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falvarez@ib.unam.mx

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Mexican species of *Exetastes* (Hymenoptera: Ichneumonidae: Banchinae), with description of three new species

Especies mexicanas de *Exetastes* (Hymenoptera: Ichneumonidae: Banchinae), con la descripción de tres especies nuevas

Andrey I. Khalaim^{1, 2✉} and Enrique Ruiz-Cancino¹

¹División de Estudios de Postgrado e Investigación, Facultad de Ingeniería y Ciencias, Universidad Autónoma de Tamaulipas, 87149 Cd. Victoria, Tamaulipas, Mexico.

²Zoological Institute, Russian Academy of Sciences, Universitetskaya nab. 1, St. Petersburg 199034, Russia.

✉ ptera@mail.ru

Abstract. Twenty one species and subspecies of *Exetastes* Grav. are recorded from Mexico. *Exetastes arteagus* sp. nov., *E. gauldi* sp. nov. and *E. lascivus* sp. nov. are described as new. *Exetastes pasculus* Gauld et Ugalde is recorded for the first time for Mexico. New data on distribution in Mexico and a key to the Mexican species of *Exetastes* are provided. The known Mexican fauna is closer to the Nearctic fauna than to the Costa Rican fauna: 13 out of 21 Mexican species and subspecies (62%) also occur in the USA and Canada, 4 species (19%) also occur in Costa Rica, and 3 species and 1 subspecies (19%) are known from Mexico only. The most abundant species of the genus in Mexico is *E. tarsalis*.

Key words: fauna, key, Mexico, new species, taxonomy.

Resumen. Se registran 21 especies y subespecies de *Exetastes* Grav. para México. Se describen *E. arteagus* sp. nov., *E. gauldi* sp. nov. y *E. lascivus* sp. nov. *Exetastes pasculus* Gauld et Ugalde es registrada para México por primera vez. Se aportan datos nuevos sobre la distribución de *Exetastes* en México y una clave para identificar las especies. La fauna mexicana es más cercana a la neártica que a la de Costa Rica: 13 de las especies y subespecies mexicanas (62% del total) también se encuentran en Estados Unidos y Canadá, 4 especies (19%) ocurren en Costa Rica, y 3 especies y 1 subespecie (19%) se conocen solamente de México. *Exetastes tarsalis* es la especie más abundante del género en México.

Palabras clave: fauna, clave, México, especies nuevas, taxonomía.

Introduction

Exetastes Grav. is a very large, almost worldwide genus (not recorded from Australia) with 50 species in the USA and Canada (Townes and Townes, 1978), and 18 species in Costa Rica (Gauld et al., 2002). Sixteen species were mentioned from Mexico by Ruiz et al. (2002), 14 of them were described by Cresson (1865, 1872, 1874) and Cushman (1937). The genus includes mostly moderate to large sized species, with fore wing length 5.2-13.5 mm. It is very distinctive genus which may easily be distinguished from other genera of Banchinae by the combination of the nervellus intercepted very high, and the large subrhombic areolet. All the species possess long and strong hind legs with enlarged coxae, and a robust, often short and decurved ovipositor. Some Mexican species possess a conspicuous bright white and black body color pattern.

The genus is rather abundant in the Mexican ichneumonid fauna, and is often collected in various biotopes from lowlands to mountain regions, most commonly in open spaces. Some species are found on flowers. The majority of host records are from larvae of Noctuidae (Townes and Townes, 1978; Gauld et al., 2002). Host larva is destroyed in its pupal chamber, usually in soil. The parasitoid cocoon is elongate elliptical, hard, and black (Townes and Townes, 1978; Gauld et al., 2002).

The aim of the present work is to review the Mexican fauna of *Exetastes*, to estimate its relations to the Nearctic and Costa Rican faunas, and to provide a key to the species.

Materials and methods

Collections of the Universidad Autónoma de Tamaulipas in Ciudad Victoria and Universidad Autónoma de Nuevo León in Monterrey were studied. From this material, 3 new species are described, and new geographic records in Mexico are provided. This work is based on

the monographs by Townes and Townes (1978) and Gauld et al. (2002). Classification follows the catalog TaxaPad (Yu et al., 2005). Morphological terminology of the body structures and wing venation predominantly follows Gauld et al. (2002). Photographs were taken with a Leica MZ16 stereomicroscope with an integrated Leica Digital

Camera. Images were assembled with Helicon Focus software. Types of the new species are deposited at the Insect Museum of the Universidad Autónoma de Tamaulipas, Ciudad Victoria, Mexico (UAT) and Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Monterrey, Mexico (UANL).

Results

Key to Mexican species of *Exetastes*

1. Metasomal tergites 1 and 2 with transverse black and white markings (Figs. 9, 28), following tergites also black and white markings (Figs. 11, 30), or entirely red (in female of *E. mexicanus*); female with ovipositor short, slightly decurved (Figs. 11, 30).....2
- Metasoma red, brown or black, without white markings (Figs. 12, 14, 23); female with ovipositor shape varied, sometimes rather long, straight or upcurved (Figs. 18, 23, 26).....9
2. Females.....3
- Males (unknown for *E. arteagus* and *E. pasculus*).....7
3. Metasoma with posterior 4 or more tergites reddish brown; mesoscutum black with longitudinal pale stripes extending from anterolateral margin to center; hind leg with femur and tibia predominantly reddish brown, distal apex of both black-marked; metapleuron finely granulate to microreticulate; clypeus, in profile, basally weakly convex.....*E. mexicanus* Cresson
- Metasoma black with extensive white markings (Figs. 11, 30); other characters varied.....4
4. Hind leg with coxa and trochanters with distinct black and white markings, femur entirely black or sometimes with narrow yellowish longitudinal stripe on outer surface, tibia broadly yellow with only distal apex black, tarsomeres 1-3 white, tarsomere 5 black, and tarsomere 4 either black or white.....*E. pasculus* Gauld et Ugalde
- Hind leg with coxa, trochanters, femur and tibia extensively yellowish or reddish, coxa usually narrowly blackish basally and with black longitudinal stripe dorsally, trochanters sometimes infuscate basally and dorsally, femur more or less unicolored or sometimes with blackish dorsal stripe, tibia at most infuscate apically.....5
5. Gena black (Figs. 2, 10); mesopleuron tricolored, with black, red and yellow markings (Figs. 3, 9); metapleuron anteriorly red and posteriorly yellow (Figs. 3, 9).....*E. arteagus* sp. nov.
- Gena entirely whitish or sometimes with small black spot at base of mandible (Fig. 29); mesopleuron and metapleuron white with black markings (Fig. 28).....6
6. Hind leg with tarsomeres 1-2 white, tarsomeres 3-5 black; hind femur yellowish to reddish, sometimes slightly infuscate dorsally; anterior edge of metapleuron black (Fig. 28).....*E. tarsalis* Cresson
- Hind leg with tarsomeres 1-4 white, tarsomere 5 black; hind femur with a discrete narrow dorsal black stripe; anterior edge of metapleuron entirely white or with a very small indistinct blackish mark.....*E. vittatipes* Cresson
- 7(2). Mesoscutum black with longitudinal pale stripes reaching from anterolateral margin to center....*E. mexicanus* Cresson
- Mesoscutum black with discrete central and anterolateral pale marks that are separated from each other.....8
8. Hind leg with tarsomeres 1-2 white, tarsomeres 4-5 black, 3 either black or white; anterior part of metapleuron broadly black-marked.....*E. tarsalis* Cresson
- Hind leg with tarsomeres 1-4 white, tarsomere 5 black; anterior part of metapleuron entirely white*E. vittatipes* Cresson
- 9(1). Gena, in profile, about as long as eye (Fig. 5); mandible with upper tooth somewhat longer or subequal to lower tooth; wings more or less yellowish or brownish; ovipositor weakly upcurved.....10
- Gena, in profile, shorter than eye; mandible sometimes with upper tooth shorter than lower tooth; wings hyaline or sometimes with brown and yellow bands; ovipositor upcurved or decurved.....12
10. Mesoscutum black with anterolateral yellow markings; hind coxa black.....*E. igneipennis* Cushman
- Mesoscutum and hind coxa largely or entirely reddish brown.....11
11. Mesoscutal punctures moderately small, separated by about 1.7 their diameter; propodeum subpolished, with moderately large, rather strong punctures and more or less weakly wrinkled*E. buccatus* Cushman

- Mesoscutal punctures of moderate size, sharp, separated by half their diameter; propodeum rather strongly ruguloso-punctate.....*E. scutellaris* Cresson
- 12(9). Upper tooth of mandible with apex broad and obliquely chisel-shaped (Figs. 8, 24); ovipositor strongly decurved (Fig. 26); propodeum with apical transverse carina entirely absent; scutellum yellow; head and mesosoma predominantly orange brown in female (Fig. 25), and black with yellow to orange brown markings in male (Fig. 27)*E. rhampha* Townes
- Upper tooth of mandible with apex pointed, not obliquely chisel-shaped; ovipositor usually upcurved; propodeum with apical transverse carina often distinct, at least medially; color pattern of scutellum, head and mesosoma varied.....13
- 13. Upper tooth of mandible distinctly shorter than lower tooth.....14
- Upper tooth of mandible subequal to or longer than lower tooth.....19
- 14. Head, mesoscutum and mesopleuron predominantly black, sometimes with white marks; mesoscutum with yellowish anterolateral marks; wings hyaline or weakly yellowish; ovipositor short, about as long as apical depth of metasoma (Figs. 7, 16, 23); fore wing length 5.2-7.0 mm.....15
- Head, mesoscutum and mesopleuron predominantly reddish brown, sometimes with black marks; mesoscutum without distinct yellowish anterolateral marks; fore wing yellowish, strongly banded with brown (yellowish but not banded with brown in males of *E. bifeneistratus*); ovipositor longer than apical depth of metasoma (Figs. 18); fore wing usually longer.....17
- 15. Flagellum black, without a whitish band; hind leg rather evenly reddish brown, tibia apically and tarsus hardly infuscate (Fig. 14).....*E. lascivus* sp. nov.
- Flagellum black with a median whitish band; hind leg reddish brown with tibia apically fuscous, and tarsus basally and apically fuscous, centrally whitish.....16
- 16. Mesopleuron without white mark next to base of mid coxa; propodeum and metapleuron mostly reddish brown, anteriorly narrowly black (Fig. 20); propodeum in front of apical transverse carina irregularly wrinkled on its medial 0.2.....*E. bioculatus* Cresson
- Mesopleuron with white mark next to base of mid coxa (Fig. 22); propodeum black with narrow white posterior band (Fig. 22); metapleuron anteriorly black and posteriorly white (Fig. 22); propodeum in front of apical transverse carina coarsely punctate on its median 0.2.....*E. pictus* Cushman
- 17(14). Hind tarsus with tarsomere 1 fuscous entirely or at least in its apical half, tarsomeres 2-4 yellowish, and tarsomere 5 fuscous; propodeum with apical transverse carina medially usually rather strong; metasoma of female cylindrical, not obviously compressed apically; ovipositor about twice as long as apical depth of metasoma (Fig. 18); mesopleuron of male dorsoposteriorly black marked.....*E. bifeneistratus* Cushman
- Hind tarsus with tarsomeres 1-4 yellowish (tarsomere 1 sometimes slightly infuscate basally), tarsomere 5 fuscous; propodeum with apical transverse carina absent except for sometimes a short median vestige; metasoma of female high, apically more or less compressed; ovipositor about 1.5 times as long as apical depth of metasoma; mesopleuron of male usually with mesopleural suture black.....18
- 18. Prepectus 20 to 60 percent black; hind femur with apical about 0.1 infuscate.....*E. callipterus callipterus* Cushman
- Prepectus 80 to 100 percent black; hind femur with apical 0.15-0.35 or more fuscous.....*E. callipterus torquatus* Townes
- 19(13). Head with a short, high, crescent-shaped carina between antennal sockets; second discoidal cell about 1.2 times as wide as high; propodeum with apical transverse carina very strong.....20
- Head without a high carina between antennal sockets; second discoidal cell at least 1.5 times as wide as high; propodeum with apical transverse carina usually weak or absent.....21
- 20. Apical declivity of clypeus occupying its apical 0.25; mesosomal punctures very dense, those on mesopleuron subadjacent; flagellum with about 50-55 flagellomeres; ovipositor about as long as apical depth of abdomen.....*E. carinatifrons* Cushman
- Apical declivity of clypeus occupying the apical half of clypeus; mesosomal punctures moderately dense, those on mesopleuron with interspaces equal to about a third of their diameter; flagellum with 34-38 flagellomeres; ovipositor about 1.5 times as long as apical depth of abdomen.....*E. septum* Cushman
- 21(19). Female with ovipositor decurved (Fig. 12); mesopleuron tricolored, yellow, reddish brown and black (Fig. 13); male unknown.....*E. gauldi* sp. nov.
- Ovipositor straight or weakly upcurved; mesopleuron not as above, predominantly reddish brown and black.....22
- 22. Wings with weak brownish tinge, not banded.....*E. obscurus* Cresson
- Wings with yellowish or brownish tinge, fore wing apically with transverse dark bands or fuscous.....23

23. Body and legs black; fore wing with apical 0.25 fuscous; propodeum with apical transverse carina present, especially distinct medially and laterally; ovipositor straight, its sheath 0.6 times as long as apical depth of metasoma; fore wing length 9.5-13.5 mm.....*E. fornicator flavipennis* Cresson

- Body and legs not entirely black, head and mesosoma extensively reddish brown and yellow marked, metasoma mostly reddish brown; fore wing with 3 transverse infusate bands; propodeum with apical transverse carina weak and incomplete or absent; ovipositor weakly upcurved, its sheath longer; fore wing length 7.7-8.5 mm.....*E. fascipennis* Cresson

Exetastes arteagus Khalaim et Ruiz-Cancino, sp. nov. (Figs. 1-3, 9-11)

Female holotype. Fore wing length 7.6 mm. Head (Figs. 1, 2, 10). Clypeus, in profile, distinctly and rather evenly convex, but less than in *E. quarus* (Gauld et al., 2002: Fig. 315), with lower margin blunt and slightly concave, mostly finely punctate and finely granulate, matt. Mandible weakly tapered, finely punctate basally, with upper tooth distinctly longer than the lower tooth, both teeth smooth and shining. Malar space about 0.80 times as long as basal width of mandible. Face and frons finely granulate, matt, finely and sometimes indistinctly punctate. Face with weak median convexity, and with small and rather sharp elongate projection dorsally. Frons almost flat. Vertex and genae without distinct punctures, almost smooth, matt. Head, in dorsal view, strongly and rather straightly narrowed behind eyes (Fig. 1); gena very short, 0.38 times as long as eye width (Fig. 1). Posterior ocellus separated from eye by 1.60 times its own maximum diameter. Lower end of occipital carina joining hypostomal carina above base of mandible. Antenna obviously longer than fore wing; flagellum apically strongly tapered, with 44 flagellomeres; middle and subapical flagellomeres slightly elongate. Mesosoma (Figs. 3, 9). Pronotum anteriorly irregularly-rugulose, latero-posteriorly finely granulate and finely and densely punctate. Epomia and notaulus absent. Mesoscutum densely and finely punctate, matt. Scutellum, in profile, distinctly roundly convex. Mesopleuron punctate, mostly matt, speculum smooth. Subtegular prominence moderately strong, rounded. Mesosternum densely punctate, matt. Hind rim of metanotum without a sublateral projection. Metapleuron finely and densely punctate, almost smooth between punctures. Propodeum, in profile, weakly convex, without carinae, with transverse wrinkling, with strongly elongate spiracle. Pleural carina developed, anteriorly weak and posteriorly stronger. Submetapleural carina anteriorly weakly raised. Legs with tarsal claws basally finely pectinate. Fore tibia unspecialized. Fore wing with *cu-a* postfurcal, distad of *Rs&M* by 0.33 its length. Areolet rather large, pointed above. Vein *2m-cu* with 1 long bulla in its anterior part. Metasoma (Fig. 11). Mostly alutaceous anteriorly to polished posteriorly. First tergite 2.30 times as long as posteriorly wide; spiracle near basal 0.43. Ovipositor short, weakly decurved, with distinct dorsal subapical notch; sheath 0.33 times as long as hind tibia. Color. Head black; palpi strongly darkened; mandible (except teeth), clypeus

(except small dark area in its lower part), face (except areas around clypeal fovea, and median vertical mark) and eye orbits (in holotype black area reaching margin of eye dorsally) white. Antenna with scape entirely black (in holotype) or with small whitish spot ventrally (in paratype); flagellum with white band on flagellomeres 10-16 (10-17 in paratype). Pronotum black with anterior margin white. Mesoscutum black with discrete anterolateral and central white marks. Scutellum black with wide V-shaped mark anteriorly. Postsutellum white. Tegula white. Mesopleuron reddish to black with white marks as in Fig. 3. Upper division of metapleuron mostly white, margined with red and black. Lower division of metapleuron mostly red, anteriorly and posteriorly usually blackish, posteriorly with wide white band. Propodeum black, anteriorly in front of spiracles white-marked, and with large posterolateral white marks. Pterostigma brown, basally whitish. Legs reddish; fore coxa dorsally black, white in front; middle and hind coxae dorsally with longitudinal black stripes, laterally usually whitish; hind femur basally and apically narrowly blackish; hind tibia fuscous in its apical 0.16; fore and mid tibiae dorsally slightly infusate; fore and mid tarsi infusate; hind basitarsus white with basal 0.3 black, tarsomere 2 entirely white, and tarsomeres 3-5 entirely black. Metasoma with first tergite black, anteriorly and posteriorly margined with white; second and following tergites anteriorly black and posteriorly white. Male unknown. *Morphological variation.* The paratype is very similar to holotype, and differs predominantly in minor details of color pattern (differences mentioned in the description).

Comparison. It belongs to the *mexicanus* species group (Gauld et al., 2002) by having a short, slightly compressed and decurved ovipositor, and a metasomal tergites with transverse white and black bands. In the *mexicanus* species group it resembles the Costa Rican *E. quarus* as both have a black gena, but differs from this species by having the clypeus in profile not nasute, moderately and rather evenly convex, and hind femur and tibia mostly red. The new species also differs from *E. tarsalis* and *E. vittatipes* by having the gena black, and by the pattern of coloration of hind leg. *Etymology.* It refers to the type locality.

Material examined. Holotype female (UAT): **Mexico**, Coahuila, W Arteaga, Rancho de los Pinos, 2 000 m, Malaise trap, 8-11.VII.2000, S. Hernández A., C. A. Covarrubias D. colls. Paratype: 1 female (UAT), same data as in holotype.

Distribution. Mexico (Coahuila).

Exetastes bifenestratus Cushman, 1937
(Figs. 17, 18)

Material examined. **Mexico**, Nuevo León: 5 females, 2 males, Pesquería, Malaise trap, 14-21.XI.1983, M. R. Cantú coll. 1 female, Santiago, Cola de Caballo, 1.IV.1981, E. Ruiz C. coll. Tamaulipas: 1 female, Cd. Victoria, park, 30.IX.1990, E. Ruiz C. coll. 1 female, 2 males, 15 km S Miquihuana, 3.X.1998, D. R. Kasparyan coll. 1 male, 45 km NE Cd. Victoria, Nuevo Padilla, 6.X.1988, E. Ruiz C. coll. 1 male, Mpio. Padilla, 8.V.2008, A. I. Khalaim coll.

Distribution. Mexico (Durango, Baja California, Tlaxcala, Tamaulipas, Coahuila, Jalisco, Nuevo León, San Luis Potosí, and Zacatecas), southern and eastern USA, and Cuba.

Biology. Reared from *Agrotis* sp. (Noctuidae) on *Brassica oleracea* (Brassicaceae), and cutworm pupa in Texas, USA (Townes and Townes, 1978).

Exetastes bioculatus Cresson, 1872
(Figs. 19, 20)

Material examined. **Mexico**, Nuevo León: 1 male, Santiago, 2.X.1987, H. Sosa coll. Zacatecas: 1 female, Villa García, 18.IV.1987, E. Ruiz C. coll.

Distribution. Northern Mexico (Nuevo León and Zacatecas) and USA.

Exetastes buccatus Cushman, 1937

Distribution. Northwest Mexico (Baja California) and USA (California).

Exetastes callipterus Cushman, 1937

Exetastes callipterus callipterus s. str.

Distribution. Northern Mexico (Chihuahua) and USA (southern Arizona and New Mexico).

Exetastes callipterus torquatus Townes, 1978
(Fig. 21)

Material examined. **Mexico**, Tamaulipas: 2 females, Ciudad Camargo, 26°18.33' N, 98°49.428' W, A. I. Khalaim, E. Ruiz C. colls. 1 female, Ciudad Miguel Alemán, 26°23.941' N, 99°01.675' W, 9.XII.2008, A. I. Khalaim coll. Oaxaca: 1 female, Ejutla de Crespo, 17.X.1948. 1 female, 4 males, 28°12'08.3" N, 107°20'18.2" W, 13.VIII.1999. Chihuahua: 1 male, Km 23 Carr. La Junta-Creel del Entronque a Basaseachic, 13.VIII.1999, J. A. Sanchez G. coll. 1 male, 20°47'56.6" N, 106°27'10.0" W, 12.VIII.1999.

Distribution. Northern and central Mexico (Tamaulipas, Chihuahua, Oaxaca, Morelos, Mexico D.F., Michoacán, and Nuevo León), above 1 750 m.

Exetastes carinatifrons Cushman, 1937

Distribution. Mexico (Durango and Nuevo León) and southern USA (Arizona, New Mexico, and Texas).

Exetastes fascipennis Cresson, 1865

Distribution. Mexico (Nuevo León, Zacatecas and Baja California), USA, and ?Canada.

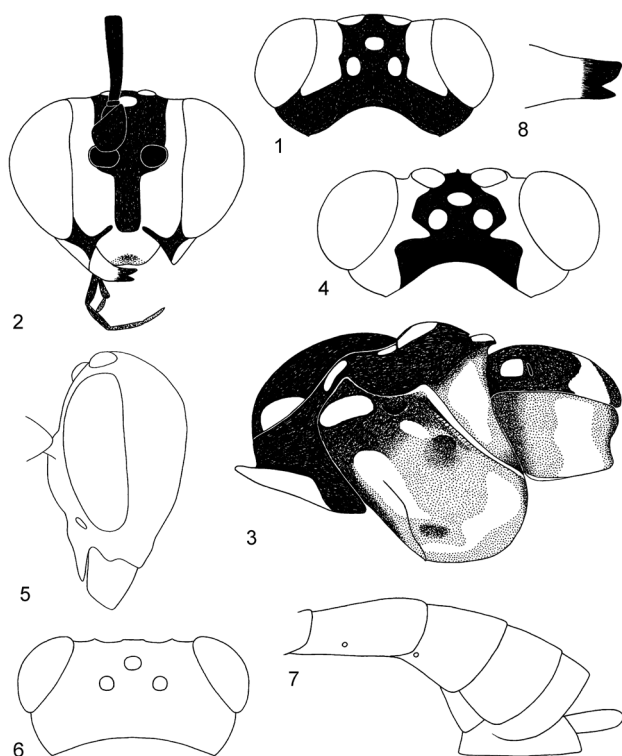
Exetastes fornicator (Fabricius, 1781)

Exetastes fornicator flavipennis Cresson, 1865

Distribution. Mexico (Mexico D.F., Morelos, Coahuila, Chiapas, and Zacatecas), USA, and ?Canada.

Exetastes gauldi Khalaim et Ruiz-Cancino, sp. nov.
(Figs. 4, 12, 13)

Female holotype. Fore wing length 10.4 mm. Head (Fig. 4). Clypeus, in profile, rather strongly convex in basal 0.67, subapically slightly concave, with lower margin blunt and slightly concave, with rare punctures medially in basal half, finely granulate, matt. Mandible weakly tapered, finely punctate, with upper tooth distinctly longer than the lower tooth, both teeth smooth and shining. Malar space 0.80 times as long as basal width of mandible. Face, frons, vertex and genae finely granulate, matt, finely and sometimes indistinctly punctate. Face with weak median convexity, and with small but rather sharp elongate projection dorsally. Frons almost flat. Head, in dorsal view, strongly narrowed behind eyes (Fig. 4); gena very short, 0.42 times as long as eye width (Fig. 4). Posterior ocellus separated from eye by 1.44 times its own maximum diameter. Lower end of occipital carina joining hypostomal carina above base of mandible. Antenna longer than fore wing; flagellum apically strongly tapered, with 56-58 flagellomeres; subapical flagellomeres subquadrate. Mesosoma (Fig. 13). Entirely granulate, matt, mostly finely and densely punctate, sometimes punctures indistinct; propodeum mostly coarsely wrinkled. Epomia and notaulus absent. Scutellum, in profile, strongly convex, almost pyramidal. Subtegular prominence rather high and sharp. Hind rim of metanotum without a sublateral projection. Propodeum, in profile, weakly convex, with median longitudinal carinae medially distinct, with elongate spiracle, impressed posteriorly next to hind coxae. Pleural carina complete, stronger anteriorly. Submetapleural carina anteriorly weakly raised. Legs with tarsal claws at extreme base finely pectinate. Fore tibia unspecialized. Fore wing with *cu-a* slightly postfurcal. Areolet rather large, pointed above. Vein *2m-cu* strongly sinuate, with 1 long bulla in its anterior part. Metasoma. First tergite entirely and tergites 2-3 in basal 0.4-0.6 coriaceous, the rest metasoma more or less smooth, matt. First tergite 2.40 times as long as posteriorly wide, with spiracle near its basal 0.41. Ovipositor short, about as long as apical depth of metasoma,



Figures 1-8. *Exetastes arteagus* sp. nov., female holotype: 1, head, dorsal view; 2, head, frontal view; 3, mesosoma, lateral view. *E. gauldi* sp. nov., female holotype: 4, head, dorsal view. *E. igneipes*, female: 5, head, lateral view. *E. lascivus* sp. nov., female holotype: 6, head, dorsal view; 7, apex of metasoma with ovipositor, lateral view. *E. rhampha*, female: 8, apex of mandible.



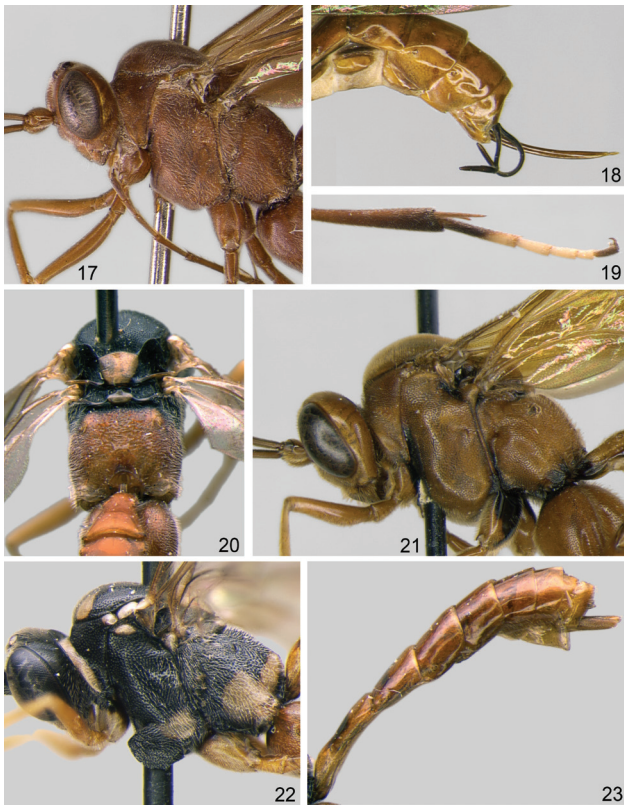
Figures 12-13. *Exetastes gauldi* sp. nov., female holotype: 12, body, lateral view; 13, head and mesosoma, lateral view.



Figures 9-11. *Exetastes arteagus* sp. nov., female holotype: 9, body, lateral view; 10, head, frontal view; 11, apex of metasoma with ovipositor, lateral view.



Figures 14-16. *Exetastes lascivus* sp. nov., female holotype: 14, body, lateral view; 15, mesosoma, lateral view; 16, apex of metasoma with ovipositor, lateral view.



Figures 17-23. *Exetastes bifenestratus*, female: 17, head and mesosoma, lateral view; 18, apex of metasoma with ovipositor, lateral view. *E. bioculatus*, female: 19, tibia and tarsus of hind leg; 20, mesosoma, dorso-posterior view. *E. callipterus torquatus*, female: 21, head and mesosoma, lateral view. *E. pictus*, female: 22, head and mesosoma, lateral view; 23, metasoma with ovipositor, lateral view.



Figures 25-30. *Exetastes tarsalis*, female: 28, body, lateral view; 29, head, frontal view; 30, apex of metasoma with ovipositor, lateral view.



Figures 24-27. *Exetastes rhampha*, female: 24, head, frontal view; 25, head and mesosoma, lateral view; 26, apex of metasoma with ovipositor, lateral view. *E. rhampha*, male: 27, head and mesosoma, lateral view.

weakly decurved, with distinct dorsal subapical notch; sheath 0.26 times as long as hind tibia. Color. Head yellow; palpi mostly fuscous, labial segments 1, 4, 5, and segment 2 basally yellowish; mandible with teeth blackish; face in upper part medially with small brownish mark. Frons medially, interocellar area and its surroundings, vertex (except for eye orbits) and most of occiput black. Antenna black with scape ventrally broadly yellow; flagellum with yellowish band on flagellomeres 8-16. Propleuron yellow. Pronotum black with a rather large discrete spot towards upper posterior corner and anterior margin white. Mesoscutum black with anterolateral and central yellowish marks. Scutellum black, anteriorly with wide V-shaped mark. Postscutellum anteriorly white, posteriorly black. Tegula black. Mesopleuron yellow, with prepectus black in upper part, narrowly black below subtegular prominence and in upper part along mesopleural suture, with black marks in mesopleural fovea, with large reddish brown area centrally. Mesosternum mostly reddish brown. Upper division of metapleuron yellow. Lower division of metapleuron dorso-anteriorly blackish, posteriorly yellowish, and more or less reddish brown in interspace. Propodeum black, anteriorly in front of spiracle white-marked, and subposteriorly with transverse yellowish band. Wings and pterostigma yellowish brown. Fore and mid legs mostly reddish brown, coxae yellowish with black marks basally and on outer surface, trochanters dorsally blackish, tarsomeres 1-2 yellowish (tarsomere 2 dorsally blackish), tarsomeres 3-5 black. Hind leg mostly reddish brown, with coxa dorsally narrowly blackish, and in paratype also with

dorsal longitudinal blackish stripe, tibia subbasally paler, tarsomeres 1-3 yellowish, tarsomeres 4-5 black. Metasoma reddish brown, first tergite with broad transverse medial blackish band, tergites 2-3 with transverse medial blackish band narrow and vestigial. Ovipositor sheath blackish, apically paler. Male unknown.

Morphological variation. The paratype is very similar to holotype, and differs predominantly in minor details of color pattern (differences mentioned in the description).

Comparison. The new species belongs to the *mexicanus* species group by having a short, slightly decurved ovipositor (Fig. 12), but it has a metasoma predominantly reddish brown, without transverse black and white markings (Fig. 12) in contrast to the other 5 Mexican species of this species group (Figs. 9, 28). It differs from other species of the genus in North and Central America by the combination of very short gena (Fig. 4), tricolored (yellow, reddish brown and black) mesopleuron (Fig. 13), yellowish brown wings, color pattern of hind leg (femur and tibia evenly reddish brown, not infusate, tarsomeres 1-3 whitish, 4-5 black), brown metasoma without whitish bands, and a short, decurved ovipositor (Fig. 12).

Etymology. Named in memory of the well-known expert in Ichneumonidae, Dr. Ian Gauld (U.K.), who has made a great contribution to study of Ichneumonidae of Costa Rica.

Material examined. Holotype female (UAT): Mexico, Chiapas, Jactenango, reserva El Triunfo, Malaise trap, CIB 97-232, 19-22.VII.1999, A. González H. coll. Paratype female (UANL), Mexico, Yucatán, Río Lagartos, Malaise trap, 9.VII.1996, P.R.R. & C.N.C. coll.

Distribution. Mexico (Chiapas and Yucatán).

Exetastes igneipennis Cushman, 1937
(Fig. 5)

Material examined. Mexico, Tamaulipas: 1 male, 15 km S Miquihuana, 3.X.1998, D. R. Kasparyan coll. Oaxaca: 1 female, Neochitlan, 16.IX.1978. Guanajuato: 1 female, Yuriria, 17.V.1986, J. C. Méndez coll.

Distribution. Mexico (Oaxaca, Mexico D.F., Durango, Puebla, Chihuahua, Nuevo León, Michoacán, Zacatecas, Guanajuato, Jalisco, and Tamaulipas) and USA.

Exetastes lascivus Khalaim et Ruiz-Cancino, sp. nov.
(Figs. 6, 7, 14-16)

Female holotype. Fore wing length 7.0 mm. Head (Fig. 6). Clypeus, in profile, distinctly convex and very densely punctate in its upper third, flattened and almost smooth in its lower part, with lower margin distinctly truncate. Mandible strong, weakly tapered, densely punctate in its basal half, smooth and shining in its apical part, with lower tooth distinctly wider and longer than the upper tooth, both teeth smooth and shining. Malar space 0.60 times as long

as basal width of mandible. Face and frons entirely very densely punctate, matt. Face with weak median convexity. Vertex and genae finely punctate, smooth between punctures. Head, in dorsal view, roundly narrowed behind eyes (Fig. 6); gena short, 0.58 times as long as eye width (Fig. 6). Posterior ocellus separated from eye by 1.90 times its own maximum diameter. Juncture of occipital and hypostomal carinae separated from base of mandible by about half the basal width of the latter. Flagellum of antenna tapered apically, with 48 flagellomeres; all flagellomeres elongate. Mesosoma (Fig. 15). Entirely more or less coarsely and rather densely punctate, mostly smooth between punctures, punctures separated by a distance distinctly shorter than diameter of puncture. Epomia and notaulus absent. Scutellum, in profile, weakly convex. Subtegular prominence moderately strong, rounded. Propodeum, in profile, weakly convex, with median longitudinal furrow, with apical transverse carina well-developed medially, enclosing a small apical area, with oval spiracle about twice as long as wide, its surface uneven but without obvious wrinkling. Pleural carina developed only posteriorly. Submetapleural carina anteriorly broadened into a rounded lobe. Legs with tarsal claws weakly curved, basally very finely pectinate. Fore wing with *cu-a* slightly postfurcal. Ramulus absent. Areolet oblique, pointed above, not stalked. Vein *2m-cu* weakly curved in its anterior half, with 1 long bulla. Metasoma (Figs. 7, 16). Tergites polished. First tergite 1.9 times as long as posteriorly wide, basolaterally distinctly and rather densely punctate, and posterolaterally sparsely punctate, with spiracle near its basal 0.4. Tergites 2 and 3 laterally with short sparse hairs, dorsally hairless. Ovipositor short, almost straight, about as long as apical depth of metasoma (Fig. 7). Color. Head and mesosoma mostly black. Palpi, most of metapleuron (margined with black anteriorly, ventrally and dorsally), spot above propodeal spiracle, and legs (coxae, especially front coxa, basally more or less blackish) reddish brown. Basal half of mandible, transverse median stripe on clypeus, front margin and distal corner of pronotum, anterolateral subtriangular spot of mesoscutum, scutellum dorsally, postscutellum, tegula, subtegular prominence, upper mesepimeron and base of wings yellow. Pterostigma and metasoma, including first tergite, brown. Male unknown.

Comparison. The new species belongs to the *bioculatus* species group (Townes and Townes, 1978) by having the upper tooth of mandible distinctly shorter than lower tooth, predominantly black head and mesosoma (sometimes with white or yellowish marks), short ovipositor, and relatively small size. It differs from the both species of this group, *E. bioculatus* and *E. pictus*, by the flagellum black, without a whitish band, and legs almost entirely and evenly reddish brown (coxae basally blackish). Also it differs from

E. bioculatus by the propodeum coarsely punctate, without obvious wrinkling, and from *E. pictus* by the propodeum and metapleuron black and reddish brown.

Etymology. From the Latin *lascivus* (cheerful, playful).

Material examined. Holotype female (UAT), Mexico, Tamaulipas, 15 km S Miquihuana, 3.X.1998, D. R. Kasparyan coll.

Distribution. Mexico (Tamaulipas).

Exetastes mexicanus Cresson, 1874

Distribution. Mexico (Veracruz) and Costa Rica.

Exetastes obscurus Cresson, 1865

Biology. Reared from *Agrotis gladiaria* Morrison in Kansas, and *Agrotis vetusta* Walker (Noctuidae) in Oregon (Townes and Townes, 1978).

Distribution. Mexico (Baja California), USA, and Canada.

Exetastes pasculus Gauld et Ugalde, 2002

Material examined. Mexico, Tamaulipas: 1 female, Cd. Victoria, El Madroño, 23.XII.1987, H. Ruiz C. coll. 1 female, Gómez Farías, Alta Cimas, 900 m, Malaise trap, 4-11.XI.2000, D. R. Kasparyan coll.

Variability. Both studied specimens from Mexico well corresponds with Gauld's original description except hind tarsus with tarsomeres 1-4 yellow (tarsomere 1 narrowly blackish or brownish basally) and the distal tarsomere black. The Costa Rican specimen, according to original description, possesses tarsomeres 1-3 yellow, and the distal 2 tarsomeres black. Moreover the specimen from Gómez Farías has a pronotum with a very small pale spot which is hardly discernible. See also variability for *E. tarsalis*.

Distribution. Mexico (Tamaulipas) and Costa Rica. First record from Mexico.

Exetastes pictus Cushman, 1937

(Figs. 22, 23)

Material examined. Mexico, Tamaulipas: 5 females, 1 male, Cd. Victoria, Cañón del Novillo, Malaise trap, 2.VII-12.XI.2003, B. A. Pérez Urbina coll. 1 male, 14 km W Jaumave, La Florida, Malaise trap, 13-20.V.2005, D. R. Kasparyan, O. Pinson D. colls.

Distribution. Mexico (Tamaulipas) and USA (Arizona and Texas).

Exetastes rhampha Townes, 1978

(Figs. 8, 24-27)

Material examined. Mexico, Coahuila: 3 females, 5 males, W Arteaga, Rancho de los Pinos, 2 000-2 300 m, Malaise trap, 8-11.VII.2000, S. Hernández A., C. A.

Covarrubias D., D. R. Kasparyan colls. Jalisco: 1 female, "T89046".

Distribution. Mexico (Coahuila, Michoacán, Jalisco, and Mexico) and USA (Arizona).

Exetastes scutellaris Cresson, 1865

Distribution. Mexico (Baja California), USA, and Canada.

Exetastes septum Cushman, 1937

Biology. Reared from *Catabena lineolata* Walker (Noctuidae) and *Cydia pomonella* L. (Tortricidae) in California (Townes and Townes, 1978).

Distribution. Mexico (Nuevo León and Baja California) and USA (California and Oregon).

Exetastes tarsalis Cresson, 1874

(Figs. 28-30)

Material examined. Mexico, Tamaulipas: 2 females, Llera de Canales, bushes, Malaise trap, 18-25.XI.2000, D.R. Kasparyan coll. 2 females, same locality, Río Guayalejo, 27.III.2000, D.R. Kasparyan coll. 9 females, 4 males, NW Cd. Victoria, Los Troncones (park), 20.XII.2007, 23.II.2008, 26-31.XII.2008, A. I. Khalaim coll. 1 male, same locality and collector, yellow pan traps, 13-22.IV.2008. Gómez Farías: 57 females, 78 males, Alta Cimas (900 m), Los Cedros, Malaise trap, XII.1998-IX.2000, S. Hernández A., C. A. Covarrubias D., D. R. Kasparyan colls. Veracruz: 1 male, Estación Biológica Los Tuxtlas, 480 m, 21.III.1986, E. Ramírez coll.

Remarks. Total of 154 specimens of *E. tarsalis* from Mexico have been studied. Eleven of 70 females (16%) and 53 of 84 males (63%) have a discrete pale spot on pronotum laterally. This spot varies from moderately large to very small and inconspicuous, or sometimes this spot present only on one side of pronotum and completely absent on the opposite side. Other characters correspond well with description of *E. tarsalis* in Gauld et al. (2002), and we are sure that these specimens belong to this species. Thus this character (absence or presence of a separate pale spot on pronotum) does not work well on the Mexican material of *E. tarsalis*, and when using Gauld's key (Gauld et al., 2002) to Costa Rican species some Mexican specimens with a pale spot on pronotum run into *E. pasculus*.

Distribution. Mexico (Tamaulipas and Veracruz) and Costa Rica.

Exetastes vittatipes Cresson, 1874

Material examined. Mexico, Tamaulipas: 1 female, Gómez Farías, Alta Cimas, Malaise trap, 1-8.V.1999, S. Hernández A. coll.

Distribution. Mexico (Tamaulipas and Veracruz) and Costa Rica.

Discussion

Twenty one species and subspecies of *Exetastes* are recorded from Mexico, 13 of them (62%) also occur in the USA and Canada (Townes and Townes, 1978), 4 (19%) in Costa Rica, and 3 species and 1 subspecies (19%) are known from Mexico only. It appears that the Mexican fauna of *Exetastes* is closer to the fauna of the USA and Canada than to the Costa Rican one, but proportions of the Mexican species in America north of Mexico and Costa Rica are subequal: 13 of 50 species of America north of Mexico (26%), and 4 of 18 Costa Rican species (22%) are known also from Mexico.

All 4 Costa Rican species found in Mexico (*E. mexicanus*, *E. pasculus*, *E. tarsalis* and *E. vittatipes*) belong to the *mexicanus* species group (Gauld et al., 2002). The Mexican species of this group possess a short, slightly compressed and decurved ovipositor (Fig. 30), and metasomal tergites with a transverse black and white markings (Figs. 9, 28). One new species, *E. arteagus* sp. nov., clearly belongs to this group by having a short decurved ovipositor and metasoma with black and white markings (Figs. 9, 11). These 5 species are separated in the first couplet of the key by the characteristic transverse black and white marks on tergites, due to the fact that none of the Nearctic species found in Mexico have this type of coloration of metasoma. Another new species, *E. gauldi* sp. nov., is also included into the *mexicanus* species group by having an ovipositor that is short and slightly decurved (Fig. 12), but in the key it runs to the "Nearctic" complex of species because it has a metasoma predominantly reddish brown. These 6 species form a "tropical" complex of species in the Mexican fauna of *Exetastes*.

Thirteen species of the Mexican fauna occur north of Mexico in the USA and Canada. These species, and also *E. lascivus* sp. nov. belonging to the Nearctic *bioculatus* species group (Townes and Townes, 1978), and form a "Nearctic" complex of species, which is characterized by metasoma more or less unicoloured, without transverse white markings (only 1 species on the "tropical" complex, *E. gauldi* sp. nov., has similar uniformly colored metasoma), and ovipositor that is short to long, decurved, straight or curved upward (all species of the "tropical" complex have a short, slightly decurved ovipositor).

The most abundant species of the genus in Mexico is *E. tarsalis*, from the "tropical" complex of species, which is most regularly collected in Mexico in forests up to 900 m in altitude. The Mexican population of this species is characterized by the pronotum either with or without a separate central pale spot (this spot is absent in Costa Rican material), thus this character cannot be used for separation of this species from *E. pasculus*.

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