A KEY TO AND NOTES ON THE GENERA OF BRACONINAE (HYMENOPTERA: BRACONIDAE) FROM AMERICA NORTH OF MEXICO WITH DESCRIPTIONS OF TWO NEW GENERA AND THREE NEW SPECIES

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Abstract

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An illustrated key to the genera of Braconinae from America north of Mexico is provided. Lapiecta aquatic Quicke gen. nov. and sp. nov. from Ontario and Iowa, and Compsobraconoides robustus Quicke gen. nov. and sp. nov. from Texas, Florida, and Mexico are described and illustrated. Bracon albispina Cameron is transferred to Compsobraconoides and a key is provided to enable its separation from Compsobraconoides rufus Quicke sp. nov. Chartobracon van Achterberg is recorded from the New World for the first time and a new species, C. canadensis Quicke sp. nov. from Canada, is described, illustrated, and distinguished from C. huggerti van Achterberg from Europe. Seliodus Brèthes is synonymized with Bracon Fabricius on the authority of C. van Achterberg. Relationships of the new genera are briefly discussed and notes are provided on all of the Nearctic genera.

Résumé


INTRODUCTION

The Nearctic Braconidae are becoming increasingly well known both at the generic and the species levels, and several keys to the genera have been provided (Marsh 1971; Marsh et al. 1987). Unfortunately, work on one of the major subfamilies, the Braconinae, has advanced slowly over the past 50 years and its genera, even from the Nearctic region, are not well known (Muesebeck 1925; Mason 1978). Recently, a preliminary key has been provided to the Old World genera of Braconinae (Quicke 1987) and as a result of that work and of studies by van Achterberg (1982, 1983, 1985), a clearer picture has emerged regarding the identity and limits of many of the genera. These investigations are now being extended to include the New World Braconinae and this has resulted in a re-evaluation of some generic identifications (Quicke 1988a) and the discovery of some new North American genera. Because these additions and changes were not incorporated in the recent keys to the Nearctic genera and the present study has resulted in the discovery of two new genera, one from Canada and one from the United States, an updated key to the braconine genera is warranted.

Descriptions of the new taxa are by the senior author. Type material is deposited in the Canadian National Collection, Ottawa, Ont. (CNCO), with some paratypes in the collection of the senior author and additional material in the United States National
Museum, Washington, DC (USNM), and the British Museum of Natural History, London (BMNH).

**TERMINOLOGY**

Terminology follows that of Harris (1979) and van Achterberg (1979). Names of wing veins and cells are indicated in Figure 8a and 8b, respectively. The term precoxal groove is used instead of sternalus.

**KEY TO THE GENERA OF BRACONINAE OF AMERICA NORTH OF MEXICO**

1. Scapus shorter ventrally than dorsally in lateral aspect (antenna directed anteriorly), not apicomically or apicolaterally emarginate (Fig. 1a) ........................................ 2

1'. Scapus longer ventrally than dorsally in lateral aspect (antenna directed anteriorly) (Fig. 1b), or if about as long ventrally as dorsally then scapus strongly emarginate at least apicolaterally ........................................ 10

2(1). At least first and usually also second and third flagellomeres strongly flared apically, especially ventrally (Fig. 5c and d) ........................................... Coeloleides Wesmael

2'. Basal flagellomeres more or less cylindrical (Fig. 1a) ........................................... 3

3(2'). Mesosoma strongly dorsoventrally compressed, more than 2.8 × longer than high (Fig. 4b); head approximately 2 × higher than long (Fig. 2e) ... Chariobroacon van Achterberg

3'. Mesosoma not or hardly dorsoventrally compressed, less than 2.3 × longer than high (Fig. 4a); head not higher than long (Fig. 2d) ........................................... 4

4(3'). Metanotum and propodeum each with complete mid-longitudinal carina (Fig. 6f); precoxal groove (sternalus) impressed and coarsely crenulate (Fig. 4a); mesopleural suture crenulate (Fig. 4a); forewing vein 1-SR + M strongly curving posteriorly some distance after arising from 1-M (Fig. 8a) ........................................... Lapidida Quicke gen.nov.

4'. Metanotum and propodeum never with complete mid-longitudinal carina (Fig. 3b) (in some species, propodeum alone may have complete carina); precoxal groove (sternalus) not or indistinctly impressed, never crenulate; mesopleural suture smooth in most species, but crenulate in some (Vipio) which have forewing vein 1-SR + M straight (Fig. 8c and d) ........................................... 5

5(4'). Radial cell of forewing short, vein SR1 joining wing margin less than 0.7 of the way between apex of pterostigma and wing tip (Fig. 8c); labio-maxillary complex moderately to very elongate (Fig. 3d); clypeal guard hairs clustered in two distinct groups and in most species, apically fused or twisted (Fig. 2c) ........................................... Vipio Aub.

5'. Radial cell of forewing normal, vein SR1 joining wing margin more than 0.75 of the way between apex of pterostigma and wing tip (Figs. 8d, 9c), or if radial cell shorter (rarely in some Bracon species) then labio-maxillary complex short (Fig. 3e) and clypeal guard hairs separate and evenly spaced ........................................... 6

6(5'). Forewing vein 3-SR less than 1.5 × length of vein r (less than 1.2 × in most specimens) (Fig. 8e); forewing vein r sinuate in most species Habrobroacon Ashmead

6'. Forewing vein 3-SR more than 1.6 × length of vein r (more than 1.9 × in most species) (Figs. 8d, 9c); forewing vein r virtually straight in most species ........................................... 7

7(6). Face with broad, parallel-sided, distinctly raised median area defined laterally by at least weakly developed pair of carinae extended from clypeus to antennal sockets (Fig. 3a); clypeus separated from face by distinct carina (Fig. 3a) ........................................... Cepsbroconoides Quicke gen.nov.

7'. Face without raised median area and sublateral carinae extended from clypeus to antennal sockets (Fig. 3c); clypeus not bordered dorsally by carina (Fig. 3c) ........................................... 8

8(7'). Sclerotized part of median tergite of first metasomal segment more than 3.0 × longer than medial width (Fig. 5a) ........................................... Myosoma Bruné

8'. Sclerotized part of median tergite of first metasomal segment less than 2.5 × longer than medial width (Figs. 5b, 7a) ........................................... 9

9(8'). Posterior part of propodeum with longitudinal carina or ridge sublaterally (Fig. 7e) ........................................... Pigeria van Achterberg

9'. Posterior part of propodeum without longitudinal carina (Fig. 7f) ... Bracon Fabricius
10(1') Ventral border of clypeus sinuate as viewed from front (Fig. 2a) ................................................................. 10

11(10') Base of scapus strongly, angularly narrowed basally on lateral and dorsal sides, petiolate (Fig. 1f); scapus with large apicomedial area set-off by distinct apicomedial ridge (Fig. 1c and f); pedicellus moderately to strongly convex medially in dorsal aspect (Fig. 1c) ........................................ 11

11' Base of scapus smoothly and roundly narrowed or indistinctly petiolate in appearance (Fig. 1d and e); scapus at most with narrow medial, pre-apical area (Fig. 1e); pedicellus almost parallel-sided in dorsal aspect (Fig. 1d) .................................................. 12

12(11') Hypopygium of female short and bluntly rounded distally in lateral aspect (Fig. 4d); hind telotarsomere, in most species, with distinct distoventral cluster of spines (Fig. 4e); second metasomal tergite without raised, posteriorly narrowing (triangular) mid-basal area (Fig. 6e) .................................................. Compsobrocon Ashmead

— Hypopygium of female acutely pointed distally in lateral aspect (Fig. 4c); hind telotarsomere without distoventral cluster of spines (see Fig. 4f); second metasomal tergite, in most species, with distinct, raised, posteriorly narrowed (triangular), mid-basal area (Fig. 6.a) .................................................. Digonagastria Viereck

13 Posterior margins of metasomal tergites 3–5 thickly sclerotized and dorsally convex in lateral aspect (Fig. 6d); metasomal tergites coarsely sculptured in most species (Fig. 6a); mid-basal area of second metasomal tergite produced posteriorly into mid-longitudinal carina (Figs. 6.a, 7b) in most species; raised median area of first metasomal tergite with short mid-longitudinal carina or pair of submedial pits medioposteriorly (Fig. 7b) in most species; dorsolateral carinae of first metasomal tergite well developed and, in most species, lamelliform .......................................................... Cyanopterus Haliday

— Posterior margins of metasomal tergites 3–5 thinly sclerotized or membranous and straight in lateral aspect (Fig. 6c); metasomal tergites smooth (Fig. 6c); mid-basal area of second metasomal tergite, if present, not produced posteriorly into mid-longitudinal carina; raised median area of first metasomal tergite without carina or pair of submedial depressions (Fig. 6b); dorsolateral carinae of first metasomal tergite absent or indistinctly defined

**DESCRIPTIONS OF NEW TAXA**

**LAPICIDA Quicke gen. nov.**

(Figs. 4a, 6f, 8a)

Type-species: *Lapicida aquatic* Quicke sp. nov., by present designation.

Diagnosis. Members of this genus may be distinguished from all other Braconinae by the combination of a strongly curved forewing vein 1-SR + M and complete mid-longitudinal carinae on the metanotum and propodeum.

Description (Females). Head. Antenna approximately as long as forewing. Terminal flagellomere acuminate. Median flagellomeres much longer than wide. Scapus small, sub-cylindrical, shorter ventrally than dorsally in lateral aspect, not apicomedially or apicilaterally emerginate. Hypoclypeal depression deep and dorsally rounded. Lower part of clypeus reflected into hypoclypeal depression and separated from upper part by transverse, median clypeal carina. Clypeus separated from face by weak groove. Lower part of face adjacent to mandible and mandible base not forming distinct 'V'-shaped groove. Malar suture poorly developed. Malar space approximately half eye height. Eye very sparsely setose, weakly emerginate opposite antennal sockets. Frons hardly impressed. Head transverse but not contracting immediately behind eyes.


Forewing. Marginal cell long, vein Sr1 extended to wing margin at approximately 0.95 of the distance between apex of pterostigma and wing tip. Second submarginal cell distally narrowed. Vein r arising from pterostigma distal to its middle. Veins C + SC + R and 1-SR forming angle of approximately 65°. Vein 1-SR + M strongly curved posteriorly. Vein 3-CU1 not expanded posteriorly, much longer than vein CU1b.


Legs. Claws with large, acutely produced basal lobes. Hind tibia slender, with distinct longitudinal, lateral groove. Hind and middle telotarsus excluding claw approximately half as long as their respective basitarsi.

Metasoma. First metasomal tergum with complete though weak and irregular dorso-lateral carinae; with dorsal carinae bordering the raised median area and running more or less in parallel to posterior margin of tergum: anteriorly with pair of short, medially converging carinae which unite to give rise to short mid-longitudinal carina. Second metasomal tergum without posteriorly diverging sublateral grooves and without posteriorly converging submedial grooves. Suture between terga 2 and 3 crenulate. Metasomal tergites 3–6 without anterior sublateral, posteriorly diverging grooves; without transverse subposterior grooves. Hypopygium acutely pointed in lateral aspect. Ovipositor slender, with weak pre-apical dorsal nodus; apicoventrally without obvious serrations; portion extending beyond apex of metasoma approximately 0.6 × length of forewing.

Description (Males). Similar to females except antenna slightly longer.

Remarks. 1. Lapicida gen. nov. belongs to the subtribe Bracoina sensu van Achterberg (1984) and is closely related to the Palearctic genus Baryproctus Ashmead with which it shares (i) complete mid-longitudinal metanotal carina, (ii) complete mid-longitudinal porpodeal carina, (iii) crenulate mesopleural suture, (iv) strongly sculptured metapleuron and propodeum. (v) dorsal carinae running along the edge of the raised median area of the first metasomal tergum. Baryproctus differs from Lapicida in having (i) forewing vein 1-SR + M straight or only weakly curved posteriorly after arising from 1-SR, (ii) the middle and hind telotarsi strongly swollen (hind telotarsus at least 0.9 × length of hind basitarsus), (iii) discrmen crenulate, (iv) no precoxal groove, (v) no mid-longitudinal carina on the first metasomal tergite, and (vi) claws without produced basal lobes.

2. Lapicida is Latin for a stone cutter and it was chosen in honor of W.R.M. Mason (the joint original collector with his wife Edith) who has made a major contribution to braconid systematics over a period of many years.

Lapicida aquatica Quicke sp. nov.
(Figs. 4a, 6f, 8a)

Females. Measurements. Length of body 2.6–3.0 mm, of forewing 2.8–3.2 mm, and of ovipositor (portion extending beyond apex of metasoma) 1.9–2.2 mm.

Head. Antenna with 27 flagellomeres. Terminal flagellomere 2.7 × longer than wide. Penultimate flagellomere 2.0 × longer than wide. Median flagellomere 2.2 × longer than wide. First flagellomere 1.5 × longer than both second and third flagellomeres separately. the latter being 2.0 × longer than wide. Height of clypeus: inter-tentorial distance:tentoriotoopcular distance = 4:15.7. Face coriaceous. Height of eye:width of face:width of head =

**Mesosoma.** Mesosoma 1.85 × longer than high. Pronotum (except for lateral groove), mesoscutum, scutellum, mesopleuron, and mesosternum coriaceous. Metaleuron with confused rugulose sculpture. Anterior third of propodeum coriaceous and densely setose, remainder with confused rugulose sculpture.


**Metasoma.** Metasoma usually with eight visible terga. First tergum approximately 1.2 × wider than long; anterior two-thirds of raised median area with confused rugulose sculpture, posterior third with coriaceous sculpture. Second tergum approximately 1.9 × wider than medially long; with combined strigulate and coriaceous sculpture anteriorly becoming coriaceous posteriorly. Third tergum approximately 2.2 × wider than medially long; with weaker coriaceous sculpture than the second tergite. Terga 4 and 5 with weak coriaceous sculpture.

**Color.** Brown to black except for the following which are yellow: head below top of eye, narrow to broad orbit around top of eyes (sometimes extending across front of frons), legs except for tibiae and tarsi which are largely piceous especially distally, metasomal tergites 3 and 4 in large part.

**Males.** Similar to females except antenna with 28–32 flagellomeres. Generally somewhat darker in color than females.

**Genitalia.** Parameral process short and broad, apically oblique in lateral aspect; with row of approximately seven strong bristles arising from apical edge; with single short bristle arising from mid-ventral edge of process. Volsellae glabrous. Digitus with single apical tooth-like process; dorsal edge weakly concave. Basal ring pointed, almost forming right angle anteroventrally.

**Material Examined.** Holotype: 9, Ontario, Canada with the following data label: "Aquatic plants. Oxford Mills, ONT. Aug. 25 1961 W. & E. Mason"; deposited in the CNCO. Paratypes: (5 9 and 4 9) topotypic with holotype but seven collected on 24 August 1961; of these 1 9 and 1 9 are in the Quicke collection, the remainder in CNCO: 1 9, same locality as above, 29 VI 1973, G. Gibson (CNCO); 30 9, 16 9, Canada, Ontario, Ottawa, swept from Sagittaria sp., 20.VII.-15.VIII.1987, R. Vockeroth (CNCO); 1 9, "Iowa. Co. 39, June 20, 1934, H.C. Knutson" (USNM).

**COMP OSOBRA CO N OIDES QUICKE GEN. NOV.**

(Figs. 1a, 3a, 7d, 9c)

**Type-species:** Compsobraconoides robustus Quicke sp. nov. by present designation.

**Diagnosis.** Compsobraconiodes may be distinguished from all other Braconinae by having the following combination of character states: scapus shorter ventrally than dorsally, a strongly curved forewing vein 1-SR + M, claws with acutely pointed basal lobes, a pair of submedial carinae running in parallel from the clypeus to the antennal sockets and the apically rounded hypopygium.

**Description (Females).** Antenna shorter than forewing. Terminal flagellomere pointed but not acuminate; diameter at base approximately 0.6 × that of median flagellomeres. Scapus small, shorter ventrally than dorsally in lateral aspect, not apicomaximally or apicolaterally emarginate. Hypoclypeal depression deep and dorsally rounded. Bordered dorsally by distinct, lamelliform, transverse median clypeal carina. Clypeus bordered dorsally by distinct
carina. Lower part of face adjacent to mandible and between clypeus and mandibular condyle, distinctly recessed in the form of a "V"-shaped groove. Malar suture well developed. Malar space less than one-quarter eye height. Face finely sculptured, with almost parallel-sided, distinctly raised, broad median area bordered laterally by pair of distinct, though sometimes weak, carinae which run from dorsolateral margin of clypeus to bases of antennal sockets. Eyes virtually glabrous. Frons with weak mid-longitudinal sulcus, not or hardly impressed. Head narrowing strongly immediately behind eyes.

**Mesosoma.** Mesoscutum largely glabrous but with some sparse setosity in vicinity of notauli; middle lobe protruding in front of lateral lobes but notauli not or hardly impressed. Scutellar sulcus finely crenulate. Epicnemial area smoothly impressed. Precoxal suture absent. Mesopleural suture smooth. Mesosternal groove simple, without crenulations. Episternal scrobe obsolete. Median area of metanotum smoothly rounded, without mid-longitudinal carina except at extreme anterior. Propodeum smooth, without longitudinal carinae either medially or laterally. Propodeal spiracle small, situated near mid-length of propodeum.

**Forewing.** Marginal cell of forewing long, vein SR1 reaching wing margin more than 0.9 of way between apex of pterostigma and wing tip. Second submarginal cell moderately long, nearly parallel-sided. Veins C + SC + R and 1-SR forming angle of approximately 85°. Vein 1-SR + M strongly curving posteriorly after arising from 1-SR. Vein cu-a interstitial or slightly postfurcal. Vein 3-CU1 not expanding posteriorly, much longer than CU1b.

**Hindwing.** Vein 1r-m shorter than SC + R1. Vein 2-SC + R longitudinal. Vein 1-M expanded toward base. Vein 2-1A absent. Base of wing more or less evenly and densely setose.

**Legs.** Claws with large, acutely pointed basal lobes. Legs mostly densely setose and rather robust. Hind tibia with only weak, narrow longitudinal lateral groove.

**Metasoma.** Metasoma smooth, with eight clearly visible terga. Median tergite of first metasomal segment widening gradually behind spiracles; without dorsolateral and dorsal carinae; median area rounded elevated; lateral areas wide. Second metasomal tergum considerably wider posteriorly than anteriorly; without either posteriorly diverging or posteriorly converging grooves. Second metasomal suture smooth, deep, moderately sinuous curving distinctly toward anterior in middle. Third metasomal tergum without grooves. Terga 4-7 with broad, deep, transverse, peri-basal groove giving each tergum strongly sinuous profile in lateral aspect; without sublateral, posteriorly diverging grooves; without transverse subposterior groove. Hypopygium very short, apically rounded in lateral aspects. Ovipositor sheaths not expanded distally. Ovipositor with well developed pre-apical dorsal nodus and apicoventral serrations.

**Description (Males).** Similar to females, but eyes larger and second metasomal suture sometimes very weakly crenulate.

**Additional Species.** *Compsobraconoides albispina* (Cameron) comb. nov. (= *Bracon albispina* Cameron, 1887).

**Remarks.** 1. *Compsobraconoides* gen. nov. is closely related to the Neotropical genera *Compsobracon* Ashmead and *Cyclaulax* Cameron. Sharing the following characters with both of these: (i) broad, parallel-sided, raised medial facial area bordered laterally by distinct carinae; (ii) forewing vein 1-SR + M strongly bent; (iii) second metasomal tergum without raised mid-basal triangular area; (iv) metasomal terga and second suture smooth; and (v) a sac-like membraneous invagination mid-ventrally between third and fourth abdominal sternites. *Compsobraconoides* differs from both genera in the following features: (i) scapus shorter ventrally than dorsally; (ii) claws with large, pointed basal lobe. Additionally, *Cyclaulax* species have the fore basitarsus more or less strongly compressed laterally and *Compsobracon* species have an apically bluntly rounded hypopygium.
(females) and have a cluster of thickened bristles mid-ventrally on the telotarsi (Quicke 1987). There are a number of undescribed Neotropical genera that are also related to Compsobraconoides; however, these all differ from Compsobraconoides in having a ventrally elongate scapus and claws without a pointed basal lobe. These new genera will be treated elsewhere.

The Compsobraconoides generic group appears to be closely related to the Atanycolus group. Some undescribed genera and some species of Cyclaulus possess scapes typical of the Atanycolus group, but otherwise share all the other Compsobracon group features. Furthermore, with the exception of Compsobracon, all genera of both groups have only a single thickened bristle at the apex of hindwing vein C+SC+R irrespective of their size, an apomorphic feature within the Braconinae (Quicke 1982, 1987). The Neotropical Hemibracon Szépligeti of the Atanycolus group has a strongly arched forewing vein 1-SR+M (an uncommon feature in the Braconinae) which lends further support to the idea that the two groups are closely related, although Hemibracon and the other Atanycolus group genera lack the other features of the Compsobraconoides group listed above.

Three other genera should also be noted as showing close affinities with the Compsobraconoides group: Calobracon Szépligeti, from the Neotropical region; Molibracon Quicke, from the Indo-Australian region; and Calcaribracon Quicke, from the Indo-Australian and southeastern Oriental regions. These three genera have smooth, unsculptured metasomalata, a strongly arched forewing vein 1-SR+M and, perhaps most importantly, a membranous sac-like structure between the third and fourth abdominal sternites. Apart from the above genera, this last feature is found in only a few other Braconinae (Virgilabracon Quicke (Australian), Stigmatobracon Turner (Australian), Myosoma Bruilé (Old and New World), and Coeloidea Wesmael (Holarctic)) and has not been found in any Dorytinae or Rogadinae s.l. It is believed therefore that this is probably an apomorphic feature within the Braconinae.

2. Compsobraconoides is so named because of its similarity to and phylogenetic affinities with Compsobracon.

Compsobraconoides robustus Quicke sp. nov.
(Figs. 1a, 3a, 7d, 9e)

**Females. Measurements.** Length of body 5.3–6.9 mm, of forewing 5.9–7.1 mm. and of ovipositor (portion exceeding beyond apex of metasoma) 1.2–2.4 mm.


**Mesosoma.** Mesosoma approximately 1.65 × longer than high; smooth but in most specimens rather dull. Mesosternum, metapleuron, and lateral part of propodeum densely silvery setose.


**Hindwing.** Ratios of length of 1r-m:SC+R1 = 2:3. Apex of C+SC+R with one ventrally thickened bristle.

Metasoma. First tergite approximately as wide posteriorly as long. Second tergite approximately 3 × wider posteriorly than medially long; 0.6 × as long as the third tergite. Ovipositor very robust, 0.78–0.85 × diameter of median flagellomere (excluding setae).

Color. Orange-brown to red except for the following which are piceous brown to black: antennae, labio-maxillary complex, trochanters and femora of front and middle legs, except close to joints. fore and middle tibiae and tarsi (usually brownish), distal third of hind tibiae and hind tarsi (black), and ovipositor sheaths (black).

Males. Similar to females but second metasomal tergite about as long as third. Most others slightly paler than females and less extensively marked with black and labio-maxillary complex uniformly yellowish.


Key to Species of *Compsobraconoides*

| 1. Depth of medial part of ovipositor more than 0.6 × diameter of third flagellomere (excluding setae) | C. robustus Quicke sp.nov. |
| 2. Depth of medial part of ovipositor less than 0.6 × diameter of third flagellomere | C. albispina (Cameron) comb.nov. |

*Chartobracon van Achterberg* (Figs. 2f, 4b)

*Chartobracon* van Achterberg, 1983.

Type-species: *Chartobracon huggerti* van Achterberg, 1983; by monotypy.

Diagnosis. Species of *Chartobracon* can be distinguished from all other Braconineae by the extreme dorsoventral compression of the mesosoma and head with a corresponding reduction in the length of the face and the simple scapus which is ventrally shorter than dorsally in lateral aspect.

Key to Species of *Chartobracon*

| 1. Third metasomal tergite with pair of widely separated rugulose-coriaceous areas close to lateral edge; second metasomal tergite with pair of posteriorly diverging submedial grooves with rugulose sculpture | C. huggerti van Achterberg |
| 2. Third metasomal tergite with broadly rugulose-coriaceous mid-basal area, smooth and shiny sublaterally; second metasomal tergite with pair of parallel submedial, rugulose-coriaceous grooves | C. canadensis Quicke sp.nov. |

*Chartobracon canadensis* Quicke sp.nov. (Figs. 2f, 4b)

Female. Measurements (holotype). Length of body 2.9 mm, of forewing 2.5 mm, and of ovipositor (portion extending beyond apex of metasoma) 1.2 mm.

Head. Antenna with 21 flagellomeres. Terminal flagellomere pointed but not acuminate, 2.0 × longer than wide. Penultimate flagellomere 1.5 × longer than medially
wide. Median flagellomere 1.5× longer than wide. First flagellomere 0.8× and 0.9×
longer than second and third flagellomeres respectively, the latter being 1.4× longer than
wide.


longer than deep. Hind tibia with distinct longitudinal lateral groove. Hind basitarsus 4.8×
longer than deep.

Metasoma. Median tergite of first metasomal segment distinctly narrowed behind
spiracles: median area more or less flat and separated from lateral areas by narrow, finely
crenulate groove, otherwise smooth and shiny. Second to fifth tergum with distinctly raised
mid-longitudinal line; largely smooth and shiny except for coriaceous area on terga 2 and
3. Second tergum approximately twice as wide as long; with narrow, smooth mid-longi-
tudinal area bordered narrowly by rugulose-coriaceous area. Second metasomal suture
weakly sinuate; finely crenulate. Third tergum with extensive mediobasal area of rugulose-
coriaceous sculpture. Third and fourth terga with strong lateral crease. Metasomal sternites
extensively coriaceous. Ovipositor approximately half as long as forewing: without pre-
apical dorsal nodus or apicoventral serrations.

Color. Evenly piceous red-brown. Wings hyaline with piceous brown venation.

Male. Unknown.

Material Examined. Holotype: female from Alberta Canada collected by W.R.M. Mason
bearing the following label "'Waterton NP. AB. 1300m. Birch-fir 24-VI-80 WM.'":
deposited in the CNCO.

NOTES ABOUT NEARCTIC GENERA

Alienoclypeus Shenefelt
(Figs. 2a, 9b)


Type-species: Alienoclypeus insolitus Shenefelt, 1978; by monotypy.

Alienoclypeus is only known from the type-species which occurs in Arizona, Texas,
and California and from northern to southern Mexico where it has been reared as a para-
sitoid of the curculionid beetle, Scyphophorus acupunctatus Gyll.

Although the scapus and pedicellus of Alienoclypeus are not modified as in Atanycolus
(see below) this genus nevertheless displays a considerable similarity to the latter both in
terms of external morphology and features of the male genitalia. Additional characters
need to be found, however, before a more positive statement about the relationships of
Alienoclypeus can be made.

Atanycolus Foerster
(Figs. 1b, 1c, 2b, 2e, 9b)

Atanycolus Foerster, 1862.

Type-species: Ichneumon denigrator Linnaeus, 1758; monobasic and original
designation.

Coelobraco Thomson, 1892.

Type-species: Ichneumon denigrator Linnaeus, 1758.

Melanobraco Ashmead, 1900.

Type-species: Braco simplex Cresson, 1872.

Atanycolidea Viereck, 1912.

Type-species: Braco rugosiventris Ashmead, 1889.
Atanycolus has a Holarctic distribution and is the only member of the Atanycolus generic group (Quicke 1987) occurring in North America. Atanycolus extends into Mexico but is apparently absent from South America where a number of other related genera are found (viz. Hemibracon Szépligeti, Calobracon Szépligeti, Cyctaulax Cameron). The Canadian and USA species were revised by Shenefelt (1943). Known hosts of Atanycolus members are principally wood-or bark-boring beetle larvae. Cerambycidae and Buprestidae being most commonly attacked, but rearings from Scolytidae, Curculionidae, and sesiid moth larvae have also been recorded.

The relationships of the Atanycolus group are at present uncertain.

**Bracon Fabricius**

(Figs. 3b, 3c, 7a, 7c, 7f, 7d)

Bracon Fabricius, 1804.

Type-species: Ichneumon minutator Fabricius, 1798; Opinion 162.

Microbracon Ashmead, 1890.

Type-species: Microbracon sulcirostris Ashmead, 1890.

Amicopsidea Ashmead, 1900.

Type-species: Zele pallidiventris (Provancher), 1880.

Macroctyium Ashmead, 1900.

Type-species: Bracon euurae Ashmead, 1889.

Tropidobracon Ashmead, 1900.

Type-species: Bracon gastroideae Ashmead, 1889.

Liobracon (Ashmead) Nason, 1905.

Type-species: Bracon nuperus Cresson, 1872.

Seliodus Bréthes, 1909. NEW SYNONYM (on the authority of C. van Achterberg).

Type-species: Seliodus testaceus Bréthes, 1909.

Bracon is an extremely large genus with thousands of species and a worldwide distribution although only about 500 species have been described to date. In most parts of the world, including the Nearctic region, the vast majority of braconines collected belong to this genus. There are no adequate keys to the species of North America despite the fact that many are parasitoids of actual or potential economic importance, and there are undoubtedly many species from this part of the world that still await description. Considerable care should therefore be exercised if trying to use the key to the North American species (under Microbracon) provided by Muesebeck (1925).

Known hosts of *Bracon* are very diverse. Members of many species attack concealed lepidopterous larvae (stem-borers, leaf-rollers, leaf-miners, etc.) or concealed coleopteran larvae. Interestingly, a number of species have been found to parasitize larval Diptera (especially gall-forming larvae) and stem-boring sawflies (notably *Cephus*).

**Chartobracon van Achterberg**

(Figs. 2f, 4b)

Chartobracon van Achterberg, 1983.

Type-species: Chartobracon huggerti van Achterberg, 1983: monobasic and original designation.

Chartobracon belongs to the subtribe Braconina sensu van Achterberg (1984) and is closely related to *Bracon*. Previously, *Chartobracon* was known only from its type-species from Sweden.

Specimens of *C. huggerti* have been found under the bark of dry *Picea*, and have been reared from white cocoons found in the tunnels of the cerambycid beetle, *Callidium coriaceum* Payk.
Coeloides Wesmael, 1838.
Type-species: Coeloides scolyticida Wesmael, 1838; see van Achterberg, 1987, for discussion of nomenclatural problems associated with type designation.
Syntomomelus Kokujev, 1902.
Type-species: Syntomomelus rossicus Kokujev, 1902.
Habrobraconidea Viereck, 1912.
Type-species: Habrobraconidea bicoloripes Viereck, 1912.
Coeloidina Viereck, 1921.
Type-species: Coeloides melanotus Wesmael, 1838.
Cerobracon Viereck, 1926.
Type-species: Bracon secundus Dallas Torre, 1898.
Coeloides is a moderately diverse genus with a Holarctic distribution. Species principally attack bark-boring beetle larvae (especially Scolytidae) and have therefore attracted considerable attention from forest entomologists. A revision of the Nearctic species is provided by Mason (1978).
Coeloides and a presently undescribed Neotropical genus are placed in a separate tribe, the Coeloidini, because of the modified basal flagellomeres and distinctive male genitalia (Quicke 1988b, 1989).

Compsobracon Ashmead
(Figs. 1d, 2c, 4d, 4e, 6c)
Compsobracon Ashmead, 1900.
Type-species: Exothecus magnificus Ashmead, 1889: monobasic and original designation.
Macronura Szépligeti, 1906.
Type-species: Iphialax mirabilis Szépligeti, 1901.
Compsobracon is a small genus of medium-sized to large, principally Neotropical wasps. Only the type-species is known from continental North America north of Mexico (a single specimen from Texas) and of this only one specimen has been collected. It would be interesting to know if this species is still extant. Other species have been collected in the Caribbean, including the Bahamas, and in Mexico.
Compsobracon is related to the Neotropical genus Cyclaulax Cameron and to Compsobraconoides gen. nov. q.v.

Compsobraconoides Quicke gen.nov.
(Figs. 1a, 3a, 7d, 9c)
Type-species: Compsobraconoides robustus Quicke sp.nov.
Compsobraconoides is a small genus with only two species known to be described to date, although several additional undescribed Neotropical and Caribbean species have been seen by the authors. Nothing is known about its biology.

Cyanopterus Haliday
(Figs. 6b, 6c)
Cyanopterus Haliday, 1835.
Type-species: Ichneumon flavator Fabricius. 1793; monobasic.
Bracambus Thomson, 1892.
Type-species: Vipio longipalpis Thomson, 1892.
Ipobracon Thomson, 1892.
Type-species: Bracon nigrator Zetterstedt, 1840.
Cyanopteridea Viereck, 1911.
Type-species: Iphialax clypeolus Szépligeti. 1905.
Atancycolimorpha Viereck, 1913.
Type-species: Atencycolimorpha winnemanae Viereck, 1913.
Coeloidimorpha Viereck, 1913.
Type-species: Bracon (Melanobracon) webbi Viereck, 1909.
Cyanopterus is a moderately diverse genus of medium-sized wasps with a Holarctic distribution. There is no adequate key to the North American species.

There has been considerable confusion over the identity of Cyanopterus, much of which being a consequence of authors attributing generic significance to the presence or absence of a raised mid-basal triangular area on the second metasomal tergite. Specimens without this area were placed in Cyanopterus whereas those with this area were treated under Iphialax. However, even in the type-species of Cyanopterus there is considerable variation in the development of the mid-basal area, which is well defined in most males of this genus. The two genera were accordingly synonymized (Quicke 1985), though this change was not reflected in the key to North American genera provided by Marsh et al. (1987). Only two species appear to have been described from America north of Mexico whereas the actual number of species occurring there is probably closer to 20. The principal hosts of Cyanopterus species are concealed larvae of cerambycid beetles.

In addition to the characters provided in the key to genera, Cyanopterus males may be distinguished from those of Digonogastra by the presence of only two tooth-like processes arising distally from the dorsal edge of the digitus; most male Digonogastra have at least three and often four tooth-like processes along the dorsal edge of the digitus. In spite of these differences, however, Cyanopterus is probably closely related to Digonogastra.

Digonogastra Viereck
(Figs. 1c, 4f, 6a, 6d, 7b, 9a)

Digonogastra Viereck, 1912.
Type-species: Bracon eicus Cresson, 1872; monobasic.
Monogonogastra Viereck, 1912.
Type-species: Bracon atricipus Ashmead, 1889.

Digonogastra is a large genus with several hundred species of mostly medium-sized to large wasps. Many species occur in both the Nearctic and Neotropical regions and it would not be surprising if the genus also occurred in the East Palaearctic region. The name Digonogastra is not included in any of the recent keys to the North American Braconinae, its species being placed in Iphialax Foerster or sometimes in Iphialax. Despite a superficial resemblance between them, Digonogastra is probably only distantly related to the exclusively Old World genus Iphialax, and appears to be of Neotropical origin. Characters separating these two genera are given by Quicke (1988a). There are no adequate keys to the species of Digonogastra in North America though approximately 20 species have been described (under Iphialax).

The principal hosts of Digonogastra species in North America appear to be concealed larvae of cerambycid beetles, but there are numerous records that indicate that concealed Lepidoptera larvae (including Psychidae) are also parasitized. Members are either solitary or gregarious ectoparasitoids.

The structure of the male genitalia of Digonogastra, and especially the three- to four-toothed digitus, suggests an affinity with the Old World tribe Eurobraconini Ashmead. Further characters will, however, have to be certified before a more definite statement can be made.
Habrobracon Ashmead
(Fig. 8e)

Habrobracon Ashmead, 1895.
Type-species: Bracon gelechiae Ashmead, 1895.
Habrobracon is closely related to Bracon and is probably best regarded as a subgenus of the latter. It has been kept distinct largely because several of its species have been widely used in genetics and developmental research and in biological control applications. Members of Habrobracon tend to be small even in comparison with the majority of species of Bracon and most appear to be gregarious ectoparasitoids whereas Bracon spp. are usually solitary. There are no adequate keys to the species of Habrobracon though some are included in Muesebeck's (1925) key to Bracon (Microbracon) and fall out in the first seven couplets of that key. Members of Habrobracon are exceedingly catholic in their host choice both in the field and in the laboratory, attacking concealed larvae of Lepidoptera, Diptera, Coleoptera, and Hymenoptera (Symphyta).

Vipio Auct.
(Figs. 2d. 3d. 8c)

Vipio Auct. (see van Achterberg 1982 and Nixon 1988 for summaries of nomenclatural problems: an application to the ICZN to resolve these has been made by Wharton and Mason).

Isomecus Kriechbaumer, 1895.
Type-species: Isomecus schlettereri Kriechbaumer, 1895.

Zavipio Viereck, 1914 (unnecessary replacement name for Vipio Auct.)

Vipio marshalli Schmiedeknecht, 1896.
Vipio is a moderately diverse genus of small to medium-sized wasps. It is principally Holarctic in distribution but at least one species is endemic to South Africa and several occur in the Neotropical region. The North American fauna requires revision as there are numerous undescribed species in addition to the eight that have been described to date. Despite the fact that Vipio species are relatively common in collections, host records for the genus are scarce. The few host records indicate that a broad spectrum of concealed Lepidoptera, Coleoptera, and Symphyta larvae may be attacked.

Vipio is the only representative of its tribe, the Glyptomorphini (see Quicke 1987), found in the New World.

Lapicida Quicke gen.nov.
(Figs. 4a, 6f. 8a)

Type-species: Lapicida aquatic Quicke sp.nov.
Little as yet is known about this new monotypic genus except that the type-species at least is associated with aquatic, river edge vegetation. This association is of interest, however, as the closely related Palaearctic genus, Baryproctus, it also aquatic, its enlarged telotarsi enabling it to run on the surface of still water. It is hoped that the discovery of this new genus may encourage hymenopterists to collect more often from semi-aquatic habitats.

Myosoma Brullé
(Fig. 5a)

Myosoma Brullé, 1846.
Type-species: Myosoma hirtipes Brullé, 1846; designated by Viereck, 1914.

Acanthobracon Kriechbaumer, 1900.
Type-species: Acanthobracon lagopus Kriechbaumer, 1900; monotypic.

Amyosoma Viereck, 1913.
Type-species: Amyosoma chilonis Viereck, 1913; monotypic.
Myosoma was originally described from South America but it extends into the Nearctic, where it is represented by four species that were revised by Mason (1978), and also into the eastern Palearctic, Indo-Australian, and Afrotropical regions (Quicke and Wharton 1989). The New World species generally range between 4 and 10 mm long (excluding ovipositor) and are thus somewhat larger on average than the Old World representatives. One Nearctic species has been reared from sesiid Lepidoptera.

Myosoma belongs to the tribe Braconini and appears to be closely related to Bracoon.

Pigeria van Achterberg (Fig. 7e)


Type-species: Bracoon piger Wesmael, 1838; by original designation.

This genus was erected recently to receive two species from the western Palearctic, P. piger and P. wolschirjini van Achterberg. Pigeria piger has been introduced in California (Muesebeck in Krombein and Burks 1967) as a parasitoid of the pyralid Etiella zinckenella (Treit.), a pest of stored legumes. Species of Pigeria that are endemic to North America may well be discovered upon careful examination of the many thousands of smaller braconines already in collections.

Pigeria species are small members of the Braconina with body lengths less than 4 mm. Although Pigeria is being kept separate from Bracoon in the present paper, it is probably best considered as only a derived subgenus of the latter.

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Fig. 1. (a) Compsobraconoides robustus sp. nov., lateral aspect of antennal base showing scapus longer dorsally than ventrally. (b) Anencolus sp., lateral aspect of antennal base showing scapus shorter dorsally than ventrally. (c) Anencolus sp., dorsal aspect of right pedicel showing convex medial portion. (d) Compsobracon sp., dorsal aspect of antennal base showing pedicel approximately parallel-sided. (e) Digonugastria sp., ventral aspect of scapus showing slight narrowing basally and small pre-apical area. (f) Anencolus sp., dorsal aspect of antennal base showing petiolate base of scapus and large pre-apical area.
Fig. 2 (a) Alienoclypeus insolitus, anterior aspect of head showing ventral border of clypeus sinuate. (b) Alienoclypeus scolus sp., anterior aspect of lower head showing rounded ventral border of clypeus. (c) Vipio sp., anterior aspect of lower head showing long, distally united clypeal guard hairs (broken on left side of face). (d) Alienoclypeus scolus sp., lateral aspect of head showing dimensions. (e) Charitobracon canadensis, lateral aspect of head showing dimensions.
Fig. 3. (a) Compsobraconoides robusus sp. nov., anterolateral aspect of head showing longitudinal carinae. (b) Braccon sp., dorsal aspect of head and mesosoma. (c) Braccon sp., anterior aspect of head showing normally developed labio-maxillary complex. (d) Vipio sp., lateral aspect of head showing well-developed labio-maxillary complex.
Fig. 4. (a) Loricida aquatica gen. nov. and sp. nov., lateral aspect of mesosoma showing crenulate mesopleural suture and well-developed precoxal suture. (b) Chantodracon canadensis, lateral aspect of mesosoma showing dimensions. (c) Digenogaster sp., lateral aspect of apex of abdomen showing acute apex of hypopygium. (d) Compsobracte sp., lateral aspect of apex of abdomen showing blunt apex of hypopygium. (e) Compsobracte sp., lateral aspect of hind tarsus showing strong spines on telotarsomere. (f) Digenogaster sp., lateral aspect of hind tarsus showing weak spines on telotarsomere.
Fig. 5 (a) *Myosoma* sp., dorsal aspect of metasomal tergite 1 showing dimensions. (b) *Bracon ischreia*, dorsal aspect of metasomal tergite 1 showing dimensions. (c) *Coeloides pissodes*, anterior aspect of antennal base. (d) *Coeloides pissodes*, lateral aspect of basal flagellomere of antenna.
Fig. 6. (a) Digonogastra sp., dorsal aspect of anterior metasoma showing triangular area at base of tergite 2. (b) Cyanopterus sp., dorsal aspect of metasomal tergum 1 showing sculpture. (c) Cyanopterus sp., lateral aspect of metasoma showing simple posterior margins of tergites 3–5. (d) Digonogastra sp., lateral aspect of metasoma showing decurved posterior margins of tergites 3, 4, and 5. (e) Campsobracon sp., dorsal aspect of metasomal tergites 1–3 showing sculpture. (f) Lapicida aquaticæ gen. nov. and sp. nov., dorsal aspect of metasternum showing median longitudinal carina.
Fig. 7. (a) Braccon sp., dorsal aspect of metasomal tergites 1–4 showing dimensions. (b) Digonogastra sp., dorsal aspect of metasomal tergites 1–4 showing sculpture. (c) Braccon sp., lateral aspect of ovipositor showing dimensions. (d) Compsobraconoides robustus gen. nov. and sp. nov., lateral aspect of ovipositor showing dimensions. (e) Pigeria sp., ventral aspect of propleuron showing lateral ridges. (f) Braccon sp., ventrolateral aspect of propleuron showing usual smooth condition.
FIG. 8 (a) Lepicida aquatica gen nov. and sp nov., forewing showing strong distal bend in 1-SR + M. Veins: 1. SR1, 2. 3-SR, 3. r. 4. 2-SR, 5. 1-SR + M, 6. 1-SR, 7. 1-M. 8. 3-CU1, 9. CU1b, 10. C - SC - R. (b) Coeloides sp., forewing Cells: 1. 3rd submarginal, 2. marginal, 3. 2nd submarginal, 4. 2nd discal, 5. 2nd subdiscal, 6. 1st submarginal, 7. 1st subdiscal, 8. 1st subdiscal, 9. basal, 10. subbasal, 11. plical. (c) Vipio sp., forewing showing 1-SR + M not seen posteriorly in distal half. (d) Bracon sp., forewing showing dimensions of veins 3-SR and r. (e) Habrobracon sp, forewing showing dimensions of veins 3-SR and r.
Fig 9 (a) *Digenesia* sp., forewing. (b) *Alienochyes insolitus*, forewing. (c) *Compsobraconoides robustus* gen. nov. and sp. nov., forewing showing greatly curved 1-SR - M. (d) *Atanycolus* sp., forewing.