimens was based on keys of (Brown and Darsy, 1991).

RESULTS AND DISCUSSION

Survey of common ichneumonid and braconid species

The survey revealed the presence of a total of 10 species; 4 braconids and 6 Ichneumonids. The identified braconid species belong to 4 subfamily and 4 genera; while those of the ichneumonids belong to 5 subfamilies and 6 genera (Table 1).

Abundances of ichneumonid and braconid parasitic species

Numbers and abundances of each of the collected parasitic species/ location/ year during the period of study, were tabulated in tables (2-5). Abundances of identified ichneumonid species at Aramo and Rabia regions were summarized in tables (2 and 3), respectively. As shown in these tables, number of the ichneumonid species, occurred at Aramo was relatively more than that occurred at Rabia. Total numbers of the 5 ichneumonid species at Aramo were 30, 38 and 6 individuals in years 2009, 2010 and 2011, respectively. *Diadegma terebrans* and *Ephialtes caudatus* were the most abundant species occurred in the location, as they represented 29.7 and 28.4% of the total number of individuals collected (Table 2). Respective total numbers of the 4 ichneumonid species at Rabia were 22, 28 and 6 individuals. *D. terebrans* and *Pristomerus vulnerator* were the most abundant ichneumonid species occurred in the location as they represented 44.64 and 37.5% of the total number of individuals collected from the location (Table 3).

Abundances of the identified braconid species at Aramo and Rabia regions were summarized in tables (4 and 5), respectively. Total numbers of the 3 braconid species at Aramo were 27, 29 and 14 individuals in years 2009, 2010 and 2011, respectively. *Ascogaster quadridentata* was the most abundant braconid species occurred in the location as it represented 68.8% of the total number of individuals collected (Table 4). Respective total numbers of the 3 braconid species at Rabia were 22, 28 and 6 individuals in years 2009, 2010 and 2011, respectively. *Bassus (Microdus) rufipes* was the highest abundant braconid species occurred in the location as it represented 44.6% of the total number of individuals collected (Table 5).

Obtained results indicated that there is a relatively rich fauna from ichneumonoids in apple orchards in the inspected region. Such ichneumonid parasitoid species may play a powerful role in pest control in several agro-ecosystems, particularly in apple orchards (Brown and Darsy, 1991; Fitton and Walker, 1992; Goulet *et al.* 1993; Noyes, 2004 and Mills, 2005). Conservation of these natural enemies is necessary. One of the efficient methods for supporting the parasitoids role in agro-ecosystems is decreasing pesticides application (McNeely *et al.*, 1990). The host range of a parasitoid species is one of its central properties, linking its evolutionary past with its present autecology. Through knowledge of the host range of parasitoids, not only their behavior within current ecosystems can be predicted, but also gained some understanding of the specified processes that brought them into existence. It is not, however, easy to define very sharply what is meant by host range (Shaw and Aeschlimann, 1994 and Shaw, 1997).

In the present research, 10 more ichneumonoid parasitoid species were collected but their hosts were not detected, therefore further studies are still needed.

Table (1): Ichneumonid parasitoid species collected from apple orchards at Aramo and Rabia regions, Latakia Governorate, Syria from June 2009 to May 2011

Family	Subfamily	Species	Collection site
Ichneumonidae	Cremastinae	*Pristomerus vulnerator(Panz)*	Aramo and Rabia
	Campopleginae	*Diadegma terebrans(Grave)*	Aramo and Rabia
	Cylloceriinae	*Hypercampus sp.*	Aramo and Rabia
	Pimplinae	*Coccygomimus turionellae L.*	Rabia
		Ephialtes caudatus	Rabia
	Ichneumoninae	*Trichomma enecato*	Aramo
Braconidae	Braconinae	*Habrobracon hebator Say*	Rabia
	Agathidinae	*Bassus (Microdus) rufipes Nees*	Aramo and Rabia
	Meteorinae	*Meteorus sp*	Aramo
	Cheloninae	*Ascogaster quadridentata* Wesmaels	Aramo and Rabia

Table (2): Total numbers of ichneumonid species collected from apple orchard, by Malaise trap, at Aramo location from June 2009 to May 2011

Species	2009		2010		2011	
	Total no.	%	Total no.	%	Total no.	%
Pristomerus vulnerator	6	20	9	23.7	1	16.7
Diadegma terebrans	8	26.7	13	34.2	1	16.7
Hypercampus sp	3	10	4	10.6	-	-
Coccygomimus turionellae	5	16.7	3	7.9	-	-
Ephialtes caudatus	8	26.7	9	23.7	4	66.7
Total	30	100	38	100	6	100

Table (3): Total numbers of ichneumonid species collected from apple orchard by Malaise trap at Rabia location from June 2009 to May 2011

Species	2009		2010		2011	
	Total no.	%	Total no.	%	Total no.	%
Pristomerus vulnerator	7	31.9	11	39.3	3	50
Diadegma terebrans	9	40.9	15	53.6	1	16.7
Hypercampus sp	3	13.6	2	7.1	1	16.7
Trichomma enecato	3	13.6	-	-	1	16.7
Total	22	100	28	100	6	100

Table (4): Total numbers of braconid species collected from apple orchard by Malaise trap, at Aramo location from June 2009 to May 2011

Species	2009		2010		2011	
	Total no.	%	Total no.	%	Total no.	%
Bassus (Microdus) rufipes	6	22	5	17	1	7
Meteorus sp	4	15	5	17	1	7
Ascogaster quadridentata	17	63	19	56	12	86
Total	27	100	29	100	14	100

Table (5): Total numbers of braconid species collected from apple orchard by Malaise trap at Rabia location from June 2009 to May 2011

Species	2009		2010		2011	
	Total no.	%	Total no.	%	Total no.	%
Habrobracon hebator	7	31.9	11	39.3	3	50
Bassus (Microdus) rufipes	9	40.9	15	53.6	1	16.7
Ascogaster quadridentata	3	13.6	2	7.1	1	16.7
Total	22	100	28	100	6	100

ACKNOWLEDGMENT

The authors are grateful to all colleagues in the Center of Research and Study of Biological Control, Faculty of Agriculture, Damascus University, Damascus, Syria, for their valuable help for the progress of the project.

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