Beautiful gelechiid moths – *Aristotelia baltica* A. Šulcs & I. Šulcs, 1983, stat. n. and related species (Gelechiidae)

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Abstract. *Aristotelia baltica* A. Šulcs & I. Šulcs, 1983 (stat. n.) is raised from being a subspecies of *A. coeruleopictella* Caradja (1920) to a separate species. It is compared with the closely related *A. coeruleopictella* and *A. pancaliella*. The adults and genitalia of these three species are described and illustrated. The female genitalia of *A. pancaliella* are figured for the first time. A lectotype of *A. pancaliella* (Staudinger, 1871) is designated. The larva and life history of *A. baltica* is described and illustrated for the first time.

Zusammenfassung. *Aristotelia baltica* A. Šulcs & I. Šulcs, 1983 (stat. n.) ist von einer Unterart von *A. coeruleopictella* Caradja (1920) zu einer separaten Art erhoben. Sie wird mit den nahe verwandten *A. coeruleopictella* und *A. pancaliella* verglichen. Die Falter und Genitalien dieser drei Arten werden beschrieben und abgebildet. Die weiblichen Genitalien von *A. pancaliella* werden zum ersten Mal abgebildet. Ein Lectotypus wird für *A. pancaliella* (Staudinger, 1871) festgelegt. Die Larve sowie die Lebensweise von A. baltica werden erstmalig beschrieben und illustriert.

Introduction

With at least 4530 described and numerous undescribed species (Hodges 1998: 147) the Gelechiidae is the third largest family of Microlepidoptera. In spite of some diversity in colour and wing pattern the larger number of Gelechiidae, especially in temperate and arid areas, have forewings with grey or brown colours and black markings.

Among the more colourful gelechiids are members of the genus *Aristotelia* Hübner, 1825. They often have yellow, orange or red-brown forewings with white and/or silvery markings. As currently delimited this genus is found in both temperate and warmer parts around the world, except some oceanic islands, being most diverse in the Nearctic and Neotropic regions. Seventeen species are found in Europe (Karsholt 2004), and several additional species are known in complexes of closely related species (O. Karsholt, in prep.).

Differences in genitalia between species are sometimes small, and many species are more easily recognized from external features. The labial palps are diverse in form and scaling, and they are useful in grouping the species. However, as in other genera of Gelechiidae such as *Gelechia* Hübner, 1825 or *Monochroa* Heinemann, 1870 the form of the labial palps does probably not reflect the phylogenetic relationships within the genus. Within *Aristotelia* some species are remarkable because of the form of their labial palps and in being extraordinary colourful. A few of these are dealt with below.

Abbreviations

CAUEC Christian Albrecht University Ecological Center, Kiel, Germany
LDM Latvian Museum of Natural History, Riga, Latvia

MGAB Muséum d'Histoire Naturelle "Grigore Antipa", Bucarest, Romania
MHNG Muséum d'histoire naturelle, Geneva, Switzerland
NHMW Naturhistorisches Museum, Vienna, Austria
ZIN Zoological Institute, Academy of Sciences, St. Petersburg, Russia
ZMHU Zoologisches Museum der Humboldt-Univarsität, Berlin, Germany
ZMUC Zoological Museum, Natural History Musum of Denmark

Results

Key to adult moths

1 Subapical patch in forewing white, with metallic base 2
1' Subapical patch metallic blue, edged with black; antenna black with apical fifth white ..... *A. baltica*

2 Antenna ringed black and white, smaller species (10–11 mm) ..... *A. pancaliella*
2' Antenna black, distal eight ringed with white; larger species (12–15 mm) ..... *A. coeruleopictella*

Key to male genitalia

1 Valva pointed, tip exceeding tip of acuminate uncus 2
1' Tip of rounded valva not or only shortly exceeding tip of rounded uncus ..... *A. pancaliella*

2 Vesica in phallus with a cone-shaped, thorned sclerotization ..... *A. coeruleopictella*
2' Vesica in phallus with plate with 1–2 small thorns ..... *A. baltica*

Key to female genitalia

1 Ostium bursae a broadly u-shaped bowl 2
1' Ostium bursae a v-shaped bowl ..... *A. pancaliella*

2 Central part of ductus bursae densly spined; signum with 1–2 lateral thorns ..... *A. baltica*
2' Central part of ductus bursae weakly spined, signum with 3 lateral thorns ..... *A. coeruleopictella*

Aristotelia coeruleopictella (Caradja, 1920)

Xystophora coeruleopictella Caradja, 1920: 106.
Aristotelia calloptera Omelko, 1999: 172 (figs), 174 (figs), 175.

Material. Lectotype: ♂, **Russia**, 'Kasakewitsch / 5582 Wlsm. 1908 / Lectotype *Xystophora coeruleopictella* Car. ♂, Des. Dr. A. Popescu-Gorj, Romania', gen. slide 671 Popescu-Gorj (MGAB) (examined). – Other material: **Russia:** 1♂, Ussuriskij regionj, Yakovlevka village, 17.vii.1926, leg. Diakonov & Filipiev, *Aristotelia pancaliella* Staudinger, 1870, male, det Piskunov, 1981 (ZIN); 1♀, same locality, but, 19.viii.1926, gen. slide OK 5109 (ZIN); 1♂, Primorskij Kraj, near Chinese border, Barabasch village,

Figs 1–4. Adults of *Aristotelia* species. **1–2.** *A. baltica* A. Šulcs & I. Šulcs, Latvia (male right, female left). **3.** *A. coeruleopictella* (Caradja), Far East Russia. **4.** *A. pancaliella* (Staudinger), Lectotype, Russia.

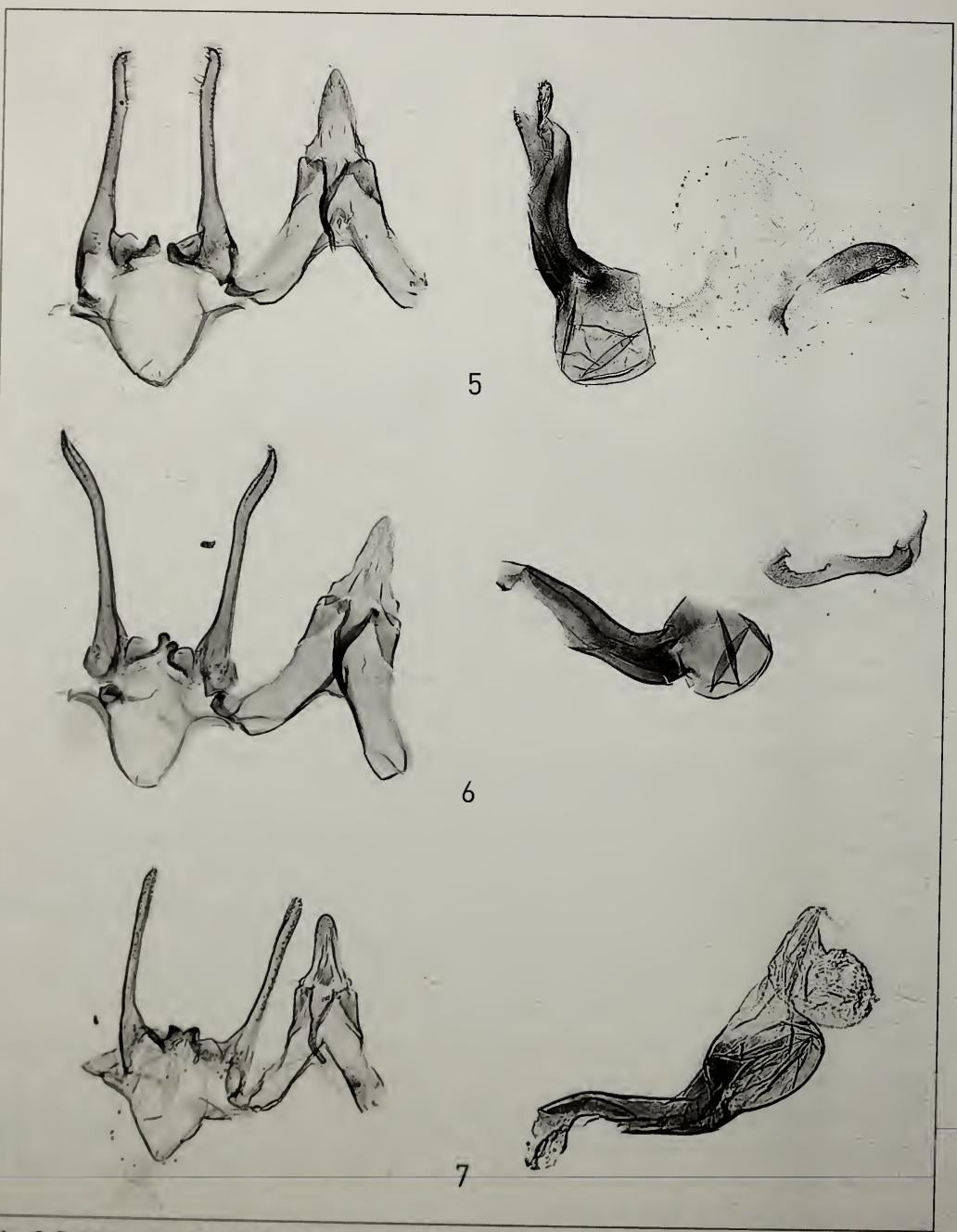
20.vii.1989, leg. S. Yu. Sinev, gen. slide HH 4980 (ZIN); 2♂, 1♀, Primorskij Kraj, Shkotovo distr., Anisimovka village, 17-20.vii.1994, by light, leg. N. Savenkov (LDM).

Diagnosis. *Aristotelia coeruleopictella* is characterized by its black antennae having the distal eighth ringed with white (apical fifth white in *A. baltica;* ringed black and white in *A. pancaliella*), and by its lanceolate, reddish orange forewings (not lanceolate and shorter in *A. pancaliella*) with metallic, black edged patches.

Description (Fig. 3). Wingspan 13–15 mm. Labial palp long, falciform, segment 2 orange-yellow; segment 3 longer than segment 2, black, upper surface mottled with yellow. Antenna black, distal eight ringed with white. Head and tegula shining metallic, thorax black. Forewing lanceolate, reddish orange with four shining metallic, black edged patches and similar markings at base and around apex and termen; a subapical white patch on costa with metallic base; stigmata absent; cilia grey without a cilia line. Hindwing blackish brown with dark grey cilia. Underside of forwing black with a weak, white subapical spot at costa.

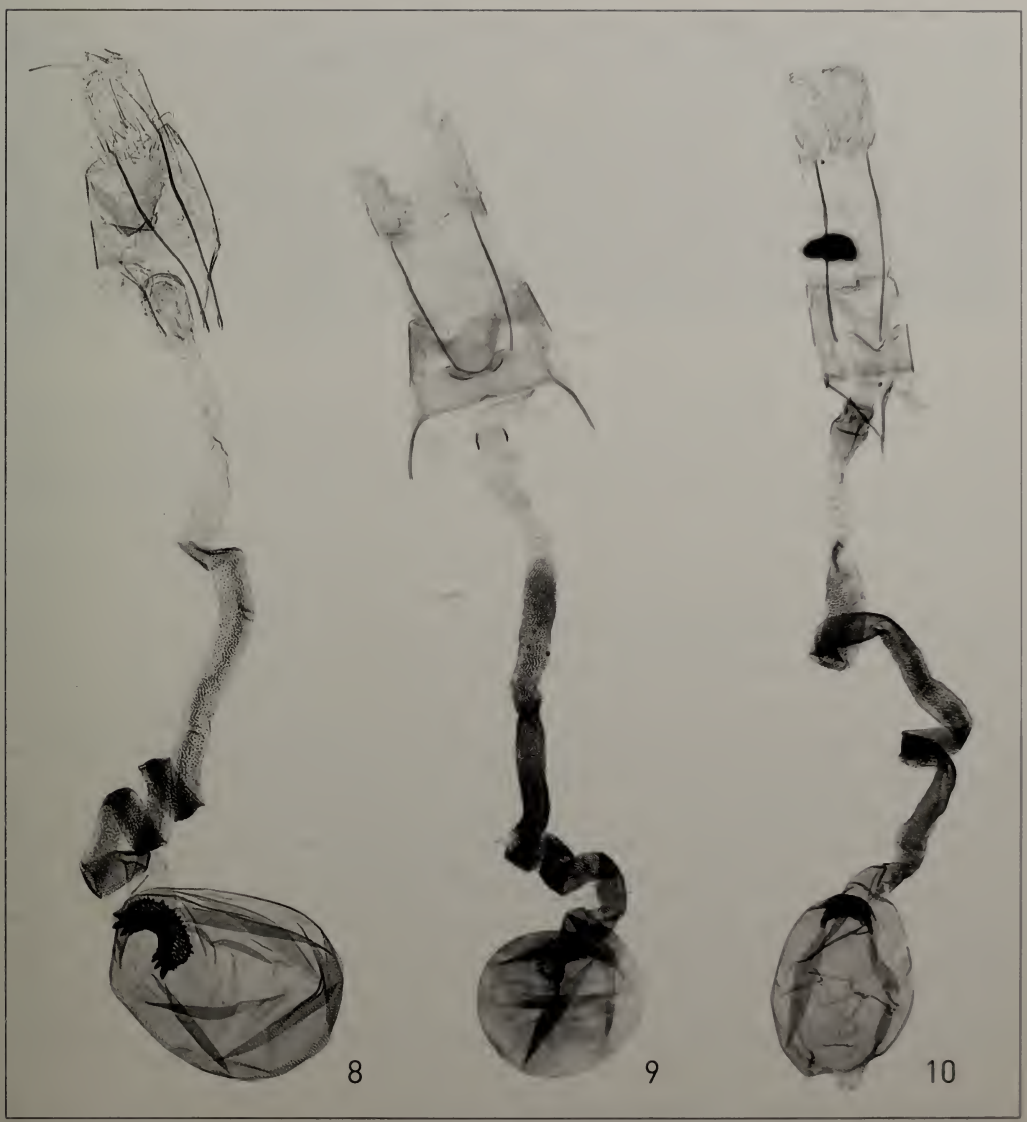
Male genitalia (Fig. 5). Uncus long, acuminate; gnathos slightly longer than uncus, slightly bent; valva very long and slender, slightly bent, exceeding beyond uncus, with apical thorn; sacculus reduced; vincular process tiny, rounded; saccus, short, semi-circular. Phallus bent, with small, globular base; distal-laterally with several small thorns; vesica with a cone-shaped, thorned sclerotization.

Female genitalia (Fig. 8). Apophyses anteriores about the length of segment VIII; ostium bursae a broadly v-shaped bowl; ductus bursae long, coiled, anterior third



Figs 5–7. Male genitalia of *Aristotelia* species. **5.** *A. coeruleopictella* (Caradja), gen. prep. HH 4980. **6.** *A. baltica* A. Šulcs & I. Šulcs, gen. prep. HH 4922. **7.** *A. pancaliella* (Staudinger), Lectotype, gen. prep. OK 5112.

densely spined, central third less spined and posterior third without spines; signum large, broadly semicircular, covered with thorns and serrated margin ending with three larger lateral thorns.



Figs 8–10. Female genitalia of *Aristotelia* species. **8**. *A. coeruleopictella* (Caradja), gen. prep. OK 5108. **9.** *A. baltica* A. Šulcs & I. Šulcs, gen. prep. HH 4923. **10**. *A. pancaliella* (Staudinger), gen. prep. OK 5110.

Distribution. Russia (Khabarovskij Kraj, Primorskij Kraj).

Life history. Early stages and host plant unknown. Adults have been collected in second part of July. Omelko (1999: 175) also gives August as flight period. Can be attracted to light.

Remarks. Caradja (1920: 106) described *Xystophora coeruleopictella* from two males collected at Kasakewitsch in Far East Russia by Raddé. He associated it with [*Argolamprotes*] *micella* (Denis & Schiffermüller, 1775). A lectotype was designated by Popescu-Gorj (1992: 145). To our knowledge it was not recorded again in the literature, apart from catalogues (Meyrick, 1925: 46; Gaede, 1937: 50), until Šulcs &

Šulcs (1983: 40). Park (1996: 61) stated the abdomen of the lectotype to be lost, but that was because its genitalia had been dissected. A drawing of the genitalia is kept in ZMUC. *Aristotelia calloptera* was described from a series of both sexes collected in the Primorye region, Russian Far East as well (Omelko 1999: 175). He apparently overlooked Caradja's description of *A. coeruleopictella*, and we consider *A. calloptera* Omelko as a junior synonym of *A. coeruleopictella* (Caradja). This synonymy was recently published by Ponomarenko (2008: 327).

The three species discussed in this paper were formerly placed under "*Aristotelia pancaliella* (Staudinger)" in the collection of ZIN, with specimens of *A. baltica* from Lithuania (and 1 specimen from a locality about 100 km north of St. Petersburg), and specimens of *A. coeruleopictella* from 'Ussuri' and 'Amur'.

The few examined specimens show almost no variation. According to Caradja (1920: 106) the medial part of the antenna is ringed black and white. We could not confirm that. Omelko (1999: 175) gave the wingspan as "11.5–14 mm". We did not examine such small specimens.

Aristotelia baltica A. Šulcs & I. Šulcs, 1983, stat. n.

Aristotelia coeruleopictella spp. *baltica* A. Šulcs & I. Šulcs, 1983: 41.

Material. Holotype: ♂, '**Latvia**, Kandava (Čužas) 17.vii.1979, leg. I. Šulcs' (coll. Šulcs) (examined). – Paratype: 1♂, same data, but leg. A. Šulcs, gen. slide OK 3395 (ZMUC). – Other material: **Bosnia-Herzegovina**: 1 ♂, 1 ♀, 25 km SW Trebinje, e. l. 29.vi.1965, *Rhamnus*, leg. H. Malicky, gen. slide O. Karsholt 5113, 5114 (NHMW). **Latvia**: 3♂, 6♀, Ķemeri 1.-15.vi.1993, ex l. *Frangula alnus*, leg. N. Savenkov (CAUEC, LDM, ZMUC); 2♂, Ķemeri (Kūdra), 29.vii.1993, leg. N. Savenkov (LDM); 1♂, Dunava, vi.1993, leg. A. Barševskis (LDM); 1♂, Teiču reserve, 23.vii.1993, leg. N. Savenkov (LDM); 2♂, 1♀, Kandava, 27.vii.1994, leg. J. Junnilainen, gen. slide HH 4922, 4923; 1♀, Carnikava, 21.vii.1995, leg. J. Jannilainen (ZMUC); 1♀, Silene, Ilgas 28.vii.1997, A. Barševskis (LDM); 5♂, 8♀, Silene, Ilgas, 17.-26.vi.2002, ex l. *Frangula alnus*, leg. N. Savenkov, (CAUEC, LDM, ZMUC); 3♂, 6♀, Nīcgale, 10.-27.vi.2002, ex l. *Frangula alnus*, leg. N. Savenkov (LDM, CAUEC); 1♂, Slītere, 23.vii.2003, leg. N. Savenkov (LDM); 1♂, Kandava (Čužas), 22.vii.1988, on *Potentilla fruticosus* flowers, leg. N. Savenkov (LDM); 1♂, 5♀, Kandava (Čužas), 14.-16.vii.2003, ex l. *Frangula alnus*, leg. N. Savenkov (LDM, CAUEC). **Lithuania:** 2♂, N. Vertiai, 23.vii.1980, 2♂, 2♀, 5.viii.1980, leg. P. Ivinskis, gen. slide HH 1582, OK 3671, 3672 (ZMUC); 1♀, N. Vertiai, 30.vi.1981, ex l. *Rhamnus*, 1♂, 7.vi.1986, ex l. *Rhamnus*, leg. P. Ivinskis (LDM).

Diagnosis. See under *A. coruleopictella*.

Description (Figs 1–2). Wingspan 10–13 mm. Labial palp long, falciform, segment 2 orange-yellow; segment 3 longer than segment 2, black. Antenna black with apical fifth white. Head and tegula shining metallic; thorax black. Forewing lanceolate, reddish orange with four metallic blue, black edged patches and similar markings at base and around apex and termen; stigmata absent; cilia grey without cilia line. Hindwing blackish brown with dark grey cilia. Abdomen and underside of wings black.

Male genitalia (Fig. 6). Uncus long, acuminate; gnathos about as long as uncus, slightly bent; valva very long and slender, slightly bent, exceeding beyond uncus, tip pointed; sacculus reduced; vincular process tiny, rounded, fused; saccus, short, rounded. Phallus bent, with globular base; vesica with plate with 1-2 small thorns.

Female genitalia (Fig. 9). Apophyses anteriores about half to about two thirds length of segment VIII; ostium bursae a broadly u-shaped bowl; ductus bursae long,

Figs 11–12. Larvae of *A. baltica* A. Šulcs & I. Šulcs on *Frangula alnus*.

coiled, densely spined, posterior part without spines; signum broadly semicircular, covered with thorns, with serrated margin and pair of lateral thorns.

Distribution. Estonia, Latvia, Lithuania, Bosnia-Herzegovina, and European Russia, eastwards to the southern Urals (Junnilainen et al. in press).

Life history (Figs 11–12). The larva is light greyish, ornamented with lighter and darker pattern and an irregular dark lateral line. The abdomen has scattered, light hairs. Head and prothoracic plate light brown; anal plate concolorous with the abdomen. It feeds, probably after hibernation, in May and June on young leaves and flowers of *Frangula alnus* Mill. (Rhamnaceae) covering them with transparent silk. The larva is very mobile and when disturbed rapidly moves to the safe place in the web or falls down to the ground. The habitats are wet meadows with *F. alnus*, but moths are often found in some distance from *Frangula* trees (Ivinskis1982: 44, 46, as *A. pancaliella*; Ivinskis *in litt.*, N. Savenkov, pers. obs.). The adult flies in July to early August. It can be found during the day and is occasionally attracted to light. It has been observed on flowers of *Potentilla fruticosus* (L.) Rydb. (Rosaceae) and *Inula salicina* L. (Asteraceae) (Šulcs & Šulcs 1983: 41). The specimens from Bosnia-Herzegovina were, according to their labels, bred from "*Rhamnus*" (Rhamnaceae).

Remarks. *Aristotelia coeruleopictella* spp. *baltica* was described from three males and one female collected in the nature reserve 'Čužas' by Kandava in Latvia. The description included important distinctive characters when compared with *A. coeruleopictella*, but due to lack of material for comparison it was at that time not obvious if the two taxa should be considered as separate species. This has since proved to be the case as we have demonstrated.

The examined specimens show little variation. The two specimens from Bosnia-Herzegovina differ from those from the Baltic States by being slightly smaller and having the subapical spot on the forewings white with metallic base.

Aristotelia pancaliella (Staudinger, 1871)

Gelechia pancaliella Staudinger, 1871: 312.

Material. Lectotype (here designated): ♂, **Russia**, 'Sarepta [=Krasnoarmeysk]. Chr.[istoph] / Orig[i]n[al]. / Zool. Mus. Berlin', gen. slide O. Karsholt 5112 (ZMHU). – Other material: **Russia**. 1 ♀. Volgograd.

18-24.v.1967, leg. V. Zouhar, gen. slide O. Karsholt 5110 (ZMUC). **Syria**: 1 ♀, 20 km N E Damascus, 16-23.v.1961, leg. F. Kasy & E. Vartian (NHMW). **Turkey**: 2 ♂, Diyarbakir, Monastery Hill, caravanserai of Husrev Pasha, 1.vii.1941, collector unknown (MHNG); 1 ♂, prov. Kayseri, 5 km W Incesu, 1250 m, 30.vii.1989, leg. M. Fibiger & N. Esser (ZMUC).

Diagnosis. See under *A. coeruleopictella*.

Description (Fig. 4). Wingspan 10–11 mm. Labial palp long, falciform, segment 2 orange-yellow; segment 3 longer than segment 2, black. Antenna ringed blackish brown and white. Head and tegula shining metallic; thorax orange mottled with brown towards head. Forewing orange with three silvery, black edged patches and similar markings at base and around apex and termen; subapical patch on costa white with metallic base; stigmata absent; cilia dark grey without cilia line. Hindwing blackish brown with dark grey cilia. Underside of forewing shining black, with white subapical spot at costa. Abdomen dark grey, distal part of each segment on underside shining pale yellow.

Male genitalia (Fig. 7). Uncus long, rounded; gnathos about as long as uncus, slightly bent; valva long and slender, almost straight, extending shortly beyond uncus, tip rounded; sacculus reduced; vincular process rather stout, subtriangular, laterally emarginated; saccus broad, triangular. Phallus bent, with globular base; distal-laterally with one small thorn; vescia with few spinules.

Female genitalia (Fig. 10). Apophyses anteriores about half length of segment VIII; ostium bursae a v-shaped bowl; ductus bursae long, coiled, densely spined, posterior part without spines; signum semicircular, covered with thorns, with serrated margin and pair of large, lateral thorns.

Distribution. South of Russia, Turkey, and Syria.

Life history. Early stages and host plant unknown. According to Anikin & Piskunov (1995: 5) *A. pancaliella* occurs in dry steppe biotopes near the type locality in southern Russia. They state the larva to feed on flowers of *Frangula alnus*. However, this host plant record almost certainly refers to *A. pancaliella sensu* Ivinskis (1982), which is in fact *A. baltica*. Adults have been collected in late June and July. Those from Diyarbakir were, according to their labels, found on flowers of *Globularia* (Globulariaceae).

Remarks. *Aristotelia pancaliella* was described from a series of specimens collected by H. Christoph in early July near Sarepta [now Krasnoarmeysk] in southern Russia (Staudinger: 1871: 112). The name *pancaliella* was first proposed by Zeller (*in litt.*) and was made available by Staudinger. He associated it with [*Argolamprotes*] *micella* (Denis & Schiffermüller, 1775).

We studied a male syntype from the Staudinger collection in ZMHU. Due to the confusion about the identity of *pancaliella* as described above we designate this specimen a lectotype.

Aristotelia pancaliella differs from *A. coeruleopictella* and *A. baltica* by being smaller (more short-winged), and by having the antennae ringed black and white from base to tip.

Only few specimens were examined. One female from South Russia has many cream-coloured scales at the underside of both wings. The examined specimens from Turkey and Syria have white scales at the basal edge of the metallic patch at 2/3 of the dorsum of the forewing.

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