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European species of the aphid genus *Eulachnus* Del Guercio, 1909 (Hemiptera: Aphididae: Lachninae): revision and molecular phylogeny

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Abstract

The aphid genus *Eulachnus* in Europe is revised to include 12 species, using an integrative taxonomy approach, based on morphometric, molecular and biological traits. Fundatrix, apterous and alate viviparous female of a new species–*Eulachnus stekolshchikovi* Kanturski **sp**. **nov**. are described. Neotypes are designated for *E. agilis*, *E. brevipilosus* and *E. nigricola*. Lectotypes are designated for *E. alticola*, *E. cembrae*, *E. rileyi* and *E. tuberculostemmatus*. New synonyms are proposed: *E. abameleki* **syn. nov.** (= *Cinara pini*), *E. cretaceus* **syn. nov.** (= *E. agilis*), *E. tauricus* **syn. nov.** (= *E. rileyi*), *E. pallidus* **syn. nov.** (= *E. tuberculostemmatus*). *Eulachnus mingazzinii* (near *Cinara piniphila*) and *E. nigrofasciatus* (near *C. brauni*) are regarded as incertae sedis. Full species status is given for *E. garganicus* **stat. nov.** and *E. ibericus* **stat. nov**. Apterous viviparous female of *E. cembrae*; apterous and alate viviparous females of remaining species are redescribed. Sexual morphs of *E. agilis*, *E. alticola, E. cembrae, E. intermedius*, *E. nigricola, E. rileyi* and oviparous female of *E. tuberculostemmatus* are fully redescribed and figured for the first time. Fundatrices of *E. agilis*, *E. brevipilosus*, *E. cembrae*, *E. rileyi* and *E. tuberculostemmatus*, sexuales of *E. brevipilosus* and the alate male of *E. tuberculostemmatus* are described and figured. A new host plant–*Pinus cembra* for *E. brevipilosus* is reported, and this species is recorded for the first time from Czech Republic. *Eulachnus tuberculostemmatus* is reported for the first time from Croatia. Phylogenetic studies, based on the COI and ITS2 molecular markers, are provided to visualize and discuss the relationships within the European species. COI barcodes are provided for seven species.

Key words: aphids, COI, ITS2, morphological description, Eulachnini, molecular analysis, Palaearctic, *Pinus* spp., SEM

Introduction

The genus *Eulachnus* Del Guercio, 1909 (Hemiptera: Aphididae: Lachninae) is after the genus *Cinara* Curtis, 1835 the most numerous of European Eulachnini genera, here revised to include 12 species with 43 known morphs.

Species from this genus are characterised by a small, narrow body adapted for feeding on pine needles, and are the Old–World equivalent for the nearctic genus *Essigella* Del Guercio, 1909 (Blackman & Eastop 1994, 2016). All *Eulachnus* species are regarded as palaearctic, with three species introduced to both Americas, Africa and Australia. Almost all species of this genus are very similar in body size and coloration of apterous and alate viviparous females, so in life they are difficult to recognize, the more so because many species are oligophagous between different pine trees (*Pinus* spp.).

Del Guercio (1909) erected a new genus *Eulachnus* for a species of aphid living on *Pinus sylvestris*, described as *Lachnus agilis* by Kaltenbach (1843). Del Guercio did not designate a type species for *Eulachnus*, and this was done by subsequent designation (Willson 1911; Favret 2016). Theobald (1915) described a new genus from Egypt–*Protolachnus* with a single species *P. tuberculostemmata*, but Baker (1920) placed this genus as a synonym of *Eulachnus* Del Guercio and accepted Wilson's type. Nevertheless, the later European authors described new species in both genera. Börner (1940, 1950) described the new taxa (*E. alticola*, *E. bluncki*, *E. brevipilosus* and *E. cembrae*) in the genus *Eulachnus* Del Guercio, while Pašek (1953) described *E. nigricola* as Theobald's *Protolachnus*. Even some years later also Mamontova (1968) described *E. pallidus* in the genus *Protolachnus*.

Eulachnus has for many years provoked taxonomic difficulties in relation to species determination, number or their identity (Theobald 1915; Mamontova 1968; Szelegiewicz 1978). The genus has never been revised or fully keyed including all known morphs. There have been reviews of the conifer or Eulachnini fauna of some European countries or regions (Pašek 1954; Pintera 1968; Szelegiewicz 1978; Carter & Maslen 1982; Heie 1995; Nieto Nafría *et al*. 2002). Binazzi (1983a, 1983b, 1989, 1996) in particular provided important information on the taxonomy and biology of the species occurring in the Mediterranean region, and his publications were for years the most reliable source of information for many *Eulachnus* species. However, problems of identity of even the most common European species of *Eulachnus* have never been solved (Heinze 1962; Pintera 1968; Mamontova 2012). Also, Blackman & Eastop (1994, 2016) pointed out that some taxa of this genus were described without taking into account factors such as geographical variation, and may be synonyms. On the other hand, some species may have been synonymized without sufficient morphological study (Eastop & Hille Ris Lambers 1976).

Improvement of taxonomic revisions could be achieved by use of molecular techniques. Genetic markers have been successfully used for understanding evolutionary relations among species and are a tool for species identification through "DNA barcoding" (Hebert *et al*. 2003, 2005; Hollingsworth 2007). Despite some drawbacks (Moritz & Cicero 2007; Meyer & Paulay 2005), molecular markers, particularly if combining data from unlinked loci such as mitochondrial and nuclear genes, can be used for identification of species and in some cases for description of new taxa or synonymisation of incorrectly designated species (e.g. Guglielmino *et al*. 2014). Such methods have been particularly useful for closely–related species of aphids that are often only slightly differentiated morphologically, with the existence of different morphs causing further complications (Foottit *et al*. 2008; Coeur d'acier 2014; Lagos 2014; Miller *et al*. 2014; Massimino Cocuzza & Cavalieri 2014, 2015; Mróz *et al*. 2015; Lee *et al*. 2015). Molecular methods have also been used extensively for studying the phylogeny of higher categories of aphid taxa (Normark 2000; von Dohlen 2002; Zhang & Qiao 2007, 2008; Ortiz-Rivas & Martínez-Torres 2010; Wieczorek & Kajtoch 2011; Chen *et al*. 2016; Wieczorek *et al*. 2017).

The genus *Eulachnus* therefore needs a fully comprehensive revision taking into account the range of species variability in different geographical regions of Europe, with keys to all known morphs, and this is the main aim of this study. In addition, a phylogenetic study of *Eulachnus* using both mitochondrial (COI) and nuclear (ITS2) markers was carried out to elucidate the relationships between species belonging to the different morphological groups recognised within the genus *Eulachnus*, as well as to solve the status of the most questionable species.

This paper is the fourth (after the study of the identity of *E. cembrae* and *E. pumilae* (Kanturski & Wieczorek 2014a), on the European species morphology (Kanturski *et al*. 2015) and the modeling of potential suitable ecological niche for the most common species treated as serious pine pests (Kanturski *et al*. 2016), dedicated to the revisionary work of the European species of the genus *Eulachnus*, with particular emphasis of the taxonomy and phylogeny.

Material and methods

Material. The following abbreviations (in the descriptions, redescriptions and tables) are used, partly following Blackman & Eastop (1994): BL—body length; HW—head width across compound eyes; ANT—antennae or their lengths; ANT I, II, III, IV, V—antennal segments I, II, III, IV, V or their lengths; BASE—basal part of the last antennal segment or its length; PT—terminal process of last antennal segment or its length; LS III—longest seta on ANT III; BD III—basal articular diameter of ANT III; URS—ultimate rostral segments (IV+V) or its length; III FEMUR—hind femur length; III TIBIA—hind tibia length; HT I—first segment of hind tarsus or its length, HT II—second segment of hind tarsus or its length, SIPH—siphunculi, ABD—abdominal tergite or tergites. Distributional data were taken from the collecting places during the work in the collections in the BMNH, MNHN, ZMUC, MZLU, ZMPA, ISZA and UŚ as well as from the collection of the fresh material in the field. Host plants records were taken from the slides during work in the collections mentioned and supplemented by the data from Blackman & Eastop (2016). The proposed synonyms will be commented in the discussion part.

Specimens used in the revision are deposited in:

1. The Natural History Museum, London (**BMNH**).
2. Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany (**SDEI**).
3. Department of Food, Environmental and Nutritional Sciences, University of Milan, Milan, Italy (**DeFENS**).
4. Council for Agricultural Research and Agricultural Economy Analysis Research Centre for Agrobiology and Pedology (formerly Instituto Sperimentale Per la Zoologia Agraria), Firenze, Italy (**ISZA**).
5. Muséum national d'Histoire naturelle, Paris, France (**MNHN**).
6. Lund University, Lund Museum of Zoology, Lund, Sweden (**MZLU**).
7. University of León, León, Spain (**UL**).
8. United States Department of Agriculture, Agricultural Research Service, Beltsville (**USDA**).
9. Zoology Department, University of Silesia, Katowice, Poland (**UŚ**).
10. Zoological Institute Ukrainian Academy of Sciences, Kiev, Ukraine (**ZIUAS**).
11. Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia (**ZMAS**).
12. Zoological Institute, Polish Academy of Sciences, Warsaw, Poland (**ZMPA**).
13. Zoological Museum University of Copenhagen, Denmark (**ZMUC**).

Taxon sampling and morphological techniques. Regular field studies in Europe (Austria, Czech Republic, Denmark, Germany, Italy, Poland and UK) were made during 2011–2015 from April to November. The specimens were collected directly from their host–plants and preserved in 70% ethanol for morphometric analysis and in 99% ethanol for molecular studies. Field photographs were taken with a Sony SLT a37 camera with extension rings. Collected *Eulachnus* individuals were prepared according to Kanturski & Wieczorek (2012). Characters, measurements and ratios used in Lachninae taxonomy were made according to Kanturski & Wieczorek (2014a).
We examined 365 microscopic slides and 706 individuals (31 fundatrices, 311 apterous viviparous females, 181 alate viviparous females, 122 oviparous females and 61 males). The specimens were examined using a light microscope Nikon Ni–U. Photographs were taken by the Nikon DS–Fi2 digital camera. The holotype and paratypes of the new species are deposited in the ZMAS; paratypes are also deposited in BMNH and UŚ.

Scanning Electron Microscopy. Specimens for SEM analyses were preserved in 70% ethanol for several days. For preparation, a method modified from that by Kanturski *et al*. (2015) was used. From ethanol, the specimens were transferred into 6% phosphotungstic acid (PTA) solution in 70% ethanol for 24 hours. Dehydration was provided by ethanol series of 80%, 90%, 96% and two changes of absolute ethanol for 30 minutes each. Dehydrated specimens were dried using hexamethyldisilazane (HMDS) solution with absolute ethanol in proportions of 1:3, 1:2; 2:3 for 30 minutes each followed by two changes of undiluted HMDS. Samples were mounted on aluminium stubs with double–sided adhesive carbon tape and sputter–coated in a Pelco SC–6 sputter coater (Ted Pella Inc., Redding, CA, USA). The specimens were imaged by the Hitachi SU8010 field emission scanning electron microscope FESEM (Hitachi High–Technologies Corporation, Tokyo, Japan) at 5, 10 and15 kV accelerating voltage with a secondary electron detector (EDS).

Molecular laboratory operations. Total genomic DNA was extracted with the Nucleospin Tissue kit

(Macherey–Nagel), using at least two individuals from each sampling site (4–26 individuals per species; Table 7) for the following species: *E. agilis*, *E. alticola*, *E. brevipilosus*, *E. cembrae*, *E. rileyi*, *E. tauricus*, *E. tuberculostemmatus*. As close outgroups, the following species were selected (sequences of some species were downloaded from GenBank, GB, and some were newly generated): *Cinara* (*Schizolachnus*) *obscura*, *Cinara* (*Schizolachnus*) *orientalis* (GB: JQ916651) *Maculolachnus submacula*, *Trama rara, Cinara* (*Cinara*) *cuneomaculata* (GB: JQ916768) and *Cinara* (*Cinara*) *edulis* (GB: KF649424) for COI analyses and *Cinara* (*Schizolachnus*) *pineti* for ITS2 analyses. As distant outgroups, sequences downloaded from GenBank were used belonging to *Aphis acaenovinae* (EU701295; for COI analyses) and *Aphis glycines* (EF690219; for ITS2 analyses). Phylogenies were estimated using data from two DNA fragments: partial Cytochrome Oxidase gene subunit I (COI) and partial Internal Transcribed Spacer 2 (ITS2) of ribosomal DNA (with short fragment of 5.8S rDNA in the 5' end). COI was polymerase chain reaction (PCR)–amplified with barcode primers LCO1490 and HCO2198 (Folmer *et al*. 1994) or alternative LepF1 and LepR (Hebert *et al*. 2004). The ITS2 ribosomal DNA region was amplified with primers ITS3 and ITS4 (White *et al*. 1990). PCR was performed in 20–μL reaction volumes with 2.0 μL of 10 × PCR buffer, 2.0 μL of 25 mm MgCl2, 0.4 μL of dNTP mixture, each in a 10 mm concentration, 0.4 μL of each 15 mm forward and reverse primers, 1.0–2.0 μL of 100 ng of genomic DNA, 0.15 μL of Taq DNA polymerase (Qiagen) and sterile and deionized water (up to 20.0 μL). PCR conditions were as follows: 4 min at 95ºC followed by 35 cycles of 30 s at 95ºC, 1 min at 52–54ºC and 2 min at 72ºC, with 10 min at 72ºC after the last cycle. PCR products were subjected to electrophoresis on a 1.0% agarose gel and stained with Midori Green (ABO). Molecular weight standards were run along with the samples for reference. The amplification products were purified using the ExoProStar purification kit (Illustra). Purified DNA was used for sequencing in two directions using the same primers and the BigDye Terminator 3.1 Cycle Sequencing Kit (Applied Biosystems) following the manufacturer's instructions.

Sequence analyses and phylogenetic reconstructions. The sequences were edited using the BioEdit Sequence Alignment Editor 5.0.9. (Hall 1999) and aligned using MAFFT v.7 (Katoh & Standley 2013). For COI, sequences were also verified for protein–coding frame–shifts to avoid pseudogenes using MEGA v.6 (Tamura *et al*. 2011) and compared with sequences from GenBank through a Blast search (Altschul *et al*. 1990). For the analyses, the appropriate nucleotide substitution model was first determined using MrModeltest 2.3 (Nylander 2004) in conjunction with PAUP* (Swofford 2002). We used two methods for phylogenetic reconstruction: the maximum likelihood (ML) approach, and Bayesian inference (BI) phylogenetic analysis. ML analysis was computed using MEGA v.6. Node support was assessed using bootstrap analyses with 1000 pseudoreplicates. BI phylogenies were computed using MrBayes 3.1 (Huelsenbeck & Ronquist 2001; Huelsenbeck *et al*. 2001) with one cold and three heated Markov chains for three million generations and trees were sampled every 100th generation. Convergence of Bayesian analyses was estimated using Tracer v. 1.5.0 (Rambaut *et al*. 2003–2009). Tree reconstruction was performed separately for each marker. BI trees were visualized with FigTree 1.3.1 (Rambaut 2006). Pairwise distances were calculated using MEGA v.6 (Katoh & Standley 2013). The number of variable and parsimony informative sites were determined for COI sequences using DnaSP v.5 (Librado *et al*. 2009). We did not calculate other metrics (like haplotype and nucleotide diversities) due to the low number of sampled individuals per species and locality, and because of uneven sampling between species.

Results

Taxonomy

Checklist of *Eulachnus* species:

Eulachnus Del Guuercio, 1909
Del Guercio, 1909: 315
Protolachnus Theobald, 1915: 145
Type species: *Eulachnus agilis* (Kaltenbach, 1843)
Eulachnus abameleki Del Guercio, 1909: 329 **syn**. **nov**. = *Cinara pini* (Linnaeus, 1758)

1. *Eulachnus agilis* (Kaltenbach, 1843) Type species
Eulachnus cretaceus (Mamontova, 1968) **syn**. **nov**.

2. *Eulachnus alticola* Börner, 1940
3. *Eulachnus brevipilosus* Börner, 1940
4. *Eulachnus cembrae* Börner, 1950
5. *Eulachnus garganicus* Binazzi, 1983a **stat**. **nov**.
6. *Eulachnus ibericus* Binazzi & Mier Durante, 1997 **stat**. **nov**.
7. *Eulachnus intermedius* Binazzi, 1989
8. *Eulachnus mediterraneus* Binazzi, 1983b
   Eulachnus mingazzinii Del Guercio, 1909: 326 **incertae sedis** (near *Cinara piniphila* (Ratzeburg, 1844))
   Eulachnus nigrofasciatus Del Guercio, 1909: 324 **incertae sedis** (near *Cinara brauni* Börner, 1940)
9. *Eulachnus nigricola* (Pašek, 1953)
10. *Eulachnus rileyi* (Williams, 1911)
    Eulachnus tauricus Bozhko, 1961 **syn**. **nov**.
11. *Eulachnus stekolshchikovi* Kanturski **sp**. **nov**.
12. *Eulachnus tuberculostemmatus* (Theobald, 1915)
    Eulachnus pallidus Mamontova, 1972 **syn**. **nov**.

Diagnosis. All known morphs from the genus *Eulachnus* are distinguished from other genera of Eulachnini and characterised by the following: six–segmented antennae, dorsal side of body with scleroites at setal bases at least on head, thorax and ABD VII–VIII; short, blunt URS and HT I with two long dorsal setae; living only on or between *Pinus* spp. needles.

Shared characters of representatives of the genus Eulachnus. *Fundatrices*: Main morphological characters such as body sclerotization and chaetotaxy as in apterous viviparous females. In some species on hind tibiae up to a few pseudosensoria can occur. They occur early in the spring, from April to May.

Apterous viviparous females: Body elongate, narrow or spindle–shaped. Colour of body in life from light green, green to yellow, orange and brown. Dorsal side of body with setae of variable length and shape in spinal, pleural and marginal positions. Dorsal setae arising from small scleroites at least on head, thorax and ABD VII–VIII. Ventral setae long and pointed. Head with large compound eyes and residual triommatidia. ANT six–segmented (Fig. 1a). ANT III longest. ANT V always with one primary rhinarium at the apex (Fig. 1b). ANT VI with very short PT, one primary rhinarium and various numbers of accessory rhinaria (Fig. 1c). ANT I and II always with 4–5 setae. URS short and blunt with button–shaped apical part bearing 3 pairs of primary setae, and without accessory setae (Fig. 1d). Hind tibiae long, with setae of variable length (Fig. 1e, f). HT I with two dorsal (Fig. 1g) and various number of ventral setae. Siphunculi are very low cones with broad bases without setae (Fig. 1h). Subgenital plate oval, slightly wider on the anterior part (Fig. 1i). Cauda broadly rounded with numerous long, fine and pointed setae and very short spinules (Fig. 1j).

Alate viviparous females: Body elongate, narrow, spindle–shaped. Colour of body in life from light green, green to yellow, orange or brown. Dorsal side of abdomen covered by spinal, pointed setae of variable length. Head with large compound eyes and residual triommatidia and well-developed ocelli (Fig. 2a) on sclerotized bases. ANT six–segmented. ANT I and II with 4–5 setae. ANT III longest, with or without secondary rhinaria (Fig. 2b). ANT V with one large, rounded primary rhinarium at the apex. ANT VI with very short PT and one large primary rhinarium. URS blunt with very short apical part. Hind legs long. HT I with two dorsal setae. Fore wings narrow. Pterostigma pale, media always once branched (Fig. 2c). Abdomen membranous, covered by two rows of scleroites at setal bases mainly in spinal and pleural positions (Figs 2d, e; 4d). Siphunculi are like those of apterae. Subgenital plate oval, slightly wider than in apterous viviparous females and with an indentation on the anterior part. Cauda broadly rounded with many long, fine and pointed setae and very short spinules. Other characters as in apterous viviparous females.

Alate males: Main morphological characters as in alate viviparous females. ANT I with 4–5 setae, ANT II with 5–6 setae, ANT III–VI with numerous secondary rhinaria. All secondary rhinaria on ANT III–V small and rounded, situated on whole length and surface of segment (Fig. 3b, c). Genitalia modified, strongly sclerotized (Fig. 3a). Parameres present, located above basal part of phallus and basally fused, with numerous long setae on entire surface. Their lobate parts, crescent–shaped, form distinct, broadly rounded projections (the largest in *E. rileyi*). Basal part of phallus elongated, with a few short setae in middle part. Sclerotized arms clearly visible, robust, forming a semicircular structure that surrounds the genital area.

Oviparous females: Main morphological characters like body sclerotization and chaetotaxy as in apterous viviparous females. Hind tibiae always slightly swollen with numerous small pseudosensoria (Fig. 3d, e).

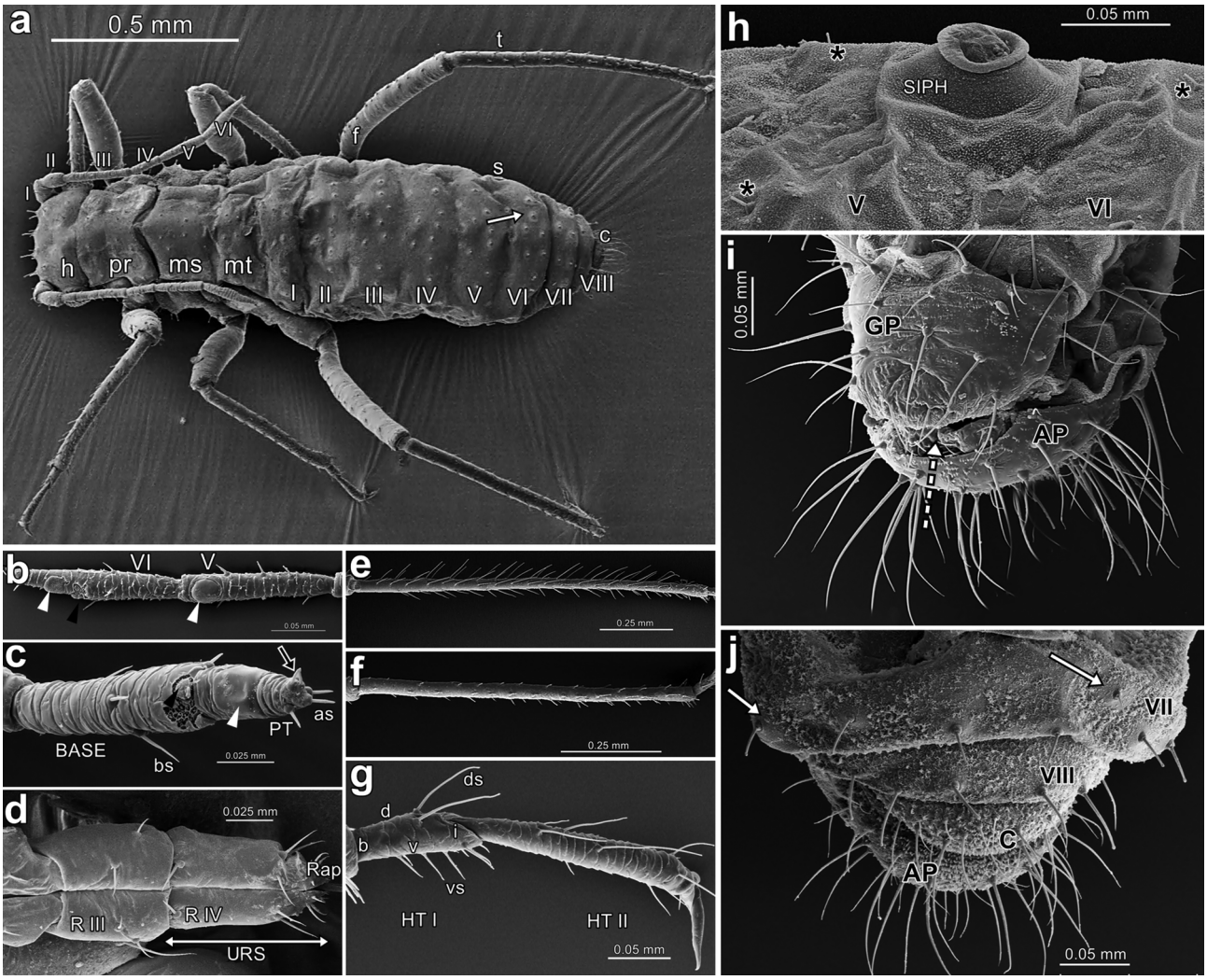

FIGURE 1. Morphological characters of apterous viviparous females of the genus *Eulachnus*: (**a**) apterous viviparous female in general view, h–head, with 6–segmented antennae (I–VI), pr–pronotum, ms–mesonotum, mt–metanotum, f–femora, t–tibiae, abdomen with scleroites at setal bases (I–VIII), s–siphunculi, C–cauda, scleroites (arrow); (**b**) general view of ANT V and ANT VI with primary rhinaria (white arrowheads) and accessory rhinaria (black arrowhead); (**c**) magnified view of ANT VI with few basal setae (bs), six apical setae (as), one big major rhinarium (white arrowhead) and small accessory rhinaria (black arrowhead); (**d**) apical rostrum segment (URS), R III–third rostrum segment, R IV–fourth rostrum segment, Rap–rostrum apical part; (**e**) chaetotaxy of hind tibiae with setae longer than the width of tibiae; (**f**) chaetotaxy of hind tibiae with setae not longer than the width of tibiae; (**g**) hind tarsus: first segment of hind tarsus (HT I) with 2 dorsal setae and various number of ventral setae, b–basal length, d–dorsal length, v–ventral length, i–intersegmental length, HT II–second segment of hind tarsus; (**h**) dorsal side of body with small, cone shaped siphunculi (SIPH), V, VI–abdominal segments V and VI with very short and blunt setae (black asterisks); (**i**) ventral side of abdomen with sclerotized and setose genital plate (GP), anal plate (AP) and rudimentary gonapophyses (dotted arrow); (**j**) dorsal side of abdomen with scleroites at setal bases (arrows) on abdominal segments VII and VIII (VII, VIII), broadly rounded cauda (C) and anal plate (AP).

Generic key to apterous and alate viviparous females of the tribe Eulachnini

1 Claws of HT II with acute, simple curved apices 2
- Claws of HT II with modified, bifurcate or double apices . . . . . *Essigella* Del Guercio, 1909
2 Body oval or almost rounded. Siphunculi as visible and haired cones always on variable sized sclerites on trunks or needles . . . . . *Cinara* Curtis, 1835
- Body elongate, narrow, spindle–shaped. Siphunculi very low with narrow cone–shaped base 3

3 Antennae 5 segmented . . . . . *Pseudessigella* Hille Ris Lambers, 1966
- Antennae 6 segmented . . . . . *Eulachnus* Del Guercio, 1909

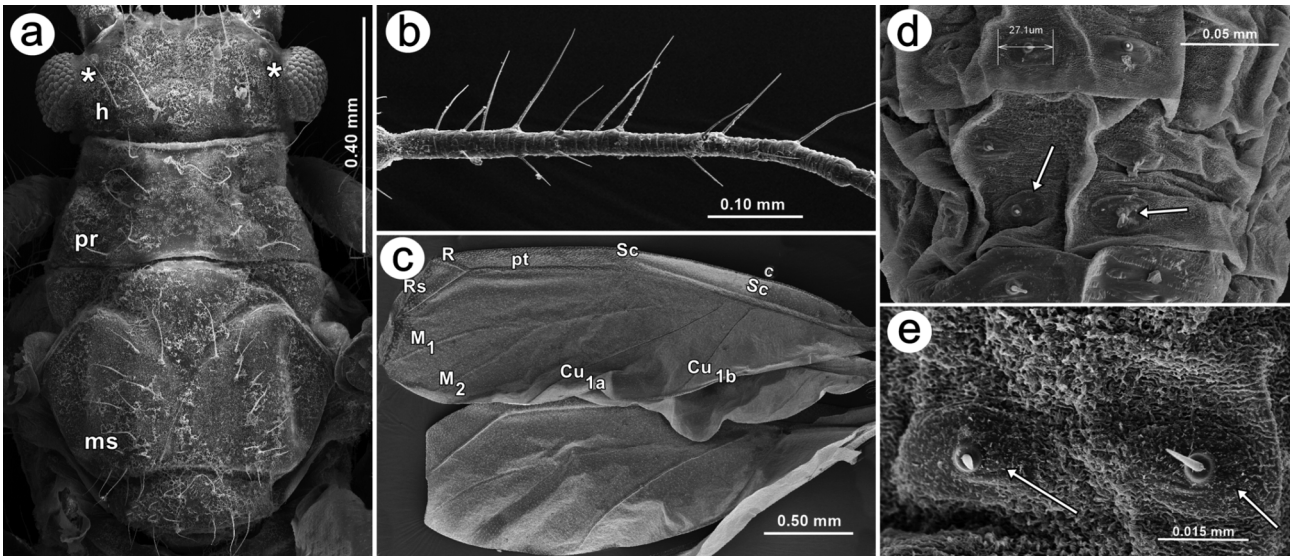

FIGURE 2. Morphological characters of alate viviparous females of the genus *Eulachnus*: (**a**) sclerotized head (h) with big compound eyes and ocelli (asterisks), and thorax, pr–pronotum, ms–mesonotum (**b**) chaetotaxy of ANT III; (**c**) fore wings, c–costal vein, Sc–subcostal vein, pt–pterostigma, R–radial vein; Rs–radial sector, M1, M2–forks of medial vein, $Cu1_a$, $Cu1_b$–cubital veins; (**d**, **e**). dorsal side of abdomen with scleroites at setal bases (arrows).

1. Key to known fundatrices of the European *Eulachnus* species

1 Dorsal side of abdomen without scleroites at setal bases . . . . . *E. cembrae*
- Dorsal side of abdomen with scleroites at setal bases. 2
2 ANT VI/ANT III 0.72–0.89; HT I basal length/HT I dorsal length 0.54–0.66; ANT setae very short; LS III/BD III 0.68–1.10 3
- ANT VI/ANT III 0.53–0.70; HT I basal length/HT I dorsal length 0.33–0.46; ANT setae of average length to long; LS III/BD III 1.45–4.50 4
3 HT II/ANT III 0.92–1.10; HT II/ANT VI 1.09–1.23. Hind tibiae with 1–3 pseudosensoria . . . . . *E. brevipilosus*
- HT II/ANT III 0.62–0.76; HT II/ANT VI 0.85–0.96. Hind tibiae without pseudosensoria . . . . . *E. nigricola*
4 ANT/BL 0.45–0.52; URS/ANT VI 0.37–0.42; HT I basal length/HT I dorsal length 0.33–0.40; HT II/ANT VI 0.90–1.05 . . . 5
- ANT/BL 0.41–0.42; URS/ANT VI 0.48–0.50; HT I basal length/HT I dorsal length 0.45–0.46; HT II/ANT VI 1.14–1.18 . . . 6
5 ANT V/ANT III 0.54–0.57; URS/HT II 0.45–0.47. Dorsal abdominal setae very long, 0.090–0.125 mm . . . . . *E. rileyi*
- ANT V/ANT III 0.62–0.63; URS/HT II 0.37–0.40. Dorsal abdominal setae very short, 0.0170–0.075 mm. . . . . *E. tuberculostemmatus*
6 ANT VI/ANT III 0.53–0.54; HT I with 10 ventral setae; LS/BD III 2.75–3.00; longest dorsal setae on thorax 0.055–0.080 mm . . . . . *E. agilis*
- ANT VI/ANT III 0.69–0.70; HT I with 8 ventral setae; LS/BD III 1.50–1.75; longest dorsal setae on thorax 0.020–0.035 mm. . . . . *E. stekolshchikovi* **sp. nov.**

2. Key to apterous viviparous females of the European *Eulachnus* species

1 Dorsal abdominal segments always without scleroites at setal bases. On *P. cembra* . . . . . *E. cembrae*
- Dorsal abdominal segments always with scleroites at setal bases. Often on other *Pinus* species 2
2 LS III 0.70–1.17 x BD III. HT I with 6–8 ventral setae 3
- LS III 1.19–6.25 x BD III. HT I with 10–12 ventral setae 4
3 HT I with 6 ventral setae. Setae on hind tibiae not longer than the diameter of tibiae. In life, light green to orange. On *P. sylvestris*, *P. mugo* and *P. cembra*. . . . . *E. brevipilosus*
- HT I with 8 ventral setae. Setae on hind tibiae longer than the diameter of tibiae. On *P. nigra*. In life, light green with head and pronotum light brown . . . . . *E. nigricola*
4 Longest setae on metanotum 0.012–0.060 mm long. 5
- Longest setae on metanotum 0.060–0.160 mm long. 9

5 Setae on metanotum 0.007–0.027 mm long. Setae on ABD I–VI 0.007–0.025 mm long 6
- Setae on metanotum 0.027–0.060 mm long. Setae on ABD I–VI 0.025–0.070 mm long 7
6 Body length 1.62–2.00 mm. ANT/BL 0.45–0.58 . . . . . *E. tuberculostemmatus*
- Body length 2.07–2.12 mm. ANT/BL 0.42–0.43 . . . . . *E. garganicus*
7 ANT VI/ANT III 0.45–0.55; URS/ANT III 0.18–0.24; HT II/ANT III 0.54–0.76 8
- ANT VI/ANT III 0.66–0.69; URS/ANT III 0.25–0.26; HT II/ANT III 0.80–0.81 . . . . . *E. stekolshchikovi* **sp. nov.**
8 Setae on ABD VIII 0.070–0.090 mm long; hind tibiae yellow to light brown . . . . . *E. mediterraneus*
- Setae on ABD VIII 0.100–0.120 mm long; hind tibiae brown . . . . . *E. ibericus*
9 Setae on ABD I–VI 0.030–0.080 mm long. Setae on pronotum 0.052–0.075 mm long. On *P. mugo* in mountain areas . . . . . *E. alticola*
- Setae on ABD I–VI 0.090–0.150 mm long. Setae on pronotum 0.085–0.155 mm. On other *Pinus* species (*P. sylvestris*, *P. nigra*, *P. mugo* in other than mountains areas). 10
10 Hind legs yellow. Femora and tibiae sometimes with slightly darker spots at setal bases. Dorsal abdominal scleroites often fused into larger sclerites. In life, green, at least slightly covered by wax. On *P. sylvestris* and *P. mugo* . . . . . *E. agilis*
- Hind legs uniformly brown. Femora and tibiae without any spots at setal bases. Dorsal abdominal scleroites always separate, not fused into larger sclerites. In life from grey to brown, strongly covered by wax powder. On *P. nigra* and rarely on *P. sylvestris* 11
11 Longest setae on ABD I–V not longer than 0.10 mm. Setae on abdomen and tibiae stiff . . . . . *E. intermedius*
- Longest setae on ABD I–V longer than 0.10 mm. Setae on abdomen and tibiae fine and hair–like . . . . . *E. rileyi*

3. Key to alate viviparous females of the European *Eulachnus* species

(Characters of *E. cembrae* after Pašek, 1954)

1 Dorsal abdomen without scleroites . . . . . *E. cembrae*
- Dorsal abdomen at least with spinal scleroites 2
2 HT I basal length/HT I dorsal length 0.43–0.59. Setae on ABD I–VI 0.015–0.040 mm long. Hind tibiae with blunt setae 3
- HT I basal length/HT I dorsal length 0.24–0.42. Setae on ABD I–VI 0.040–0.160 mm long (if less than 0.040 mm long then hind tibiae clearly longer than middle tibiae with pointed setae) 4
3 HT II/ANT III 0.70–0.81. Setae on pronotum 0.017–0.020 mm . . . . . *E. brevipilosus*
- HT II/ANT III 0.61–0.69. Setae on pronotum 0.025–0.045 mm . . . . . *E. nigricola*
4 LS/BD III 1.00–1.90. Setae on pronotum 0.025–0.090 mm long 5
- LS/BD III 2.00–5.25. Setae on pronotum 0.090–0.150 mm long 7
5 HT II/ANT III 0.50–0.70; HT II/ANT VI 0.91–1.08; HT I dorsal length/HT I intersegmental length 1.70–3.00 6
- HT II/ANT III 0.39–0.40; HTII/ANT VI 0.78–0.80; HT I dorsal length/HT I intersegmental length about 1.41 . . . . *E. alticola*
6 ANT/BL 0.50–0.67. Longest setae on pronotum longer than 0.030 mm long. Longest setae on ABD I–VI longer than 0.030 mm long. . . . . *E. tuberculostemmatus*
- ANT/BL 0.43–0.46. Longest setae on pronotum not longer than 0.030 mm long. Longest setae on ABD I–VI not longer than 0.030 mm long. . . . . *E. garganicus*
7 Longest setae on ABD I–VI not longer than 0.080 mm long 8
- Longest setae on ABD I–VI longer than 0.080 mm long 10
8 ANT VI/ANT III 0.36–0.45 9
- ANT VI/ANT III 0.50–0.55 . . . . . *E. stekolshchikovi* **sp. nov.**
9 ANT IV/ANT III 0.51–0.52; HW/ANT 0.30–0.31 . . . . . *E. mediterraneus*
- ANT IV/ANT III 0.43–0.48; HW/ANT 0.33–0.34 . . . . . *E. ibericus*
10 Hind legs yellow to light brown. If light brown than always with darker spots at setal bases. Hind tibiae with both pointed and blunt setae . . . . . *E. agilis*
- Hind legs uniformly brown to dark brown without spots at setal bases. Hind tibiae with either only pointed or only blunt setae 11
11 PT/BASE 0.14–0.17; URS/HT II 0.36–0.45. . . . . *E. rileyi*
- PT/BASE 0.12–0.13; URS/ HT II 0.33–0.35 . . . . . *E. intermedius*

4. Key to known oviparous females of the European *Eulachnus* species

1 Dorsal abdominal segments always without scleroites at setal bases . . . . . *E. cembrae*
- Dorsal abdominal segments always with scleroites at setal bases 2
2 Antennal setae very short, never longer than BD III. Hind tibiae with thick setae at most as long as the width of tibiae 3
- Antennal setae long, longer than BD III. Hind tibiae with thin setae always longer than the width of tibiae 4
3 HT I with 6 ventral setae. In life body orange with tip of abdomen covered by wax. On *P. sylvestris,* - *P. mugo* and *P. cembra* . . . . . *E. brevipilosus*
- HT I with 8 ventral setae. In life body green with head and pronotum brown and tip of abdomen without wax. On *P. nigra* . . . . . *E. nigricola*

4 LS/BD III 1.18–2.33; Longest dorsal setae on metanotum not longer than 0.062 mm long. Longest dorsal setae on ABD I–VI not longer than 0.075 mm long 5
- LS/BD III 2.5–5.4; Longest dorsal setae on metanotum longer than 0.062 mm long. Longest dorsal setae on ABD I–VI longer than 0.075 mm long. 6
5 PT/BASE 0.18–0.22; URS/ANT III 0.23–0.25; URS/ANT VI 0.39–0.41 . . . . . *E. tuberculostemmatus*
- PT/BASE 0.14–0.17; URS/ANT III 0.19–0.22; URS/ANT VI 0.33–0.38 . . . . . *E. alticola*
6 URS/HT II less than 0.36; legs yellow to pale brown. . . . . *E. agilis*
- URS/HT II more than 0.37; legs brown to dark 7
7 Hind tibiae with 38–60 pseudosensoria. Longest dorsal setae on head longer than 0.11 mm long. Longest setae on metanotum longer than 0.11 mm long . . . . . *E. rileyi*
- Hind tibiae with 60–88 pseudosensoria. Longest dorsal setae on head not longer than 0.11 mm long. Longest setae on metanotum not longer than 0.11 mm long . . . . . *E. intermedius*

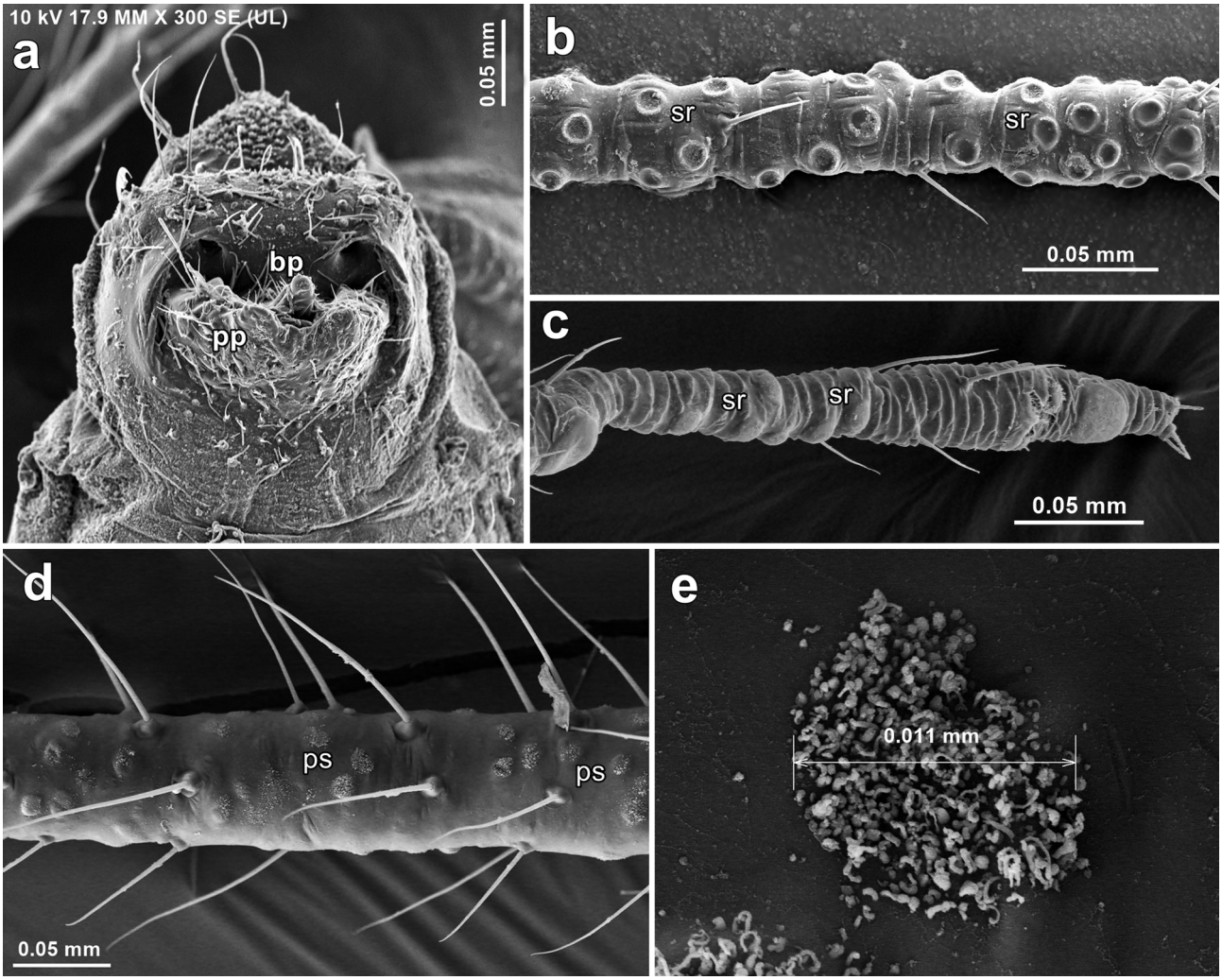

FIGURE 3. Characters of the sexual generation of the genus *Eulachnus*; (**a**) sclerotized genitalia of the alate male, pp–parameres, bp–basal part of phallus, (**b**) ANT III with numerous secondary rhinaria (sr), (**c**) ANT VI with secondary rhinaria (sr) on BASE; (**d**) pseudosensoria (scent plaques) on hind tibiae of oviparous female; (**e**) magnified view of the pseudosensorium.

5. Key to known alate males of the European *Eulachnus* species

1 ANT setae never longer than BD III 2
- ANT setae always longer than BD III 3
2 BL more than 2.00 mm. ANT V with 23–38 secondary rhinaria. Abdomen with only one pair of spinal scleroites on each segment. . . . . *E. cembrae*
- BL less than 2.00 mm. ANT V with 4–12 secondary rhinaria. Abdomen with at least two pairs of scleroites per segment (spinal and pleural) . . . . . *E. nigricola*

3	HT I dorsal length/HT I intersegmental length 3.00–3.33	4
-	HT I dorsal length/HT I intersegmental length 1.87–2.85	5
4	PT/BASE 0.19–0.20; HT II/ANT III 0.41–0.44. BASE with 1–2 secondary rhinaria	*E. brevipilosus*
-	PT/BASE about 0.17; HT II/ANT III 0.37–0.38. BASE with 3 secondary rhinaria.	*E. intermedius*
5	PT/BASE 0.13–0.17 (if 0.17 then hind femora yellow or yellow with darker spots at setal bases).	*E. agilis*
-	PT/BASE 0.17–0.25 (if 0.17 then hind femora uniformly brown to black)	6
6	In mounted specimens, hind legs dark brown to black. BASE with 2–4 secondary rhinaria	*E. rileyi*
-	In mounted specimens, hind legs yellow to light brown. BASE with 4–7 secondary rhinaria.	7
7	HTII/ANT III 0.40–0.52. ANT V with 18–19 secondary rhinaria	*E. tuberculostemmatus*
-	HTII/ ANT III 0.36–0.40. ANT V with 23–28 secondary rhinaria.	*E. alticola*

Review of species

Eulachnus agilis (Kaltenbach, 1843)

Lachnus agilis Kaltenbach, 1843: 161
Eulachnus cretaceus (as *Protolachnus cretacea* Mamontova, 1968): 33 **syn. nov.**

Fundatrix (Fig. 4a; Table 1)—description (based on one specimen). *Colour*. In life: green. In mounted specimens: head and thorax yellow with scleroites at setal bases brown. ANT yellowish with paler basal parts and light brown apices of ANT III–V. ANT VI uniformly light brown. Abdomen with scleroites at setal bases light brown. Body setae dark brown (Fig. 4a). *Morphometric characters*: HW 0.44–0.45 × ANT. Head chaetotaxy: dorsal side with 6 pairs; ventral side with 5 pairs of long, thick and blunt setae. Dorsal setae 0.070–0.090 mm long. ANT 0.48–0.55 × BL. ANT IV as long as or only slightly shorter than ANT V. ANT V shorter than ANT VI. PT 0.12–0.13 × BASE, with 5–6 accessory rhinaria. Other antennal ratios: VI:III 0.53–0.54, V:III 0.43–0.46, IV:III about 0.43. ANT III with 9–10 setae, ANT IV with 5 setae, ANT V with 5 setae, ANT VI with 6 basal setae. ANT setae of average length, rigid and slightly blunt, longer than diameter of segments. LS III 2.75–3.00 × BD III. Rostrum reaching middle coxae. URS about 0.26 × ANT III, 0.48–0.50 × ANT VI and about 0.42 × HT II. Outer side of hind legs covered by rigid and blunt setae, longer than width of tibiae, on femora 0.030–0.075 mm long, on tibiae 0.050–0.095 mm long. Basal length of HT I about 0.46 × dorsal, 0.27–0.28 × ventral and about 0.66 × intersegmental length, with 10 ventral setae. HT II about 0.62 × ANT III and 1.14–1.17 × ANT VI. Dorsal setae long—on pronotum 0.055–0.085 mm long, on mesonotum 0.070–0.080 mm long, on metanotum 0.065–0.075 mm long; on abdomen—on ABD I–VI 0.040–0.090 mm long, segm. VII–VIII 0.050–0.090 mm long and blunt. Dorsal side of abdomen with 3–6 scleroites on anterior and 6–8 scleroites on posterior part of ABD I–VI.

Remarks. This morph differs from the apterous viviparous female by having shorter ANT (less than 1.00 mm long) and lower ratio of ANT V: ANT III (0.43–0.46).

Apterous viviparous female (Figs 4–6; 46, Table 2)—redescription (based on 40 specimens). *Colour*. In life: head, thorax and abdomen green to light green with dark, clearly visible dorsal scleroites. ANT light with darker apices. Legs yellowish–green. In mounted specimens: head and thorax sclerotized, yellow or pale brown with scleroites at setal bases light brown or brown (Fig. 4b). ANT yellow with ANT I–II and apices of ANT III–VI light brown (Fig. 5a). Abdomen pale or yellowish with scleroites at setal bases light brown to brown. Femora uniformly yellow with darker spots at setal bases. Tibiae yellow or exceptionally yellowish–light brown. Body setae dark (Fig. 4b). *Morphometric characters*: HW 0.35–0.46 × ANT. Head chaetotaxy: dorsal side with 5 pairs of long, thick and blunt setae; ventral side with 5 pairs of long, hair–like and pointed setae. Dorsal setae 0.070–0.150 mm long. ANT 0.48–0.55 × BL. ANT IV shorter or very rarely slightly longer than ANT V. ANT V always longer than ANT VI. PT 0.12–0.20 × BASE with 3–5 accessory rhinaria. Other antennal ratios: VI:III 0.47–0.72, V:III 0.56–0.75, IV:III 0.48–0.68. ANT III (Fig. 5b) with 13–16, ANT IV with 6–9, ANT V with 7–12 setae, ANT VI with 4–6 basal setae. ANT setae long, thick, rigid and blunt, longer than diameter of segments. LS III 1.73–4.75 × BD III. Rostrum reaching middle coxae. URS 0.20–0.26 × ANT III, 0.33–0.44 × ANT VI and 0.33–0.38 × HT II. Outer side of hind legs covered by long, rigid, blunt and pointed setae, longer than width of tibiae (Fig. 6a), on femora 0.050–0.900 mm long, on tibiae 0.090–0.105 mm long. Basal length of HT I 0.29–0.36 × dorsal, 0.20–0.27 × ventral and 0.59–0.72 × intersegmental length, with 10 ventral setae. HT II 0.56–0.79 × ANT III and 0.93–1.31 ANT VI. Dorsal setae long, rigid and blunt, on pronotum 0.070–0.130 mm long, mesonotum 0.055–0.150 mm

long, metanotum 0.055–0.130 mm long; on abdomen—ABDI–VI 0.050–0.130 mm long, ABD VII–VIII 0.060–0.0150 mm long. Abdomen with 4–6 scleroites on the anterior and 4–8 scleroites on the posterior part of of ABD I–VI. Scleroites at setal bases very often fused into larger sclerites (Fig. 46b).

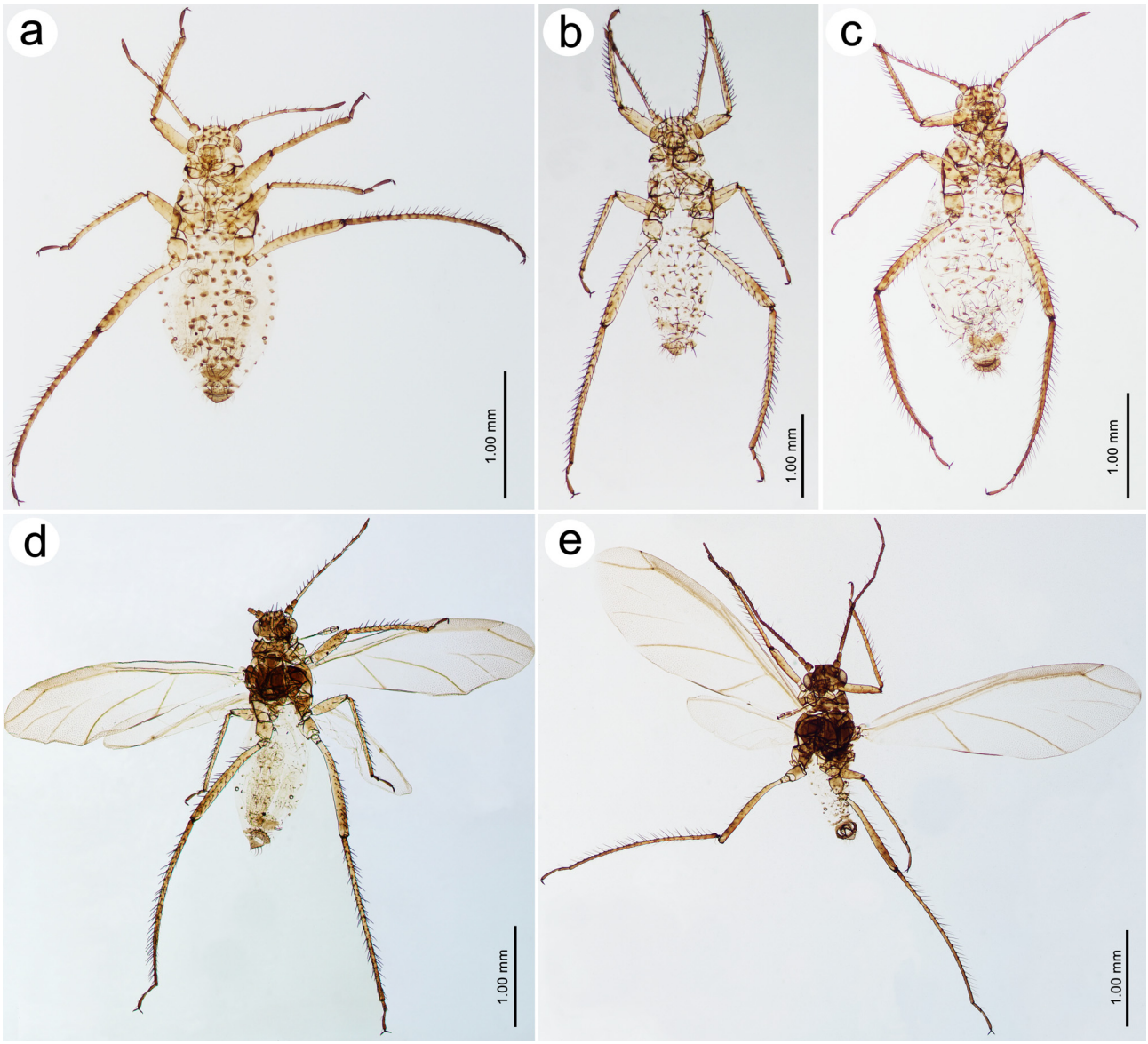

FIGURE 4. *Eulachnus agilis*: (**a**) fundatrix; (**b**) apterous viviparous female; (**c**) oviparous female; (**d**) alate viviparous female; (**d**) alate male.

Alate viviparous female (Figs 4–6; Table 3)—redescription (based on 39 specimens). *Colour*. In life: head and thorax grey–green, ANT greenish with apices of segments darker. Legs greenish–brown. Abdomen light green with dark dorsal scleroites. In mounted specimens: head yellow to light brown with darker scleroites at setal bases. ANT yellow with ANT I–II and apices of ANT III–VI light brown to brown. Thorax light brown to brown. Forewings yellowish, pterostigma pale. Hind wings yellowish or pale. Femora uniformly yellow with darker spots at setal bases. Tibiae uniformly yellow. Abdomen pale with scleroites light brown to brown. Body setae light brown to dark (Fig. 4d). *Morphometric characters*: HW 0.33–0.37 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 5 pairs of long, rather rigid, pointed or slightly blunt setae. Dorsal setae 0.075–0.140 mm long. ANT 0.49–0.59 × BL. ANT IV as long as or slightly shorter than ANT V. ANT V longer than ANT VI. PT 0.11–0.18 × BASE with 3–6 accessory rhinaria. Other antennal ratios: VI:III 0.45–0.56, V:III 0.53–0.66, IV:III 0.50–0.59. ANT III (Fig. 5c) with 13–18, ANT IV with 6–8, ANT V with 7–11 setae, ANT VI with 3–4 basal setae. ANT setae long, rigid and slightly blunt, longer than diameter of segments. LS III 2.22–4.18 × BD III. Rostrum reaching mesosternum. URS 0.17–0.18 × ANT III, 0.33–0.41 × ANT VI and 0.30–0.40 × HT II. Outer side of hind legs

covered by long, fine, pointed or slightly blunt setae, longer than the width of tibiae (Fig. 6b), on femora 0.050–0.090 mm long, on tibiae 0.090–0.110 mm long. Basal length of HT I 0.27–0.41 × dorsal, 0.18–0.29 × ventral and 0.62–1.00 × intersegmental length, with 10 ventral setae. HT II 0.46–0.60 × ANT III and 0.97–1.28 × ANT VI. Dorsal setae long, fine and pointed, on pronotum—0.070–0.130 mm long; on abdomen—ABD I–VI 0.052–0.110 mm long, ABD VII–VIII 0.070–0.110 mm long. Abdomen with 2–4 scleroites on the anterior and 2–4 scleroites on the posterior part of of ABD I–VI

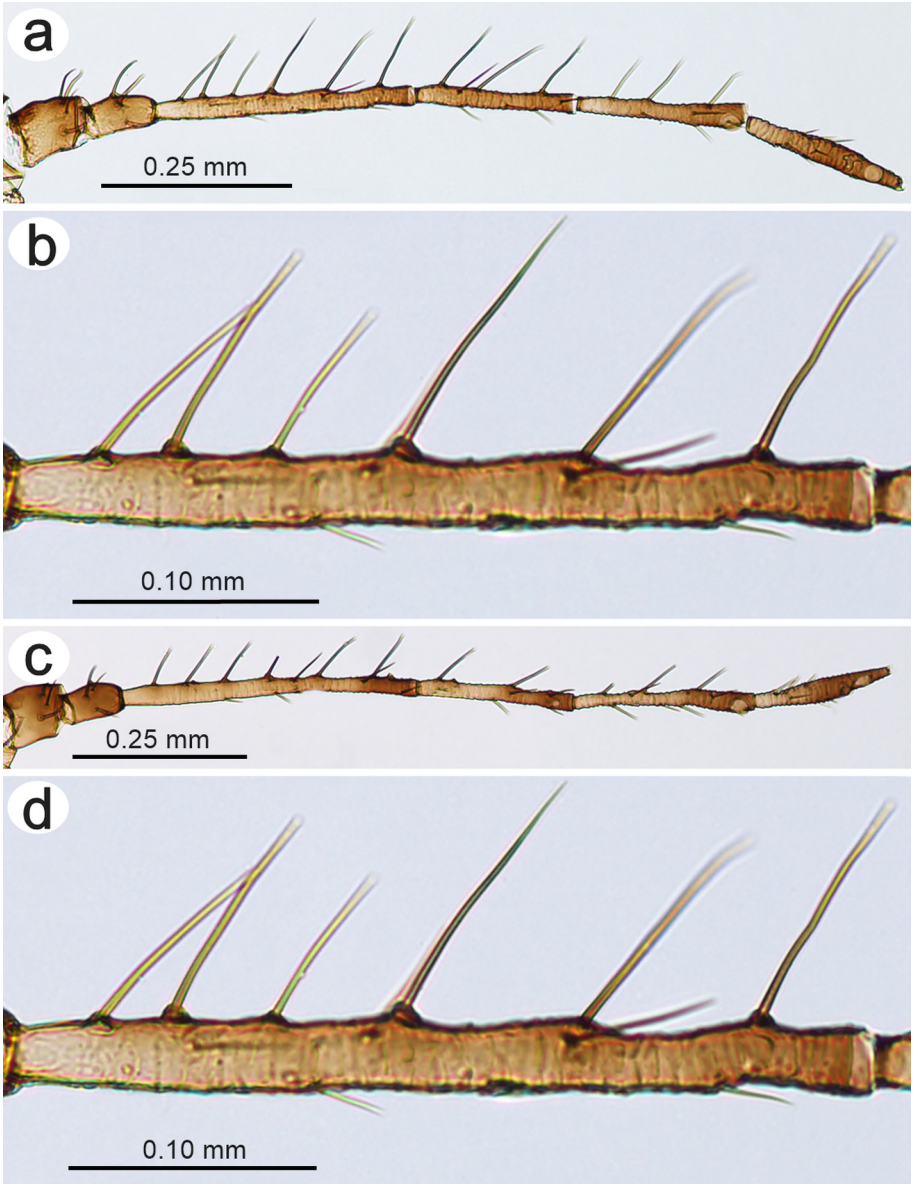

FIGURE 5. *Eulachnus agilis* apterous viviparous female: (**a**) ANT, (**b**) ANT III chaetotaxy; alate viviparous female: (**c**) ANT (**d**) ANT III chaetotaxy.

Oviparous female (Figs 4, 6, 7; Table 4)—redescription (based on 23 specimens). *Colour*. In life: head yellowish to light green. ANT yellowish to light green with darker apices of segments. Legs yellowish to light brown. Abdomen green with dark spots on dorsal side (Fig. 7a). In mounted specimens: head and thorax sclerotized, yellow or pale brown with scleroites at setal bases light brown or brown. ANT yellow with ANT I–II and apices of ANT III–VI light brown. Abdomen pale or yellowish with scleroites at setal bases light brown to brown. Femora uniformly yellow with darker spots at setal bases. Fore and middle tibiae yellow. Hind tibiae light brown. Body setae brown (Fig. 4c). *Morphometric characters*: HW 0.36–0.41 × ANT. Head chaetotaxy: dorsal side with 6 pairs; ventral side with 5 pairs of long, hair–like and pointed setae. Dorsal setae 0.100–0.160 mm long. ANT 0.42–0.54 × BL. ANT IV as long as or slightly shorter than ANT V. ANT V as long as or longer than ANT

VI. PT 0.15–0.17 × BASE with 4–5 accessory rhinaria. Other antennal ratios VI:III 0.54–0.64, V:III 0.64–0.67, IV:III 0.58–0.64. ANT with long, rigid or hair–like, blunt or slightly pointed setae, longer than diameter of segments. LS III 3.20–5.50 × BD III. ANT III with 13–14 setae, ANT IV with 6–9 setae, ANT V with 6–9 setae, ANT VI with 5–6 basal and 6 apical setae. Rostrum reaching middle coxae. URS 0.22–0.25 × ANT III, 0.35–0.42 × ANT VI and 0.34–0.36 × HT II. Hind legs long, covered by rigid, pointed and blunt setae, as long as or longer than the width of tibiae, on femora 0.100–0.125 mm long, on tibiae 0.120–0.150 mm long. Hind tibiae with 45–65 pseudosensoria (Fig. 6c). Basal length of HT I 0.26–0.37 × dorsal, 0.20–0.23 × ventral and 0.50–0.60 × intersegmental length, with 10 ventral setae. HT II 0.62–0.69 × ANT III and 1.02–1.15 ANT VI. Dorsal setae long, hair–like, pointed or slightly blunt, on pronotum—0.100–0.150 mm, mesonotum 0.110–0.137, metanotum 0.120–0.140 mm long; on abdomen—ABD I–VI 0.100–0.150 mm long, ABD VII–VIII 0.110–0.150 mm long. Abdomen with 4–5 scleroites on the anterior and 6–8 scleroites on the posterior part of ABD I–VI.

FIGURE 6. *Eulachnus agilis* hind tibiae: (**a**) apterous viviparous female; (**b**) alate viviparous female; (**c**) oviparous female.

Alate male (Figs 4, 7, 8; Table 5)—redescription (based on 17 specimens). *Colour*. In life: head and thorax grey, covered by wax powder. ANT yellowish with apices of segments brown. Abdomen green. Legs yellowish–light brown (Fig. 7b). In mounted specimens: head and thorax sclerotized, light brown to brown. ANT uniformly pale brown to brown. Femora uniformly yellow or with darker dorsal side but then with darker spots at setal bases. Fore and middle tibiae uniformly yellow or with distal and proximal parts light brown. Hind tibiae uniformly yellow or light brown with darker spots at setal bases. Tarsi brown. Wings yellowish with veins brown and pterostigma light brown to brown. Abdomen pale with scleroites light brown to brown (Fig. 4e). Genitalia light brown to brown (Fig. 8d, e). *Morphometric characters:* HW 0.24–0.27 × ANT. Head chaetotaxy: dorsal side with 5–6 pairs, ventral side with 5–6 pairs of long, fine, hair–like and pointed setae. Dorsal setae 0.090–0.130 mm long. ANT (Fig. 8a) 0.74–0.94 × BL. ANT III (Fig. 8b) with 65–75 secondary rhinaria, ANT IV shorter than ANT V, with 26–39 secondary rhinaria, ANT V (Fig. 8c) longer than ANT VI, with 22–32 secondary rhinaria; ANT VI with 3–5 accessory rhinaria and 3–7 secondary rhinaria situated on the basal part of BASE. PT 0.13–0.17 × BASE, other antennal ratios: VI:III 0.39–0.52, V:III 0.53–0.75, IV:III 0.50–0.64. ANT III with 16–21 setae, ANT IV with

5–11 setae, ANT V with 8–13 setae, ANT VI with 5–8 basal setae. ANT setae fine and pointed, longer than the diameter of segments. LS III 2.33–4.25 × BD III. Rostrum reaching mesosternum. URS 0.13–0.15 × ANT III, 0.27–0.34 × ANT VI and 0.32–0.35 × HT II. Outer side of hind legs covered by long, rigid or fine and pointed setae longer than the width of tibiae, on femora 0.100–0.125 mm long, on tibiae 0.130–0.155 mm long. Basal length of HT I 0.25 × dorsal, 0.17–0.20 × ventral and 0.55–0.71 × intersegmental length, with 12 ventral setae. HT II 0.38–0.44 × ANT III and 0.82–1.06 ANT VI. Dorsal setae long fine and pointed on pronotum—0.100–0.120 mm long; on abdomen—ABD I–VI 0.090–0.135 mm long, ABD VII–VIII 0.120–0.140 mm long. Abdomen with 4–6 scleroites on the anterior and 4–8 scleroites on the posterior part of ABD I–VI. Scleroites often fused into larger sclerites. Ventral side of ABD VI–VII with spinal or spino–pleural cross–bars.

Diagnosis. This very common species is similar to other long–haired species (0.90–0.150 mm) by yellow hind legs in mounted specimens. Femora and tibiae sometimes with slightly darker spots at setal bases. Dorsal abdominal scleroites often fused into larger sclerites. Dorsal abdominal setae rigid. In life, light green to green, slightly covered by wax powder.

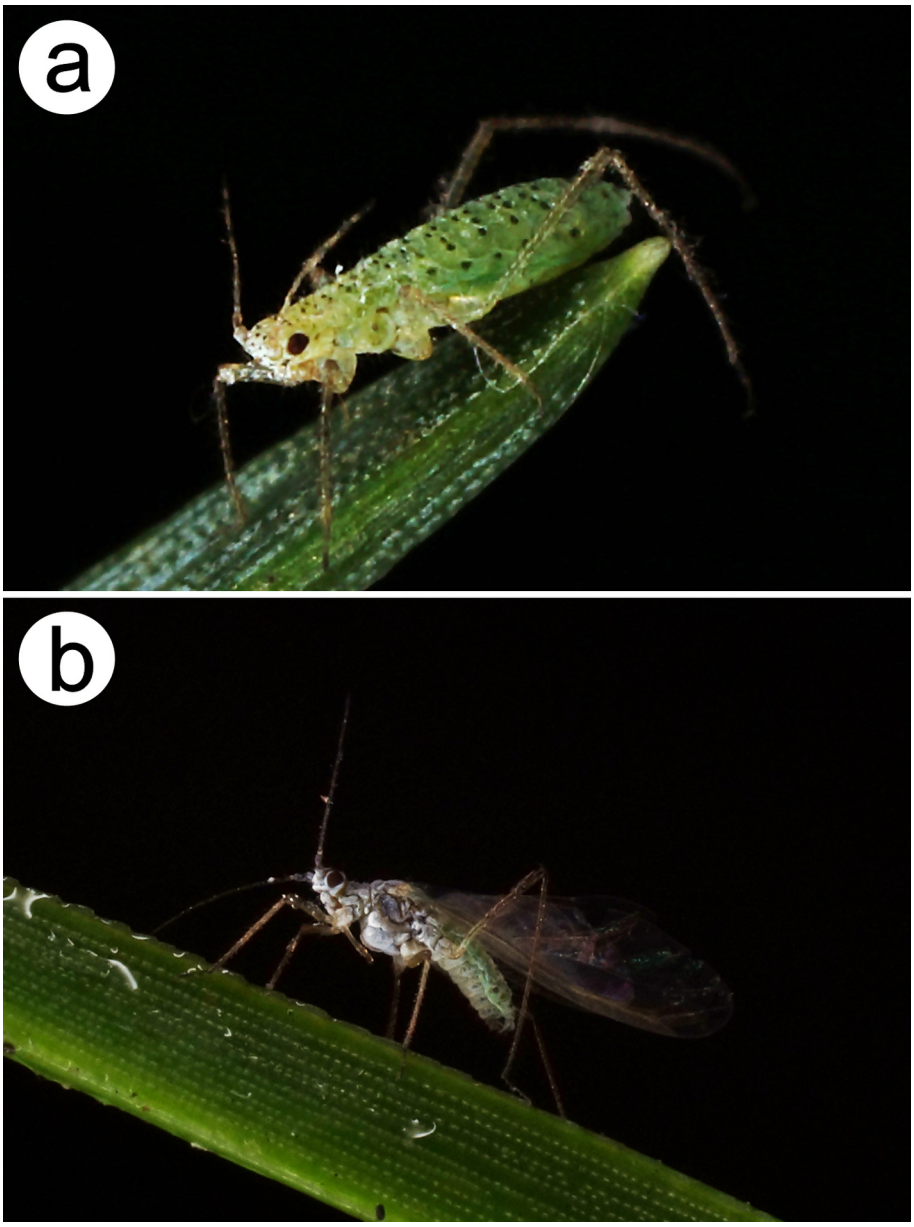

FIGURE 7. *Eulachnus agilis* life specimens (sexuales): (**a**) oviparous female, (**b**) alate male.

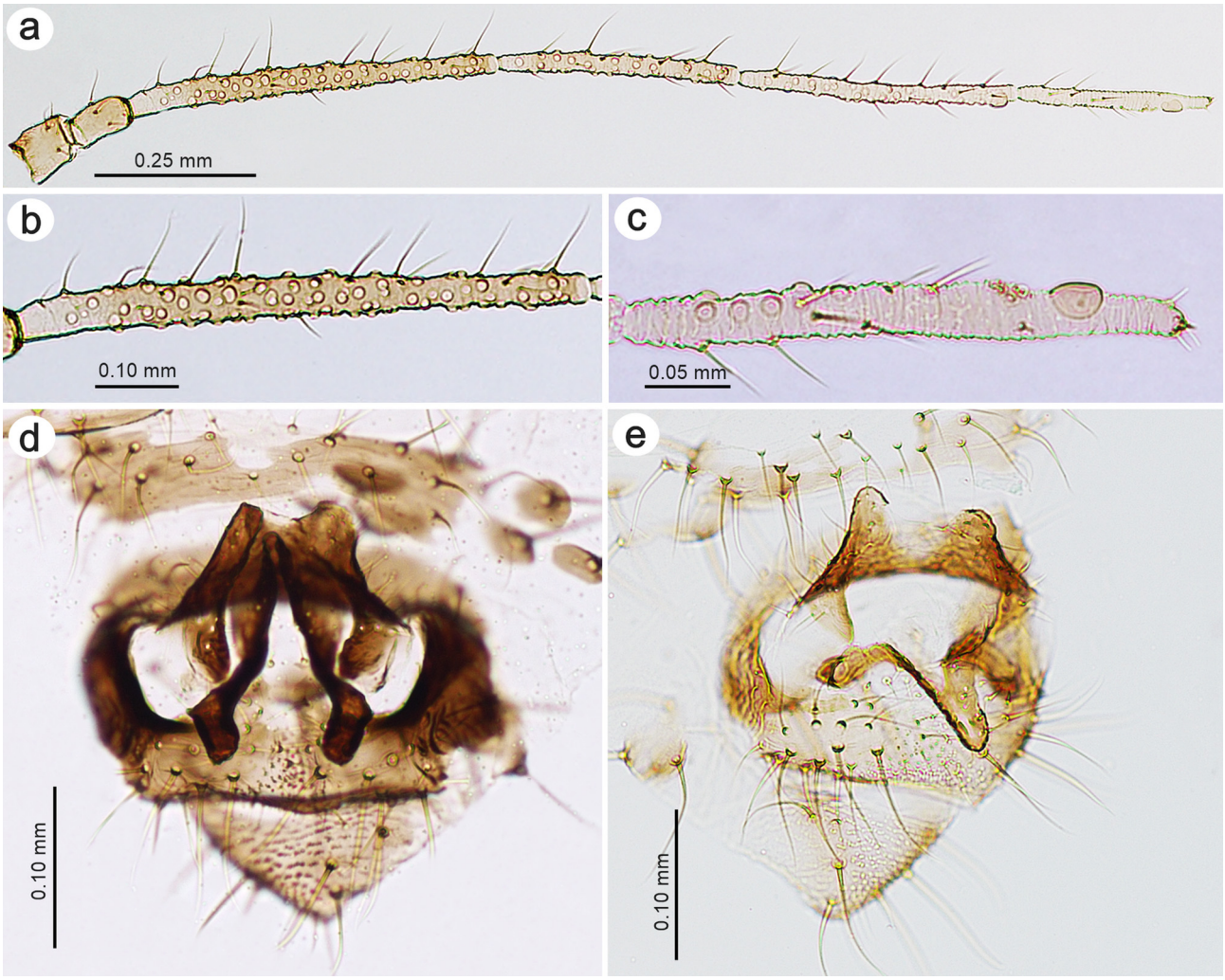

FIGURE 8. *Eulachnus agilis* male: (**a**) ANT, (**b**) ANT III, (**c**) ANT VI, (**d**, **e**) genitalia.

Distribution. Very common throughout Europe (so far has not been recorded from Greece, Holland, Hungary, Portugal and the countries of the western part of the Balkan Peninsula). Outside Europe the species has been reported in the East Palaearctic (China and Korea), Near East (Turkey), Nearctic (Canada, USA) and North Africa (Tunisia)

Host plants. In Europe, the species feeds mainly on *P. sylvestris* but it was also recorded on: *P. banksiana*, *P. brutia*, *P. cembra*, *P. densiflora*, *P. halepensis*, *P. heldreichii*, *P. mugo*, *P. nigra, P. pinaster*, *P. pinea*, *P. resinosa*, *P. rigida*, *P.*x *rotundata* and *P. sibirica*.

Type material examined. As there is no information that during the original description any type material was designated and none material of Kaltenbach is available for the authors, no name-bearing type specimen is believed to be extant and the authors consider that a name-bearing type is necessary to define the nominal taxon objectively. According to the International Code of Zoological Nomenclature (Article 75.1), the Neotype of *E. agilis* is here designated:

NEOTYPE: Katowice, 15.06.2013; 1 apterous viviparous female, *P. sylvestris*, M. Kanturski leg., UŚ, 13/06/10.

As *E. cretaceus*: SYNTYPES: UKRAINE: Donetsk circuit, Krasno–Lymansky area, Lavrentyevka, 05.07.1962, 1 apterous, 1 alate viviparous female, *P. cretacea* (=*P. sylvestris*), Mamontova leg., ZIUAS, 4639.

TABLE 1. Measurements of known fundatrices of the genus *Eulachnus* in Europe.

Character	***E. agilis***	***E. brevipilosus***	***E. cembrae***	***E. nigricola***	***E. stekolshchikovi***	***E. rileyi***	***E. tuberculostemmatus***
BL	2.25	1.92–2.20	3.00–3.10	1.90–2.22	1.87	2.00–2.40	1.82–2.05
HW	0.42	0.41–0.45	0.54–0.56	0.38–0.42	0.40	0.46–5.00	0.42–0.43
ANT	0.930–0.935	0.67–0.70	1.57–1.63	0.72–0.87	0.78–0.80	1.01–1.08	0.91–1.02
ANT III	0.32	0.17–0.19	0.52–0.53	0.21–0.25	0.23–0.24	0.31–0.35	0.27–0.30
ANT IV	0.14	0.07–0.08	0.26–0.28	0.09–0.14	0.10–0.11	0.15–0.16	0.14–0.17
ANT V	0.14–0.15	0.125	0.28–0.31	0.10–0.16	0.13–0.14	0.17–0.20	0.17–0.19
ANT VI	0.170–0.175	0.15–0.16	0.26–0.27	0.16–0.18	0.16–0.17	0.20–0.21	0.17–0.20
BASE	0.150–0.155	0.12–0.13	0.21–0.22	0.13–0.15	0.14–0.15	0.180–0.185	0.14–0.17
PT	0.020	0.027–0.035	0.05	0.030–0.035	0.020	0.020–0.025	0.025–0.030
FEMUR III	0.76–0.78	0.52–0.55	1.20–1.22	0.57–0.69	0.60	0.69–0.73	0.61–0.73
TIBIA III	1.30–1.32	0.80–0.85	1.92–1.95	0.80–0.96	1.00	1.05–1.22	0.97–1.07
HT I b.	0.030	0.027	0.030–0.035	0.025–0.030	0.025	0.025–0.030	0.025–0.030
HT I d.	0.065	0.042–0.050	0.125	0.045	0.055	0.070–0.075	0.065–0.075
HT I v.	0.110–0.105	0.072–0.087	0.150–0.155	0.07–0.075	0.085	0.090–0.105	0.10–0.11
HT I i.	0.045	0.037	0.045	0.030–0.033	0.035	0.040	0.035–0.040
HT II	0.20	0.180–0.187	0.26–0.27	0.15–0.17	0.19	0.18–0.20	0.17–0.19
URS	0.085	0.067–0.075	0.09–0.10	0.075	0.080	0.085–0.090	0.070–0.075
Genital plate length	0.11	0.13–0.15	0.17–0.18	0.11–0.12	0.10	0.11–0.12	0.10–0.12
Genital plate width	0.25	0.25	0.28–0.30	0.21–0.23	0.22	0.22–0.28	0.20–0.24

TABLE 2. Measurements of apterous viviparous females of the genus *Eulachnus* in Europe. ***E. ag***—*E. agilis;* ***E. al***—*E. alticola;* ***E. b***—*E. brevipilosus;* ***E. c***—*E. cembrae;* ***E. in***—*E. intermedius;* ***E. m***—*E. mediterraneus;* ***E. ib***—*E. ibericus;* ***E. n***—*E. nigricola;* ***E. r***—*E. rileyi;* ***E. s***—*E. stekolshchikovi*; ***E. t***—*E. tuberculostemmatus;* ***E. g***—*E. garganicus.*

Character	*E. ag*	*E. al*	*E. b*	*E. c*	*E. in*	*E. m*	*E. ib*	*E. n*	*E. r*	*E. s*	*E. t*	*E. g*
BL	2.07–2.50	2.37–2.90	1.05–2.10	2.17–2.92	1.80–2.50	2.00–2.52	2.05–2.62	1.59–1.90	1.92–2.85	1.90–1.97	1.62–2.00	2.07–2.12
HW	0.39–0.49	0.48–0.51	0.36–0.45	0.48–0.51	0.47–0.53	0.44–0.52	0.41–0.50	0.35–0.41	0.42–0.57	0.46	0.37–0.42	0.40–0.41
ANT	1.01–1.27	1.28–1.32	0.66–0.78	1.18–1.48	1.13–1.41	1.16–1.29	1.15–1.40	0.73–0.82	1.04–1.55	1.12–1.14	0.86–1.03	0.88–0.92
ANT III	0.29–0.39	0.38–0.40	0.18–0.23	0.39–0.53	0.33–0.45	0.37–0.42	0.39–0.47	0.20–0.24	0.35–0.50	0.31–0.30	0.26–0.33	0.26
ANT IV	0.16–0.22	0.22–0.23	0.07–0.10	0.19–0.23	0.20–0.26	0.19–0.21	0.19–0.23	0.09–0.12	0.11–0.31	0.21–0.22	0.13–0.18	0.15–0.16
ANT V	0.18–0.28	0.26–0.27	0.12–0.14	0.20–0.27	0.22–0.28	0.21–0.25	0.19–0.26	0.13–0.16	0.18–033	0.22–0.24	0.16–0.20	0.17–0.18
ANT VI	0.17–0.22	0.21–0.23	0.14–0.16	0.21–0.23	0.20–0.23	0.20–0.21	0.19–0.22	0.16–0.18	0.17–0.27	0.20–0.21	0.16–0.17	0.16–0.18
BASE	0.14–0.19	0.18–0.20	0.12–0.13	0.17–0.19	0.17–0.21	0.17–0.18	0.17–0.19	0.13–0.15	0.15–0.23	0.17–0.18	0.13–0.16	0.13–0.14
PT	0.02–0.03	0.02–0.03	0.02–0.03	0.03–0.04	0.20–0.30	0.02–0.03	0.02–0.03	0.02–0.03	0.02–0.04	0.30	0.02–0.03	0.03–0.04
FEMUR III	0.76–1.02	1.00–1.07	0.58–0.67	0.85–1.15	0.92–1.15	0.79–1.00	0.76–1.00	0.53–0.63	0.67–1.02	0.95–1.00	0.60–0.75	0.65–0.68
TIBIA III	1.17–1.62	1.62–1.77	0.86–1.06	1.25–1.80	1.42–1.80	1.30–1.52	1.48–1.64	0.76–0.90	1.10–2.00	1.50–1.55	0.95–1.22	0.97–1.07
HT I b.	0.02–0.03	0.02–0.03	0.02–0.03	0.03–0.04	0.02–0.03	0.03	0.03	0.02	0.02–0.03	0.02–0.03	0.02–0.03	0.02–0.03
HT I d.	0.07–0.09	0.08–0.09	0.04–0.05	0.08–0.12	0.08–0.10	0.08–0.11	0.07–1.00	0.04–0.05	0.06–0.10	0.09–0.10	0.06–0.08	0.07–0.08
HT I v.	0.11–0.13	0.11–0.12	0.07–0.09	0.11–0.16	0.12–0.14	0.12–0.13	0.11–0.14	0.07–0.08	0.13–0.14	0.12–0.13	0.09–0.11	0.10–0.11
HT I i.	0.03–0.05	0.04–0.06	0.03–0.04	0.03–0.05	0.03–0.05	0.03–0.04	0.04–0.05	0.02–0.03	0.03–0.05	0.03–0.04	0.03–0.04	0.03–0.04
HT II	0.21–0.23	0.21–0.22	0.16–0.20	0.22–0.24	0.20–0.23	0.23–0.26	0.23–0.26	0.14–0.16	0.18–0.24	0.24–0.25	0.18–0.20	0.18–0.19
URS	0.07–0.09	0.08	0.06–0.07	0.09–0.10	0.08–0.09	0.08–0.09	0.08–1.00	0.06–0.07	0.07–0.09	0.08	0.06–0.07	0.06–0.07
Genital plate length	0.10–0.13	0.11–0.15	0.10–0.13	0.10–0.15	0.10–0.15	0.10–0.12	0.11–0.15	0.09–0.12	0.09–0.15	0.10–0.15	0.08–0.12	0.09–0.12
Genital plate width	0.23–0.27	0.26–0.34	0.23–0.26	0.20–0.28	0.23–0.27	0.24–0.26	0.23–0.27	0.18–0.22	0.20–0.35	0.20–0.23	0.18–0.21	0.19–0.25

TABLE 3. Measurements of alate viviparous females of the genus *Eulachnus* in Europe. ***E. ag***—*E. agilis;* ***E. al***—*E. alticola;* ***E. b***—*E. brevipilosus;* ***E. c***—*E. cembrae;* ***E. in***—*E. intermedius;* ***E. m***—*E. mediterraneus;* ***E. ib***—*E. ibericus;* ***E. n***—*E. nigricola;* ***E. r***—*E. rileyi;* ***E. s***—*E. stekolshchikovi*; ***E. t***—*E. tuberculostemmatus;* ***E. g***—*E. garganicus.*

Character	*E. ag*	*E. al*	*E. b*	*E. in*	*E. m*	*E. ib*	*E. n*	*E. r*	*E. s*	*E. t*	*E. g*
BL	2.15–2.70	3.00	1.75–2.12	2.25–2.85	2.00–2.52	2.20–2.50	1.59–1.90	2.22–2.82	2.27–2.37	1.62–2.30	2.00–2.35
HW	0.43–0.50	0.53	0.37–0.42	0.47–0.50	0.44–0.52	0.48–0.50	0.35–0.41	0.46–0.53	0.44–0.45	0.37–0.45	0.39–0.41
ANT	1.21–1.37	1.58–1.59	0.73–0.89	1.49–1.59	1.16–1.29	1.41–1.49	0.73–0.82	1.41–1.67	1.30–1.37	0.95–1.21	0.92–1.03
ANT III	0.40–0.46	0.50–0.51	0.22–0.27	0.47–0.53	0.37–0.44	0.50–0.55	0.20–0.24	0.43–0.53	0.41–0.42	0.31–0.40	0.24–0.32
ANT IV	0.20–0.25	0.29–0.31	0.09–0.12	0.28–0.30	0.19–0.21	0.24–0.25	0.09–0.12	0.27–0.33	0.25–0.26	0.11–0.22	0.15–0.17
ANT V	0.24–0.28	0.32–0.33	0.12–0.16	0.28–0.32	0.21–0.25	0.26–0.27	0.13–0.16	0.29–0.37	0.25–0.28	0.19–0.24	0.2
ANT VI	0.19–0.22	0.25	0.15–0.18	0.23–0.25	0.20–0.21	0.19–0.23	0.16–0.18	0.22–0.25	0.20–0.23	0.18–0.21	0.18–0.19
BASE	0.17–0.19	0.21–0.22	0.13–0.15	0.20–0.22	0.17–0.18	0.17–0.20	0.13–0.15	0.19–0.21	0.18–0.20	0.14–0.18	0.14–0.15
PT	0.02–0.03	0.35	0.02–0.03	0.02–0.03	0.02–0.03	0.02–0.03	0.02–0.03	0.03	0.02–0.03	0.02–0.04	0.03–0.04
Wings L	2.40–2.75	3.00–3.25	1.97–2.27	2.87–2.97	2.60–3.00	2.50–2.87	1.75–2.00	2.65–3.00	2.65–2.67	1.80–2.42	1.87–2.00
Wings W	0.77–0.90	1.00–1.05	0.52–0.65	0.85–0.90	0.92–0.95	0.70–0.95	0.44–0.50	0.87–0.92	0.80–0.87	0.50–0.75	0.50–0.60
III FEMUR	1.00–1.15	1.12	0.60–0.71	1.17–1.30	0.79–1.00	1.00–1.10	0.53–0.63	0.95–1.30	1.05–1.20	0.85–0.92	0.70–0.80
III TIBIA	1.67–2.00	1.85	0.97–1.22	2.00–2.17	1.30–1.52	1.77–1.85	0.76–0.90	1.80–2.25	1.80–1.92	1.17–1.60	1.15–1.37
HT I b.	0.02–0.03	0.02	0.02–0.03	0.02–0.03	0.03	0.02–0.03	0.02	0.02–0.03	0.02–0.03	0.02–0.03	0.02
HT I d.	0.08–0.10	0.08	0.04–0.05	0.09–0.10	0.08–0.11	0.08–0.09	0.04–0.05	0.09–1.05	0.10	0.06–0.08	0.06–0.07
HT I v.	0.12–0.15	0.13	0.06–0.08	0.13–0.14	0.12–0.13	0.12–0.13	0.07–0.08	0.13–0.14	0.13–0.14	0.09–0.11	0.08–0.10
HT I i.	0.03–0.05	0.06	0.03–0.04	0.04	0.03–0.04	0.04–0.05	0.02–0.03	0.04–0.05	0.04	0.03–0.04	0.02–0.03
HT II	0.21–0.27	0.20	0.17–0.19	0.23–0.25	0.23–0.26	0.25–0.26	0.14–0.16	0.22–0.24	0.25	0.17–0.22	0.17–0.18
URS	0.07–0.08	0.08	0.06–0.07	0.08	0.08–0.09	0.09–0.11	0.06–0.07	0.08–0.10	0.08–0.09	0.07–0.08	0.06–0.07
Genital plate length	0.12–0.14	0.17	0.11–0.12	0.14–0.15	0.10–0.12	0.14–0.15	0.09–0.12	0.10–0.15	0.12–0.13	0.10–0.12	0.09–0.12
Genital plate width	0.23–0.30	0.30	0.19–0.24	0.19–0.23	0.24–0.26	0.23–0.25	0.18–0.22	0.23–0.27	0.24–0.25	0.17–0.22	0.17–0.19

TABLE 4. Measurements of known oviparous females of the genus *Eulachnus* in Europe.

Character	*E. agilis*	*E. alticola*	*E. brevipilosus*	*E. cembrae*	*E. intermedius*	*E. nigricola*	*E. rileyi*	*E. ttuberculostemmatus*
BL	2.12–2.72	2.32–2.82	2.25–2.35	2.62–3.25	2.02–2.90	1.62–2.07	2.05–3.00	1.55–2.50
HW	0.42–0.49	0.51–0.55	0.44–0.48	0.46–0.68	0.45–0.51	0.37–0.41	0.46–0.49	0.40–0.43
ANT	1.15–1.19	1.2–1.42	0.76–0.86	1.48–1.67	1.29–1.42	0.71–0.85	1.18–1.40	1.00–1.11
ANT III	0.33–0.35	0.36–0.42	0.22–0.25	0.48–0.54	0.35–0.43	0.20–0.25	0.31–0.43	0.29–0.34
ANT IV	0.20–0.22	0.20–0.26	0.10–0.11	0.20–0.29	0.19–0.26	0.10–0.12	0.23–0.27	0.17–0.19
ANT V	0.22–0.23	0.23–0.28	0.13–0.17	0.30–0.34	0.26–0.29	0.12–0.15	0.26–0.30	0.19–0.22
ANT VI	0.19–0.22	0.22–0.24	0.16–0.17	0.26–0.28	0.22–0.24	0.16–0.18	0.20–0.25	0.18–0.20
BASE	0.16–0.19	0.19–0.21	0.13–0.15	0.22–0.24	0.19–0.21	0.13–0.15	0.17–0.22	0.15–0.16
PT	0.025–0.030	0.030–0.035	0.027–0.030	0.040–0.050	0.025–0.035	0.030–0.032	0.030–0.035	0.030–0.035
FEMUR III	0.82–1.087	0.93–1.12	0.64–0.72	1.10–1.27	1.00–1.07	0.55–0.68	0.82–1.12	0.70–0.80
TIBIA III	1.30–1.60	1.50–1.75	1.00–1.05	1.67–1.97	1.55–1.75	0.78–1.00	1.37–1.67	1.11–1.27
HT I b.	0.025–0.030	0.025–0.040	0.025–0.027	0.035–0.037	0.025–0.030	0.020–0.023	0.02–0.03	0.022–0.027
HT I d.	0.080–0.097	0.060–0.097	0.055	0.105–0.120	0.085–0.100	0.045–0.055	0.09–0.10	0.070–0.085
HT I v.	0.12–0.14	0.120–0.137	0.090–0.095	0.142–0.160	0.12–0.13	0.078–0.085	0.12–0.14	0.105–0.120
HT I i.	0.047–0.050	0.040–0.055	0.035–0.040	0.040–0.050	0.040–0.050	0.027–0.035	0.040–0.045	0.035–0.045
HT II	0.21–0.23	0.19–0.22	0.18–0.20	0.24–0.28	0.21–0.24	0.15–0.16	0.20–0.23	0.195–0.200
URS	0.075–0.085	0.08–0.09	0.075	0.095–0.100	0.085–0.10	0.065–0.075	0.08–0.09	0.075–0.080
Genital plate length	0.12–0.16	0.15–0.16	0.14–0.17	0.13–0.15	0.15–0.18	0.12–0.14	0.12–0.16	0.09–0.14
Genital plate width	0.27–0.33	0.31–0.35	0.26–0.30	0.33–0.37	0.26–0.34	0.23–0.25	0.23–0.33	0.19–0.30

TABLE 5. Measurements of known alate males of the genus *Eulachnus* in Europe.

Character	*E. agilis*	*E. alticola*	*E. brevipilosus*	*E. cembrae*	*E. intermedius*	*E. nigricola*	*E. rileyi*	*E. tuberculostemmatus*
BL	1.80–2.37	2.12–2.42	2.17–2.52	2.50–2.70	1.95–2.07	1.32–1.60	2.00–2.37	1.75–1.92
HW	0.43–0.50	0.46–0.47	0.50–0.52	0.52	0.45–0.48	0.35–0.40	0.47–0.53	0.42–0.46
ANT	1.61–1.85	1.78–1.87	1.69–1.71	2.11–2.20	1.76–1.77	0.77–1.13	1.87–2.00	1.37–1.76
ANT III	0.54–0.61	0.55–0.63	0.58–0.60	0.69–0.74	0.60–0.61	0.26–0.36	0.60–0.65	0.38–0.55
ANT IV	0.29–0.35	0.35	0.32–0.35	0.36–0.43	0.31–0.36	0.09–0.20	0.37–0.45	0.29–0.40
ANT V	0.31–0.41	0.40–0.41	0.32–0.35	0.45–0.49	0.34–0.38	0.15–0.21	0.41–0.44	0.30–0.36
ANT VI	0.23–0.29	0.27–0.29	0.24–0.25	0.33–0.35	0.27	0.16–0.21	0.27–0.30	0.22–0.26
BASE	0.20–0.25	0.23–0.24	0.20–0.21	0.27–0.30	0.23	0.12–0.17	0.22–0.26	0.18–0.22
PT	0.030–0.040	0.045–0.050	0.040	0.055–0.065	0.040	0.035–0.040	0.045–0.055	0.040–0.045
Wings L	2.55–3.10	2.82–2.85	2.95–3.17	3.12–3.40	2.62–2.92	1.50–1.90	2.75–3.35	2.50–2.75
Wings W	0.80–1.05	0.92–1.00	0.90–0.97	1.00–1.10	0.77–0.98	0.35–0.45	0.82–1.02	0.72–0.80
III FEMUR	0.85–1.02	1.00–1.07	1.05–1.07	1.22–1.25	1.02–1.07	0.46–0.61	0.95–1.07	0.62–0.97
III TIBIA	1.50–1.82	1.82–1.85	1.80–1.82	1.95–2.05	1.77–1.80	0.77–1.02	1.70–1.97	1.02–1.67
HT I b.	0.025	0.030	0.030–0.035	0.032–0.035	0.025–0.035	0.020	0.025–0.027	0.025
HT I d.	0.10	0.09–0.10	0.090–0.110	0.11–0.12	0.10–0.11	0.040–0.050	0.095–0.105	0.075–0.095
HT I v.	0.12–0.14	0.13–0.14	0.125–0.135	0.14–0.15	0.13–0.14	0.065–0.080	0.13–0.14	0.105–0.125
HT I i.	0.035–0.045	0.050–0.052	0.030–0.035	0.040–0.047	0.030–0.035	0.025–0.030	0.035–0.045	0.040
HT II	0.22–0.26	0.022–0.023	0.25–0.26	0.25–0.28	0.22–0.23	0.14–0.17	0.24–0.25	0.20–0.23
URS	0.080–0.087	0.080	0.090	0.090–1.000	0.075–0.090	0.062–0.075	0.095–0.105	0.075–0.080

Eulachnus alticola **Börner, 1940**

Börner, 1940: 1

Apterous viviparous female (Figs 9, 10; Table 2)—redescription (based on 10 specimens). *Colour*. In life: light green without wax powder. In mounted specimens: head and thorax yellow with scleroites at the setal bases brown. ANT yellowish with ANT I–II and apices of ANT III–VI light brown. Abdomen yellowish with scleroites at setal bases light brown to brown. Legs uniformly yellow or yellow with brown spots at setal bases and darker distal and proximal parts of tibiae. Body setae light brown to brown (Fig. 9a). *Morphometric characters:* HW 0.36–0.39 × ANT. Head chaetotaxy: dorsal side with 5 pairs of long, thick and blunt setae with extended apices; ventral side with 5 pairs of long, rigid and blunt setae. Dorsal setae 0.050–0.100 mm long. ANT (Fig. 10a) 0.44–0.55 × BL. ANT IV always shorter than ANT V. ANT V longer than ANT VI. PT 0.13–0.19 × BASE with 5–6 accessory rhinaria. Other antennal ratios: VI:III 0.56–0.58, V:III 0.65–0.71, IV:III 0.55–0.60. ANT III (Fig. 10b) with 18–19 setae, ANT IV with 7–13 setae, ANT V with 7–12 setae, ANT VI with 5–6 basal setae. ANT setae of medium length and long, rigid and blunt with extended apices, longer than diameter of segments. LS III 1.62–2.00 × BD III. Rostrum reaching middle coxae. URS 0.20–0.22 × ANT III, 0.34–0.39 × ANT VI and 0.35–0.40 × HT II. Outer side of hind legs covered by long, rigid and blunt setae with extended apices, as long as or longer than the width of tibiae (Fig. 10d), on femora 0.040–0.090 mm long, on tibiae 0.095–0.105 mm long. Basal length of HT I 0.26–0.37 × dorsal, 0.20–0.29 × ventral and 0.41–0.71 × intersegmental length, with 10 ventral setae. HT II 0.55–0.56 × ANT III and 0.95–0.97 × ANT VI. Dorsal setae long, rigid and blunt with extended apices, on pronotum—0.020–0.075 mm long, mesonotum 0.040–0.060 mm long, metanotum 0.035–0.060 mm long; on abdomen—ABD I–VI 0.030–0.080 mm long, ABD VII–VIII 0.047–0.115 mm long. Abdomen with 2–3 scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI. (Fig. 46g).

Alate viviparous female (Fig. 10; Table 3)—redescription (based on one specimen). *Colour*. In life: unknown. In mounted specimens: head and thorax light brown with scleroites at setal bases brown. ANT yellowish with ANT I–II brown and apices of ANT III–VI light brown. Fore wings pale yellow with pterostigma and veins slightly darker. Hind wings pale. Legs yellow. Abdomen pale with dorsal scleroites brown. Body setae yellow to light brown. *Morphometric characters:* HW 0.32–0.33 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 5 pairs of long, fine and pointed setae. Dorsal setae 0.100–0.125 mm long. ANT 0.52–0.53 × BL. ANT IV slightly shorter than ANT V. ANT V longer than ANT VI. PT 0.15–0.16 × BASE with 5–6 accessory rhinaria. Other antennal ratios: VI:III about 0.50, V:III 0.62–0.66, IV:III 0.58–0.60. ANT III (Fig. 10c) with 14–15, ANT IV with 8–10, ANT V with 10 setae, ANT VI with 5–6 basal setae. Setae medium–sized, rigid and pointed, longer than diameter of segments. LS III 1.79–1.90 × BD III. Rostrum reaching mesosternum. URS 0.15–0.16 × ANT III, 0.31–0.32 × ANT VI and about 0.40 × HT II. Outer side of hind legs covered by long, fine, pointed or slightly blunt setae, longer than width of tibiae, on femora 0.070–0.080 mm long, on tibiae 0.090–0.100 mm long. Basal length of HT I about 0.29 × dorsal, about 0.18 × ventral and about 0.41 × intersegmental length, with 10 ventral setae. HT II 0.39–0.40 × ANT III and 0.78–0.80 × ANT VI. Dorsal setae fine and pointed, on pronotum—0.060–0.065 mm long; on abdomen—ABD I–VI 0.035–0.040 mm long, ABD VII–VIII 0.050–0.060 mm long. Abdomen with 2–3 scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI.

Oviparous female (Figs 9, 10; Table 4)—redescription (based on 12 specimens). *Colour*. In life: unknown. In mounted specimens: head and thorax pale yellow to yellow with scleroites at setal bases light brown, abdomen pale with scleroites at setal bases light brown. ANT uniformly pale to light brown with basal part of ANT III pale. Legs light yellow to yellow. Body setae pale to dark (Fig. 9b). *Morphometric characters*: HW 0.36–0.43 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 6 pairs of long, rigid blunt setae. Dorsal 0.012–0.110 mm long. ANT 0.48–0.52 × BL. ANT IV as long as or shorter than ANT V, with 1 secondary rhinarium. ANT V longer than ANT VI. PT 0.14–0.17 × BASE with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.57–0.62, V:III 0.61–0.69, IV: III 0.52–0.61. ANT with medium–sized, fine and slightly blunt setae, slightly longer than diameter of segments. LS III 1.62–2.33 × BD III. ANT III with 12–19 setae, ANT IV with 6–11 setae, ANT V with 7–10 setae, ANT VI with 5–6 basal setae. Rostrum reaching middle coxae. URS 0.19–0.22 × ANT III, 0.33–0.38 × ANT VI and 0.36–0.41 × HT II. Outer side of hind legs covered by medium, rigid and slightly blunt setae, as long as or slightly longer than width of tibiae, on femora 0.035–0.070 mm long, on tibiae 0.095–0.105 mm long. Hind tibiae with 20–45 small, rounded pseudosensoria situated from the distal part to ½ of length of tibiae (Fig. 10e). Basal

length of HT I 0.30–0.50 × dorsal, 0.19–0.32 × ventral and 0.48–0.87 × intersegmental length, with 10 ventral setae. HT II 0.48–0.61 × ANT III and 0.77–1.00 ANT VI. Dorsal setae medium sized and slightly blunt, on pronotum—0.030–0.075 mm long, mesonotum 0.023–0.075 mm long, metanotum 0.065–0.062 mm long; on abdomen setae short and blunt—ABD I–VI 0.032–0.075 mm long, ABD VII–VIII 0.062–0125 mm long. Abdomen with 2–3 scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI.

FIGURE 9. *Eulachnus alticola*: (**a**) apterous viviparous female; (**b**) oviparous female; (**c**) male.

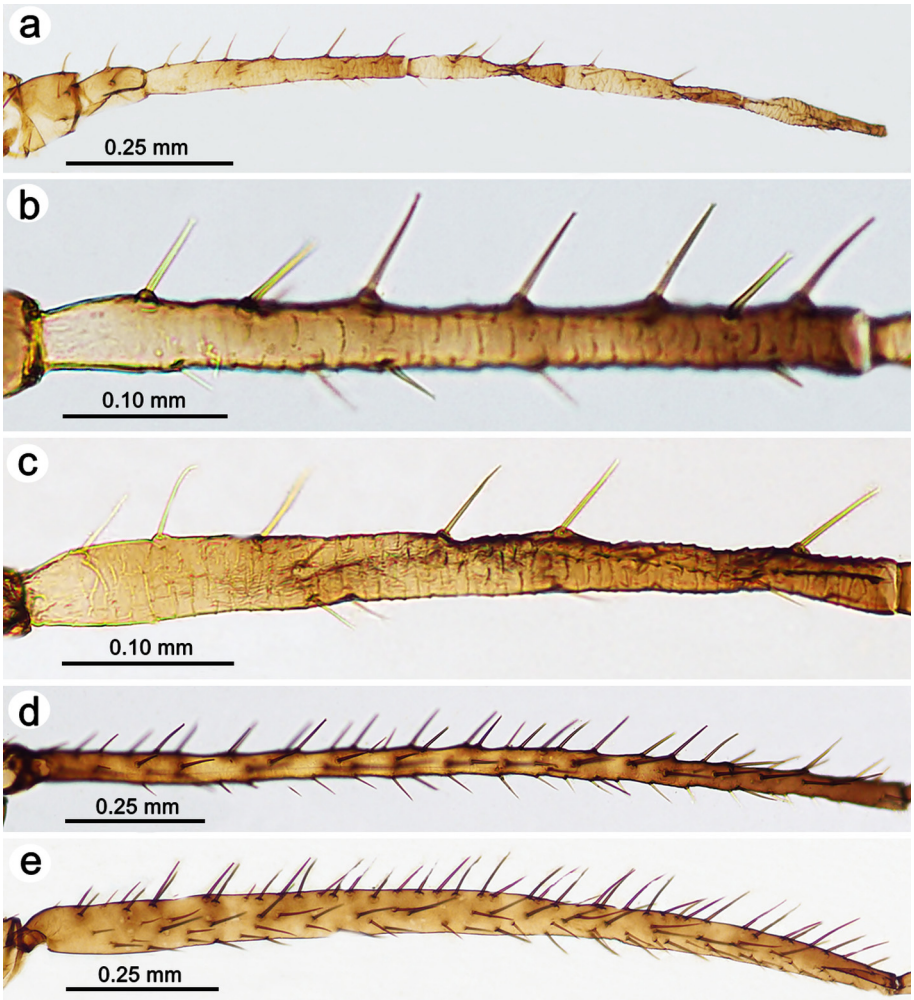

FIGURE 10. *Eulachnus alticola* (**a**) ANT of apterous viviparous female; (**b**) ANT III of apterous viviparous female (**c**) ANT III of alate viviparous female, (**d**) chaetotaxy of hind tibiae of apterous viviparous female, (**e**) hind tibiae with pseudosensoria of oviparous female.

Alate male (Figs 9, 11; Table 5)—redescription (based on five specimens). *Colour*. In life: unknown. In mounted specimens: head and thorax brown. ANT light brown to brown. Wings with pterostigma brownish and veins brown. Abdomen pale with sclerites and scleroites brown (Fig. 9c). Genitalia brown (Fig. 11d, e). *Morphometric characters:* HW 0.24–0.26 × ANT. Head chaetotaxy: dorsal side with 6, ventral side with 5 pairs of long, fine and pointed setae. Dorsal setae 0.080–0.100 mm long. ANT (Fig. 11a) 0.77–0.84 × BL. ANT III (Fig. 11b) with 83–87 secondary rhinaria, ANT IV shorter than ANT V with 29–33 secondary rhinaria. ANT V (Fig. 11c) longer than ANT VI with 23–28 secondary rhinaria, ANT VI with 4–5 accessory rhinaria and 5–7 secondary rhinaria. PT 0.19–0.20 × BASE, other antennal ratios: VI:III 0.43–0.53, V:III 0.65–0.72, IV:III 0.55–0.63; ANT III with 16–20 setae, ANT IV with 9–11 setae, ANT V with 6–9 setae, ANT VI with 5–6 basal setae. ANT setae fine and pointed as long as or slightly shorter than the diameter of segments. LS III 2.00–2.22 × BD III. Rostrum reaching mesosternum. URS 0.12–0.14 × ANT III, 0.27–0.29 × ANT VI and 0.34–0.35 × HT II. Outer side of hind legs covered by long, rigid and slightly blunt setae, longer than width of tibiae, on femora 0.09–0.10 mm long, on tibiae 0.10–0.11 mm long. Basal length of HT I 0.30–0.33 × dorsal, 0.21–0.23 × ventral and 0.57–0.60 × intersegmental length, with 10 ventral setae. HT II 0.36–0.40 × ANT III and 0.76–0.83 × ANT VI. Dorsal setae long, fine and pointed, on pronotum—0.060–0.100 mm long; on abdomen—ABD I–VI 0.050–0.062 mm long, ABD VII–VIII 0.075–0.110 mm long. Abdomen with 2–4 scleroites on anterior and 2–4 scleroites on posterior part of ABD I–VI. Scleroites can fuse into larger sclerites or cross–bars. Ventral side of ABD I–VI. VI–VIII with sclerotized cross–bars (Fig. 11e).

Diagnosis. In mounted specimens, this species is similar to *E. agilis* but differs from it by clearly shorter setae

on the dorsal side of body—0.052–0.075 mm long on pronotum and 0.030–0.080 mm long on ABD I–VI (more than 0.080 mm on pronotum and more than 0.090 mm on ABD I–VI in *E. agilis*). In life with similar colour but without wax powder.

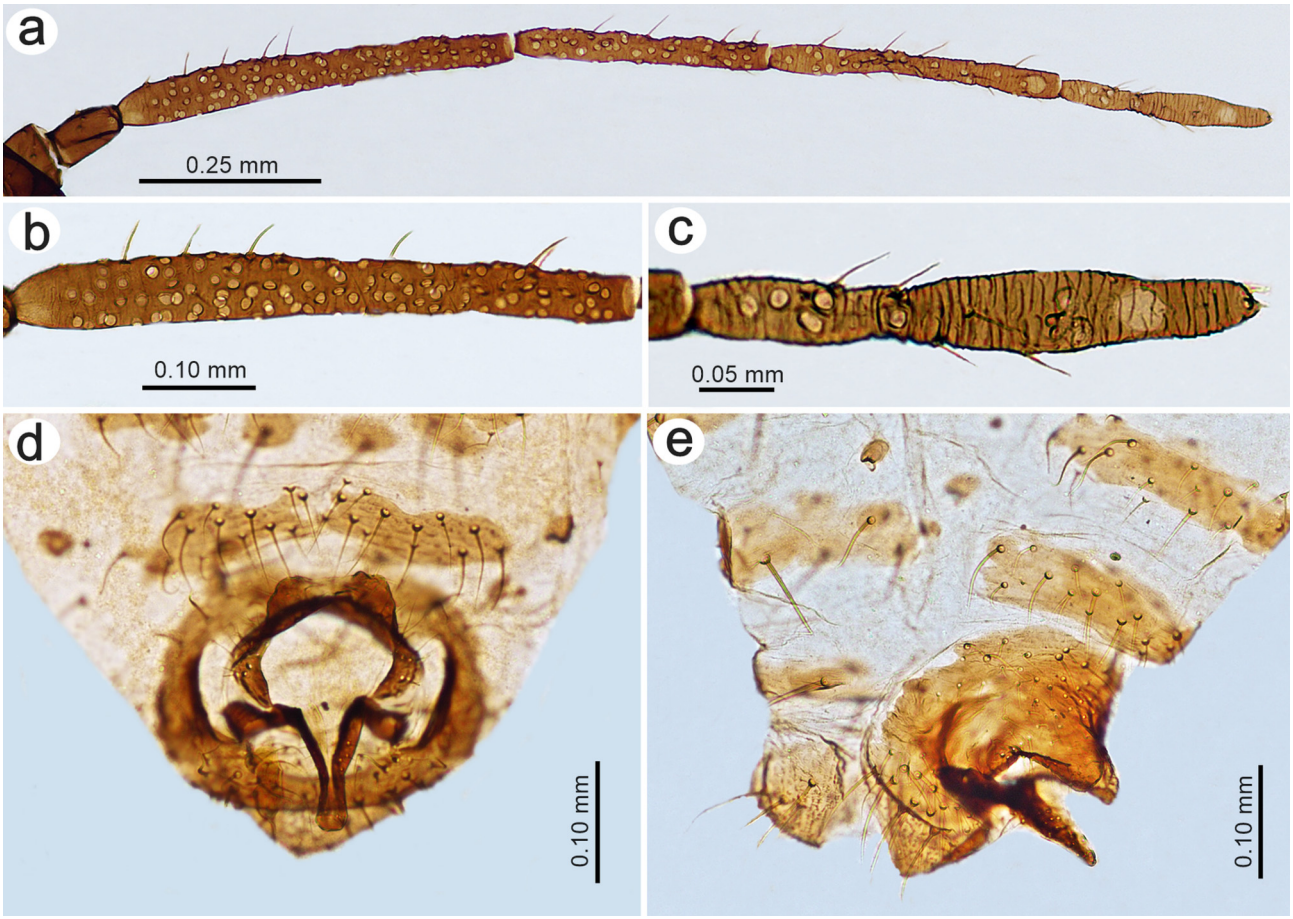

FIGURE 11. *Eulachnus alticola* male: (**a**) ANT, (**b**) ANT III, (**c**) ANT VI, (**d**, **e**) genitalia.

Distribution. In Europe, this species is known from mountain areas in: Austria, Czech Republic, Italy, Poland, Slovakia and Ukraine. Outside Europe it was reported from East Palaearctic (China).

Host Plants. This species feeds mainly on *Pinus mugo* in natural high altitudes. Also, known from: *P. banksiana*, *P. massoniana*, *P. ponderosa*, *P. sylvestris*, *P. yunnanensis*.

Type material examined. As no holotype was designated in the original description, according to the International Code of Zoological Nomenclature, the lectotype of *E. alticola* is here designated from the Syntypes.

LECTOTYPE: AUSTRIA: Eastern Alps (locality unreadable) 1800m, 4.08.1939, 1 oviparous female from *P. mugo* (host plant after Börner, 1940) marked with black circle and „L" (present designation), H. Franz leg., SDEI 1/5; PARALECTOTYPE: AUSTRIA: Eastern Alps (locality unreadable) 1800m, 4.08.1939, 1 oviparous female from *P. mugo* (host plant after Börner, 1940) next to the lectotype (present designation), H. Franz leg. SDEI 1/5

Eulachnus brevipilosus Börner, 1940

Börner, 1940: 1

Fundatrix (Figs 12, 13, 15; Table 1)—description (based on 10 specimens). *Colour*. In life: orange to orange–yellow with head, pronotum and dorsal scleroites dark. ANT dark, except of basal part of ANT III. Legs dark brown (Fig. 12a). In mounted specimens: head yellow to light brown, thorax pale to yellow with scleroites at setal bases light brown, abdomen pale with scleroites at setal bases light brown to brown. ANT yellowish with apices of ANT III–VI light brown. Femora yellow, tibiae yellow to light brown. Body setae pale (Fig. 13a).

Morphometric characters: HW 0.58–0.64 × ANT. Head chaetotaxy: dorsal side with 6 pairs of short thick, rigid and blunt or slightly truncate setae; ventral side with 5 pairs of medium–sized, rigid and blunt setae. Dorsal setae 0.010–0.050 mm long. ANT 0.33–0.36 × BL. ANT IV always shorter than ANT V. ANT V shorter than ANT VI. PT 0.21–0.28 × BASE with 5 accessory rhinaria. Other antennal ratios: VI:III 0.82–0.89, V:III 0.64–0.73, IV:III 0.38–0.47. ANT III with 6–12 setae, ANT IV with 5–6 setae, ANT V with 7–8 setae, ANT VI with 5–6 basal setae. ANT setae very short, rigid, pointed or slightly blunt, never longer than diameter of segments. LS III 0.68–0.80 × BD III. Rostrum reaching middle or hind coxae. URS 0.38–0.39 × ANT III, 0.44–0.46 × ANT VI and 0.35–0.41 × HT II. Outer side of hind legs covered by short, thick, rigid and blunt setae, always shorter than the width of tibiae, on femora 0.012–0.017 mm long, on tibiae 0.005–0.062 mm long. Hind tibiae with 1–3 small oval pseudosensoria (Fig. 15a). Basal length of HT I 0.54–0.64 × dorsal, 0.31–0.37 × ventral and 0.72–0.73 × intersegmental length, with 6 ventral setae. HT II 0.92–1.10 × ANT III and 1.09–1.23 × ANT VI. Dorsal setae very short, spike–like, on pronotum—0.010–0.020 mm long, mesonotum 0.010–0.020 mm long, metanotum 0.007–0.015 mm long; on abdomen—ABD I–VI 0.007–0.017 mm long and pointed, ABD VII–VIII 0.010–0.045 mm long and blunt. Dorsal side of abdomen with 2 scleroites on anterior and 6–8 scleroites on posterior part of ABD I–VI.

Remarks. This morph differs from the apterous viviparous female by higher ratio of ANT VI/ANT III (0.82–0.89 whereas in the apterous viviparous female the ratio reaches 0.69–0.79) and having 1–3 pseudosensoria on slightly thickened hind tibiae.

Apterous viviparous female (Figs 12–15; Table 2)—redescription (based on 44 specimens). *Colour*. In life: green form—light green with only slightly darker ANT V–VI, tarsi and not well pigmented scleroites at dorsal side of abdomen (Fig. 12c). Orange form—orange to yellow with ANT III–VI brown, distal parts of tibiae and well visible brown pigmented scleroites at dorsal side of abdomen (Fig. 12b). In mounted specimens: all structures pale to yellow with only slightly darker PT and distal part of tarsi. Abdominal scleroites pale, apices of ANT III–VI, femora and tarsi light brown. Body setae pale (Fig. 13b). *Morphometric characters*: HW 0.53–0.59 × ANT. Head chaetotaxy: dorsal side with 6 pairs of short or very short thick, rigid and blunt setae; ventral side with 5 pairs of longer, thick, rigid and blunt setae. Dorsal setae 0.010–0.057 mm long. ANT (Fig. 14a) 0.36–0.44 × BL. ANT IV always shorter than ANT V. ANT V shorter than ANT VI. PT 0.18–0.28 × BASE with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.69–0.79, V:III 0.57–0.67, IV:III 0.37–0.50. ANT III (Fig. 14b) with 9–12 setae, ANT IV with 4–5 setae, ANT V with 4–9 setae, ANT VI with 4–6 basal setae. Setae very short, rigid and blunt, never longer than diameter of segments. LS III 0.75–0.85 × BD III. Rostrum reaching middle or hind coxae. URS 0.30–0.36 × ANT III, 0.42–0.47 × ANT VI and 0.34–0.41 × HT II. Outer side of hind legs covered by short, thick, rigid and blunt setae, never longer than width of tibiae (Fig. 15b), on femora 0.012–0.022 mm long, on tibiae 0.007–0.052 mm long. Basal length of HT I 0.50–0.75 × dorsal, 0.27–0.34 × ventral and 0.62–0.75 × intersegmental length, with 6 ventral setae. HT II 0.80–0.95 × ANT III and 1.01–1.25 ANT VI. Dorsal setae very short, pointed or blunt, on pronotum—0.040–0.057 mm long, mesonotum 0.007–0.015 mm long, metanotum 0.007–0.015 mm long; on abdomen—ABD I–VI 0.006–0.012 mm long, ABD VII–VIII 0.007–0.085 mm long. Abdomen with 2–3 scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI (Fig. 46k).

Alate viviparous female (Figs 12–15; Table 3)—redescription (based on 14 specimens). *Colour.* In life (orange form): head and thorax orange–grey with slcerites at setal bases darker. Antennae brown with basal part of ANT III orange. Wings slightly dimmed. Legs orange–grey or orange–brown with ends of tibiae darker. Abdomen orange (Fig. 12d). In mounted specimens: head and thorax pale brown to brown. ANT pale brown or light brown with ANT I–II and basal part of ANT III pale. Fore wings yellowish with pterostigma and veins slightly darker. Hind wings yellowish. Legs yellowish to light brown with slightly darker distal part of femora and anterior and posterior parts of tibiae. Abdomen pale with dorsal scleroites light brown. Body setae pale (Fig. 13d). *Morphometric characters*: HW 0.46–0.52 × ANT. Head chaetotaxy: dorsal side with 7 pairs of short, rigid, pointed and blunt setae; ventral side with 5 pairs of longer, rigid, thick and blunt setae. Dorsal setae 0.017–0.055 mm long. ANT (Fig. 14c) 0.41–0.44 × BL. ANT III with 0–4 secondary rhinaria (Fig. 14d). ANT IV always shorter than ANT V with 0–1 secondary rhinarium. ANT V shorter than ANT VI. PT 0.20–0.26 × BASE with 3–5 accessory rhinaria. Other antennal ratios: VI:III 0.66–0.73, V:III 0.56–0.62, IV:III 0.40–0.48. ANT III with 9–12 setae, ANT IV with 4–6 setae, ANT V with 5–8 setae, ANT VI with 5–7 basal setae. ANT setae very short, rigid, slightly blunt and pointed, never longer than diameter of segments. LS III 0.85–1.17 × BD III. Rostrum reaching metasternum. URS 0.24–0.31 × ANT III, 0.35–0.43 × ANT VI and 0.33–0.38 × HT II. Outer side of hind legs covered by short to medium–sized, rigid and blunt or slightly pointed setae, as long as or shorter than the width of tibiae (Fig. 15c), on

femora 0.010–0.025 mm long, on tibiae 0.010–0.062 mm long. Basal length of HT I 0.44–0.59 × dorsal, 0.27–0.37 × ventral and 0.59–0.84 × intersegmental length, with 6 ventral setae. HT II 0.70–0.81 × length of ANT III and 0.98–1.11 × ANT VI. Dorsal setae very short, rigid and pointed, on pronotum—0.007–0.020 mm long; on abdomen—ABD I–VI 0.005–0.015 mm long, ABD VII–VIII 0.010–0.050 mm long. Abdomen with 2 scleroites on anterior and 2–4 scleroites on posterior part of ABD I–VI.

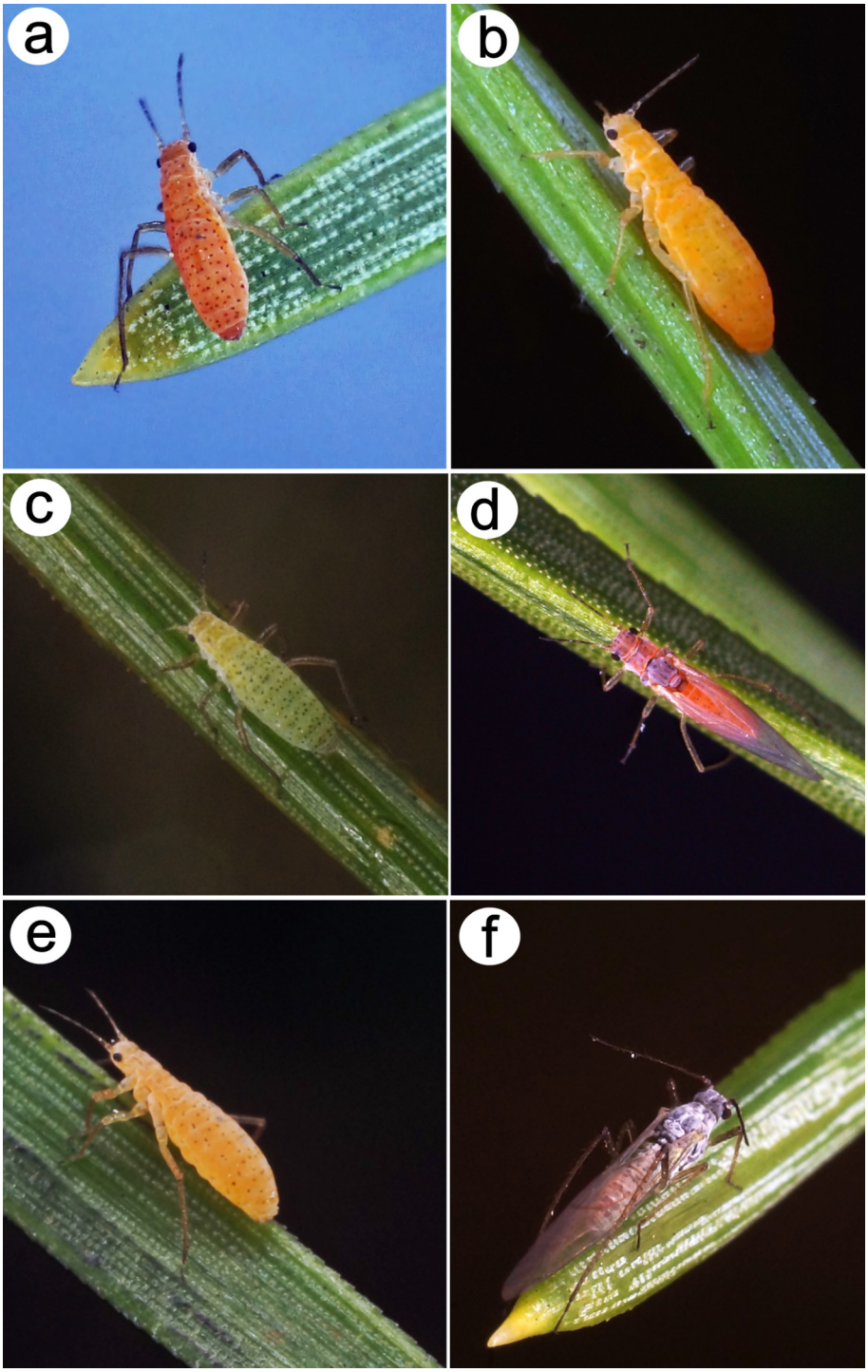

FIGURE 12. *Eulachnus brevipilosus* life specimens: (**a**) fundatrix, (**b**) apterous viviparous female (orange colour form), (**c**) apterous viviparous female of green colour form, (**d**) alate viviparous female, (**e**) oviparous female, (**d**) alate male.

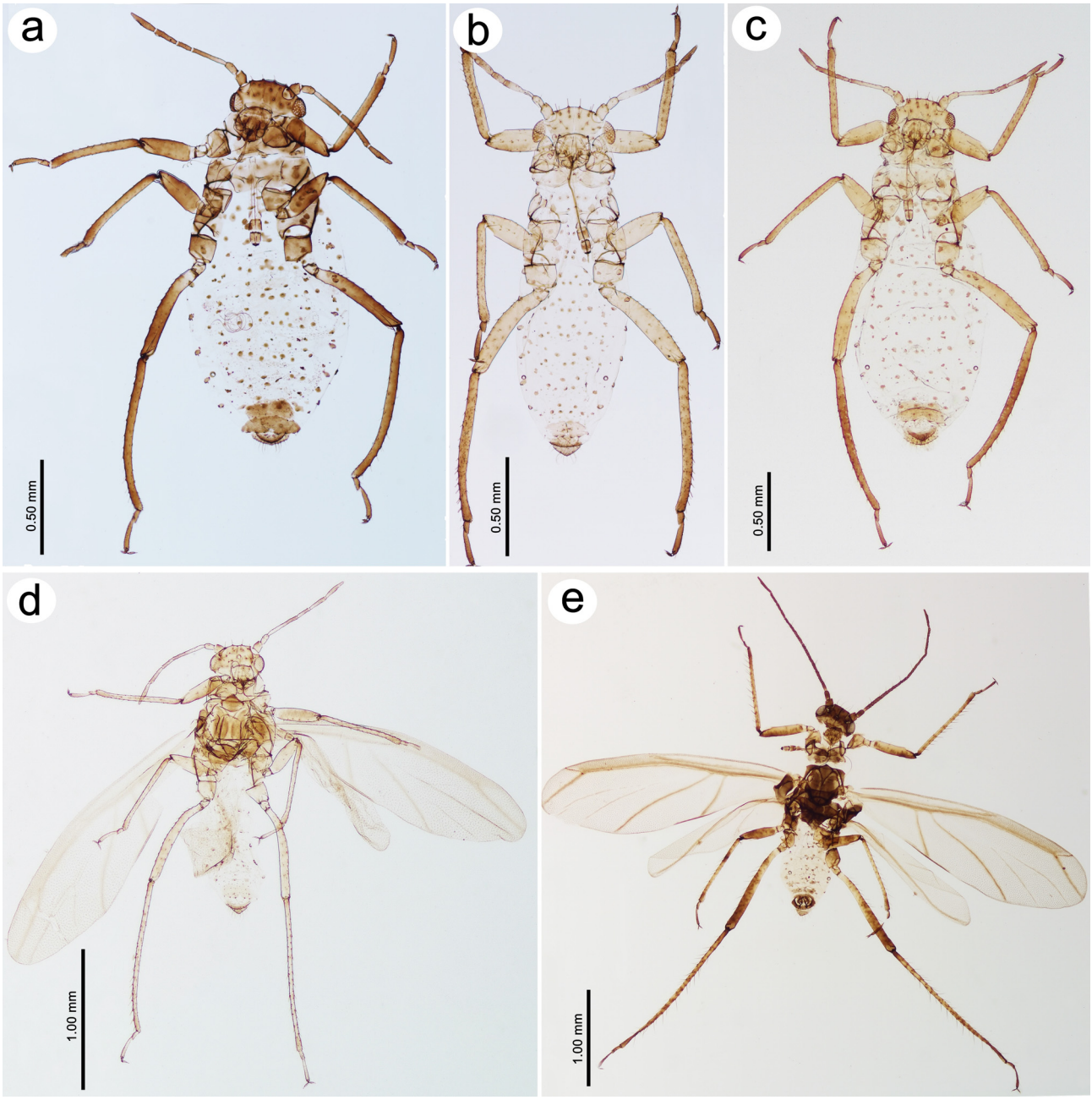

FIGURE 13. *Eulachnus brevipilosus*: (**a**) fundatrix, (**b**) apterous viviparous female; (**c**) oviparous female; (**d**) alate viviparous female; (**e**) alate male.

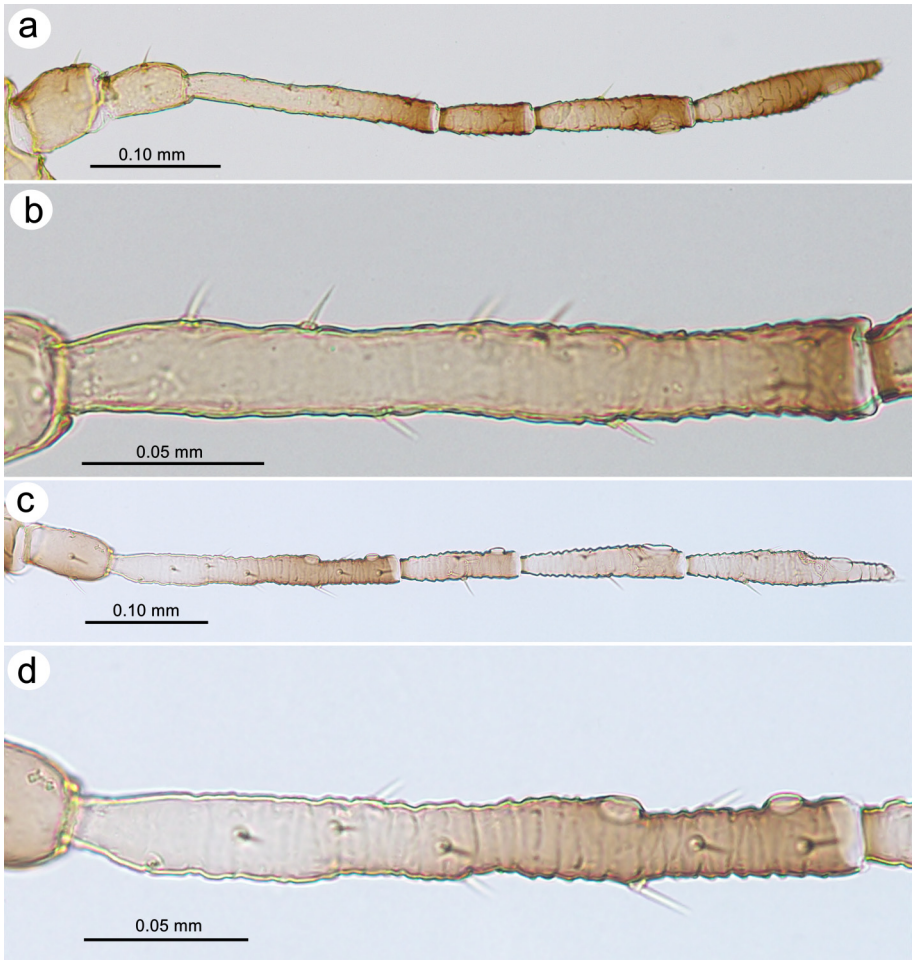

FIGURE 14. *Eulachnus brevipilosus* apterous viviparous female: (**a**) ANT, (**b**) ANT III chaetotaxy; alate viviparous female: (**c**) ANT (**d**) ANT III chaetotaxy.

Oviparous female (Figs 12, 13, 15; Table 4)—description (based on 15 specimens). *Colour*. In life (orange form): head, thorax and abdomen orange with dorsal scleroites brown. ANT yellowish with apices of segments brown. Femora yellowish to orange, tibiae light brown to brown (Fig. 12e). In mounted specimens: head and thorax yellow with scleroites at setal bases light brown, abdomen pale with scleroites at setal bases only slightly darker. ANT yellow with apices of ANT III light brown. ANT IV–V from ½ length light brown, ANT VI light brown with basal part yellow. Femora yellow. Fore and middle tibiae yellow. Hind tibiae light brown, always darker than fore and middle tibiae. Body setae pale to yellow (Fig. 13c). *Morphometric characters*: HW 0.51–0.63 × ANT. Head chaetotaxy: dorsal side with 4–5 pairs of short and very short, thick, blunt or truncate setae; ventral side with 5–6 pairs of long, thick and rigid blunt or truncate setae. Dorsal setae 0.008–0.057 mm long. ANT 0.33–0.36 × BL. ANT IV always shorter than ANT V. ANT V shorter or only slightly longer than ANT VI. PT 0.18–0.23 × BASE, with 4 accessory rhinaria. Other antennal ratios: VI:III 0.70–0.72, V:III 0.59–0.70, IV:III 0.44–0.45. ANT setae very short, spike–like and pointed, never longer than diameter of segments. LS III 0.54–1.00 × BD III. ANT III with 11 setae, ANT IV with 4–7 setae, ANT V with 6–8 setae, ANT VI with 6 basal setae. Rostrum reaching middle coxae. URS 0.30–0.34 × ANT III 0.42–0.47 × ANT VI and 0.37–0.40 × HT II. Outer side of hind legs covered by short, thick, rigid, blunt or truncate setae, as long as or shorter than the width of tibiae, on femora 0.010–0.022 mm long, on tibiae 0.010–0.040 mm long. Hind tibiae with 36–52 circular, oval or irregular pseudosensoria, situated almost on whole surface of tibiae except of distal and proximal parts (Fig. 15d). Basal length of HT I 0.45–0.49 × dorsal, 0.26–0.30 × ventral and 0.67–0.71 × intersegmental length, with 6 ventral setae. HT II 0.80–0.84 × ANT III and 1.12–1.15 × ANT VI. Dorsal setae very short, spike–like and pointed—on pronotum 0.010–0.020 mm long, mesonotum 0.012 mm long and metanotum 0.006–0.020 mm long; on abdomen—ABD I–VI 0.010–0.015 mm long and pointed, ABD VII–VIII 0.008–0.052 mm long and blunt. Abdomen with 2–4 scleroites on anterior and 4–8 scleroites on posterior part of ABD I–VI.

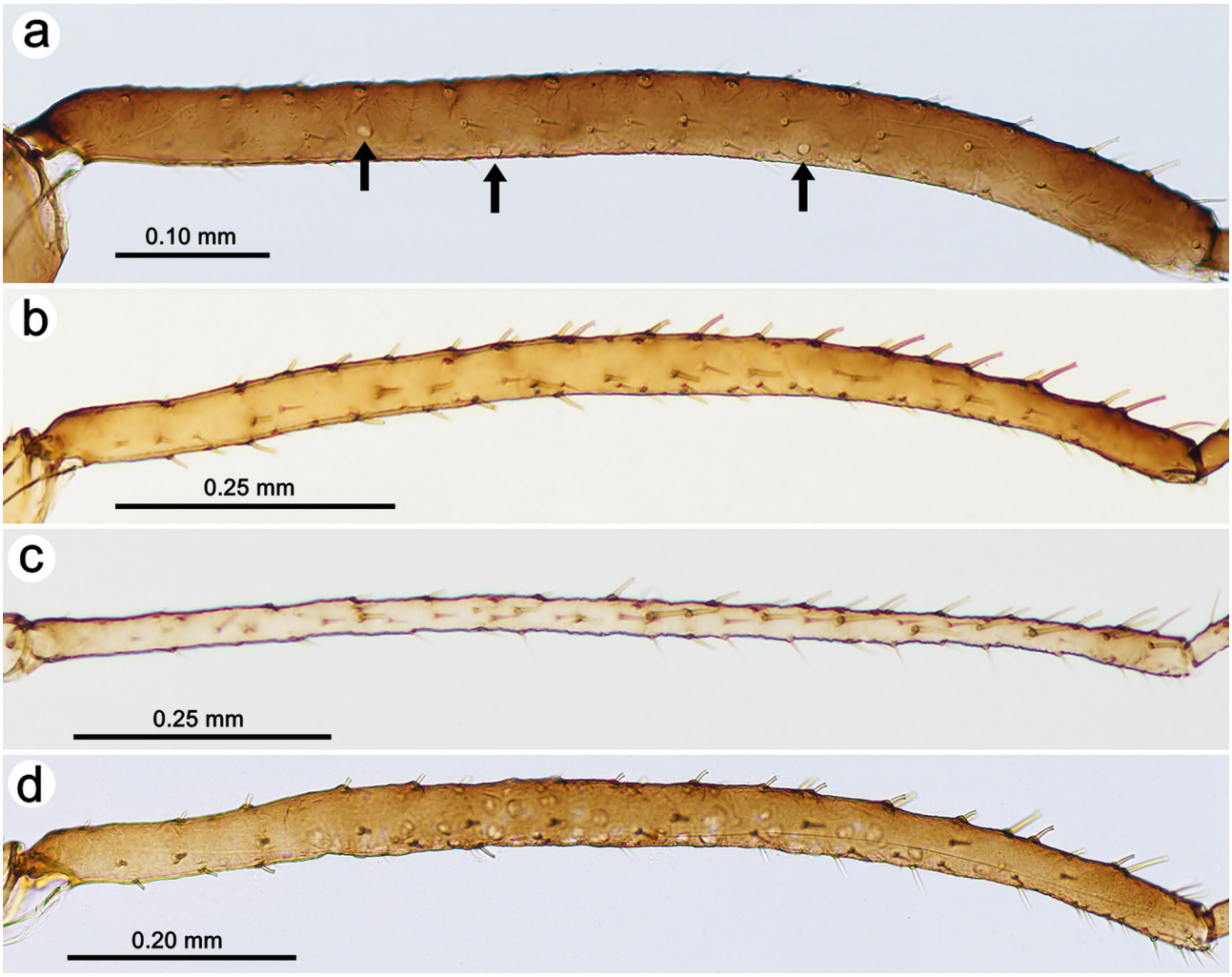

FIGURE 15. *Eulachnus brevipilosus* hind tibiae: (**a**) fundatrix with 1–3 pseudosensoria (black arrows), (**b**) apterous viviparous female; (**c**) alate viviparous female; (**d**) oviparous female with numerous pseudosensoria.

Alate male (Figs 12, 13, 16)—description (based on five specimens). *Colour*. In life (orange form): head and thorax grey, covered by white wax powder. ANT brown. Legs light brown. Abdomen orange with dorsal scleroites brown (Fig. 12f). In mounted specimens: head and thorax sclerotized, brown. ANT brown with basal part of ANT III slightly lighter. Femora yellow with dorsal side light brown. Tibiae yellow to light brown with darker proximal and distal parts. Wings pale brown with veins brown and pterostigma light brown. Abdomen membranous, pale with sclerites and scleroites light brown (Fig. 13e). Genitalia brown (Fig. 16d, e). *Morphometric characters*: HW 0.29–0.30 × ANT. Head chaetotaxy: dorsal side with 5; ventral side with 5 pairs of long, fine and pointed setae. Dorsal setae 0.090–0.900 mm long. ANT (Fig. 16a) 0.67–0.78 × BL. ANT III (Fig. 16b) with 53–60 secondary rhinaria, ANT IV as long as or slightly shorter than ANT V, with 25–26 secondary rhinaria, ANT V longer than ANT VI with 14–20 secondary rhinaria, ANT VI with 5–6 accessory rhinaria and 1–2 secondary rhinaria (Fig. 16c). PT 0.19–0.20 × BASE, other antennal ratios: VI:III 0.40–0.43, V:III 0.53–0.60, IV:III 0.55–0.58; ANT III with 13–17 setae, ANT IV with 8–9 setae, ANT V with 8–10 setae, ANT VI with 4–5 basal setae. ANT setae short to medium sized, fine and pointed. LS III 2.00–2.33 × BD III. Rostrum reaching metasternum. URS 0.15 × ANT III, 0.36–0.37 × ANT VI and 0.34–0.36 × HT II. Outer side of hind legs covered by fine, pointed and slightly blunt setae always longer than the width of tibiae, on femora 0.100–0.110 mm long, on tibiae 0.110–0.130 mm long. Basal length of HT I 0.27–0.38 × dorsal, 0.22–0.28 × ventral and 0.85–1.16 × intersegmental length, with 6 ventral setae. HT II 0.41–0.44 × ANT III and 1.04 ANT VI. Dorsal setae long, fine and pointed—on pronotum 0.090–0.110 mm long; on abdomen—ABD I–VI 0.090–0.100 mm long, ABD VII–VIII 0.012 mm long. Abdomen with 2–4 scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI. Ventral side of ABD VI–VIII with sclerotised cross–bars (Fig. 16d).

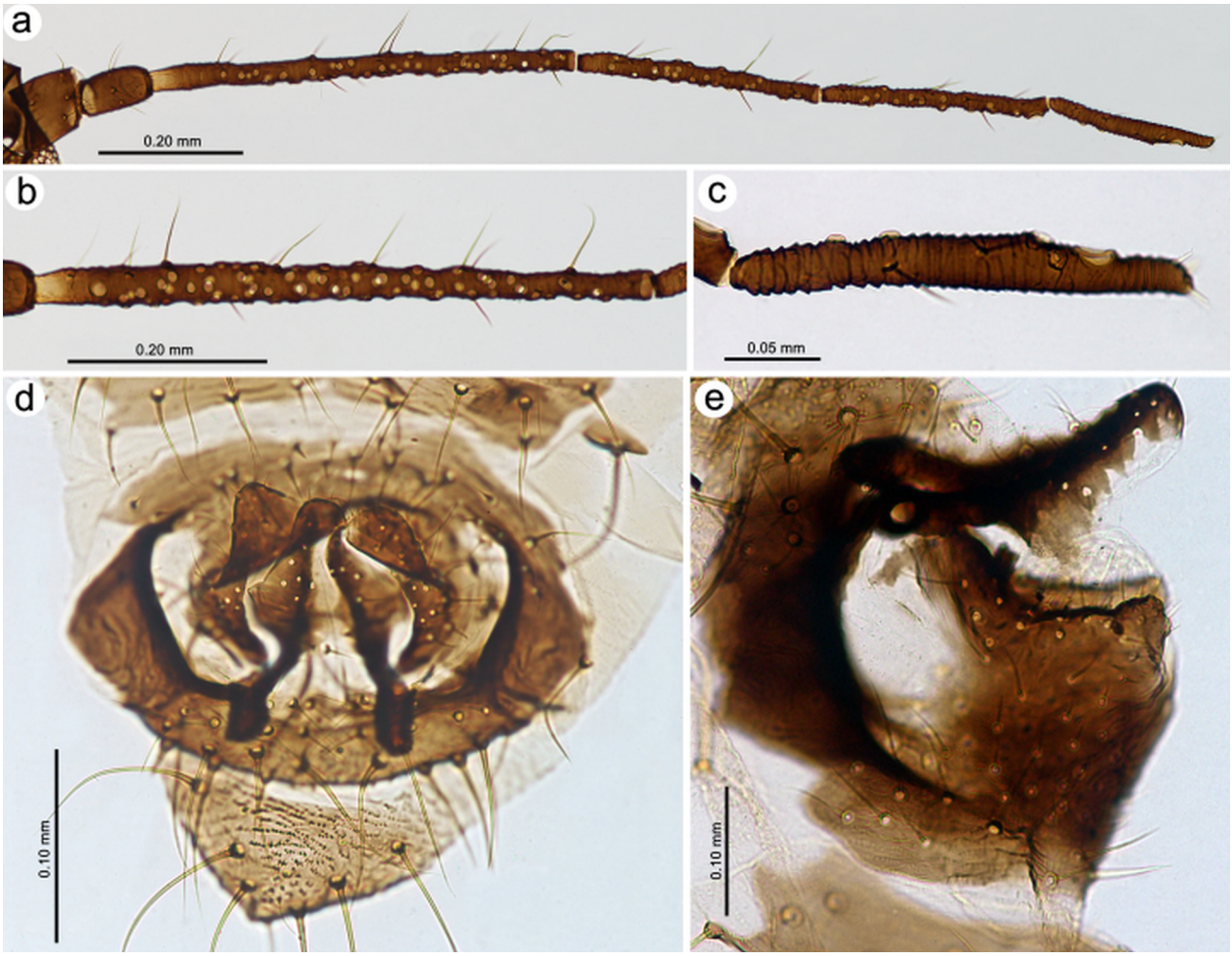

FIGURE 16. *Eulachnus brevipilosus* male: (**a**) ANT, (**b**) ANT III, (**c**) ANT VI, (**d**, **e**) genitalia.

Remarks. There are two colour forms of this species: the typical green form and a hitherto unknown orange form found in Poland and Czech Republic.

Diagnosis. *Eulachnus brevipilosus* together with *E. nigricola* differ from other *Eulachnus* species with scleroites on abdomen by having very short antennal setae, LS III/BD III 0.70–1.17 (1.19–6.25 in remaining species) and characteristic truncate setae on legs (pointed or blunt in remaining species). *Eulachnus brevipilosus* differs from *E. nigricola* by shorter setae on the outer side of hind tibiae which are never longer than the width of tibiae (always longer in *E. nigricola*) and six ventral setae on HT I (eight in *E. nigricola*).

Distribution. In Europe, this species is known from: Andorra, Belgium, Czech Republic (**new record**), Arboretum Nový Dvůr—Stěbořice (Okres Opava), 17.08.2014, apterous viviparous females and immatures from *P. mugo*, M. Kanturski leg.), Denmark, Finland, Germany, Hungary, Ireland, Italy, Norway, Poland, Romania, Slovakia, Spain, Sweden, Switzerland. Outside Europe the species has been introduced to Nearctic (USA) and Australian region (New Zealand).

Host Plants. In Europe, this species feeds mainly on *Pinus sylvestris* and *P. mugo*. In southern Poland *P. cembra* as **new host plant** was recorded (adult apterous viviparous females and immatures were found on needles in the Botanic Garden of the Jagiellonian University in Cracow, 16.05.2013, M. Kanturski leg.). It was also recorded from *P. nigra* and *P. pinaster*.

Type material examined. As there is no information that during the original description any type material was designated and none material of Kaltenbach is available for the authors, no name-bearing type specimen is believed to be extant and the authors consider that a name-bearing type is necessary to define the nominal taxon objectively. According to the International Code of Zoological Nomenclature (Article 75.1), the Neotype of *E. brevipilosus* is here designated:

NEOTYPE: POLAND: Branice, 03.05.2014, 1 apterous viviparous female, *P. mugo*, M. Kanturski leg., UŚ, 05/14/14.

Eulachnus cembrae Börner, 1950

Börner, 1950: 2

Fundatrix (Figs 17, 18; Table 1)—description (based on four specimens). *Colour*: In life: light green with slightly darker antennae and legs. In mounted specimens: head and thorax light yellow with setae light brown. ANT yellowish with apices of ANT III–V light brown. ANT VI light brown with yellowish basal part. Femora yellow, tibiae light brown with darker spots at setal bases. Abdomen light yellow with pale, almost colourless setae. Few scleroites on segm. VII–VIII light brown (Fig. 17a). *Morphometric characters*: HW 0.33–0.35 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 6 pairs of thick and rigid blunt setae. Dorsal setae 0.06–0.08 mm long. ANT 0.50–0.54 × BL. ANT IV shorter than ANT V. ANT V slightly longer than ANT VI. PT 0.22–0.23 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.49–0.59, V:III 0.52–0.57, IV:III 0.49–0.53. ANT III with 16–19, ANT IV with 7–9, ANT V with 8–10 setae, ANT VI with 5–6 basal setae. ANT setae very short, thick and blunt, never longer than diameter of segments. LS III 0.60–0.66 × BD III. Rostrum reaching middle coxae. URS 0.17–0.18 × ANT III, 0.33–0.38 × ANT VI and 0.33–0.37 × HT II. Outer side of hind legs covered by short rigid, slightly curved and blunt setae, as long as or shorter than width of tibiae, on femora (Fig. 18c) 0.015–0.020 mm long, on tibiae 0.015–0.50 mm long. Basal length of HT I 0.24–0.28 × dorsal, 0.19–0.23 × ventral and 0.66–0.77 × intersegmental length, with 12 ventral setae. HT II 0.50–0.51 × ANT III and 1.00–1.01 × ANT VI. Dorsal setae very few and very short, blunt—on pronotum 0.010–0.017 mm long, mesonotum 0.012–0.013 mm long, metanotum 0.010–0.014 mm long; on abdomen—ABD I–VI 0.010–0.015 mm long, ABD VII–VIII 0.010–0.020 mm long. ABD I–V always without dorsal scleroites at setal bases, sclerites or intersegmental muscle sclerites. ABD VI–VIII sometimes with few inconspicuous scleroites.

Remarks. This morph differs from the apterous viviparous female by larger body size and lower ratio of URS/HT II 0.33–0.37 (0.40–0.45 in apterous viviparous female).

Apterous viviparous female (Figs 17, 18; Table 2)—redescription (based on 10 specimens). *Colour*. In life: light green with slightly darker ANT and tibiae; in mounted specimens: head and thorax pale to yellow with only slightly darker scleroites at setal bases. Abdomen pale to yellow with scleroites at setal bases on abdominal segm. VII–VIII light brown. ANT yellowish to light brown with ANT I–II and basal parts of ANT III–VI paler. Legs with femora pale to yellow and tibiae yellowish–light brown. Body setae pale, except for darker setae on head (Fig. 17b). *Morphometric characters*: HW 0.34–0.40 × ANT. Head chaetotaxy: dorsal side with 6 pairs of thick and slightly blunt setae; ventral side with 4 pairs of thick and hair–like pointed setae. Dorsal setae 0.010–0.087 mm long. ANT (Fig. 18a) 0.50–0.54 × BL. ANT IV slightly shorter than ANT V. ANT V shorter or longer than ANT VI. PT 0.19–0.23 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.43–0.53, V:III 0.47–0.54, IV:III 0.41–0.48. ANT III (Fig. 18b) with 7–20 setae, ANT IV with 5–10 setae, ANT V with 5–9 setae, ANT VI with 5–6 basal setae. ANT setae very short, rigid and blunt, never longer than diameter of segments. LS III 0.33–0.66 × BD III. Rostrum reaching middle coxae. URS 0.18–0.25 × ANT III, 0.42–0.47 × ANT VI and 0.40–0.45 × HT II. Outer side of hind legs covered by short, slightly curved, rigid and blunt setae, as long as or shorter than the width of tibiae (Fig. 18d), on femora 0.015–0.035 mm long, on tibiae 0.020–0.060 mm long. Basal length of HT I 0.28–0.37 × dorsal, 0.23–0.27 × ventral and 0.75–0.81 × intersegmental length, with 10 ventral, setae. HT II 0.45–0.56 × ANT III and 1.04–1.06 ANT VI. Dorsal setae very short, rigid and blunt, on pronotum 0.007–0.012 mm long, mesonotum 0.010–0.012 mm long, metanotum 0.007–0.010 mm long; on abdomen—ABD I–VI 0.007–0.030 mm long, ABD VII–VIII 0.020–0.060 mm long. Abdomen without scleroites on ABD I–VI (Fig. 46l) and with small scleroites on ABD VII–VIII.

Alate viviparous female—After Pašek (1954). *Colour.* In life: head and pronotum light brown. Meso and metanotum dark brown, strongly covered by wax powder. Abdomen light green without any sclerites and scleroites. Wings transparent, pterostigma brown. *Morphometric characters*: ANT III longest, ANT IV slightly shorter than ANT V. ANT V longer than ANT VI. Antennal ratios: VI:III about 0.44, V:III about 0.57; IV:III 0.55. Setae like in apterous viviparous female but those on legs slightly longer and fine. Setae on hind tibiae longer than diameter of tibiae.

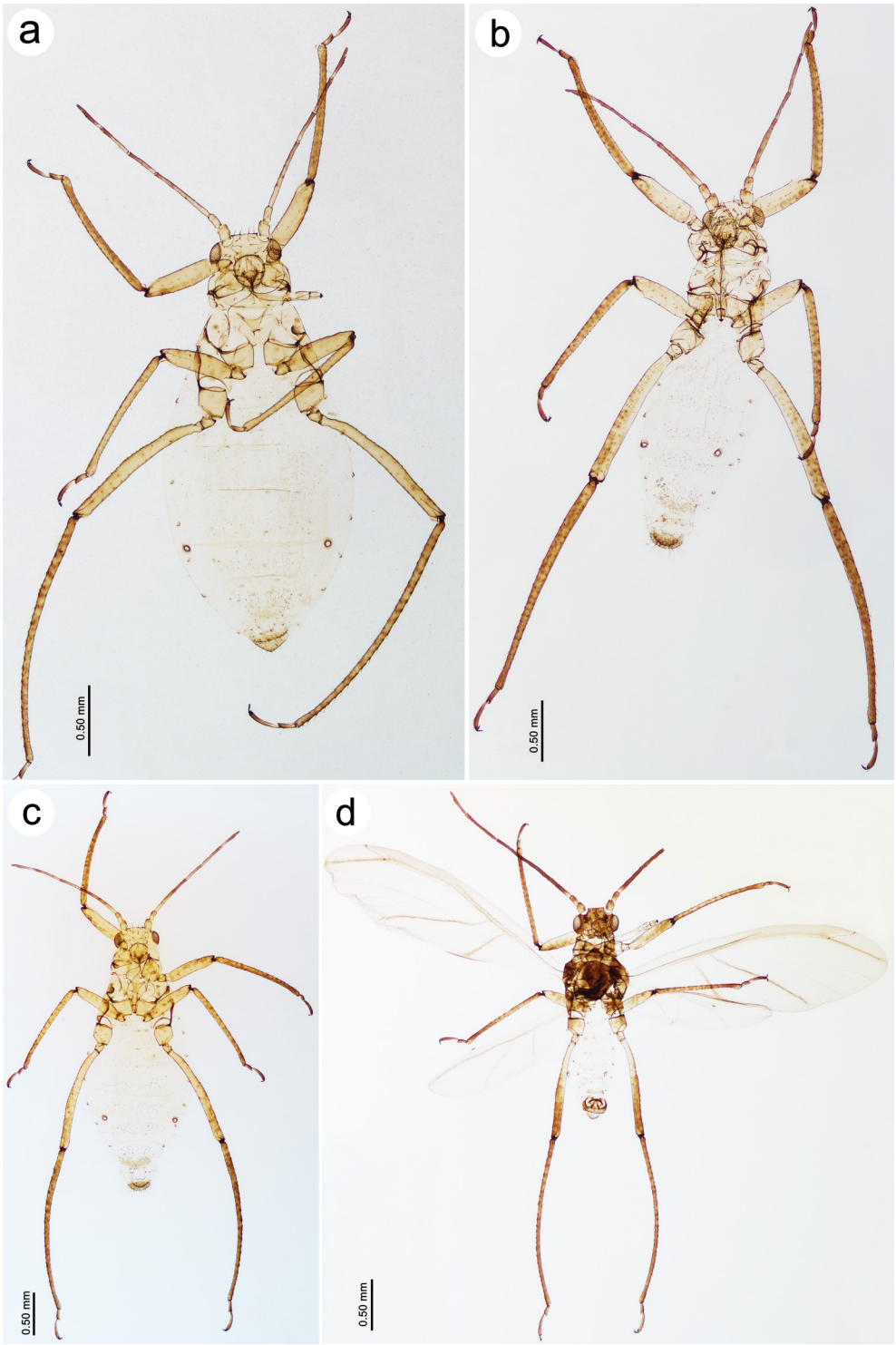

FIGURE 17. *Eulachnus cembrae*: (**a**) fundatrix, (**b**) apterous viviparous female; (**c**) oviparous female; (**d**) alate male.

Oviparous female (Figs 17, 18; Table 4)—redescription (based on 17 specimens). HW 0.29–0.40 × ANT. PT 0.16–0.22 × BASE. Other antennal ratios: VI:III 0.51–0.57, V:III 0.59–0.66, IV:III 0.38–0.53. LS III 0.56–0.66 × BD III. URS 0.18–0.20 × ANT III, 0.33–0.37 × ANT VI and 0.35–0.41 × HT II. Hind tibiae with 32–58 irregular pseudosensoria reaching mostly to half of length of tibiae (Fig. 18e). Basal length of HT I 0.30–0.33 × dorsal, 0.23–0.24 × ventral and 0.70–0.92 × intersegmental length, with 12 ventral setae. HT II 0.48–0.55 × ANT III and 0.90–1.00 × ANT VI. Dorsal setae very short, on thorax and abdominal segm. I–VI—0.01–0.02 mm long and slightly blunt, on segm.VII–VIII 0.03–0.06 mm long and pointed arising from oval scleroites. ABD I–VI without sclerites and scleroites (Fig. 17c).

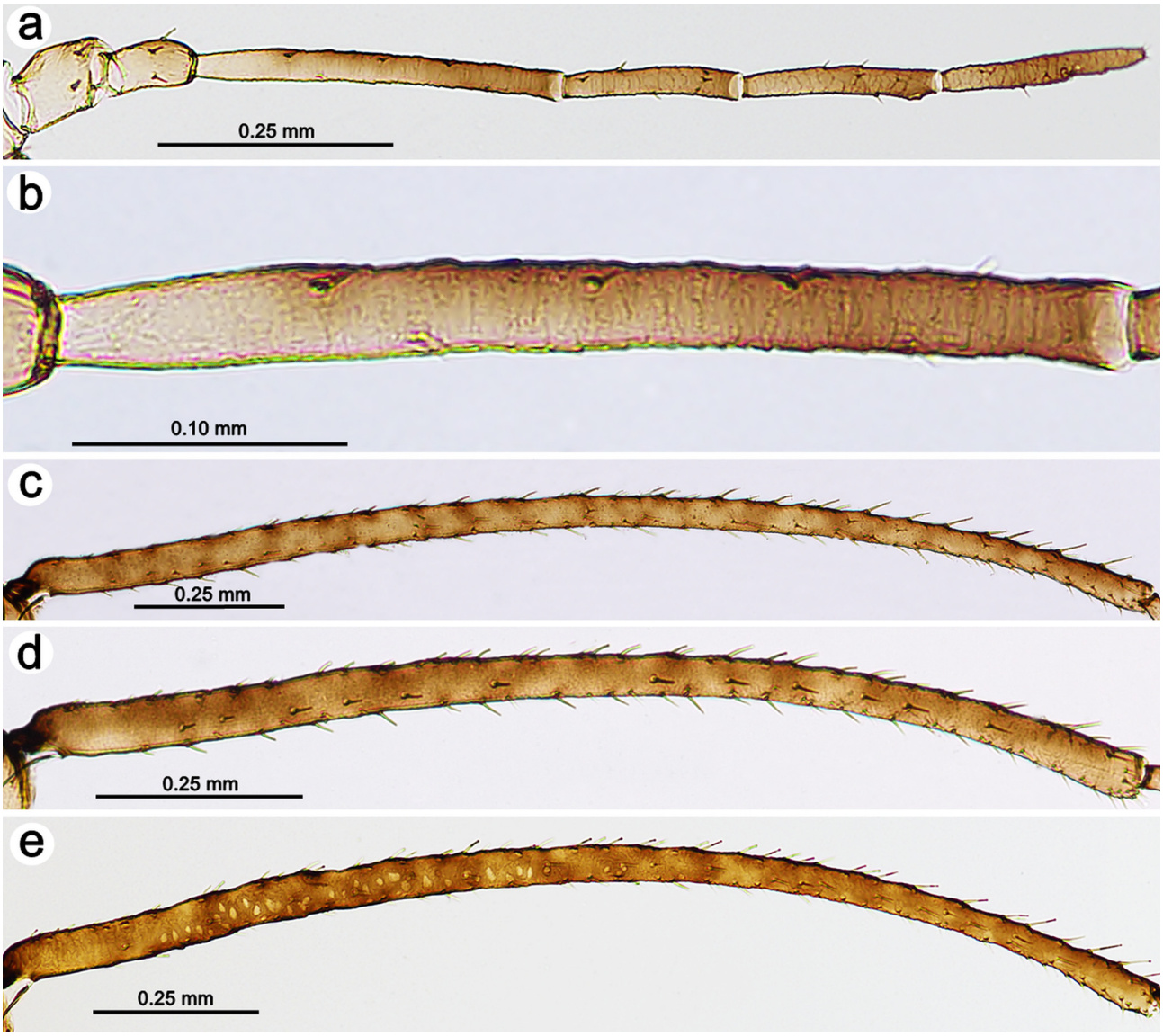

FIGURE 18. *Eulachnus cembrae* (**a**) ANT of apterous viviparous female; (**b**) ANT III of apterous viviparous female (**c**) hind tibia of fundatrix, (**d**) hind tibia of of apterous viviparous female, (**e**) hind tibia with pseudosensoria of oviparous female.

Alate male (Figs 17, 19; Table 5)—redescription (based on five specimens). *Morphometric characters*: HW 0.23–0.24 × ANT (Fig. 19a). ANT III with 80–120 secondary rhinaria (Fig. 19b), ANT IV with 29–42 secondary rhinaria, ANT V with 23–38 secondary rhinaria. ANT VI with 1 primary rhinarium, 4–5 accessory rhinaria situated close to each other in about $^{2}/_{3}$ of length of segment and 4–10 small and rounded secondary rhinaria (Fig. 19c). PT 0.19–0.24 × BASE, other antennal ratios: VI:III 0.45–0.51, V:III 0.60–0.71, IV:III 0.50–0.62. LS III 0.62–0.67 × BD III. URS 0.12–0.14 × ANT III, 0.27–0.29 × ANT VI and 0.32–0.40 × HT II. Basal length of HT I 0.26–0.31 × dorsal, 0.21–0.23 × ventral and 0.68–0.80 × intersegmental length, with 14 ventral setae. HT II 0.35–0.38 × ANT III and 0.72–0.83 ANT VI. Dorsal setae pointed, on abdomen—ABD I–VI 0.017–0.025 mm long, ABD VII–VIII 0.032–0.052 mm long. Spinal setae arranged in two pairs on each segment arising from oval scleroites (Fig. 17d). Genitalia strongly sclerotized (Fig. 19d, e).

Remarks. The detailed redescriptions of oviparous female and male are given by Kanturski & Wieczorek (2014a).

Diagnosis. From all known European species, this species can be recognized by the extremely short, inconspicuous body setae and the absence of dorsal scleroites et least on ABD I–VI.

Distribution. This species is known from montane regions of Europe: Austria, Bulgaria, Czech Republic, Italy, Macedonia, Poland, Slovakia and Switzerland.

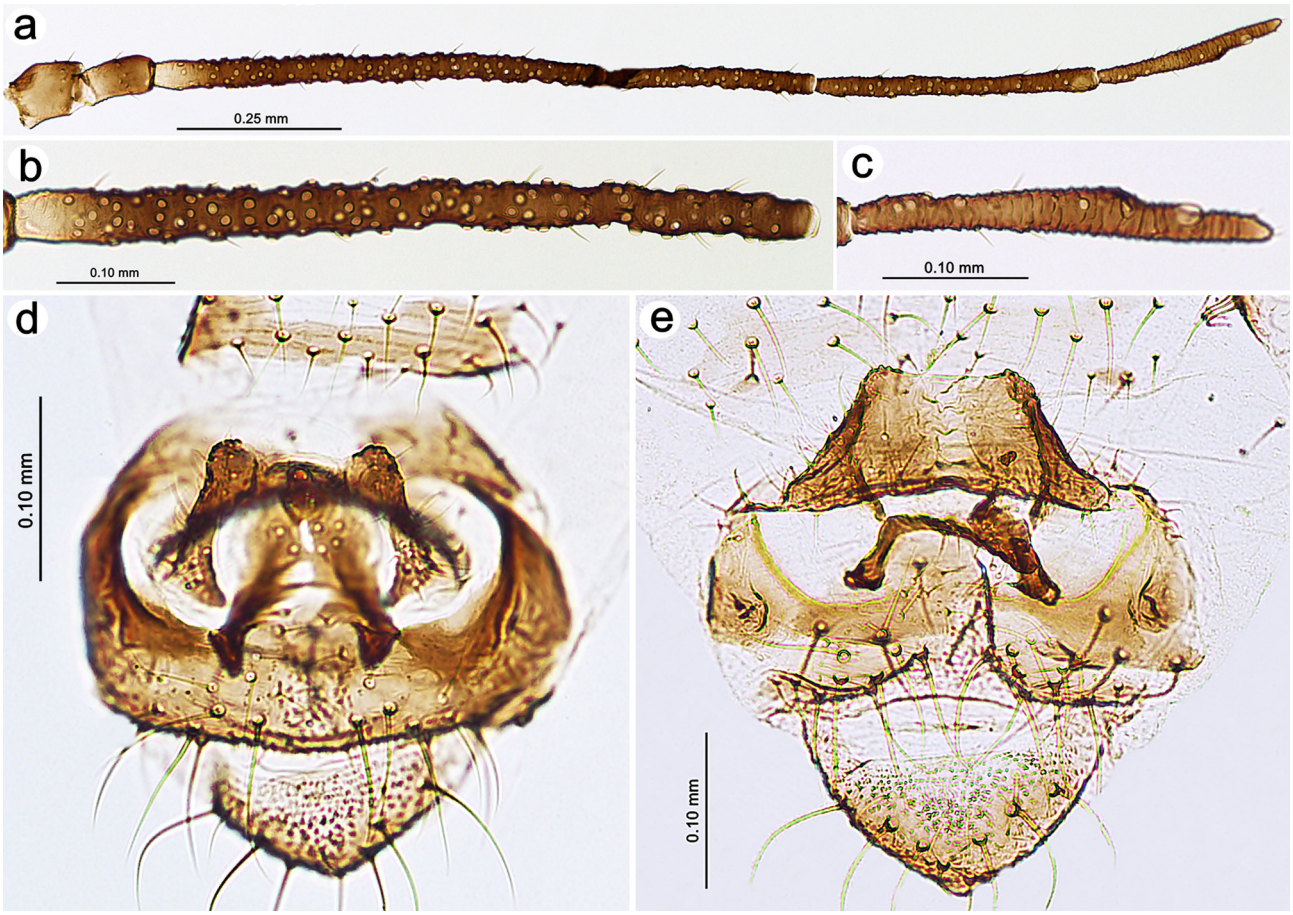

FIGURE 19. *Eulachnus cembrae* male: (**a**) ANT, (**b**) ANT III, (**c**) ANT VI, (**d**, **e**) genitalia.

Host plants. The most common host plants of this species is *Pinus cembra*, but it was also collected from *P. peuce* and *P. strobus*.

Type material examined. As no holotype was designated in the original description, according to the International Code of Zoological Nomenclature, the lectotype of *E. cembrae* is here designated from the Syntypes:

LECTOTYPE: AUSTRIA: Eastern Alps (locality unreadable) 1200m, 21.08.1942, 1 apterous viviparous female, *P. cembra* marked with black circle and „L" (present designation), H. Franz leg., SDEI 1/22; PARALECTOTYPES: AUSTRIA: Eastern Alps (locality unreadable) 1200m, 21.08.1942, 1 apterous viviparous female, 1 oviparous female, 1 alate male, *P. cembra*, H. Franz leg., SDEI 1/22.

Eulachnus garganicus Binazzi, 1983a stat. nov.

Eulachnus tuberculostemmatus garganicus Binazzi, 1983a: 116

Apterous viviparous female (Figs 20, 21; Table 2)—redescription (based on seven specimens). *Colour*. In life, unknown. In mounted specimens: head and thorax pale to yellow with scleroites at the setal bases light brown and brown. ANT yellowish with apices of ANT III–VI light brown or brown. Legs yellow, ends of hind tarsi brown. Abdomen pale to yellow with scleroites at setal bases light brown. Body setae yellow to brown (Fig. 20a). *Morphometric characters*: HW 0.43–0.46 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 6 pairs of long, thick, rigid and blunt setae. Dorsal setae 0.020–0.070 mm long. ANT (Fig. 21a) 0.42–0.43 × BL. ANT IV always shorter than ANT V. ANT V as long as or shorter than ANT VI. PT 0.23–0.28 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.66–0.72, V:III 0.65–0.72, IV:III 0.60–0.64. ANT III (Fig. 21b) with 11–14 setae, ANT IV with 7–9 setae, ANT V with 8–9 setae, ANT VI with 6 basal setae. ANT setae short, rigid, blunt and pointed, as long as diameter of segments. LS III 1.19–1.35 × BD III. Rostrum reaching hind coxae.

URS 0.26–0.27 × ANT III, 0.36–0.40 × ANT VI and 0.34–0.37 × HT II. Outer side of hind legs covered by long, rigid and blunt setae, longer than width of tibiae (Fig. 21e), on femora 0.02–0.035 mm long, on tibiae 0.02–0.08 mm long. Basal length of HT I 0.26–0.35 × dorsal, 0.20–0.23 × ventral and 0.57–0.62 × intersegmental length, with 10 ventral setae. HT II 0.72–0.76 × ANT III and 1.05–1.07 × ANT VI. Dorsal setae medium–sized to short, blunt or slightly pointed—on pronotum 0.017–0.035 mm long, mesonotum 0.015–0.027 mm long, metanotum 0.007–0.015 mm long; on abdomen—ABD I–VI 0.010–0.020 mm long, ABD VII–VIII 0.017–0.062 mm long. Abdomen with 2 scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI (Fig. 21i).

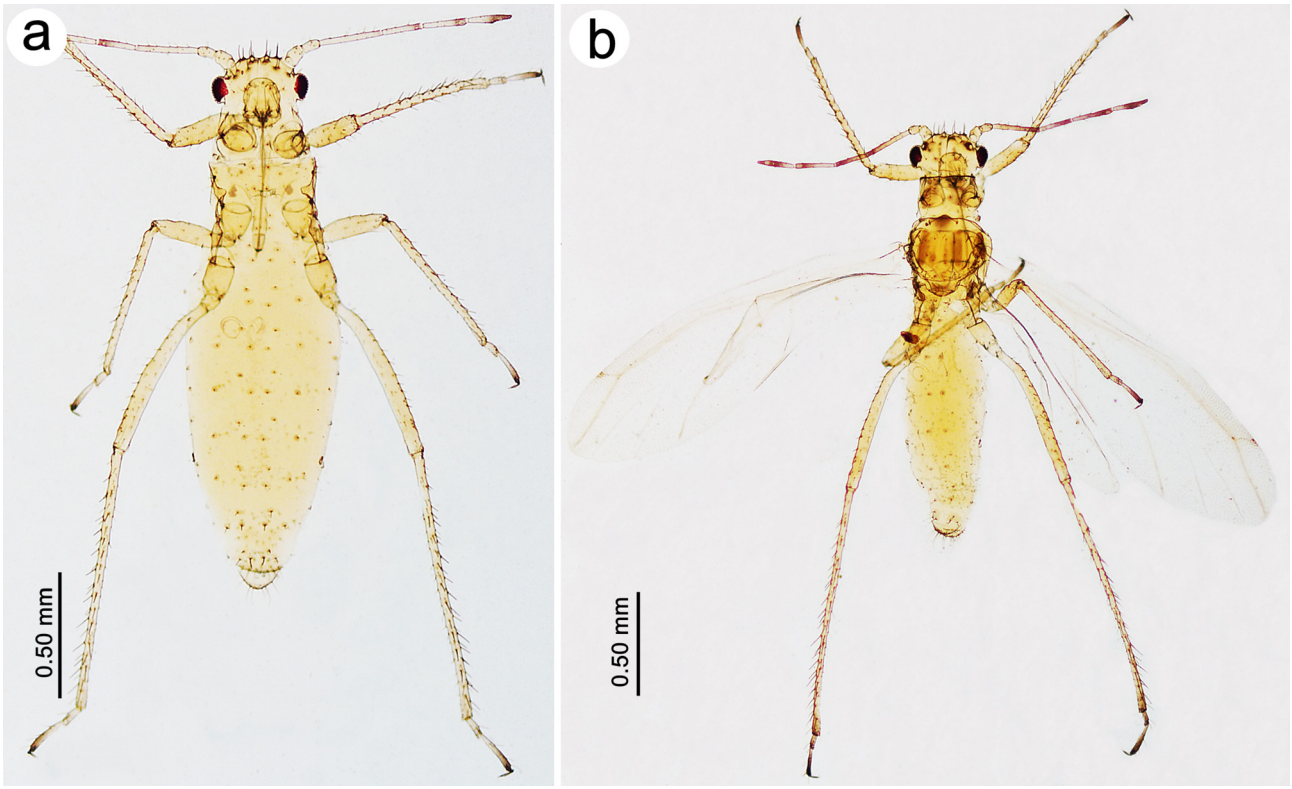

FIGURE 20. *Eulachnus garganicus* **stat. nov.**: (**a**) apterous viviparous female; (**b**) alate viviparous female.

Alate viviparous female (Figs 20–21; Table 3)—redescription (based on six specimens). *Colour*. In life: light yellow. In mounted specimens: head yellow with scleroites at setal bases light brown and bases of ocelli brown. ANT light brown with ANT I and basal parts of ANT III–VI yellow. Thorax light brown. Fore wings pale with only slightly darker pterostigma and veins light brown. Hind wings pale. Legs in general yellowish with end of hind tarsi brown. Abdomen pale to yellowish with dorsal scleroites brown. Body setae dark (Fig. 20b). *Morphometric characters*: HW 0.39–0.42 × ANT. Head chaetotaxy: dorsal side with 5; ventral side with 6 pairs of medium–sized and slightly blunt setae. Dorsal setae 0.030–0.067 mm long. ANT (Fig. 21c) 0.43–0.46 × BL. ANT IV always shorter than ANT V with 1 secondary rhinarium. ANT V longer than ANT VI. PT 0.23–0.26 × BASE, with 5 accessory rhinaria. Other antennal ratios: VI: III 0.59–0.75, V: III 0.62–0.73, IV: III 0.53–0.70. ANT III (Fig. 21d) with 10–15 setae, ANT IV with 6–8 setae, ANT V with 6–9 setae, ANT VI with 6 basal setae. ANT setae short, rigid and blunt, at most as long as or slightly longer than diameter of segments. LS III 1.0–1.35 × BD III. Rostrum reaching to end of mesosternum. URS 0.21–0.29 × ANT III, 0.35–0.38 × ANT VI and 0.32–0.35 × HT II. Outer side of hind legs covered by rigid and blunt or slightly blunt setae, longer than the width of tibiae (Fig. 21f), on femora 0.020–0.035 mm long, on tibiae 0.045–0.085 mm long. Basal length of HT I 0.33–0.38 × dorsal, 0.23–0.31 × ventral and 0.83–1.00 × intersegmental length, with 10 ventral setae. HT II 0.54–0.72 × ANT III and 0.91–0.94 × ANT VI. Dorsal setae long and fine –on pronotum 0.015–0.032 mm long and blunt; on abdomen—ABD I–VI 0.010–0.020 mm long and pointed, ABD VII–VIII 0.022–0.062 mm long and blunt. Abdomen with 2 scleroites on anterior and 2 scleroites on posterior part of ABD I–VI.

Type material examined. PARATYPES: ITALY: Garganoo, Bosco Risega (Peschici), 12.07.1982, 4 apterous viviparous females, 6 alate viviparous females, *P. halepensis*, P. Rovessi leg., ISZA 33, n73.

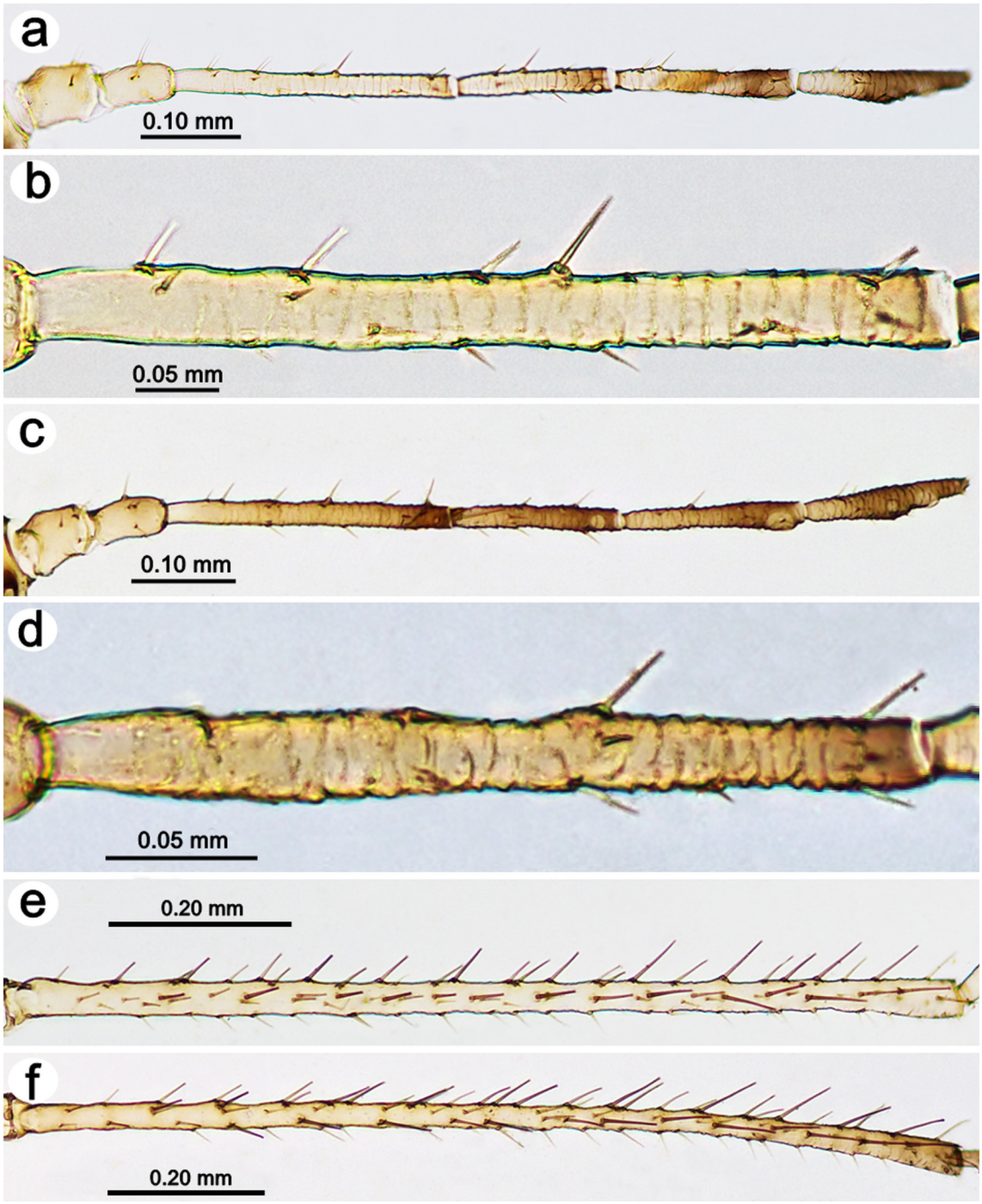

FIGURE 21. *Eulachnus garganicus* **stat. nov.**: (**a**) ANT of apterous viviparous female; (**b**) ANT III of apterous viviparous female (**c**) ANT of alate viviparous female, (**d**) ANT III chaetotaxy of alate viviparous female, (**e**) hind tibia of apterous viviparous female, (**f**) hind tibia of alate viviparous female.

Diagnosis. Representatives of this species differ from *E. tuberculostemmatus* (*E. t*) by the following characters: 1) Apterous viviparous females: BL 2.07–2.12 mm (1.67–2.00 mm in *E. t*), ANT:BL 0.42–0.43 (0.45–0.58 in *E. t*), ANT IV:ANT III 0.60–0.64 (0.43–0.58 in *E. t*), URS:ANT III 0.26–0.28, HT II:ANT III 0.72–0.76 (0.60–0.69 in *E. t*); 2) Alate viviparous females: ANT:BL 0.43–0.46 (0.50–0.67 in *E. t*), longest setae on ABD I–V not longer then 0.021 mm (longer than 0.022 mm in *E. t*), HT II:ANT III 0.91–0.94 (0.96–1.08 in *E. t*).

Considering these differences *E. garganicus* stat. nov. should be regarded as full status species.

Distribution. So far, this species is known from Italy.

Host plants. This species is known from the record of *Pinus halepensis*.

Eulachnus ibericus Binazzi & Mier Durante, 1997 stat. nov.

Eulachnus mediterraneus ibericus Binazzi & Mier Durante: 71

Apterous viviparous female (Figs 22, 23, 46e; Table 2)—redescription (based on six specimens). *Colour*. In life: unknown. In mounted specimens: head and thorax pale to yellow with scleroites at setal bases brown, abdomen pale with scleroites at setal bases yellow or light brown. ANT yellow or brownish with apices of ANT III–VI darker. Femora yellow, tibiae and tarsi light brown. Body setae yellow or dark (Fig. 22a). *Morphometric characters*: HW 0.31–0.42 × ANT. Head chaetotaxy: dorsal side with 6 pairs of rigid and slightly blunt setae; ventral side with 5 pairs of rigid and blunt setae, 0.035–0.120 mm long. ANT (Fig. 23a) 0.49–0.59 × BL. ANT IV as long as or slightly shorter than ANT V. ANT V longer than ANT VI. PT 0.13–0.18 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.45–0.50, V:III 0.47–0.55, IV:III 0.46–0.48. ANT III (Fig. 23b) with 15–18 setae, ANT IV with 6–9 setae, ANT V with 8–9 setae, ANT VI with 5–6 basal setae. ANT setae medium–sized, rigid and pointed, longer than diameter of segments. LS III 1.80–2.20 × BD III. Rostrum reaching middle or hind coxae. URS 0.18–0.24 × ANT III, 0.37–0.48 × ANT VI and 0.32–0.41 × HT II. Hind legs covered by long fine and pointed setae, longer than the width of tibiae (Fig. 23e), on femora 0.035–0.080 mm long, on tibiae 0.040–0.120 mm long. Basal length of HT I 0.30–0.40 × dorsal, 0.20–0.27 × ventral and 0.60–0.75 × intersegmental length, with 10 ventral setae. HT II 0.54–0.60 × ANT III and 1.15–1.31 × ANT VI. Dorsal setae long and pointed—on pronotum 0.030–0.080 mm long, mesonotum 0.020–0.080 mm long, metanotum 0.020–0.060 mm long; on abdomen—ABD I–VI 0.025–0.070 mm long, ABD VII–VIII 0.050–0.12 mm long. Abdomen with 2–5 scleroites on anterior and 6–8 scleroites on posterior part of ABD I–VI. Some scleroites are lying on larger sclerites (Fig. 46e).

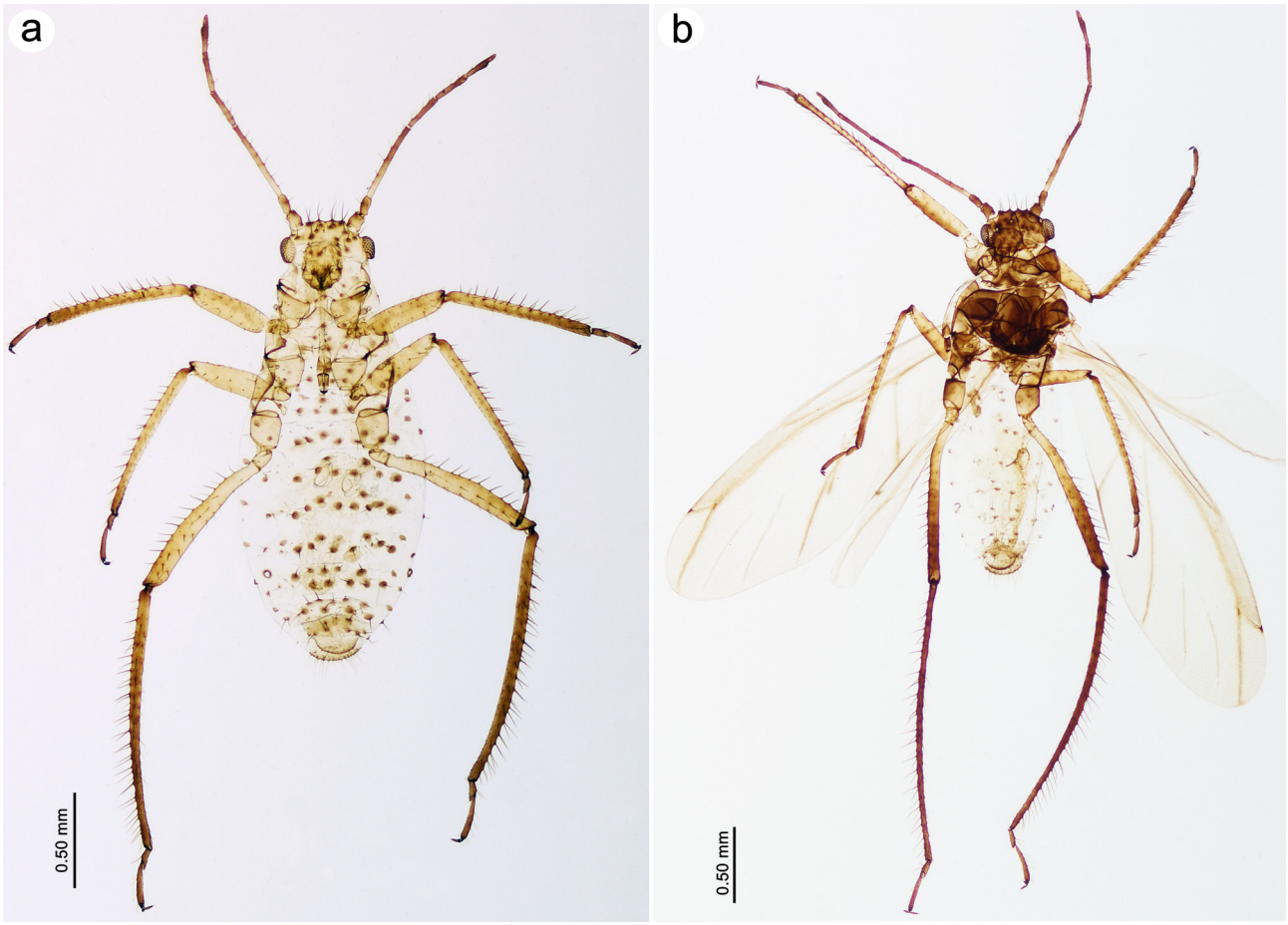

FIGURE 22. *Eulachnus ibericus* **stat. nov.**: (**a**) apterous viviparous female; (**b**) alate viviparous female.

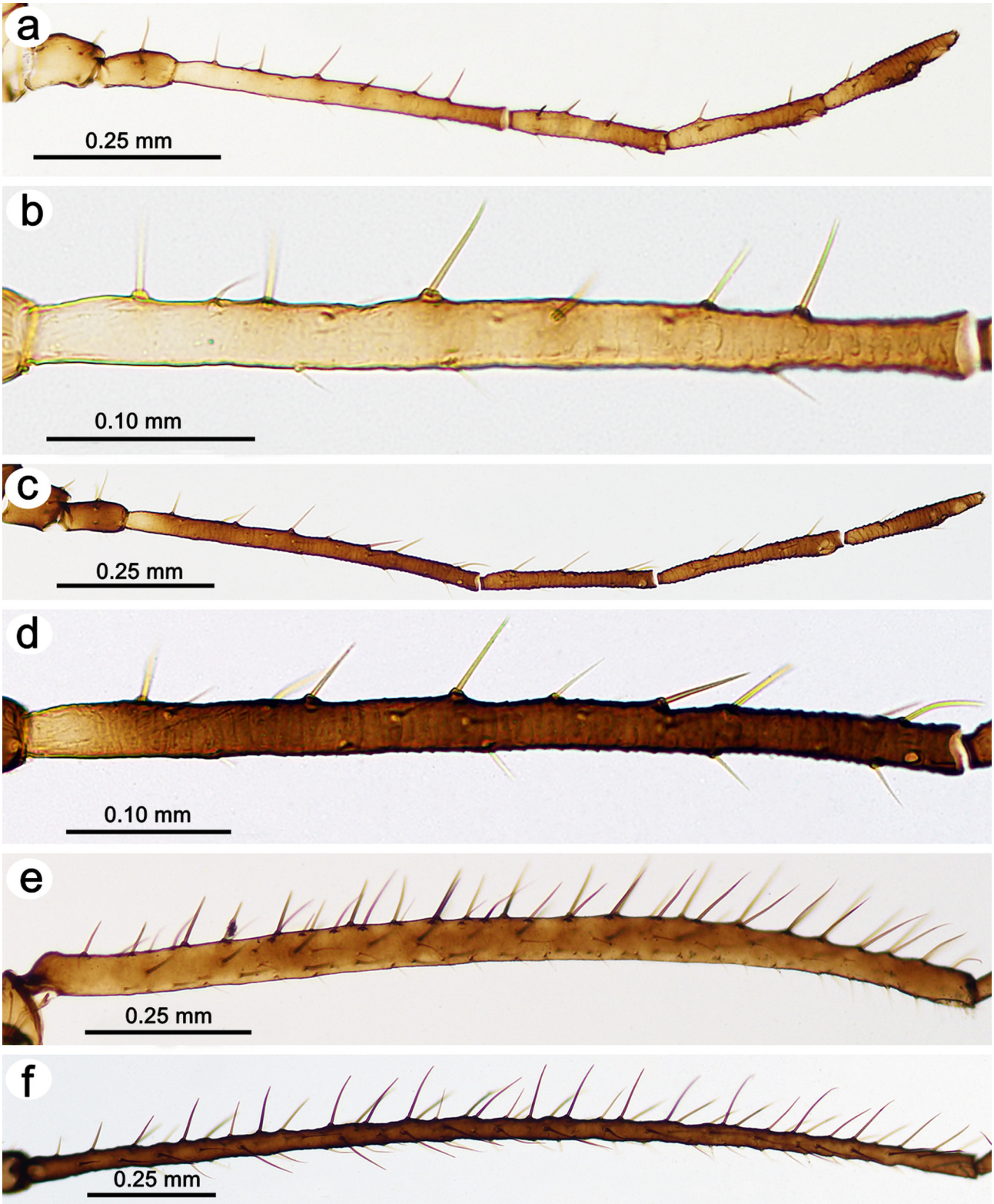

FIGURE 23. *Eulachnus ibericus* **stat. nov.**: (**a**) ANT of apterous viviparous female; (**b**) ANT III of apterous viviparous female (**c**) ANT of alate viviparous female, (**d**) ANT III chaetotaxy of alate viviparous female, (**e**) hind tibia of apterous viviparous female, (**f**) hind tibia of alate viviparous female.

Alate viviparous female (Figs 22, 23; Table 3)—redescription (based on 13 specimens). *Colour*. In life: light green. In mounted specimens: head and thorax brown. ANT brown with basal part of ANT III paler. Fore wings yellowish with pterostigma and veins light brown. Fore and middle femora uniformly yellow or light brown. Hind femora with proximal part pale or yellow and distal part brown. Fore and middle tibiae yellowish–light brown.

Hind tibiae and tarsi brown. Abdomen pale with scleroites brown. Body setae dark (Fig. 22b). *Morphometric characters*: HW 0.33–0.34 × ANT. Head chaetotaxy: dorsal side with 5 pairs of long, rigid and slightly blunt setae; ventral side with 5 pairs of long, fine and pointed setae 0.050–0.120 mm long. ANT (Fig. 23c) 0.59–0.62 × BL. ANT IV shorter than ANT V with 1 secondary rhinarium. ANT V longer than ANT VI. PT 0.12–0.15 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.36–0.45, V:III 0.47–0.52, IV:III 0.43–0.48. ANT III (Fig. 23d) with 16–17 setae, ANT IV with 7–9 setae, ANT V with 8–11setae, ANT VI with 5–6 basal setae. ANT setae short, rigid and pointed, as long as or longer than diameter of segments. LS III 2.00–2.22 × BD III. Rostrum reaching metasternum or abdominal sternite I. URS 0.17–0.20 × ANT III, 0.40–0.48 × ANT VI and 0.34–0.42 × HT II. Hind legs covered by long, rigid and pointed setae, longer than the width of tibiae (Fig. 23f), on femora 0.040–0.085 mm long on tibiae 0.040–0.550 mm long. Basal length of HT I 0.26–0.37 × dorsal, 0.19–0.24 × ventral and 0.55–0.60 × intersegmental length, with 10 ventral setae. HT II 0.47–0.52 × ANT III and 1.13–1.30 × ANT VI. Dorsal setae fine and pointed, on pronotum—0.050–0.090 mm long; on abdomen—ABD I–VI 0.045–0.080 mm long, ABD VII–VIII 0.055–0.130 mm long. Abdomen with 2–3 scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI.

Diagnosis. Representatives of this species differ from *E. mediterraneus* (*E. m*) by the following characters: 1) Apterous viviparous females: longest setae on ABD VI–VIII longer than 0.10 mm (not longer than 0.09 mm in *E. m*), all tibiae uniformly brown to dark brown (all tibiae pale to at least with only slightly darker distal ends and knee areas in *E. m*); 2) Alate viviparous females: HW:AL 0.33–0.34 (0.30–0.31 in *E. m*), ANT IV:ANT III 0.43–0.48 (0.51–0.52 in *E. m*), HT I dorsal length/HT I intersegmental length 1.60–2.10 (2.20–2.40 in *E. m*), antennal segments brown with only slightly paler basal parts (antennal segments pale with darker apices in *E. m*), hind tibiae and femora brown to dark brown (hind tibiae and femora pale in *E. m*).

Considering these differences *E. ibericus* stat. nov. should be regarded as having full species status.

Distribution. This species is so far only known from Spain. Most probably it could be found in Portugal and Northern parts of Morocco.

Host plants. The species has been recorded mostly from *Pinus pinaster*, less often from *P. pinea* (two alate viviparous females in Cazorla 29.06.1984, J.M. Nieto Nafría & M. Mier Durante leg.) and *P. sylvestris*. Records from *P. halepensis* are regarded as accidental.

Type material examined. HOLOTYPE: SPAIN: Ferreira, 27.05.1980, 1 apterous viviparous female, *P. pinaster* (marked by black circle), Nieto leg., UL, GR–50/51; PARATYPES: SPAIN: Ferreira, 27.05.1980, 2 apterous viviparous females, *P. pinaster*, Nieto leg., UL, GR–50/51; Pto. De la Raguna (2100), 27.05.1980, 2 alate viviparous females, NN & MD leg., UL, AL–246; Pto. De la Raguna (2100), 27.05.1980, 2 alate viviparous females, *P. sylvestris*, NN & MD leg., UL, AL–246; Gata (Caceres), 07.05.1972, 1 apterous viviparous female, Nieto leg., UL, Uch–46; Cerdal, 08.07.1991, 2 alate viviparous females, *P. pinaster*, NN & MD leg., UL, OR–699; La Calahorra 27.05.1980, 2 alate viviparous females, *P. pinaster*, NN & MD leg., UL, GR–64; Cazorla 29.06.1984, 2 alate viviparous females, *P. pinea*, NN & MD leg., UL, J–76; Gata (Caceres), 07.05.1972, 1 apterous viviparous female, *P. pinaster*, Nieto leg., UL, Uch–4c; Ferreiras, 27.05.1980, 2 alate viviparous females, Mier leg., UL, GR–39yYo; Carrizal, 11.07.1978, 1 apterous, 1 alate viviparous females, Nieto leg., UL, LE–865

Eulachnus intermedius Binazzi, 1989

Binazzi, 1989: 171

Apterous viviparous female (Figs 24–26, 46c; Table 2)—redescription (based on 10 specimens). *Colour*. In life: light brown, covered by grey wax secrection. In mounted specimens: head, pronotum and mesonotum brown with scleroites at setal bases slightly darker. Metanotum and abdomen pale with scleroites at setal bases brown. ANT yellowish with ANT I–II and apices of ANT III–VI brown. Fore and middle legs yellowish to light brown. Hind legs always uniformly brown. Body setae dark (Fig. 24a). *Morphometric characters*: HW 0.34–0.41 × ANT. Head chaetotaxy: dorsal side with 6 pairs; ventral side with 5 pairs of thick and rigid blunt setae. Dorsal setae 0.06–0.11 mm long. ANT (Fig. 25a) 0.49–0.76 × BL. ANT IV as long as or shorter than ANT V. ANT V longer than ANT VI. PT 0.11–0.18 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.51–0.60, V:III 0.62–0.69, IV:III 0.55–0.66. ANT III (Fig. 25b) with 14–18 setae, ANT IV with 6–11 setae, ANT V with 6–10 setae, ANT VI with 5–6 basal setae. ANT setae medium–sized, rigid and blunt, longer than diameter of segments. LS III 2.00–3.75 ×

BD III. Rostrum reaching from middle to hind coxae. URS 0.19–0.25 × ANT III, 0.36–0.42 × ANT VI and 0.35–0.40 × HT II. Outer side of hind legs covered by rigid and blunt setae, longer than the width of tibiae (Fig. 26a), on femora 0.075–0.110 mm long, on tibiae 0.095–0.125 mm long. Basal length of HT I 0.23–0.35 × dorsal, 0.19–0.25 × ventral and 0.55–0.85 × intersegmental length, with 12 ventral setae. HT II 0.50–0.66 × ANT III and 0.890–1.100 × ANT VI. Dorsal setae long and blunt—on pronotum 0.04–0.10 mm long, mesonotum 0.05–0.12 mm long, metanotum 0.05–0.11 mm long; on abdomen—ABD I–VI 0.050–0.100 mm long, ABD VII–VIII 0.010–0.105 mm long. Abdomen with 2–4 (often 2 or 3) scleroites on anterior and 4–8 scleroites on posterior part of ABD I–VI. Scleroites often of irregular shape and often fused into larger ones, but fused sclerite are forming always from 2 smaller scleroites (Fig. 46c).

Alate viviparous female (Figs 24–26; Table 3)—redescription (based on six specimens). *Colour*. In life: unknown. In mounted specimens: head and thorax brown. ANT yellowish with ANT I–II and apices of ANT III–VI brown. Fore wings pale to yellow with pterostigma darker. Hind wings pale. Fore and middle legs yellowish to light brown. Hind legs uniformly brown. Abdomen pale or yellowish with dorsal scleroites light brown. Body setae brown (Fig. 24b). *Morphometric characters*: HW 0.31 × ANT. Head chaetotaxy: dorsal side with 4 pairs of long and almost pointed setae; ventral side with 6 pairs of fine and pointed setae. Dorsal setae 0.085–0.120 mm long. ANT (Fig. 25c) 0.53–0.66 × BL. ANT IV as long as or only slightly shorter than ANT V with 1 secondary rhinarium. ANT V longer than ANT VI. PT 0.12–0.13 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.46–0.53, V:III 0.56–0.65, IV:III 0.56–0.63. ANT III (Fig. 25d) with 16–18, ANT IV with 8–9, ANT V with 7–9 setae, ANT VI with 5–6 basal setae. ANT setae long, rigid and slightly blunt, longer than diameter of segments. LS III 3.00–3.80 × BD III. Rostrum reaching metasternum. URS 0.16–0.18 × ANT III, 0.33–0.34 × ANT VI and 0.33–0.35 × HT II. Outer side of hind legs covered by rigid and pointed setae, longer than the width of tibiae (Fig. 26b), on femora 0.085–0.100 mm long, on tibiae 0.120–0.135 mm long. Basal length of HT I 0.26–0.30 × dorsal, 0.19–0.23 × ventral and 0.62–0.75 × intersegmental length, with 12 ventral setae. HT II 0.46–0.51 × ANT III and 0.96–1.00 × ANT VI. Dorsal setae fine and pointed—on pronotum 0.050–0.120 mm long; on abdomen—ABD I–VI 0.050–0.115 mm long, ABD VII–VIII 0.090–0.100 mm long. Abdomen with 1–2 scleroites on anterior and 2 scleroites on posterior part of ABD I–VI.

Oviparous female (Figs 24, 26; Table 4)—redescription (based on five specimens). *Colour*. In life: unknown. In mounted specimens: head, pronotum and mesonotum wholly sclerotized, light brown to brown with light brown scleroites at setal bases. Metanotum with one large light brown spinal sclerite. Abdomen membranous pale to yellow with scleroites at setal bases brown. ANT yellowish with ANT I–II and apices of ANT III–VI light brown. Femora yellowish–light brown with darker spots at setal bases. Tibiae light brown to brown. Body setae dark (Fig. 24c). *Morphometric characters*: HW 0.32–0.38 × ANT. Head chaetotaxy: dorsal side with 5 pairs of thick and slightly blunt setae; ventral side with 6 pairs of thick, rigid and blunt setae. Dorsal setae 0.05–0.11 mm long. ANT 0.46–0.70 × BL. ANT IV always shorter than ANT V with 1–2 rounded secondary rhinaria. ANT V longer than ANT VI. PT 0.12–0.17 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.55–0.66, V:III 0.66–0.80, IV:III 0.47–0.65. ANT setae long, rigid and blunt, longer than diameter of segments. LS III 2.50–4.00 × BD III. ANT III with 13–16 setae, ANT IV with 9–8 setae, ANT V with 7–11 setae, ANT VI with 5–6 basal setae. Rostrum reaching middle coxae. URS 0.21–0.24 × ANT III, 0.36–0.41 × ANT VI and 0.36–0.43 × HT II. Hind legs covered by long, rigid and blunt setae, longer than width of tibiae, on femora 0.090–0.105 mm long, on tibiae 0.090–0.115 mm long. Hind tibiae slightly swollen with 60–88 rounded and oval pseudosensoria of variable size, situated almost on whole length and surface of tibiae (Fig. 26c). Basal length of HT I 0.26–0.35 × dorsal, 0.19–0.25 × ventral and 0.50–0.75 × intersegmental length, with 12 ventral setae. HT II 0.53–0.60 × ANT III and 0.91–1.02 ANT VI. Dorsal setae long and blunt with expanded apices—on pronotum 0.050–0.105 mm long, mesonotum 0.040–0.120 mm long, metanotum 0.054–0.110 mm long; on abdomen—ABD I–VI 0.06–0.12 mm long, ABD VII–VIII 0.08–0.12 mm long, rigid and blunt. Abdomen with two rows of scleroites—2–5 on anterior and 4–9 on posterior part of ABD I–VI. Scleroites can fuse into larger ones (larger sclerites are forming from only two smaller ones).

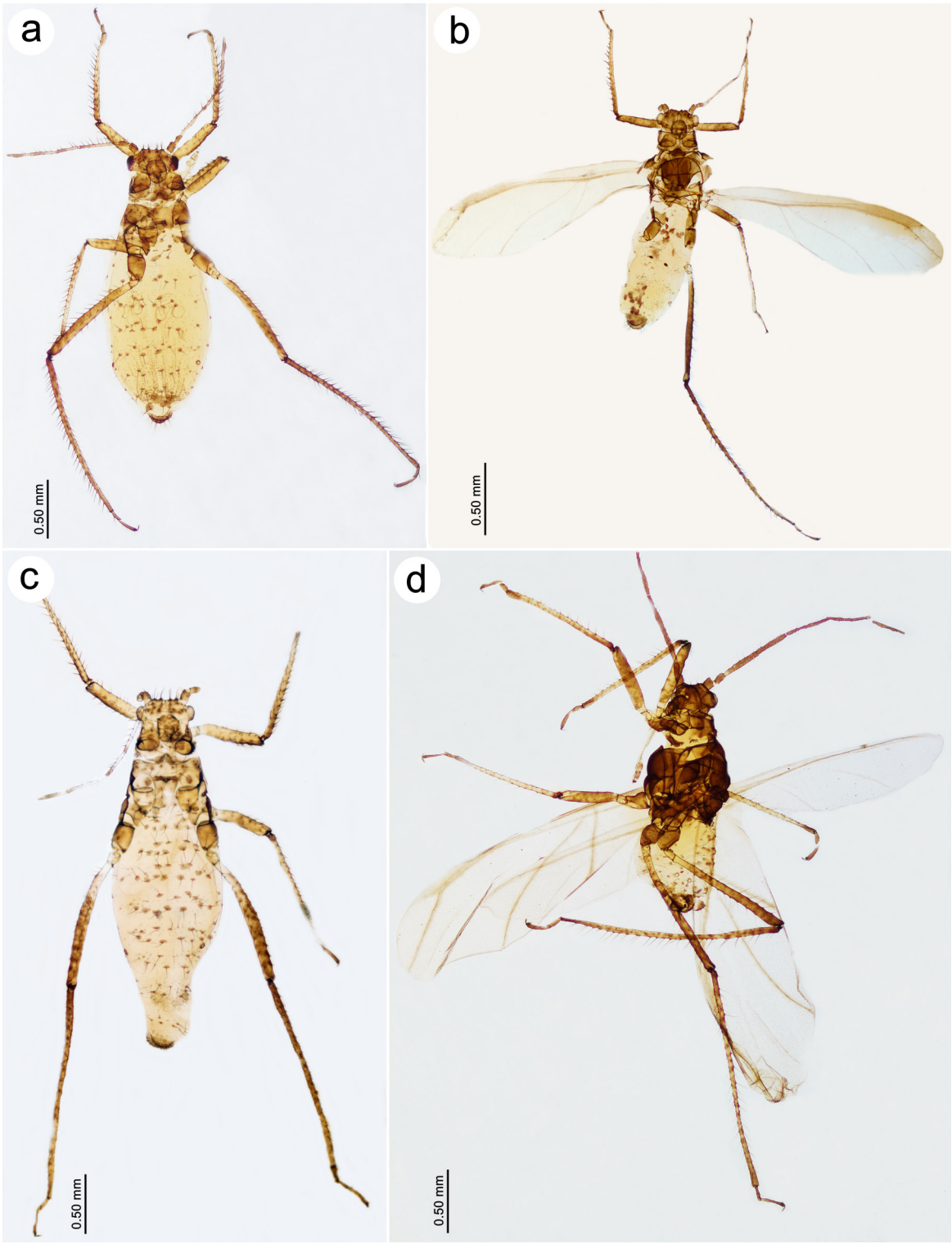

FIGURE 24. *Eulachnus intermedius*: (**a**) apterous viviparous female; (**b**) alate viviparous female; (**c**) oviparous female, (**d**) alate male.

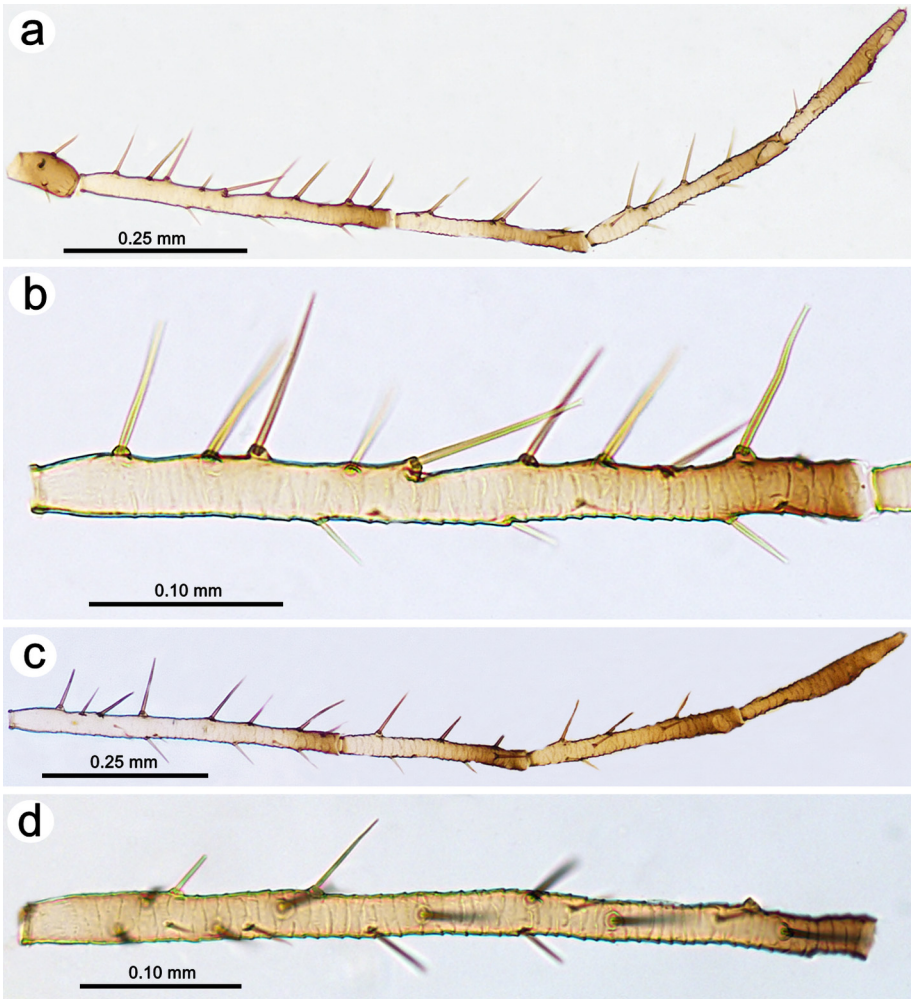

FIGURE 25. *Eulachnus intermedius* apterous viviparous female: (**a**) ANT, (**b**) ANT III chaetotaxy; alate viviparous female: (**c**) ANT (**d**) ANT III chaetotaxy.

FIGURE 26. *Eulachnus intermedius* hind tibiae: (**a**) apterous viviparous female; (**b**) alate viviparous female; (**c**) oviparous female.

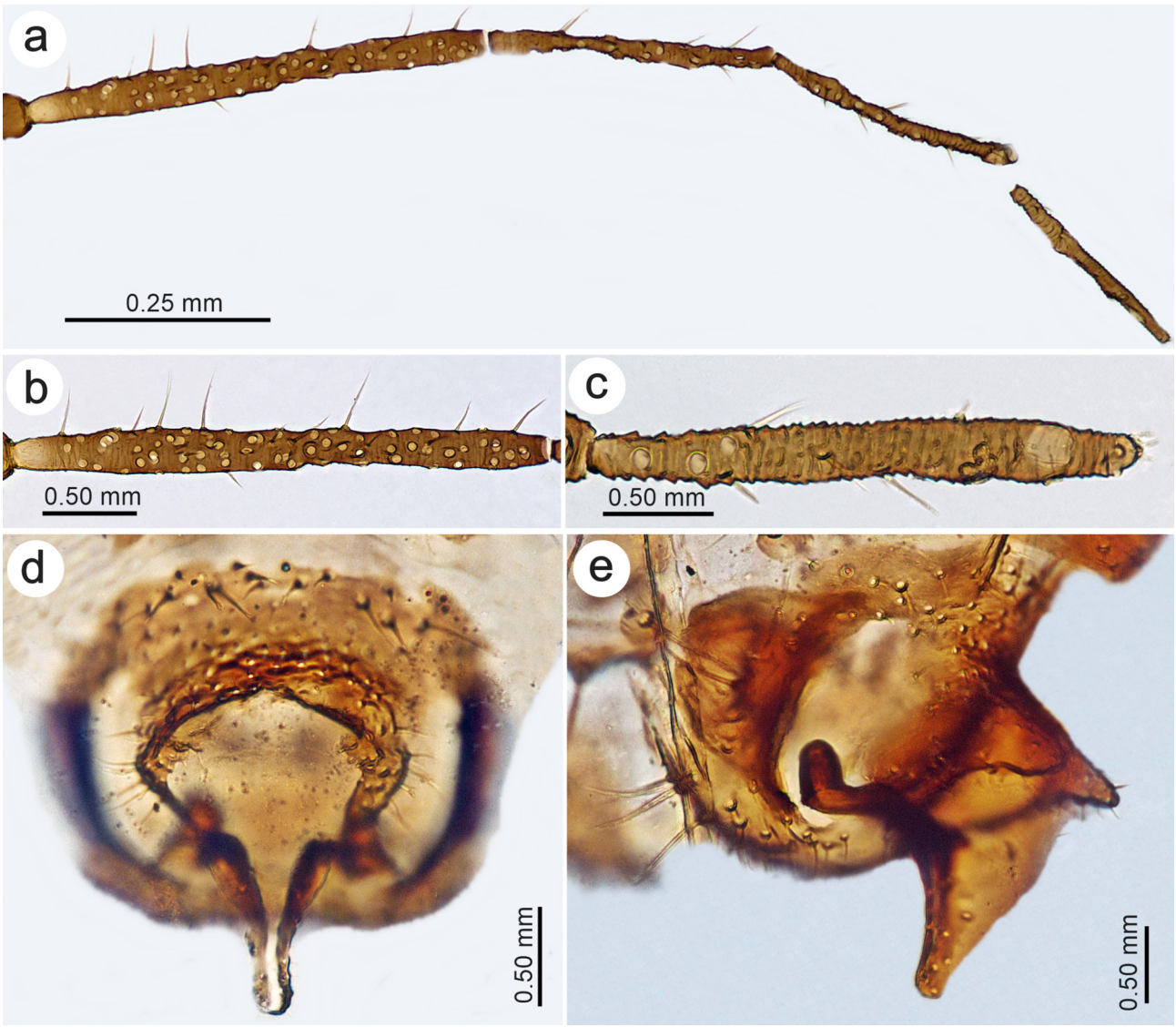

FIGURE 27. *Eulachnus intermedius* male: (**a**) ANT, (**b**) ANT III, (**c**) ANT VI, (**d**, **e**) genitalia.

Alate male (Figs 24, 27; Table 5)—redescription (based on three specimens). *Colour*. In life: unknown. In mounted specimens: head and thorax sclerotized, brown. ANT brown with basal part of ANT III slightly paler. Femora of fore and middle legs yellow to brown. Hind femora light brown to brown. Tibiae yellow to light brown with anterior and posterior parts darker. Wings and veins light brown, pterostigma brownish. Abdomen pale to yellow with sclerites and scleroites brown (Fig. 24d). Genitalia dark brown (Fig. 27d, e). *Morphometric characters*: HW 0.25–0.27 × ANT. Head chaetotaxy: dorsal side with 6, ventral side with 5 pairs of long, fine and pointed setae. Dorsal setae 0.075–0.110 mm long. ANT (Fig. 27a) 0.85–0.90 × BL. ANT III with 67–76 secondary rhinaria (Fig. 27b), ANT IV longer or shorter than ANT V, with 19–25 secondary rhinaria, ANT V longer than ANT VI, with 14–22 secondary rhinaria, ANT VI with 4–5 accessory rhinaria and 3 secondary rhinaria (Fig. 27c). PT about 0.17 × BASE, other antennal ratios: VI:III 0.44–0.45, V:III 0.56–0.32, IV:III 0.50–0.60; ANT III with 13–20 setae, ANT IV with 7–8 setae, ANT V with 8–9 setae, ANT VI with 5 basal and 5–6 apical setae. ANT setae long, fine and pointed, longer than diameter of segments. LS III 2.50–3.60 × BD III. Rostrum reaching meso– or metasternum. URS 0.12–0.14 × ANT III, 0.27–0.33 × ANT VI and 0.33–0.38 × HT II. Outer side of hind legs covered by long, fine and pointed setae, longer than width of tibiae, on femora 0.110–0.120 mm long, on tibiae 0.120–0.130 mm long. Basal length of HT I 0.22–0.35 × dorsal, 0.17–0.26 × ventral and 0.71–1.16 × intersegmental length, with 14 ventral setae. HT II 0.37–0.38 × ANT III and 0.81–0.87 ANT VI. Dorsal setae long, fine and pointed—on pronotum 0.045–0.099 mm long; on abdomen—abd I–VI 0.090–0.120 mm long, ABD

VII–VIII 0.100–0.120 mm long. Abdomen with 2–4 scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI. Ventral side with spinal or spino–pleural sclerites on segm. VI–VIII.

Diagnosis. This species, like *E. rileyi*, is characterized by the longest dorsal setae on thorax and abdomen (up to 0.150 mm). From *E. agilis* it could be distinguished by uniformly brown pigmented femora and separated dorsal scleroites. From *E. rileyi* it could be distinguished by stiff and shorter dorsal setae on ABD I–VI.

Distribution. So far, this species is known only from Italy.

Host plants. This species is known only from the record on *Pinus mugo* in mountain areas.

Type material examined. HOLOTYPE: ITALY: Monte Acquaviva 2300m, 02.09.1987, 1 apterous viviparous female, *P. mugo* var. *pumilio* (= *P. mugo*), M. Covassi leg., ISZA E1/90.

PARATYPES: ITALY: Monte Acquaviva 2300m, 02.09.1987, 4 apterous, 1 alate viviparous female, 2 oviparous females, *P. mugo*, M. Covassi leg., ISZA 37 (91); Monte Acquaviva 2300m, 02.09.1987, 2 apterous, 2 alate viviparous female, 1 oviparous female, 2 alate males, *P. mugo*, M. Covassi leg., ISZA 38 (92); Monte Acquaviva 2300m, 02.09.1987, 4 apterous, 1 alate viviparous female, 2 oviparous females, *P. mugo*, M. Covassi leg., ISZA 39 (93).

Eulachnus mediterraneus Binazzi, 1983b

Binazzi, 1983b: 197

Apterous viviparous female (Figs 28, 29, 46d; Table 2)—redescription (based on 30 specimens). *Colour*. In life: light green. In mounted specimens: head and thorax yellow with scleroites at setal bases dark brown, abdomen pale with scleroites at setal bases light brown. ANT yellowish with ANT I–II and apices of ANT III–VI brown. Femora yellow. Tibiae yellowish–light brown to yellow. When tibiae yellow then the posterior part and tarsi brown. Body setae dark (Fig. 28a). *Morphometric characters*: HW 0.34–0.41 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 6 pairs of thick, rigid and blunt setae. Dorsal 0.05–0.06 mm long. ANT (Fig. 29a) 0.49–0.58 × BL. ANT IV as long as or slightly shorter than ANT V. ANT V as long as or longer than ANT VI. PT 0.11–0.17 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.47–0.55, V:III 0.53–0.63, IV:III 0.45–0.54. ANT I with 5–6, ANT II with 5, ANT III (Fig. 29b) with 14–17 setae, ANT IV with 7–10 setae, ANT V with 8–10 setae, ANT VI with 6 basal setae. ANT setae medium–sized, rigid and blunt, slightly longer than diameter of segments. LS III 1.60–2.20 × BD III. Rostrum reaching between middle and hind coxae. URS 0.20–0.23 × ANT III, 0.39–0.47 × ANT VI and 0.32–0.39 × HT II. Hind legs long outside covered by rigid and blunt setae, as long as or longer than the width of tibiae (Fig. 29e), on femora 0.06–0.08 mm long, on tibiae 0.01–0.11 mm long. Basal length of HT I 0.29–0.35 × dorsal, 0.23–0.25 × ventral and 0.66–0.85 × intersegmental length, with 12 ventral setae. HT II 0.56–0.67 × ANT III and 1.15–1.30 × ANT VI. Dorsal setae very short and blunt—on pronotum 0.02–0.06 mm long, mesonotum 0.01–0.06 mm long, metanotum 0.01–0.05 mm long; on abdomen—ABD I–VI 0.02–0.05 mm long, ABD VII–VIII 0.04–0.09 mm long. Abdomen with 2 scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI (Fig. 46d).

Alate viviparous female (Figs 28, 29; Table 3)—redescription (based on 30 specimens). *Colour*. In life: unknown. In mounted specimens: head yellow to brown, with scleroites at setal bases dark brown. ANT yellowish with ANT I–II brown and apices of ANT III–VI pale brown, or light brown with darker ANT I–II and apices of ANT III–VI, or ANT uniformly brown only with basal part of ANT III pale. Sclerotized bases of ocelli brown. Thorax brown. Fore wings yellowish with only slightly darker pterostigma. Hind wings pale. Femora yellow to brown. When femora yellow then tibiae yellowish with anterior and posterior parts light brown and tarsi brown. When femora brown then tibiae and tarsi dark brown. Abdomen pale or yellowish with dorsal scleroites brown. Body setae dusky (Fig. 28b). *Morphometric characters*: HW 0.30–0.31 × ANT. Head chaetotaxy: dorsal side with 4 pairs; ventral side with 4 pairs of rigid and blunt setae. Dorsal setae 0.070–0.120 mm long. ANT (Fig. 29c) 0.56–0.65 × BL. ANT IV as long as or slightly shorter than ANT V with 1 secondary rhinarium. ANT V longer than ANT VI. PT 0.11–0.12 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.39–0.45, V:III 0.51–0.60, IV:III 0.51–0.52. ANT III (Fig. 29d) with 16–17 setae, ANT IV with 8–10 setae, ANT V with 8–9 setae, ANT VI with 6 basal setae. ANT setae medium–sized, rigid and blunt, longer than diameter of segments. LS III 2.20–2.50 × BD III. Rostrum reaching abdominal sternite I. URS 0.15–0.18 × ANT III, 0.40 × ANT VI and

0.34–0.36 × HT II. Outer side of hind legs covered by rigid and blunt or slightly blunt setae, longer than the width of tibiae (Fig. 29f), on femora 0.070–0.080 mm long, on tibiae 0.130–0.140 mm long. Basal length of HT I 0.22–0.27 × dorsal, 0.16–0.20 × ventral and 0.55–0.60 × intersegmental length, with 12 ventral setae. HT II 0.43–0.52 × ANT III and 1.10–1.15 × ANT VI. Dorsal setae fine and pointed—on pronotum 0.06–0.12 mm long; on abdomen—ABD I–VI 0.04–0.07 mm long, ABD VII–VIII 0.08–0.11 mm long. Abdomen with 2 scleroites on anterior and 2 scleroites on posterior part of ABD I–VI.

Diagnosis. This species is most similar to *E. stekolshchikovi* **sp**. **nov**. (and the differences are given in the description of the new species), *E. tuberculostemmatus* and *E. garganicus* stat. nov., by having short dorsal setae on metanotum (0.012–0.060). From both species, it can be distinguished by longer setae on metanotum (0.027–0.060) and on ABD I–VI (0.025–0.070).

Distribution. This species was so far recorded from Mediterranean areas of Europe: Andorra, France, Italy, Portugal (Madeira) and Spain. It is very likely that it could be found also in Mediterranean North Africa.

Host plants. Most frequently recorded from *Pinus pinaster* and *P. pinea*. Collected also from *P. nigra*.

Type material examined. HOLOTYPE: ITALY: Fucecchio, 06.05.1980, 1 apterous viviparous female, *Pinus pinaster*, A. Binazzi leg., ISZA n1, 3.

PARATYPES: ITALY: Monte Pisano Tre Colli, 13.07.1979, 3 apterous viviparous females, 6 alate viviparous females, *Pinus pinaster*, A. Binazzi leg., ISZA n10, 21

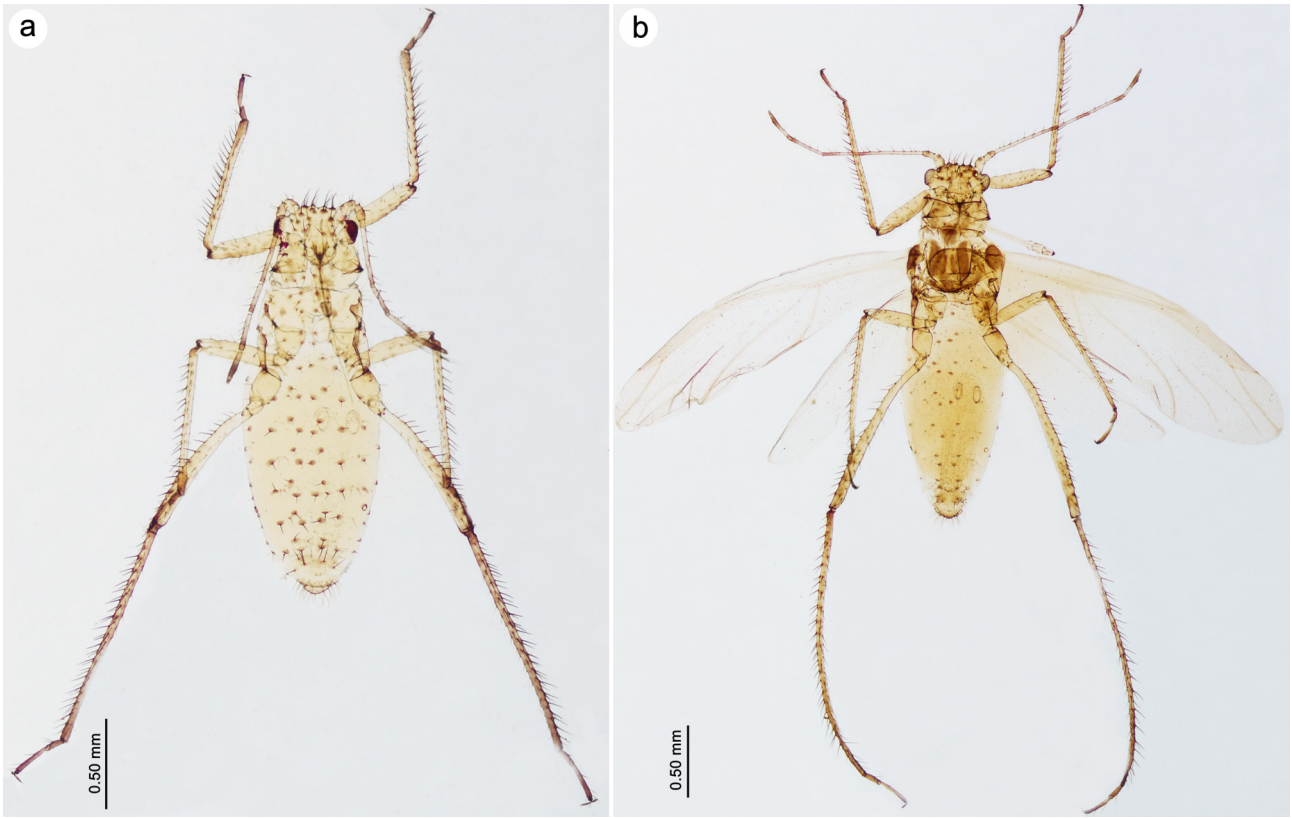

FIGURE 28. *Eulachnus mediterraneus*: (**a**) apterous viviparous female; (**b**) alate viviparous female.

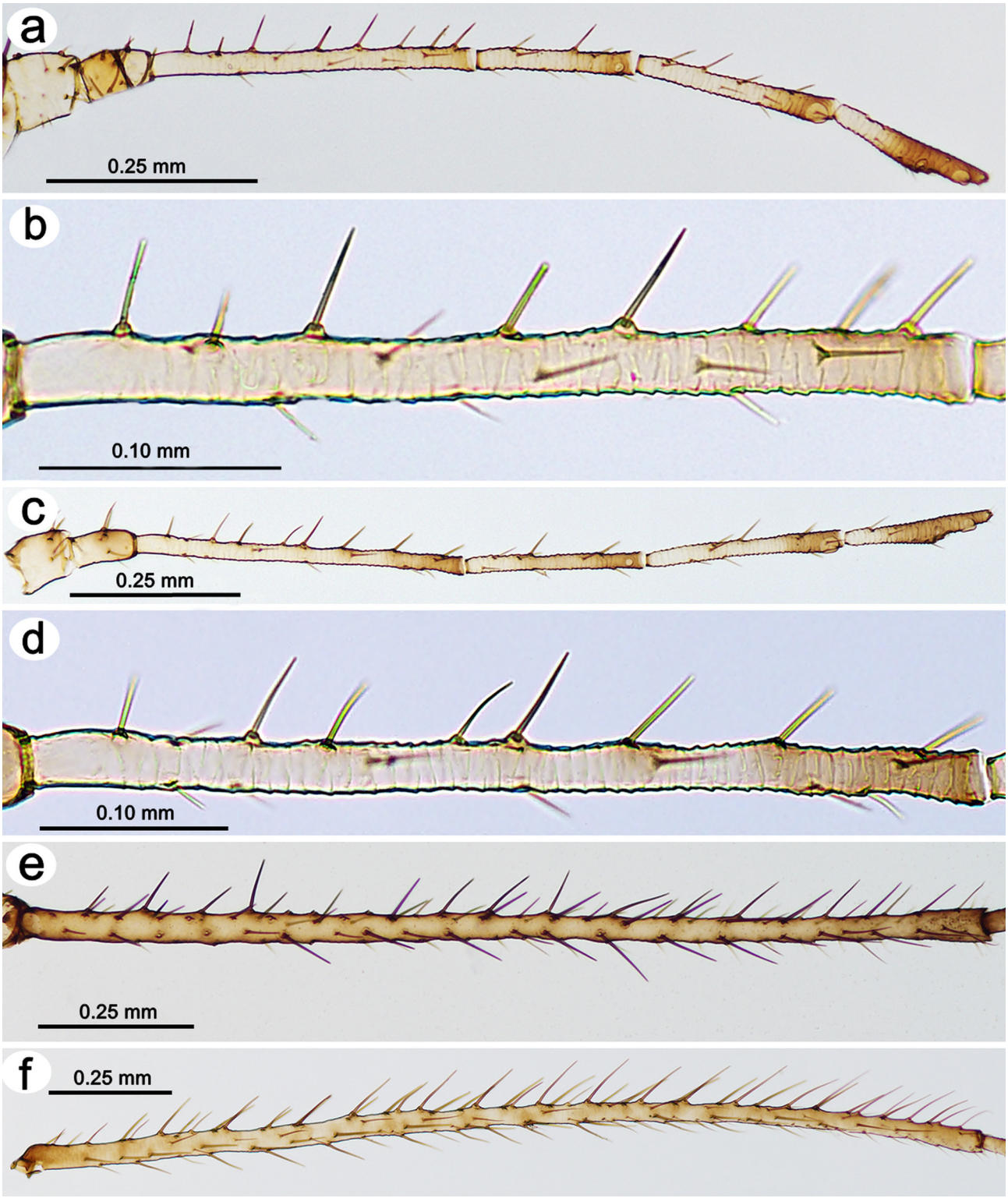

FIGURE 29. *Eulachnus mediterraneus*: (**a**) ANT of apterous viviparous female; (**b**) ANT III of apterous viviparous female (**c**) ANT of alate viviparous female, (**d**) ANT III chaetotaxy of alate viviparous female, (**e**) hind tibia of apterous viviparous female, (**f**) hind tibia of alate viviparous female.

Eulachnus nigricola (Pašek, 1953)

Protolachnus nigricola Pašek, 1953: 33

Fundatrix (Figs 30, 31; Table 1)—description (based on three specimens). *Colour*. In life: head and thorax light brown to brown. ANT and legs light brown. Abdomen light green or yellowish–green with dorsal scleroites brown (Fig. 30a). In mounted specimens: head, pronotum and mesonotum yellowish–brown, covered by sclerotic shield. Metanotum and abdomen pale with scleroites at setal bases light brown. ANT light brown with ANT I–II paler. Legs yellowish–light brown. Legs setae brown (Fig. 31a). *Morphometric characters*: HW 0.48–0.52 × ANT. Head chaetotaxy: dorsal side with 5 pairs of thick rigid and blunt setae with slightly expanded or flabellate apices; ventral side with 5 pairs of thick, rigid and blunt setae. Dorsal setae 0.035–0.075 mm long. ANT 0.33–0.42 × BL. ANT IV always slightly shorter than ANT V with 0–1 secondary rhinaria. ANT V shorter than ANT VI. PT 0.20–0.23 × BASE with 5–6 accessory rhinaria. Other antennal ratios: VI:III 0.72–0.78, V:III 0.43–0.64, IV:III 0.37–0.56. ANT III with 6–11 setae, ANT IV with 2–5 setae, ANT V with 2–7 setae, ANT VI with 4–6 basal setae. ANT setae very short, rigid, blunt or truncate, not longer than diameter of segments. LS III 0.75–1.10 × BD III. Rostrum reaching over middle coxae. URS 0.30–0.35 × ANT III, 0.40–0.45 × ANT VI and 0.44–0.50 × HT II. Outer side of hind legs covered by thick, rigid and blunt or truncate setae, in general longer than width of tibiae, on femora 0.05–0.06 mm long, on tibiae 0.06–0.08 mm long. Basal length of HT I 0.55–0.66 × dorsal, 0.33–0.04 × ventral and 0.75–0.10 × intersegmental length, with 8 ventral setae. HT II 0.62–0.76 × ANT III and 0.85–0.96 × ANT VI. Dorsal setae on thorax very short, rigid and pointed—on pronotum 0.015–0.037 mm long, mesonotum 0.017–0.052 mm long (the longest setae on mesonotum in group of 4–5 in marginal position of segment), metanotum 0.017–0.032 mm long; on abdomen—ABD I–VI 0.012–0.028 mm long and pointed, ABD VII–VIII 0.017–0.060 mm long and blunt or truncate. Dorsal side of abdomen with 1 row of scleroites at setal bases in the spinal, pleural and marginal position (some segments with 2 rows of scleroites in pleural and marginal position). Between rows of scleroites there are rows of intersegmental muscle sclerite in pleural and marginal position.

Remarks. This morph differs from the apterous viviparous female by the larger body size and higher ratio HT I basal length to dorsal length.

Apterous viviparous female (Figs 30–33, 46j; Table 2)—redescription (based on 28 specimens). *Colour*. In life: light green with head, thorax and legs light brown (Fig. 30b). In mounted specimens: head, pronotum and mesonotum yellow, covered by sclerotic shield. Metanotum and abdomen pale with scleroites at setal bases light brown. ANT yellowish with apices of ANT III–VI slightly darker. Legs yellow to light brown. Legs setae brown (Fig. 31b). *Morphometric characters*: HW 0.46–0.52 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 5 pairs of thick, rigid and blunt setae. Dorsal setae 0.012–0.075 mm long. ANT (Fig. 32a) 0.41–0.51 × BL. ANT IV always clearly shorter than ANT V, very rarely with 0–1 rounded secondary rhinarium. ANT V shorter than ANT VI. PT 0.17–0.25 × BASE, with 5–6 accessory rhinaria. Other antennal ratios: VI:III 0.70–0.84, V:III 0.59–0.72, IV:III 0.41–0.53. ANT III (Fig. 32b) with 8–11 setae, ANT IV with 3–7 setae, ANT V with 5–8 setae, ANT VI with 5–6 basal setae. ANT setae very short, rigid, pointed or blunt, not longer than diameter of segments. LS III 0.70–1.17 × BD III. Rostrum reaching over hind coxae. URS 0.26–0.33 × ANT III, 0.35–0.40 × ANT VI and 0.40–0.46 × HT II. Outer side of hind legs covered by thick, rigid and blunt setae, as long as and longer than the width of tibiae (Fig. 33a), on femora 0.042–0.055 mm long, on tibiae 0.050–0.075 mm long. Basal length of HT I 0.40–0.50 × dorsal, 0.25–0.28 × ventral and 0.66–0.80 × intersegmental length, with 8 ventral setae. HT II 0.63–0.75 × ANT III and 0.89–0.94 × ANT VI. Dorsal setae very short, on thorax pointed—on pronotum 0.005–0.032 mm long, mesonotum 0.007–0.05 mm long, metanotum 0.007–0.032 mm long; on abdomen longer and blunt in marginal position, shorter and pointed in spinal and pleural positions—ABD I–VI 0.008–0.027 mm long, ABD VII–VIII 0.012–0.052 mm long. Abdomen with one row of 4–6 scleroites (Fig. 46j) (only segm. VII with 2 rows on anterior and posterior part of ABD I–VI), segm. VIII entire sclerotized.

Alate viviparous female (Figs 31–33; Table 3)—redescription (based on 10 specimens). *Colour*. In life: unknown. In mounted specimens: head and thorax light brown to brown. ANT light brown to brown with bases of ANT III–VI slightly paler. Fore wings yellow, pterostigma and edges of wing slightly darker. Hind wings pale. Legs yellowish to brown. Abdomen pale, with dorsal scleroites brown. Body setae brown (Fig. 31d). *Morphometric characters*: HW 0.46–0.50 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 6 pairs of rigid and slightly blunt setae. Dorsal setae 0.03–0.070 mm long. ANT (Fig. 32c) 0.43–0.51 × BL. ANT III

with 1–2 secondary rhinaria (Fig. 32d), ANT IV slightly shorter than ANT V with 0–1 secondary rhinaria. ANT V shorter than ANT VI. PT 0.22–0.23 × BASE, with 5 accessory rhinaria. Other antennal ratios: VI:III 0.61–0.69, V:III 0.48–0.57, IV:III 0.40–0.47. ANT III with 9–11 setae, ANT IV with 5–7 setae, ANT V with 5–7 setae, ANT VI with 5–6 basal setae. ANT setae short, rigid and slightly pointed, not longer than diameter of segments. LS III 0.90–1.29 × BD III. Rostrum reaching to hind coxae. URS 0.25–0.26 × ANT III, 0.37–0.40 × ANT VI and 0.37–0.40 × HT II. Outer side of hind legs covered by rigid and blunt or slightly blunt setae, longer than width of tibiae (Fig. 33c), on femora 0.060–0.065 mm long, on tibiae 0.070–0.090 mm long. Basal length of HT I 0.44–0.55 × dorsal, 0.26–0.35 × ventral and 0.57–0.83 × intersegmental length, with 8 ventral setae. HT II 0.61–0.69 × ANT III and 0.96–1.03 × ANT VI. Dorsal setae short, fine and pointed—on pronotum 0.012–0.045 mm long; on abdomen—ABD I–VI 0.012–0.04 mm long, ABD VII–VIII 0.02–0.05 mm long. Abdomen with 2 scleroites on anterior and 2–4 scleroites on posterior part of ABD I–VI.

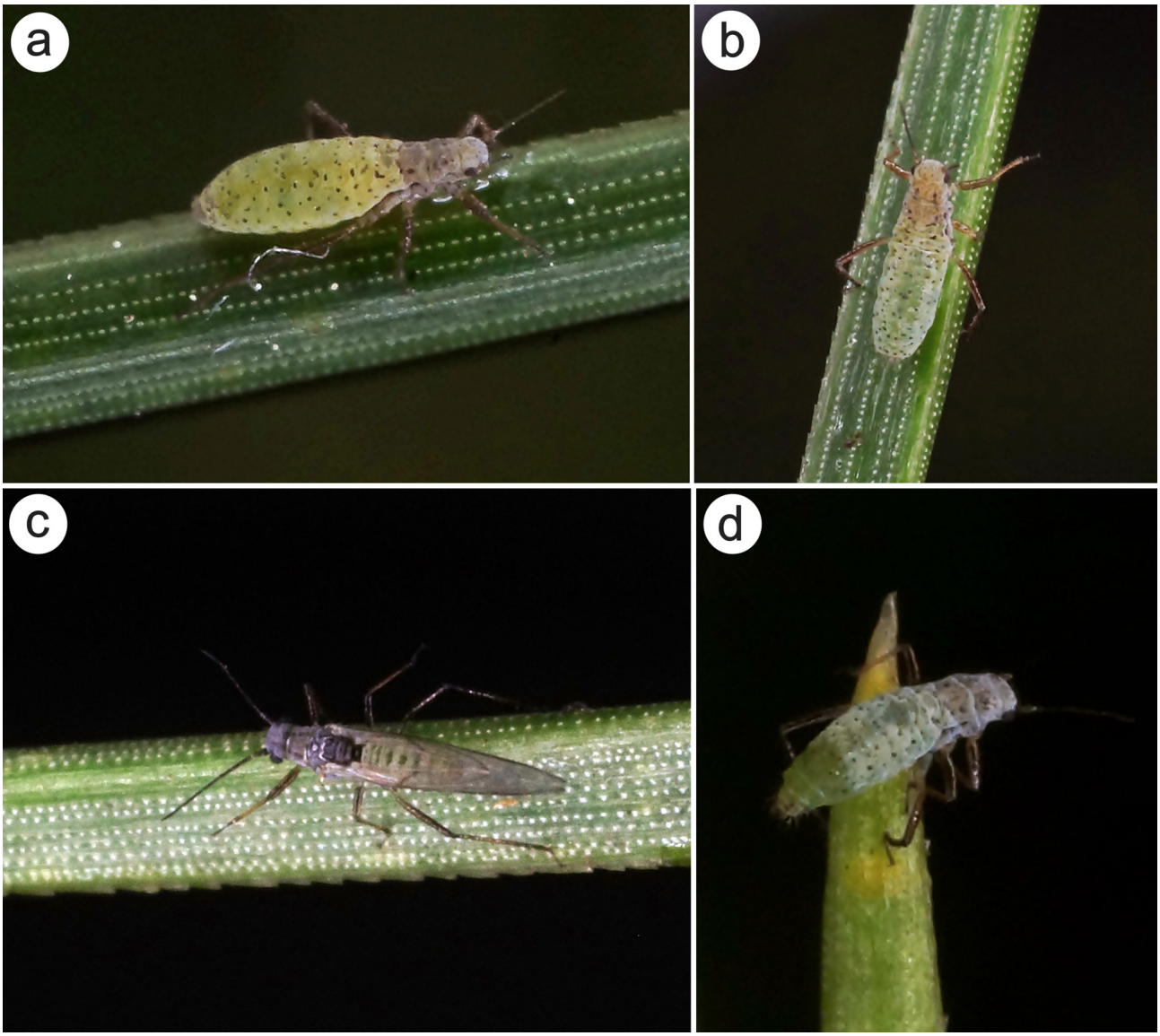

FIGURE 30. *Eulachnus nigricola* life specimens: (**a**) fundatrix, (**b**) apterous viviparous female, (**c**) alate male, (**d**) oviparous female.

Alate male (Figs 30, 31, 34; Table 5)—redescription (based on eight specimens). *Colour*. In life: head and thorax livid, slightly covered by wax powder. Abdomen dark green with dorsal scleroites black. Legs blackish (Fig. 30c). In mounted specimens: head and thorax sclerotized, light brown to brown. ANT light brown to brown with basal part of ANT III slightly lighter. Legs light brown to brown. Wings light brown with veins light brown and pterostigma brownish. Abdomen membranous, pale with sclerites and scleroites light brown (Fig. 31d). Genitalia

brown (Fig. 34d, e). *Morphometric characters*: HW 0.35–0.45 × ANT. Head chaetotaxy: dorsal side with 4, ventral side with 5–6 pairs of fine and pointed setae. Dorsal setae 0.022–0.075 mm long. ANT (Fig. 34a) 0.58–0.70 × BL. ANT III (Fig. 34b) with 23–38 secondary rhinaria, ANT IV as long as or shorter than ANT V with 5–14 secondary rhinaria, ANT V as long as or only slightly shorter than ANT VI, with 4–12 secondary rhinaria, ANT VI with 5–6 accessory rhinaria and 1–4 secondary rhinaria (Fig. 34c). PT 0.23–0.28 × BASE, other antennal ratios: VI:III 0.58–0.67, V:III 0.57–0.64, IV:III 0.36–0.55; ANT III with 8–11 setae, ANT IV with 4–5 setae, ANT V with 7–9 setae, ANT VI with 5–6 basal setae. ANT setae short, fine and pointed. LS III 1.13–1.41 × BD III. Rostrum reaching over hind tibiae. URS 0.20–0.25 × ANT III, 0.35–0.40 × ANT VI and 0.41–0.46 × HT II. Outer side of hind legs covered by thick, rigid, blunt or spatulate setae, always longer than width of tibiae, on femora 0.017–0.060 mm long, on tibiae 0.045–0.075 mm long. Basal length of HT I 0.40–0.50 × dorsal, 0.25–0.30 × ventral and 0.66–0.80 × intersegmental length, with 8–9 ventral setae. HT II 0.47–0.57 × ANT III and 0.80–0.90 × ANT VI. Dorsal setae very short, fine and pointed—on pronotum 0.010–0.037 mm long; on abdomen—ABD I–VI 0.01–0.017 mm long, ABD VII–VIII 0.012–0.037 mm long. Abdomen with 2 rows of scleroites—2–6 on anterior and 4–8 on posterior part of ABD I–VI. Ventral side of ABD VII–VIII with sclerotised cross–bars.

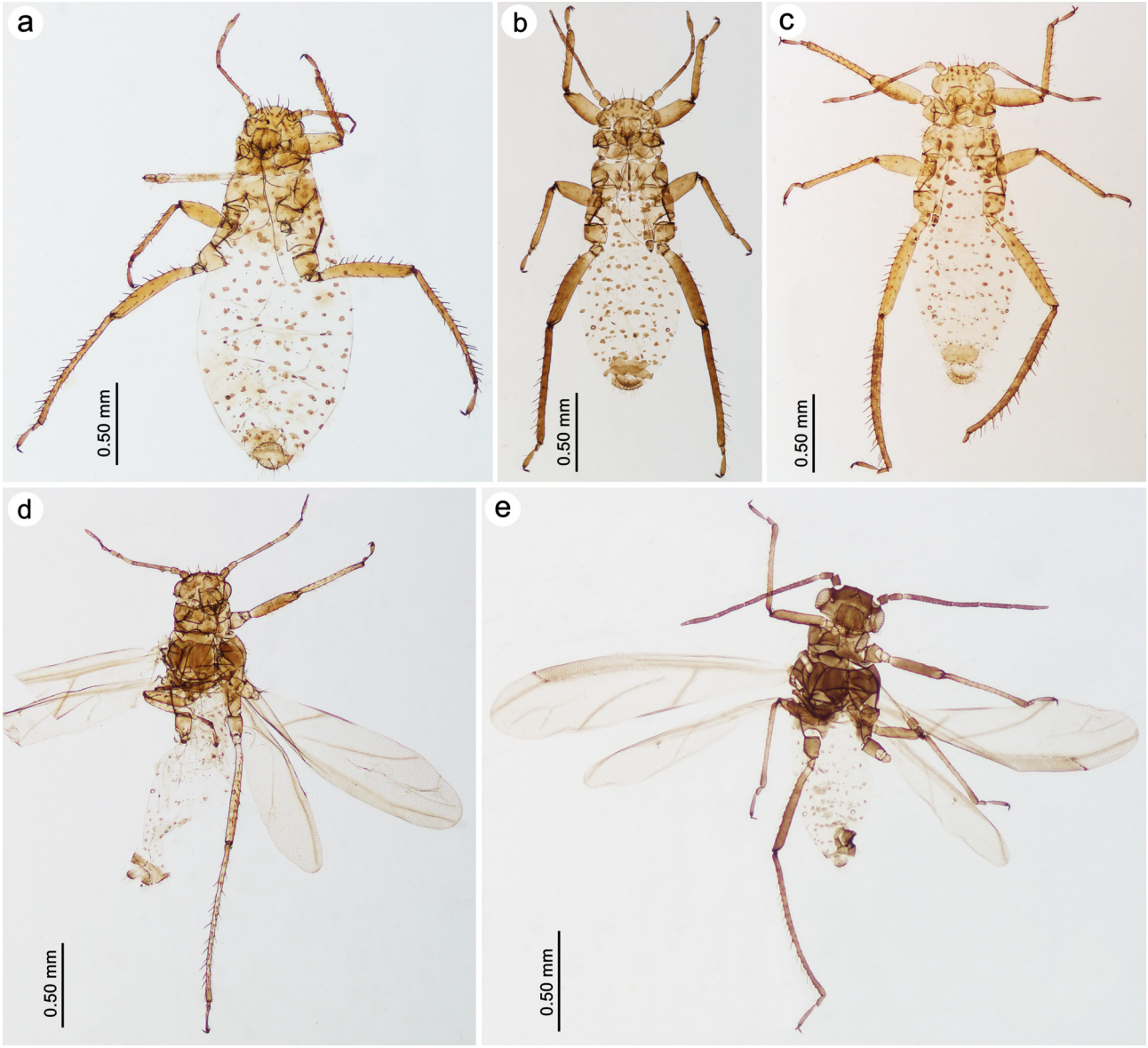

FIGURE 31. *Eulachnus nigricola*: (**a**) fundatrix, (**b**) apterous viviparous female; (**c**) oviparous female; (**d**) alate viviparous female; (**d**) alate male.

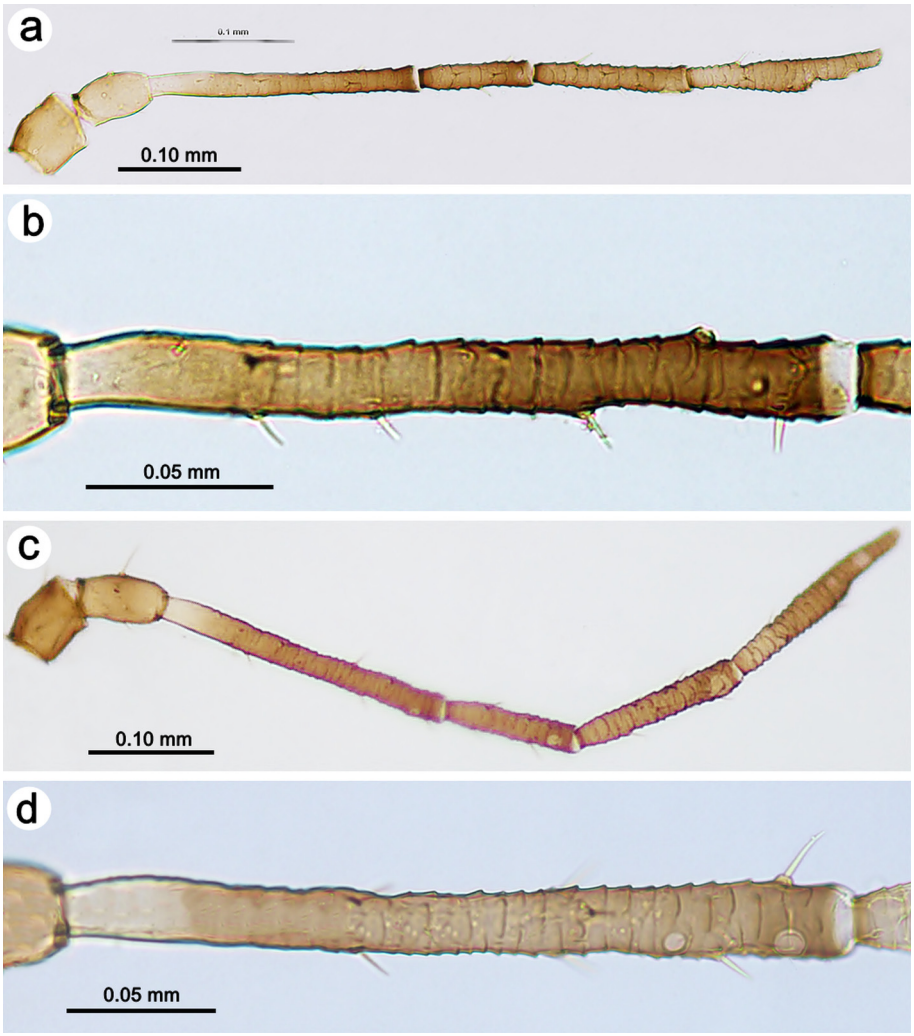

FIGURE 32. *Eulachnus nigricola* apterous viviparous female: (**a**) ANT, (**b**) ANT III chaetotaxy; alate viviparous female: (**c**) ANT (**d**) ANT III chaetotaxy.

Oviparous female (Figs 30, 31, 33; Table 4)—redescription (based on 15 specimens). *Colour*. In life: head and thorax greenish–light brown, abdomen green with scleroites brown. Body covered by wax powder from head to ABD V, tip of abdomen clearly without wax. Legs dark brown to black (Fig. 30d). In mounted specimens: head, pronotum and mesonotum sclerotized, yellow to light brown with darker scleroites at setal bases. Metanotum and abdomen pale with scleroites at setal bases light brown. ANT yellowish with apices of ANT III–VI light brown. Legs yellow with hind tibiae light brown. Body setae brown (Fig. 31c). *Morphometric characters*: HW 0.47–0.51 × ANT. Head chaetotaxy: dorsal side with 5 pairs of thick, rigid and slightly blunt setae; ventral side with 5 pairs of thick, rigid and blunt setae. Dorsal setae 0.017–0.067 mm long. ANT 0.41–0.44 × BL. ANT IV as long as or slightly shorter than ANT V with 0–1 rounded secondary rhinarium. ANT V shorter than ANT VI. PT 0.19–0.23 × BASE, with 6 accessory rhinaria. Other antennal ratios: VI:III 0.73–0.82, V:III 0.60–0.68, IV:III 0.43–0.51. ANT setae very short, rigid, pointed and blunt, never longer than diameter of segments. LS III 0.75–1.00 × BD III. ANT III with 8–11 setae, ANT IV with 4–7 setae, ANT V with 4–7 setae, ANT VI with 5–6 basal setae. Rostrum reaching over hind coxae. URS 0.29–0.34 × ANT III, 0.35–0.44 × ANT VI and 0.43–0.48 × HT II. Outer side of hind legs covered by rigid and blunt setae, as long as and longer than width of tibiae, on femora 0.040–0.055 mm long, on tibiae 0.055–0.075 mm long. Hind tibiae slightly swollen with 24–53 small, rounded or oval pseudosensoria on almost whole length and surface of tibiae (Fig. 33c). Basal length of HT I 0.40–0.51 × dorsal, 0.25–0.28 × ventral and 0.62–0.85 × intersegmental length, with 10 ventral setae. HT II 0.64–0.73 × ANT III and 0.82–0.93 × ANT VI. Dorsal setae short, rigid and pointed—on pronotum 0.008–0.037 mm long, mesonotum 0.007–0.052 mm long, metanotum 0.008–0.025 mm long; on abdomen—ABD I–IV 0.012–0.035 mm long

(marginal setae with blunt apices), ABD VII–VIII 0.015–0.070 mm long and blunt. Abdomen with one row of 6–9 scleroites (on some segments there are two rows of scleroites).

FIGURE 33. *Eulachnus nigricola* hind tibiae: (**a**) apterous viviparous female; (**b**) alate viviparous female; (**c**) oviparous female.

Diagnosis. *Eulachnus nigricola* together with *E. brevipilosus* differ from other *Eulachnus* species with scleroites on abdomen by having very short antennal setae, LS III/BD III 0.70–1.17 (1.19–6.25 in remaining species) and characteristic truncate setae on legs (pointed or blunt in remaining species). *Eulachnus nigricola* differs from *E. brevipilosus* by longer setae on the outer side of hind tibiae which are longer than the width of tibiae (always shorter in *E. brevipilosus*) and eight ventral setae on HT I (six in *E. brevipilosus*).

Distribution. This species is widely distributed in continental Europe, with records from: Bulgaria, Czech Republic, Denmark, France, Germany, Hungary, Italy, Macedonia, Moldova, Poland, Romania, Slovakia, Spain and Switzerland. Until recently it was regarded as montane element but in Southern Poland it is very common also in anthropogenic areas (e.g. Kościuszko City Park in Katowice). Outside Europe it was recorded in East Palaearctic (China), Near East (Turkey) and North Africa (Tunisia).

Host plants. Most commonly this species was recorded from *Pinus nigra*. Also *P. heldreichii, P. massoniana* and *P. sylvestris* are known to be the host plants.

Type material examined. As there is no information that during the original description any type material was designated and none material of Kaltenbach is available for the authors, no name-bearing type specimen is believed to be extant and the authors consider that a name-bearing type is necessary to define the nominal taxon objectively. According to the International Code of Zoological Nomenclature (Article 75.1), the Neotype of *E. agilis* is here designated:

NEOTYPE: POLAND: Lachowice, 17.06.2013, 1 apterous viviparous female marked by black circle and „N”, *P. nigra*, M. Kanturski leg., UŚ, 06/13/20.

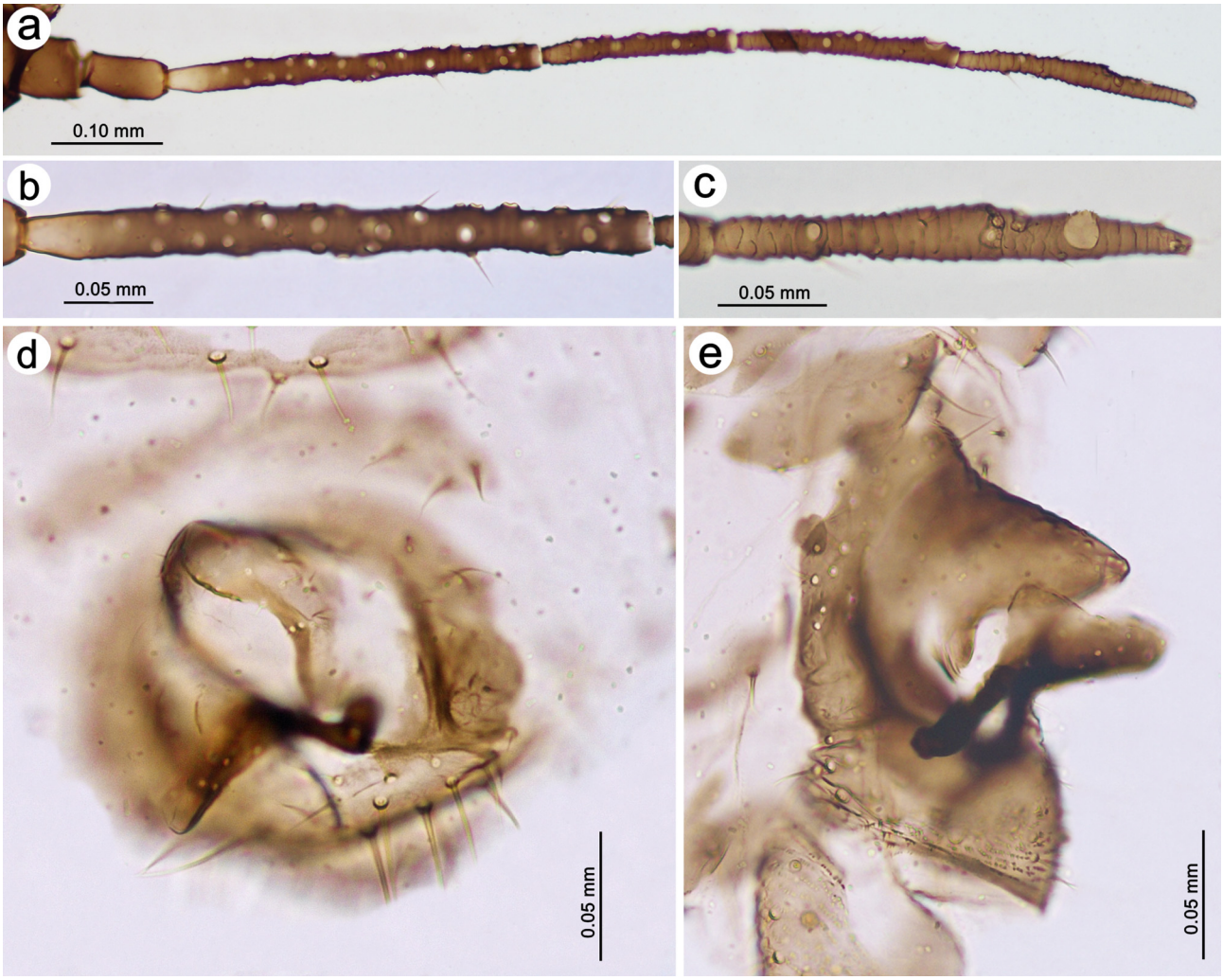

FIGURE 34. *Eulachnus nigricola* male: (**a**) ANT, (**b**) ANT III, (**c**) ANT VI, (**d**, **e**) genitalia.

Eulachnus rileyi (Williams, 1911)

Lachnus rileyi Williams, 1911: 108
Eulachnus bluncki Börner, 1940: 1
Eulachnus tauricus Bozhko, 1961: 5, **syn. nov.**

Fundatrix (Figs 35, 36; Table 1)—description (based on eight specimens). *Colour*. In life: body in general brown, covered by white to grey wax powder, but mostly on head and thorax; abdomen shiny, without wax. ANT light brown. Femora and hind tibiae brown. Fore and middle tibiae light brown (Fig. 35a). In mounted specimens: head and thorax yellowish–light brown with scleroites at setal bases light brown. ANT yellowish with ANT I–II and apices of ANT III–VI light brown. Abdomen pale with scleroites at setal bases light brown. Femora light brown. Fore and middle tibiae yellow with distal and proximal parts light brown, hind tibiae and tarsi uniformly brown, body setae light brown to brown (Fig. 36a). *Morphometric characters*: HW 0.45–0.46 × ANT. Head chaetotaxy: dorsal side with 4 pairs; ventral side with 6 pairs of thick, pointed setae. Dorsal setae 0.090–0.110 mm long. ANT 0.45–0.52 × BL. ANT IV shorter than ANT V with 0–1 rounded secondary rhinarium. ANT V as long as or shorter than ANT VI. PT 0.11–0.13 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.57–0.67, V:III 0.54–0.57, IV:III 0.45–0.48. ANT III with 10–11, ANT IV with 3–7, ANT V with 6–7 setae, ANT VI with 5 basal setae. ANT setae long and slightly blunt, longer than diameter of segments. LS III 3.00–4.50 × BD III. Rostrum reaching middle coxae. URS 0.24–0.29 × ANT III, 0.42–0.43 × ANT VI and 0.45–0.47 × HT II. Outer side of hind legs covered by thick, rigid and pointed or slightly blunt setae, longer than width of tibiae, on femora 0.060–0.110

mm long, on tibiae 0.050–0.100 mm long. Basal length of HT I 0.33–0.40 × dorsal, 0.25–0.28 × ventral and 0.62–0.75 × intersegmental length, with 10 ventral setae. HT II 0.51–0.61 × ANT III and 0.90–0.95 × ANT VI. Dorsal setae long, fine and pointed—on pronotum 0.050–0.105 mm long, mesonotum 0.050–0.115 mm long, segm III 0.060–0.120 mm long; on abdomen—ABD I–VI 0.090–0.125 mm long, ABD VII–VIII 0.080–0.120 mm long. Dorsal side of abdomen with 2–5 scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI.

Remarks. This morph differs frome apterous viviparous female by the lower ratio HT I dorsal length to intersegmental length (1.75–1.85) and higher ratio of URS to ANT III (0.24–0.29).

Apterous viviparous female (Figs 35–38; Table 2)—redescription (based on 78 specimens). *Colour*. In life: brown to grey with grey wax powder on head, thorax and abdomen. ANT brown, legs uniformly brown to black (Fig. 35c). In mounted specimens: head and thorax light brown to brown with darker scleroites at setal bases. ANT yellowish with ANT I–II brown and apices of ANT III–VI light brown to brown. Abdomen pale with scleroites at setal bases light brown to brown. Femora and hind tibiae uniformly brown to black. Fore and middle tibiae yellowish with distal and proximal parts brown. Body setae dark (Fig. 36b). *Morphometric characters*: HW 0.29–0.45 × ANT. Head chaetotaxy: dorsal side with 5 pairs of thick slightly blunt or pointed setae; ventral side with 6 pairs of thick and pointed setae. Dorsal setae 0.050–0.150 mm long. ANT (Fig. 37a) 0.48–0.70 × BL. ANT IV as long as or slightly shorter than ANT V. ANT V always longer than ANT VI. PT 0.12–0.18 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.45–0.70, V:III 0.47–0.78, IV:III 0.29–0.73. ANT III (Fig. 37b) with 9–21 setae, ANT IV with 4–10 setae, ANT V with 5–11 setae, ANT VI with 4–6 basal setae. ANT setae long, rigid or fine, pointed or slightly blunt, longer than diameter of segments. LS III 2.68–6.25 × BD III. Rostrum reaching middle coxae. URS 0.17–0.23 × ANT III, 0.33–0.45 × ANT VI and 0.33–0.47 × HT II. Outer side of hind legs covered by fine and hair–like, blunt or pointed setae, longer than width of tibiae (Fig. 38a), on femora 0.035–0.135 mm, on tibiae 0.050–0.170 mm long. Basal length of HT I 0.23–0.42 × dorsal, 0.17–0.23 × ventral and 0.50–0.91 × intersegmental length, with 10 ventral setae. HT II 0.44–0.67 × ANT III and 0.88–1.11× ANT VI. Dorsal setae long, fine, hair–like and pointed—on pronotum 0.050–0.150 mm long, mesonotum 0.050–0.160 mm long, metanotum 0.070–0.150 mm long; on abdomen—ABD I–VI 0.070–0.155 mm long, ABD VII–VIII 0.040–0.0160 mm long. Abdomen with 4–6 scleroites on anterior and 4–9 scleroites on posterior part of ABD I–VI (Fig. 46a).

Alate viviparous female (Figs 35–38; Table 3)—redescription (based on 29 specimens). *Colour*. In life: body brown, densely covered by grey wax powder on head and thorax. Abdomen covered by longitudinal wax powder stripes on posterior part of previous and anterior part of next segment. ANT brown to black. Tibiae dark brown. Fore and middle tibiae light brown with dark distal and proximal parts. Hind legs uniformly brown (Fig. 35b). In mounted specimens: head brown to dark brown with darker scleroites at setal bases. ANT light brown with ANT I–II and apices of ANT III–VI darker. Thorax brown to dark brown. Fore wings yellowish, pterostigma and veins brown. Hind wings yellowish. Fore and middle tibiae light brown with dark distal and proximal parts. Hind tibiae dark. Abdomen pale with scleroites light brown. Body setae light brown (Fig. 36d). *Morphometric characters*: HW 0.30–0.34 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 6 pairs of long, fine and pointed setae. Dorsal setae 0.080–0.150 mm long. ANT 0.55–0.72 × BL. ANT III sometimes with 1 secondary rhinarum. ANT IV as long as or slightly shorter than ANT V with 1 secondary rhinarium. ANT V longer than ANT VI. PT 0.14–0.17 × BASE, with 3–5 accessory rhinaria. Other antennal ratios: VI:III 0.41–0.53, V:III 0.66–0.70, IV:III 0.58–0.67. ANT III (Fig. 37c) with 15–18 setae, ANT IV with 8–10 setae, ANT V with 6–11 setae, ANT VI with 5–6 basal setae. ANT setae long, rigid, pointed or slightly blunt, longer than diameter of segments. LS III 3.00–5.25 × BD III. Rostrum reaching metasternum. URS 0.17–0.22 × ANT III, 0.34–0.41 × ANT VI and 0.36–0.45 × HT II. Outer side of hind legs covered by long, fine, pointed or slightly blunt setae, longer than the width of tibiae (Fig. 38b), on femora 0.035–0.150 mm long, on tibiae 0.11–0.18 mm long. Basal length of HT I 0.25–0.33 × dorsal, 0.18–0.23 × ventral and 0.54–0.75 × intersegmental length, with 10 ventral setae. HT II 0.43–0.55 × ANT III and 0.88–1.04 × ANT VI. Dorsal setae fine and pointed—on pronotum 0.070–0.150 mm long; on abdomen—ABD I–VI 0.060–0.130 mm long, ABD VII–VIII 0.090–0.150 mm long. Abdomen with 2 scleroites on anterior and 2–4 scleroites on posterior part of ABD I–VI.

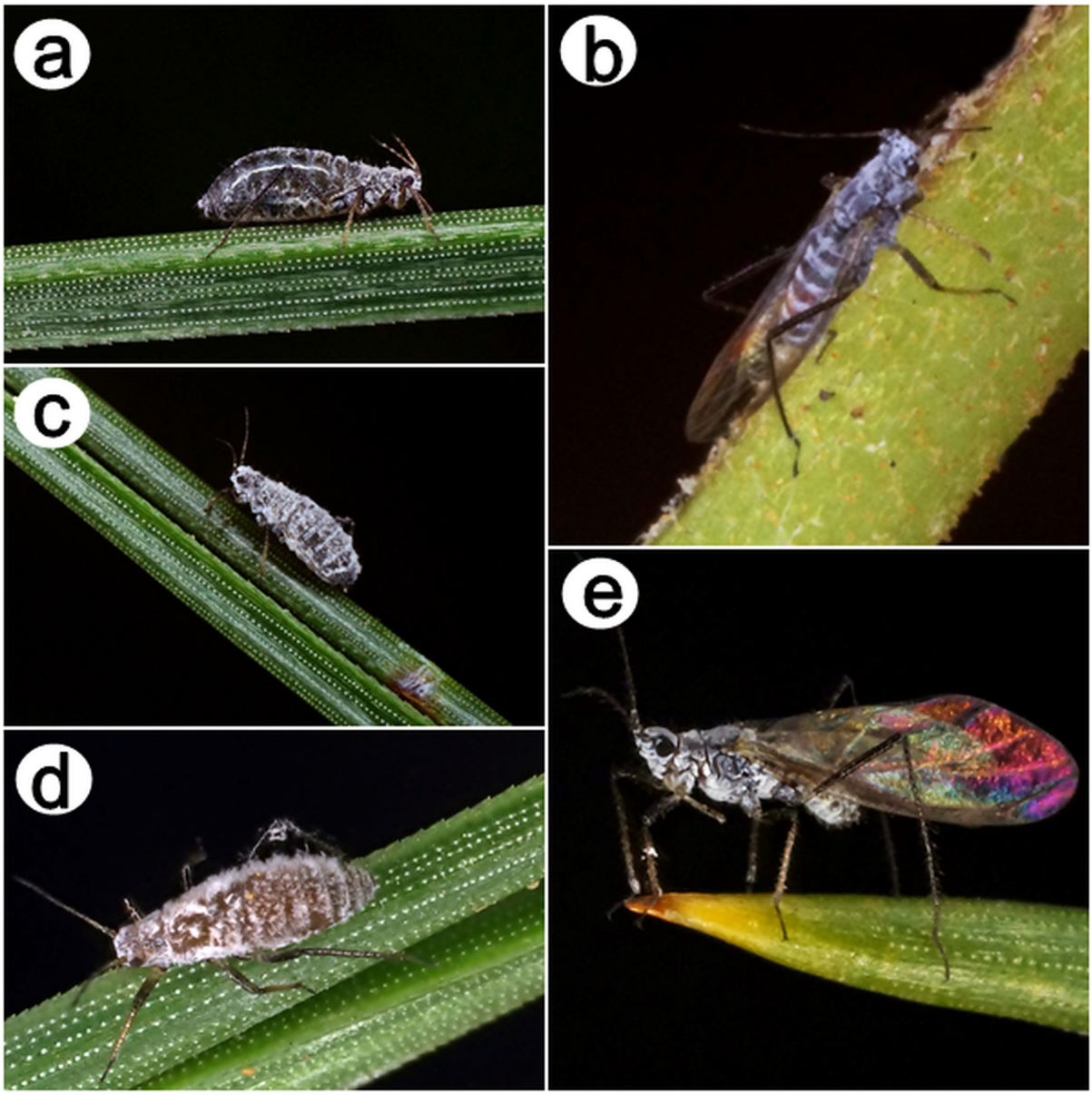

FIGURE 35. *Eulachnus rileyi* life specimens: (**a**) fundatrix, (**b**) alate viviparous female, (**c**) apterous viviparous female, (**d**) oviparous female, (**e**) alate male.

Oviparous female (Figs 35, 36, 38; Table 4)—redescription (based on 27 specimens). *Colour*. In life: brown with white wax powder. ANT at base yellowish and at apex brown. Femora and hind tibiae dark. Fore and middle tibiae paler in the middle of their length (Fig. 35d). In mounted specimens: head and thorax sclerotized, brown with scleroites at the setal bases darker. ANT yellow with ANT I–II brown and apices of ANT III–VI light brown. Abdomen pale to yellow with scleroites at setal bases brown. Fore and middle femora brown with yellow stripe on ventral side. Fore and middle tibiae yellow with distal and proximal parts brown. Hind femora uniformly brown, hind tibiae brown with distal part slightly paler, or legs uniformly yellow. Body setae dark (Fig. 36c). *Morphometric characters*: HW 0.33–0.43 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 5 pairs of long, fine and pointed setae. Dorsal setae 0.085–0.155 mm long. ANT 0.45–0.58 × BL. ANT IV always shorter than ANT V with 1 secondary rhinarium. ANT V longer than ANT VI. PT 0.13–0.20 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.47–0.69, V:III 0.65–0.83, IV:III 0.60–0.74. ANT with medium–sized or long, fine, hair–like and pointed setae, longer than diameter of segments. LS III 3.40–5.40 × BD III. ANT III with 12–17 setae, ANT IV with 5–9 setae, ANT V with 9–10 setae, ANT VI with 5–6 basal setae. Rostrum reaching middle coxae. URS 0.20–0.25 × ANT III, 0.36–0.43 × ANT VI and 0.38–0.42 × HT II. Outer side of hind legs covered by long, fine hair–like and pointed setae, longer than width of tibiae, on femora

0.150–0.160 mm long, on tibiae 0.110–0.160 mm long. Hind tibiae with 38–60 rounded and irregular pseudosensoria, located from distal part to about ¾ of length of tibiae (Fig. 38c). Basal length of HT I 0.22–0.35 × dorsal, 0.16–0.26 × ventral and 0.50–0.87 × intersegmental length, with 12 ventral setae. HT II 0.51–0.67 × ANT III and 0.84–1.07 × ANT VI. Dorsal setae long, fine, hair–like and pointed—on pronotum 0.050–0.160 mm long, mesonotum 0.060–0.170 mm long, metanotum 0.080–0.160 mm long; on abdomen—ABD I–VI 0.070–0.180 mm long, ABD VII–VIII 0.100–0.170 mm long. Abdomen with 2–4 scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI.

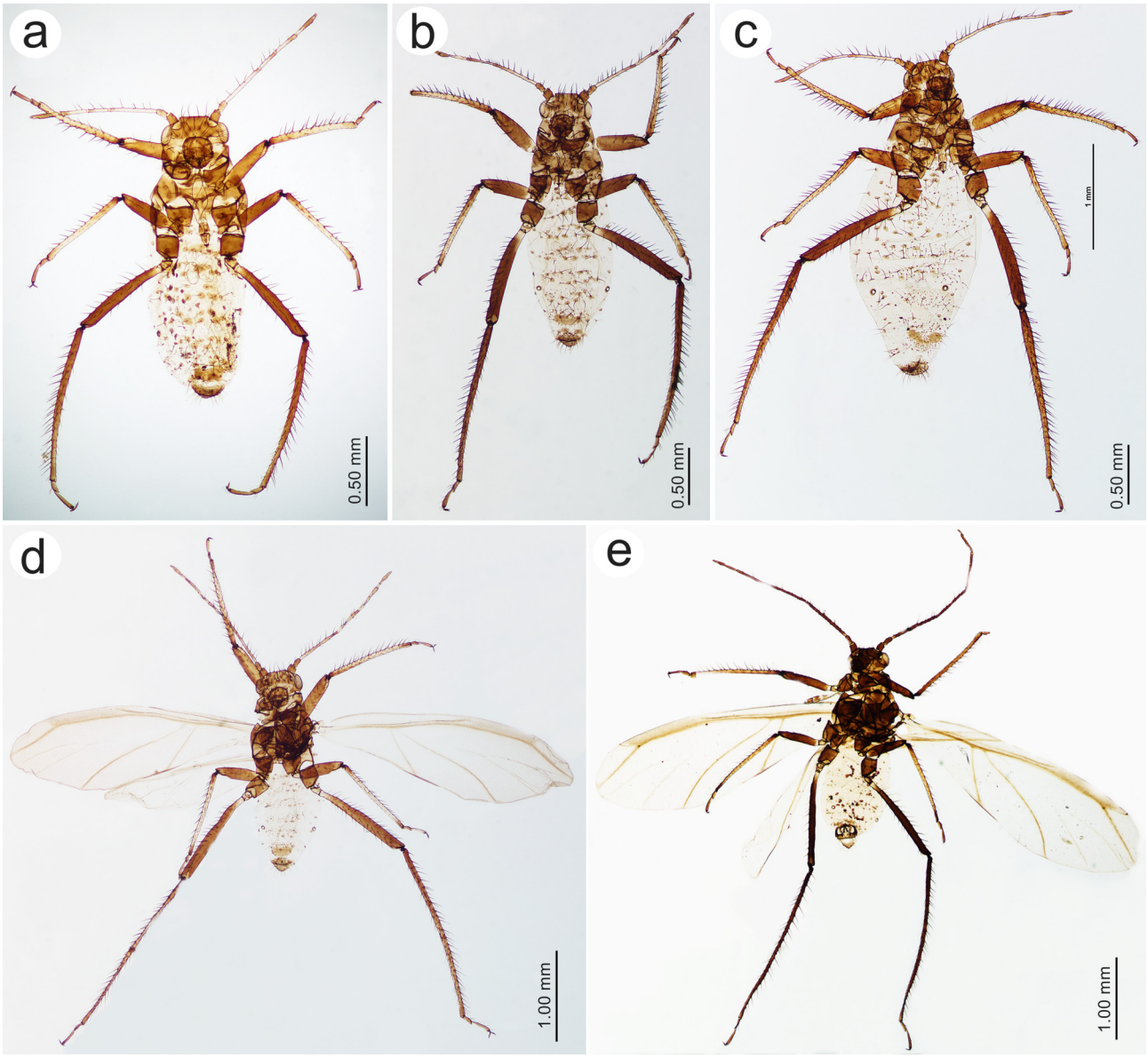

FIGURE 36. *Eulachnus rileyi*: (**a**) fundatrix, (**b**) apterous viviparous female; (**c**) oviparous female; (**d**) alate viviparous female; (**d**) alate male.

Alate male (Figs 35, 36, 39; Table 5)—redescription (based on 15 specimens). *Colour*. In life: brown, covered by grey wax powder. ANT brown. Fore wings transparent. Femora and hind tibiae dark brown. Fore and middle tibiae yellowish with distal and proximal parts brown (Fig. 35e). In mounted specimens: head and thorax sclerotized, dark brown. ANT uniformly brown. Femora brown. Fore and middle tibiae yellowish with distal and proximal parts brown. Hind tibiae uniformly dark or light brown. Tarsi brown. Wings yellowish with veins brown and pterostigma light brown. Abdomen pale with scleroites brown to dark brown (Fig. 36e). Genitalia dark brown (Fig. 39d, e). *Morphometric characters*: HW 0.24–0.27 × ANT. Head chaetotaxy: dorsal side with 5–6 pairs, ventral side with 5 pairs of long, fine, hair–like and pointed setae. Dorsal setae 0.080–0.130 mm long. ANT (Fig.

39a) 0.84–0.96 × BL. ANT III (Fig. 39b) with 65–76 secondary rhinaria, ANT IV shorter than ANT V, with 26–32 secondary rhinaria, ANT V longer than ANT VI, with17–23 secondary rhinaria; ANT VI with 4–5 accessory rhinaria and 2–4 secondary rhinaria (Fig. 39c). PT 0.17–0.25 × BASE, other antennal ratios: VI:III 0.42–0.47, V:III 0.63–0.70, IV:III 0.56–0.73. ANT III with 18–21 setae, ANT IV with 8–13 setae, ANT V with 8–13 setae, ANT VI with 6–7 basal setae. ANT with medium sized to long, rigid and pointed setae. LS III 3.40–4.75 × BD III. Rostrum reaching mesosternum. URS 0.14–0.16 × ANT III, 0.31–0.38 × ANT VI and 0.39–0.42 × HT II. Outer side of hind legs covered by long, rigid and pointed setae, longer than width of tibiae, on femora 0.110–0.150 mm long, on tibiae 0.130–0.160 mm long. Basal length of HT I 0.25–0.26 × dorsal, 0.17–0.19 × ventral and 0.55–0.77 × intersegmental length, with 14 ventral setae. HT II 0.36–0.40 × ANT III and 0.78–0.90 ANT VI. Dorsal setae long, fine and pointed—on pronotum 0.080–0.160 mm long; on abdomen—ABD I–VI 0.110–0.165 mm long, ABD VII–VIII 0.130–0.150 mm long. Abdomen with two scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI. Ventral side of ABD VI–VII with spinal or spino–pleural cross–bars.

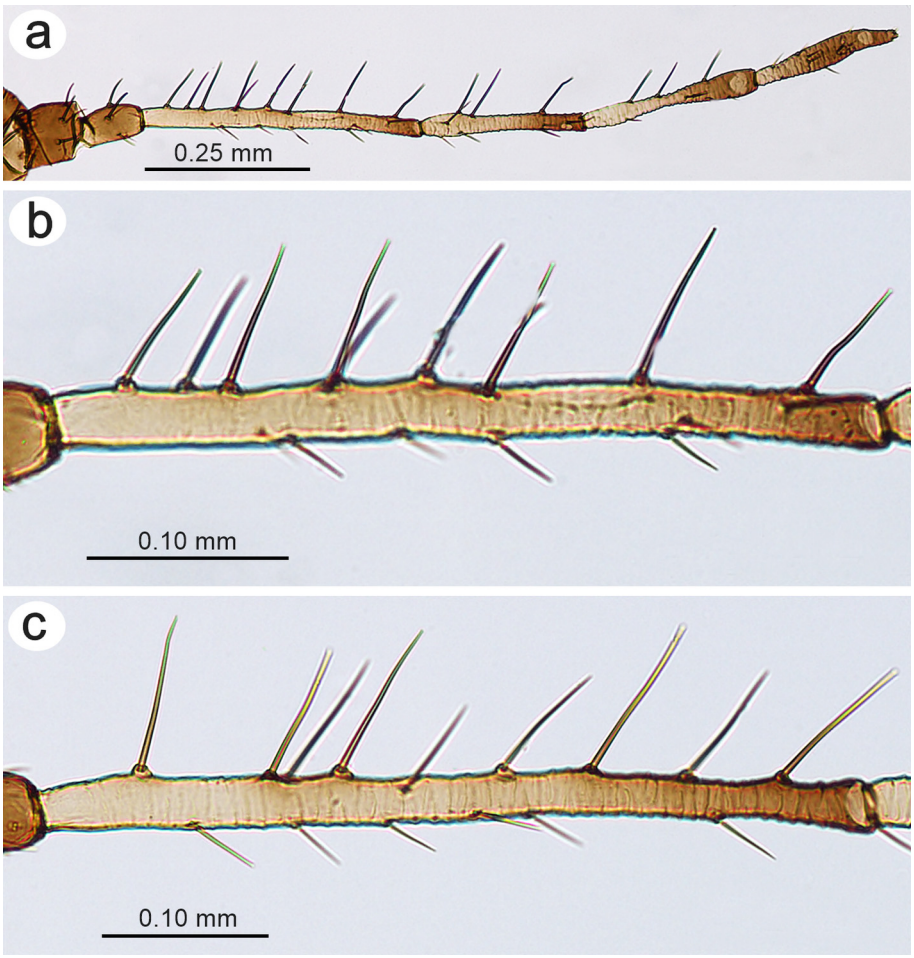

FIGURE 37. *Eulachnus rileyi* (**a**) ANT of apterous viviparous female; (**b**) ANT III chaetotaxy of apterous viviparous female; (**c**) ANT III chaetotaxy of alate viviparous female.

Diagnosis. This species, like *E. intermedius*, is characterized by the longest dorsal setae on thorax and abdomen (up to 0.150 mm). From *E. agilis* it could be distinguished by uniformly brown pigmented femora and separated dorsal scleroites. From *E. intermedius* it could be distinguished by hair–like and longer dorsal setae on ABD I–VI.

Distribution. Very common throughout Europe. This species is the most common *Eulachnus* member in the world, known from: Nearctic (Mexico, USA), Neotropical (Argentina, Brazil, Chile, Colombia, Jamaica, Venezuela), Near East (Iran, Iraq, Israel, Turkey), Africa (Democratic Republic of Congo, Kenya, Malawi, South Africa, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe).

Host plants. This species was recorded from many Pines in many countries in the world. In Europe, the most common host plant for *E. rileyi* is *P. nigra*. Also, recorded from *P. banksiana*, *P. brutia*, *P. canariensis*, *P. cembra*,

P. cembroides, *P. contorta*, *P. devoniana*, *P. douglasiana*, *P. echinata*, *P. elliottii*, *P. glabra*, *P. halepensis*, *P. heldreichii*, *P. massoniana*, *P. montezumae*, *P. mugo*, *P. palustris*, *P. patula*, *P. peuce*, *P. pinaster*, *P. pinea*, *P. ponderosa*, *P. radiata*, *P. resionosa*, *P. rigida*, *P.* x *rotundata*, *P. strobus*, *P. sylvestris*, *P. taeda*, *P. taivanensis*, *P. thunbergi*, *P. virginiana, P. wallichiana*. This species is regarded as a serious pine pest in Africa.

Type material examined. As no holotype was designated in the original description, according to the the International Code of Zoological Nomenclature, the lectotype of *E. rileyi* is here designated from the Syntypes.

LECTOTYPE: USA: Lancaster (Nebraska), 04.10.1888, 1 apterous viviparous female, *P. sylvestris*, Williams leg., USDA, 00399893 (present designation); PARALECTOTYPE: USA: Lancaster (Nebraska), 04.10.1888, 1 alate viviparous female, *P. sylvestris*, Williams leg., USDA, 00399894 (present designation).

As *E. bluncki*: SYNTYPES: AUSTRIA: Bad Fischau 05.08.1939, 3 apterous, 3 alate viviparous females, *P. austriaca* (=*P. nigra*), name of the collector not reported, SDEI, 1/15.

As *E. tauricus*: HOLOTYPE: UKRAINE: Jaltensk, 14.06.1956, 1 apterous viviparous female, *Pinus* sp., M. Bozhko leg., ZIUAS, N24; PARATYPES: Jaltensk, 14.06.1956, 3 apterous viviparous females, *Pinus* sp., M. Bozhko leg., ZIUAS, N24.

FIGURE 38. *Eulachnus rileyi* hind tibiae: (**a**) apterous viviparous female; (**b**) alate viviparous female; (**c**) oviparous female.

Eulachnus stekolshchikovi **Kanturski sp. nov.**

Fundatrix (Fig. 40; Table 1)—description (based on one specimen). *Colour*. In life: green. In mounted specimens: head and thorax yellow with scleroites at setal bases brown. ANT yellowish with paler basal parts and light brown apices of segments. Abdomen with scleroites at setal bases light brown. Body setae brown (Fig. 40a). *Morphometric characters*: HW 0.50–0.51 × ANT. Head chaetotaxy: dorsal side with 6 pairs; ventral side with 5 pairs of average length, thick and blunt setae. Dorsal setae 0.025–0.050 mm long. ANT 0.41–0.42 × BL. ANT IV shorter than ANT V. ANT V shorter than ANT VI. PT 0.13–0.14 × BASE, with 7–6 accessory rhinaria. Other antennal ratios: VI:III 0.69–0.70, V:III 0.54–0.60, IV:III 0.43–0.45. ANT III with 5–7 setae, ANT IV with 3 setae, ANT V with 6–7 setae, ANT VI with 4–5 basal setae. ANT setae short, rigid and blunt, slightly longer than diameter of segments. LS III 1.50–1.75 × BD III. Rostrum reaching between fore and middle coxae. URS about 0.34 × ANT III, about 0.50 × ANT VI and about 0.42 × HT II. Outer side of hind legs covered by rigid and blunt

setae, longer than width of tibiae, on femora 0.020–0.035 mm long, on tibiae 0.025–0.055 mm long. Basal length of HT I about 0.45 × dorsal, about 0.29 × ventral and about 0.71 × intersegmental length, with 8 ventral setae. HT II about 0.82 × ANT III and about 1.18 × ANT VI. Dorsal setae short—on pronotum 0.025–0.030 mm long, on mesonotum 0.020–0.030 mm long, on metanotum 0.020–0.025 mm long; on abdomen—ABD I–VI 0.025–0.035 mm long, ABD VII–VIII 0.025–0.055 mm long and blunt. Dorsal side of abdomen with two scleroites on anterior and 4–8 scleroites on posterior part of ABD I–VI.

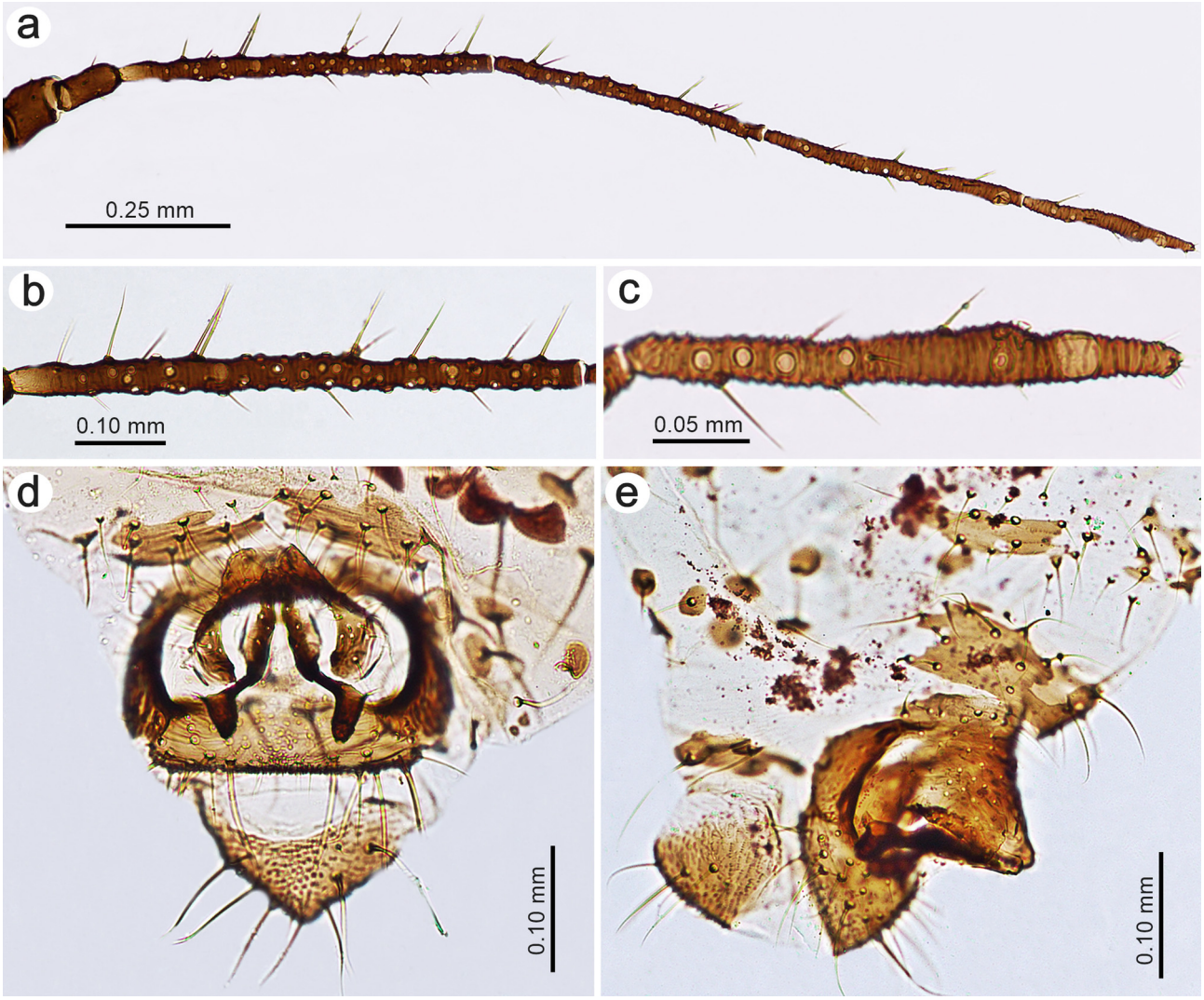

FIGURE 39. *Eulachnus rileyi* male: (**a**) ANT, (**b**) ANT III, (**c**) ANT VI, (**d**, **e**) genitalia.

Remarks. This morph differs from the apterous viviparous female by having shorter ANT (less than 1.00 mm long) and lower ratio of PT:BASE (0.13–0.14).

Apterous viviparous female (Figs 40, 41, 46f; Table 2)—description (based on 11 specimens). *Colour*. In life: unknown. In mounted specimens: head and thorax yellow with scleroites at setal bases light brown, abdomen pale with scleroites at setal bases light brown. ANT yellowish with ANT I–II light brown and apices of ANT III–VI light brown. Legs yellow. Body setae dark (Fig. 40b). *Morphometric characters*: HW 0.40–0.41 × ANT. Head chaetotaxy: dorsal side with 5 pairs of thick and slightly blunt setae; ventral side with 5 pairs of thick, rigid and blunt setae. Dorsal setae 0.04–0.08 mm long. ANT (Fig. 41a) 0.58–0.59 × BL. ANT IV as long as or slightly shorter than ANT V. ANT V longer than ANT VI. PT 0.18–0.20 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.66–0.69, V:III 0.70–0.80, IV:III 0.70–0.71. ANT III (Fig. 41b) with 11–13 setae, ANT IV with 7–10 setae, ANT V with 7 setae, ANT VI with 6–7 basal setae. ANT setae medium–sized, rigid and blunt, longer than diameter of segments. LS III 2.36–3.00 × BD III. Rostrum reaching middle coxae. URS 0.25–0.26 × ANT III, 0.38–0.39 × ANT VI and 0.32–0.33 × HT II. Outer side of hind legs covered by rigid and blunt setae, as

long as or longer than width of tibiae (Fig. 41e), on femora 0.020–0.025 mm long, on tibiae 0.065–0.070 mm long. Basal length of HT I 0.27–0.28 × dorsal, 0.20–0.21 × ventral and 0.67–0.73 × intersegmental length, with 10 ventral setae. HT II 0.80–0.81 × ANT III and 1.15–1.21 ANT VI. Dorsal setae short and blunt—on pronotum 0.02–0.06 mm long, mesonotum 0.01–0.06 mm long, metanotum 0.01–0.05 mm long; on abdomen—ABD I–VI 0.02–0.03 mm long, ABD VII–VIII 0.040–0.050 mm long. Abdomen with two scleroites on anterior part of ABD I–V, three scleroites on ABDVI–VIII and 6–8 scleroites on posterior part of ABD I–VI (Fig. 46f).

Alate viviparous female (Figs 40, 41; Table 3)—description (based on three specimens). *Colour*. In life: unknown. In mounted specimens: head yellow with scleroites at setal bases brown. ANT yellowish with ANT I–II brown and apices of ANT III–VI light brown. Thorax brown. Fore wings yellow with slightly darker pterostigma and edges of wing. Hind wings pale. Legs in general yellowish–light brown. Anterior and posterior parts of tibiae slightly darker. Abdomen pale or yellowish with dorsal scleroites brown. Body setae brown (Fig. 40c). *Morphometric characters*: HW 0.32–0.34 × ANT. Head chaetotaxy: dorsal side with 5 pairs of long, fine and slightly blunt setae; ventral side with 5 pairs of thick and slightly blunt setae. Dorsal setae 0.070–0.100 mm long. ANT (Fig. 41c) 0.57–0.58 × BL. ANT IV as long as or slightly shorter than ANT V with 0–1 secondary rhinarium. ANT V longer than ANT VI. PT 0.15–0.16 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.50–0.55, V:III 0.61–0.66, IV:III 0.59–0.63. ANT III (Fig. 41d) with 15–16, ANT IV with 8–9, ANT V with 8–10 setae, ANT VI with 6 basal setae. ANT setae medium–sized, rigid and slightly blunt, longer than diameter of segments. LS III 2.48–3.27 × BD III. Rostrum reaching mesosternum. URS 0.19–0.21 × ANT III, 0.38 × ANT VI and 0.32–0.35 × HT II. Outer side of hind legs covered by rigid and blunt or slightly blunt setae, longer than width of tibiae (Fig. 41f), on femora 0.02–0.22 mm long, on tibiae 0.045–0.55 mm long. Basal length of HT I 0.25–0.27 × dorsal, 0.19 × ventral and 0.59–0.67 × intersegmental length, with 10 ventral setae. HT II 0.60–0.61 × ANT III and 1.10–1.20 × ANT VI. Dorsal setae fine and pointed—on pronotum 0.030–0.100 mm long, on abdomen—ABD I–VI 0.04–0.07 mm long, ABD VII–VIII 0.05–0.07 mm long. Abdomen with two scleroites on anterior and two scleroites on posterior part of ABD I–VI.

Diagnosis. The new species resembles *E. mediterraneus* in having very short dorsal thoracic (*E. stekolshchikovi* **sp. nov**. 0.015–0.050 mm long and *E. mediterraneus* 0.017–0.060 mm long) and abdominal (*E. stekolshchikovi* **sp. nov**. 0.020–0.0550 mm long and *E. mediterraneus* 0.020–0.090 mm long) setae. Both species differing in these characters from *E. agilis* (thoracic setae 0.055–0.130 mm long and abdominal setae 0.050–0.150 mm long).

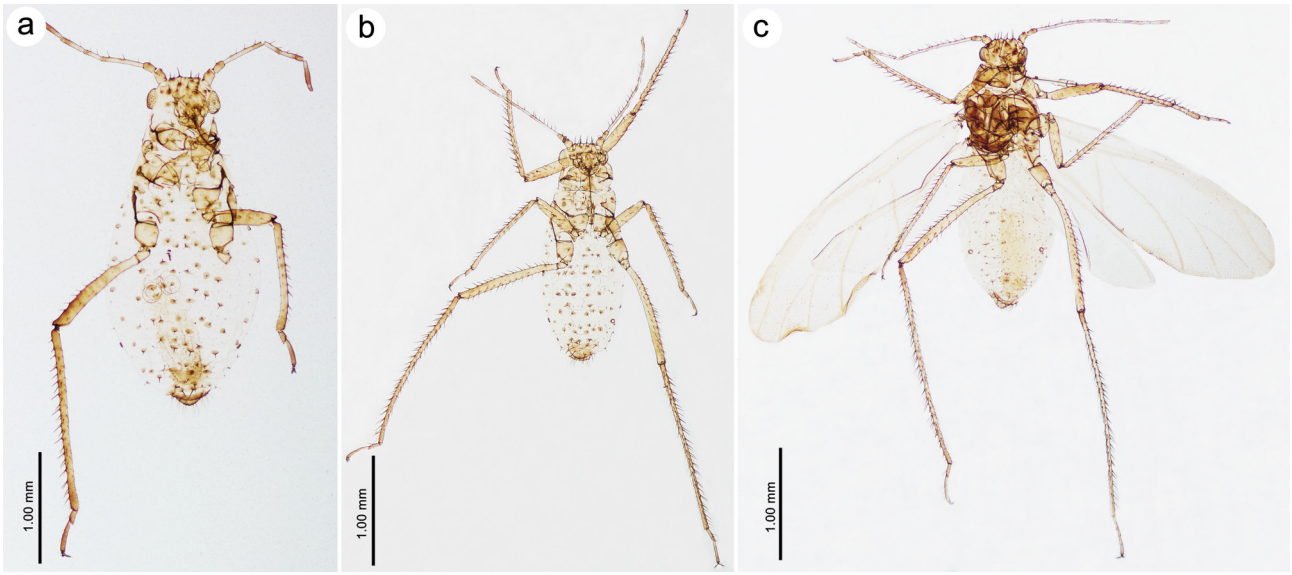

FIGURE 40. *Eulachnus stekolshchikovi* **sp. nov**.: (**a**) fundatrix; (**b**) apterous viviparous female; (**c**) alate viviparous female.

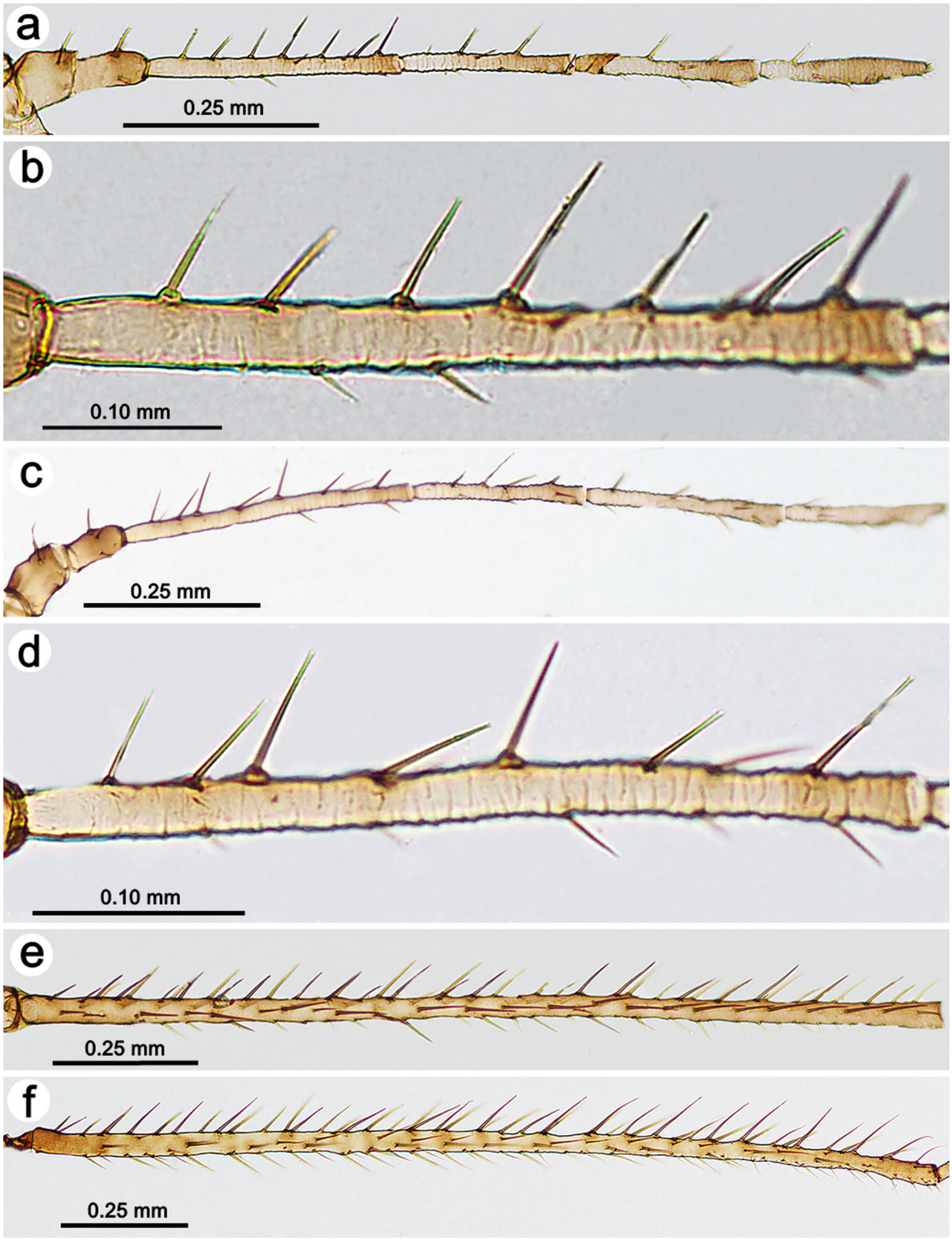

FIGURE 41. *Eulachnus stekolshchikovi* **sp. nov.**: (**a**) ANT of apterous viviparous female; (**b**) ANT III of apterous viviparous female (**c**) ANT of alate viviparous female, (**d**) ANT III chaetotaxy of alate viviparous female, (**e**) hind tibia of apterous viviparous female, (**f**) hind tibia of alate viviparous female.

Apterous viviparous females of the new species can be distinguished from *E. mediterraneus* (*E. m*) by:

- higher ratio of ANT VI: ANT III 0.66–0.69 (0.47–0.55 in *E. m*)
- higher ratio of URS: ANT III 0.25–0.26 (0.20–0.23 in *E. m*)
- higher ratio of HT II: ANT III 0.80–0.81 (0.57–0.67 in *E. m*)

Alate viviparous females of the new species can be distinguished by:

- higher ratio of PT: BASE 0.15–0.16 (0.11–0.12 in *E. m*)
- higher ratio of URS: ANT III 0.19–0.21 (0.15–0.18 in *E. m*)
- lower ratio of HT I basal length: HT I intersegmental length 2.38–2.50 (0.55–0.60 in *E. m*)

Etymology. I have the pleasure of naming the new species to honour my colleague Dr. Andrey Valer'evich Stekolshchikov, an aphid specialist at ZMAS, St. Petersburg, Russia, who was also a collector of the new species.

Host plants. *P. sylvestris* (Russia), *P. nigra* (United Kingdom).

Distribution. Russia (Murmansk Oblast), United Kingdom (Scotland).

Type material examined. HOLOTYPE: RUSSIA: Murmanskaya Obl., Laplandsky zap. Chun–Ozyerskaya usadba., 08.07.2005, 1 apterous viviparous female, *P. sylvestris*, A. Stekolshchikov leg., ZMAS, 9949; PARATYPES: RUSSIA: Murmanskaja Obl., Laplandskij zap. Kordon Pus., 08.07.2005, 1 apterous viviparous female, *P. sylvestris*, A. Stekolshchikov leg., ZMAS, 9475; Murmanskaya Obl., Laplandsky zap. Chun–Ozyerskaya usadba., 08.07.2005, 2 alate viviparous females, *P. sylvestris*, A. Stekolshchikov leg., ZMAS, 9949. PARATYPES: UNITED KINGDOM: Glen Festie, Inverness–shire (Scotland), 07.06.1967, 1 fundatrix, 5 immatures, *P. sylvestris*, H.L.G.S. leg., BMNH, 82–492–Av/4; Green Tanar, Aberdeenshire (Scotland), 18.08.1971, 3 apterous, 1 alate viviparous females, *P. sylvestris,* H.L.G.S. leg., UŚ, BR/226; Argyllshire (Scotland), 12.07.1974, 1 apterous viviparous female, 2 immatures, *Pinus sylvestris*, H.L.G.S. leg., BMNH, 82–492–OB/119; 2 apterous viviparous females (together with 1 apterous viviparous female of *E. brevipilosus*), *P. nigra*, H.L.G.S. leg., BMNH, 82–492–OB/116; Glen Liubeg, Caimgorms (Scotland), 19.07.1970, 2 apterous viviparous females, 2 immatures, *P. sylvestris*, R.C. Welch leg., BMNH, 82–492–BR/98; Kinlochleven, (Scotland), 15.09.1977, 1 apterous viviparous female, 2 immatures, *P. sylvestris*, J.H. Martin leg., BMNH, 168.630.

Eulachnus tuberculostemmatus (Theobald, 1915)

Protolachnus tuberculostemmata Theobald, 1915: 145
Eulachnus pallidus Mamontova, 1972: 69, **syn. nov.**

Fundatrix (Figs 42, 44; Table 1)—description (based on four specimens). *Colour*. In life: unknown. In mounted specimens: head light yellow with scleroites at setal bases light brown. ANT light brown with paler basal parts of ANT III–VI. Thorax and legs yellow. Abdomen with scleroites at setal bases light brown. Body setae from yellow to brown (Fig. 42a). *Morphometric characters*: HW 0.41–0.47 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 7 pairs of long, thick and blunt setae. Dorsal setae 0.035–0.095 mm long. ANT 0.46–0.52 × BL. ANT IV always shorter than ANT V with 0–1 secondary rhinarium. ANT V shorter than ANT VI. PT 0.16–0.20 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI: III 0.60–0.66, V:III 0.62–0.63, IV:III 0.51–0.56. ANT III with 11–13 setae, ANT IV with 6–9 setae, ANT V with 7–9 setae, ANT VI with 5–6 basal setae. ANT setae short to medium–sized, rigid and blunt, longer than diameter of segments. LS III 1.45–1.68 × BD III. Rostrum reaching middle coxae. URS 0.24–0.25 × ANT III, 0.37–0.40 × ANT VI and 0.37–0.40 × HT II. Hind tibiae slightly thickened with 1–5 small, oval pseudosensoria in about half of length (Fig. 44a). Tibiae outside covered by long, rigid and blunt setae, longer than width of tibiae, on femora 0.030–0.037 mm long, on tibiae about 0.075 mm long. Basal length of HT I 0.33–0.40 × dorsal, 0.23–0.27 × ventral and 0.71–0.75 × intersegmental length, with 10 ventral setae. HT II 0.63–0.64 × ANT III and 0.95–1.05 × ANT VI. Dorsal setae short—on pronotum 0.015–0.090 mm long, mesonotum 0.020–0.032 mm long, metanotum 0.012–0.035 mm long, pointed; on abdomen—ABD I–VI 0.017–0.037 mm long and pointed, ABD VII–VIII 0.027–0.075 mm long and blunt. Dorsal side of abdomen with 2 scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI.

Remarks. This morph differs from the apterous viviparous female by having pseudosensoria on hind tibiae and longer setae on head and tibiae.

Apterous viviparous female (Figs 42–44; Table 2)—redescription (based on 37 specimens). *Colour*. In life: head, thorax and abdomen light green with dorsal scleroites at setal bases light brown. ANT dark brown, almost black. Legs pale greenish–brown (from specimens collected in Greece and Tajikistan). In mounted specimens: head light yellow with scleroites at setal bases light brown. ANT light yellow with apices of ANT III–VI light

brown. Thorax and legs yellow. Abdominal scleroites at setal bases light brown. Body setae from yellow to brown (Fig. 42b). *Morphometric characters*: HW 0.39–0.45 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 6 pairs of long, thick, rigid and blunt setae. Dorsal setae 0.017–0.085 mm long. ANT (Fig. 43a) 0.45–0.58 × BL. ANT IV always shorter than ANT V. ANT V as long as or longer than ANT VI. PT 0.17–0.24 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI: III 0.54–0.71, V:III 0.56–0.69, IV:III 0.43–0.58. ANT III (Fig. 43b) with 10–15 setae, ANT IV with 4–9 setae, ANT V with 7–10 setae, ANT VI with 5–6 basal setae. ANT setae short, rigid and blunt, slightly longer than diameter of segments. LS III 0.90–1.75 × BD III. Rostrum reaching middle coxae. URS 0.22–0.26 × ANT III, 0.37–0.42 × ANT VI and 0.35–0.39 × HT II. Outer side of hind legs covered by short and long, rigid and blunt setae, shorter or longer than the width of tibiae (Fig. 44b), on femora 0.017–0.017 mm long, on tibiae 0.045–0.085 mm long. Basal length of HT I 0.26–0.38 × dorsal, 0.18–0.27 × ventral and 0.50–0.72 × intersegmental length, with 10 ventral setae. HT II 0.60–0.69 × ANT III and 0.97–1.12 × ANT VI. Dorsal setae short, pointed or blunt—on pronotum 0.017–0.045 mm long, mesonotum 0.012–0.037 mm long, metanotum 0.010–0.027 mm long; on abdomen—ABD I–VI 0.010–0.032 mm long, ABD VII–VIII 0.017–0.10 mm long. Abdomen with two scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI (Fig. 46h).

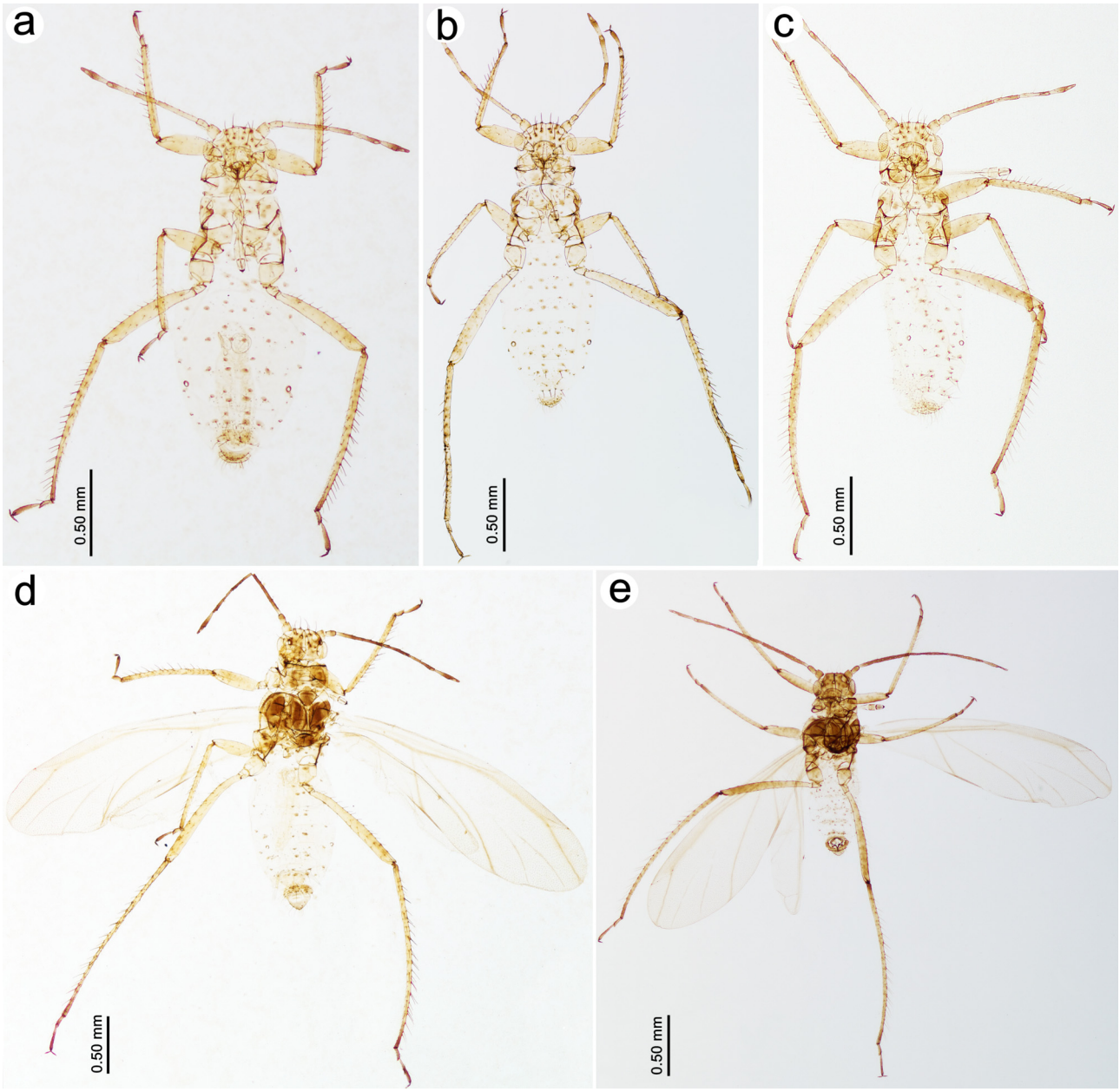

FIGURE 42. *Eulachnus tuberculostemmatus*: (**a**) fundatrix, (**b**) apterous viviparous female; (**c**) oviparous female; (**d**) alate viviparous female; (**e**) alate male.

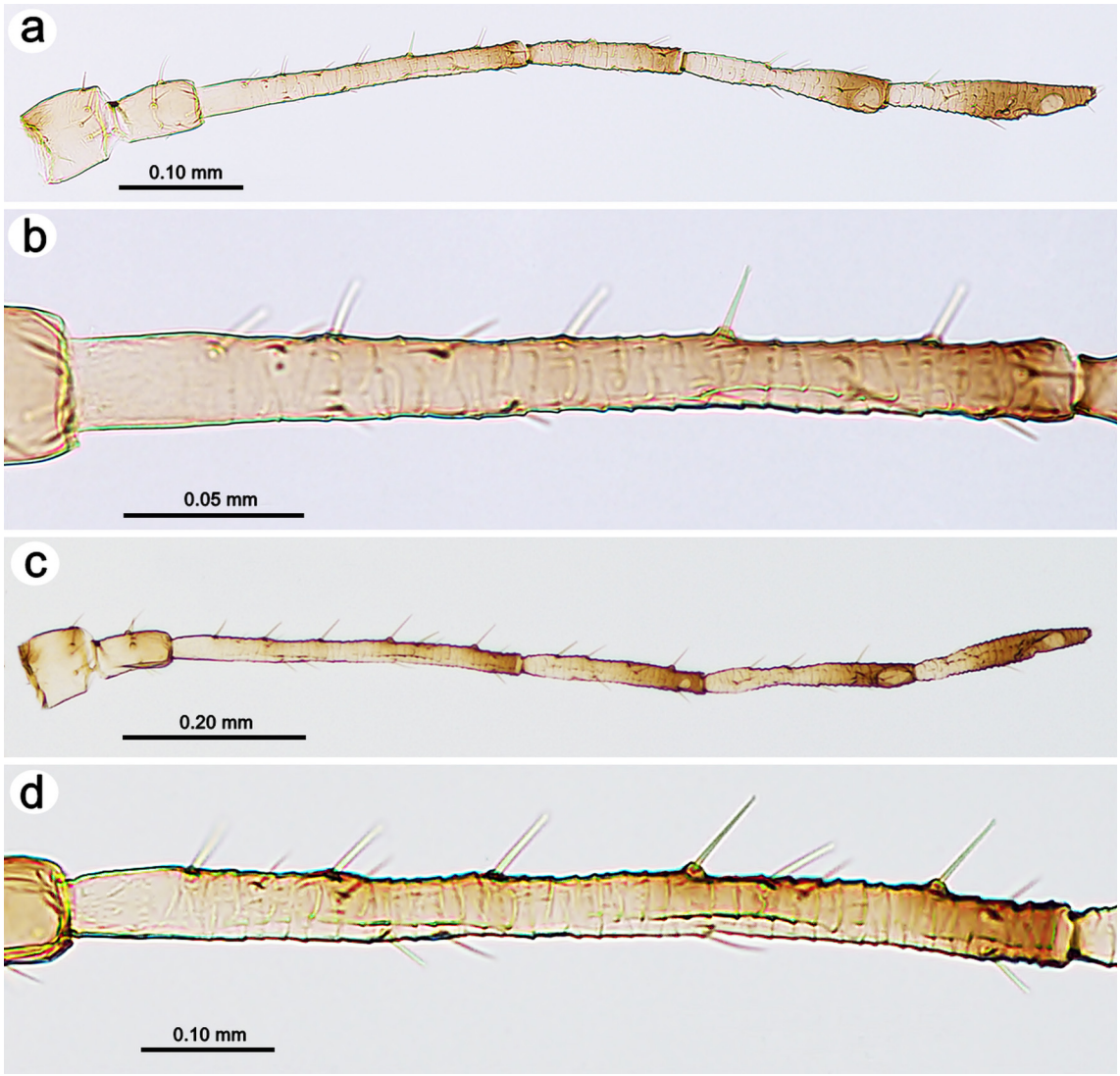

FIGURE 43. *Eulachnus tuberculostemmatus* apterous viviparous female: (**a**) ANT (**b**) ANT III chaetotaxy; alate viviparous female: (**c**) ANT; (**d**) ANT III chaetotaxy.

Alate viviparous female (Figs 42–44; Table 3)—redescription (based on 30 specimens). *Colour*. In life: head antennae and pronotum light green to brown with scleroites at setal bases brown. Meso and metanotum light brown. Legs light green with darker spots at setal bases. Tarsi brown. Abdomen light green with brown scleroites at setal bases (based on specimens collected in Greece). In mounted specimens: head and pronotum yellow with scleroites at setal bases brown. ANT brown with basal parts of ANT I–VI slightly paler. Meso and metanotum brown. Fore wings yellowish with slightly darker pterostigma and veins light brown. Hind wings pale. Legs yellow with tarsi brown. Abdomen pale or yellowish with dorsal scleroites light brown. Body setae yellow to brown (Fig. 42d). *Morphometric characters*: HW 0.33–0.40 × ANT. Head chaetotaxy: dorsal side with 6 pairs; ventral side with 5 pairs of long, thick and blunt setae. Dorsal setae 0.040–0.100 mm long. ANT (Fig. 42c) 0.50–0.67 × BL. ANT IV always shorter than ANT V, always with 1 secondary rhinarium. ANT V as long as but mostly longer than ANT VI. PT 0.13–0.25 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.46–0.61, V:III 0.54–0.63, IV:III 0.34–0.60. ANT III (Fig. 42d) with 8–18 setae, ANT IV with 5–9 setae, ANT V with 4–9 setae, ANT VI with 5–6 basal setae. ANT setae medium–sized or long, rigid and blunt, longer than diameter of segments. LS III 1.25–1.90 × BD III. Rostrum reaching mesosternum. URS 0.18–0.23 × ANT III, 0.35–0.43 × ANT VI and 0.35–0.40 × HT II. Outer side of hind legs covered by long, rigid and blunt setae, longer than the width of tibiae (Fig. 44c), on femora 0.030–0.060 mm long, on tibiae, 0.08–0.11 mm long. Basal length of HT I 0.29–0.38 × dorsal, 0.22–0.27 × ventral and 0.57–0.85 × intersegmental length, with 10 ventral setae. HT II 0.50–0.63 × ANT III and 0.96–1.08 × ANT VI. Dorsal setae long, fine and pointed—on pronotum 0.035–0.090 mm long; on

abdomen—ABD I–VI 0.017–0.065 mm long, ABD VII–VIII 0.030–0.100 mm long. Abdomen with two scleroites on anterior and two scleroites on posterior part of ABD I–VI.

Oviparous female (Figs 42, 44; Table 4)—redescription (based on eight specimens). *Colour*. In life: unknown. In mounted specimens: head light yellow with scleroites at setal bases light brown. ANT light yellow with apices of ANT III–VI light brown. Thorax and legs yellow with hind tibiae slightly darker. Abdomen membranous and transparent with scleroites at setal bases light brown. Body setae from yellow to brown (Fig. 42c). *Morphometric characters*: HW 0.38–0.42 × ANT. Head chaetotaxy: dorsal side with 5 pairs; ventral side with 6 pairs of long fine and almost pointed setae. Dorsal setae 0.035–0.097 mm long. ANT 0.42–0.64 × BL. ANT IV always shorter than ANT V, with 1 secondary rhinarium. ANT V as long as or longer than ANT VI. PT 0.18–0.22 × BASE, with 4–5 accessory rhinaria. Other antennal ratios: VI:III 0.56–0.65, V:III 0.59–0.68, IV:III 0.53–0.62. ANT setae medium–sized, rigid and blunt, longer than diameter of segments. LS III 1.18–1.81 × BD III. ANT III with 13–15 setae, ANT IV with 7–9 setae, ANT V with 8–1 setae, ANT VI with 6 basal setae. Rostrum reaching hind coxae. URS 0.23–0.25 × ANT III, 0.39–0.41 × ANT VI and 0.37–0.40 × HT II. Outer side of hind legs covered by long, rigid and blunt setae, longer than width of tibiae, on femora 0.025–0.055 mm long, on tibiae 0.010–0.100 mm long. Hind tibiae with 25–65 oval or 8–shaped pseudosensoria, located on almost whole length and surface of tibiae (Fig. 44d). Basal length of HT I 0.27–0.38 × dorsal, 0.20–0.25 × ventral and 0.60–0.67 × intersegmental length, with 10 ventral setae. HT II 0.58–0.67 × ANT III and 1.00–1.08 ANT VI. Dorsal setae short and medium sized, fine and pointed—on pronotum 0.015–0.065 mm long, mesonotum 0.012–0.052 mm long, metanotum 0.012–0.030 mm long; on abdomen—ABD I–VI 0.017–0.050 mm long and pointed, ABD VII–VIII 0.037–0.110 mm long and blunt. Abdomen with two scleroites on anterior and 4–6 scleroites on posterior part of ABD I–VI.

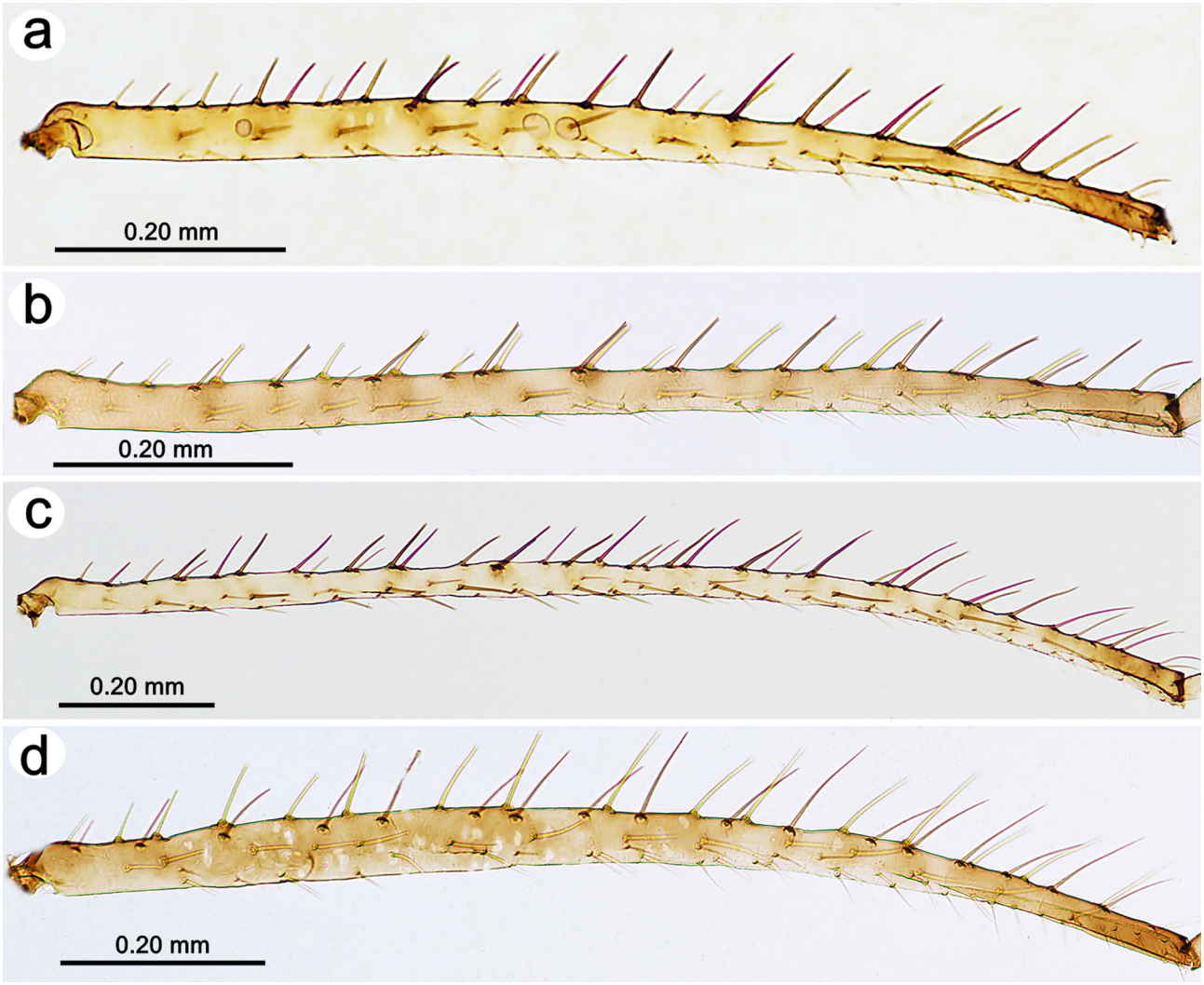

FIGURE 44. *Eulachnus tuberculostemmatus* hind tibiae: (**a**) fundatrix; (**b**) apterous viviparous female; (**c**) alate viviparous female; (**d**) oviparous female.

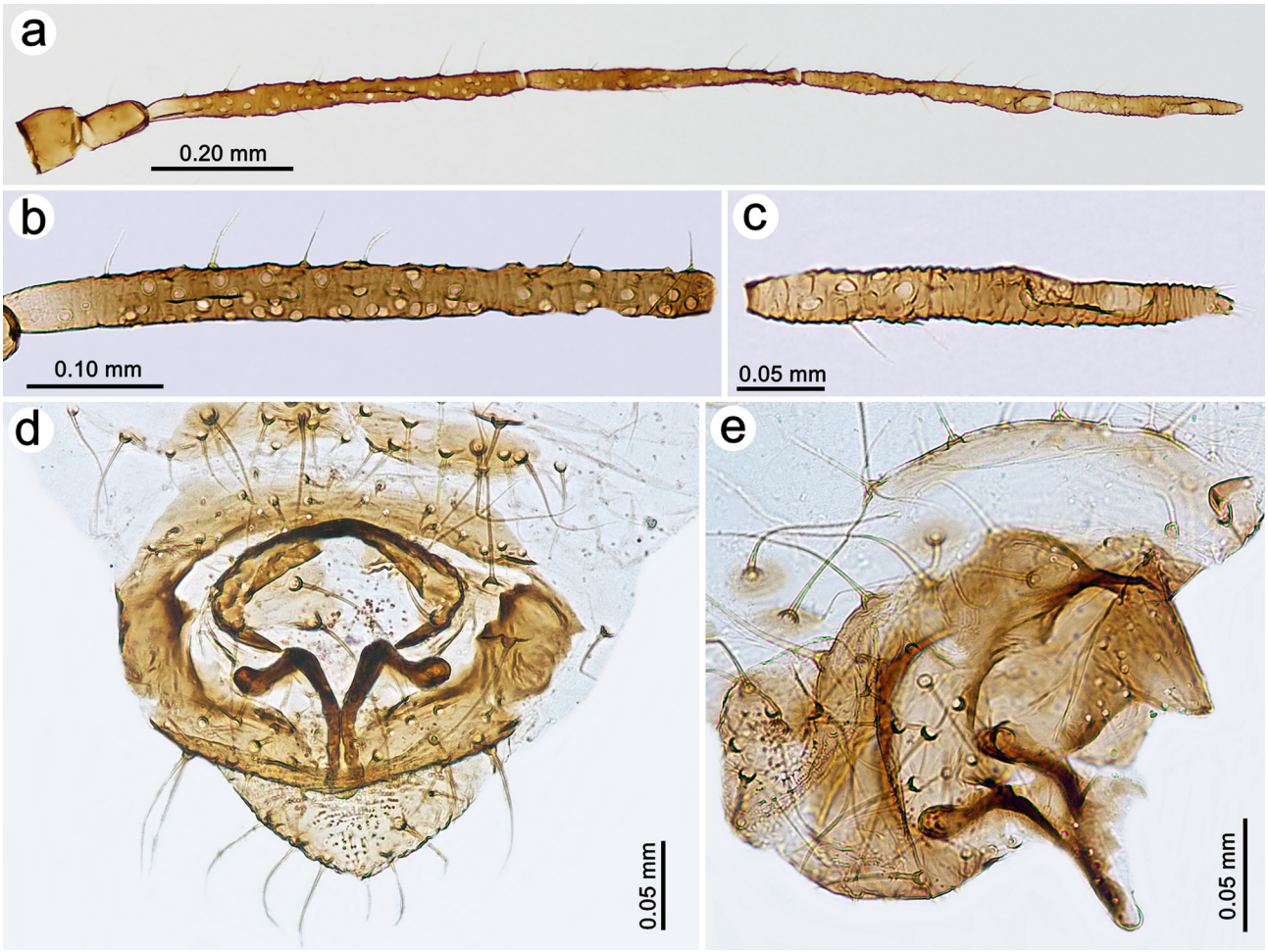

FIGURE 45. *Eulachnus tuberculostemmatus* male: (**a**) ANT, (**b**) ANT III, (**c**) ANT VI, (**d**, **e**) genitalia.

Alate male (Figs 42, 45; Table 5)—description (based on three specimens). *Colour*. In life: unknown; in mounted specimens: head and thorax sclerotized, brown. ANT light brown to brown with basal part of ANT III slightly lighter. Legs yellow to light brown. Wings yellowish with veins and pterostigma light brown. Abdomen membranous, pale with sclerites and scleroites light brown (Fig. 42e). Genitalia brown (Fig. 45d, e). *Morphometric characters*: HW 0.26–0.30 × ANT. Head chaetotaxy: dorsal side with 5, ventral side with 6 pairs of long, fine and pointed setae. Dorsal setae 0.080–0.110 mm long. ANT (Fig. 45a) 0.78–0.91 × BL. ANT III (Fig. 45b) with 51–52 secondary rhinaria, ANT IV shorter or longer than ANT V, with 23–29 secondary rhinaria, ANT V longer than ANT VI, with 18–19 secondary rhinaria; ANT VI with 5 accessory rhinaria and 4–6 secondary rhinaria (Fig. 45c). PT 0.19–0.25 × BASE, other antennal ratios: VI:III 0.45–0.64, V:III 0.62–0.78, IV:III 0.60–0.73. ANT III with 14–17 setae, ANT IV with 9 setae, ANT V with 11–12 setae, ANT VI with 5 basal setae. ANT setae long, fine, hair–like and pointed. LS III 1.40–2.50 × BD III. Rostrum reaching mesosternum. URS 0.14–0.19 × ANT III, 0.30–0.33 × ANT VI and 0.34–0.37 × HT II. Outer side of hind legs covered by long, fine and pointed setae, longer than width of tibiae, on femora 0.11–0.15 mm long, on tibiae 0.13–0.16. mm long. Basal length of HT I 0.26–0.33 × dorsal, 0.20–0.23 × ventral and 0.62 × intersegmental length, with 12 ventral setae. HT II 0.40–0.52 × ANT III and 0.81–0.88 × ANT VI. Dorsal setae long, fine and pointed—on pronotum 0.070–0.090 mm long, on abdomen—ABD I–VI 0.075–0.090 mm long, ABD VII–VIII 0.100–0.110 mm long. Abdomen with two scleroites on anterior and 2–4 scleroites on posterior part of ABD I–VI. Ventral side of ABD V–VIII with spinal or spino–pleural cross–bars.

Diagnosis. This species together with *E. garganicus* stat. nov. can be distinguished from other species with short setae on metanotum (*E. mediterraneus* and *E. stekolshchikovi* **sp. nov.**) by longest setae on metanotum 0.007–0.027 mm and longest setae on ABD I–VI not longer than 0.007–0.025 mm. From *E. garganicus* stat. nov. it can be distinguished by smaller body size (1.62–2.00) and higher ratio of ANT:BL (0.45–0.58).

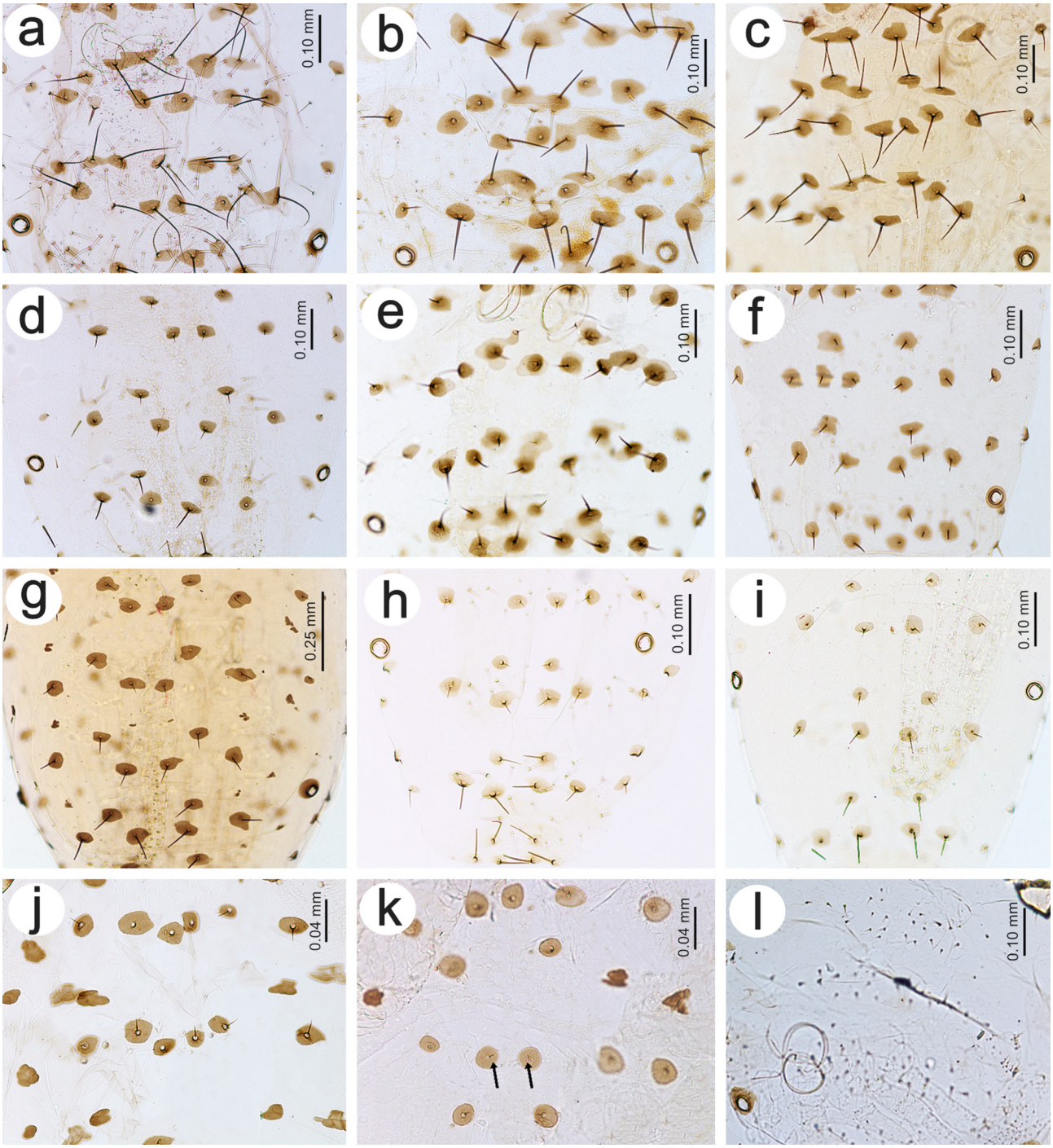

FIGURE 46. Dorsal abdominal sclerotization and chaetotaxy: (**a**) *E. rileyi*, (**b**) *E. agilis*, (**c**) *E. intermedius*, (**d**) *E. mediterraneus*, (**e**) *E. ibericus*, (**f**) *E. stekolshchikovi* sp. nov., (**g**) *E. alticola*, (**h**) *E. tubeculostemmatus*, (**i**) *E. garganicus*, (**j**) *E. nigricola*, (**k**) *E. brevipilosus* (arrows show the very short setae), (**l**) *E. cembrae*.

Distribution. In Europe the species is known from Mediterranean areas of: Croatia (**first record**, Cavtat, 26.04.1966, two fundatrices, 1 apterous, 4 alate viviparous females from *Pinus* sp., D. Hille Ris Lambers leg.), Greece, Italy, Portugal and Spain. Outside the continent it has been recorded from East Palaeractic (China), South Palaearctic (Pakistan) and Near East (Iran, Turkey) and Central Asia (Tajikistan).

Host plants. This species feeds most commonly on *Pinus brutia*, *P. halepensis* and *P. pinaster*. Also recorded from *P. canariensis*, *P. massoniana*, *P. nigra, P. pinea* and *P. yunnanensis*.

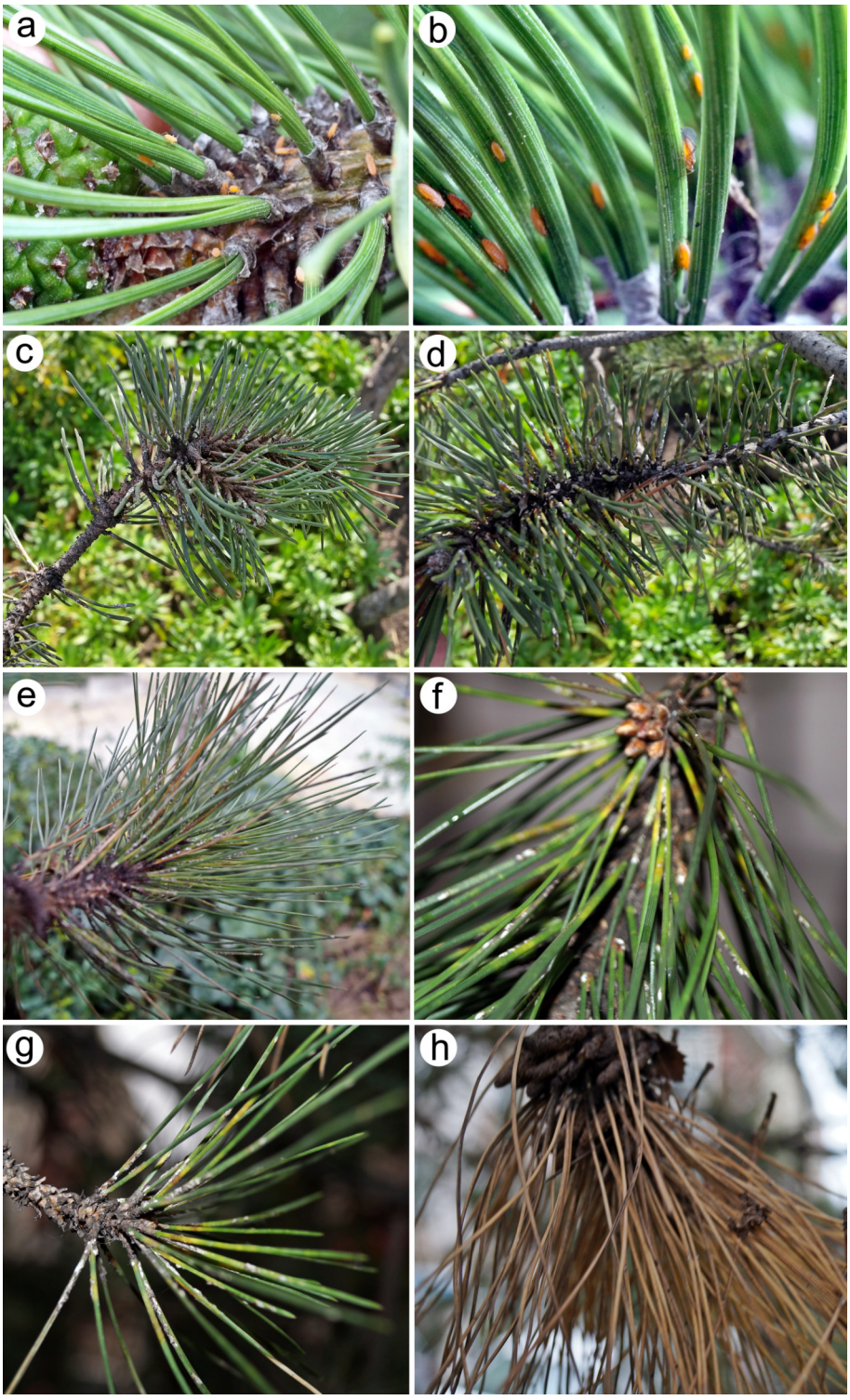

FIGURE 47. Injurious effects of some species of *Eulachnus* observed in Poland: (**a**, **b**) numerous apterous viviparous females and alatoid nymphs of *E. brevipilosus* on *Pinus sylvestris* in the spring, (**c**, **d**) the twigs of *P. sylvestris* in the autumn, (**e**, **f**) yellowing of needles of *P. nigra* after feeding by *E. rileyi* in the autumn, (**g**) yellowing of needles of *P. nigra* after feeding by *E. rileyi*, (**h**) the necrosis of earlier yellowed needles of *P. nigra*.

Type material examined. As no holotype was designated in the original description, according to the International Code of Zoological Nomenclature the lectotype of *E. tuberculostemmatus* is here designated from the Syntypes.

LECTOTYPE: EGYPT: Gizah, 22.06.1909, 1 apterous viviparous female marked by black circle and „L" (present designation), *Pinus* sp., Wilcocks leg., BMNH (Theobald Coll.), B. M. Reg. No 1930–204a (present

marking); PARALECTOTYPES: Gizah, 22.06.1909, 1 alate viviparous female under another cover–glass from *Pinus* sp., Wilcocks leg., BMNH (Theobald Coll.), B. M. Reg. No 1930–204a (present marking); Gizah, 22.06.1909, 3 apterous viviparous females. *Pinus* sp., Wilcocks leg., BMNH (Theobald Coll.), B. M. Reg. No 1930–204b (present marking).

As *E. pallidus*: SYNTYPES: RUSSIA: Krasnodar circuit, Dagomys, 25.08.1962, 1 apterous viviparous female, *P. pithyusa* (=*Pinus brutia var. pityusa*), Mamontova leg., ZIUAS, 4739; UKRAINE, Krimea, Banktsesarayski circuit, Batiliman, 16.06.1964, 1 damaged apterous viviparous female (only head and thorax), *P. stankeviczii* (=*Pinus brutia* var. *pityusa*), Mamontova leg., ZIUAS, 5331.

Biology of the genus *Eulachnus* and caused damage

Aphids from the genus *Eulachnus* are trophically associated with pines (*Pinus* spp.) where they always feed on needles of branches several–years old, either on the surface of the needles or between them. Unlike other Eulachnini species e.g. *Cinara* (together with the subgenus *Schizolachnus*) and most other Aphididae, species from this genus do not form large colonies and feed generally in small groups of several individuals including one to three adult females and a few larvae. Also in contrast to *Cinara* (including *Schizolachnus*), *Eulachnus* species lead a cryptic mode of life; they are hidden when feeding but become very active when disturbed (Kanturski & Wieczorek 2014b; Blackman & Eastop 2016). They are also not obligatory myrmecophiles; any ant attendance is often random while visiting *Cinara* species colonies.

All *Eulachnus* species are monoecious (having a life cycle without host alternation) and holocyclic (with sexual phase occurring). So far only *E. garganicus* stat. nov., *E. ibericus* stat. nov. and *E. mediterraneus* are regarded to be anholocyclic as their sexuales have never been recorded. The presence of the fundatrix morph of *E. stekolshchikovi* **sp**. **nov**. indicates that a sexual phase must occur. The fundatrix morph hatches from the overwintering egg at the end of March or in early April and grows fast. Adult fundatrices give birth to apterous viviparous females in April; at the beginning of May adults of both morphs—fundatrices and their apterous offspring have been observed. Also in the first half of May nymphs of the alate viviparous females occur and adult alate have been found from mid–May. The peak numbers of apterous and alate viviparous females occur from mid–May to mid–June. After this time the aphids become fewer, and the alate also become rarer, what was also reported by Carter & Maslen (1982) and Zondag (1983). The sexual morphs—oviparous females and alate males—appear at the end of September and occur until the first half of November. The oviparous females live much longer than the males, which are also much rarer.

In May, the pine needles are attacked intensively by sucking aphids (Fig. 47a, b) (Carter & Maslen 1982), whereas the population of aphids has been observed to decline from June to August or September. After this time the needles begin to yellow and to drop (Fig. 47c–g). The second peak of aphid population (especially in *E. agilis*, *E. brevipilosus* and *E. rileyi*) occurs in October and November when complete necrosis has been observed (Fig. 47h).

Results of molecular studies

After trimming of ambiguous fragments, alignments of 600 bp (COI) and 367–442 bp (ITS2) (387–442 bp for available *Eulachnus* species) were obtained. All newly generated sequences were deposited in GenBank under accession numbers: KP637087–KP637101 (ITS2) and KP637102– KP637146 (COI). No polymorphism in COI sequences was detected between specimens belonging to particular species collected from the same localities, and only single sequences (haplotypes) of COI were used in further analyses for each sampling site. We failed to generate full sequences of ITS2 for some specimens due to presence of short tandem repeats in several parts of this sequence that resulted in double peaks in large internal fragments of chromatograms, regardless of sequencing direction.

For ingroup taxa *(Eulachnus* species) in COI we found 112 variable sites and 98 parsimony–informative sites. For species with sampled number of individuals larger than 4, numbers of variable and parsimony–informative sites were as follows: 9 and 2 (*E. brevipilosus*), 13 and 2 (*E. rileyi*), 6 and 1 *(E. agilis*). The sequences of the ITS2

fragments were more conserved (12 variable sites and 13 parsimony–informative sites for all analysed *Eulachnus* species**).**

Modeltest identified the TN93+G model (gamma distribution shape parameter G = 0.16) as the best nucleotide substitution model for the COI data and the T92 model for the ITS2 data. The ML and BI phylogenies resulted in a congruent topology and therefore only phylogenetic trees obtained with ML based on COI or ITS2 sequences are presented (with supports of both—ML bootstrap values and BI posterior probabilities) (Figs 48 and 49).

Phylogenies obtained from both markers support monophyly of the genus *Eulachnus*, but some discrepancies between COI and ITS2 trees were observed.

Four lineages were present in COI trees: (I) *E. cembrae*, (II) *E. brevipilosus*, (III) *E. nigricola* and (IV) the remaining five species. Within that last group the most basal was *E. tuberculostemmatus* followed by *E. alticola*, then *E. agilis* and then a clade clustering individuals morphometrically assigned to *E. rileyi* and *E. tauricus* (with *E. tauricus* samples nested within *E. rileyi* samples) (Fig. 48). ITS2 sequences allowed for more detailed phylogenetic reconstruction for some species but not for others. The phylogeny of *Eulachnus* species according to this marker was as follows. *E. nigricola* was in a basal position to all other *Eulachnus* species. The remaining species divided into two clades. One contained *E. cembrae* and *E. brevipilosus*. In the second clade, the most basal was again *E. tuberculostemmatus*, whereas the other four species (*E. alticola, E. agilis, E. rileyi* and *E. tauricus*) possessed the same ITS2 sequences and therefore were indistinguishable genetically (Fig. 49). All these clades (in COI and ITS2 trees) were highly supported (Figs 48 and 49). In both trees (COI and ITS2), colour forms of *E. brevipilosus* could not be separated as distinct genetic clusters—individuals of both colours were mixed within the clade.

Based on the appropriate nucleotide substitution model, genetic distances between ingroup species ranged 1.9% to 9.1% (COI) and 0.0% to 1.7% (ITS2) (Table 6).

TABLE 6. Mitochondrial (COI—below diagonal) and nuclear (ITS2—above diagonal) DNA pairwise distances (in %) for all pairs of studied species.

Species		*E. b*	*E. r*	*E. ta*	*E. t*	*E. c*	*E. ag*	*E. n*	*E. al*
E. brevipilosus	E. b	–	1.1	1.1	1.1	0.4	1.1	1.7	1.1
E. rileyi	E. r	9.1	–	0.0	0.2	0.6	0.0	0.9	0.0
E. tauricus	E. ta	9.1	0.2	–	0.2	0.6	0.0	0.9	0.0
E. tuberculostemmatus	E. t	7.1	5.3	5.3	–	0.6	0.2	0.9	0.2
E. cembrae	E. c	7.7	8.1	8.1	7.9	–	0.6	1.3	0.6
E. agilis	E. ag	8.9	1.9	1.9	5.1	8.7	–	0.9	0.0
E. nigricola	E. n	7.5	7.5	7.5	6.5	8.1	6.8	–	0.9
E. alticola	E. al	8.9	3.8	3.8	5.1	8.3	4.0	7.3	–

Discussion

Many species from the tribe Eulachnini as well as in the whole subfamily Lachninae are complexes and groups of taxa of unclear position (Sorensen 1994; Blackman & Eastop 1994, 2016). The most numerous questionable species in Lachninae are in the genera *Cinara* and *Eulachnus*. The genus *Cinara* is known from over 200 described species, with over 150 native to North America and about 30 in Europe (Binazzi 1978, 1990; Eastop 1972; Favret & Voegtlin 2004a). In the genus *Eulachnus* in Europe about six species have been considered to be possible synonyms of species already described (Blackman & Eastop 1994, 2016; Remaudière & Remaudière 1997).

Morphological groups within the genus *Eulachnus*. All European species of the genus *Eulachnus* are characterized apart from their body shape by having characteristic dorsal sclerotization at least on head, thorax and ABD VII–VIII in form of small, often rounded scleroites at setal bases. The presence or absence of dorsal sclerotization (especially on ABD I–VI, together with the chaetotaxy of the antennae, dorsal side of body–both thorax and abdomen) and tibiae, have great taxonomic importance in the systematics of this group of aphids. The importance of the chaetotaxy was for the first time pointed out by Binazzi (1983b) and Binazzi & Mier Durante (1997) as a means of distinguishing species belonging to the "*agilis*" group. Analysing the above mentioned morphological characters in the genus *Eulachnus*, three distinct groups of species can be distinguished. Species

with long, rigid and mostly pointed setae on antennae and hind femora, which are also always longer than the width of antennal segments or tibiae, are characteristic of the "*agilis*" group (*E. agilis*, *E. alticola*, *E. garganicus* stat. nov., *E. ibericus* stat. nov., *E. intermedius*, *E. mediterraneus*, *E. stekolshchikovi* **sp**. **nov**. and *E. tuberculostemmatus*). However, in this group of species the length of setae on the thorax and abdomen can be much more variable, from the longest setae in *E. rileyi* to the shortest in *E. tuberculostemmatus* (Fig. 46). The tendency to shortening of dorsal setae was not considered by many authors as a difference between two or more species but as an interspecific variability, as a result of geographical variation (Blackman & Eastop 1994, 2016). Detailed analyses have shown that the validity of the differences in length of dorsal setae as a character to separate species in the "*agilis*" group are supported by other morphological, morphometric and biological features (Kanturski *et al.* 2015).

The second group of species morphologically similar to each other and distinguished by having very short antennal and dorsal setae, is the "*brevipilosus*" group, consisting of *E. brevipilosus* and *E. nigricola* (but not supported in the COI analyse results). In mounted specimens of these species the tibial setae can be seen to be thick and have truncate or expanded apices. Both species, in contrast to the taxa of the "*agilis*" group, occupy a different ecological niche on the needles. Representatives of the long–haired species in their natural conditions feed on the upper side of the needle whereas species from the "*brevipilosus*" group feed always between two needles additionally near the shoot (Fig. 48). Within Europaean *Eulachnus* the most outstanding group—"*cembrae*" group, with very short setae and lack of dorsal scleroites and sclerites on abdomen is constituted solely of *E. cembrae*.

Less or more?—new synonyms in the genus *Eulachnus* (*E. cretaceus*, *E. pallidus*, *E. tauricus*). Among European *Eulachnus* species we consider that 12 should have full species status. The most common and the most widespread species (*E. rileyi* and less *E. agilis*) show a tendency to vary in colour in life and mounted specimens as well as in the shape of their setae. *Eulachnus rileyi* has also the largest number of synonyms. Here we propose one new synonym–*E. tauricus* syn. nov. This species was described by Bozhko (1961) from four apterous viviparous females and one alate viviparous female. In the description, only a few differences were listed, mainly from *E. agilis*, with a note that the species is also similar to *E. bluncki* (now a synonym of *E. rileyi*). On examination of the type material of *E. tauricus*, we found that the characters this species match with characters of *E. rileyi* from several localities, especially in Southern Europe, where varied populations can occur: some with clearly pointed apices of setae and others with little shorter antennae and slightly blunt apices of setae. Also during the field studies, specimens morphologically in line with *E. tauricus* characters were collected in southeastern Poland and compared with other collected material, especially with *E. rileyi* material in molecular analyses. These results fully confirmed the suspicions of previous authors (Blackman & Eastop 2016) and justify that in present moment *E. tauricus* should be treated as a synonym of *E. rileyi* which in different regions of Europe and on different *Pinus* species may be characterized by some minor differences and variability in selected populations. As it is stated in Nieto Nafría *et al*. (2002), these two species can be distinguished by different length of antennae or different number of dorsal scleroites on abdomen. Detailed comparative morphological analyses and measurements revealed that representatives of both species have similar characters, moreover characters of both species overlap. Collected samples, morphologically characterized as *E. tauricus* are in the same clade as the samples of *E. rileyi* in our phylogenetic analyses based on COI and ITS2 and both species are found to have the same ITS2 haplotype or nearly the same COI haplotype (of only 0.2% divergence). Of course, we suggest that an additional study on the molecular relationships of many populations of *E. rileyi* in Europe should be conducted to solve this unquestionable problem in the future.

A similar situation can be observed in the case of *E. cretaceus*, described from one apterous and one alate viviparous female (Mamontova 1972). The characters of the examined type material fully overlap with the numerous material of *E. agilis*, especially the specimens with the shortest setae (within the limit of variation). In the case of *E. pallidus*, Mamontova (1968) did not have full information about all species belonging to the genus *Eulachnus*, because the diagnosis and the description were based on comparison with *E. agilis*, whereas all the described characters of the type and the lengths of setae on antennae, legs and dorsum assign her specimens (two apterous viviparous females, but one is to a large degree incomplete) to *E. tuberculostemmatus*. As additional evidence, the host plants given by Mamontova—*Pinus stankewiczii* and *P. pithyusa*—are synonyms of *P. brutia* var. *pityusa*. *Pinus brutia* is a common host plant for *E. tuberculostemmatus*. *Eulachnus pallidus* was described from Crimea and Krasnodar in the Black Sea basin and now is the northernmost and easternmost record for *E. tuberculostemmatus* in Europe.

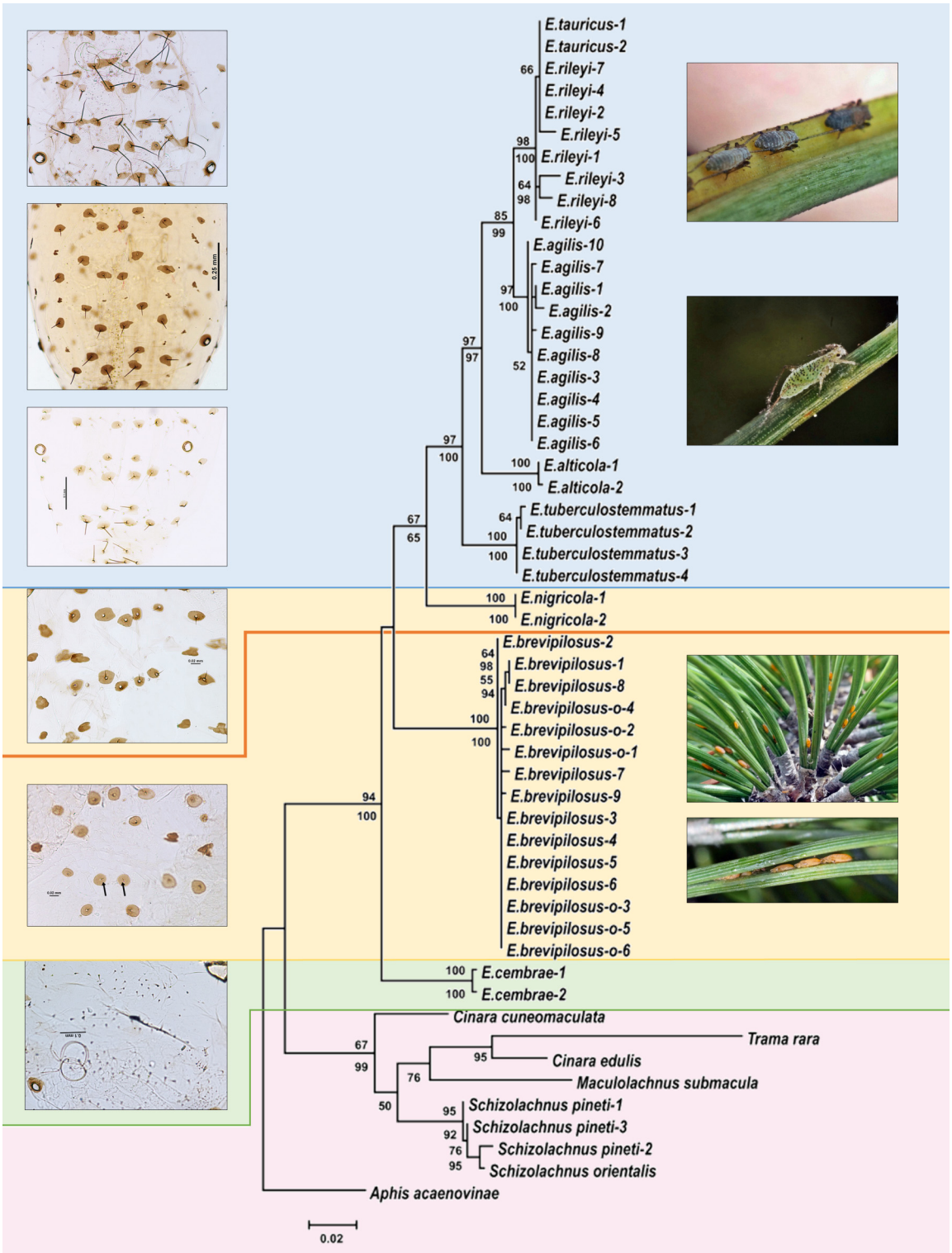

FIGURE 48. Results of molecular analyses, based on COI of eight species of the European *Eulachnus*. The colour of fields reveals species groups distinguished on the basis of morphological study: blue—"*agilis*" group with species with long setae and living on the upper side of the needles; yellow—"*brevipilosus*" group with species with very short setae and living between the needles; green—"*cembrae*" group with species without dorsal sclerotization and very short setae; lilac—outgroups in Eulachnini, Lachninae and Aphidinae.

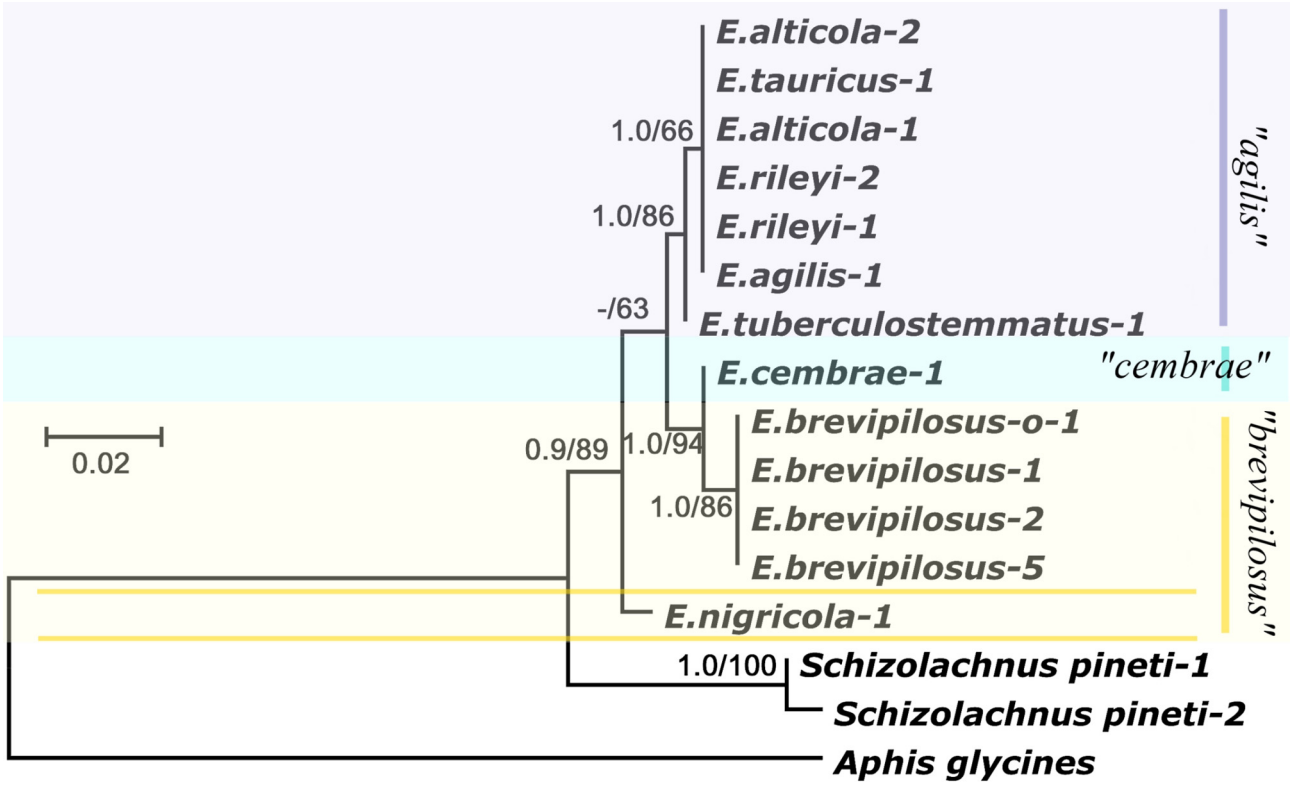

FIGURE 49. Results of molecular analyses, based on ITS2 of eight species of the European *Eulachnus*. The colour of fields reveals species groups distinguished on the basis of morphological study: blue—"*agilis*" group; yellow—"*brevipilosus*" group with species with very short setae; green—"*cembrae*" group; white—outgroups in Eulachnini and Aphidinae

Eulachnus cembrae was for many years treated as a synonym of an Asiatic species *E. pumilae* Inouye, 1939 due to the absence of dorsal scleroites. Remaudière & Remaudière (1997) reported a distinct difference between these two species in the chaetotaxy of the apical segment of the rostrum (*E. cembrae* like other European species is characterized by lacking the accessory setae). Nevertheless, in recent times this species was still considered as a synonym of *E. pumilae* (Mamontova 2011, 2012), but further evidence provided by sexual morphs has confirmed that these species should be treated as separate taxa (Kanturski & Wieczorek 2014a).

When Del Guercio (1909) erected the genus *Eulachnus*, besides the new combination of *Lachnus agilis* Kaltenbach, he described also eight other species in the new genus. Over the years many of them were synonymized with species from the genus *Cinara* (Eastop & Hille Ris Lambers 1976). However, according to Favret (2016) and Remaudière & Remaudière (1997), three nominal species of Del Guercio (1909) (*E. abameleki, E. mingazzinii* and *E. nigrofasciatus*) still have questionable but valid status as members of this genus, having never been formally synonymized with members of the genus *Cinara*, although in Del Guercio's paper the described species were excellently figured (Redia. 1909; V: 315–359, plates XVIII, XIX and XX), and show typical features of the genus *Cinara* such as setose siphunculi on large sclerites, first segments of hind tarsi without dorsal setae and the very characteristic long, narrow and subdivided apical segment of rostrum. In the case of *E. abameleki* material of this species was available (deposited in DeFENS, Milan, Italy). However, no material of *E. mingazzinii* and *E. nigrofasciatus* was available for our study and should be regarded as lost. In a situation when any type or other material is available, *E. mingazzinii* and *E. nigrofasciatus* should be regarded as *incertae sedis* taxa.

The position of *E. stekolshchikovi* sp. nov. in the genus *Eulachnus*. Some species of *Eulachnus* have a wide distribution covering almost all of Europe (*E. agilis* and *E. rileyi*); some species have a wide but more restricted range (*E. brevipilosus* in central and north–west Europe, *E. nigricola* in central and southern Europe), and *E.*

tuberculostemmatus and *E. mediterraneus* (in the Mediterranean region); and some species have a restricted and selective range (*E. alticola*, *E. cembrae* and *E. intermedius* in mountainous regions). The new species *E. stekolshchikovi* has a more northerly distribution than any other species of *Eulachnus*. It should be treated as the member of the "*agilis*" group due to the characteristic chaetotaxy of antennae and legs and in the length of the dorsal setae it is close to *E. mediterraneus*. Both species can be separated from *E. agilis* by clearly shorter dorsal setae on thorax and abdomen (the longest setae never longer than 0.06 mm long on thorax and 0.09 mm long on abdomen). *Eulachnus stekolshchikovi* **sp**. **nov**. superficially have very similar morphometric characters like *E. mediterraneus*, but can be easily distinguished from the Mediterranean species in the main characters listed in the diagnosis clearly shorter setae on head and the dorsal side of abdomen especially on ABD VI–VIII. *Eulachnus mediterraneus* is characterized also by dark brown knee area of legs, brown (and dark brown in *E. ibericus*) hind tibiae and tarsi whereas the knee areas, hind tibiae and tarsi of *E. stekolshchikovi* **sp**. **nov**. are yellow.

Relationships in light of molecular studies. The results of molecular analysis have shown groups similar, but not identical, to the morphological groups in the European *Eulachnus*. In the study using COI partial gene, all species in the "*agilis*" group form one clade. Within this group the closest species are *E. rileyi* and *E. agilis*. Both these species have the longest setae of all *Eulachnus* and form a sister group with *E. alticola* (with evidently shorter dorsal setae), and in turn this group forms a sister group to *E. tuberculostemmatus* which has the shortest dorsal setae in the "*agilis*" group. These results are congruent with our previous statement about the importance of using the length of dorsal setae in differentiation of species that are superficially very similar. The COI analysis also confirmed the separate species status of *E. alticola*, here established on the basis of the morphology as already observed by Binazzi (1989). In the molecular results *E. nigricola* constitutes an independent lineage—a sister group to the "*agilis*" group. Representatives of this species have very short dorsal setae similar to those of *E. brevipilosus*, but apterous viviparous females of *E. nigricola* have a much more strongly sclerotized thorax than *E. brevipilosus*, with groups of setae on the ventro–lateral side of body which are lacking in *E. brevipilosus*. All morphs of *E. nigricola* are small, and in general individuals of this species are the smallest within all European *Eulachnus*. Other distinguishing characters can be found in the sexual generation, oviparous females having an unusual distribution of wax covering of the body (only as far back as ABD V leaving the end of the abdomen without wax).

TABLE 7. Collection data of the European *Eulachnus* species and other Lachnini members for the molecular analyses

No.	Species	Host plant	Place	Date	Collector
1.	*E. agilis*-1	*P. sylvestris*	Poland	17.05.2013	M. Kanturski
2.	*E. agilis*-2	*P. mugo*	Poland	17.05.2013	M. Kanturski
3.	*E. agilis*-3	*P. mugo*	Germany	28.09.2013	M. Kanturski
4.	*E. agilis*-4	*P. sylvestris*	Poland	21.07.2014	M. Kanturski
5.	*E. agilis*-5	*P. sylvestris*	Czech Republic	18.08.2014	M. Kanturski
6.	*E. agilis*-6	*P. sylvestris*	Denmark	01.06.2013	M. Kanturski
7.	*E. agilis*-7	*P. sylvestris*	UK	19.08.2013	M. Kanturski
8.	*E. agilis*-8	*P. sylvestris*	Denmark	01.06.2013	M. Kanturski
9.	*E. agilis*-9	*P. sylvestris*	UK	20.08.2013	M. Kanturski
10.	*E. alticola*-1	*P. mugo*	Poland	21.05.2014	M. Kanturski
11.	*E. alticola*-2	*P. mugo*	Poland	30.08.2014	M. Kanturski
12.	*E. brevipilosus*-1	*P. sylvestris*	Poland	03.05.2013	M. Kanturski
13.	*E. brevipilosus*-2	*P. sylvestris*	Czech Republic	18.08.2014	M. Kanturski
14.	*E. brevipilosus*-3	*P. sylvestris*	Czech Republic	18.08.2014	M. Kanturski
15.	*E. brevipilosus*-4	*P. sylvestris*	Denmark	04.06.2013	M. Kanturski
16.	*E. brevipilosus*-5	*P. sylvestris*	Denmark	04.06.2013	M. Kanturski
17.	*E. brevipilosus*-6	*P.mugo*	Poland	17.08.2014	M. Kanturski
18.	*E. brevipilosus*-7	*P.mugo*	Poland	17.08.2014	M. Kanturski

.....continued on the next page

TABLE 7. (Continued)

No.	Species	Host plant	Place	Date	Collector
19.	*E. brevipilosus*-8	*P. sylvestris*	Germany	28.09.2013	M. Kanturski
20.	*E. brevipilosus*-9	*P.mugo*	Czech Republic	18.08.2014	M. Kanturski
21.	*E. brevipilosus*-o-1	*P. sylvestris*	Poland	01.05.2014	M. Kanturski
22.	*E. brevipilosus*-o-2	*P. sylvestris*	Poland	25.09.2014	M. Kanturski
23.	*E. brevipilosus*-o-3	*P.mugo*	Poland	03.05.2013	M. Kanturski
24.	*E. brevipilosus*-o-4	*P. sylvestris*	Czech Republic	18.08.2014	M. Kanturski
25.	*E. brevipilosus*-o-5	*P.mugo*	Czech Republic	18.08.2014	M. Kanturski
26.	*E. brevipilosus*-o-6	*P. cembra*	Poland	10.05.2014	M. Kanturski
27.	*E. cembrae*-1	*P. cembra*	Austria	17.07.2014	K. Wieczorek
28.	*E. cembrae*-2	*P. cembra*	Poland	10.05.2014	M. Kanturski
29.	*E. nigricola*-1	*P. nigra*	Poland	03.05.2013	M. Kanturski
30.	*E. nigricola*-2	*P. nigra*	Poland	17.09.2014	M. Kanturski
31.	*E. rileyi*-1	*P. nigra*	Poland	03.05.2013	M. Kanturski
32.	*E. rileyi*-2	*P. nigra*	Austria	07.07.2013	M. Kanturski
33.	*E. rileyi*-3	*P. mugo*	Austria	07.07.2013	M. Kanturski
34.	*E. rileyi*-4	*P. nigra*	Italy	14.09.2013	Ł. Junkiert
35.	*E. rileyi*-5	*P. nigra*	Italy	14.09.2013	Ł. Junkiert
36.	*E. rileyi*-6	*P. nigra*	Italy	14.09.2013	Ł. Junkiert
37.	*E. rileyi*-7	*P. nigra*	UK	20.08.2013	M. Kanturski
38.	*E. rileyi*-8	*P. mugo*	Poland	26.06.2014	M. Kanturski
39.	*E. tauricus*-1	*Pinus sp.*	Poland	15.05.2014	A. Taszakowski
40.	*E. tauricus*-2	*Pinus sp.*	Poland	15.05.2014	A. Taszakowski
41.	*E. tuberculostemmatus*-1	*P. brutia*	Tajikistan	09.07.2014	M. Walczak
42.	*E. tuberculostemmatus*-2	*P. brutia*	Tajikistan	09.07.2014	M. Walczak
43.	*E. tuberculostemmatus*-3	*P. pinaster*	Greece	02.05.2015	M. Walczak
44.	*E. tuberculostemmatus*-4	*P. pinaster*	Greece	02.05.2015	M. Walczak
45.	*Cinara* (*Schizolachnus*) *pineti*-1	*P. sylvestris*	Poland	19.08.2014	M. Kanturski
46.	*C*. (*S.*) *pineti*-2	*P. sylvestris*	Poland	19.08.2014	M. Kanturski
47.	*C*. (*S.*) *pineti*-3	*P. nigra*	Poland	19.08.2014	M. Kanturski
48.	*Maculolachnus submacula*	*Rosa sp. cult.*	Poland	19.08.2014	M. Kanturski
49.	*Trama rara*	*Taraxacum officinale*	Poland	19.08.2014	M. Kanturski

Eulachnus brevipilosus in the COI analysis forms a sister group to the "*agilis*" group and *E. nigricola*. A previously unknown orange colour form of *E. brevipilosus* found in Poland and Czech Republic was at the beginning of these studies suspected to be a different taxon as there were some slight morphometric differences in the ratio between PT and BASE and slightly shorter setae on legs. Both the orange form and the typical green form were found together in one locality, from one host plant and at the same time. Both forms were included in the COI analysis, and the results indicate that they are conspecific. The reason of occurrence of the orange form of *E. brevipilosus* is still unknown and will be solved in a separate study.

In the COI analysis, *E. cembrae* forms an outgroup to all other examined *Eulachnus* species, in agreement with the differences in chaetotaxy and lack of dorsal scleroites on the abdomen that make it the most easily recognized *Eulachnus* species in Europe.

Interspecific genetic distances calculated for COI marker were generally in range between 5.1% and 9.1% except *E. agilis—E. rileyi—E. tauricus*, which all had 1.9% distance. Similar interspecific distances are typical for

insect species, including aphids (e.g. among Siphini, Wieczorek & Kajtoch 2011) and other bugs (e.g. among *Eupteryx* leafhoppers, Guglielmino *et al*. 2014).

The interspecific divergence of mitochondrial genes in insects is assumed to be greater than 3% (Ferguson 2002), but intraspecific distances generally do not exceed 2% (Hebert *et al*. 2003), however there are known numerous exceptions, especially if we consider species complexes and other groups of closely related taxa, which are in the early steps of speciation (Lee *et al.* 2017). Consequently, all genetically examined *Eulachnus* species express mitochondrial divergence which supports their species status except above-mentioned three species (*E. agilis—E. rileyi—E. tauricus*). Also, genetic distances calculated for ITS2 show similar pattern. These distances are much lower than these found in COI, but again, the lowest values (equal to zero percent) were found among above mentioned three taxa and additionally *E. alticola*, which supports close relationships in this group.

The ITS2 marker analysis provided some different results with the studied species forming only three lineages. Two first of them are formed in general by long-haired species from the "*agilis*" group and the short-haired species like *E. brevipilosus* and *E. cembrae*, and the individual position of *E. nigricola* most probably due to the above-mentioned characters of this species. In comparison with the COI tree, the ITS2 phylogeny shows that studied species belonging to morphologically different groups are members of one, probably young and not strongly differentiated genus of aphids associated with one plant genus and one part of the plants which, in Lachninae, are known as hosts only in the *Cinara* subgenus *Schizolachnus* and, with one exception in the genus *Essigella*, in opposition to species from other *Cinara* subgenera and other Lachninae genera (Favret & Voegtlin 2004b; Jousselin *et al*. 2013; Mroz *et al*. 2015; Chen *et al*. 2016). The relatively young age of the genus and close relations between particular species in subgroups could be the reason for the observed lack of congruence between mitochondrial and nuclear gene trees. Discordant phylogenies arising from use of different, unlinked DNA markers are often observed in young groups (Guglielmino *et al*. 2014) and may result from either incomplete lineage sorting or recent/current gene flow (Rogers & Gibbs 2014). Both phenomena are worth further study and could lead to interesting findings about speciation mode and/or hybridization events in the *Eulachnus* genus.

Conclusions

The genus *Eulachnus* in Europe comprises 12 species associated only with *Pinus* trees. All species are small, spindle shaped, living mainly singly on the pine needles, without forming large colonies. Members of this genus are characterized by having spotted dorsal sclerotization always present on head and thorax. Presence or absence of the dorsal sclerotization on abdominal segments I–VI as well as the chaetotaxy of antennae, thorax and abdomen are the most important and significant features in the taxonomy of this genus. The reliablity of setal shape and size as species–specific characters have been questioned in the literature, but our detailed, comparative study showed clear differences between species. Also, the research using molecular markers (especially COI) of available material supported the main proposal that the European species of *Eulachnus* can, despite close similarity, be safely determined by differences in body chaetotaxy characters.

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