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Parasitoid Wasps of the Subgenus *Pauesia* Quilis s. str. (Hymenoptera, Aphidiidae) from Russia and Neighboring Countries

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Abstract—*Pauesia* (*Pauesia*) *eugenii* Davidian, sp. n. is described from Irkutsk Province and Kunashir Island of Russia. New data on *P. unilachni* (Gahan, 1926), *P. picta* (Haliday, 1834), and *P. laricis* (Haliday, 1834) and a key to 8 species of the subgenus *Pauesia* are given. A new synonymy is established: *P. akamatsukola* Takada, 1968 = *P. longicauda* Chiriac, 1993, syn. n.

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The genus *Pauesia* Quillis, 1931 comprises 3 subgenera, *Pauesia* s. str. [type species *P. albuferensis* Quilis, 1931 = *P. unilachni* (Gahan, 1926)], *Paraphidius* Starỳ, 1958 [the type species *Pauesia californica* (Ashmead, 1889)], and *Pauesiella* Sedlag et Starỳ, 1980 (type species *P. spatulata* Sedlag et Starỳ, 1980), mainly differing from one another in the shape of the ovipositor sheaths (Sedlag et Starỳ, 1980; Sanchis et al., 2001). Chiriac (1993) showed the presence of two types of setae at the apices of the ovipositor sheaths in the species of genus *Pauesia*: simple ones and those having tubular bases. It has been found that the setae with tubular bases are mainly typical of the species of the subgenus *Paraphidius* possessing widely oval ovipositor sheaths, whereas the simple setae are typical of the majority of the species of *Pauesia* s. str. with the sheaths more or less elongate and narrowed toward the apices (Pike et al., 2002).

The new species described here possesses strongly elongate ovipositor sheaths with simple setae at their apices and belongs to the nominotypical subgenus *Pauesia*. This subgenus includes the following Palaearctic species: *P. akamatsucola* Takada, 1968, *P. anatolica* Michelena, Assael et Mendel, 2005, *P. antennata* (Mukerji, 1950), *P. cedrobii* Starỳ et Leclant, 1977, *P. cupressobii* (Starỳ, 1960), *P. goidanichi* Starỳ, 1966, *P. japonica* (Ashmead, 1906), *P. jezoensis* (Watanabe, 1941), *P. koraiensis* Starỳ, 2001, *P. laricis* (Haliday, 1834), *P. luntervalvae* Chiriac, 1993, *P. maculolachni* (Starỳ, 1960), *P. momicola* Takada, 1965, *P. picta* (Haliday, 1834), and *P. unilachni*.

MATERIALS AND METHODS

The study is based on the results of examination of the material from the Zoological Institute of the Russian Academy of Sciences (St. Petersburg; ZIN). The following designations and indexes were used: POL, the distance between the posterior ocelli; od, the maximum diameter of the posterior ocellus; the tentorial index, the ratio of the distance from the tentorial pit to that between the tentorial pits; F1 and F2, the 1st and 2nd flagellar segments of the antennae; R1 and R2, the 1st and 2nd sections of the radial vein of the fore wing. The total number of the antennal segments is given including the scape and pedicel.

All the photographs were taken by the author using an "Axio Imager M–1" ZEISS microscope in the Laboratory of Biomethod of the All-Russia Research Institute for Plant Protection (St. Petersburg). The type series of the new species is deposited in the ZIN collection.

The Species of the Subgenus Pauesia s. str. Quillis, 1931 with Narrow Ovipositor Sheaths

Pauesia* (*Pauesia*) *unilachni (Gahan, 1926)

Material. Belarus. *Vitebsk Prov.*, Poozer'e, Gorodokskii District, Marchenki Vill., from *Schizolachnus pineti* on needles of Pinus sp., 13.VII.2000, 1 ♀. *Minsk Prov.*, 0.2 km SW of Verkhutino Railway Station, from *Sch. pineti* on needles of Pinus sp., 5.X.1999 (S.V. Buga), 1 ♀. **Russia.** *Kaliningrad Prov.*, Curonian Spit, Rybachii Vill., on Pinus sp.,

9.VII.1999, 1 ♀; same locality, 21.VIII.1990, 1 ♂; 23rd km of Curonian Spit, from *Sch. pineti* on P. sylvestris, 10.VI.1992, 3 ♀; same locality, 27–30.VI.1998, 1 ♂, 3 ♀; same locality, 4.VII.1998, 2 ♀; 32nd km of Curonian Spit, from *Sch. pineti*, 21.VIII.1990, 1 ♀; 34th km of Curonian Spit, from *Sch. pineti*, 16.IX.1991 (A.R. Manukian), 1 ♂; 45th km of Curonian Spit, from *Sch. pineti* on P. sylvestris, 29–30.VI.1998, 5 ♀; Kaliningrad, botanical garden, on P. nigra, 8.VII.1998 (V. Bordukov), 1 ♂, 1 ♀. *Leningrad Prov*., Tosnenskii Distr., Ushaki Vill., on Pinus sp., 10.VII.2003 (E.M. Davidian), 1 ♂, 1 ♀. *St. Petersburg*: Solnechnoe Vill., dunes, 31.VI.1980 (V.I. Tobias), 1 ♀; Pushkin, on Pinus sp., 11.VIII.2003, 4 ♂, 5 ♀; 16.VII.2004, 1 ♂, 6 ♀; same locality, 29.VI.2005, 1 ♂; same locality, 16.VI.2008, 2 ♂, 2 ♀; Pavlovsk, on Pinus sp., 12.VII.2003, 1 ♀; same locality, 8.VI.2013, 1 ♀; St. Petersburg, on Pinus sp., VI.2009 (E.M. Davidian), 1 ♀. *Moscow Prov*., Zagorskii District, Krasnozavodsk, 21.IV.1978 (V.N. Alekseev), 1 ♀. *Belgorod Prov*.: Borisovka Vill., arboretum of "Les na Vorskle" Nature Reserve, from *Sch. pineti* on P. sylvestris, 3.VI.2002, 6 ♂, 11 ♀; same locality, "Ostras'evy yary" steppe area, from *Sch. pineti* on P. sylvestris, 17.V.2000, 1 ♂, 4 ♀; same locality, fish farm, 12.VI.2002 (E.M. Davidian), 4 ♂, 4 ♀. *Krasnodar Territory*, Sochi, Lazarevskii Distr.: from *Sch. pineti* on Pinus sp., 26.V.1984, 3 ♂, 10 ♀; 28.VI.1984, 1 ♀; 9.VII.1984, 1 ♂; 31.V.1985, 1 ♀; 4.VI.1985, 1 ♀; 20–23.VI.1985, 2 ♂, 3 ♀; 2–7.VII.1985, 3 ♂, 4 ♀; 20.VII.1985 (E.M. Davidian), 1 ♀. *Novosibirsk Prov*., Novosibirsk, botanical forestry, on P. sylvestris, 27–28.VI.2007 (A.V. Gavrilyuk), 3 ♀. *Republic of Altai*, Chemal Vill., mixed forest, 19–22.VII.2007 (S.A. Belokobylskij), 1 ♀. *Amurskaya Prov.*, environs of Zeya, on pine, 6–10.VI.1978 (V.N. Alekseev), 1 ♀.

Distribution. A widespread Palaearctic species described from Taiwan (= Formosa). It is recorded from the Caucasus and the Russian Far East for the first time.

Pauesia* (*Pauesia*) *eugenii Davidian, sp. n.
(Fig. 1, *1–5*)

Material. Russia. Holotype: ♀. *Sakhalin Prov*., Kunashir Island, Golovnin Volcano, glade, 27.VII.1981 (S.A. Belokobylskij). Paratypes. *Irkutsk Prov*., environs of Tibelti Vill., 8–10.VI.1970 (D.R. Kasparyan), 2 ♀.

In the holotype, the left antenna is complete; the right one is broken off and includes 16 segments. In both the paratypes, the antennae are broken off: 2 segments (scape and pedicel) remain in one paratype and 7, in the other.

Description. Female. Head wider than long, smooth, shining, wider than thorax with tegulae, narrowed behind eyes. Eyes subhemispherical, with sparse hairs. Longitudinal diameter of eye 2.1–2.4 times length of temples. POL 4–4.5 times od. Clypeus smooth, slightly convex, twice as long as wide. Tentorial pits deep. Tentorial index 0.8. Maxillary palpi 4-segmented, labial palpi 3-segmented. Antennae filiform, 19-segmented. F1 slightly longer than F2. F1 2.2 times and F2 twice as long as wide in median part (Fig. 1, *1*). F1 with 2 rhinaria, F2 with 3 or 4 rhinaria. Face densely pubescent. Mandible with long hairs on lower margin.

Mesoscutum smooth and shining, with sparse hairs, almost vertically falling on pronotum in lateral view. Notauli reaching middle of mesoscutum, clearly transversely rugose in anterior half, smooth in distal part. Propodeum with smooth closed central cell (Fig. 1, *4*). Pterostigma of fore wing 2.3–2.7 times as long as wide, equal in length to metacarp. R1 as long as or slightly longer than R2; its length equal to width of pterostigma (Fig. 1, *2*).

Petiolus long, slightly more strongly widened from spiracles toward apex than toward base (Fig. 1, *3*), with spiracular tubercles situated near middle, 3.5 times as long as wide at level of spiracles, dorsally with distinct sculpture: in holotype, entirely finely punctate in middle 1/3, finely tuberculate-alveolate in apical 1/3; in paratypes, more strongly smoothened dorsally in apical 1/3. Ovipositor sheaths moderately narrowed toward apex, weakly and smoothly curved upwards, dorsally with numerous short setae along nearly entire length except in basal part; in addition, with 4 long setae behind middle, one among which 1.5–2 times as long as others (Fig. 1, *5*).

Type specimens slightly differing in coloration of body. In holotype, head mainly brown; face, clypeus, mouthparts, prothorax, legs except for tarsi, and apical part of metasoma beginning with tergite IV, yellowish. Scape yellow ventrally, brown dorsally. Pedicel, apical half of petiolus, accrete metasomal tergites II and III, and also ovipositor sheaths brown. Flagellar segments, mesoscutum, mesopleura, scutellum, metanotum, and propodeum dark brown. Paratypes darker and uni-

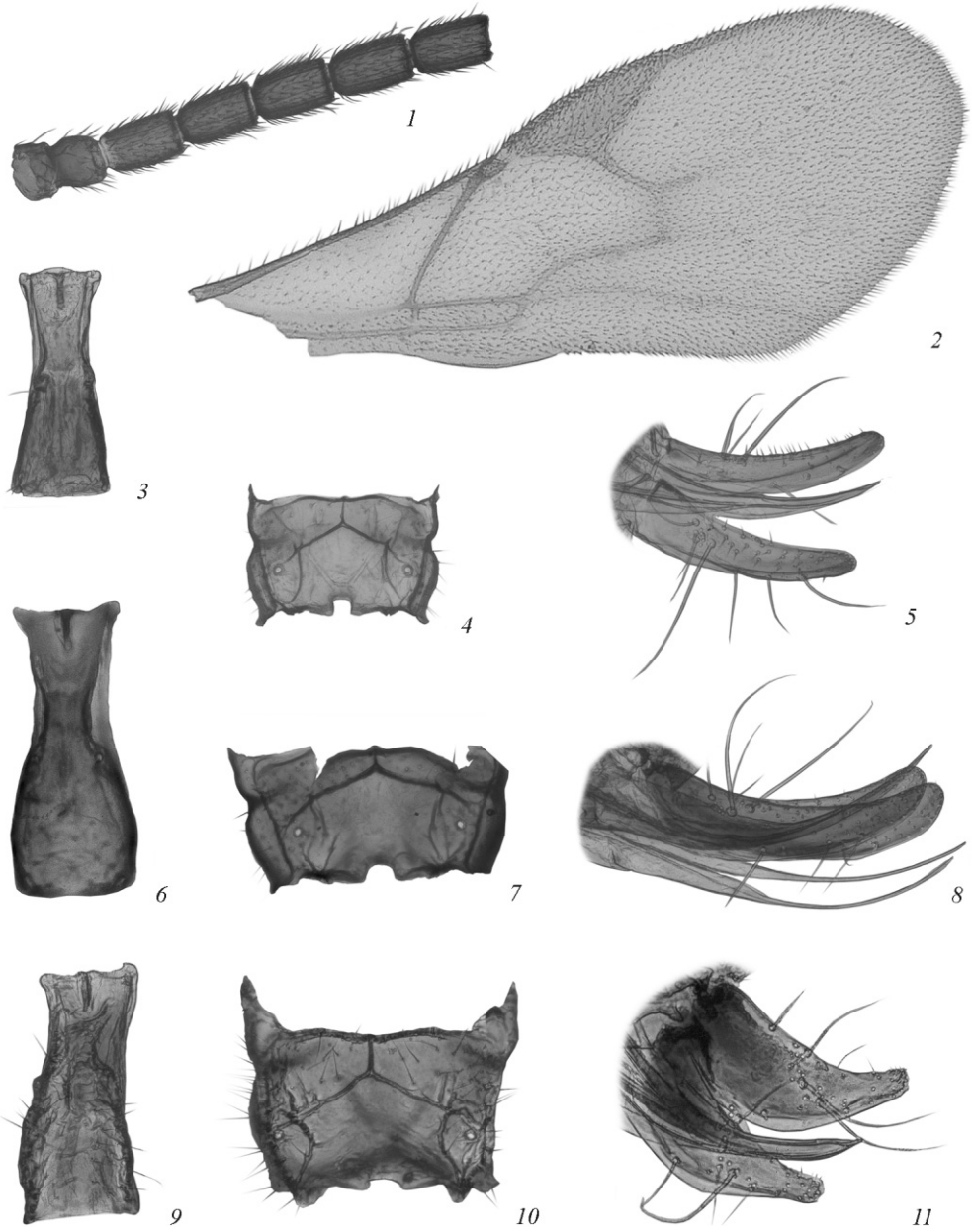

Fig. 1. *Pauesia* Quilis, basal part of antenna (*1*), fore wing (*2*), petiolus (*3*, *6*, *9*), propodeum (*4*, *7*, *10*), ovipositor (*5*, *8*, *11*): (*1–5*) *P. eugenii*, sp. n., paratype; (*6–8*) *P. picta* Haliday; (*9–11*) *P. laricis* (Haliday, 1834).

formly colored: face, clypeus, mouthparts, legs except for tarsi, apical part of metasoma beginning with tergite IV, and ovipositor sheaths pale brown.

Length of body 2.3–3.5 mm, that of antennae 1.9 mm, that of fore wing 1.8–2.3 mm; in holotype, 3.5, 1.9, and 2.3 mm, respectively.

Male unknown.

Host unknown.

Differential diagnosis. The new species is most closely related to *P. picta* and *P. akamatsucola* but differs in a smaller number of the antennal flagellar segments and in the shape of the ovipositor sheaths which are more strongly narrowed toward the apices than those in *P. picta* and are less strongly narrowed than those in *P. akamatsucola*. The new species clearly differs from *P. anatolica* described from Turkey in weakly curved ovipositor sheaths rounded apically and in the pterostigma to metacarp length ratio: 1.2–1.4 in *P. anatolica* and 1.0 in *P. eugenii* sp. n.

Etymology. The species is named after the eminent Russian hymenopterologist, Evgenii Semenovich Sugonyaev.

Pauesia* (*Pauesia*) *picta (Haliday, 1834)
(Fig. 1, *6–8*)

Material. Russia. *St. Petersburg*: Levashovo Railway Station, 6.VI.1975 (V.V. Kostjukov), 1 ♀; Pavlovsk, from *Cinara* sp. on Pinus sp., 25.VI.2005 (E.M. Davidian), 1 ♀. *Smolensk Prov*., "Smolenskoe Poozer'e" National Park, 17.VII.1971 (A.V. Gorochov), 1 ♀. *Voronezh Prov*., Aidarovo, environs of Ramon Vill., 14.VII.1974 (V.A. Trjapitzin), 1 ♀. *Republic of Crimea*: Yalta, mountains, from *Cinara schimitscheki* Börner, 22.VI.1972, 3 ♂, 2 ♀; Nikitskii Botanical Garden, from *C. schimitscheki*, 18–22.VI.1972 (Ichanskaya), 1 ♂, 2 ♀. *Irkutsk Prov*., environs of Tibelti Vill., 8–10.VI.1970, 1 ♀; same locality, Bolshie Koty Vill. on Lake Baikal, 21.VI.1970 (D.R. Kasparyan), 1 ♀. *Tuva*, Tandinskii Distr., 10 km NE of Balgazyn Vill., steppe, 51º03′32″N, 92º13′33″E, 22.VII.2009 (S.A. Belokobylskij), 1 ♀.

Note. The Crimean specimens differ in an almost uniformly yellow body and in longer antennae: 25-segmented in the male and 21–23-segmented in the female.

Pauesia* (*Pauesia*) *akamatsukola Takada, 1968
(Fig. 2, *7–10*)

= *longicauda* Chiriac, 1993: 42, **syn. n.**

Material. Ukraine. *Kiev Prov*., Kievo-Svyatoshinskii Distr., Zhornovka Vill., from *Cinara pilosa* (Zetterstedt), 8–11.VII.1972 (Ichanskaya), 1 ♀. **Turkey**. Turkey. *Kars Prov*., Sarıkamış vicinity, 4–5 km E of Sarıkamış, forest with grass, from Pinus sylvestris, 40°18′26″N, 42°38′07″E, H = 2187 m, 31.V.2014 (G. E. Davidian), 1 ♀.

Synonymy. *P. longicauda* was earlier assumed by me (Davidian and Gavrilyuk, 2014) to be a synonym of *P. akamatsukola* described from Japan. Additional analysis of material from Turkey, the Republic of Altai, and Kiev Province of Ukraine, and also the type specimens of *P. akamatsukola* has confirmed that all the specimens belong to one species. Chiriac justly compares *P. longicauda* with *P. akamatsukola* and lists among the diagnostic characters the closed median cell on the propodeum and the temple to eye length ratio. In my opinion, the differences listed are insufficiently reliable. In particular, based on the degree of development of the lateral carinae on the propodeum, H. Takada characterizes the median cell on the propodeum of *P. akamatsukola* as an incomplete one. The temple to eye length ratio in the specimen from Kiev Province, which is geographically close to the type locality of *P. longicauda*, is subequal to that in *P. akamatsukola*.

Distribution. Russia (the Republic of Altai); Moldova, Ukraine, Turkey, Japan. The species is recorded from Turkey for the first time.

Pauesia* (*Pauesia*) *luntervalvae Chiriac, 1993
(Fig. 2, *1–6*)

The species is known to me from the two paratypes supplied by Chiriac. Both the specimens are females, each of which is supplied with a pinned cardboard rectangle bearing a pasted aphid mummy. One of the paratypes is labeled as follows: (1) "Moldavia, Kishinev, Pinus spp., 1051, 20.III.1981, leg I. Chiriac;" (2) "Paratype ♀ *Pauesia luntervalvae* spec. nov." (red). The second one is labeled as follows: (1) "Mold. Kishinev, 1.IV.1980, Pinus nigra;" (2) "26–28.IV.80;" (3) "990;" (4) "Paratype ♀ *Pauesia luntervalvae* spec. nov." The labels with different dates, pinned under the specimen, seem to indicate the time of collection of the infected aphid in nature and the time of emergence of the ichneumon fly in the laboratory. The date of collection of the first paratype "20.III.1981" is absent in the text of the description.

Description. Female. Head wider than long, smooth, shining, narrowed behind eyes, wider than thorax with tegulae. Eyes subhemispherical, with sparse hairs. Longitudinal diameter of eye 3.0 times length of temple. POL 4.3 times od. Clypeus smooth, slightly convex, twice longer than wide. Tentorial pits deep. Tentorial index 0.8. Maxillary palpi 4-segmented, labial palpi 3-segmented. Antennae filiform, 21-segmented (Fig. 2, *1, 2*). F1 as long as F2, 1.5 times as long as wide in median part. F1 with 4 rhinaria, F2 with 6 rhinaria. Face densely pubescent.

Mesoscutum smooth and shining, with sparse hairs, almost vertically falling on pronotum in lateral view. Notauli reaching middle of mesoscutum, clearly transversely rugose in anterior half, smooth in distal part. Propodeum with closed rugose central cell (Fig. 2, *5*). Pterostigma of fore wing 3 times as long as wide and 1.3 times as long as metacarp (Fig. 2, *3*). R1

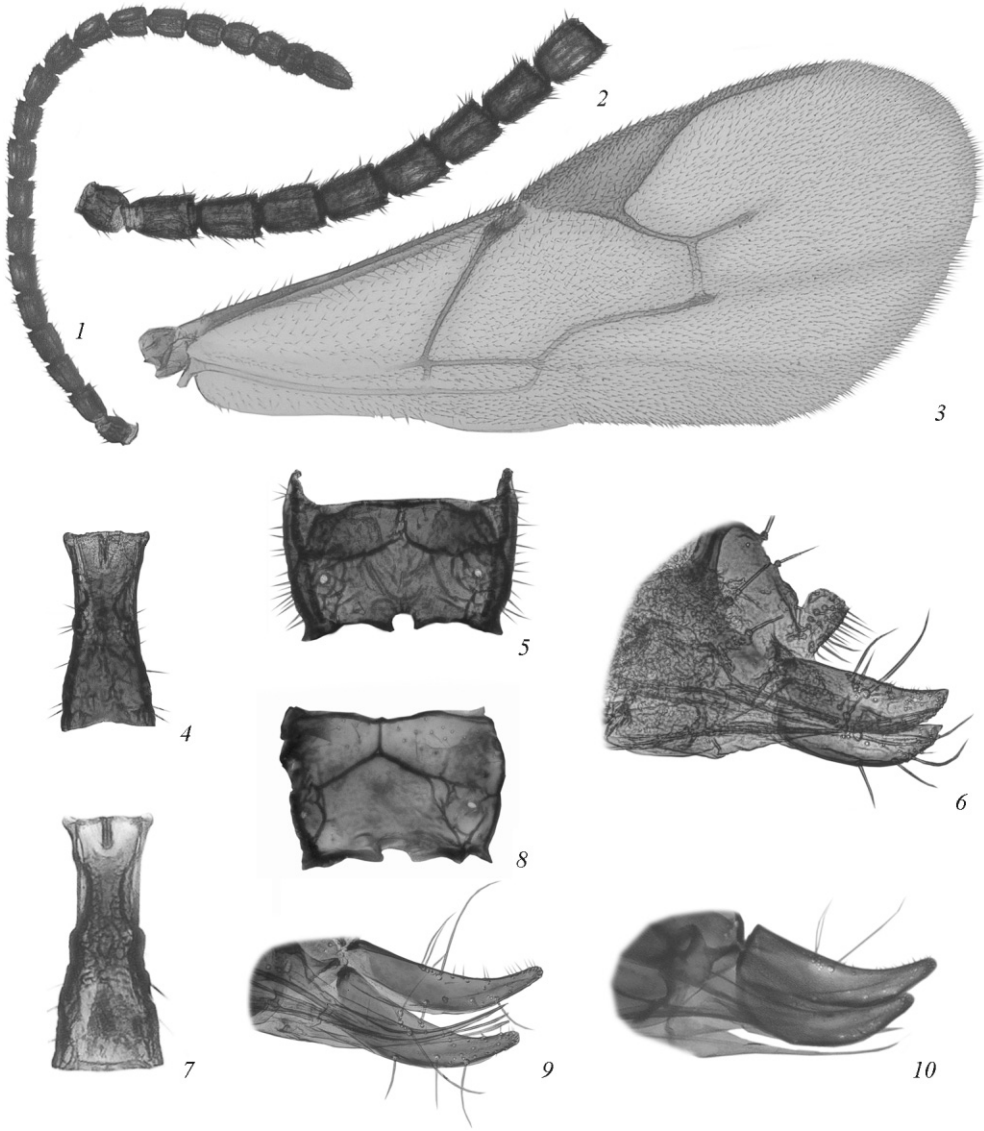

Fig. 2. *Pauesia* Quilis, antenna (*1*), enlarged basal part of antenna (*2*), fore wing (*3*), petiolus (*4*, *7*), propodeum (*5*, *8*), ovipositor (*6*, *9*, *10*): (*1–6*) *P. luntervalvae* Chiriac, paratype; (*7–10*) *P. akamatsukola* Takada [(*7–9*) Kiev Prov., (*10*) paratype].

1.3 times as long as R2, its length equal to width of pterostigma.

Petiolus long, slightly more strongly widened from spiracles toward apex than toward base (Fig. 2, *4*), with spiracular tubercles situated near middle, 4.0–4.3 times as long as wide at level of spiracles, dorsally with distinct sculpture: in holotype, entirely finely punctate in middle 1/3, finely tuberculate-alveolate in apical 1/3. Ovipositor sheaths with nearly straight dorsal margin, moderately narrowed toward apices (Fig. 2, *6*), dorsally with numerous short setae in apical half and with 2 long and 2 medium-long setae in median part.

Head mainly brown; clypeus, part of face from clypeus to antennal scrobes, and mouthparts yellowish. Fore leg except for tarsus yellowish on inner side, brown on outer side; middle and hind legs brown. Pronotum laterally and propleuron on sutures yellowish; central part of propleura brown. Antennae entirely, mesoscutum except for yellowish anterior lateral angles, mesopleuron, scutellum, metanotum, propodeum, petiolus, apical metasomal tergites beginning

with VI, and ovipositor sheaths dark brown; metasomal tergites II–V paler.

Length of body 3.0–3.5 mm, that of antennae 2.3 mm, that of fore wing 2.5–2.6 mm.

Host. *Cinara brauni* Börner, *Cinara* sp.

Differential diagnosis. *Pauesia* (*Pauesia*) *luntervalvae* clearly differs from all the species of the nominotypical subgenus in the structure of the ovipositor sheaths with nearly straight dorsal margins slightly concave in the apical 1/3.

Distribution. Moldova.

Pauesia* (*Pauesia*) *laricis (Haliday, 1834) (Fig. 1, *9–11*)

Material. Russia. *Republic of Crimea*: Yalta, mountains, from *Cinara brauni* Börner, 22–27.VI.1972 (Ichanskaya), 1 ♀.

A Key to the Palaearctic Species of the Subgenus Pauesia s. str. with Narrow Ovipositor Sheaths

1 (8). Antennae 16–19-segmented.

2 (5). Antennae 16- or 17-segmented.

3 (4). Ovipositor sheaths very narrow and long, nearly subulately pointed apically. Antennae 16- or 17-segmented. Propodeum with closed median cell. A parasite of aphids of the genus *Schizolachnus*. 2.0–2.2 mm. A Transpalaearctic species. It was introduced to the Republic of Burundi ..... *P. unilachni* (Gahan).

4 (3). Ovipositor sheaths distinctly wider. Antennae 17-segmented. Propodeum with distinct transverse carina and with incomplete obsolete lateral carinae. A parasite of *Cedrobium laportei* Remaudière. 2.2 mm. Morocco .... *P. cedrobii* Starỳ et Leclant.

5 (2). Antennae 18- or 19-segmented.

6 (7). Pterostigma of fore wing 1.2–1.4 times as long as metacarp. Ovipositor sheaths strongly curved upwards and pointed apically. A parasite of *Cinara cedri* Mimeur on Cedrus libani. 2.5 mm. Turkey .... *P. anatolica* Michelena, Assael et Mendel.

7 (6). Pterostigma of fore wing as long as metacarp. Ovipositor sheaths weakly curved upwards and rounded apically. 2.3–3.5 mm. (Fig. 1, *1–5*). Russia (Irkutsk Prov., Kunashir Island) .... *P. eugenii* Davidian, sp. n.

8 (1). Antennae with greater number of segments (20–23).

9 (14). Dorsal margin of ovipositor sheaths distinctly concave (Figs. 1, *8*; 2, *9*).

10 (11). Ovipositor sheaths acinaciform, almost not narrowed toward apices. A parasite of aphids of the genus *Cinara*. 3.5–3.7 mm. (Fig. 1, *6–8*). A Transpalaearctic species .... *P. picta* (Haliday).

11 (10). Ovipositor sheaths distinctly narrowed toward apices (Fig. 2, *9*).

12 (13). Ovipositor sheaths strongly narrowed toward apices about behind middle, nearly 4 times as long as wide. A parasite of *Cinara pinea* Mordv. On Pinus densiflora. 2.8–3.2 mm. (Fig. 2, *7–10*). Altai. Moldova, Ukraine, Turkey, Japan .... *P. akamatsucola* Takada.

13 (12). Ovipositor sheaths strongly narrowed toward apices nearly from base, about 2.5 times as long as wide. A parasite of aphids of the genus *Cinara*. 3.8 mm. (Fig. 1, *9–11*). Crimea. Western Europe, Moldova, Ukraine, Japan .... *P. laricis* (Haliday).

14 (9). Dorsal margin of ovipositor sheaths nearly straight or slightly concave in apical 1/3. Antennae 20- or - 21-segmented. Two basal flagellar segments equal in length, 1.5 times as long as wide in middle. Pterostigma of fore wing 1.3 times as long as metacarp. 3.2–3.5 mm. (Fig. 2, *1–6*). Moldova .... *P. luntervalvae* Chiriac.

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