



Review of the leafhopper genus *Alnetoidia* Dlabola (Hemiptera: Cicadellidae: Typhlocybinae: Erythroneurini) from China, with descriptions of two new species

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Abstract

Generic characteristics of genus *Alnetoidia* Dlabola are revised based on study of nine species from China, including two new species: *A. (Alnetoidia) gracilis*, *A. (Alnella) dentata* **spp. nov.**, and four new records to China. A key to species for identification of Chinese adult males is provided.

Key words: Homoptera, Auchenorrhyncha, taxonomy, morphology

Introduction

The leafhopper genus *Alnetoidia* Dlabola was established by Dlabola in 1958 with *Cicadula alneti* Dahlbom as its type species. It includes two subgenera: *A. (Alnetoidia)* Dlabola and *A. (Alnella)* Anufriev. *Alnella* Anufriev, was originally treated as a separate genus (Anufriev 1971) and contained the subgenus *Sapporoa* Dworakowska, 1972. Subsequently Dworakowska (1979) treated *Alnella* Anufriev as a subgenus of *Alnetoidia* Dlabola according to the great similarity between these two taxa, and treated *Sapporoa* Dworakowska as a synonym of *Alnella* Anufriev. At present there are twenty-two species in this genus, most of which are distributed in East Asia, the Far East or India, except the type species *A. alneti* (Dahlbom) which is very common in Europe and also occurs in East Asia and North America. Previous host records indicate that this genus mainly feeds on woody angiosperms, such as *Acer*, *Alnus*, *Betula*, *Ulmus*, etc.

In the present work, we studied nine species of *Alnetoidia* from China, two of which are new to science, *A. (Alnetoidia) gracilis*, *A. (Alnella) dentata* **spp. nov.**, and four of which are newly recorded from China: *A. (Alnetoidia) sikkimensis*, *A. (Alnella) orientalis*, *A. (Alnella) sudzuchenica* and *A. (Alnella) trisetata*. According to the specimens studied, the structures described as aedeagal “processes” in the original description of *A. (Alnetoidia) awla* Song & Li appear to be ligaments connecting the aedeagus to the dorsal part of the genital capsule. Nomenclature of wings follows Dworakowska (1993) with other terminology following Zhang (1990). All the materials examined are deposited in the collection of Entomological Museum of Northwest A&F University, China, except the specimens of *A. alneti* (Dahlbom, 1850) housed in Illinois Natural History Survey, USA.

Alnetoidia Dlabola, 1958

Type species: *Cicadula alneti* Dahlbom, 1850, by original designation

Alnetoidia Dlabola, 1958: 55; Anufriev, 1972: 721; Anufriev & Emeljanov, 1988: 109; Chiang & Knight, 1990: 193

Description. Body slim, pale yellow to yellow, usually without dark markings. Head narrower than pronotum. Vertex slightly produced in middle; coronal suture distinct, nearly exceeding anterior margin of vertex. Face with lorum small, anteclypeus inflated in male. Forewing long, 4th apical cell shorter than 1/2 of the 3rd. Hind wing as usual for Erythroneurini, RA vein present.

Abdominal apodemes well developed, pocketlike, extended to 4th to 6th sternite.

Male pygofer weakly sclerotized. Pygofer side bearing several rigid setae on posterior margin or some stout macrosetae on inner side of posterior margin; dorsal appendage long and lamellate, articulated to pygofer side; ventral appendage present or absent. Subgenital plate exceeding hind margin of pygofer side, broad at base, gradually narrowing towards apex, with row or rows of marginal microsetae, basal setae longer and forming group, with 2–4 macrosetae. Style with preapical lobe greatly enlarged, apical part extended from dorsal side of preapical lobe, usually footlike, sometimes slender. Connective lamellate, central lobe well developed. Aedeagus shaft tubular, usually with process; dorsal apodeme rudimentary to well developed, length of preatrium varies among species; gonopore apical.

Distribution. Palaearctic, Oriental, Nearctic.

Key to species of genus *Alnetoidia* Dlabola from China (males)

1	Pygofer ventral appendage present (Figs 1d, 2c, 3b, 4b, 5b) (subgen. <i>Alnetoidia</i>)	2
-	Pygofer ventral appendage absent (Figs 6b, 7b, 8b, 9b) (subgen. <i>Alnella</i>)	10
2	Aedeagal shaft without process (Figs 2g, h)	<i>A. (Alnetoidia) awla</i> Song & Li
-	Aedeagal shaft with process (Figs 1j, 3g–i, 4i–l, 5k, l)	3
3	Aedeagal shaft with single process (Fig. 1j)	<i>A. (Alnetoidia) alneti</i> (Dahlbom)
-	Aedeagal shaft with pair of processes (Figs 3g–i, 4i–l, 5k, l)	4
4	Aedeagal shaft with pair of basal processes, slim and long (Figs 4i–l)	5
-	Aedeagal shaft with pair of apical processes, short (Figs 3g–i, 5k, l)	8
5	Aedeagal processes close to shaft (Figs 4i–l)	6
-	Aedeagal processes well separated from shaft	7
6	Aedeagal shaft almost straight, processes extended from ventro-lateral margin of shaft	<i>A. (Alnetoidia) dujuanensis</i> Song & Li
-	Aedeagal shaft distinctly curved dorsad, processes extended from dorso-lateral margin of shaft (Figs 4i–l)	<i>A. (Alnetoidia) gracilis</i> sp. nov.
7	Aedeagal shaft with apical part greatly expanded in ventral view	<i>A. (Alnetoidia) sophia</i> Chiang & Knight
-	Aedeagal shaft with apical part as narrow as basal part in ventral view	<i>A. (Alnetoidia) leishanensis</i> Song & Li
8	Apical part of style slender	<i>A. (Alnetoidia) fina</i> Song & Li
-	Apical part of style footlike (Figs 3e, 5i)	9
9	Pygofer ventral appendage extended from hind margin of pygofer side (Fig. 3b)	<i>A. (Alnetoidia) cedrelae</i> Chou & Ma
-	Pygofer ventral appendage extended from ventral margin of pygofer side (Fig. 5b)	<i>A. (Alnetoidia) sikkimensis</i> Dworakowska
10	Pygofer side with 3 macrosetae at inner side of hind margin (Figs 6b, 9b)	11
-	Pygofer side with several rigid microsetae on hind margin (Figs 7b, 8b)	12
11	Aedeagus broad in caudal view, apical margin serrate (Fig. 6i)	<i>A. (Alnella) dentata</i> sp. nov.
-	Aedeagus narrow in caudal view, apical margin smooth (Fig. 9h)	<i>A. (Alnella) triseta</i> Dworakowska
12	Apical part of style footlike	<i>A. (Alnella) watanabei</i> Dworakowska
-	Apical part of style slender (Figs 7e, 8e)	13
13	Style with a small process on outer margin near preapical lobe (Fig. 7e)	<i>A. (Alnella) orientalis</i> Dworakowska
-	Style without process (Fig. 8e)	<i>A. (Alnella) sudzuchenica</i> Anufriev

Alnetoidia (Alnetoidia) Dlabola, 1958

Type species: *Cicadula alneti* Dahlbom, 1958, by original designation

Alnetoidia Dlabola, 1958: 55

Diagnosis. Pygofer ventral appendage well developed.

Distribution. Palaearctic, Oriental, Nearctic.

***Alnetoidia (Alnetoidia) alneti* (Dahlbom, 1850)**

(Fig. 1)

Cicadula alneti Dahlbom, 1850: 181

Typhlocyba coryli Tollin, 1851: 70

Typhlocyba alneti: Kirschbaum, 1868: 184

Typhlocyba (Zygina) alneti: Sahlberg, 1871: 181

Typhlocyba alni Sahlberg, 1871: 33

Zygina alneti: Fieber, 1872: 15

Erythroneura alneti: Oshanin, 1912: 114

Zygina mali Edwards, 1915: 209

Erythroneura ador McAtee, 1918: 361

Zygina basiflava Matsumura, 1932: 109

Erythroneura (Zygina) alneti: Ossiannilsson, 1953:107

Alnetoidia alneti: Dlabola, 1958: 55; Anufriev & Emeljanov, 1988: 114, Pl. 74: 7–12

(synonymy from <http://dmitriev.speciesfile.org/>)

Material examined. 1♂, CHINA, Taiwan, Nantou, Reiyen Res. Chifong Rd. 1km N Rt.14, 2200m, 24°6'28"N, 121°11'50"E, 13 vi 2004, 8–10: 30pm, mercury vapor light, coll. C.H. Dietrich; 1♂, same locality and collector, 14 vi 2004, 7–9: 30pm; 1♂, CHINA, Taiwan, Nantou, Meifeng, Rt.14 km 15, 2100m, 24°5'42"N, 121°10'40"E, 15 vi 2004, sweeping, coll. C.H. Dietrich.

Host. *Acer*, *Aesculus*, *Alnus*, *Betula* sp., *Carpinus*, *Cornus* sp., *Corylus* sp., *Crataegus* sp., *Fagus* sp., *Filipendula ulmaria*, *Geranium* sp., *Malus*, *Prunus*, *Quercus* sp., *Salix* sp., *Sorbus* sp., *Tilia*, *Ulmus* sp., *Vitis* sp. (records from <http://dmitriev.speciesfile.org/>).

Distribution. Austria, Belgium, Bulgaria, Canada (Nova Scotia), China (Taiwan), Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Hungary, Ireland, Israel, Italy, Japan, Kazakhstan, Latvia, Lithuania, Moravia, Netherlands, Norway, Poland, Romania, Portugal, Serbia, Slovakia, Spain, Sweden, Switzerland, Russia, United Kingdom, Ukraine, Yugoslavia. (modified from <http://dmitriev.speciesfile.org/>)

***Alnetoidia (Alnetoidia) awla* Song & Li, 2010**

(Fig. 2)

Alnetoidia (Alnetoidia) awla Song & Li, 2010b: 65, Figs 1–7, 27, 28

Material examined. 1♂, CHINA, Shaanxi Prov., Mt. Taibai, Haoping, 14 vii 1982, coll. Zhou Jingruo.

Distribution. China (Henan, Shaanxi).

Remarks. In the original description, the aedeagal shaft was described as “with pair of long and apically bifurcate processes at base of [the upper] part”, whereas the specimen we examined has the “processes” weakly sclerotized and connected with the anal tube appendages at tip, indicating that they are ligaments.

***Alnetoidia (Alnetoidia) cedrelae* Chou & Ma, 1981**

(Fig. 3)

Alnetoidia cedrelae Chou & Ma, 1981: 194, Fig. 4

Material examined. 1♂ (holotype), 5♂♂ (paratypes), 5♀♀ (paratypes), CHINA, Shaanxi Prov., Nanwutai, 25 vi 1980, coll. Ma Ning.

Host. *Ailanthus* sp.

Distribution. China (Shaanxi).

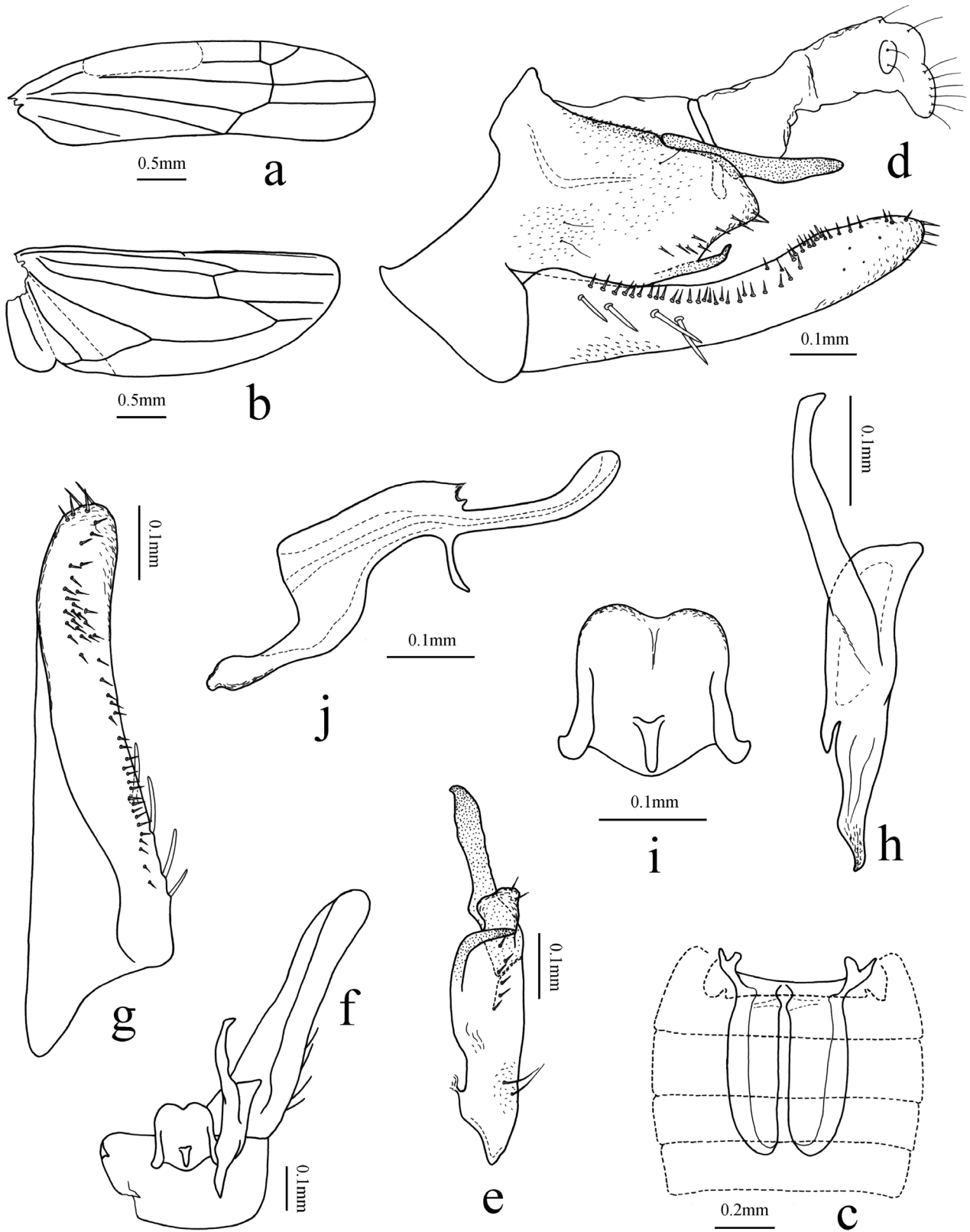


FIGURE 1 *Alnetoidia (Alnetoidia) alneti* (Dahlbom, 1850) a. forewing; b. hind wing; c. abdominal apodemes; d. genital capsule; e. pygofer side, ventral view; f. subgenital plate, style, connective and the 9th sternite; g. subgenital plate, dorsal view; h. style, dorsal view; i. connective; j. aedeagus, lateral view.

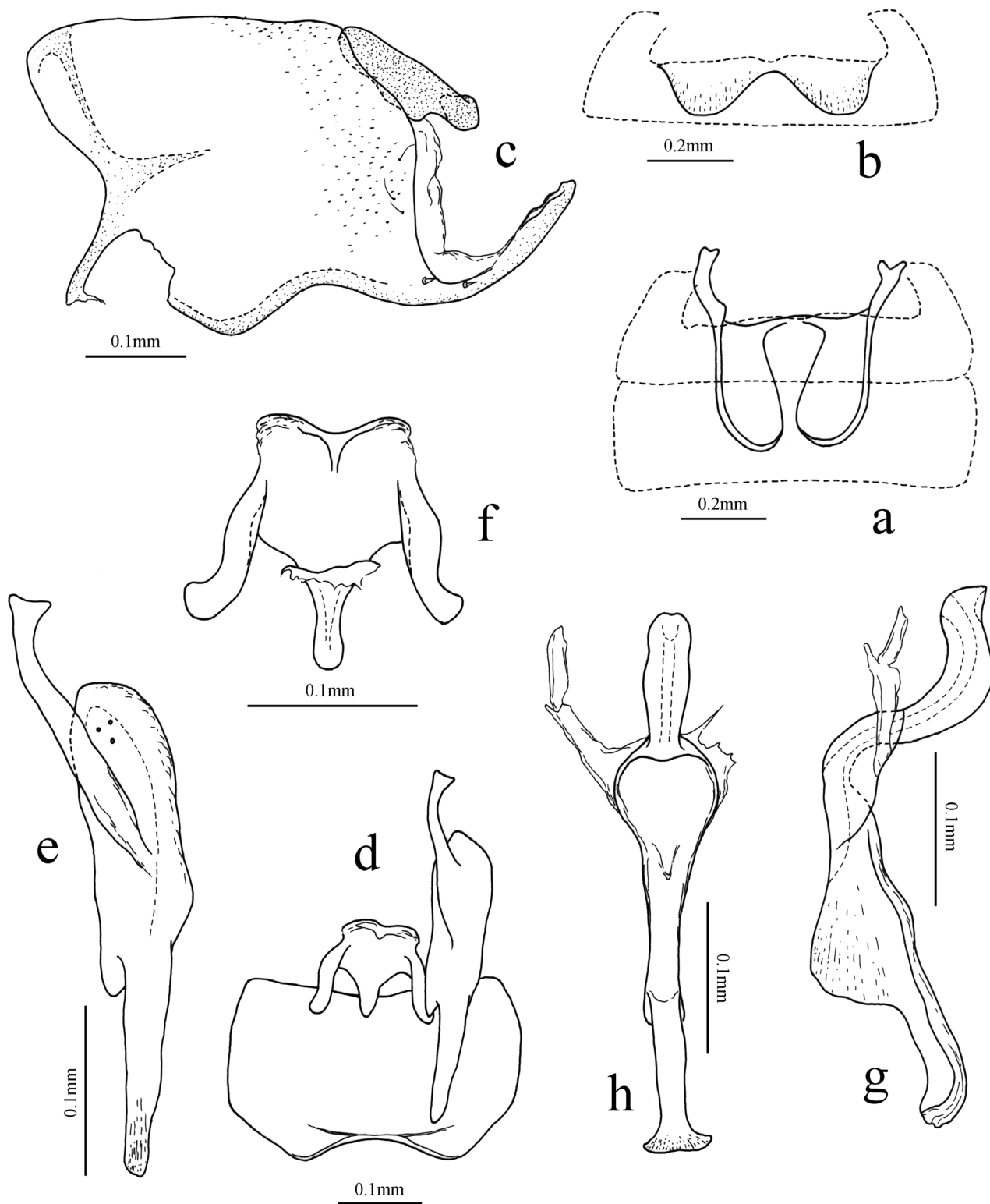


FIGURE 2 *Alnetoidia (Alnetoidia) awla* Song & Li, 2010 a. abdominal ventral apodemes; b. abdominal dorsal apodemes; c. pygofer side, lateral view; d. style, connective and the 9th sternite; e. style, dorsal view; f. connective; g. aedeagus, lateral view; h. aedeagus, caudal view.

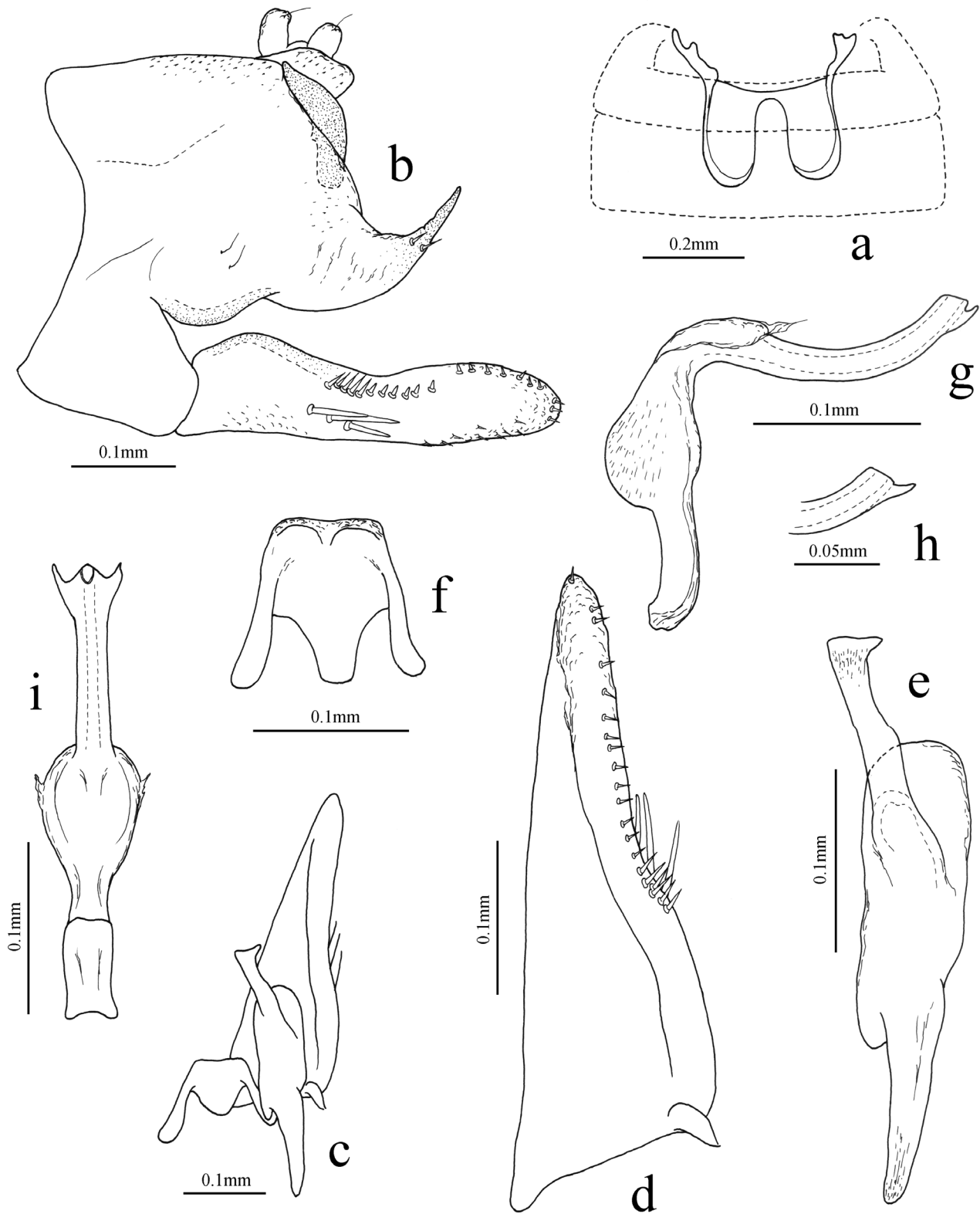


FIGURE 3 *Alnetoidia (Alnetoidia) cedrelae* Chou & Ma, 1981 a. abdominal apodemes; b. genital capsule; c. subgenital plate, style and connective; d. subgenital plate, dorsal view; e. style, dorsal view; f. connective; g. aedeagus, lateral view; h. apex of aedeagal shaft, lateral view; i. aedeagus, caudal view.

***Alnetoidia (Alnetoidia) gracilis* sp. nov.**

(Fig. 4)

Description. Body yellowish, without markings.

Abdominal apodemes (Fig. 4a) extended to hind margin of 4th sternite.

Pygofer side (Fig. 4b) with several rigid setae on posterior margin; dorsal appendage sinuated; ventral appendage slim, extended from ventral margin of pygofer side. Subgenital plate (Fig. 4e) with group rigid setae near base, row of marginal microsetae from near base to apex, shorter than the basal ones, with 3 macrosetae subbasally along outer margin. Style (Figs 4f, g) with apical part footlike. Connective (Fig. 4h) broad, lateral arms short and broad. Aedeagal shaft (Figs 4i–l) tubular, curved dorsad, paired basal processes slim and long, the length and thickness slightly varies among individuals, some specimens bearing a small spinelike process on lateral margin; dorsal apodeme large in lateral view, preatrium short; gonopore apical on ventral side.

Measurement. Male 3.42mm, female 3.45mm.

Material examined. Holotype: ♂, CHINA, Sichuan Prov., Mt. Emei, 950m, 30 x 1999, coll. I. Dworakowska; paratypes: 1♂, 1 xi 1999, other data same as holotype; 1♀, 29 x 1999, other data as holotype; 18♂♂, Sichuan Prov., Ya'an, Hongta Botanic Garden, *Pterocarya stenoptera*, 12 vii 2010, coll. Cao Yanghui.

Host. *Pterocarya stenoptera*.

Remarks. The new species is similar to *A. (Alnetoidia) dujuanensis* Song & Li, but differs in having the pygofer dorsal appendage shorter, the aedeagal shaft distinctly curved dorsad and the paired basal processes shorter and extended from the dorso-lateral margins of the shaft.

Etymology. The specific epithet is derived from the Latin word “*gracilis*”, referring to the slender lateral processes of the aedeagal shaft.

***Alnetoidia (Alnetoidia) sikkimensis* Dworakowska, 1994 n. rec.**

(Fig. 5)

Alnetoidia (Alnetoidia) sikkimensis Dworakowska, 1994a: 108, Figs 234–243

Material examined. 1♂1♀, CHINA, Yunnan Prov., Baoshan, Mt. Taibao, 1800m, 19 xi 1999, coll. Qin Daozheng; 3♂♂, Yunnan Prov., Mengla, Mt. Nangong, 1100m, 13 xii 1999, coll. Qin Daozheng; 1♂1♀, Yunnan Prov., Mengyuan, 750m, 17 xii 1999, coll. Qin Daozheng.

Distribution. China (Yunnan), India.

Alnetoidia (Alnella) Anufriev, 1971

Type species: *Alnella sudzuchenica* Anufriev, 1971, by original designation

Alnella Anufriev, 1971: 109

Alnella (Sapporoa) Dworakowska, 1972: 775

Alnetoidia (Alnella) Dworakowska, 1979: 30

Diagnosis. Pygofer ventral appendage absent.

Distribution. Palaearctic, Oriental.

***Alnetoidia (Alnella) dentata* sp. nov.**

(Fig. 6)

Description. Body yellowish, without markings.

Apodemes (Fig. 6a) extended to 4th sternite.

Pygofer side (Fig. 6b) with 3 stout macrosetae at inner side of posterior margin; dorsal appendage long, curved ventrad, apex blunt. Subgenital plate (Fig. 6e) bearing group of long setae near base and row of stout microsetae

from near base to near apex, with 3 macrosetae at middle part along outer margin. Style (Fig. 6f) with basal part thin, apex footlike with some furrows. Connective (Fig. 6g) broad, lateral arms slim and long. Aedeagal shaft (Figs 6h, i) depressed, with pair of slim processes at middle part of lateral margins, exceeding gonopore, with small fingerlike process just beneath gonopore, apex weakly sclerotized and serrate; dorsal apodeme rudimentary, preatrium shorter than aedeagus shaft; gonopore apical on ventral side.

Measurement. Male 2.89mm.

Material examined. Holotype: ♂, CHINA, Yunnan Prov., Xinzhu, 2400–2500m, 16 xi 1999, coll. I. Dworakowska.

Remarks. The new species is similar to *A. (Alnella) triseta* Dworakowska, but can be distinguished by broader aedeagal shaft and its serrate apical margin, and presence of a small fingerlike process beneath the gonopore.

Etymology. The specific epithet is derived from the Latin word “*dentatus*”, referring to the serrate apex of the aedeagal shaft.

***Alnetoidia (Alnella) orientalis* Dworakowska, 1979 n. rec.**

(Fig. 7)

Alnetoidia (Alnella) orientalis Dworakowska, 1979b: 31, Figs 240–249; Dworakowska, 1994a: 109

Material examined. 1♂, CHINA, Yunnan Prov., Menglun, 570m, *Bauhinia* sp., 9 xii 1999, I. Dworakowska.

Distribution. China (Yunnan), India.

***Alnetoidia (Alnella) sudzuchenica* Anufriev, 1971 n. rec.**

(Fig. 8)

Alnella sudzuchenica Anufriev, 1971a: 110, Figs 78–83

Alnetoidia (Alnella) sudzuchenica Dworakowska, 1972e: 775; Anufriev & Emeljanov, 1988: 114, Pl. 74, 1–6

Alnetoidia (Alnella) sudzhuchenica Sohi, 1998a: 88 (Missp.)

Material examined. 1♂, CHINA, Sichuan Prov., Wolong, 2100m, 26 x 1999, coll. I. Dworakowska; 1♂, Yunnan Prov., Tengchong, 1700m, 22 xi 1999, coll. I. Dworakowska.

Host. *Alnus* sp.

Distribution. China (Sichuan, Yunnan), Russia, India, South Korea.

***Alnetoidia (Alnella) triseta* Dworakowska, 1994 n. rec.**

(Fig. 9)

Alnetoidia (Alnella) triseta Dworakowska, 1994a: 110, Figs 254–264

Material examined. 1♂1♀, CHINA, Yunnan Prov., Xinzhu, 2300m–2500m, 16 xi 1999, coll. I. Dworakowska.

Distribution. China (Yunnan), India.

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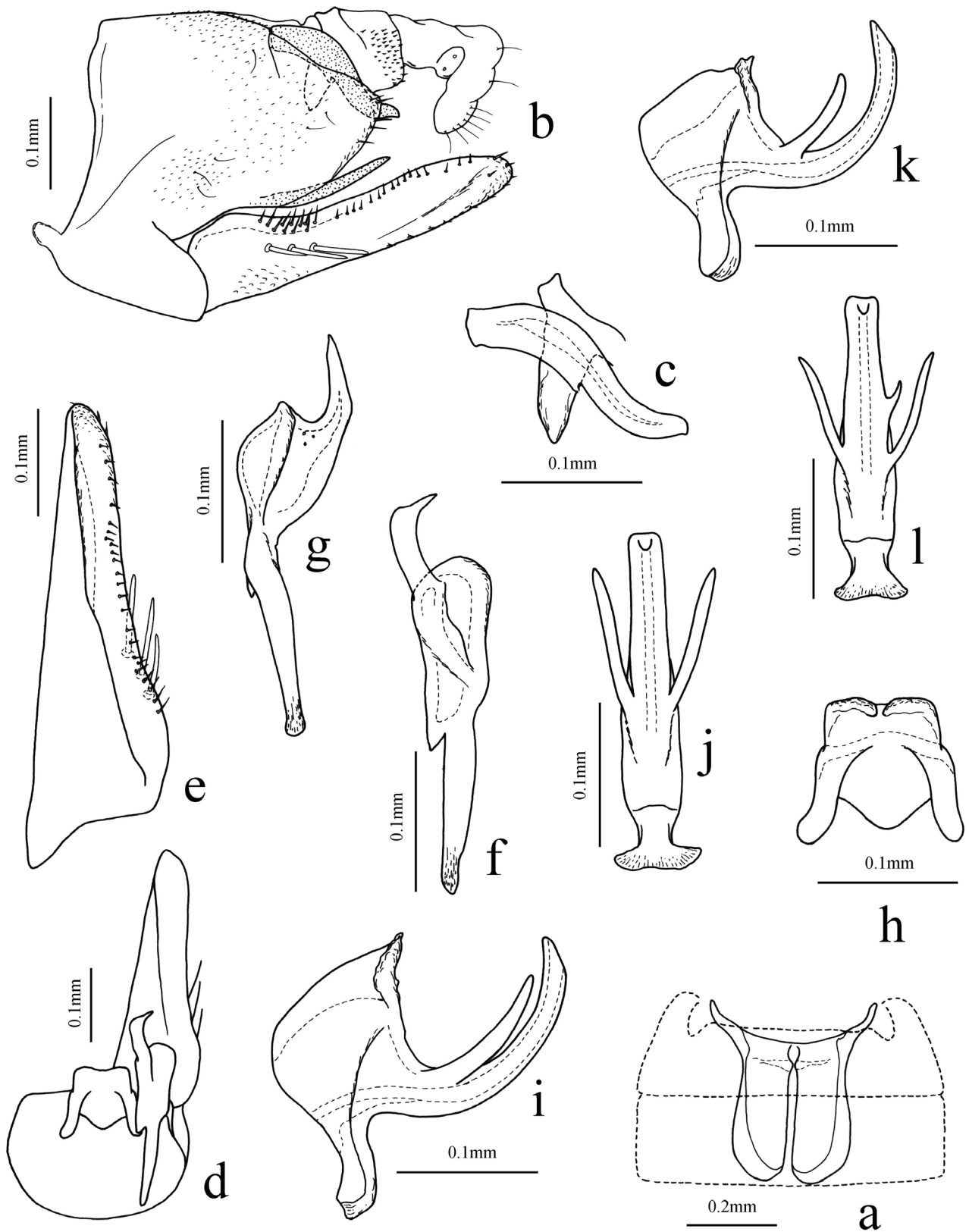


FIGURE 4 *Alnetoidia (Alnetoidia) gracilis* sp. nov. a. abdominal apodemes; b. genital capsule; c. anal tube appendage and pygofer dorsal appendage; d. subgenital plate, style, connective and the 9th sternite; e. subgenital plate, dorsal view; f. style, dorsal view; g. style, lateral view; h. connective; i. aedeagus of holotype, lateral view; j. aedeagus of holotype, caudal view; k. aedeagus of paratype, lateral view; l. aedeagus of paratype, caudal view.

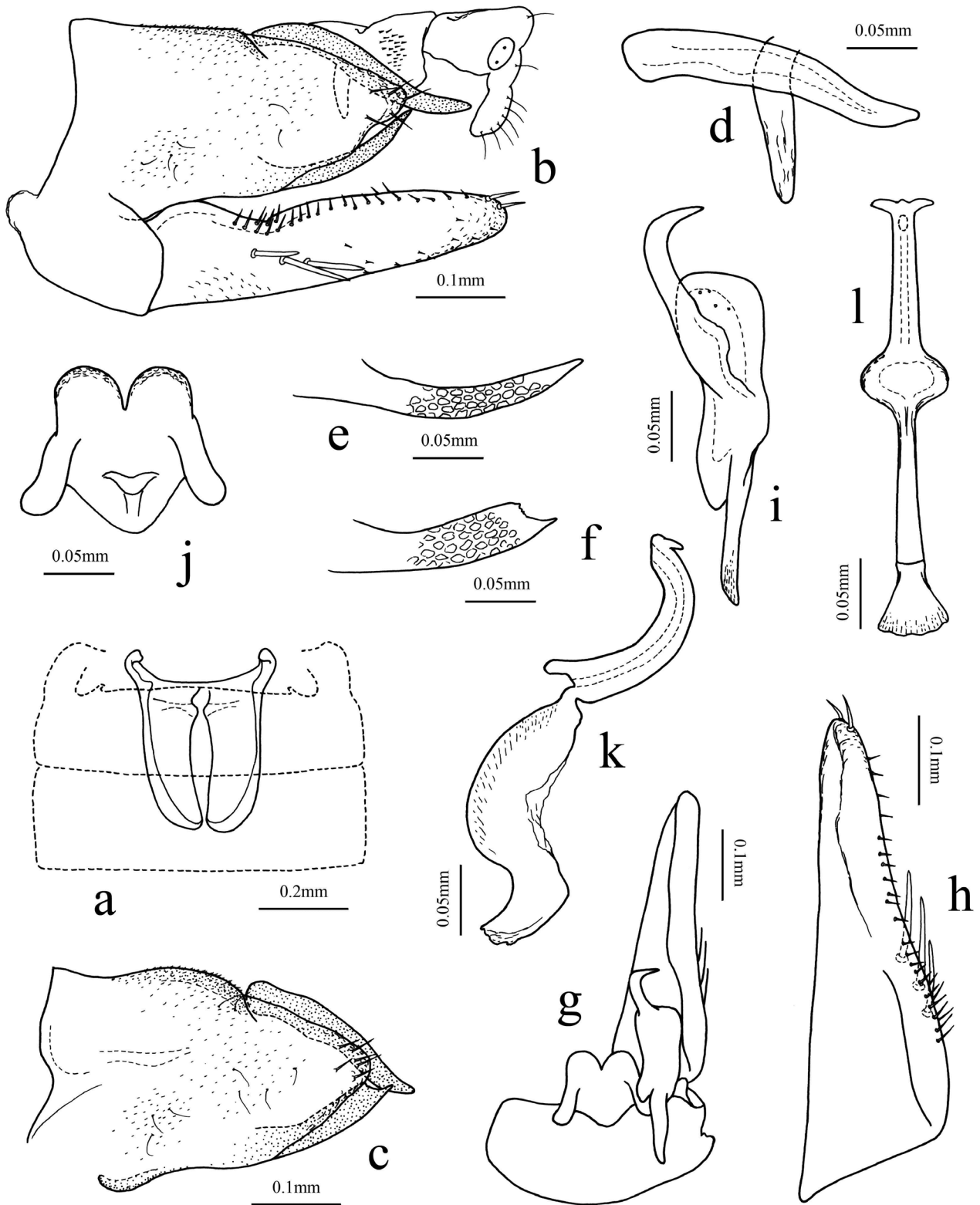


FIGURE 5 *Alnetoidia (Alnetoidia) sikkimensis* Dworakowska, 1994 a. abdominal apodemes; b. genital capsule; c. pygofer side, lateral view; d. anal tube appendage and pygofer dorsal appendage; e. f. pygofer ventral appendage; g. subgenital plate, style, connective and the 9th sternite; h. subgenital plate, dorsal view; i. style, dorsal view; j. connective; k. aedeagus, lateral view; l. aedeagus, caudal view.

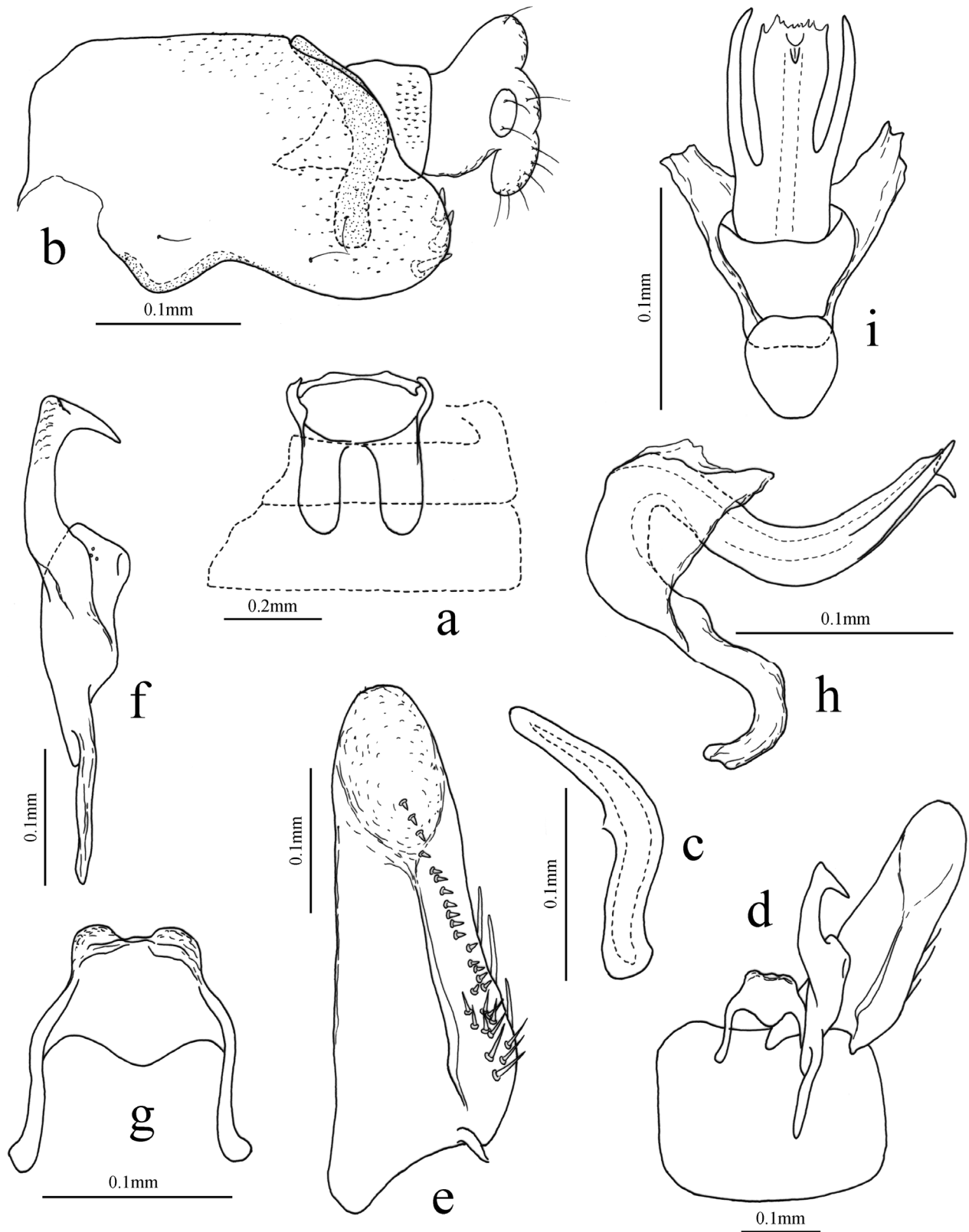


FIGURE 6 *Alnetoidia (Alnella) dentata* sp. nov. a. abdominal apodemes; b. anal tube and pygofer side, lateral view; c. pygofer dorsal appendage; d. subgenital plate, style, connective and the 9th sternite; e. subgenital plate, dorsal view; f. style, dorsal view; g. connective; h. aedeagus, lateral view; i. aedeagus, caudal view.

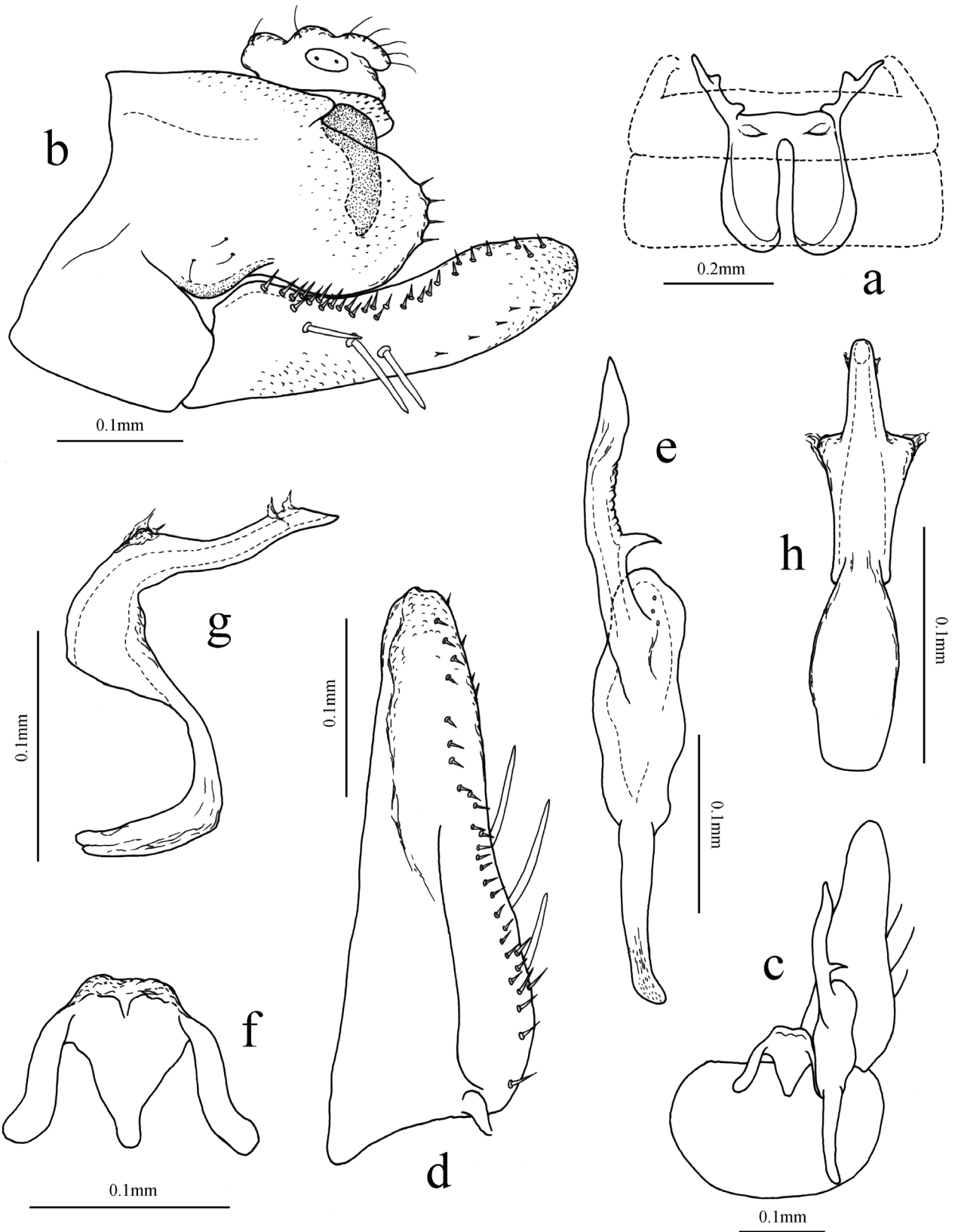


FIGURE 7 *Alnetoidia (Alnella) orientalis* Dworakowska, 1979 a. abdominal apodemes; b. genital capsule; c. subgenital plate, style, connective and the 9th sternite; d. subgenital plate, dorsal view; e. style, dorsal view; f. connective; g. aedeagus, lateral view; h. aedeagus, caudal view.

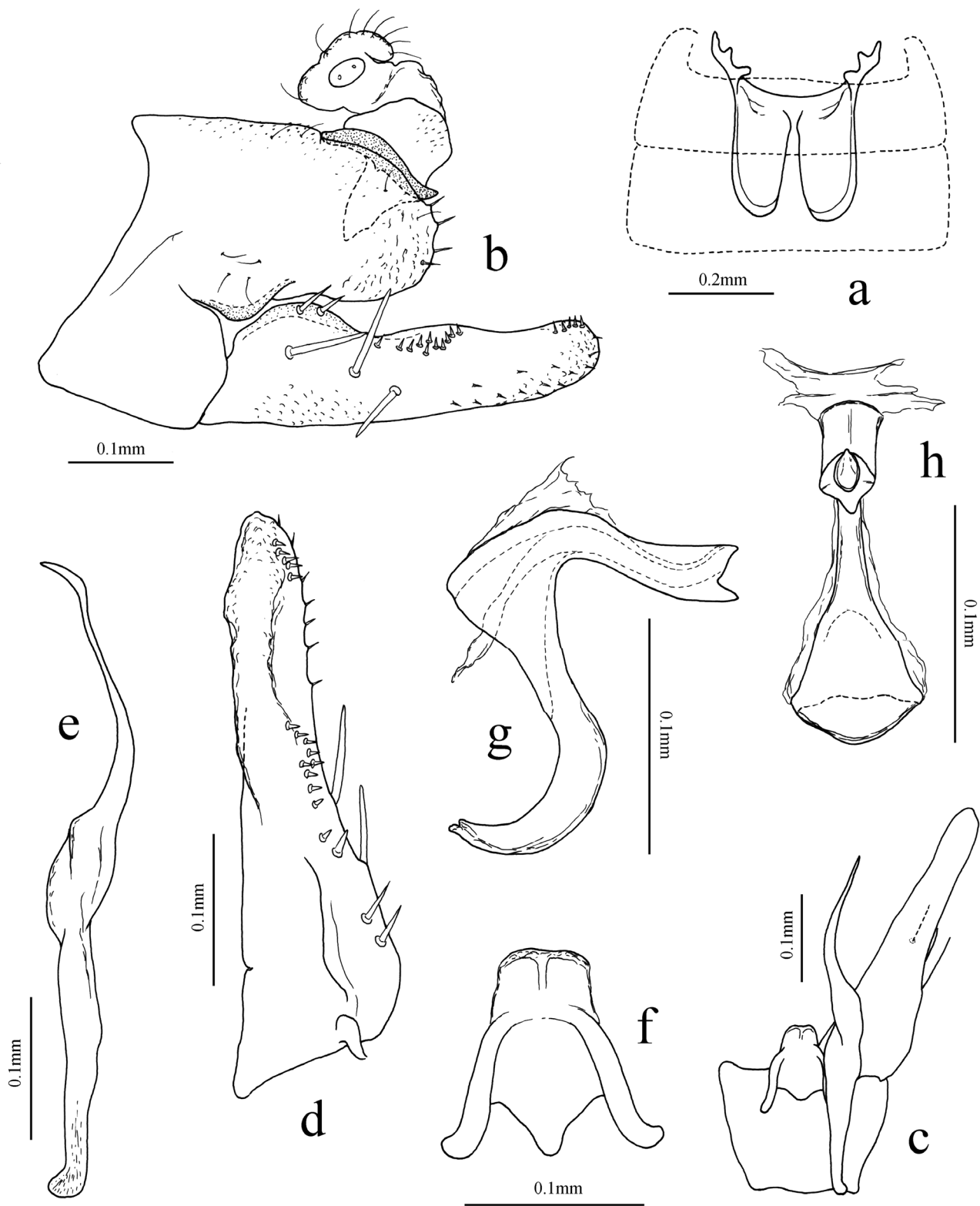


FIGURE 8 *Alnetoidia (Alnella) sudzuchenica* Anufriev, 1971 a. abdominal apodemes; b. genital capsule; c. subgenital plate, style, connective and the 9th sternite; d. subgenital plate, dorsal view; e. style, dorsal view; f. connective; g. aedeagus, lateral view; h. aedeagus, caudal view.

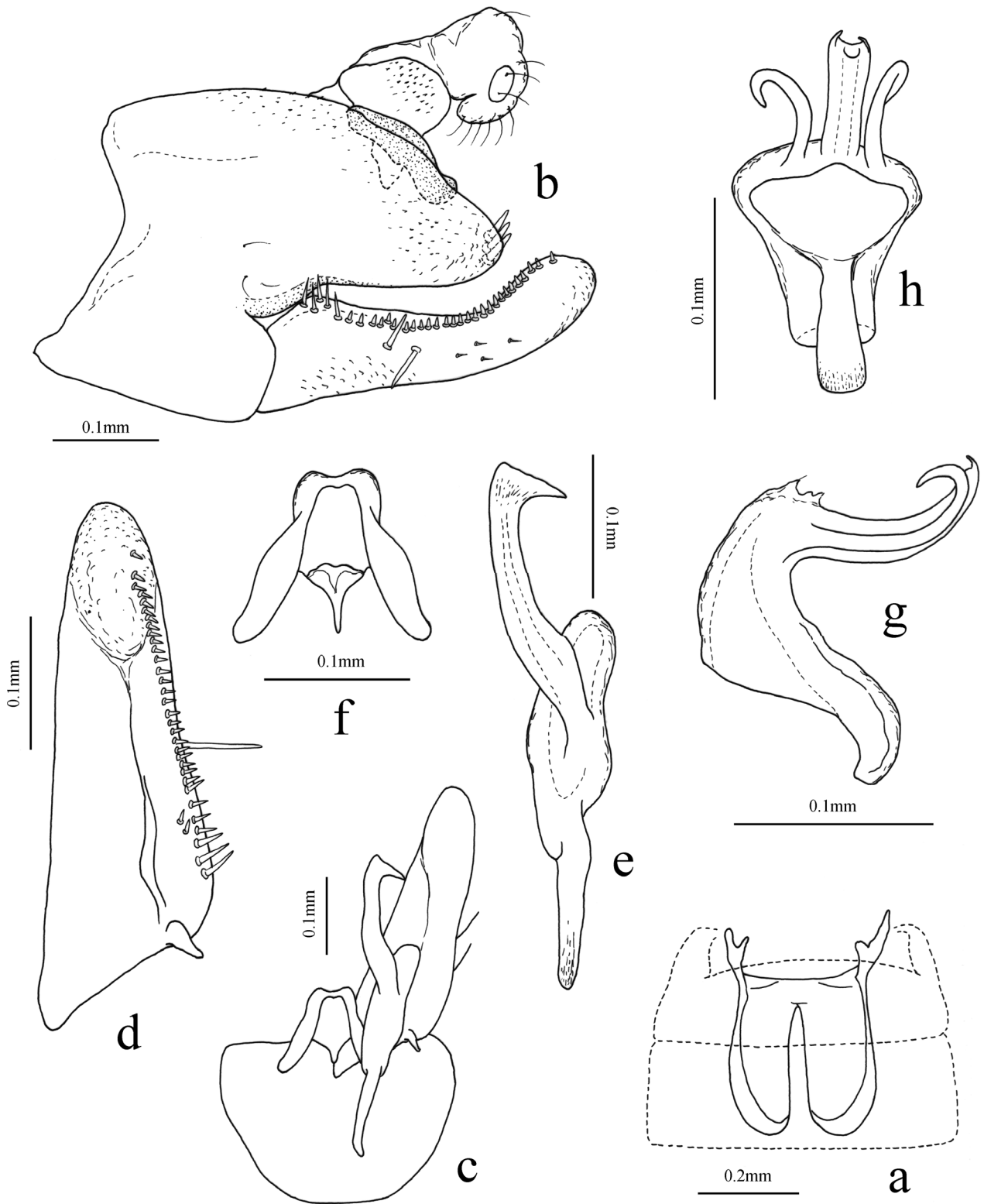


FIGURE 9 *Alnetoidia (Alnella) triseta* Dworakowska, 1994 a. abdominal apodemes; b. genital capsule; c. subgenital plate, style, connective and the 9th sternite; d. subgenital plate, dorsal view; e. style, dorsal view; f. connective; g. aedeagus, lateral view; h. aedeagus, caudal view.

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