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Review and key to Nearctic *Lathrolestes* Förster (Hymenoptera: Ichneumonidae), with special reference to species attacking leaf mining tenthredinid sawflies in *Betula* Linnaeus (Betulaceae)

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Abstract

All Holarctic members of the genus *Lathrolestes* Förster (Hymenoptera: Ichneumonidae) were reviewed. Five species are described as new: *L. syringe* Reshchikov **sp. nov.**, *L. barroni* Reshchikov **sp. nov.**, *L. fissus* Reshchikov **sp. nov.**, *L. thomsoni* Reshchikov **sp. nov.**, and *L. soperi* Reshchikov **sp. nov.** The last two species were reared from *Profenusa thomsoni* (Konow, 1886), an invasive European birch leafmining sawfly found in North America. *Lathrolestes nasoni* Davis, 1897 is synonymized with *L. caudatus* (Thomson, 1883); *L. scutellatus* (Ashmead, 1890) **stat. rev.** is reestablished as a valid species.

Key words: Ichneumon flies, Ctenopelmatinae, Perilissini, Tenthredinidae, birch, biocontrol

Introduction

The Nearctic species of the genus *Lathrolestes* Förster (Hymenoptera, Ichneumonidae) were last revised by Barron (1994). The Palearctic members of the genus have not been revised. *Lathrolestes* included previously 66 species worldwide, with 36 species from the Nearctic region, including 2 introduced Palearctic species; 25 species from the Palearctic region, 1 from the Ethiopian, 4 from the Neotropical and 2 from the Oriental (Yu and Horstmann 1997, Gauld *et al.* 1997) regions.

The original diagnosis of the genus *Lathrolestes* was given by Burks (1952) and later added by Townes (1970). However, these diagnoses do not provide an adequate separation of this genus from the genera *Priopoda* Holmgren, 1856 (Hymenoptera, Ichneumonidae) and *Perilissus* Förster, 1855 (Hymenoptera, Ichneumonidae). In his 1994 revision, J.R. Barron included within the genus *L. protenus* Barron, 1994, a species with occipital carina intercepting the hypostomal carina before the base of mandible, a character state shared by members of the genus *Perilissus*. However, Barron (1992) states that *L. protenus* has very short and broad parameres, a character that *Perilissus* doesn't share (Barron 1992). On the other hand, *Perilissus nudus* Barron, 1994 has occipital carina doesn't intercept the hypostomal carina before the base of mandible (Barron 1994). Townes (1970) noted that first metasomal tergum of members of the genus *Priopoda* is 2.0 times as long as wide; whereas in members of the genus *Lathrolestes,* the first metasomal tergum is only 1.65 times as long as wide.

Larvae of *Lathrolestes* species feed as koinobont endoparasitoids of sawfly larvae, mainly of the tribe Fenusini (Hymenoptera, Tenthredinidae), which feed on foliage of deciduous trees or shrubs (Pschorn-Walcher and Altenhofer 1989). Several species are parasitoids of other, non-leaf-mining Tenthredinidae e.g. *Lathrolestes luteolator* (Gravenhorst, 1829) attacks several species of *Caliroa*. There are species that are parasitoids of leafmining lepidopterans in the Eriocraniidae (Rohwer 1914, Heath 1961, Carlson 1979), *L. clypeatus* (Zetterstedt, 1838) and *L. mnemonicae* (Rohwer, 1914).

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Some species in the genus *Lathrolestes* have been used as biological control agents invasive sawflies. Two have been introduced into North America from Europe: *Lathrolestes nigricollis* (Thomson, 1883) and *Lathrolestes ensator* (Brauns 1898) (Barron 1994, Vincent *et al.* 2001). The first was introduced to control *Fenusa pumila* Leach, 1817, the birch leafmining sawfly attacking paper and grey birches in the northeastern United States and eastern Canada (Coulson 1992, Barron 1994, Van Driesche *et al.* 1997). This sawfly invaded from Europe (Friend 1933) and became a pest of several birch species (Fuester *et al.* 1984). The second introduced species, *L. ensator* (Brauns 1898), was released to control the apple sawfly, *Hoplocampa testudinea* (Klug 1814) (Vincent *et al.* 2001), which was first detected in New York and then spread to Quebec (Barron 1994).

The goal of this work is review of Nearctic species of *Lathrolestes* with description of new species including two new species which were reared from the invasive leafmining sawfly *Profenusa thomsoni* (Konow 1886).

Material and methods

Morphological data were used for descriptions of new species and preparation of a key to species. In addition to morphological data, DNA analysis was used to obtain gene sequences for three species to assist ongoing biological control efforts.

The biological part of this work was carried out by Anna Soper and Roy Van Driesche, at the University of Massachusetts (USA). To obtain adults of *L. thomsoni* Reshchikov sp. nov., *Profenusa thomsoni* (Konow, 1886) (Hymenoptera: Tenthredinidae) larvae were collected in late July to early August in Hay River, Northwest Territories, Canada and Edmonton, Alberta, by Chris MacQuarrie and Scott Digweed at the Canadian Forest Service. Rearing methods were adapted from Fuester *et al.* (1984) and detailed in MacQuarrie (2008). Leaves containing 4th, 5th, and 6th instar *P. thomsoni* larvae were collected from birch trees and placed in 1 liter plastic bags (Ziploc). To collect larvae from leaves, larvae-infested leaves were held in 2.5 cm square nylon mesh bags inside 60–70 liters, clear plastic bags. This allowed the larvae to drop onto the bottom of the plastic bag after they completed development. Clear plastic tubs (30 x 45 x 15 cm) were filled with 10 cm of 3 parts potting soil and 1 part sand. In the bottom of each tub, holes were cut and screened. Dropped larvae were collected, counted and placed directly on top of the soil. The tubs remained in an insectary until September, when they were sunk in the ground and overwintered at the Canadian Forest Service, in Edmonton, Alberta. In May 2008, the tubs were transferred to Anchorage, Alaska. Parasitoids emerged from the tubs in July and August 2008.

Profenusa thomsoni larvae were reared in Massachusetts using the same methods. The soil tubs were sunk into the ground in November 2007 in Westhampton, MA (USA). Parasitoids emerged from the soil tubs from June till August 2008.

Adult *L. thomsoni* Reshchikov sp. nov. individuals were also aspirated directly from the undersides of leaves from birch trees (*Betula pendula* and *Betula papyrifera*) in Edmonton, Alberta (53.2635°N, 113.3015°W).

Adult *L. soperi* Reshchikov sp. nov. were collected as follows: (a) directly aspirated from birch trees (*Betula papyrifera*) with leaves mined by *P. thomsoni* (Konow, 1886); (b) from emergence traps (orange traffic cones, area = 122.7 cm^2, with a clear 2 oz. trapping cup mounted on top), placed over the soil beneath birch trees. Adults were collected weekly and placed directly into 100% ethanol. Larval parasitoids were obtained by dissecting larvae of *P. thomsoni.*

For *L. nigricollis* (Thomson, 1883), Lisa Tewksbury, at the University of Rhode Island, supplied 12 adult specimens, reared from larvae of *Fenusa pumila* Leach, 1817 collected in North Kingston, Rhode Island (USA). Larval specimens were also obtained from dissections of *Fenusa pumila*.

Adults of *L. thomsoni* Reshchikov sp. nov., *L. nigricollis* (Thomson, 1883), and *L. soperi* Reshchikov sp. nov. were subject to DNA extraction using the DNeasy kit as per manufacturer's instructions (Qiagen, Valencia, CA, USA). The barcode primers (Hebert et al., 2003) were used to amplify the mitochondrial

cytochrome oxidase c subunit I (COI). Each PCR reaction was carried out in 50 µl reactions. PCRs contained 0.2 µM of each primer, 0.2 mM of each dNTP, 2.5 mM $MgCl_2$, 2 U of *Taq* polymerase (Applied Biosystems, Carlsbad, CA), USA), 1x buffer supplied by the manufacturer (Qiagen) and 1 µl genomic DNA. All reactions were carried out in an MJ Research Inc., programmable thermocycler. An initial denaturation at 94°C for 1 min. was followed by five cycles of 94°C for 1 min., 45°C for 1.5 min, and 72°C for 1.5 min; 35 cycles of 94°C for 1 min., 50°C for 1.5 min. and 72°C for 1 min; 72°C for 5 min. PCR products were purified prior to sequencing using ExoSAP-IT (U.S. Biochemicals, Cleveland, OH) as per manufacturer's instructions. PCR products were sent to the Genomics Center at Yale University. Sequences were edited in Sequencher 4.2 (Gene Codes Corporation).

Alexey Reshchikov carried out all the taxonomic work with types and wrote the descriptions of the new species. All available types of Palearctic (21 types of 26 known species) and Nearctic species (30 types of 32 known species) were studied and compared. Type specimens of the following species from the following institutions were examined (abbreviations given in parentheses are used hereafter in the text): *L. nasoni* Davis, 1897, *L. obscurellus* (Davis, 1897) and *L. platynus* (Davis, 1897) - Academy of Natural Sciences of Philadelphia, Philadelphia, Pennsylvania, U.S.A. (ANSP); *L. breviremus* Barron, 1994, *L. bulbus* Barron, 1994, *L. bullatus* Barron, 1994, *L. carinatus* Barron, 1994, *L. convexus* Barron, 1994, *L. dentatus* Barron, 1994, *L. erugatus* Barron, 1994, *L. planus* Barron, 1994 and *L. striatus* Barron, 1994 - American Entomological Institute, Gainesville, Florida, U.S.A. (AEI); *L. asperatus* Barron, 1994, *L. clavipes* Barron,1994, *L. euryremus* Barron, 1994, *L. gibbosus* Barron, 1994, *L. messae* Barron, 1994, *L. ochraceus* Barron, 1994, *L. periclistae* Barron, 1994 and *L. zeugophorae* Barron, 1994 - Canadian National Collections, Centre for Land and Biological Resources Research, Agriculture Ottawa, Canada (CNC); *L. meridionalis* (Smits van Burgst,1912) - Laboratorium voor Entomologie, Landbouwhogeschool, Wageningen, The Netherlands (LEW); *L. morator* Aubert, 1984, *L. occultor* Aubert, 1984 - Musée de Zoologie, Lausanne, Switzerland (MZLS); *L. buccinator* (Holmgren, 1857), *L. macropygus* (Holmgren, 1857), *L. pictilis* (Holmgren, 1857) and *L. saliceti* (Roman,1909) - Naturhistoriska Riksmuseet, Stockholm, Sweden (NHRS); *L. moravicus* (Habermehl, 1923) - Natur-Museum Senckenberg, Frankfurt, Germany (SMF); *L. mnemonicae* (Rohwer, 1914), *L. pictus* Cushman, 1933, *L. profenusae* Barron,1994 and *L. scutellatus* (Ashmead, 1890) - U.S. National Museum of Natural History, Smithsonian Institute, Washington, D.C., U.S.A. (USNM); *L. clypeatus* (Zetterstedt, 1838), *L. luteolus* (Thomson, 1883), *L. nigricollis* (Thomson, 1883), *L. pleuralis* (Thomson, 1883), *L. ungularis* (Thomson, 1883), *Lathrolestus marginatus* (Thomson,1883), *L. pictilis* (Holmgren, 1857), *L. saliceti* (Roman, 1909) - Zoologiska Institutionen, Lund, Sweden (MZLU); *L. citrofrontalis* Schmiedeknecht, 1912 - Zoologisches Staatsammlung, Münchhausenstrasse, München, Germany (ZSM);

Morphological terminology follows that of Barron (1994), Townes (1970) and Gauld *et al.* (1997). Structures of ovipositors are illustrated for the first time (Figs 1–30); also drawings with propodeums (Figs 31–36), first metasomal terga (Figs 37-39), male subgenital plate (Fig. 40), tarsal claws (Figs 41-50), and last tarsal articles (Figs 51, 52) are given; color pictures of habitus and faces of all new taxa and *L. nigricollis* are presented (Figs 53–58).

Results

Lathrolestes Förster

Lathrolestes Förster, 1869: 196. Type-species: *Tryphon clypeatus* Zetterstedt.
Camporychus Förster, 1869. Type-species: *Lathrolestes marginatus* Thomson;
Culmina Benoit, 1955. Type-species: *Culmina ruwenzorica* Benoit;
Ecclinops Förster, 1869. Type-species: *Tryphon orbitalis* Gravenhorst;
Homalomma Förster, 1869. Type-species: *Homalomma caliroae* Rohwer;
Laphyroscopus Förster, 1869. Type-species: *Tryphon gorskii* Ratzeburg;
Lathrolestus Thomson, 1883. Type-species: *Lathrolestus clypeatus* Zetterstedt

Luphyroscopus Thomson, 1883. Type-species: *Luphyroscopus gorskii* Ratzeburg
Ritzemabosia Smits van Burgst, 1912. Type-species: *Ritzemabosia meridionalis* Smits van Burgst;
Tryphonopsis Brauns, 1898. *Tryphonopsis ensator* Brauns

Diagnosis. Small to medium sized species, 4.0–7.5 mm. Occipital carina not intercepting hypostomal carina. Clypeus profile flat, its apical margin thick. Mandibles with lower tooth distinctly longer than the upper. Areolet petiolate, oblique. Second recurrent vein with a single bulla. Nervellus intercepted below or at its middle. Tarsal claws pectinate, with 1 or 3 teeth or with basal lobe. Glymmae deep. Apex of subgenital plate of male not incurved on hind margin. Tip of aedeagus somewhat decurved and swollen, its apex rounded. Ovipositor sheath 0.5 to 1.5 as long as metasomal height.

Key to Nearctic species of *Lathrolestes*

1. Occipital carina complete dorsally 2
-. Occipital carina incomplete dorsally 24
2. Propodeum without carinae or only area petiolaris present. Clypeus towards apex projecting strongly anteriorly . 21
-. Propodeum with carinae more or less complete (Figs 31–36). Clypeus towards apex not strongly projecting anteriorly 3
3. Face and clypeus separated by a transverse impression or not separated (Figs 53–56) 4
-. Face and clypeus separated by a transverse suture or sharp groove (Fig. 57a) 14
4. Antennal flagellum with median articles white. Ovipositor straight, without notch (Fig. 14) 5
-. Antennal flagellum with articles uniformly colored. Ovipositor straight (Figs 3, 4, 9) or with shallow notch (Figs 6, 8) 6
5. Face smooth, not sculptured, punctures weak. Forewing infuscate. Propodeal carinae complete, except costula absent, carinae not strongly raised ..... *L. erugatus* Barron, 1994
-. Face sculptured. Forewing not infuscate. Propodeal carinae complete, strongly raised .... *L. asperatus* Barron, 1994
6. Lower part of mesopleuron, mat, shagreen or rugose, not punctate. If ovipositor with shallow notch, its apical part to basal part ratio 0.35 (Fig. 6) 7
-. Lower part of mesopleuron shiny, distinctly punctate, with distinct sparse deep punctures. If ovipositor with shallow notch, its apical part to basal part ratio 0.5 (Fig. 8) 11
7. Tarsal claws pectinate (Figs 41, 42) 8
-. Tarsal claws short, strongly curved at apex, with one basal tooth or basal lobe (Fig. 43, 44) 10
8. Ovipositor with shallow notch (Fig. 6)..... *L. scutellatus* (Ashmead, 1890) **stat. rev.**
-. Ovipositor without notch (Fig. 1, 2) 9
9. Ovipositor not stout dorsally (Fig. 1); mesosoma not wide, with mesopleuron not projecting; area superomedia elongate (Fig. 31); 2nd metasomal tergum almost as wide as long, with superficial sculpture .... *L. syringe* Reshchikov **sp. nov.**
-. Ovipositor stout dorsally (Fig. 2); mesosoma rather wide, with projecting mesopleuron; area superomedia as long as wide (Fig. 32); 2nd metasomal tergum transverse, polished ..... *L. barroni* Reshchikov **sp. nov.**
10. Costula absent (Fig. 33). First metasomal tergum without median longitudinal carinae and projections at spiracles, evenly granulate, except that basal part of petiole is polished with a longitudinal groove (Fig. 37). Apical margin of male subgenital plate notched (Fig. 40). Face with bulge (Fig. 55a). Lower part of mesopleuron without punctures, mat, shagreen. Tarsal claws with preapical teeth (Fig. 43). Body from uniformly yellow-pale to dark with pale spots on mesolpeuron and metasoma (Fig. 55b) ..... *L. fissus* Reshchikov **sp. nov.**
-. Costula present (Fig. 34). First metasomal tergum with projections at spiracle and median longitudinal carinae, entirely granulate, without basal polished part (Fig. 38). Apical margin of male subgenital plate without notch. Face without bulge. Lower part of mesopleuron rugose. Tarsal claws with basal lobe (Fig. 44). Body black with black mesopleuron and reddish-yellow face and maculae on sides of metasomal tergum (Fig. 56b) .... *L. thomsoni* Reshchikov **sp. nov.**
11. Face with punctures deeply impressed. Head not narrowed behind the eyes, long. Tarsal claws with teeth distinctly separated (Fig. 46). Ovipositor straight and thin, without notch (Fig. 9) ..... *L. platynus* (Davis, 1897)
-. Face with punctures shallowly impressed. Ovipositor with notch (Figs 8, 23)..... 12
12. Propodeum with area petiolaris and area superomedia confluent. Body black..... *L. planus* Barron, 1994
-. Propodeum with area petiolaris and area superomedia separate by apical transverse carina. Body black or reddish-yellow, mostly reddish-yellow or mostly black with yellow metasoma 13

13. Body of female uniformly reddish-yellow, of male reddish-yellow tinged reddish-brown and black. Head narrowed behind the eyes. Propodeum with carinae complete. Clypeus and face separated by impression .... *L. obscurellus* (Davis, 1897)
-. Body reddish-yellow and black, dorsally mostly black or dark reddish-brown, ventrally mostly reddish-yellow. Head not narrowed behind the eyes; Propodeum with carinae complete, except costula absent. Clypeus and face confluent, not separated by a groove or impression ..... *L. luteolator* (Gravenhorst, 1829)
14. Propodeum with carinae complete, costula present (Fig. 36). 5th article of tarsus enlarged (Fig. 52) .... *L. zeugophorae* Barron, 1994
-. Propodeum with carinae incomplete (Fig. 35). 5th article of tarsus not enlarged or only slightly enlarged (except *L. mnemonicae*) (Fig. 51) 15
15. Face and clypeus separated by transverse distinct groove 16
-. Face and clypeus separated by a transverse suture 18
16. Head with yellow maculae (Fig. 58a). Tarsal claws with preapical teeth or basal lobe (Figs 47–50) 17
-. Head black. Tarsal claws pectinate with three teeth (Fig. 45). Area basalis and area superomedia present; costula absent (Fig. 35). 2nd metasomal tergum reddish (Fig. 57b) ..... *L soperi* Reshchikov **sp. nov.**
17. Tarsal claws with two preapical teeth, one of them apically cloven (Fig. 49). Area basalis and area superomedia distinct but confluent ..... *L. dentatus* Barron, 1994
-. Tarsal claws with basal lobe (Fig. 47). Area basalis and area superomedia not defined .... *L. nigricollis* (Thomson, 1883)
18. Tarsal claws with one preapical tooth or teeth (Figs 48, 50). Body small, 3.0–4.0 mm 19
-. Tarsal claws pectinate or not pectinate, without preapical tooth. Body medium or large size, 4.0–7.0 mm 20
19. Ovipositor curved up (Fig. 24). Tarsi each with 5th article enlarged. Tarsal claws with two preapical teeth (Fig. 48). Occiput at middle acute. Parameres longer then aedeagus. Body dark reddish-brown to black .... *L. mnemonicae* (Rohwer, 1914)
-. Ovipositor straight (Fig. 10). Tarsi each with 5th article not enlarged. Tarsal claws with one preapical tooth (Fig. 50). Occiput at middle obtuse. Parameres very short, much shorter then aedeagus, broad medianly. Body mostly reddish-brown ..... *L. clavipes* Barron, 1994
20. Body black with reddish-yellow maculae. Antennal flagellum dark reddish-brown. Clypeus slightly projecting anteriorly. Ovipositor straight (Fig. 11). Body medium size, 4.0 mm ..... *L. euryremus* Barron, 1994
-. Body uniformly reddish-yellow or reddish-yellow with black maculae. Antennal flagellum in basal half dark reddish-brown, in apical half pale yellow. Clypeus strongly projecting anteriorly. Body large, 6.0–7.0 mm .... *L. protrusus* Barron, 1994
21. Occipital carina intercepting hypostomal carinae before base of mandible. Propodeum with carinae absent. Ovipositor with notch and cavity at apex of lower valvae (Fig. 12) ..... *L. protenus* Barron, 1994
-. Occipital carina intercepting hypostomal carinae at base of mandible. Propodeum with carinae partly complete. Ovipositor without notch (Figs 7, 13) 22
22. Clypeus not separate from face by a transverse groove or impression. Propodeum with area petiolaris defined. Nervellus intercepted slightly below middle. Face, mesopleuron and propodeum roughly rugose, with punctures shallowly impressed. Ovipositor without notch, stout at base (Fig. 13) ..... *L. tomostethi* (Cushman, 1935)
-. Clypeus distinctly separate from face by a transverse groove. Propodeum with area petiolaris and apical transverse carina distinctly defined. Nervellus intercepted far below middle. Face, mesopleuron and propodeum granulated, with punctures deeply impressed 23
23. Metasomal terga smooth, punctures large, deeply impressed. Body black, except face and clypeus of males yellow. Ovipositor short, straight and swollen, without teeth (Fig. 7) ..... *L. breviremus* Barron, 1994
-. Metasomal terga granulate, punctures shallow, slightly impressed. Body black with reddish-yellow maculae. Metasomal terga of females red, except first tergum black, reddish-yellow at apex, that of males black, except second and third terga with broad pale yellow transverse macula. Ovipositor long (Fig. 15b), longer than metasoma, with apical teeth (Fig. 15a) ..... *L. ensator* (Brauns, 1898)
24. Propodeum with carinae incomplete, area petiolaris and rarely remnants of area superomedia at sides present. Subgenital plate of female large. Ovipositor very short, shorter than height of metasoma (Figs 17, 18) 26
-. Propodeum with more nearly carinae complete, except costula absent or with only area petiolaris, apical transverse carina, and area superomedia in apical part defined. Subgenital plate of female not large. Ovipositor as long as height of metasoma (Figs 27–30) 25
25. Clypeus with apical margin subtruncate; at apex projecting slightly anteriorly. Propodeum with carinae complete, except costula absent. Head, mesosoma black, metasomal terga mostly reddish-yellow. Face and clypeus of males black ..... *L. constrictus* (Provancher, 1882)
-. Clypeus of females with apical margin at middle strongly concave, that of males less strongly; at apex projecting strongly anteriorly. Propodeum with carinae incomplete, except area petiolaris, apical transverse carina, and area superomedia in apical part defined. Body black, legs reddish-yellow. Face and clypeus of males yellow .....

..... *L. profenusae* Barron, 1994

26. Face very convex, with distinct bulge at middle. Tarsal claws pictinate 27
-. Face in dorsolateral profile flat or moderately convex. Tarsal claws each with teeth or pictinate, if pictinate and face moderately convex ovipositor as long as three first terga of metasoma, with apical teeth, or mesosoma reddish-yellow, or parameres of males very broad 30
27. First metasomal tergum with deep median longitudinal groove from base to near apex. Clypeus of females at apical margin on each side with distinct "tooth-like projection. Propodeum with area petiolaris obscurely defined .... *L. messae* Barron, 1994
-. First metasomal tergum with shallow median longitudinal impression from base to near apex. Clypeus of females at apical margin on each side without distinct "tooth-like projection. Propodeum with area petiolaris distinctly defined 28
28. Face at middle smooth, with shallow punctures. Head black, clypeus at apex reddish-brown. Mesosoma entirely black ..... *L. bullatus* Barron, 1994
-. Face at middle granulate. Head of females reddish-yellow with black maculae or black with face, clypeus, orbits reddish-yellow maculae. Head of males pale yellow with vertex, frons at middle black or head black with face, clypeus, orbits, genae reddish-yellow. Mesosoma mostly pale yellow or black with reddish-yellow maculae. [Ovipositor without notch (Figs 27, 28)] 29
29. Mesopleuron smooth. Head of females reddish-yellow with black maculae; that of males pale yellow with vertex, frons at middle black. Mesosoma of females black with reddish-yellow maculae, that of males pale yellow, in part black. Metasomal terga of females reddish-brown, first tergum black, second, third, fourth terga in part reddish-yellow. Metasomal terga of males dark reddish-brown, in part reddish-yellow ..... *L. gibbosus* Barron, 1994
-. Mesopleuron granulate. Head of females and males black with yellow or reddish-yellow maculae. Metasomal terga of females and males black, third tergum of males at base reddish-yellow ..... *L. pictus* Cushman, 1933
30. Face flat 31
-. Face moderately convex 33
31. Body color uniformly reddish-yellow. Ovipositor straight and not thin in apical part (Fig. 19) .... *L. ochraceus* Barron, 1994
-. Body color black and reddish-yellow. Ovipositor thin in apical part and slightly angular bent (Figs 20, 21) 32
32. Clypeus not separate from face. Females black and reddish-yellow; head, propodeum, metasomal terga mostly black; mesosoma mostly reddish-yellow. Males with head and mesosoma mostly very pale yellow, almost white; metasomal terga mostly black, with pale transverse bands ..... *L. carinatus* Barron, 1994
-. Clypeus separate from face by transverse impression. Females black; third and fourth metasomal terga reddish-brown. Males black with extensive yellow maculae; head mostly yellow, upper face, vertex black; mesosoma dorsally black, laterally and ventrally mostly yellow; metasomal terga black, third and fourth terga reddish-brown .... *L. bulbus* Barron, 1994
33. Tarsal claws pectinate 34
-. Tarsal claws each with teeth (as at Figs 48–50) 36
34. First metasomal tergum with median longitudinal shallow impression from base to near apex. Parameres of males not modified, narrow 35
-. First metasomal tergum with deep median longitudinal groove from base to near apex. Parameres of males modified, very broad ..... *L. striatus* Barron, 1994
35. Ovipositor as long as three first terga of metasoma (Fig. 16b), with apical teeth (Fig. 16a). Mesosoma mostly black ..... *L. caudatus* (Thomson, 1883) (= *L. nasoni* Davis, 1897 **syn. nov.**)
-. Ovipositor shorter, without apical teeth (Fig. 22). Mesosoma reddish-yellow ..... *L. periclistae* Barron, 1994
36. First metasomal tergum with distinct median longitudinal groove from base to near apex; between lateral longitudinal carina and groove, proximad spiracle, with distinct impression. Ovipositor with notch (Fig. 25) .... *L. aquilus* Barron, 1994
-. First metasomal tergum with shallow median impression, without median longitudinal carinae. Ovipositor with notch or without notch (Figs 26, 30) 37
37. Ovipositor with notch (Fig. 26). Tarsal claws with two or three distinct teeth. Body of female mostly black. Head black, clypeus at apex, orbits reddish-brown. Metasomal terga black, third tergum in part yellow tinged reddish. Male with body dorsally mostly black, ventrally mostly yellow. Head black, face, orbits, clypeus yellow. Mesosoma black with yellow maculae. Metasomal terga black, apical terga in part yellow tinged reddish .... *L. convexus* Barron, 1994
-. Ovipositor without notch (Fig. 30). Tarsal claws with three fine teeth. Body of female and male black and reddish-yellow. Head reddish-yellow, vertex, occiput, temple in part black. Metasomal terga reddish-yellow, first tergum at base black ..... *L. truncatus* (Provancher, 1888)

***Lathrolestes syringe* Reshchikov sp. nov.**

Description. Female. Body length 4.0–5.0 mm. Antennal flagellum with 26 articles. Width to length ratio of scapus 0.53. Head narrowed behind the eyes, mat. Maximal length of temple to transverse eye diameter ratio 0.8; minimal length of temple to transverse eye diameter ratio 0.6. Face as wide as longitudinal eye diameter; in profile convex, with bulge. Clypeus separated from face by transverse impression; at apex projecting slightly anteriorly; apical margin of clypeus moderately thick. Clypeal foveae small. Malar space as wide as 0.33 of basal mandible width (Fig. 53a). Occipital carina complete, not interrupted above. Lower mandible tooth longer than upper.

Mesosoma. Notaulus shallow, impressed at base. Lower part of mesopleuron without punctures, mat, meshed. Tarsal claws weakly pectinate (Fig. 41). Hind tarsus article length ratio: 8:4:3:2:3. Forewing with areolet petiolate. Second recurrent vein with a single bulla. Nervellus intercepted below middle. Nervulus postfurcal. Propodeal carinae complete (Fig. 31). Area superomedia elongate.

Metasoma. Shiny. First metasomal tergum width to length ratio 0.6; with shallow median longitudinal impression; bordered by lateral longitudinal carinae, median longitudinal carina defined at base. Ovipositor straight, without notch, syringe –like, extra heavy at base, not stout dorsally (Fig. 1).

Color. Face, malar space, temple, base of antenna, tegulae, edges of propleuron, mesopleuron, legs, scutellum, 3d and 8th metasomal tergum, hind part of second and other tergum laterally yellow (Fig. 53b). Remainder black.

Comments. This species differs from the similar *L. barroni* Reshchikov sp. nov. by ovipositor not stout dorsally (Fig. 1); mesosoma not wide, with mesopleuron not projecting; area superomedia elongate (Fig. 31); second metasomal tergum almost as wide as long, sculptured. Ovipositor without notch (Fig. 1) as distinct from *L. scutellatus* (Ashmead, 1890).

Variation. Scutellum of paratype from Cleveland, South Carolina. dark.

Etymology. The species epithet, *syringe*, refers to structure of ovipositor.

Host. Unknown

Distribution. USA: SC; GA

Type material examined. Holotype, female, GA, Forsyth, Malaise Trap, 12–16.vi.1970, F.T. Naumann (AEI); Paratypes: 1 female, GA, Forsyth, Malaise Trap, 12–16.vi.1970, F.T. Naumann, (AEI); 1 female, SC, Cleveland, 18.ix.1975, G.F. Townes, (AEI).

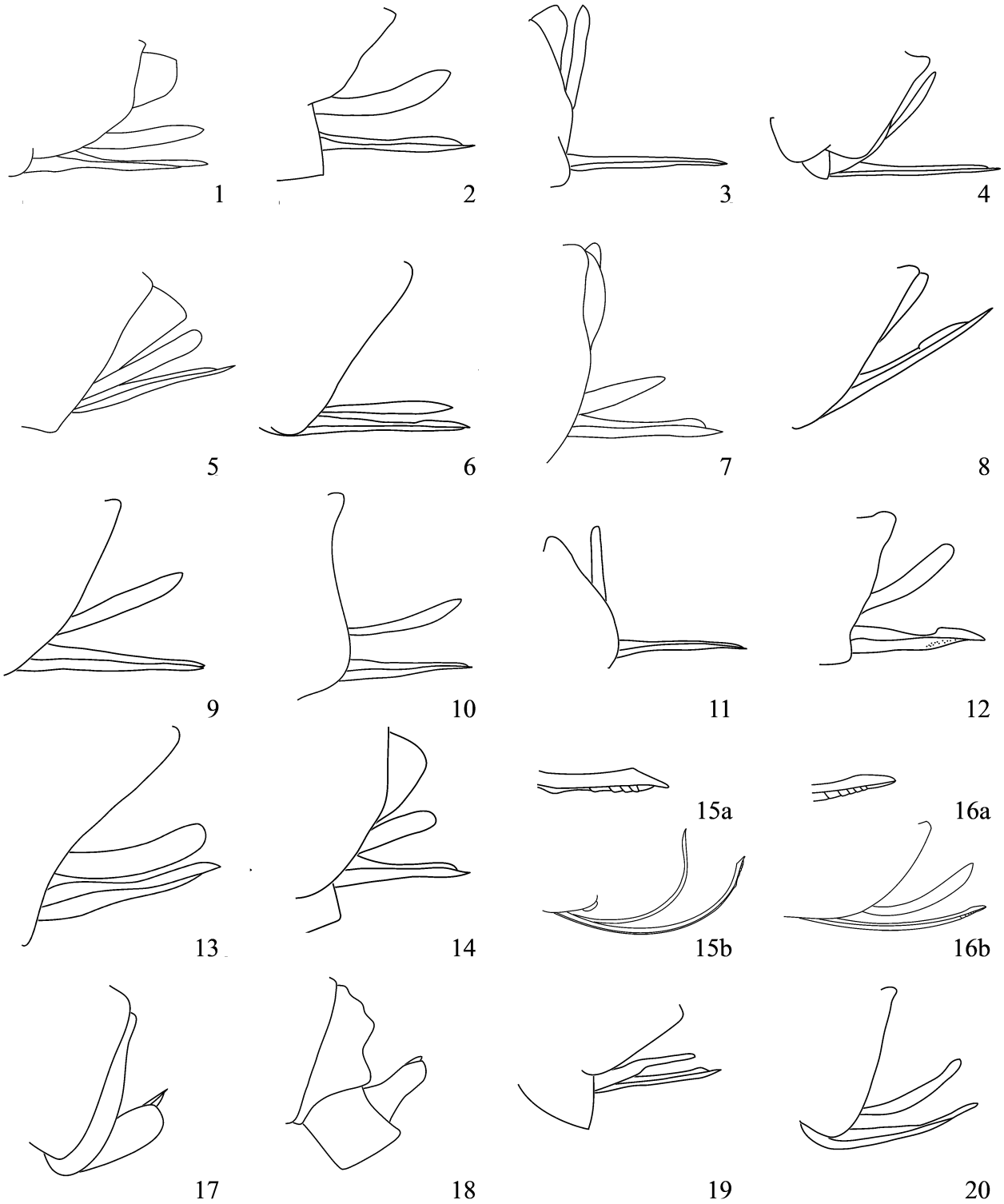
***Lathrolestes barroni* Reshchikov sp. nov.**

Description. Female. Body length 4.0–5.0 mm. Antennal flagellum with 27 articles. Width to length ratio of scapus 0.53. Head narrowed behind the eyes, mat. Maximal length of temple to transverse eye diameter ratio 0.63; minimal length of temple to transverse eye diameter ratio 0.43. Face as wide as longitudinal eye diameter; in profile convex, with bulge. Clypeus separated from face by transverse impression; at apex projecting slightly anteriorly; apical margin of clypeus moderately thick. Clypeal foveae small. Malar space as wide as 0.27 of basal mandible width (Fig. 54a). Occipital carina complete, not interrupted above. Lower mandible tooth longer than upper.

Mesosoma. Notaulus shallow, impressed at base. Mesosoma very wide, protruding laterally. Lower part of mesopleuron without punctures, mat, meshed. Tarsal claws pectinate (Fig. 42). Hind tarsus article length ratio: 9:4:3:2:3. Forewing with areolet petiolate. Second recurrent vein with a single bulla. Nervellus intercepted below middle. Nervulus interstitial or slightly postfurcal. Propodeal carinae complete (Fig. 32). Area superomedia as long as wide.

Metasoma. Shiny. First metasomal tergum width to length ratio 0.7; with shallow median longitudinal impression; bordered by lateral and median longitudinal carinae. Ovipositor straight, stout dorsally, without notch (Fig. 2).

Color. Face, malar space, temple, base of antenna (Fig. 54a), tegulae, edges of propleuron and lower part of mesopleuron, scutellum, fore and middle legs, hind coxa and femur, hind margin of metasomal tergum, metasomal tergum 3–6 laterally, 8th metasomal tergit yellow (Fig. 54b). Remainder black.



FIGURES 1–20. Apex of gaster, showing last tergum and sternite, ovipositor and sheaths. Scale 0.50 mm. 1, *L. syringe** Reshchikov; 2, *L. barroni** Reshchikov; 3, *L. fissus** Reshchikov; 4, *L. thomsoni** Reshchikov; 5, *L. soperi** Reshchikov; 6, *L. scutellatus* (Ashmead); 7, *L. breviremus* Barron; 8, *L. planus* Barron; 9, *L. platynus* (Davis); 10, *L. clavipes* Barron; 11, *L. euryremus* Barron; 12, *L. protenus* Barron. ; 13, *L. tomostethi* (Cushman); 14, *L. erugatus* Barron; 15, *L. ensator* (Brauns); 16, *L. caudatus* (Thomson); 17, *L. constrictus* (Provancher); 18, *L. profenusae* Barron; 19, *L. ochraceus* Barron; 20, *L. carinatus* Barron. (*) Holotype.

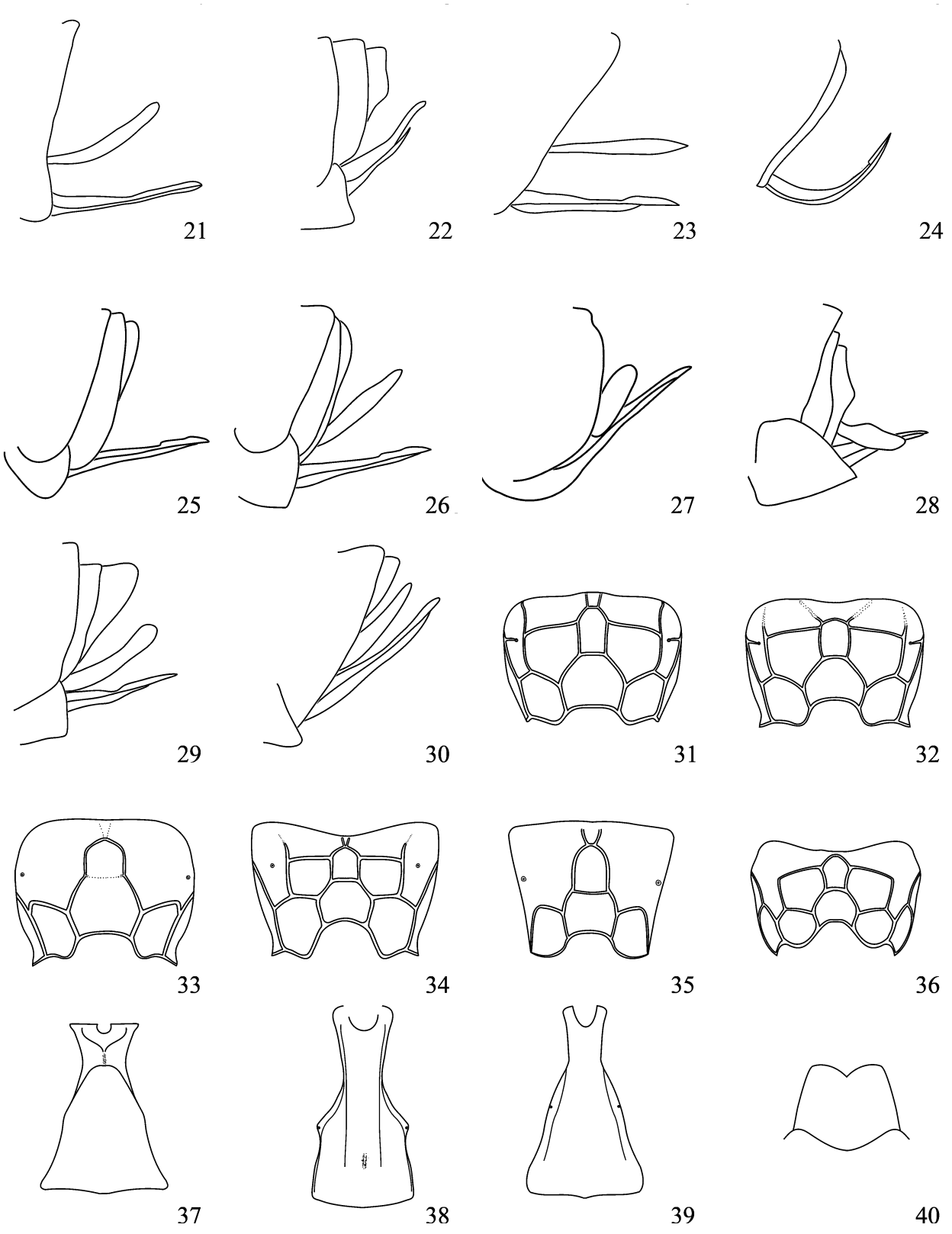


FIGURE 21–40. 21–30. Apex of gaster, showing last tergum and sternite, ovipositor and sheaths. Scale 0.50 mm. 21, *L. bulbus* Barron; 22, *L. periclistae* Barron; 23, *L. luteolator* (Gravenhorst); 24, *L. mnemonicae* (Rohwer);. 25, *L. aquilus* Barron; 26, *L. convexus* Barron; 27, *L. gibbosus* Barron; 28, *L. pictus* Cushman; 29, *L. protrusus* Barron; 30, *L. truncatus* (Provancher). **Figures 31–36.** Propodeum, dorsal view. 31, *L. syringe** Reshchikov; 32, *L. barroni** Reshchikov; 33, *L. fissus** Reshchikov; 34, *L. thomsoni** Reshchikov; 35, *L. soperi** Reshchikov; 36, *L. zeugophorea* Barron; **Figures 37–40.** First metasomal tergum: 37, *L. fissus** Reshchikov; 38, *L. thomsoni** Reshchikov; 39, *L. soperi** Reshchikov; Male subgenital plate: 40, *L. fissus** Reshchikov. (*) Holotype.

Comments. This species differs from the closely related *L. syringe* Reshchikov **sp. nov.** by ovipositor being stout dorsally (Fig. 2); mesosoma rather wider, with projecting mesopleuron; area superomedia as long as wide (Fig. 32); 2nd metasomal tergum transverse, with smooth and shiny surface. Ovipositor without notch (Fig. 2) as distinct from *L. scutellatus* (Ashmead, 1890).

Etymology. Named in honor of John Barron, Canadian researcher, who described many species of the family Ichneumonidae and previously revised the genus *Lathrolestes.*

Host. Unknown

Distribution. Canada: Quebec, Ontario

Type material examined. Holotype, female, Hull, Quebec, Canada, 10.viii.1965, (CNC); Paratypes: female, St. Lawrence Is. Nat. Park Ontario, Canada, 01.ix.1976, A. Carter (CNC).

Lathrolestes fissus Reshchikov sp. nov.

Description. Female. Body length 5.0 mm. Antennal flagellum with 26–31 articles. Width to length ratio of scapus 0.33. Head narrowed behind the eyes, mat. Maximal length of temple to transverse eye diameter ratio 0.8; minimal length of temple to transverse eye diameter ratio 0.48. Face almost as wide as longitudinal eye diameter, their ratio 1.07; in profile convex, with bulge. Clypeus separated from face by transverse impression; at apex projecting slightly anteriorly; apical margin of clypeus moderately thick. Clypeal foveae small. Malar space as wide as 0.33 of basal mandible width (Fig. 55a). Occipital carina complete, not interrupted above. Lower mandible tooth longer than upper.

Mesosoma. Notaulus absent. Mesopleuron without punctures, mat, shagreen. Tarsal claws short, strongly curved at apex, with basal lobe (Fig. 43). Hind tarsus article length ratio: 5.0:2.0:1.6:1.0:1.7. Forewing with areolet petiolate. Second recurrent vein with a single bulla. Nervellus intercepted below middle. Nervulus interstitial. Propodeal carinae partly complete (Fig. 33). Costula absent.

Metasoma. Partly shiny, pubescent with white hairs. First metasomal tergum width to length ratio 0.8; without shallow median longitudinal impression; bordered by lateral longitudinal carinae; median longitudinal carinae absent; with shiny area at base separate from punctate part, with median longitudinal groove (Fig. 37). 2nd metasomal tergum transverse. Ovipositor straight, thin, very gradually tapered from base to apex, without notch (Fig. 3). Apical margin of male subgenital plate notched (Fig. 40). Male genitalia with parameres not surpassing apex of metasoma.

Color. Female. Body yellow-reddish; fore coxae and trochanters yellow; antennae and ovipositor sheath dark. Male. Face yellow. Otherwise as in female (Fig. 55a, b).

Comments. The species differs from the closely related *L. thomsoni* Reshchikov **sp. nov.** by its mostly yellowish body (Fig. 55b); costula absent (Fig. 33); face with bulge; lower part of mesopleuron shagreen; first metasomal tergum without projections at spiracles. Hind tibia uniformly colored as distinct from European *L. albicinctus* (Habermehl, 1922). Tarsal claws short, strongly curved at apex, with preapical teeth (Fig. 43)

Variation. Body of some specimens darker than type specimens.

Etymology. The species epithet, *fissus*, refers to structure of first metasomal tergum.

Host. Unknown

Distribution. USA: NC, GA, FL

Type material examined. Holotype, female, GA, Forsyth, 12–16.vi.1970, F.T. Naumann, (AEI); Paratypes (AEI): 1 female, FL, Gainesville, SW 34th St., Malaise Trap, 2.x.1985, Brambila; 1 male, Tall Timbers, 2–12.vi.1971, R.H. Arnett; 1 female, NC, Highlands, vi.1977, H&M Townes; 1 female, GA, Forsyth, 28.v.–9.vi.1970, F.T. Naumann

Lathrolestes thomsoni Reshchikov sp. nov.

Description. Female. Body length 5.0 mm. Antennal flagellum with 24–27 articles. Width to length ratio of scapus 0.47. Head narrowed behind the eyes, mat. Maximal length of temple to transverse eye diameter ratio

0.63; minimal length of temple to transverse eye diameter ratio 0.26. The ratio of the width of the face to the longitudinal diameter of the eye 0.82; convex, without bulge. Clypeus separated from face by impression; at apex projecting slightly anteriorly; apical margin of clypeus moderately thick. Clypeal foveae small. Malar space as wide as 0.36 of basal mandible width (Fig. 56a). Occipital carina complete, not interrupted above. Lower mandible tooth longer than upper.

Mesosoma. Notaulus slightly impressed. Lower part of mesopleuron without punctures, mat, rugose. Tarsi with apical article very slightly enlarged. Tarsal claws short, strongly curved at apex (Fig. 44). Hind tarsus almost as long as hind tibia; each article length ratio 10:5:4:2:4. Forewing with areolet petiolate. Second recurrent vein with a single bulla. Nervellus intercepted below middle. Nervulus interstitial. Propodeal carinae complete (Fig. 34).

Metasoma. Mat, with sparse white hairs. First metasomal tergum width to length ratio 0.62; without shallow median longitudinal impression; bordered by lateral longitudinal carinae; median longitudinal carinae defined at base; with projections at spiracles (Fig. 38). Second metasomal tergum transverse. Ovipositor straight, thin, very gradually tapered from base to apex, without notch (Fig. 4). Male genitalia with parameres slightly surpassing apex of metasoma.

Color. Female. Body black; Face, malar space and temple reddish-yellow; base of antennae, tegulae, legs (except base and apex of hind tibia and tarsi); base and apex of hind tibia, 5th article of fore tarsi, middle and hind tarsi brownish; metasomal tergum brown with reddish-yellow maculae on sides. Male. Face, clypeus, malar space, lower part of temple, base of antennae, edge of propleuron entirely, fore and hind edges pronotum, prepectus partly or entirely and tegulae yellow. Otherwise as in female (Fig. 56a, b).

Comments. The species differs from the closely related *L. fissus* Reshchikov **sp. nov.** by coloration: mesosoma in female entirely black, propleuron of male yellow; costula present (Fig. 34); face without bulge; lower part of mesopleuron rugose; first metasomal tergum with projections at spiracles. Hind tibia uniformly colored as distinct from European *L. albicinctus* (Habermehl, 1922). From other species differ by tarsal claws short, strongly curved at apex, with basal lobe (Fig. 44)

Variation. Several individuals with very weak shallow median longitudinal impression of first metasomal tergum.

Etymology. Named in honor of Carl Gustaf Thomson, Sweden researcher, author of many works on Hymenoptera, who described more than thousand species of the family Ichneumonidae including 6 species of the genus *Lathrolestes.*

Host. Reared from *Profenusa thomsoni* (Konow, 1886) on *Betula papyrifera*

Distribution. Canada: AB, NB, NT; USA: AK, MA

Type material examined. Holotype, female, AB, Edson, Canada, 8.vii.-6.viii.2007, ex. from *Profenusa thomsoni*, A. Soper, (USNM); Paratypes: 4 females, 3 males, AB, Edson, Canada, 8.vii.-6.viii.2007, ex. from *Profenusa thomsoni*, A. Soper, (USNM); 2 females, 2 males, AB, Edson, Canada, 8.vii.-6.viii.2007, ex. from *Profenusa thomsoni*, A. Soper, (AEI); 2 females, 2 males, AB, Edson, Canada, 8.vii.-6.viii.2007, ex. from *Profenusa thomsoni*, A. Soper, (CNC); 2 females, 2 males, AB, Edson, Canada, 8.vii.-6.viii.2007, ex. from *Profenusa thomsoni*, A. Soper, (ZIN RAS); 2 females, AB, Edmonton, Bearspaw, Canada 19.vii.2007, A. Soper (CNC); 2 males, NT, Hay River, Canada, on *Betula sp*., 17–20.vii.2007, S. Digweed, (CNC); 4 males, AB, Edmonton, Canada, 11.vii.1994, S. Digweed, (CNC); 2 females, NB, Kouchibouguac National Park, 30.viii.1977, S.J. Miller, (CNC).

***Lathrolestes soperi* Reshchikov sp. nov.**

Description. Female. Body length 5.0 mm. Antennal flagellum with 26 articles. Width to length ratio of scapus 0.75. Head not narrowed behind the eyes, mat. Maximal length of temple to transverse eye diameter ratio 0.86; minimal length of temple to transverse eye diameter ratio 0.57. The ratio of the width of the face to the longitudinal diameter of the eye 0.92; convex, with bulge. Clypeus separated from face by transverse groove (Fig. 57a); at apex projecting slightly anteriorly; apical margin of clypeus moderately thick. Clypeal

foveae small. Malar space as wide as 0.3 of basal mandible width. Occipital carina complete, not interrupted above. Lower mandible tooth longer than upper.

Mesosoma. Notaulus distinctly impressed. Lower part of mesopleuron without punctures, mat, rugose. Tarsal claws with three teeth (Fig. 45). Hind tarsus articles length ratio 10:5:4:2:4. Forewing with areolet petiolate. Second recurrent vein with a single bulla. Nervellus intercepted below middle. Nervulus interstitial. Propodeal carinae partly complete: area basalis and area superomedia present, costula absent (Fig. 35).

Metasoma. Mat, with sparse white hairs. First metasomal tergum about tree times as long as broad, without shallow median longitudinal impression; bordered by lateral longitudinal carinae; median longitudinal carinae very short, impressed at base (Fig. 39). Second metasomal tergum transverse. Ovipositor straight, thin, very gradually tapered from base to apex, without notch (Fig. 5). Male genitalia with parameres slightly surpassing apex of metasoma.

Color. Female. Body black. Mandibles, base of antennae, legs (except brown 5th article of fore tarsus, apex of middle tibia and middle tarsus, hind femur, tibia and tarsus), lateral part of 2nd metasomal segment and almost completely 3rd metasomal segment yellowish. Stigma brownish (Fig. 57b). Male as in female.

Comments. Differs from the closely related *L. nigricollis* (Thomson, 1883) (Figs 58a, b) and *L. dentatus* Barron, 1994 by coloration: head and mesosoma entirely black except mandibles, palpi and tegulae; partly complete carinae of propodeum (area basalis and area superomedia present but costula absent) (Fig. 35). Clypeus small. Malar space short, as wide as 0.3 of basal mandible width. Lower part of mesopleuron mat, rugose, not punctate,.

Etymology. Named for Anna Soper, University of Massachusetts, the original collector of the species.

Host. *Profenusa thomsoni* (Konow, 1886).

Distribution. USA: AK

Type material examined. Holotype, female, Javier de la Vega Park, Anchorage, AK, USA, 23.vii.2007, A. Soper (USNM); Paratypes: two males, one females, Javier de la Vega Park, Anchorage, AK, USA, 23.vii.2007, A. Soper (USNM).

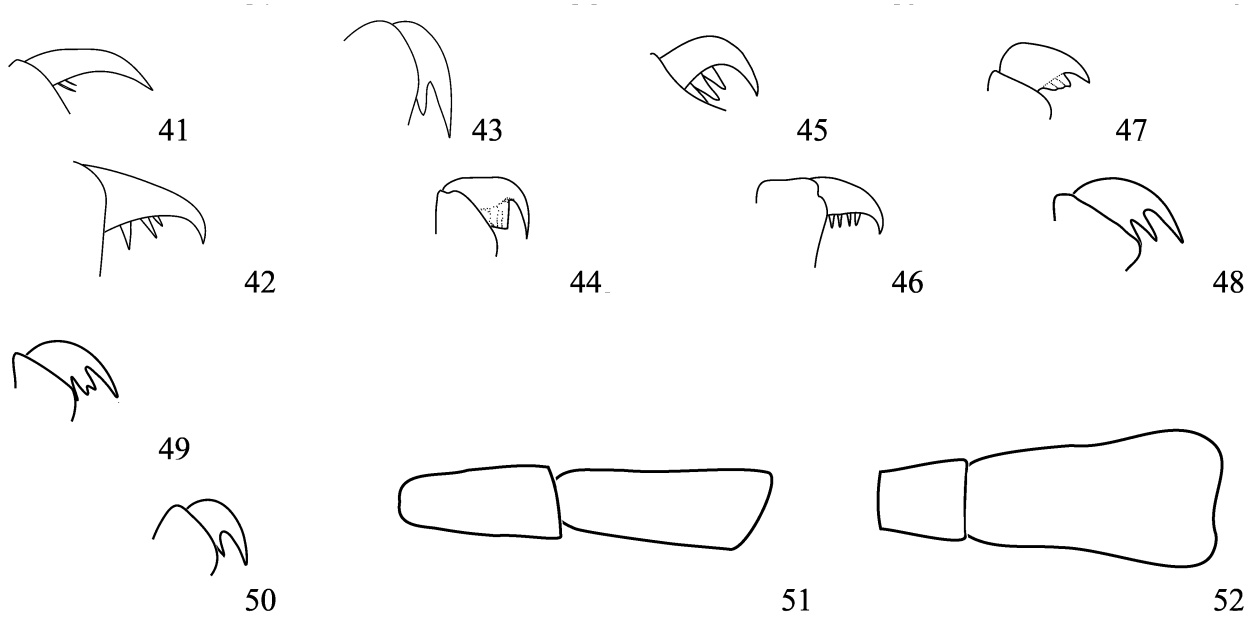
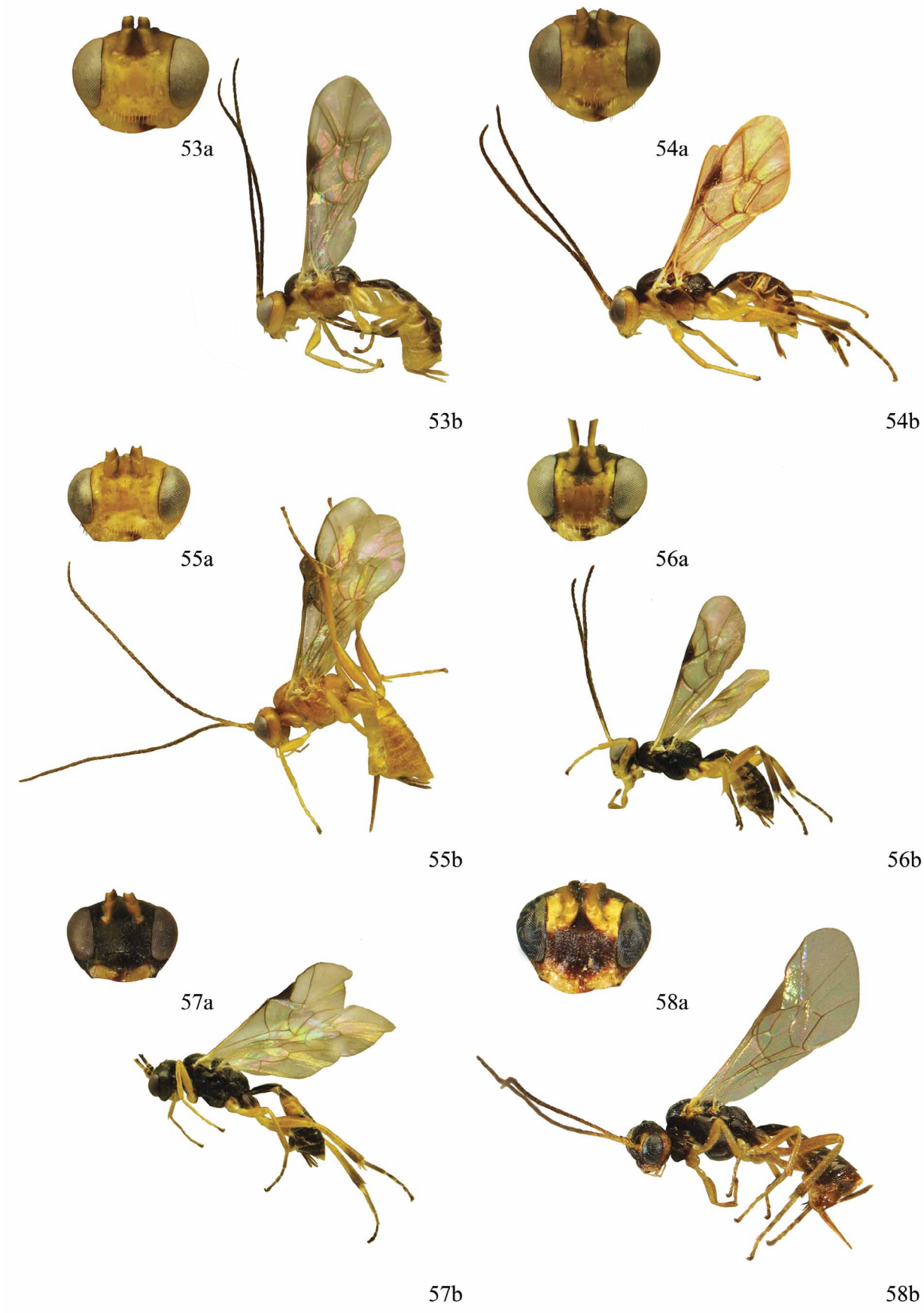


FIGURE 41–52. 41–50. Tarsal claws: 41, *L. syringe** Reshchikov; 42, *L. barroni** Reshchikov; 43, *L. fissus** Reshchikov. (*); 44–52. Tarsal claws: 44, *L. thomsoni** Reshchikov; 45, *L. soperi** Reshchikov; 46, *L. platynus* (Davis); 47, *L. nigricollis* (Thomson); 48, *L. mnemoniacae* (Rohwer) (from Barron, 1994); 49, *L. dentatus* Barron (from Barron, 1994); 50, *L. clavipes* Barron (from Barron, 1994); **Figures 51, 52.** Last tarsal articles: 51, *L. nigricollis* (Thomson); 52, *L. zeugophorea* Barron. (*) Holotype..



FIGURES 53–58. Habitus and faces: 53, *L. syringe* * Reshchikov; 54, *L. barroni** Reshchikov; 55, *L. fissus** Reshchikov; 56, *L. thomsoni** Reshchikov; 57, *L. soperi** Reshchikov; 58, *L. nigricollis* (Thomson, 1883). (*) Holotype.

***Lathrolestes scutellatus* (Ashmead, 1890) stat. rev.**

Prionopoda scutellata Ashmead, 1890, Holotype, female, USNM
Homalomma eriocampoides Rohwer, 1915, Holotype, female, USNM
Homalomma caliroae Rohwer, 1915, Holotype, female, USNM

This species was synonymized with *Lathrolestes luteolator* (Gravenhorst, 1829) by Barron (1994) i.q. *Homalomma eriocampoides* Rohwer, 1915 and *H. caliroae* Rohwer, 1915.

The holotype specimens of these species are similar to that of European *L. luteolator* (Gravenhorst, 1829) but differ from the latter by the sculpture and punctation of the mesopleuron. Specimens of *L. scutellatus* (Ashmead, 1890) from AEI and CNC show variation in sculpture and punctation of the mesopleuron and coloration but nevertheless individuals of *L. scutellatus* (Ashmead, 1890) never have shiny smooth surface of mesopleuron and deep distinct punctures. *L. scutellatus* (Ashmead, 1890) **stat. nov.** reestablished here as a valid species.

***Lathrolestes zeugophorae* Barron, 1994**

Lathrolestes zeugophorae Barron, 1994, Holotype, female, (CNC)

The type specimen has propodeal carinae complete, with the costula present (Fig. 36). There is mistake in original description (Barron, 1994) in this character state. Some additional description is provided here. Head not narrowed behind the eyes. Malar space as wide as 0.8 of basal mandible width. Mesopleuron granulate. 5th article of tarsus enlarged (Fig. 52). Ovipositor straight.

***Lathrolestes mnemonicae* (Rohwer, 1914)**

Sympherta mnemonicae Rohwer, 1914, Holotype, female, Falls Church, Virginia (SI).
Lathrolestes mnemonicae; Cushman, 1933; Carlson, 1979

In addition to the previous description of this species, we note that this species is rather close to the European *L. clypeatus* (Zetterstedt, 1838). It differs from the latter species by a wider and shorter clypeus; pale apical margin of clypeus and maculae on the sides adjacent antenna; tarsal claws more strongly curved at apex, apical tooth longer than two preapical teeth (Fig. 48). Ovipositors of both species are similar (Fig. 24). There is variation in coloration in specimens from the CNC, which resemble *L. clypeatus* (Zetterstedt, 1838). Most likely, *L. mnemonicae* (Rohwer, 1914) is a Nearctic subspecies of *L. clypeatus* (Zetterstedt, 1838). These two species are also similar in the hosts they attack, leafmining Lepidoptera of the family Eriocraniidae. *Lathrolestes mnemonicae* (Rohwer, 1914) attacks *Dyseriocrania auricyanea* (Walsingham, 1882) and *D. griseocapitella* (Walsingham, 1898); *L. clypeatus* (Zetterstedt, 1838) attacks members of the genus *Eriocrania.*

***Lathrolestes caudatus* (Thomson, 1883)**

Lathrolestus caudatus, Thomson, 1883, type lost.
Lathrolestus pleuralis Thomson, 1883. ex. syn.; Hinz, 1996.
Lathrolestus nasoni Davis, 1897, Holotype, male, Algonquin, IL, (ANSP) **syn. nov.**
Lathrolestus similis Davis, 1897, Holotype, female, Colorado, (ANSP); Barron, 1994; Aubert, 2000.

In regards its main character states, the holotype of *L. nasoni* Davis, 1897 is fully similar to *L. caudatus* (Thomson, 1883). Consequently, *L. nasoni* Davis, 1897 is proposed as a new junior synonym for *L. caudatus*

(Thomson, 1883). Ovipositors of both these taxa are long, slightly curved up, with apical teeth. There is a slight difference in coloration in Nearctic and Palearctic specimens: Nearctic individuals have reddish-brown clypeus; propodeum varying from black to reddish-brown; Palearctic specimens with black clypeus and propodeum. This species was recorded as parasitoid of *Ardis brunniventris* (Hartig, 1837) on *Rosa rugosa* in Europe (Evenhuis, 1973).

DNA sequences

A total of eleven sequences were obtained from three species: four sequences of *L. nigricollis*, four of *L. soperi*, and three of *L. thomsoni*. The sequences generated for this study are deposited in GenBank under Accession Nos. GQ325434–GQ325444. The *Lathrolestes nigricollis* haplotypes differed from the *Lathrolestes soperi* haplotypes by 7.2–7.4% and from *Lathrolestes thomsoni* haplotypes by 11.2–11.8%. The *Lathrolestes soperi* haplotypes differed from *Lathrolestes thomsoni* haplotypes by 12.6-13.0%. Intraspecific variation was less than 0.15%. The smaller difference between *L. soperi* and *L. nigricollis* as compared to with *L. thomsoni*, matched the diagnosis of these species developed on morphological grounds.

Final comments

To support the biological control of an invasive leafminer (*P. thomsoni*) in Alaska, we clarified the status of *Lathrolestes* species reared from this species and other birch-mining tenthredinids in North America. We reviewed all type material for the genus in Europe and North America and developed an improved key to the Nearctic species. We reestablished *L. scutellatus* as a valid species, and determined that older North American museum specimens marked as *L. luteolator* belong to this species. Parasitoids reared more recently from *P. thomsoni* in western Canada or Alaska, also recorded in the literature as *L. luteolator,* were found to be an undescribed species that we describe here as *L. thomsoni*. We also described as new four other species – *L. soperi* from *P. thomsoni* in Alaska and *L. syringe, L. barroni*, and *L. fissus*. DNA sequences from larvae of the three *Lathrolestes* species (*L. soperi, L. thomsoni* and *L. nigricollis*) associated with North American birch-mining sawflies were determined and incorporated into Genbank in assist in future identification of larval specimens. These activities have clarified the identities of the parasitoids most likely to be recovered in studies of the biological control of North American tenthredinid leafminers.

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