Three new ichneumonid species of the genus *Lymeon* Förster, 1869 (Hymenoptera: Ichneumonidae: Cryptinae) from Mexico

Три новых вида наездников-ихневмонид рода *Lymeon* Förster, 1869 (Hymenoptera: Ichneumonidae: Cryptinae) из Мексики

D.R. Kasparyan
Д.Р. Каспарян

Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia. E-mail: kasparyan@yandex.ru
Зоологический институт Российской Академии наук, Санкт-Петербург, Россия.

KEY WORDS: Cryptini, *Lymeon*, new species, key, Veracruz, Mexico, Neotropic Region, North America.

ABSTRACT. Three new species of the subfamily Cryptinae (Hymenoptera: Ichneumonidae) of the genus *Lymeon* Förster, 1869 are described from the State of Veracruz, Mexico: *L. caudator* sp.n., *L. scitula* sp.n. and *L. xalapensis* sp.n. A key to 11 North and Central American species of *Lymeon* with reddish brown metasoma is provided.
РЕЗЮМЕ. Три новых вида подсемейства Cryptinae (Hymenoptera: Ichneumonidae) описаны в роде *Lymeon* Förster, 1869 из штата Веракрус, Мексика: *L. caudator* sp.n., *L. scitula* sp.n. и *L. xalapensis* sp.n. Дан определятельный ключ 11 северо- и центральноамериканских видов *Lymeon* с коричневато-коричневой метасомой.

Material and Methods

This work is based on the review of species of the genus *Lymeon* occurring in Central America and Mexico [Kasparyan, Ruiz-Cancino, 2004] and monographs on the North American [Townes, Townes, 1962] and Mexican [Kasparyan, Ruiz-Cancino, 2008a] Cryptini. Types of *Lymeon* species described by P. Cameron, E.T. Cres-son, R.A. Cushman, H.K and M. Townes were examined in the Academy of Natural Sciences of Philadelphia, Philadelphia, USA; U.S. National Museum of Natural History, Washington, USA; Townes & Dasch collections (former American Entomological Institute), recently moved to the Utah State University, Logan, Utah, USA; and the Natural History Museum, London, UK.

Three new species of *Lymeon* were discovered from the ichneumonid material recently collected by M. López-Ortega (Instituto de Biotecnología y Ecología Aplicada, Universidad Veracruzana, Xalapa) from the State of Veracruz, Mexico. Type material (including all holotypes) is deposited in the Instituto de Biología, Universidad Nacional Autónoma de México, DF, Mexico (UNAM) except for one paratype preserved in the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia [ZIN].

Morphological terminology mainly follows that of Townes [1970]. Taxonomy follows the catalogue Taxapad [Yu et al., 2016]. Layer photographs were taken in ZIN with a Canon EOS 70D digital camera attached to an Olympus SZX10 stereomicroscope, and partially
focused images were assembled with Helicon Focus 6 Pro software.

Descriptions of new species

Family Ichneumonidae
Subfamily Cryptinae
Tribe Cryptini
Subtribe Lymeonina

Genus Lymeon Förster, 1869
Type species: Lymeon annulicorne Ashmead, 1894 (≡ L. orbus Say, 1835).

Lymeon caudator Kasparyan, sp.n.
Figs 1–3.

MATERIAL EXAMINED. Holotype: ♂, Mexico, Veracruz, Xalapa, USBI, Malaise trap, May 2017 (M. López-Ortega) (UNAM).

COMPARISON. Lymeon caudator sp.n. differs from its congeners by its unusually long ovipositor (ovipositor sheath 1.33 times as long as hind tibia) with weak nodus and a long postnodal part of the upper valve (in the latter feature it converges with the genus Debilos Townes, 1966; see Comparative notes below). In its colouration (Figs 1–2) the new species differs from all North American species of Lymeon with red propodeum and black with white markings metastoma by its entirely black mesoscutum. In colour pattern, L. caudator sp.n. is very similar to L. rufotibialis Kasparyan et Ruiz-Cancino, 2004; the latter species also has a rather long ovipositor, i.e., ovipositor sheath as long as hind tibia (vs 0.5–0.8 times in most other congeners), weak nodus, a long postnodal part of the upper valve of ovipositor, and reduced brachiella; but in L. rufotibialis the ovipositor is shorter, mesoscutum with two whitish stripes, hind tibia uniformly reddish and tergite 8 white-marked.

DESCRIPTION. Female (holotype). Fore wing length 7.6 mm.

Antenna with 24 flagellomeres; flagellomeres 1 and 2 subequal in length, their combined length about 1.65 times as long as maximum diameter of eye; flagellomeres 4–9 distinctly compressed and widened, 1.4–1.6 times as wide as flagellomeres 1 and 2 at apex; flagellomere 8 on inner side near its apical margin with a bunch of 6–8 short setae.
Flagellomeres 10–21 subcylindrical, 1.4–1.8 times as long as wide; the apical one about 2.1 times as long as wide at base. Face mat, laterally evenly finely granulate with fine punctures, and medially scabrous with fine rugosity, covered with rather dense and moderately long setae. Clypeus polished, strongly convex in profile, with scarce large punctures, setae thin and long; clypeus with transverse ridge which is highest in lower 0.35 of clypeus; lower margin of clypeus sharp, truncate, slightly impressed and darkened. Frons mat, finely granulate laterally, with coarse rugosity centrally, and with thin median longitudinal carina, the setae are rather short and moderately dense.

Vertex and temples very finely and shallowly granulate, with fine and moderately sparse punctures. Head very strongly narrowed behind eyes. Temple broadened to mandible, in profile its maximum length about 2.5 times more than its minimum length at level of upper 0.25 of eye. Occipital carina weakly sinuate before its connection with hypostomal carina; oral carina slightly higher than occipital carina and about 0.6 times as long as basal mandibular width. Malar space half as long as basal mandibular width. Mandible rather narrow at apex, its upper tooth hardly longer than the lower tooth.

Epomia strong. Notaulis sharp in anterior 0.3 of mesoscutum. Mesoscutum mat, very finely granulose and covered with dense fine punctures and short setae; central 0.4 of mesoscutum in posterior 0.6 with coarse and dense longitudinal rugae. Prescutellar groove with about 8 short and strong transverse rugae. Scutellum polished with irregular rather dense punctures. Mesopleuron with dense and strong longitudinal rugae. Speculum convex, smooth, with moderately large dense punctures. Mesosternum densely and finely granulose-lustrous with dense fine punctures and short setae; central 0.4 of mesosternum completely white. Metapleuron and propodeum reddish brown with yellowish, whitish and brownish markings, and apophyses of propodeum white (see Fig. 1). Fore wing hyaline with apical 0.15 weakly infuscate; distal part of brachial cell slightly infuscate (Fig. 1). Fore and mid coxae reddish with brown marks, white dorsally; trochanters white with brown dorsal stripe; trochantelli, femora and tibiae yellowish brown; tarsi dark brown. Hind coxa, femur and trochanters reddish except for blackish posterior 0.12 of femur and brown and whitish markings on trochanters; hind tibia black with subbasal 0.15 white (Fig. 1); hind tarsus predominantly white, basal 0.25 of basitarus and entire tarsomere 5 black.

Mesosomal tergite 1 reddish, tergites 2–8 black; tergites 1–7 with wide posterior white bands (Fig. 1), these bands on tergites 3, 5 and 6 dorsally interrupted; sternites 2–9 yellowish with large blackish lateral spot; sternite 6 light brown with strong basal desclerotization.

**Male.** Unknown.

**COMPARATIVE NOTES.** Lymeon caudator sp.n. belongs to the subtribe Lymeonina, but in the habits and characteristic shape of the ovipositor it resembles the Neotropical genus *Debilos* of the subtribe Goryphina (especially *D. priroilix* Scherrer, 2012). In the revision of *Debilos* [Scherrer, Aguiar, 2012], authors noted that the similarity of the *Debilos* in “the body size and general shape, combined with T[tergite]1 without lateral triangular tooth or flange at base” can make the species of this genus resemble the species of *Lymeon*. They proposed following characters that separate *Lymeon* from *Debilos*. The *Lymeon* has mandible more stout, lower tooth 0.6–0.8 times as long as upper tooth (vs ventral tooth about half length of dorsal tooth in *Debilos*); nervulus antefurcal; and ventral valve of ovipositor with a long series of teeth (vs nervulus interstitial or postfurcal in *Debilos* and teeth of lower valve inconspicuous and restricted to its extreme tip). *Lymeon caudator* sp. n. shares all these features of *Lymeon*. The new species also differs from *Debilos* in its predominantly whitish colouration of head, whereas in all 30 known species of *Debilos* the head is completely black, except for occasionally white clypeus or mandibles.

**ETYMOLOGY.** The species name is a noun from the Latin “caudatus” (caudate, tailed) referring to the long ovipositor.
Lymeon scitula Kasparyan, sp.n.
Fig. 4–8.
MATERIAL EXAMINED. Holotype: ♂, Mexico, Veracruz, Municipio Teocelo, Tejerias, Malaise trap, November 2016 (M. López-Ortega) (UNAM).

COMPARISION. Lymeon scitula sp.n. is similar to L. xalapensis sp.n. in general habitus, colouration (pale reddish metasoma and legs, mesosoma predominantly black with white markings), and lack of the apical transverse carina which in both species is represented by a pair of low and wide obtuse apophyses (Figs 7, 12). Lymeon scitula may easily be distinguished from L. xalapensis by black speculum and mesostrum, completely black mesocutum (Fig. 6), longer petiole (compare Figs 7 and 12) and tergites 7 and 8 with white dorsal

Figs 4–8. Lymeon scitula sp.n., female, holotype. 4 — habitus, lateral view; 5 — head, frontal view; 6 — head and anterior part of thorax, dorso-lateral view; 7 — propodeum, hind coxae and first tergite of metasoma, dorsal view; 8 — apex of ovipositor, lateral view. Scale bar in Fig. 4 — 2.0 mm.

Рис. 4–8. Lymeon scitula sp.n., голотип (самка): 4 — общий вид, сбоку; 5 — голова, спереди; 6 — голова и передняя часть груди, сбоку и снизу; 7 — проподеум, задние тазики и тергит 1 метасомы, снизу; 8 — вершина яйцеклада, сбоку. Масштабная линейка к рис. 4 — 2.0 мм.
spot (compare Figs 4 and 9). Lymeon scitula is also similar to L. maculipennis Kasparyan, 2017 and L. yanegai Kasparyan, 2004 as all these species possess the apical transverse carina reduced, metasoma reddish, and clypeus with a pair of small median teeth on its lower margin; the two latter species can easily be distinguished from all other known species by entirely pale reddish body with head mainly yellow. The differences from these and other North American species with reddish metasoma are given below in the key.

DESCRIPTION. Female (holotype). Fore wing length 4.5 mm. Antenna with 22 flagellomeres; flagellomeres 1 and 2 almost subequal and combined about 1.52 times as long as maximum diameter of eye; flagellomeres 4–9 weakly compressed and broadened, 1.3 as wide as flagellomeres 1 and 2. Flagellomeres 10–21 are subcylindrical, about 1.33 times as long as wide; the apical one 2.5 times as long as wide, it is of same diameter as previous ones. Face mat, evenly finely granulate with sparse inconspicuous setiferous punctures, the setae very fine and moderately long. Clypeus rather strongly and evenly convex in profile, smooth with scarce punctures; its lower margin sharp and with two small median teeth. Frons mat, with weak median longitudinal carina, evenly granulate with dense and moderately fine punctures, its lower half above antennal sockets with a pair of superficial concavities; ocellar area rugose-punctate. Head very strongly narrowed behind eyes (dorsal view). Temple broadened to mandibles, in profile their maximum length about 2 times more than its minimum length at level of dorsal 0.25 of eye. Occipital carina weakly sinuate before its connection with hypostomal carina; oral carina as high as occipital carina and about 0.5 times as long as basal width of mandible. Malar space 0.8 times as long as basal width of mandible. Mandible rather narrow at apex, its upper tooth 1.3 times as long as lower tooth.

Epomia distinct, rather short. Notauli distinct. Mesoscutum mat, very finely granulose, covered with moderately dense short setae. Prescutellar groove without transverse rugae. Scutellum polished with scarce punctures. Mesopleuron mat, covered with dense longitudinal rugosity and with inconspicuous rather sparse setiferous punctures, the setae moderately short; rugae absent below sternaulus. Speculum large and polished. Mesoscutellum mat, with weak median longitudinal carina as high as occipital carina and about 0.5 times as long as basal width of mandible. Malar space 0.8 times as long as basal width of mandible. Mandible rather narrow at apex, its upper tooth 1.3 times as long as lower tooth.

Antenna black, flagellomeres 4–10 white dorsally, blackish ventrally; scape and pedicel blackish, scape whitish ventrally. Head with face, clypeus, mouthparts and orbits completely whitish; black are broad median longitudinal band from antennal sockets to occipital carina, hind half of temple and vertex, and entire occiput. Mesosoma black with black markings and reddish in posterior third of propodeum beyond apophyses (Figs 4, 6–7); propleuron white, mesoscutum and mesosternum entirely black; scutellum whitish with hind margin black, apophyses of propodeum white. Fore wing weakly infuscate in apical 0.2, on brachial cell and on posterior half of discomedian cell. Fore and mid coxae and their trochanters white; their trochantelli light brownish with white marking on anterior side. Fore and mid femora and tibiae light brownish, tarsi brownish. Hind coxa, trochantellus and femur completely reddish, hind trochanter blackish with reddish dorsal marking; hind tibia light brownish with blackish extreme base and obscure subbasal pale marking; hind spurs brown. Hind tarsus white with basal 0.25–0.3 of basitarus and entire tarsomere 5 blackish. Metasomal tergites pale reddish with apical 0.15 of tergite 1 whitish, and tergites 7 and 8 with white apical spot (Fig. 4), sternites 2–4 predominantly dark brown, sternites 5 and 6 light brown.

Male. Unknown.

ETYMOLOGY. The name “scitula” emphasizes the similarity of the new species in habitus and colouration with the abundant Mexican species Diapetimorpha scitula (Cresson, 1873).

REMARKS. Diapetimorpha scitula (Cresson, 1873) may be distinguished from L. scitula sp.n. in having the first metasomal tergite with lateral tooth at base (such tooth is typical for Diapetimorpha and many other genera of Goryphina), in having mesoscutum with two median yellowish stripes, white spot covering apophyses larger and extending from basal transverse carina to hind edge of propodeum, and the apophyses longer and depressed.

Lymeon xalapensis Kasparyan, sp.n. Figs 9–13.


COMPARISON. Lymeon xalapensis sp.n. is similar to L. scitula sp.n. as both have broad, low and obtuse apophyses on the propodeum, whitish and black colouration of head and mesosoma, and pale reddish brown metasoma and hind legs. Lymeon xalapensis can easily be distinguished from L. scitu-
Three new ichneumonid species of the genus *Lymeon* from Mexico

Fig. 9–13. *Lymeon xalapensis* sp.n., female: 9 — habitus, lateral view; 10 — head, frontal view; 11 — head and anterior part of mesosoma, dorsal view; 12 — hind part of mesosoma, hind coxae and first tergite of metasoma, dorsal view; 13 — apex of ovipositor, lateral view. Scale bar in Fig. 9 — 2.0 mm.

About 30 species of North American Lymeon with other types of colouration of metasoma were keyed before [Kasparyan, Ruiz, 2004, 2008; Kasparyan, 2013]. Recently described L. albomargin Kasparyan, 2017 has similar colouration of metasoma, but may easily be separated by its unusual (autapomorphic) colouration of middle of hind basitarsi which are white in basal half and black in apical half (in other species of Lymeon basitarsi usually darker at base or unicoloured).

D.R. Kasparyan
2. Propodeum at least basally black (Figs 7, 11; in *L. translis* only transverse basal groove and front margin of propodeum are black); metapleural reddish .......................... 3.

   — Propodeum red (usually white on apophyses). Hind coxa redelloversegment white on apophyses .............................................................. 8.

3. Mesoscutum entirely black or with one white central large spot covering at least 0.5 of mesoscutum length. Propodeum with only basal transverse carina present, the apical carina absent and represented only by a pair of rather blunt conical apophyses; hind leg yellowish rufous except for white tarsomeres (1)–(4) and black tarsomere 5 (Figs 4, 9) ........................................ 4.

   — Mesoscutum with two median white or yellowish stripes........................................................................................................ 5.

4. Mesoscutum with large median oval white spot covering at least 0.5 of mesoscutum length (Fig. 11). Frons almost polished. Clypeus granulated, its lower margin with median small brownish impression; scape black ventrally (Fig. 10). Speculum and mesoscutum whitish; postscutellum white (Fig. 11). Tergite 1 of metasoma twice as long as wide posteriorly (Fig. 12), tergite 2 with white apical band; tergites 7 and 8 without white apical spot (Fig. 9). Tip of dorsal valve of ovipositor beyond the nodus distinctly compressed in apical 0.35 (Fig. 13) .... *L. xalapensis* sp.n.

   — Mesoscutum entirely black (Fig. 6). Frons granulated. Clypeus polished, its lower margin with a pair of small brownish teeth or irregularities on lower margin; scape whitish ventrally (Fig. 5). Speculum and mesoscutum black; hind leg yellowish rufous with (Fig. 4); postscutellum black (Figs 4, 7). Tergite 1 of metasoma 3.3 times as long as wide posteriorly (Fig. 7), tergite 2 without white apical band; tergites 7 and 8 with white apical spot (Fig. 4). Tip of dorsal valve of ovipositor beyond the nodus hardly depressed in apical 0.35 (Fig. 8) ............ *L. scitula* sp.n.

5. Front wing with two distinct transverse brownish bands. Scape black. Flagellomeres 4–10 white, black ventrally. Head predominantly white with black markings; thorax black with white spots; propodeum black, apophyses white, conical. Metasoma reddish with postpetiole, hind margin of tergite 2, and dorsum of tergite 7 white. Hind coxa entirely reddish, without white dorsal spot. Mexico ........... *L. tinctipennis* Kasparyan et Ruiz-Cancino, 2004

   — Front wing hyaline, without fuscous bands. Scape ventrally reddish or white; hind corner of pronotum, speculum and mesoscutum whitish; postscutellum white or brownish, and metapleural (except on marginals) whitish-yellow or reddish. Tergite 7 reddish (at most hind margin white). Hind coxa red, usually with dorsal white spot ............ 6.

6. Mesopleura medially with oblique black band (from mesopleural pit to subtegular ridge). White flagellomeres brownish ventrally; scape reddish brown beneath; pedicel with dorsal white spot. Mesoscutum black, with two large median yellow stripes. Postscutellum white. Propodeum black with two large whitish spots extended from basal transverse carina through apophyses to apex; metapleural whitish yellow. Hind tarsus with basitarsus completely reddish. Flagellomeres 1 and 2 combined about 1.3 times as long as maximum diameter of eye. Fourth tarsomere of hind leg bilobed, the distal lobe 1.6 times as long as segment 2 of hind tarsus. Mexico ........................................ *L. junctus* (Cresson, 1873)

   — Mesopleura medially without oblique black band. White flagellomeres not darkened ventrally; scape white beneath; pedicel without dorsal white spot in *L. sulsus*.

Postscutellum brownish. Propodeum predominantly reddish with white. Flagellomeres 1 and 2 combined about 1.6–1.7 times as long as maximum diameter of eye. The groove between metanotum and propodeum black, shallow and broad, below postscutellum with vertical wrinkles .............................................................. 7.

7. Pronotum on latero-posterior (vertical) margin black, except before tegula. Metasoma black, with two median yellow stripes. Propodeum with two sublateral white spots covering apophyses and extending to apex; rufous between apophyses. Mexico ...................... *L. sulsus* (Cresson, 1873)

   — Pronotum on hind (vertical) margin broadly white. Mesoscutum reddish with black margins and with two yellow median stripes. Propodeum reddish, white only on apophyses. Mexico .................. *L. translis* (Cresson, 1873)

8. Head completely black (except for white mandibles and palpI). Legs uniformly reddish, only fore coxa and trochanters white and last tarsal segments brownish. Metasoma completely reddish. In female mesosoma entirely red (except for small white markings); scape reddish brown; flagellum with about 4 segments white; front wing with two fuscous bands; just distad of basal vein, and subapical one. In male wings without fuscous bands, and mesosoma may be entirely black except for reddish metapleural and propodeum. USA (Texas), Mexico, Guatemala .................. *L. imbecillis* (Cresson, 1873) (=*leucosoma* Cameron, 1886)

   — Head predominantly reddish, whitish or yellowish. The body almost completely reddish ................................................ 9.

9. Propodeum with only basal transverse carina present, the apical carina absent and represented only by a pair of rather blunt conical apophyses ................................................. 10.

   — Propodeum with both transverse carinae. Fore wing with two or three dark transverse markings ..................... 11.

10. Fore wing with two distinct fuscous bands. Second tergite with setiferous punctures scarce and setae very short. Scape and pedicel blackish with brownish tinge ventrally; fore coxa white, hind tibia brownish with subbasal white ring; pterostigma blackish. Metasomal sternites completely brownish. Mexico ......................................................... *L. muculipennis* Kasparyan, 2017

   — Fore wing hyaline, slightly infuscate. Second tergite with dense setiferous punctures, distances between them equal to length of setae. Scape pale brownish yellow; fore coxa, fore and mid legs yellowish red; pterostigma dirty yellow. Metasomal sternites 1–4 light yellow to whitish yellow. Yellow pattern on thorax richer (including speculum, prepectus, mesosomum and metapleuron). Honduras ..................................................... *L. yanegai* Kasparyan, 2004

11. Propodeum with two transverse carinae without tubercles. Clypeus not projecting downwards. Front wing slightly infuscated on basal vein, on areolet and at apex. Petiole yellow at base. Mexico .......................................................... *L. mexicanus* (Cameron, 1886)

   — Propodeum with strong crests at apical transverse carina. Clypeus strongly projecting downwards. Front wing with a median and subapical slightly infuscate bands. USA (New Mexico) ...................... *L. nasutus* (Pratt, 1945)

Acknowledgments. I am cordially grateful to M. López-Ortega (Xalapa, Mexico) and Andrey Khalaim (ZIN) for new materials on Cryptini, and also to Yulia Astafurova (ZIN) and Andrey Khalaim for their kind help with the preparation of photographs. The work was supported by the Russian Foundation for Basic Research (grant no. 19-04-00027) and performed in the framework of the Russian State Research Project no. AAAA-A19-119020690010-6.
References


