The *Zethus* of Venezuela (Hymenoptera: Eumenidae)

Lionel A. Stange

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The *Zethus* of Venezuela (Hymenoptera: Eumenidae)

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Abstract: Thirty-four species of *Zethus* are enumerated from Venezuela, providing known and new locality records. Six new species are described: *Z. rubioi* and *Z. vincenti* in the subgenus *Zethusculus*, *Z. carpenteri* and *Z. milleri* in the subgenus *Zethoides*, and *Z. bolivarense* and *Z. yepezi* in the nominate subgenus. A key to the species of Venezuela is provided. The distribution patterns of *Zethus* are discussed.

Key Words: Hymenoptera, Eumenidae, *Zethus*, Venezuela

Introduction

Bohart and Stange (1965) recorded fifteen species from Venezuela. Material taken during recent collecting trips by Menke and Vincent (1976), Menke and Carpenter (1985), Stange and Miller (1986) and Stange and Porter (1988), as well as material found in the Maracay collection, have added another 19 species to the faunal list. Six new species are described. Two new species belong to the *Z. arietis* Group (*Zethusculus*), two to the *Z. biglumis* Group (*Zethoides*), and two new species are described in the nominal subgenus.

Venezuela is very diverse in ecological habitats, including cloud forests, lowland rain forests, semi-deserts, lowland savannas, highland savannas, paramos and the Tepuy highlands. Some areas are still poorly collected, or in the case of the Tepuy highlands not collected at all, for *Zethus*. Additional species of *Zethus* will certainly be collected in this country in the future.

Another interesting feature of the Venezuelan *Zethus* fauna is the existence of geographic color forms. In the western state of Zulia there are eight species of which five exhibit a common color pattern of a black head and thorax, crimson abdomen. Also, one species of Central America and Colombia, *Z. matzicatzin*, with this same color pattern also occurs in this part of Venezuela.

Key to species of *Zethus* of Venezuela

1. Lamella of sternite III abbreviated laterally, well-developed otherwise (fig. 2); lamella of tergite III separated into three sections by sharp sublateral incisions (Subgenus *Zethoides*) ............ 2

1'. Lamella of sternite III weakly to well-developed, but not especially abbreviated laterally; lamella of tergite III not separated into sections by sharp incisions ........................................... 11

2(1). Stem of tergite II longer than that of I (fig. 1); abdominal petiole with complete fusion of sternum and tergum ........................................... 3

2'. Stem of tergite II shorter than that of I; abdominal petiole sternum and tergum separated by su- ture ........................................... 4

3(2). Petiole and tergite II mostly red; antennal hook of male reaching near middle of flagellomere VIII; male clypeus smooth across distal one-third, somewhat depressed, lateral teeth weak (fig. 3) ........................................... *matzicatzin* Saussure

3'. Petiole and tergite II mostly black; antennal hook reaching to near base of flagellomere VIII; male clypeus completely and coarsely punctate, apex with strong lateral teeth (fig. 4) ......................... ........................................... *binodis* Fabricius

4(2). Pronotal lamella relatively thick and opaque, raised evenly but lower than one mid-ocellus diameter ........................................... 5

4'. Pronotal lamella relatively thin, translucent, higher submedially than mid-ocellus diameter ...... 6

5(4). Male foretibia with at most 1 well developed spur; female forebasitarsus without reddish pegs along outer face .................. *miniatus* Saussure

5'. Male foretibia with 2 well developed spurs; female forebasitarsus with at least 5 small reddish spines along outer face .......... *tollicatus* Saussure

6(4). Abdominal sternite I constricted to a median carina before posterior expanded part; tergite I distinctly bent at anterior one-third (fig. 15) ........................................... 7

6'. Abdominal sternite I not constricted into a median carina before posterior expanded part; tergite I rather evenly expanded in profile .......... 9
7(6). Midtibia with 2 spurs; intercellar area with narrow, polished tubercles; dorsal surface of propodeum reticulate ................................ carinatus Smith

7'. Midtibia with 1 spur; intercellar area not tuberculate; dorsal surface of propodeum with large shallow punctures (fig. 13) ..................... 8

8(7). Genal carina sharp; male clypeus tridentate (fig. 12); apical flagellomere of male antenna 3 times longer than basal diameter (fig. 16) ........................................ bodkini Bohart & Stange

8(6'). Genal carina rounded; male clypeus bidentate; apical flagellomere of male antenna 2 times longer than basal diameter (fig. 17) ........................................ carpenteri new species

9(6'). Interocellar area with broad and somewhat polished tubercles separated by a narrow line of punctures; male antenna with apical flagellomere minute, button-like ................................................................. haemorrhoidalis Kriechbaumer

9'. Interocellar area without tubercles; male antenna with apical flagellomere not minute ........................................ 10

10(9'). Mid-dorsal area of abdominal tergite I (petiole) with extensive micropunctuation; humerus rounded (fig. 9........................................ diminutus Fox

10'. Mid-dorsal area of tergite I with macropunctuation but without micropunctuation; humerus sharp (fig. 10) ........................................ milleri new species

11(1'). Midtibia with 1 apical spur ............. 12

11'. Midtibia with 2 apical spurs ............. 19

12(11). Sternite II with a strong, flattened medio-apical bulge; male clypeus very short, mandibles huge (fig. 18); female clypeus polished, sparsely punctate ................................................................. magrettii Zavattari

12'. Sternite II without medio-apical bulge; male clypeus and mandibles not highly modified; female clypeus with regular, longitudinal microstriae (Subgenus Zethusculus) ........................................ 13

13(12'). Stem of tergite II shorter than that of I (fig. 22); male with sternite V usually and sternite VI always with a sublateral tooth or process; no whitish or yellow markings on thorax or abdomen (Z. mexicanus Group) ........................................ 14

13'. Stem of tergite II longer than that of I; male sternite V and VI without sublateral process or tooth; usually with whitish or yellow markings on thorax or abdomen (Z. arietis Group) ............ 15

14(13). Tegula nearly convex along outer rim; petiole and propodeum without red color ........................................ mexicanus fuscatus Bohart & Stange

14'. Tegula distinctly angled outward opposite posterior margin of scutum; petiole and propodeum with extensive red ........................................ brasiliensis fusca Bohart & Stange

15(13'). Mesoscutellum and metanotum mostly pale colored ........................................ 16

15'. Mesoscutellum and metanotum black; mesepimeron black ........................................ 17

16(15). Mesoscutellum, metanotum, propodeum, and petiole orange color; tergite I reddish; antennal hook more than 2.0 times longer than greatest width (fig. 25); tergite II with moderate micropubesence ........................................ vincenti n.sp.

16'. Mesoscutellum, metanotum, and part of propodeum yellow; tergite I with black ground color; antennal hook less than 2.0 times longer than greatest width (fig. 24); tergite II with dense rust-red micropubesence westwoodi Saussure

17. Metasoma reddish in marked contrast to black mesosome; apical flagellomere of male antenna pale with many short, pale setae on exterior face (fig. 23)................. rubioi new species

17'. Metasoma mostly black as is mesosome; flagellomere of male antenna pale or dark brown, with inconspicuous setae (fig. 21) ........................................ 18

18(17). Male apical flagellomere all or nearly all pale within (fig. 21) ........................................ romantinus Saussure

18'. Male apical flagellomere mostly or all dark brown within (fig. 24) ........................................ nigricornis Saussure

19(11). Stem of tergite II plainly longer than of I .... 20

19'. Stem of tergite II shorter than that of I ........ 22

20(19). Maxillary palps with 3-4 palpomeres; mesoscutum with reddish welts .. hilarianus Saussure

20'. Maxillary palps with 6 palpomeres; mesoscutum without reddish welts ........................................ 21

21(20). Pronotal lamella angularly prolonged backward at least halfway from humerus to tegula ................. fuscus (Perty)

21'. Pronotal lamella not prolonged toward tegula ................................................................. miscogaster Saussure

22(19'). Apical propodeal lamella much abbreviated, not differentiated from rest of submarginal propodeal carina ........................................ 23

22'. Apical propodeal lamella produced as a definite subtriangular rounded lobe on either side of petiole insertion ........................................ 29

23(22). Subhumeral area narrow, critical breadth at most equal to 2 midocellus diameters; distal lamella of tergite II sharply bent upward at middle .................... trispinosus Zavattari

23'. Subhumeral area broad, critical breadth over 3 midocellus diameters; distal lamella of tergite II not bent upward ........................................ 24

24(23'). Tegula very broadly rounded posteriorly .... 25
24'. Tegula considerably narrowed posteriorly .... 26
25(24). Abdomen mostly blue in color; thorax dark colored .................................. chalybeus Saussure
25'. Abdomen mostly orange-yellow, as well as much of head and thorax bequaerti Bohart & Stange
26(24'). Metanotum with median tubercle or tooth; notaulices undeveloped; male sternite VII with a pale, beveled excavation at base of notch of sternite VII (fig. 20) ................................................ nicaraguensis Zavattari
26'. Metanotum without tubercle or tooth; notaulices usually indicated at least posteriorly; male sternite VII not excavated ................................ 27
27(26'). Expanded part of petiole (tergite I) over 3/4 broader than long in dorsal view; flagellar hook of male minute, button-like .......... sessilis Fox
27'. Expanded part of petiole much longer than broad in dorsal view; flagellar hook of male evident, at least as long as wide .......... 28
28(27'). Mesoscutum polished with sparse punctuation medially; tegula definitely bent outward at posterior one-third ............ laevinodus Smith
28'. Mesoscutum densely micropunctate between sparse macropunctures medially; tegula with outer edge almost evenly rounded as seen from directly above .................. striatitrons Fox
29(22'). Scutum completely longitudinally striate .... 30
29'. Scutum punctate or striatopunctate .......... 31
30(29). Forewing dark brown on basal two-thirds, pale brown or white on distal one-third ................. apicalipennis Zavattari
30'. Forewing gradually paler toward apex .......... ................................ melanis Bohart & Stange
31(29'). Sternite I constricted to a median carina before expanded posterior section .......................... 32
31'. Sternite I rounded or flat in constricted area before expanded posterior section ........................ 35
32(31). Tergite II coarsely punctate anterior to distal lamella ........................................... 33
32'. Tergite II not coarsely punctate anterior to distal lamella .................................................. 34
33(32). Midtibia with 1 well developed spur; pronotum limited laterally by a carina running from humeral angle to below pronotal lobe; postocular carina strong .......... bolivarensis new species
33'. Midtibia with 2 well developed spurs; pronotum evenly rounded laterally; no postocular carina .................................. cylindricus Fox
34(32'). Pronotum with interhumeral distance somewhat longer than distance between humerus and tegula; postoccipital carina highest at dorsolateral angle; male flagellumere X asymmetrical, hooded ............. sichelianus (Saussure)
34'. Pronotum with interhumeral distance shorter than distance between humerus and tegula; male flagellumere X symmetrical, not hooded; postoccipitall carina not enlarged at dorsolateral angle; male flagellumere x symmetrical, not hooded .................................. yepezi new species
35(31'). Scutum not depressed in front of scutellum, separated from it by a fine cross groove (fig. 19) ........................................................ prominens Fox
35'. Scutum depressed in front of scutellum separated from it by a pitted cross groove ................. 36
36(35'). Tergite I macropunctate but not micropunctate at dorsal middle; tergite II with macropunctures concentrated just before distal lamella ................ venezuelanus Zavattari
36'. Tergite I moderately to densely micropunctate at dorsal middle; tergite II with macropunctures not concentrated just before distal lamella ...... ........................................ infelix Zavattari

List of species found in Venezuela

Old Records are taken from Bohart and Stange (1965). Additional Records are cited as “New Records”.

Subgenus Zethus Fabricius 1804

Zethus coeruleopennisi group


Zethus magretti group

Plate 1 (Figs. 1 - 17). 1. *Z. matzicalzin*. 2. *Z. olmecus*. Male clypeal apex of *Z. matzicalzin* (fig. 3) & *Z. binodis* (fig. 4). *Z. miniatus*, petiole (fig. 5), male antenna (figs. 6, 7) and male clypeus (fig. 8). Outline of pronotum of *Z. diminutus* (fig. 9), *Z. milleri* (fig. 10), and *Z. bodkini* (fig. 11). *Z. bodkini*, pronotum (fig. 11), male clypeal apex (fig. 12), sculpture on upper lateral surface of male propodeum (fig. 13), profile of female pronotum (fig. 14), petiole (fig. 15), male antenna (fig. 16, 17). Male antenna of *Z. carinatus*. 
Plate 2 (Fig. 18-27). 18. Male head of *Z. magretti*; 19, dorsal view of male pronotum and mesonotum of *Z. prominens*; 20, abdominal apex of male *Z. nicaraguensis*. 21, 23-27, male antennal hook of *Z. romaninus* (fig. 21), *Z. rubioi* (fig. 23), *Z. nigricornis* (fig. 24), *Z. vincenti* (fig. 25), *Z. brasiiliensis* (fig. 26), *Z. mexicanus* (fig. 27). 22, lateral view of male abdomen of *Z. mexicanus*.

*Zethus prominens* group


*Zethus chalybeus* group


Plate 3 (Fig. 28-34). Male digitus & cuspis of Z. vincenti (fig. 28), Z. rubioi (fig. 30), Z. yepezi (fig. 31), Z. carpenteri (fig. 33). Aedeagus of Z. vincenti (fig. 29), Z. yepezi (fig. 32), and Z. carpenteri (fig. 34).

(MHNG). New Record: Barinas: Reserva Forestal Ticoporo 230 m., 10.IV.1966 (1 female, FSCA)

Zethus discoeliodes group

da Santa Anna, Mato Grosso, Brasil (ICCM). 

**Records:** Las Adjuntas (BMNH). Also known from Brazil, Bolivia, Paraguay, and Argentina.

**Zethus hilarianus group**


**Records:** Distrito Federal: Caracas (MNHN), Trujillo: Valera (MCZC); Yaracuy (USNM).

Monagas: 42 kms. southeast of Maturin (LACM).


**Zethus smithii group**


**Records:** Monagas: 42 km. southeast of Maturin (LACM). 

**New Records:** Zulia: Carraquero, 18.VI.1976, Menke and Vincent (1 female, USNM); Carraquero, 13.VII.1991, C. Porter and L. Stange (2 females, FSCA). This species is known from Arizona and Texas in the U.S.A. to Argentina.

**Observations:** The two females collected by Porter and Stange have the gaster crimson, which is found in several other species in this area. The female collected by Menke and Vincent has a black gaster which is the typical color pattern of this species. The discovery of the male may lead to the recognition of this species in the proper species group. The collecting of a second specimen shows the species belongs to the Z. heydeni group.

**Zethus fuscus group**


**New Record:** Tachira: Rio Frio, 600 m., 10.XI.1981, Fernandez (IZAV).

**Zethus heydeni group**


**New Record:** Merida: 8 km. northeast of Merida, Valle Grande, 1.VII.1981. Stange and Porter (1 male, FSCA). 

**Observations:** The original notes on the holotype failed to place this species in the proper species group. The collecting of a second specimen shows the species belongs to the Z. heydeni group.

**Zethus sichelianus group**


**Length to apex of tergite II about 10 mm:** Black with yellow as follows: mandible, dorsolateral spot on clypeus, scrobal spot, ocular spot, most of scape, prominent postocular spot; pronotum anteriorly and weakly posteriorly; mesopleural spot; tegula mostly, parategula weakly, mesoscutellum with faint sublateral spot at middle, metanotum nearly entirely; anterior face of meso-and metaxoa; femora with broad yellow band on apical half of closing face, hindfemur less extensive; foretibia mostly with black stripe on much of posterior surface, midtibia mostly on outer face, hindtibia with yellow not extending to apex; tergite I with apical band, tergites II-III with narrow subapical band. Mesopleuron with moderate, appressed white pubescence; propodeum with abundant appressed white pubescence; clypeus strigate, interantennal carina moderately developed, extending strongly onto clypeus; subhumeral area regularly striate, mesopleuron at middle moderately punctate; pronotum with an oblique carina extending nearly to pronotal lobe; scutum with mostly close, large punctures; punctures more separated on mesoscutellum; propodeum with submedian carina fading below, area between carinae mostly striate except dorsally, area between median and sublateral carinae strongly punctate; petiole (tergite I) shiny, without micropunctation, large punctures on dorsal surface mostly contiguous; tergite II mostly micropunctate with macropunctures concentrated posteriorly. Head broader than long in front view, genal carina strongly developed; pronotum with interhumeral distance about twice as long as distance between humerus and tegula; critical breadth of subhumeral area at least three midocellus diameters; scutum about as long as greatest breadth, notaules undeveloped; midtibia with well developed spur; petiole with expanded area broadest.
near base, becoming narrower apically, about 2.5 times longer than greatest breadth.

**Observations.** This species keys out to *Z. clypeolaris* Bohart & Stange in Bohart and Stange (1965). These are the only two species in the Group with one midtibial spur. *Z. bolivarensis* can be separated from *Z. clypeolaris* by the concentrated macropunctures at the apex of abdominal tergite II, the oblique carina on the pronotum extending nearly to the pronotal lobe, and lack of micropunctures on the mesoscutum.


Length from head to tergite II 10 mm, black with yellow as follows: clypeus laterally and apically, scrobital spot, scape below, mandible with stripe above; pronotum anteriorly; small upper mesopleural spot; tegula and parategula; mesoscutellum and metanotum with small dot sublaterally at middle; propodeum with elongate sumedial stripe; tergite I with broad apical band, extending short distance anteriorly on lateral margin; tergites II-IV with subapical band; sternites II-IV with subapical band, VI with weak area medially; forefemur and midfemur with band on apical half of posterior surface; foretibia and midtibia externally. Mesopleuron with moderately dense pubescence; vertex and mesonotum with abundant, erect brownish pubescence; propodeum and especially tergite I below with moderate erect whitish pubescence. Clypeus with weak striatopunctuation, interantennal carina not developed; subhumeral area with moderately spaced macropunctures; mesopleuron and scutum with fairly close and coarse macropunctuation; propodeum strongly striate between strong medial carina and fully developed submedial carinae; irregu larly striate between submedial carina and sublateral carina; petiole with weak micropunctuation dorsally between macropunctuation; tergite II strongly micropunctate, without macropunctures. Head almost as broad as long in front view, postoccipital carina not produced at dorsolateral angle, no genal carina; male flagellomere X symmetrical, not hooded; flagellomere XI evenly rounded, about twice as long as greatest diameter; subhumeral area about equal to four midcellus diameters; pronotum with interhumeral distance slightly longer than distance between humerus and tegula, without oblique carina, humerus square at anterior corner; scutum about equal in length to greatest breadth, notaulices not indicated; midtibia with two well-developed tibial spurs; tergite I with expanded area with greatest width anteriorly, narrowing posteriorly where it is nearly square in cross section; genitalia with cusps and digitus as in fig. 30, aedeagus as in fig. 31.

**Female.** About as described for male. Head longer than wide in front view. Clypeus striatopunctate, apical margin truncate.


**Observations.** This species keys out to *Z. sichelianus* (Saussure) in Bohart and Stange (1970). It differs from that species by the unflared postoccipital carina, the symmetrical male flagellomere X, and the petiole is relatively shorter. This species is named in honor of Fernando Fernandez Yepez, in appreciation for his help in providing specimens and field assistance.

**Zethus sulcatus group**


**Zethus spinosus group**


**Observations:** See figure 20.
Subgenus Zethusculus Saussure 1855

Zethus mexicanus group


20. Zethus mexicanus mexicanus (Linnaeus) 1758. Syst. Nat. (Ed. 10) 1:576 (n.6). Syntypes, Surinam (Stockholm?). Records: Bohart and Stange (1965) have recorded this species from various parts of Venezuela in a distribution map. Observations: See figure 22.

Zethus arietis group


Length from head to apex of tergite II 11 mm. Black head and thorax, crimson red petiole and gaster. Clypeus mostly yellow except dorsally, flagellomeres I - VI with pale areas below, VI-XI mostly pale; midtibia with yellow stripe on closing face; hindtibia with small yellow spot on apex of cutting edge; petiole with small lateral yellow area subapically; tergite II with weak yellow subapical band. Pubescence mostly inconspicuous except moderately dense white, appressed micropubescent on clypeus, metapleuron, and propodeum; some erect hairs laterally of scutellum and metanotum, propodeum above. Clypeus sparsely punctate; frons closely punctate, somewhat with a "braised" effect; vertex, pronotum, mesoscutum, scutellum with moderate punctuation; metanotum almost impunctate, with a weak transverse ridge near middle; posterior propodeal face with micro-punctuation obscured by micropubescence, few punctures toward lateral margin; petiole polished, with scattered small punctures; tergite II polished with few macropunctures on posterior half; clypeal apex moderately emarginate, bidentate; flagellum with hook less than twice as long as greatest width, with conspicuous setae (fig. 23); pronotum rounded; mesoscutum without notaulices; tegula strongly bent out at posterior third; petiole about as high as broad, not especially flattened above; stem of tergite II longer that of I; apical lamella of tergite II flattened, about 1.5 midocellus diameters; tergite V without tooth; genitalia with gonostyle about 3/4's as long as gonocoxite; digitus and cuspis as in fig. 30; aedeagus about as in fig. 29.

Female. About as described for male; clypeus weakly tridentate.

Types. 1 paratype female, same data as holotype (FSCA). 1 paratype male, 15 km. north of Carraquero, Zulia, Venezuela, 29. V.1978, A. Menke and D. Vincent (USNM); 1 paratype female, Carraquero, Zulia, Venezuela, 15.VI.1978, A. Menke and D. Vincent (USNM); 1 male, 1 female paratype, 12 km. east of Santa Marta, Magdalena, Colombia, 27.XI.1974, M. Cooper, dry tropical forest (BMNH 1975-33).

Observations. This species has distinctive coloration and can be separated from other species of the Z. arietis group by the contrast between the black head and thorax and orange petiole and gaster. The coloration is most similar to Z. slosozsa Fox from Florida which usually has tergite I black. The gonostyle is very long in this species. This species is named for the celebrated Venezuelan Hymenopterist, Edmundo Rubio-Espina.


Length from head to apex of tergite II 13 mm. Black with extensive orange as follows: mandibles, scape, pedicel and flagellomere I; scrobe; pronotum; most of upper mesopleuron; tegula; legs; scutellum, metanotum, propodeum, petiole and stem of tergite II. Clypeus mostly yellow, flagellomeres I-VI with yellow below, VII-X mostly yellow, hook mostly pale; some yellow on scape blending with orange coloration. Pubescence inconspicuous; dense mostly appressed white micropubescence on propodeum, base of petiole, and expanded part of sternite I. Clypeus with shallow, sparse macropunctures, surface finely microstriate; vertex and pronotum
with moderately spaced macropunctures; scutum with moderately spaced macropunctures except sparser medially, especially posteriorly; scutellum with moderate punctuation; metanotum nearly impunctate, without transverse ridge; posterior face of propodeum granulate with fine transverse striae; petiole polished with sparse macropunctures, nearly impunctate in narrow lateral strip basad of spiracle; tergite II dulled by shagreening and micropubesence with moderately spaced macropunctures on posterior half; clypeal apex moderately emarginate, bidentate; antennal hook more than twice as long as greatest width (fig. 25); pronotum rounded; mesoscutum without notaulices; tegula weakly angled out at posterior two-fifths along outer rim; petiole broader (at widest point) than high, somewhat flattened above; stem of tergite II longer than that of I; apical lamella of tergite II flat, about 1.5 midoscellus diameters; sternite V without tooth; gonostyle less than 1/2 as long as gonocoxite; digitus and cuspis as in fig. 28; aedeagus as in fig. 29.

**Female.** About as described for male; clypeal apex beveled.


**Observations.** The orange coloration of the pronotum, propodeum, and petiole is distinctive in the subgenus *Zethusculus*. Structurally the male genitalia provides a good diagnostic character. This species is named for David Vincent, one of the collectors of this species.


**Record.** Monagas: 43 km. southeast of Maturin (LACM).

**Subgenus Zethoides** Fox 1899

**Zethus binodis group**


Although no records of this species are known to date for Venezuela, it is known from Trinidad which suggests strongly that this species is found in Venezuela. The male clypeus and antennal hook are illustrated in fig. 4.


**New Records.** Zulia: La Sierra, near Machiques, 22.II.1986, R. Miller & L. Stange (2 females, FSCA); Los Angeles del Tucuco, 15.IV.1981, E. Grissell (1 male, USNM).

**Observations.** This is an especially interesting range distribution for this species, which was previously known from Mexico to the Panama Canal. This record indicates that there is a corridor of species penetration to the east side of the Andes at the northwestern corner of Venezuela. This species is closely related to *binodis* but differs structurally by the less dentate clypeal apex (fig. 3) and shorter antennal hook.

**Zethus olmecus group**


**Observations.** See figures 5 to 8.


**Zethus parvulus group**


**Zethus carinatus group**


**Observations.** Coloration of the gaster is variable. The specimen from Merida Province has the gaster all black whereas the Zulia specimen has most of the gaster reddish. This species is known from British Guiana and Surinam. Re-examination of the holotype revealed the presence of only one midtibial spur rather than two spurs as implied in the Group description. See figures 11 to 16 for structural details.


**Observations.** See figure 17 for antennal hook.


Length from head to tergite II 12 mm.; Head and thorax mostly black with mandibles and flagellum reddish, yellow stripe on scape below, orbital spot, small postorbital spot; yellow to reddish yellow on pronotum laterally and posteriorly, upper mesopleural spot, tegula, parategula apically; small area sublaterally on metanotum, and tiny spot on propodeum below; legs mostly crimson except mostly black coxae and trochanters; abdomen crimson with small yellow area sublaterally at apex of petiole. Micropubescent silvery, relatively sparse except pronotum laterally, pleura and propodeum where it is densest medially between submedial carinae. Punctuation moderate, fairly close on vertex, pronotum, and scutum, sparse on middle of scutellum and metanotum; dorsal face of propodeum with large shallow punctures, posteriorly with irregular oblique carinulae; petiole and tergite II with well space macropunctures, interspaces polished. Clypeus weakly bidentate; genal carina rounded; apical flagellomere two times longer than basal diameter; occipital carina weakly angled opposite orbit; humerus obtuse, a carina ending in front of pronotal lobe; critical breadth of subhumeral area about two midocellus diameters; metanotum relatively flat, without median carina; apical lamella of propodeum weakly developed; petiole without dorsobasal carina; membrane of tergite II pitted basally; genitalia as in figs. 33 and 34; aedeagus with lateral "wings" united as median process; basivosella elongate.

**Female.** About as described for male except clypeus striatopunctate, apex tridentate.

**Types.** 1 female paratype, same data as type (FSCA); 1 female paratype, Pueblo Nuevo, Falcon, Venezuela, 21.III.1987, R. Miller & L. Stange (FSCA).

**Observations.** The presence of only one well developed midtibial spur distinguishes this species from all others in the Group except for *Z. bodkini*. The rounder genal carina of *Z. carperteri* appears to be a consistent although minor difference from *Z. bodkini*. In the male the relative lengths of the apical flagellomere and the clypeal apex are specific differences. This species is named for Jim Carpenter who has collected *Zethus* specimens in Venezuela.

34. *Zethus biglumis* group


Observations. This species appears closely related to the following new species. Both have been captured at the same locality (Hato Masaguaral) at the same time. Only females are known so that precise comparison with Z. diminutus from other localities in Brazil, Paraguay and Argentina is difficult. These Venezuelan females seem to agree with other South American specimens of Z. diminutus in sculpture and structure and the coloration is most similar to the "subspecies" santaremae. The humerus of the pronotum is more rounded (fig. 9) than in the following species.


Length from head to apex of tergite II 9 mm.; Head, thorax, and petiole black with yellow as follows: mandibular spot, scrobe, scape mesally, flagellar hook, humeral spot, tegula, apex of parategula, a pair of small spots on metanotum, petiole posteriorly; gaster crimson red with black on basal one-half of tergite II. Silvery-grey micropubescence sparse except on clypeus, metapleura and propodeum; macropunctures each with moderately long setae resulting in fairly dense pubescence especially on vertex, pronotum, and mesoscutum. Punctuation fine and close on clypeus, coarse but shallow on vertex, pronotum, mesoscutum and mesoscutellum, latter two areas with macropunctures more widely spaced medially; propodeum with sculpture obscured by pubescence, sparsely punctate; tergite with well spaced punctures, without micropunctuation dorsally; tergite II with moderately spaced punctures, close micropunctuation. Antennal flagellomeres without calli; clypeal apex beveled, rimmed, nearly straight between short teeth; antennal longitudinal carina very weak; stipes with relatively low, rounded bulge sublaterally; flagellar hook about as long as preceding flagellomere; pronotum square below sharp humerus (fig. 10); critical breadth of subhumeral area about 2.0 midocellus diameters; notaules absence; tegula with outer rim a little bowed at posterior one-third; postscutellum sloping forward to a thin edge behind scutellum, lateral carina curved in posteriorly, a low median anterior ridge; submedian propodeal ridges converging and strong halfway to petiole insertion; upper lamella of propodeum weakly projecting; sternite II slightly angled.


Observations. The series of females from Hato Masaguaral have the petiole and first gaster segment black with broad yellow stripes posteriorly. The rest of the gaster is yellowish. This may represent a different species but no males are known which are needed to compare genitalia and antennal characters. This species is named for Robert Bruce Miller, one of the collectors of Venezuelan Zethus. The male genitalia are missing in the holotype.

Zoogeography

According to Cabrera & Willink (1973), there are eight zoogeographical provinces within Venezuela. These can be roughly divided into the lowland provinces and the highland provinces as follows:

Lowland Provinces
1. Amazon
2. Savanna
3. Venezuelan
4. Guajira

Highland Provinces
5. Paramo
6. Cloud forest
7. Tepuys (Guayana)
8. High Andes

There are no records of Zethus from the Paramo, Tepuys or High Andes. The most endemic fauna is found in the Guajira Province where four endemic species are found. There is no data to support the recognition of the Venezuelan and Savanna Provinces from the Amazon Province and for the sake of discussion these are combined. Based on the information gathered to date, three main zoogeographic provinces can be defined based on the Zethus fauna.
Guajira Province. This is an arid tropical zone in the states of Zulia and Falcon on the Caribbean coast and evidently in the Northeast area of Colombia although few records of Zethus are known from that part of Colombia. This zone lies between two spurs of the Andes mountains. This area has semi-desert areas but most of the species were collected in the more humid western part of the area at Carrasquero. This area is of considerable zoogeographical interest because it appears to be a corridor of faunal exchange from the western side of the Andes to the eastern side of the Andes. For example, Z. matzicatzin was previously known only from Mexico to Panama whereas its adelphotaxon, Z. binodis, ranges from Trinidad south to Brazil. Now its occurrence in western Zulia indicates its successful passage to the far side of the Andes although still contained by the Andes. This also appears to the case with Z. nigricornus which was previously known from Mexico to Colombia.

There is a distinct geographic facies in this area. One notable color combination is head and thorax black and abdomen crimson. This occurs in five species in the subgenus Zethoides (Z. carpenteri, Z. bodkini, Z. milleri, Z. matzicatzin and Z. haemorrhoidalis), one species of Zethusculus (Z. rubioi) and one species in the nominal subgenus (Z. miscogaster). These species (or color forms in the case of Z. miscogaster and Z. bodkini) are not known from the other areas of Venezuela. Another color type is represented by Z. vincentii and Z. miniatus, which have a lot of orange. Two additional Zethusculus are found in this zoogeographical province (Z. nigricornis and Z. westwoodi) which are mostly black. The comparative representation of the subgenera in this area is remarkable since 90% of the species belong to Zethoides and Zethusculus. The percentage of Zethoides is the highest known. This subgenus is often well represented in arid tropical zones such as Mexico which has about 45% Zethoides. The representation of Zethusculus is also high with 36% of the species and 22% of all the species known in the Zethusculus arietis Group.

Cloud Forests. All the species known from the cloud forests of Venezuela belong to the nominate subgenus. Cloud forests are tropical cool areas which have considerable humidity owing in part to regular fogs. A well developed cloud forest is usually characterized by the presence of tree ferns. The best represented Group in the Venezuelan cloud forests is the Z. sulcatus Group with two species. One species, Z. melanis, appears to be endemic whereas the other species is found also in Costa Rica.

Zethus magretti is the only member of its group and is known from only three specimens from Costa Rica, Panama, and Venezuela. This species appears to be a cloud forest species. Three additional species are known from the cloud forests belonging to the Z. heydeni Group (Z. infelix & Z. venezuelanus) and the Z. scelitianus Group (Z. cylindricus). This latter species is the only one that is also found in the lowland Amazon Biotic Province.

Amazon Province. This is the largest biotic province in South America with more than 4 million square kilometers extending from Venezuela to Bolivia and Paraguay. This area has high precipitation and is often flooded and in its best development has three tree layers. More than 50% of the described species of Zethus live in this area. In Venezuela about 65% of the known species live in the Amazon Province.

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