

**NEW RECORDS AND LIST OF GENERA OF BRACONIDAE
(HYMENOPTERA: ICHNEUMONOIDEA) AT THE UNIVERSITY
OF ZULIA MUSEUM OF ARTHROPODS, VENEZUELA**

MAGALLY QUIRÓS DE G., YADIRA PETIT Y PAUL MARSH¹

*Museo de Artrópodos de LUZ (MALUZ), Dpto. Fitosanitario, Facultad de
Agronomía, Universidad del Zulia, Maracaibo, Estado Zulia, Venezuela
mquiros@cantv.net, yadirapetit@yahoo.com*

¹*P. O. Box 384, North Newton, KS, 67117, USA
swampy@southwind.net*

Abstract. We examined about 23,000 specimens of Braconidae from Venezuela, deposited at the Museo de Artrópodos de la Universidad del Zulia (MALUZ), located in Maracaibo, Zulia State, Venezuela. The braconids were collected during several research projects and field visits, from 1961 to 2005. Identification was done chiefly by Paul Marsh (Systematic Entomology Laboratory (SEL), United States Department of Agriculture (USDA) and Rosa Briceño (Universidad Centro Occidental Lisandro Alvarado (UCLA), Venezuela, and among 13 subfamilies, 35 genera and 59 species counted, 11 genera are new records for Venezuela. Collection information (state, year, locality) as well as number of species and specimens is given for each genus. This information will help better the taxonomic and biogeographical knowledge of this family of parasitic wasps. *Received: 19 May 2006, accepted: 08 December 2006.*

Key Words: Braconidae, new records, Venezuela, catalog, collection, Hymenoptera, Ichneumonoidea, museum, parasitic wasps, taxonomy.

**NUEVOS REGISTROS Y LISTA DE GÉNEROS DE BRACONIDAE
(HYMENOPTERA: ICHNEUMONOIDEA) DEL MUSEO DE
ARTHROPODOS DE LA UNIVERSIDAD DEL ZULIA, VENEZUELA**

Resumen. Se presentan nuevos registros y una lista de los géneros de Braconidae colectados en Venezuela y cuyos ejemplares se encuentran depositados en la Colección de Insectos del Museo de Artrópodos de LUZ, (MALUZ), localizado en Maracaibo, Estado Zulia, Venezuela. Se revisó esta colección, encontrándose que estos braconidos fueron recolectados a través de diferentes proyectos y giras de investigación, efectuadas entre 1961 y 2005. Las identificaciones fueron realizadas, en

su mayoría, por Paul Marsh (Systematic Entomology Laboratory (SEL), United States Department of Agriculture (USDA) y Rosa Briceño (Universidad Centro Occidental Lisandro Alvarado (UCLA), Venezuela. Se contaron cerca de 23 mil ejemplares pertenecientes a 13 subfamilias, 35 géneros y 59 especies, de los cuales 11 géneros son nuevos registros para Venezuela. Se presenta una lista de los géneros, con datos de recolección (estado, año, localidad), número de especies y especímenes de cada género. Esta información contribuirá al conocimiento taxonómico y biogeográfico de esta familia de avispas parasíticas. *Recibido: 19 mayo 2006, aceptado: 08 diciembre 2006.*

Palabras clave: Braconidae, nuevos registros, Venezuela, catálogo, colección, Hymenoptera, Ichneumonoidea, museo, avispas parasíticas, taxonomía.

INTRODUCTION

Braconidae are a diverse worldwide group of parasitoid wasps, important in natural and biological control of many crop pests. Most are primary parasites, especially of larval instars of Coleoptera, Diptera and Lepidoptera, killing their hosts or making them less active or sterile (Whitfield *et al.* 2004). This family contains 34 subfamilies and 404 genera in the New World, but knowledge about their distribution patterns in Neotropical and South Temperate regions of America are still rather meager, due either to the little attention received or lack of intensive sampling (Wharton *et al.* 1997).

Preservation of specimens with their related information is, through time, one of the duties of entomological museums, because taxonomists will be interested in studying and identifying species diversity in collections. Even though braconids are of economic importance, taxonomic lists and catalogues that describe their diversity are unfortunately limited in Venezuela. Lack of taxonomic information, as well as many other specific factors relative to biological control and integrated pest management, has influenced commercial usage and protection of these parasites in agroecosystems (Ferrer 2001).

The oldest list of braconids from Venezuela dates from 1966, and includes 11 subfamilies, 18 genera (*Ipobracon* Thomson and *Microbracon* Ashmead are now synonyms of others) and 37 species (Guagliumi 1966). Unfortunately, there is no information about the custody of specimens used in that study. In 1980, 13 subfamilies, 28 genera (*Parachasma* Fisher and *Pelecystoma* Wesmael are now synonyms of others) and 123 species were cited, and specimens are deposited in the Museo del Instituto de Zoología Agrícola

(MIZA) of the Universidad Central de Venezuela (UCV), and in the Collection of the Instituto de Investigaciones Agropecuarias (INIA), formerly Centro Nacional de Investigaciones Agropecuarias (CENIAP) and the Fundación Servicio para el Agricultor (FUSAGRI), now in MIZA, all in Aragua State. Other specimens are deposited at the Instituto de Investigaciones Agropecuarias (IIAP), in the Universidad de Los Andes in Mérida State (Terán 1980). The subfamily Agathidinae has received more attention, and the preserved specimens are deposited in the MIZA, at the Museum “José Manuel Osorio” of the Universidad Centro Occidental Lisandro Alvarado, (UCLA), Lara State, and in the Museo de Artropodos de LUZ(MALUZ) (Briceño 1999, 2002). The rest of the taxonomic literature in Venezuela is oriented toward pests of several crops, where some of the braconid parasitoids were cited and deposited at the collection of the MALUZ (Geraud *et al.* 1988, Geraud *et al.* 1995, Katiyar *et al.* 1995, Geraud *et al.* 1997, Katiyar *et al.* 1997, Domínguez *et al.* 1999, Domínguez *et al.* 2000, Ramírez and Domínguez 2000, Domínguez *et al.* 2001, Domínguez *et al.* 2002, Domínguez *et al.* 2003 a and b). The purpose of this study is to present new records and a list of the genera of Braconidae deposited at the Museo de Artropodos of the University of Zulia, located at Maracaibo, Zulia State, Venezuela.

MATERIALS AND METHODS

The braconid specimens deposited in the Collection of the Museo de Artropodos of the University of Zulia (MALUZ) were examined, and apparently most of them were collected with Malaise traps or reared in the laboratory, parasitizing Lepidoptera and Diptera, from 1961 to 2005. Collecting and rearing activities were part of many projects and field trips undertaken by researchers, students and technicians, chiefly associated with Edmundo Rubio and José Ramón Labrador, with financial grants from the Consejo de Desarrollo Científico y Humanístico de la Universidad del Zulia (CONDES-LUZ), and Fondo Nacional de Ciencia, Tecnología e Innovación (FONACIT), formerly Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICIT). Specimens were pin mounted, card point or minuten pin mounted, and several were preserved in 70% alcohol. Romer Romero and Eleodoro Inciarte did most of the preservation and group separation.

An Excel data base was prepared with label information for each specimen, and Paul Marsh, of the Systematic Entomology Laboratory (SEL), Department of Agriculture of the United States (USDA), identified most specimens. The Agathidinae were identified by Rosa A. Briceño, from the

Universidad Centroccidental Lisandro Alvarado (UCLA), in Barquisimeto, Venezuela. Names of subfamilies and genera, as well as authorships and dates of descriptions, were verified with the manual of Wharton *et al.* (1997). Full and abbreviated names of collectors according to the labels are as follows: A. Mora (A.M.); A. Montiel (A.R.M.); A. Timaure (A.T.); A. Torres (A.T.); A. Vilorio (A.V.); D. Contreras (D.C.); D. Chirinos (D.Ch.); E. Inciarte (E.I.); E. Rubio E. (E. R. E.); C. Geraud (C.G.); F. Geraud (F.G.); G. A. González (G.A.G.); G. Piccirillo (G.P.); I. Hernández (I.H.); J. Camacho (J.C.); J. Mateo (J.M.); J. Morales (J.L.M.); J. Oroño (J.O.); J. R. Labrador (J.R.L.); J. Salazar (J.S.); K. Katiyar (K. K.); L. Chinchilla (L.C.); L. A. Atencio (L.A.A.); M. Burgos (M.B.); M. García (M.G.); M. Quirós (M.Q.); O. Domínguez (O.D.); O. Liscano (O.L.); R. Calchi (R.C.); R. Gutiérrez (R.G.); R. Matheus (R.M.); R. Pulgar (R.P.); R. Ramírez (R.R.); R. Romero (R.R.); R. Francisco (R.F.); T. Borrego (T.B.); V. Briceño (V. B.) and Y. Nava (Y.N.).

RESULTS

About 23,000 braconid specimens, collected from different States of Venezuela, were separated and identified. Subfamilies and genera, along with the collection data (State, year, locality, estimated number of species and specimens preserved for each genus) are listed in Table 1.

The following genera are new records for Venezuela:

<i>Cenocoelius</i> Haliday	<i>Eubazus</i> Nees
<i>Phanerotoma</i> Wesmael	<i>Urosigalphus</i> Ashmead
<i>Liobracon</i> Szépligeti	<i>Cotesia</i> Cameron
<i>Monarea</i> Szépligeti	<i>Dolichogenidea</i> Viereck
<i>Semirhytus</i> Szépligeti	<i>Orgilus</i> Haliday
<i>Trigonophasmus</i> Enderlein	

Table 1 includes 13 subfamilies and 35 genera. Thirteen genera were reported by Guagliumi (1966), 17 genera by Terán (1980), 7 genera by Briceño (1999), and 1 genus by Briceño (2002). Other genera for Venezuela, not present in the MALUZ collection, have been reported by Guagliumi (1966): *Aphidius* Nees, *Cyanopterus* Haliday (cited as *Ipobracon* Thomson), *Diachasma* Foerester, *Heterospilus* Haliday, and *Phaenocarpa* Foerester. In addition, specimens of the following genera, reported by Terán (1980), have not been identified or deposited in the MALUZ: *Allobracon* Gahan, *Allorhogas* Gahan, *Cyanopterus* Haliday, *Doryctes* Haliday, *Heterospilus* Haliday, *Macrocentrus* Curtis, *Microgaster* Latreille, *Perilitus* Nees, *Phaeno-*

Table 1. Genera of Braconidae (Hymenoptera: Ichneumonoidea) from Venezuela deposited in the Museum of Arthropods of the University of Zulia (MALUZ), Maracaibo, Venezuela.

Genus	State (Year) Collection Locality	Quantity ¹
1-Agathidinae		
<i>Alabagrus</i> Enderlein, 1920 (Briceño 1999)	Aragua (1976) Ocumare de la Costa. Bolívar (1978) Río Grande. Táchira (1985) Jáuregui Co. Trujillo (1997) Rafael Rangel Co. Zulia (1963) Maracaibo; (1982,1983, 1984) Tocuco; (1982) Jardín Botánico de Maracaibo.	4 (125)
<i>Agathis</i> Latreille, 1804 (1, 2)	Zulia (1977) Baralt; (1972) Mara; (1973) Perijá.	2 (22)
<i>Bassus</i> Fabricius, 1804 (Guagliumi 1966, Briceño 1999)	Amazonas (1996) Guainia Co. Aragua (1976, 1978) Rancho Grande. Táchira (1994) Jáuregui Co. Trujillo (1997) Rafael Rangel Co. Zulia (1962, 1982, 1983,1984) Tocuco.	4 (12)
<i>Coccygidium</i> de Saussure, 1892 (Briceño 1999)	Aragua (1978) Rancho Grande. Barinas (1978) Río Caparo. Bolívar (1982) El Dorado. Falcón (1993) Sierra de San Luís. Lara (1979) Yacambu. Táchira (1985) Jáuregui Co. Trujillo (1970,1971) El Cenizo. Zulia (1971) La Yolanda; (1971) Maracaibo; (1981,1982,1984) Tocuco; (1973) Sucre; (1984) Jardín Botánico de Maracaibo; (1991) Mara.	4 (54)
<i>Crassomicrodus</i> Ashmead, 1900 (Briceño 2002)	Zulia (1984) Jardín Botánico de Maracaibo.	1(4)
<i>Cremnops</i> Foerester, 1862 (Briceño 1999)	Bolívar (1978) El Dorado.	1(17)

Table 1. Cont.

Genus	State (Year) Collection Locality	Quantity ¹
<i>Pharpa</i> Sharkey, 1986 (Briceño 1999)	Zulia (1972) Sipayare; (1986) El Tocuco.	1(2)
<i>Zamicrodus</i> Viereck, 1912 (Briceño 1999)	Barinas (1978) Río Caparo.	1(1)
<i>Zacremnops</i> Sharkey and Wharton, 1985 (Briceño 1999)	Zulia (1972, 1976) Villa del Rosario; (1977) Tocuco.	1(5)
2-Alysiinae		
<i>Asobara</i> Foerester, 1862 (Terán 1980)	Mérida (1992,1993). Táchira (1992,1993). Trujillo (1995) Monte Carmelo.	1(22)
<i>Idiasta</i> Foerester, 1862 (Terán 1980)	Mérida (1992, 1993). Táchira (1992,1993).	1(21)
<i>Oenonogastra</i> Ashmead, 1900 (Terán 1980)	Mérida (1972) Libertador Co.	1(25)
3-Braconinae		
<i>Bracon</i> Fabricius, 1804 (Guagliumi 1966, Terán 1980) (= <i>Microbacron</i> Ashmead in Terán 1980)	Lara (1979). Portuguesa (1990) Santa Lucía Aragua (1976) Ocumare de la Costa.	1(41)
<i>Digonogastra</i> Viereck, 1912 (reported as <i>Iphiaulux</i> Foerester, 1982 in Guagliumi 1966 and Terán 1980)	Trujillo (1974) Cenizo. Zulia (1977) El Tocuco; (1972) Mara; (1972) Colon; (1973) Francisco Javier Pulgar Co.	2 (36)
4-Cardiochilinae		
<i>Cardiochiles</i> Nees, 1818 (Guagliumi 1966 and Terán 1980)	Zulia (1967) Mara; (1982, 1983,1984) Jardín Botánico; (1982, 1983) Tocuco.	1 (66)

Table 1. Cont.

Genus	State (Year) Collection Locality	Quantity ¹
5-Cenocoeliinae		
<i>Cenocoelius</i> Haliday, 1840*	Bolívar (1978) Río Grande.	1(1)
6-Cheloninae		
<i>Chelonus</i> Panzer, 1806 (Guagliumi 1966 and Terán 1980)	Lara (1991) Yacambu. Nueva Esparta (1983) El Valle. Táchira (1974) Jáuregui Co. Zulia (1987) Maracaibo; (1982) Urdaneta; (1976,1982,1983,1984) Tocuco; (1984) El Mecoque; (1992) Mara.	3 (286)
<i>Phanerotoma</i> Wesmael, 1838*	Bolívar (1978) Río Grande. Zulia (1964) Mara.	1 (3)
7-Doryctinae		
<i>Liobracon</i> Szépligeti, 1901*	Zulia (1974) Río Laja.	1 (1)
<i>Monarea</i> Szépligeti, 1904*	Zulia (1980) Sucre.	1 (1)
<i>Semirhytus</i> Szépligeti, 1902*	Zulia (1975) San Juan de los Altos.	1 (1)
<i>Trigonopasmus</i> Enderlein, 1912*	Zulia (1967) Mara; (1967) La Kasmera; (1976) Tocuco.	2 (5)
8-Helconinae		
<i>Eubazus</i> Nees, 1814*	Zulia (1977) Perijá.	1 (1)
<i>Urosigalphus</i> Ashmead, 1888*	Trujillo (1995) Monte Carmelo.	1 (5)
9-Meteorinae		
<i>Meteorus</i> Haliday 1835 (Guagliumi 1966 and Terán 1980)	Aragua (1987). Zulia (1991).	1 (1)

Table 1. Cont.

Genus	State (Year) Collection Locality	Quantity ¹
<i>Zele</i> Curtis, 1832 (Terán 1980)	Lara (1978) Yacambu. Trujillo (1976) La Mesa. Zulia (1979) Mara; (1983,1985) Tocuco.	2 (7)
10-Microgastrinae		
<i>Apanteles</i> Foerester, 1862 (Guagliumi 1966, Terán 1980)	Lara (1966) Morán Co. Mérida (1987) San Rafael de Mora. Portuguesa (1991) Araure Co. Zulia (1972, 1974,1991) Mara; (1977) Maracaibo; (1973, 1977) Perijá; (2000) Colón Francisco Javier Pulgar Co.	3 (232)
<i>Cotesia</i> Cameron, 1891*	Trujillo (2002). Zulia (2000) Maracaibo; (2002) Perijá; (2004) Mara; Colon Francisco Javier Pulgar Co.	1 (783) G ²
<i>Microplitis</i> Foerester, 1862 (Guagliumi 1966, Terán 1980)	Zulia (1967, 1968, 1973, 1978) Maracaibo; (1987) Tomoporo de Tierra; (1989) Ricaurte Co. Sector los Membrillos.	2 (197)
<i>Dolichogenidea</i> Viereck, 1911*	Aragua (1987). Trujillo (1993).	1 (15)
<i>Fornicia</i> Brullé 1846 (Guagliumi 1966, Terán 1980)	Zulia (2004) Colón Francisco Javier Pulgar Co.	1 (9)
11-Opiinae		
<i>Doryctobracon</i> Enderlein, 1920 (=Parachasma Fischer, 1967 in Terán 1980)	Mérida (1992) San Luis; (1992) La Azulita; (1992) Justo Briceño Co.; (1992) Caño Amarillo; (1992) Vía Torondoy; (1992) El Palmar Boca Grande; (1992, 1993) San Juan de Lagunillas; (1992, 1993) Jaji Co., Tabay. Táchira (1992 ,1993) Caliche; (1992) Las Piedras; (1993) San Juan de Colón; (1992, 1993) Delicias; (1992,1993) Las	4 (19,699) Terán (1980)

Table 1. Cont.

Genus	State (Year) Collection Locality	Quantity ¹
<i>Doryctobracon</i> – cont.	Tendidas; (1993) Caña Brava; (1992,1993) La Honda; (1992) Hernández; (1992,1993) Las Lajas; El Diamante. Trujillo (1992, 1993) Miyayi; (1987) Betijoque; (1993) El Cumbe, El Chorrón; (1992 ,1993) La Puerta; (1992 ,1993) Santa Ana; (1992) Bocono; (1992 ,1993) El Helechal; (1992 ,1993) Monte Carmelo; (1992) Jajo; (1993, 1996) Vía el Alto. Zulia (1987) Baralt; (1988,1990, 1992) Maracaibo; (1990) Palito Blanco; (1987) Finca La Esperanza; (1987, 1988) Tocuco; (1990) Manantial.	
<i>Opius</i> Wesmael, 1835 (Guagliumi 1966, Terán 1980)	Mérida (1992) Justo Briceño, Los Manantiales, San Luís, Torondoy, Caño Amarillo. Táchira (1999) Rubio; (1995) Vía Bramón; (1999) Finca Buenos Aires. Trujillo (1992) Monte Carmelo; Betijoque, Bituqui, El Cumbe. Zulia (1992) Maracaibo; Manantial, Tocuco.	4 (971) Briceño (1999)
12- <i>Orgilinae</i> <i>Orgilus</i> Haliday, 1833*	Bolívar (1978) Río Grande.	1 (1)
13- <i>Rogadinae</i> <i>Rogas</i> Nees, 1818 (Guagliumi 1966, Terán 1980) (= <i>Pelecystoma</i> Wesmael, 1838 in Terán 1980)	Aragua (1975) Rancho Grande. Trujillo (1991) Escuque. Zulia (1961) Perijá; (1971) Bolívar; (1971) Maracaibo; (1977) Tocuco; (1975) Miranda Co.	1 (20)

¹Number of species (Number of specimens); *New record for Venezuela;²Guagliumi (1966).

carpa Foerester, *Rhysipolis* Foerester and *Snellenius* Westwood. The nine genera of Agathidinae included in Table 1, have been reported in previous works, along with the genera *Earinus* Wesmael, *Labagathis* Enderlein, *Sesioctonus* Viereck, *Trachagathis* Viereck, and *Plesiocoelus* van Achterberg (Briceño 1999, 2002).

DISCUSSION

In the present study 11 genera of Braconidae are reported as new records for Venezuela, representing a 39% increase with respect to the list of Terán (1980). Specimens were collected at 80 localities from 12 Venezuelan states. The Agathidinae are the only subfamily well represented in the MALUZ collection, with 9 of 14 genera reported for Venezuela.

The number of genera reported for Venezuela has increased slowly over time, considering the great diversity known in this group in the New World. The major problem in the MALUZ collection has been the lack of specialists to identify braconids at the species level.

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