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Genus *Hydrosmecta* C. G. Thomson: a review of species occurring in eastern Canada (Coleoptera, Staphylinidae, Aleocharinae)

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Genus *Hydrosmecta* C. G. Thomson: a review of species occurring in eastern Canada (Coleoptera, Staphylinidae, Aleocharinae)

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Abstract. Species of *Hydrosmecta* C. G. Thomson, occurring in eastern Canada, are studied and reviewed. Six species are recognized, and two of them are described as new to science. The new species are: *Hydrosmecta canadensis* Webster and Klimaszewski, **new species**, and *Hydrosmecta minutissimoides* Webster and Klimaszewski, **new species**. Two species described in the USA are recorded from Canada and New Brunswick for the first time: *Hydrosmecta caduca* Casey and *Hydrosmecta dulcis* Casey. New distribution and collection data, diagnoses, a key for species identification, and images of habitus and genital structures are provided. *Hydrosmecta newfoundlandica* Klimaszewski and Langor, 2011, is transferred to the genus *Atheta* Thomson based on morphology of genital structures.

Key Words. North America, riparian habitats, rove beetles.

Introduction

The genus *Hydrosmecta* was described by Thomson (1858) for Palaearctic species. In North America, the first species of this genus was described from California by Bernhauer (1906), originally in *Atheta* (*Parameotica*). Later, Casey (1910, 1911) described eleven species, one each from New York and Wisconsin, eight from California, and one from Mexico (Table 1). Although originally described in *Hydrosmecta* “provisionally” because of some *Hydrosmecta*-like characters, Casey (1910, 1911) noted that six of these actually belonged “near *Atheta*” or in “the *Athetid* series”. Fenyés (1920) also placed these in *Atheta* (incertae sedis), which is how they are treated here (Table 1). Therefore, only six from Casey’s (1910, 1911) original descriptions may be considered as valid in *Hydrosmecta*. Fenyés (1921) described one species in *Hydrosmectina*, which is now treated as *Hydrosmecta*. Notman (1921) added two new species from New York. Our effort to borrow the type specimens of these two species from the Staten Island Museum at Snug Harbor, NY, failed because nobody could locate the types there, and they are presumably lost. Lohse (1990) described one currently valid species from the Yukon, which has subsequently been recorded elsewhere in Canada. In this publication, we describe two new species of *Hydrosmecta* from New Brunswick and record *H. caduca* Casey and *H. dulcis* Casey for the first time from Canada in New Brunswick. Klimaszewski and Langor, in Klimaszewski et al. (2011) described two new species of *Hydrosmecta*. One of them, *Hydrosmecta newfoundlandica* Klimaszewski and Langor, is transferred here to the genus *Atheta* (**new combination**). Its affiliation with *Hydrosmecta* was based on convergent external body characters, but the genital structures are typical for *Atheta*. As it currently stands, there are 20 nominal Nearctic species of *Hydrosmecta*, six of Casey’s species are of uncertain generic status (most likely representing

Table 1. Checklist of *Hydrosmeeta* species in North America. Current names of valid species in *Hydrosmeeta* are in bold in the right column; current placement is indicated for names removed from the genus.

Original taxon	Author	Distribution	Generic placement
1. <i>Hydrosmeeta benigna</i>	Casey, 1910	CA	In <i>Atheta</i> (<i>Philhygra</i>): Gusarov 2003; in <i>Philhygra</i> here.
2. <i>Hydrosmeeta borealis</i>	Klimaszewski and Langor, in Klimaszewski et al. 2011	NF	<i>Hydrosmeeta borealis</i>
3. <i>Hydrosmeeta caduca</i>	Casey, 1910	NB, NY	<i>Hydrosmeeta caduca</i> : Fenyés 1920; Notman 1921; Leng 1928; Gusarov 2003.
4. <i>Hydrosmeeta callidula</i>	Casey, 1910	CA	<i>Hydrosmeeta callidula</i> ; Gusarov 2003. As closely allied to <i>Atheta</i> : Casey 1910; in <i>Atheta</i> (incertae sedis): Fenyés 1920.
5. <i>Hydrosmeeta canadensis</i>	Webster and Klimaszewski, sp. nov.	NB	<i>Hydrosmeeta canadensis</i>
6. <i>Atheta</i> (<i>Parameotica</i>) <i>delicata</i>	Bernhauer, 1906	CA	In <i>Metaxya</i> : Leng 1920; <i>Hydrosmeeta delicata</i> : Gusarov 2003.
7. <i>Hydrosmeeta depressicola</i>	Casey, 1911	Mexico	Probably not in <i>Hydrosmeeta</i> (s. str): Casey 1911; <i>Hydrosmeeta depressicola</i> : Leng 1920; Gusarov 2003.
8. <i>Hydrosmeeta dulcis</i>	Casey, 1910	NB, WI	<i>Hydrosmeeta dulcis</i> : Fenyés 1920; Leng 1920; Gusarov 2003.
9. <i>Hydrosmeeta fastidiosa</i>	Casey, 1911	CA	<i>Hydrosmeeta fastidiosa</i> : Fenyés 1920; Leng 1920; Gusarov 2003.
10. <i>Hydrosmeeta jugalis</i>	Casey 1910	CA	In <i>Atheta</i> (incertae sedis): Fenyés 1920; in <i>Atheta</i> (<i>Philhygra</i>): Gusarov 2003; in <i>Philhygra</i> here.
11. <i>Hydrosmeectina macra</i>	Fenyés, 1921	CA	In <i>Hydrosmeeta</i> (<i>Hydrosmeectina</i>): Leng 1927; <i>Hydrosmeeta macra</i> : Gusarov 2003.
12. <i>Hydrosmeeta minutissimoides</i>	Webster and Klimaszewski, sp. nov.	NB	<i>Hydrosmeeta minutissimoides</i> .
13. <i>Hydrosmeeta newfoundlandica</i>	Klimaszewski and Langor, in Klimaszewski et al. 2011	NF	<i>Atheta newfoundlandica</i> (new comb.).
14. <i>Hydrosmeeta odiosica</i>	Casey, 1911	CA	<i>Hydrosmeeta odiosica</i> : Fenyés 1920; Leng 1920; Gusarov 2003.
15. <i>Hydrosmeeta pseudodiosica</i>	Lohse in Lohse et al., 1990	NB, ON, YT	<i>Hydrosmeeta pseudodiosica</i>
16. <i>Hydrosmeeta rarula</i>	Casey, 1910	NY	<i>Atheta</i> (incertae sedis): Fenyés 1920; <i>Hydrosmeeta rarula</i> : Leng 1920; Leng 1928. Transferred to <i>Philhygra</i> by Gusarov 2003.
17. <i>Hydrosmeeta salinasica</i>	Casey, 1911	CA	<i>Hydrosmeeta salinasica</i> : Fenyés 1920; Leng 1920, Gusarov 2003.
18. <i>Hydrosmeeta subparilis</i>	Casey, 1910	CA	Generic placement uncertain; “not a typical <i>Hydrosmeeta</i> ”: Casey 1910; in <i>Atheta</i> (incertae sedis): Fenyés 1920; <i>Hydrosmeeta subparilis</i> : Gusarov 2003.
19. <i>Hydrosmeeta tinctoria</i>	Notman, 1921	NY	<i>Hydrosmeeta tinctoria</i> : <i>nomen dubium</i> . Type presumed to be lost.
20. <i>Hydrosmeeta torrida</i>	Notman, 1921	NY	<i>Hydrosmeeta torrida</i> : <i>nomen dubium</i> . Type presumed to be lost.

Atheta or other genera of Athetini), one Canadian species is transferred here to *Atheta*, the two Notman species are considered *nomina dubia* because the types cannot be found, and we thus recognize 13 species of *Hydrosmeeta* in America and one in Mexico as valid (Table 1). The objective of this paper is to publish two new Canadian species and new records of *Hydrosmeeta*, with descriptions/redescriptions and images of body and genital structures, and to provide a key for identification of the Canadian species.

Materials and Methods

All specimens in this study were dissected to examine the genital structures. Extracted genital structures were dehydrated in absolute alcohol, mounted in Canada balsam on celluloid micro-slides, and pinned with the specimen from which they originated. Images of the entire body and the genital structures were taken using an image processing system (Nikon SMZ 1500 stereoscopic microscope; Nikon Digital Camera DXM 1200F, and Adobe Photoshop software).

Morphological terminology mainly follows that used by Seevers (1978). The ventral side of the median lobe of the aedeagus is considered to be the side of the bulbus containing the foramen mediale, the entrance of the ductus ejaculatorius, and the adjacent ventral side of the tubus of the median lobe with the internal sac and its structures (this part is referred to as the parameral side in some recent publications); the opposite side is referred to as the dorsal part.

Depository/institutional abbreviations

- CNCI** Canadian National Collection of Insects, Archnids, and Nematodes, Agriculture and Agri-Food Canada, Ottawa, Ontario, Canada.
LFC Natural Resources Canada, Canadian Forest Service, Laurentian Forestry Centre, R. Martineau Insectarium, Quebec City, Quebec, Canada.
NBM New Brunswick Museum, Saint John, New Brunswick, Canada.
RWC Reginald Webster Collection, Charters Settlement, NB, Canada.
SIM Staten Island Museum at Snug Harbor, NY, USA.
USNM United States National Museum, Washington, DC, USA.

USA state abbreviations follow those of the US Postal Service. Canadian provincial abbreviations used in the text are:

- NB** New Brunswick
NF Newfoundland
ON Ontario
YT Yukon Territory

Genus *Hydrosmeeta* C. G. Thomson, 1858

(Seevers 1978; Lohse et al. 1990; Ashe 2000)

Diagnosis. Body length 1.4–3.0 mm; slender, narrow, parallel-sided, subdepressed; light to dark brown; antennae long, reaching pronotal base or slightly shorter, antennomeres VI–X elongate or may be subquadrate to slightly transverse in some; head subquadrate with moderate to large eyes, postocular area long; pronotum about as wide as elytra, subquadrate to transverse, pubescence directed latero-cranial and latero-caudad from median line of disc; elytra flattened, elongate, at suture as long as or distinctly longer than pronotum, shoulders angular, pubescence directed straight or obliquely latero-caudad; abdomen subparallel; mesocoxae contiguous; meso- and metaventrite process short; tergite VII distinctly longer than VI; tubus of median lobe of aedeagus simple or with narrow basal process, athetine bridge narrow, bulbus large, with crista apicalis on triangularly shaped projection; spermatheca either S-shaped or irregularly twisted, capsule spherical, stem elongate and coiled or twisted posteriorly. Riparian species associated with gravel and sand along stream margins.

Key to Species of *Hydrosmecta*

1. Body length 1.5–1.6 mm; antennomeres VII–X moderately transverse (Fig. 32).....
 ***H. minutissimoides* Webster and Klimaszewski, new species**
- Body length over 1.6 mm; antennomeres VII–X subquadrate to slightly or distinctly elongate (Fig. 1, 9, 17, 25, 39) **2**
- 2(1). Antennomere XI as long as two preceding antennomeres combined or slightly shorter (Fig. 9, 17); pronotum trapezoidal (Fig. 9, 17) **3**
- Antennomere XI distinctly shorter than two preceding antennomeres combined (Fig. 1, 25, 39); pronotum subrectangular (Fig. 1, 25, 39) **4**
- 3(2). Body length 2.0–2.1 mm; apical antennomere on average more elongate, at least two times as long as two preceding antennomeres combined (Fig. 17); median lobe of aedeagus with basal projection of bulbus shorter, distinctly separated from tubus in lateral view (Fig. 18); median part of tubus subparallel in dorsal view (Fig. 19); spermathecal coils less tight (Fig. 24)
 ***Hydrosmecta canadensis* Webster and Klimaszewski, new species**
- Body length 1.9–2.0 mm; apical antennomere on average less elongate, slightly less than two preceding antennomeres combined (Fig. 9); median lobe of aedeagus with basal projection of bulbus slightly longer, narrowly separated from tubus in lateral view (Fig. 10); median part of tubus strongly constricted in dorsal view (Fig. 11); spermathecal coils tighter (Fig. 16).....
 ***Hydrosmecta caduca* Casey**
- 4(2). Body broad (Fig. 1); pronotum wider than length of elytra at suture, its lateral margins arcuate, microsculpture coarse, punctation moderately dense (Fig. 1); median lobe of aedeagus and spermatheca as illustrated (Fig. 2, 3, 8)
 ***Hydrosmecta borealis* Klimaszewski and Langor**
- Body narrow (Fig. 25, 39); pronotum about as wide as length of elytra at suture, its lateral margins subparallel, microsculpture fine, punctation dense (Fig. 25, 39); median lobe of aedeagus and spermatheca not as above **5**
- 5(4). Antennomeres VII–IX distinctly elongate (Fig. 39); apical margin of female sternite VIII emarginate medially (Fig. 45); spermatheca and median lobe of aedeagus as illustrated (Fig. 40, 41, 46, 47) ***Hydrosmecta pseudodiosica* Lohse**
- Antennomeres VII–IX moderately elongate (Fig. 25); apical margin of female sternite VIII not emarginate medially (Fig. 30); spermatheca and median lobe of aedeagus as illustrated (Fig. 26, 31) ***Hydrosmecta dulcis* Casey**

***Hydrosmecta borealis* Klimaszewski and Langor**

(Fig. 1–8)

Hydrosmecta borealis Klimaszewski and Langor, in Klimaszewski et al. 2011: 162.

Diagnosis. Body length 2.3–2.5 mm; subparallel, flattened, light brown to dark brown with antennae, legs and elytra slightly paler and reddish brown; moderately glossy, with fine, moderately dense punctation and faint meshed microsculpture on forebody (Fig. 1); head as wide as pronotum, with large and protruding eyes; antennae moderately robust, antennomere IV subquadrate and V–X slightly elongate; pronotum widest at middle, as wide as head and abdomen but narrower than elytra; elytra strongly elongate and flattened, at suture about 1.2 times as long as pronotum; abdomen subparallel, slightly narrowed apically. **Male:** tergite VIII truncate apically (Fig. 4); sternite VIII arcuate apically (Fig. 5); median lobe of aedeagus with narrow bulbus and wide tubus in dorsal view (Fig. 3), in lateral view apex of tubus truncate (Fig. 2), internal sac as illustrated (Fig. 2, 3). **Female:** tergite VIII arcuate apically (Fig. 6); sternite VIII broadly rounded apically (Fig. 7); spermatheca S-shaped (Fig. 8).

Distribution. Origin: Nearctic. **Canada:** NF. **USA:** not recorded.

Collection and habitat data. Habitat: not recorded but probably riparian habitats as in other members of the genus. **Collecting period:** V. **Collecting method:** not recorded.

Comments. This species is easily distinguishable externally from *H. pseudodiosica* and *H. dulcis*, which have similarly shaped antennae, in having larger body and longer and wider elytra. Spermatheca of *H. borealis* is similar to that of *H. dulcis* but has slightly different shape of capsule and more tightly curved stem (Fig. 8). Externally, the female holotype of *H. borealis* agrees with characteristics of the genus *Hydrosmecta* but males are needed for confirmation. The median lobe of the aedeagus has some unique features and likely was slightly damaged. More males are needed for study to confirm the morphology of the median lobe of the aedeagus and their affiliation with this species.

Hydrosmecta caduca Casey

(Fig. 9–16)

Hydrosmecta caduca Casey 1910: 87.

Lectotype (male): New York [Catskill Mts. in original description]; *caduca* Csy. [Casey]; Type USNM 39085; Casey bequest 1925; Lectotypus: *Hydrosmecta caduca* Casey, V.I. Gusarov 2000 (USNM) male, with aedeagus missing. Present designation.

New Canadian records: Canada, New Brunswick: Queens Co., Bayard, at Nerepis River, 45.4426°N, 66.3280°W, 25.V.2008, R.P. Webster // river margin, under small rocks in gravel (LFC) 2 males, 3 females (NBM) 1 male (RWC) 1 male, 1 female; Bayard, at Nerepis River, 45.4426°N, 66.3280°W, 30.V.2008, R.P. Webster // river margin, under small rocks in gravel (LFC) 1 female (RWC) 1 male; Bayard, at Nerepis River, 45.4426°N, 66.3280°W, 7.VI.2017, R.P. Webster // river margin, in gravel near water (NBM) 1 female; Canning, Grand Lake, Goat Island, 46.0110°N, 66.0133°W, 8.VIII.2007, R.P. Webster // Lakeshore, on cobblestone beach, under cobblestone in moist sand (LFC) 1 male; Restigouche Co., Jacquet River Gorge, 47.8257°N, 66.0779°W, 14.V.2010, R.P. Webster // partially shaded cobblestone bar near outflow of brook, cobblestones and gravel on sand (LFC) 1 male, 2 females (RWC) 2 males; Carleton Co., Belleville, Meduxnekeag Nature Preserve, 46.1942°N, 67.6832°W, 9.VI.2008, R.P. Webster // river margin, among small cobblestones set in sand and fine gravel near water's edge (LFC) 1 male (RWC) 3 females; Belleville, Meduxnekeag Nature Preserve, 46.1942°N, 67.6832°W, 11.VI.2008, R.P. Webster //river margin, under cobblestones set in sand with grass roots (LFC) 1 male.

Diagnosis. Body length 1.9–2.0 mm; subparallel, flattened, light brown with head and abdomen dark brown, legs and basal antennomeres yellow; moderately glossy, with fine and dense punctation and pubescence; faint meshed microsculpture present on forebody (Fig. 9); head as wide as pronotum, post-ocular area about as long as diameter of eye, posterior angles rounded; eyes moderately large; antennae long, reaching posterior margin of elytra, all antennomeres distinctly elongate, antennomere XI about as long as two preceding antennomeres combined; pronotum subquadrate, widest in apical third, as wide as head and abdomen but narrower than elytra, slightly depressed medially; elytra elongate and flattened, at suture slightly longer than pronotum; abdomen subparallel, slightly narrowed apically. **Male:** apical margin of tergite VIII sinuate, medially broadly shallowly emarginate (Fig. 12); sternite VIII longer than wide, broadly arcuate apically, distance between antecostal suture and basal margin wide (Fig. 13); median lobe of aedeagus in lateral view with large bulbus, tubus triangular, with venter sinuate and with small, narrow basal projection narrowly separated from venter of tubus (Fig. 10); in dorsal view tubus constricted medially (Fig. 11). **Female:** tergite VIII similar to that of male (Fig. 14); apical margin of sternite VIII truncate medially, broadly rounded laterally apically and slightly concave medially (Fig. 15); spermatheca with capsule short with moderate-sized apical invagination, stem sinuate and broadly looped posteriorly, with base slightly swollen (Fig. 16).

This species is very similar to *H. canadensis*, from which it may be distinguished by shorter and narrower body, less elongate apical antennomeres, basal projection of bulbus longer and narrowly separated from tubus in lateral view (Fig. 10), tubus distinctly constricted at middle in dorsal view (Fig. 11), and spermathecal coils slightly tighter (Fig. 16).

Distribution. Origin: Nearctic. **Canada:** NB. **USA:** NY.

Collection and habitat data. Habitat: This is a riparian species associated with gravel and sand near river margins (Fig. 48), but it was also reported from a lakeshore. Specimens were collected from under small rocks in gravel along a river margin, from under small cobblestones set in sand and fine gravel near water edge along a river margin, and from a partially shaded cobblestone bar near outflow of a brook. Most specimens were found close to the river margin. One individual was found among grass roots under a cobblestone set in sand along a river margin; another from under a cobblestone set in sand on a cobblestone beach on a lakeshore. **Collecting period:** V, VI, VIII. **Collecting method:** turning gravel and cobblestones and aspirating specimens.

Comments. This is the first record of this species from Canada and NB. We have compared the lectotype male with our specimens and they agree with the lectotype in shape of tergite and sternite VIII and external characters, including its size, shape, proportions of antennomeres, color and pubescence pattern. The lectotype male is missing the median lobe of the aedeagus. Because Gusarov's designation was never published, we formally designate this specimen as the lectotype with our designation label. The male and female of this species are redescribed and illustrated for the first time, including habitus, tergite and sternite VIII, median lobe of aedeagus and spermatheca.

Hydrosmeeta canadensis Webster and Klimaszewski, new species

(Fig. 17–24)

Holotype (male): Canada, New Brunswick, Queens Co., Bayard, at Nerepis River, 45.4426°N, 66.3280°W, 25.V.2008, R.P. Webster // river margin, under small rocks in gravel (CNCI). **Paratypes:** Canada, New Brunswick, Queens Co., Bayard, at Nerepis River, 45.4426°N, 66.3280°W, 25.V.2008, R.P. Webster // river margin, under small rocks in gravel (LFC) 1 male, 1 female, (RWC) 2 males, 1 female; Bayard, at Nerepis River, 45.4426°N, 66.3280°W, 30.V.2008, R.P. Webster // river margin, under small rocks in gravel (RWC) 2 females; Bayard, at Nerepis River, 45.4426°N, 66.3280°W, 7.VI.2017, R.P. Webster // river margin, in gravel near water (NBM) 1 female (RWC) 1 female; York Co., 1.5 km N of Durham Bridge, 46.1408°N, 66.6179°W, 15.VII.2008, R.P. Webster, Nashwaak River // river margin, among cobblestones near outflow of brook (RWC) 1 male.

Etymology. Named after Canada, the country of origin of the type series, and to commemorate the 150th anniversary of Canada.

Diagnosis. Body length 2.0–2.1 mm; subparallel, flattened, light brown with head and abdomen dark brown, legs and basal antennomeres yellow (Fig. 17); moderately glossy, with fine and dense punctation and pubescence; faint meshed microsculpture present on forebody; head as wide as pronotum, postocular area about as long as diameter of eye, posterior angles rounded; eyes moderately large; antennae long, reaching posterior margin of elytra, all antennomeres distinctly elongate, antennomere XI at least as long as two preceding antennomeres combined; pronotum subquadrate, widest in apical third, as wide as head and abdomen but narrower than elytra, slightly depressed medially; elytra elongate and flattened, at suture slightly longer than pronotum; abdomen subparallel, slightly narrowed apically. **Male:** tergite VIII broadly arcuate apically (Fig. 20); sternite VIII longer than wide, apical margin arcuate, laterally rounded, antecostal suture widely separated from basal margin (Fig. 21); median lobe of aedeagus in lateral view with large bulbus, tubus triangular, with venter sinuate, with small, narrow basal projection moderately widely separated from tubus (Fig. 18); in dorsal view tubus subparallel medially (Fig. 19). **Female:** tergite VIII truncate apically (Fig. 22); sternite VIII with apical margin straight in middle third, broadly rounded laterally (Fig. 23); spermatheca with capsule short with moderate-sized apical invagination, stem sinuate and broadly looped posteriorly with base slightly swollen (Fig. 24).

This species is very similar to *H. caduca*, from which it may be distinguished by generally slightly longer and broader body, more elongate apical antennomeres, basal projection of bulbus shorter and

more widely separated from tubus in lateral view (Fig. 18), subparallel median part of tubus in dorsal view (Fig. 19), and spermathecal coils slightly less tight (Fig. 24).

Distribution. Origin: Nearctic. **Canada: NB. USA:** not recorded.

Collection and habitat data. Habitat: This is a riparian species associated with gravel and sand near river margins (Fig. 48). Most specimens were collected from under small rocks in gravel along river margins; one individual was found among cobblestones near the outflow of a brook into a river. **Collecting period:** V, VI. **Collecting method:** examining gravel and aspirating specimens.

Hydrosmecta dulcis Casey

(Fig. 25–31)

Hydrosmecta dulcis Casey 1910: 87.

Lectotype (female): Bayfield, Wisconsin, Wickham; *dulcis* Csy.; Type USNM 39084; Casey bequest 1925; Lectotypus: *Hydrosmecta dulcis* Casey, V.I. Gusarov 2000 (USNM). Present designation. Examined.

New Canadian records: Canada, New Brunswick, Queens Co., Bayard, at Nerepis River, 45.4426°N, 66.3280°W, 25.V.2008, R.P. Webster // river margin, splashing fine sand (LFC) 1 female, (RWC) 1 female; New Brunswick, Queens Co., Bayard, at Nerepis River, 45.4426°N, 66.3280°W, 30.V.2008, R.P. Webster // river margin, under small rocks in gravel (RWC) 1 male.

Diagnosis. Body length 2.0–2.3 mm; subparallel, flattened, light brown with head, pronotum, bases of elytra and abdomen dark brown and legs yellow (Fig. 25); moderately glossy, with fine and dense punctation and pubescence; faint meshed microsculpture present on forebody; head as wide as pronotum, postocular area about as long as diameter of eye, posterior angles rounded; eyes moderately large; antennae long, almost reaching posterior margin of elytra, antennomeres I–III distinctly elongate, IV–X slightly elongate, XI only slightly longer than preceding antennomere; pronotum slightly transverse, shorter than head, widest in middle of its length, as wide as head and abdomen but narrower than elytra, slightly depressed medially; elytra elongate and flattened, at suture about one-fourth longer than pronotum; abdomen subparallel, slightly narrowed apically. **Male:** tergite VIII broadly arcuate apically (Fig. 27); sternite VIII longer than wide, evenly rounded apically, antecostal suture widely separated from basal margin (Fig. 28); median lobe of aedeagus with large bulbus, tubus short triangular, arcuate and strongly produced ventrally in lateral view (Fig. 26). **Female:** tergite VIII very broadly arcuate apically (Fig. 29); sternite VIII about evenly rounded apically (Fig. 30); spermatheca S-shaped, capsule club-shaped with moderate-sized apical invagination, stem slightly swollen at base (Fig. 31).

Distribution. Origin: Nearctic. **Canada: NB. USA:** WI.

Collection and habitat data. Habitat: this is a riparian species associated with gravel and sand near river margins (Fig. 48). Adults in NB were found in sand or under small rocks in gravel. **Collecting period:** V, VI. **Collecting method:** splashing fine sand at river margin or aspirating from gravel.

Comments. This is the first record of this species from Canada and NB. We have compared the lectotype female with our female and it agrees with the lectotype in shape of spermatheca, tergite and sternite VIII and external characters, including similar size and antennae (length and width of antennomeres), shape, color and pubescence pattern. The lectotype has slightly wider elytra than our female from NB. Because Gusarov's lectotype designation was never published, we formally designate this female specimen as the lectotype with our designation label. The male and female of this species are described and illustrated for the first time, including genital structures, based on the specimens from NB.

***Hydrosmeeta minutissimoides* Webster and Klimaszewski, new species**

(Fig. 32–38)

Holotype (male): Canada, New Brunswick, Queens Co., Bayard, at Nerepis River, 45.4426°N, 66.3280°W, 25.V.2008, R.P. Webster // river margin, in moist gravel (CNCD). **Paratype (female):** Canada, New Brunswick, New Maryland, Charters Settlement, 45.8395°N, 66.7391°W, 20.VII.2006, R.P. Webster // mixed forest, MV light (RWC).

Etymology. The species name *minutissimoides* is derived from a Latin adjective meaning ‘the smallest’, referring to the fact that this is the smallest species of *Hydrosmeeta*.

Diagnosis. Body length 1.5–1.6 mm; subparallel, flattened, light brown with head and abdomen dark brown, legs and basal antennomeres yellow (Fig. 32); moderately glossy, with fine and dense punctation and pubescence; faint meshed microsculpture present on forebody; head large, as wide as pronotum, postocular area about twice as long as eye in dorsal view, posterior angles rounded; eyes moderately large; antennae moderately long, reaching two-thirds of length of elytra, antennomeres I–II distinctly elongate, III moderately elongate, IV subquadrate, V–X slightly transverse, XI clearly shorter than two preceding antennomeres combined; pronotum transverse, widest in apical third, as wide as head and elytra, slightly depressed medially; elytra elongate and flattened, at suture about one-fourth longer than pronotum; abdomen subparallel, slightly narrowed apically. **Male:** tergite VIII broadly truncate apically (Fig. 34); sternite VIII longer than wide, with apical margin truncate in middle third, rounded laterally, antecostal suture widely separated from basal margin (Fig. 35); median lobe of aedeagus with large bulbus, tubus strongly narrowly produced, triangular, arcuate ventrally in lateral view (Fig. 33). **Female:** tergite VIII slightly, very broadly emarginate apically (Fig. 36); sternite VIII with apical margin broadly truncate, laterally rounded (Fig. 37); spermatheca S-shaped, capsule short, spherical, with large apical invagination, stem sinuate and broadly looped and twisted posteriorly (Fig. 38).

Distribution. Origin: Nearctic. **Canada: NB.** **USA:** not recorded.

Collection and habitat data. Habitat: One specimen collected at MV light in a mixed forest; the other was found in moist gravel on a river margin (Fig. 48). **Collecting period:** V, VII. **Collecting method:** examining moist gravel and collecting at a MV light.

***Hydrosmeeta pseudodiosica* Lohse**

(Fig. 39–47)

Hydrosmeeta pseudodiosica Lohse, in Lohse et al. 1990: 149. Majka and Klimaszewski 2008; Webster et al. 2012.

Diagnosis. Body length 2.5–2.7 mm; body brown to piceous, dull, elytra and legs dark brown (Fig. 39); microsculpture of forebody minute, consisting of rounded meshes; head subquadrate, at eye level about as wide as at level of tempora; eyes about as long as postocular region in dorsal view; antennae slender, antennomeres II and III subequal in length, following ones elongate but decreasing in length toward apex; glossa thin and long, Y-shaped, deeply split apically; each mandible with subapical tooth; pronotum transverse, 1.25 as broad as long and 1/6 broader than head, broadest near apex, sides converging basally to obtuse posterior angles; elytra at suture 1.3 as long as pronotum along midline of disc, about 1.2 as broad as pronotum; abdomen subparallel, tergites becoming longer toward apex. **Male:** tergite VIII broadly arcuate (Fig. 42); sternite VIII with apical margin straight medially, very broadly rounded laterally (Fig. 43); median lobe of aedeagus with narrowly oval bulbus, evenly coalescent with short triangular tubus in dorsal view (Fig. 41); in lateral view tubus with apical part narrow, directed slightly ventrad (Fig. 40); internal sac with two elongate structures in bulbus (Fig. 41). **Female:** tergite VIII truncate apically (Fig. 44); sternite VIII with apical margin moderately produced, with moderately deep,

rounded emargination at middle (Fig. 45); spermatheca with capsule small, spherical, with shallow and moderately wide apical invagination, stem long, irregularly twisted and swollen posteriorly (Fig. 46, 47).

This species is similar to *H. odiosica* Casey from California, but has a larger and longer body (*H. odiosica* is 1.8 mm long) and a more transverse pronotum.

Distribution. Origin: Nearctic. **Canada:** NB, ON, YT. **USA:** not recorded.

Collection and habitat data. Habitat: riparian habitats, sandy and cobblestone shores of brooks and rivers; adults under small cobblestones and gravel set in sand on a partially shaded cobblestone bar near the outflow of a brook into a clear rocky river. **Collecting period:** V, VI. **Collecting method:** hand collecting or aspirating specimens from near and under cobblestones at edges of streams.

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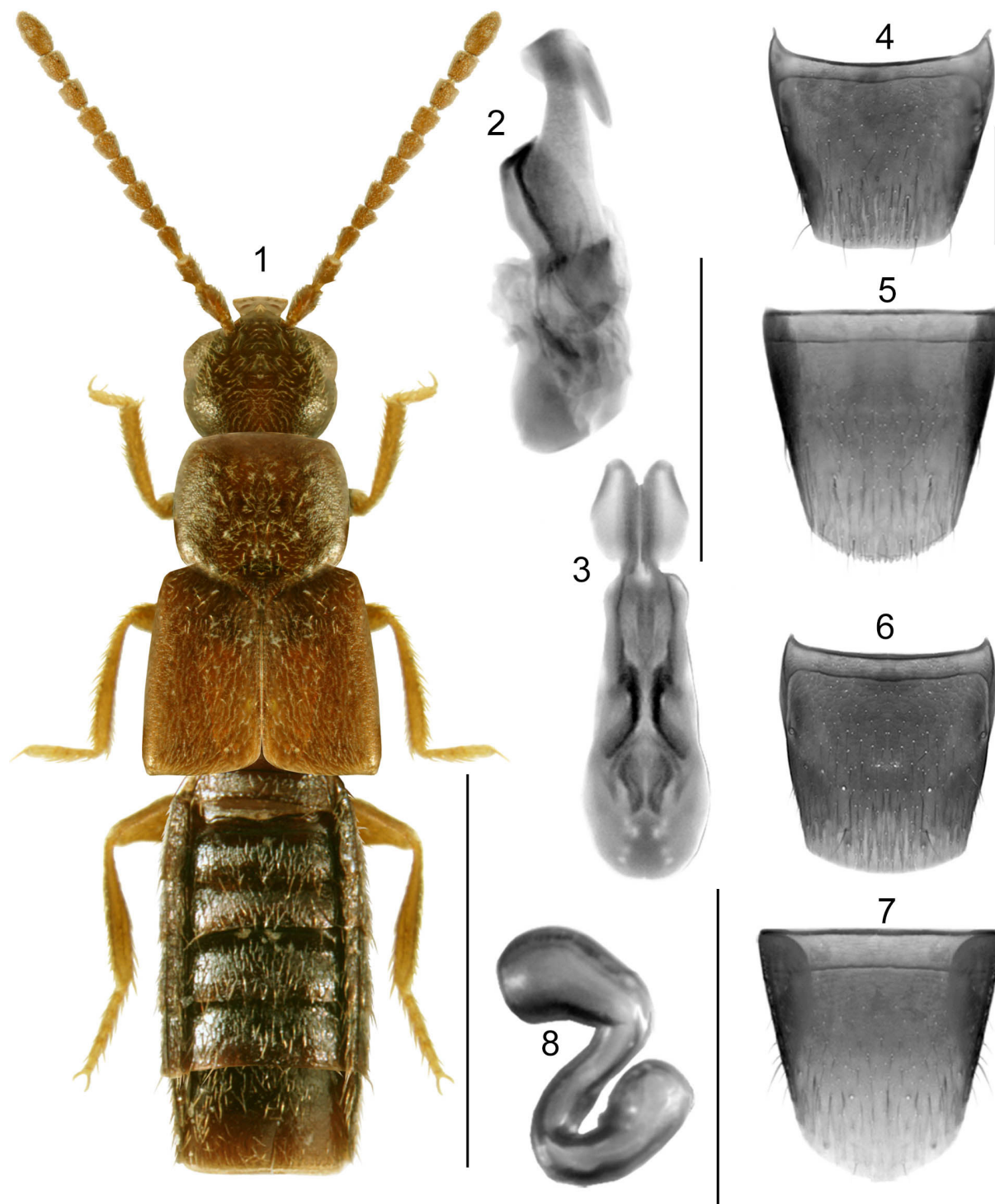
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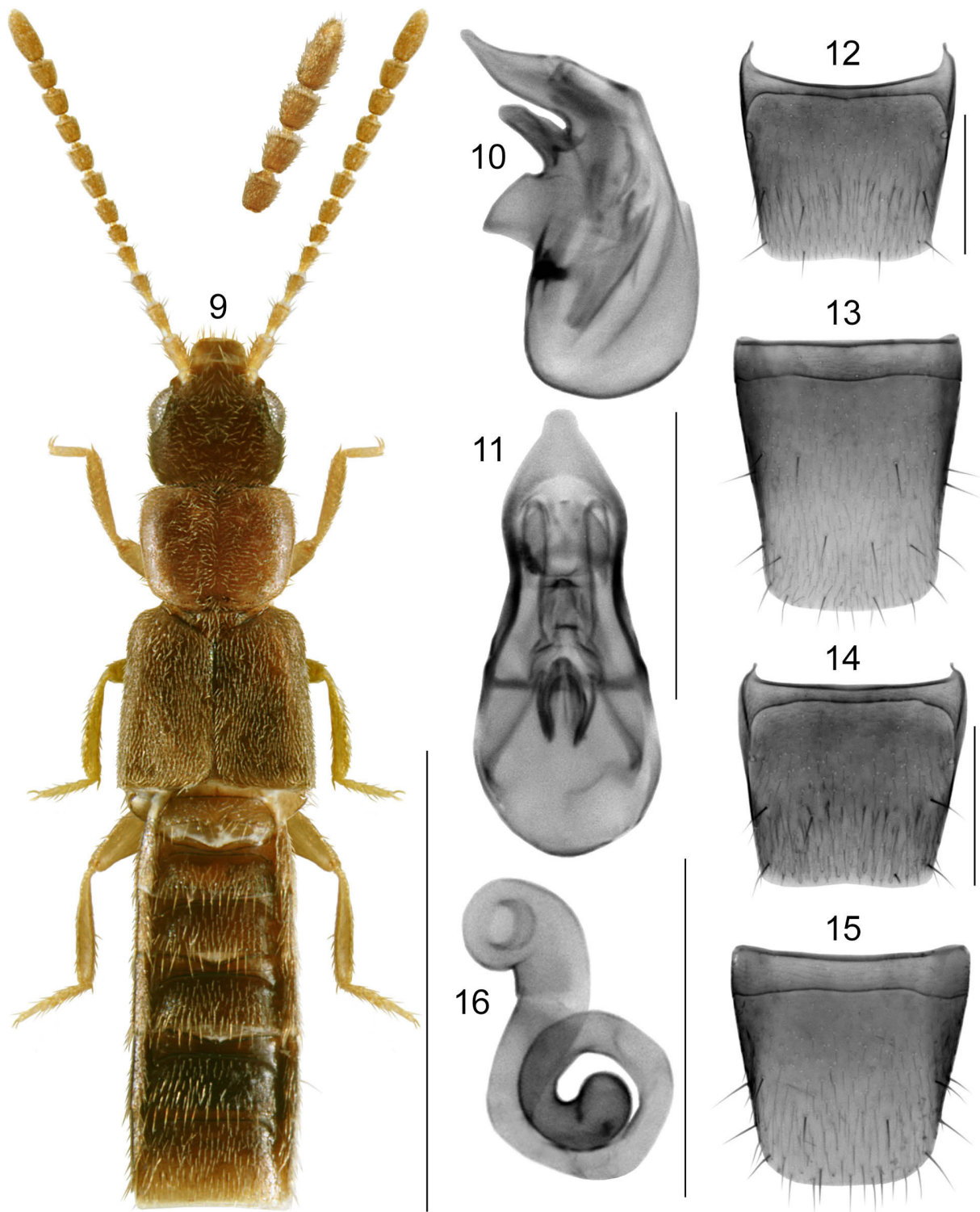
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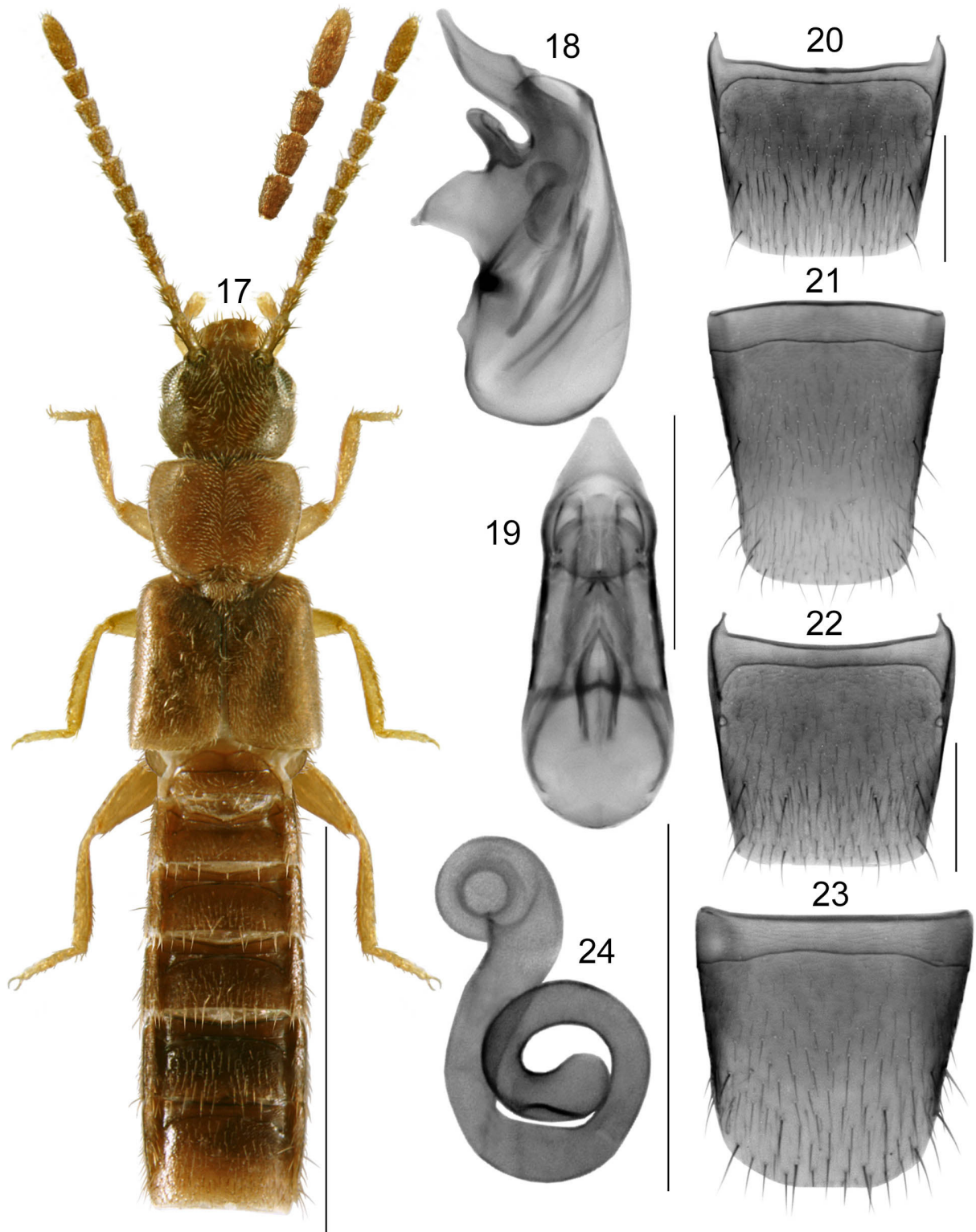
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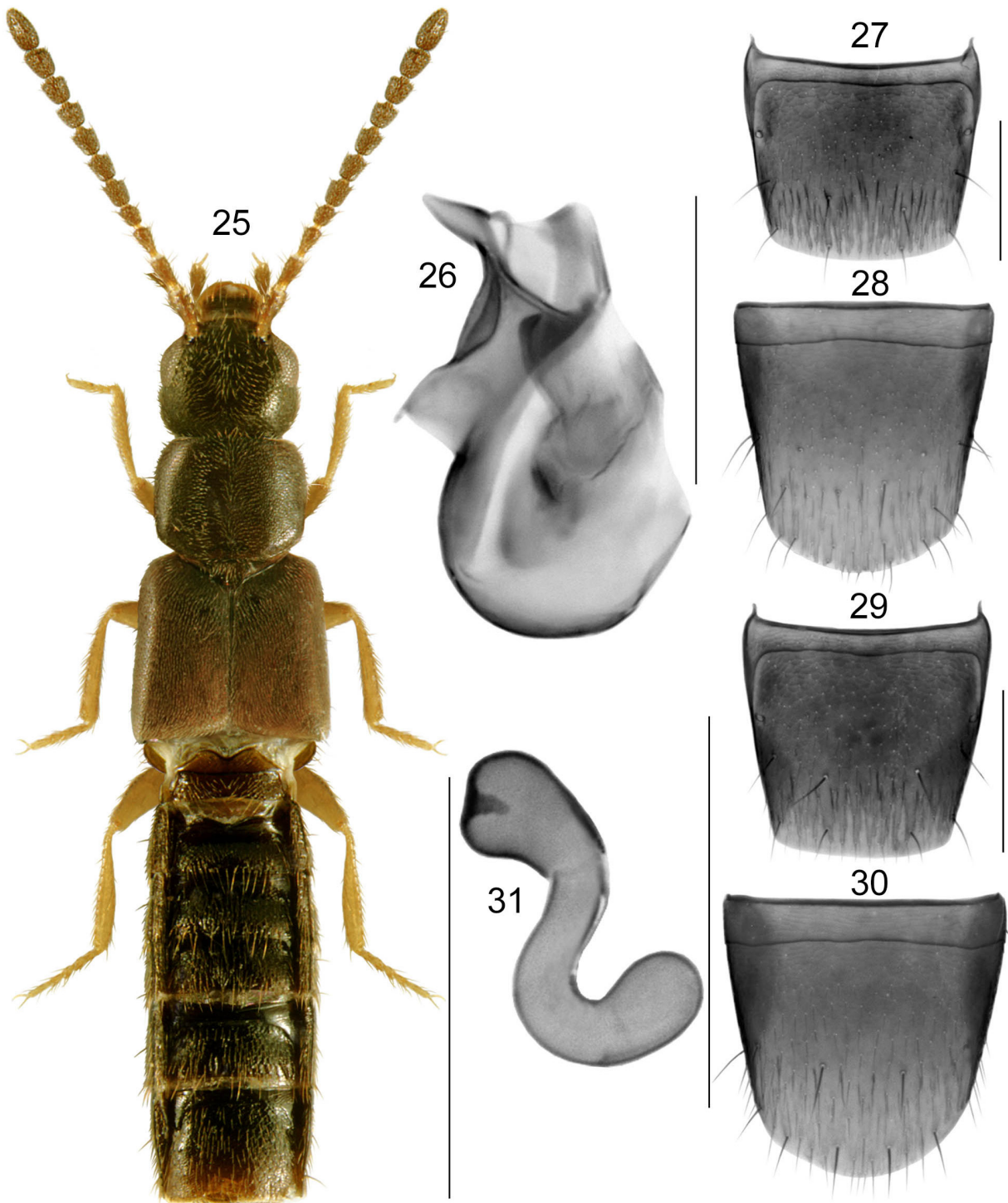
Figures 1–8. *Hydrosmecta borealis* Klimaszewski and Langor. 1) Habitus in dorsal view. 2) Median lobe of aedeagus in lateral view. 3) Median lobe of aedeagus in dorsal view. 4) Male tergite VIII. 5) Male sternite VIII. 6) Female tergite VIII. 7) Female sternite VIII. 8) Spermatheca. Scale line for habitus = 1 mm, remaining scale bars = 0.2 mm.



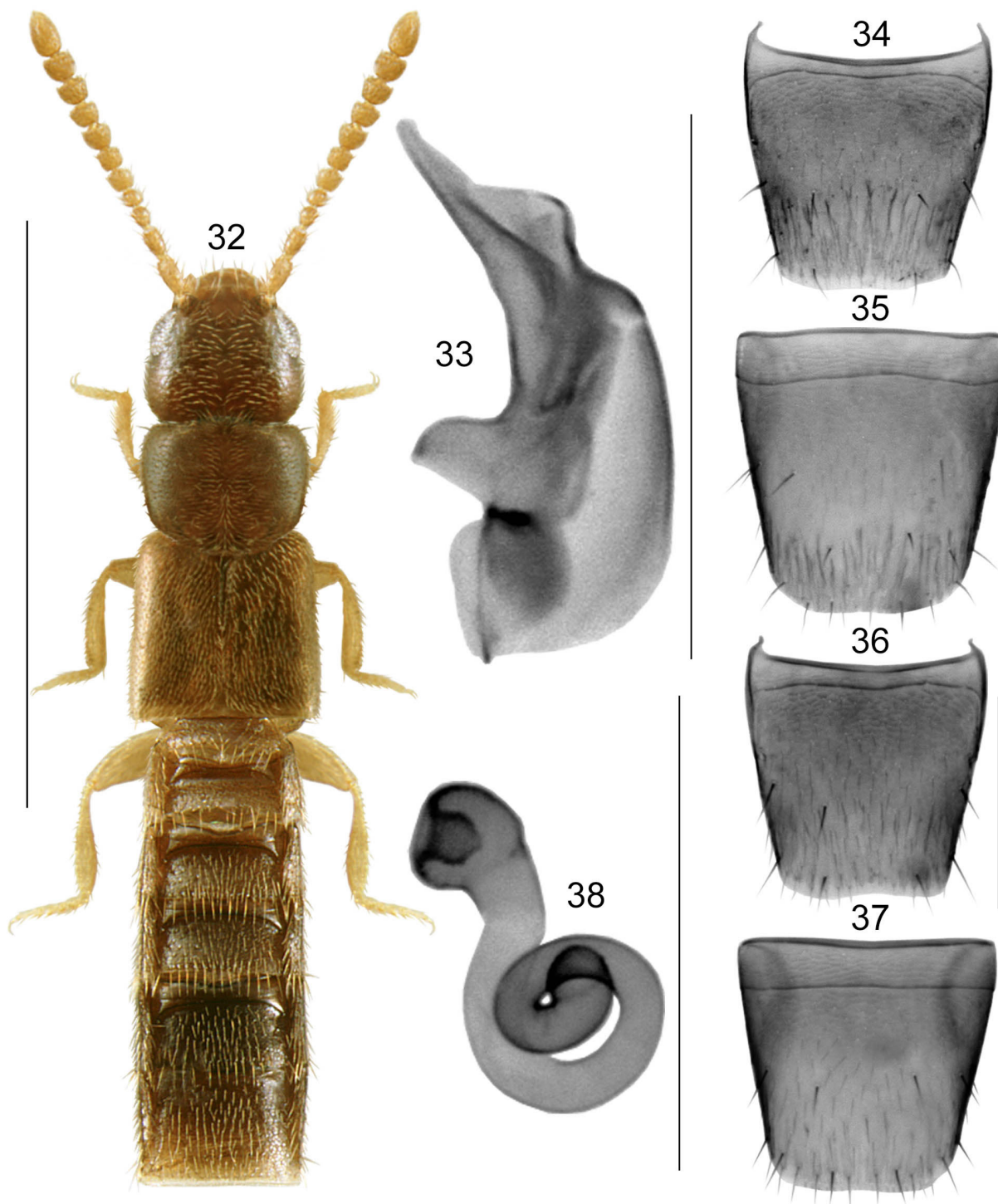
Figures 9–16. *Hydrosmeeta caduca* Casey. **9)** Habitus in dorsal view. **10)** Median lobe of aedeagus in lateral view. **11)** Median lobe of aedeagus in dorsal view. **12)** Male tergite VIII. **13)** Male sternite VIII. **14)** Female tergite VIII. **15)** Female sternite VIII. **16)** Spermatheca. Scale line for habitus = 1 mm, remaining scale bars = 0.2 mm.



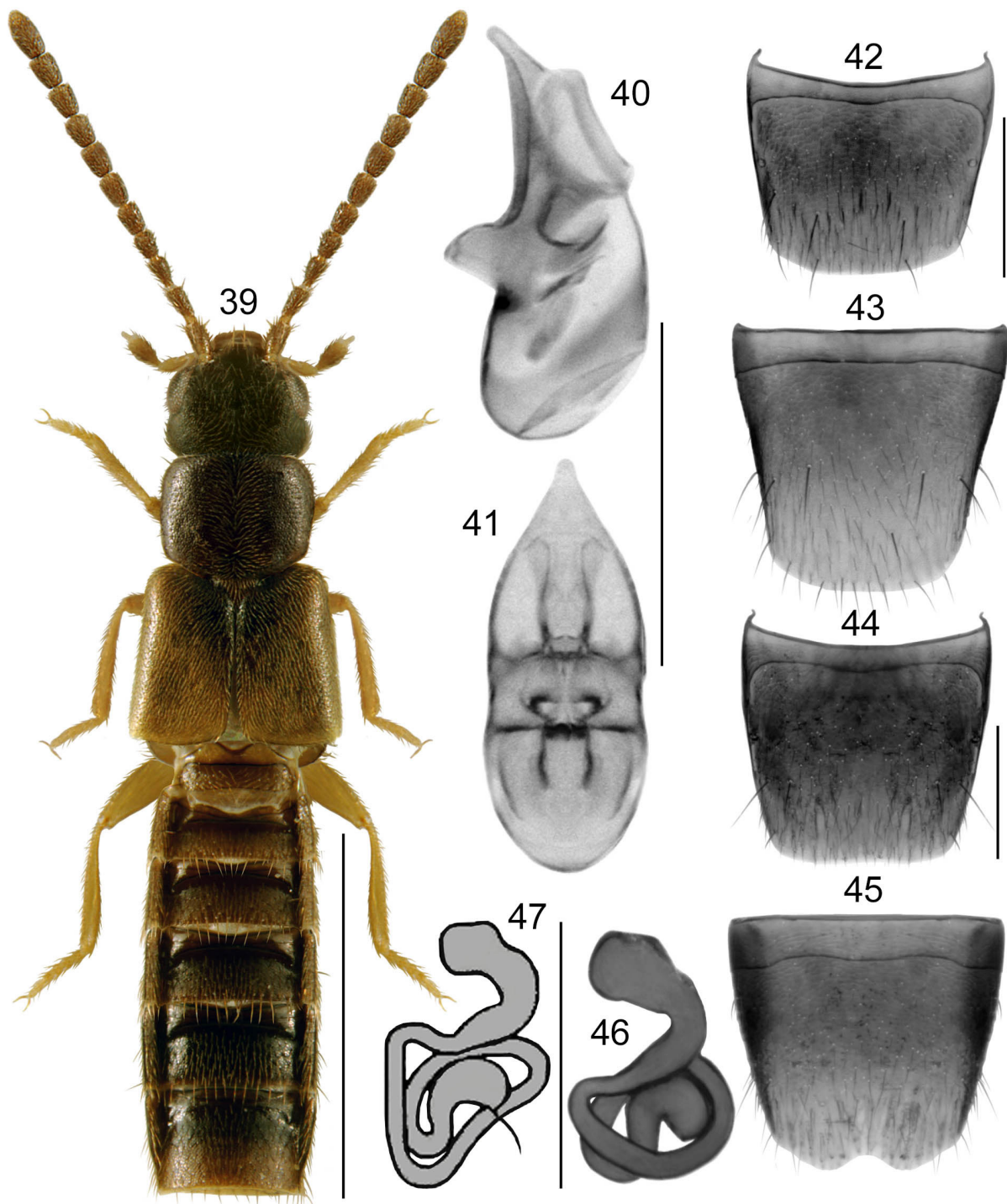
Figures 17–24. *Hydrosmeeta canadensis* Webster and Klimaszewski, sp. nov. **17)** Habitus in dorsal view. **18)** Median lobe of aedeagus in lateral view. **19)** Median lobe of aedeagus in dorsal view. **20)** Male tergite VIII. **21)** Male sternite VIII. **22)** Female tergite VIII. **23)** Female sternite VIII. **24)** Spermatheca. Scale line for habitus = 1 mm, remaining scale bars = 0.2 mm.



Figures 25–31. *Hydrosmeeta dulcis* Casey. **25)** Habitus in dorsal view. **26)** Median lobe of aedeagus in lateral view. **27)** Male tergite VIII. **28)** Male sternite VIII. **29)** Female tergite VIII. **30)** Female sternite VIII. **31)** Spermatheca. Scale line for habitus = 1 mm, remaining scale bars = 0.2 mm.



Figures 32–38. *Hydrosmecta minutissimoides* Webster and Klimaszewski, sp. nov. **32)** Habitus in dorsal view. **33)** Median lobe of aedeagus in lateral view. **34)** Male tergite VIII. **35)** Male sternite VIII. **36)** Female tergite VIII. **37)** Female sternite VIII. **38)** Spermatheca. Scale line for habitus = 1 mm, remaining scale bars = 0.2 mm.



Figures 39–47. *Hydrosmeeta pseudodiosica* Lohse. **39)** Habitus in dorsal view. **40)** Median lobe of aedeagus in lateral view. **41)** Median lobe of aedeagus in dorsal view. **42)** Male tergite VIII. **43)** Male sternite VIII. **44)** Female tergite VIII. **45)** Female sternite VIII. **46–47)** Spermatheca. Scale line for habitus = 1 mm, remaining scale bars = 0.2 mm.



Figure 48. Gravel bar habitat at Nerepis River, Queens Co., Bayard, NB, habitat for *Hydrosmecta caduca* Casey, *H. canadensis* Webster and Klimaszewski, sp. nov. (type locality), *H. dulcis* Casey, and *H. minutissimoides* Webster and Klimaszewski, sp. nov. (type locality).

