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This contribution is dedicated
to the memory of Prof. Dan Gerling,
a scientist, a colleague and a friend

Review of the Palearctic *Aphelinoidea* (Hymenoptera: Trichogrammatidae), with focus on the species described by Ś. Nowicki

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ABSTRACT

Type specimens of *Aphelinoidea anatolica* Nowicki, *A. anatolica melanosoma* Nowicki (now *A. melanosoma*), *A. deserticola* Nowicki, and *A. subexserta* Nowicki (Hymenoptera: Trichogrammatidae), which were not examined by taxonomists since their original descriptions had been published, are identified, labeled, re-diagnosed, and illustrated. A lectotype is designated for *A. anatolica*. Taxonomic notes on these Palearcic taxa and also some other species of *Aphelinoidea* Girault in the Holarctic Region are provided along with a key to females of the Palearctic species. The subgenus *Aphelinoidea (Diaclava)* (Blood & Kryger), n. syn., is synonymized under the nominate subgenus, *A. (Aphelinoidea)* Girault, and its type species *Diaclava waterhousei* Blood & Kryger is transferred to the latter as *A. (Aphelinoidea) waterhousei* (Blood & Kryger), rev. stat. *Aphelinoidea (Krygeriola) dolichoptera* Nowicki, n. syn., and *A. gwaliorensis* Yousuf & Shafee, n. syn., are synonymized under *A. (Lathromeroides) neomexicana* (Girault), and *A. retiruga* Lin, n. syn., is synonymized under *A. (Aphelinoidea) longiclavata* Yousuf & Shafee. A new taxon, *A. (Aphelinoidea) gerlingi* n. sp., is described; it is known from specimens collected in Algeria, Egypt, Israel, Morocco, and Oman, and also, including the holotype, from vouchers of the colonies introduced (misidentified as *A. anatolica*) from Iran into California, USA, for biological control against the beet leafhopper, *Neoaliturus (Circulifer) tenellus* (Baker) (Hemiptera: Cicadellidae). To prevent further damage, most of the examined specimens in the Ś. Nowicki collection of *Aphelinoidea* at its current depository, the Entomological Collection of Dipartimento di Entomologia e Zoologia Agraria «Filippo Silvestri», Università degli Studi di Napoli «Federico II», Portici, Italy, were remounted into Canada balsam from the dried and often darkened original water-soluble mountant.

KEYWORDS: Chalcidoidea, taxonomy, synonymy, new species, host associations, Cicadellidae, identification key, new records, Holarctic, Afrotropical, Oriental, Neotropical.

INTRODUCTION

Forest Engineer Światosław Nowicki (Svatoslav Novicky, 1902–1980) was a Polish (later in life he lived in Austria), mainly amateur entomologist who, as a skilled collector and taxonomist working on several families of Chalcidoidea (Hymenoptera), published six very important papers on the Trichogrammatidae

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(Nowicki 1927, 1934, 1935, 1936, 1940; Novicky 1946) in which he described, mostly in great detail, a number of new taxa from Europe, northern Africa, and the Near East, all within the Palearctic ecozone. The almost entire Ś. Nowicki collection of Trichogrammatidae was donated by him to Gennaro Viggiani and is now part of the Entomological Collection of Dipartimento di Entomologia e Zoologia Agraria «Filippo Silvestri», Università degli Studi di Napoli «Federico II», Portici, Italy (DEZA) (Viggiani 2011). A very small portion of his trichogrammatid collection can be now also found in the Natural History Museum, London, UK (BMNH). Unfortunately, as described by Viggiani (2011) and Triapitsyn *et al.* (2013, 2017), his collections of Trichogrammatidae respectively at the BMNH and DEZA and of Mymaridae in the DEZA were in a very poor condition: almost every specimen (or sometimes several specimens) had been dipped in liquid Faure (or Hoyer's) medium and either covered on both sides with two pieces of coverslips or just mounted on one coverslip, thus making a very small "slide" that was glued over a circular hole on a card (Figs 20, 21, 40, 41, 74, 75). The card also served as a primary data label and in some cases as an identification label; all Nowicki's labels are extremely difficult (and often impossible) to read because of his illegible handwriting with very hard to figure out abbreviations and frequent omissions of critical data. With time, the mounting medium on most "slides" darkened and dried to the point some specimens became severely fragmented (ruptured by drying water-soluble mounting medium). These were mostly impossible to see and examine, and thus were in great need for being remounted on standard microscopic slides in Canada balsam as pointed by Viggiani (2011), who also provided illustrations and taxonomic information on two of Nowicki's species, *Aphelinoidea (Lathromeroides) bischoffi* (Novicky) and *A. (Lathromeroides) dolichoptera* Nowicki. Here I report on the interesting results of the recent efforts in remounting of Nowicki's other species of *Aphelinoidea* Girault, which were kindly made available to me by G. Viggiani.

Aphelinoidea is a large and diverse genus of Trichogrammatidae, some members of which are known as egg parasitoids of various leafhoppers (Hemiptera: Cicadellidae) and thus may be important for biological control (Trjapitzin 1995; Walker *et al.* 1997, 2005; Bayoun *et al.* 2008). The Holarctic species of the genus were reviewed and keyed by Trjapitzin (1995); more recently Fursov (2007) provided a key to the Palearctic species of *Aphelinoidea*, but then types of Nowicki's species were unavailable for study. Seven species of *Aphelinoidea* were described from the Palearctic region since Nowicki: one from Turkmenistan (Trjapitzin 1995), two from Xinjiang Uyghur Autonomous Region of China (Hu & Lin 2005; Wang *et al.* 2009), three from Ukraine (Fursov 2007), and one from Uzbekistan (Rakitov & Triapitsyn 2013). Recently, however, *A. cultrocaudata* Wang, He, Zhang & Hu was synonymized under *A. bischoffi* (Viggiani 2011) and *A. scythica* Fursov under *A. (Aphelinoidea) turanica* S. Trjapitzin (Rakitov & Triapitsyn 2013). Also, Lin (1994) described one species from Fujian, which is in the Oriental part of China.

Khan and Anis (2016) keyed the Indian *Aphelinoidea* and also described one new species, and redescribed and illustrated the two species described by Yousuf and Shafee (1985, 1988). However, all four known Oriental species of the genus were described without proper comparison with the already named taxa from other ecozones (other than with *A. deserticola* Nowicki for the two of them, but *A. retiruga* Lin is not in the same species group with it).

Aphelinoidea turanica was introduced first from Turkmenistan and then from Iran into California, USA, against the beet leafhopper, *Neoaliturus (Circulifer) tenellus* (Baker), and became established there (Trjapitzin 1995; Anonymous 1997; Walker *et al.* 1997, 2005; Bayoun *et al.* 2008). Several other species of *Aphelinoidea* (only *A. anatolica* Nowicki from Libya was identified, although its true identity remains to be clarified as it could rather be *A. turanica*) were released in California in the 1950s from the colonies originating from Spain and some northern African countries but results of those introductions were unknown (Huffaker *et al.* 1954; Clausen 1978). I have studied their vouchers specimens, deposited in Essig Museum of Entomology, University of California, Berkeley, USA, and found these to be all poorly mounted in dammar gum, uncleared, and often fragmented on microscopic slides. Only a few of them are recognizable with some confidence, for instance *Aphelinoidea* sp. "O" from Morocco (Clausen 1978), which is conspecific with the new taxon described herein from several other countries. This species was introduced (as *A. anatolica*) into California from Iran against beet leafhopper (Walker *et al.* 1997, 2005) but was misidentified by me as such based mostly on the somewhat similar color of the mesosoma of females, due to unavailability of Nowicki's type material for a thorough comparison at that time.

Walker *et al.* (2005) reviewed the species of egg parasitoids attacking *N. tenellus* in California and described two new species, both native there. They provided a key to both indigenous and introduced species of *Aphelinoidea* known to parasitize eggs of *N. tenellus* in North America, which also includes the Nearctic species *A. (Aphelinoidea) plutella* Girault whose hosts are unknown. Walker *et al.* (2005) also redescribed *A. plutella* and demonstrated that it does not occur in the western USA and that it is not an egg parasitoid of *N. tenellus*.

MATERIALS AND METHODS

Ś. Nowicki specimens in the BMNH were examined during my several visits there over the years. Original specimens of *Aphelinoidea* from the Nowicki collection (other than those reviewed by Viggiani (2011)—these were examined during my visits to the DEZA) were received on loan from the DEZA. Associating the specimens with their proper scientific names was difficult and time consuming detective work, which I mostly succeeded by comparing the scarce label data with the collecting information given by Nowicki (1936, 1940). I also thoroughly compared the types with the original descriptions; these mostly matched quite well. At the UCRC, all the original mounts of the primary types were photographed, and

then the micro-slides were soaked in distilled water to float off the specimens. They were then cleared in 10% KOH and remounted in Canada balsam on individual slides by Vladimir V. Berezovskiy mostly following the procedure described by Triapitsyn and Kim (2008). The original labels were glued onto these new slides, and proper data and identification labels were added. The dry-preserved syntypes of *A. anatolica* were partially point-mounted and partially slide-mounted at the UCRC in Canada balsam, and then labeled.

The morphological terminology follows Doutt and Viggiani (1968) and Gibson (1997). Measurements of the Nowicki specimens were made after they had been remounted. All measurements are given in micrometers (μm), as length or, for the fore and hind wings only, as length : width. The following abbreviation is used: mps – multiporous plate sensillum or sensilla on the antennal flagellar segments (= longitudinal sensillum or sensilla or sensory ridge(s)).

The acronyms for the depositories of specimens are as follows: BMNH, the Natural History Museum, London, England, UK; DEZA, Dipartimento di Entomologia e Zoologia Agraria «Filippo Silvestri», Università degli Studi di Napoli «Federico II», Portici, Italy; EMEC, Essig Museum of Entomology, University of California, Berkeley, California, USA; FAFU, Fujian Agriculture and Forestry University, Jinshan, Fuzhou, Fujian, China; ICXU, Insect Collection of College of Life Science and Technology, Urumqi, Xinjiang, China; INHS, Illinois Natural History Survey, Champaign, Illinois, USA; SIZK, I.I. Schmalhausen Institute of Zoology, National Academy of Sciences of Ukraine, Kiev, Ukraine; TAU, Steinhardt Museum of Natural History, Tel Aviv University, Tel Aviv, Israel; UCRC, Entomology Research Museum, University of California, Riverside, California, USA; USNM, National Museum of Natural History, Washington, District of Columbia, USA; ZDAMU, Insect Collections, Department of Zoology, Aligarh Muslim University, Aligarh, Uttar Pradesh, India; ZIN, Zoological Institute, Russian Academy of Sciences, Saint Petersburg, Russia.

TAXONOMY

Genus *Aphelinoidea* Girault, 1911

Aphelinoidea Girault, 1911: 2–4. Type species: *Aphelinoidea semifuscipennis* Girault, by orig. des.
Aphelinoidea Girault: Pinto 2006: 87–89 (taxonomic history, list of synonyms, diagnosis, distribution, diversity, discussion, list of New World records, hosts).

Among the Trichogrammatidae, *Aphelinoidea* species can be recognized using the keys in Doutt and Viggiani (1968), Pinto (2006) and Fursov (2007). See Doutt and Viggiani (1968), Trjapitzin (1995), Walker *et al.* (2005), Fursov (2007), and particularly Pinto (2006) for the taxonomic history of the genus and its diagnosis, and also for the diagnoses of the recognized subgenera and species groups within the nominate subgenus. Pinto (2006) also provided an important discussion and good illustrations. The currently recognized subgenera and species groups in the nominate subgenus of *Aphelinoidea* occurring in the Palearctic region are keyed below.

The identities of the European species *A. laticlavia* Fursov and *A. stepposa* Fursov, very briefly described in the key to the ten Palearctic species of *Aphelinoidea* (Fursov 2007) without mentioning some crucial morphological features, such as relative length of the ovipositor (this is an improper way to describe new taxa), are not clear to me. Without access to their holotype females or, at least, their digital images (my request for these has not been fulfilled), it is impossible to include them in the key to the Palearctic species of *Aphelinoidea* below. Recognition of species in the *A. (Aphelinoidea) plutella* species group is very difficult (and often practically impossible without supporting genetic data, which are currently lacking) to separate from each other, and identification of *A. laticlavia* and *A. stepposa* is problematic in the absence of their full description and digital images of the primary types, even though the original illustrations are good. As shown here, even with availability of the very detailed original descriptions, as well as images and measurements of Nowicki's type specimens, some species from this group are still almost impossible to diagnose properly. As noted by Rakitov and Triapitsyn (2013), users of the key in Fursov (2007), which they partially translated and slightly modified, need to keep in mind that proportions of the clava and its two segments (length : width ratios) as well as other antennomeres vary, often substantially, within the same species, and thus seem to be quite similar among some of the already described species in the *plutella* group (Table 1). Moreover,

Table 1. Some diagnostically important morphological features of females of the described species in the *plutella* group of *Aphelinoidea (Aphelinoidea)* in the Nearctic, Oriental, and Palearctic regions.

Species	Main color of mesosoma	Ratio of				
		Clava length / width	Apical / basal clava segments lengths	Clava to pedicel lengths	Fore wing length to width	Ovipositor to metatibia lengths
anatolica	brown	2.9–4.5	2.0–2.8	2.4–2.8	2.05–2.2	1.1–1.3
deserticola	light brown	3.1	2.2–2.3	2.3–2.4	2.0–?2.2	1.6
laticlavia	unknown	2.4	1.8	1.5	unknown	unknown
melanosoma	dark brown	3.2–3.8	2.1–2.8	2.5–2.6	2.2–2.4	1.2–1.4
plutella	brown	3.7–5.0	1.9–2.5	2.5–2.8	2.3–2.5	1.3–1.4
roja	red	5.4–5.5	2.6	2.7	2.2–2.3	1.7
sariq	yellow	2.1–2.4	1.25–2.0	2.5	2.0–2.2	0.95–1.0
shawanica	brown	unknown	2.4–2.6	2.1	2.3	2.1–?2.4
stepposa	unknown	2.5–3.1	2.0–2.2	1.9–2.0	unknown (?2.1)	unknown (?2.0)
subexserta	brown	2.5–3.1	2.3–3.0	2.1–2.3	2.0–2.2	1.8–2.1
turanica	dark brown	4.4–4.7	2.5–2.7	2.7	2.2	1.2
yousufi	red	4.0	2.85	2.5	2.1	1.5
zarehi	dark brown	3.3–3.4	2.05	2.65	2.0–2.1	1.3

Fursov's descriptions were not based on the examination of the type material of the Nowicki species, and neither was my own previous key (Trjapitzin 1995). The way specimens are dried or mounted on a slide (particularly orientation of the clava) also may, potentially significantly, affect these ratios, especially if the antennae are not in a perfect lateral view or shriveled. Thus, describing any new taxa in this species group based solely on the ratios of antennal segments should be discouraged in the absence of other distinguishing morphological characters and supporting molecular evidence, which would be particularly helpful for separation of the already known species. I expect that once such information becomes available, some of them would eventually need to be synonymized.

Key to the Palearctic species of *Aphelinoidea* based on females

Note: A. (Aphelinoidea) laticlavia Fursov and *A. (Aphelinoidea) stepposa* Fursov are excluded, and female of *A. (Aphelinoidea) waterhousei* (Blood & Kryger), rev. stat., is unknown.

1 Gaster very long, at least about 1.1× combined length of head and mesosoma; hypopygium extending to apex of gaster (subgenus *A. (Lathromeroides)* Girault) 2

– Gaster at most about as long as head and mesosoma combined; hypopygium not extending to apex of gaster (subgenus *A. (Aphelinoidea)* Girault) 3

2 (1) Ovipositor scimitar-shaped (Fig. 18), markedly exserted beyond apex of gaster; fore wing disc with distinct hyaline path beyond venation (Fig. 19) ..... *A. (L.) bischoffi* (Novicky)

– Ovipositor straight (Figs 53, 54), at most exserted a little beyond apex of gaster; fore wing disc without distinct hyaline path beyond venation (Fig. 55) ..... *A. (L.) neomexicana* (Girault)

3 (1) Fore wing disc conspicuously setose, without hyaline path beyond venation (*semifuscipennis* species group) 4

– Fore wing disc with distinct hyaline path (with very short, light-colored, inconspicuous microtrichia except at most for a few distinct setal lines) beyond venation (*plutella* species group) 5

4 (3) Pronotum and scutellum yellow, mesoscutum orange-yellow (Fig. 32); clava (Figs 28, 33, 34) at least 3.7× as long as wide, its apical segment at least 2.1× as long as basal segment ..... *A. (A.) gerlingi* n. sp.

– Pronotum brown, mesoscutum and scutellum brown to dark brown (Fig. 62); clava (Figs 60, 61) at most 3.2× as long as wide, its apical segment at most 2.0× as long as basal segment ..... *A. (A.) semifuscipennis* Girault

5 (3) Ovipositor at least 1.8× length of metatibia 6

– Ovipositor at most 1.6× length of metatibia 7

6 (5) Marginal vein relatively thicker (Fig. 80) ..... *A. (A.) subexserta* Nowicki

– Marginal vein relatively thinner (Fig. 73) ..... *A. (A.) shawanica* Hu & Lin

7 (5) Mesosoma and metasoma mostly yellow..... ..... *A. (A.) sariq* Triapitsyn & Rakitov
– Mesosoma and metasoma mostly light brown to brown or dark brown..... 8
8 (7) Mesosoma mostly light brown; fore wing with very strong infuscation behind venation projecting slightly beyond its apex (Fig. 25); ovipositor 1.6× length of metatibia ..... *A. (A.) deserticola* Nowicki
– Mesosoma mostly brown or dark brown; fore wing with relatively less strong infuscation behind venation not projecting beyond its apex; ovipositor at most 1.4× length of metatibia 9
9 (8) Mesosoma mostly brown (Figs 2–5, 7); fore wing with weak infuscation behind venation (mainly as small, conspicuous, diffuse darker spot just behind stigmal vein (Figs 4, 5, 8, 12)) ..... *A. (A.) anatolica* Nowicki
– Mesosoma mostly dark brown; fore wing with relatively stronger infuscation behind venation 10
10 (9) Antenna with clava at most 3.8× as long as wide .... *A. (A.) melanosoma* Nowicki
– Antenna with clava at least 4.4× as long as wide..... ..... *A. (A.) turanica* S. Trjapitzin

Synopsis of species in alphabetical order

Aphelinoidea (Aphelinoidea) anatolica Nowicki, 1936

(Figs 1–16)

Aphelinoidea (Aphelinoidea) anatolica Nowicki, 1936: 144–147. Type locality (lectotype designated here): Kayseri ("near the town in the direction to the Ercias mountain" [i.e., Mount Erciyes]), Kayseri Province, Central Anatolia Region, Turkey.

Aphelinoidea (Aphelinoidea) anatolica subsp. *halepensis* Nowicki, 1936: 147. Type locality: Aleppo, Aleppo Governorate, Syria. Holotype ♀ (not examined, lost). *Nomen dubium*.

Aphelinoidea anatolica Nowicki: Huffaker *et al.* 1954: 786–789 (20 specimens released in California, USA, of Libya origin); Doutt & Viggiani 1968: 529 (list); Fursov 2007: 967 (key, distribution); Huang *et al.* 2007: 312–314 (♀ antenna structure, illustrations), 316 (key); Fursov 2007: 967 (key, distribution); Wang *et al.* 2009: 316 (key); Viggiani 2011: 104 (list); Rakitov & Triapitsyn 2013: 544 (*s.l.*, key, distribution [in part]).

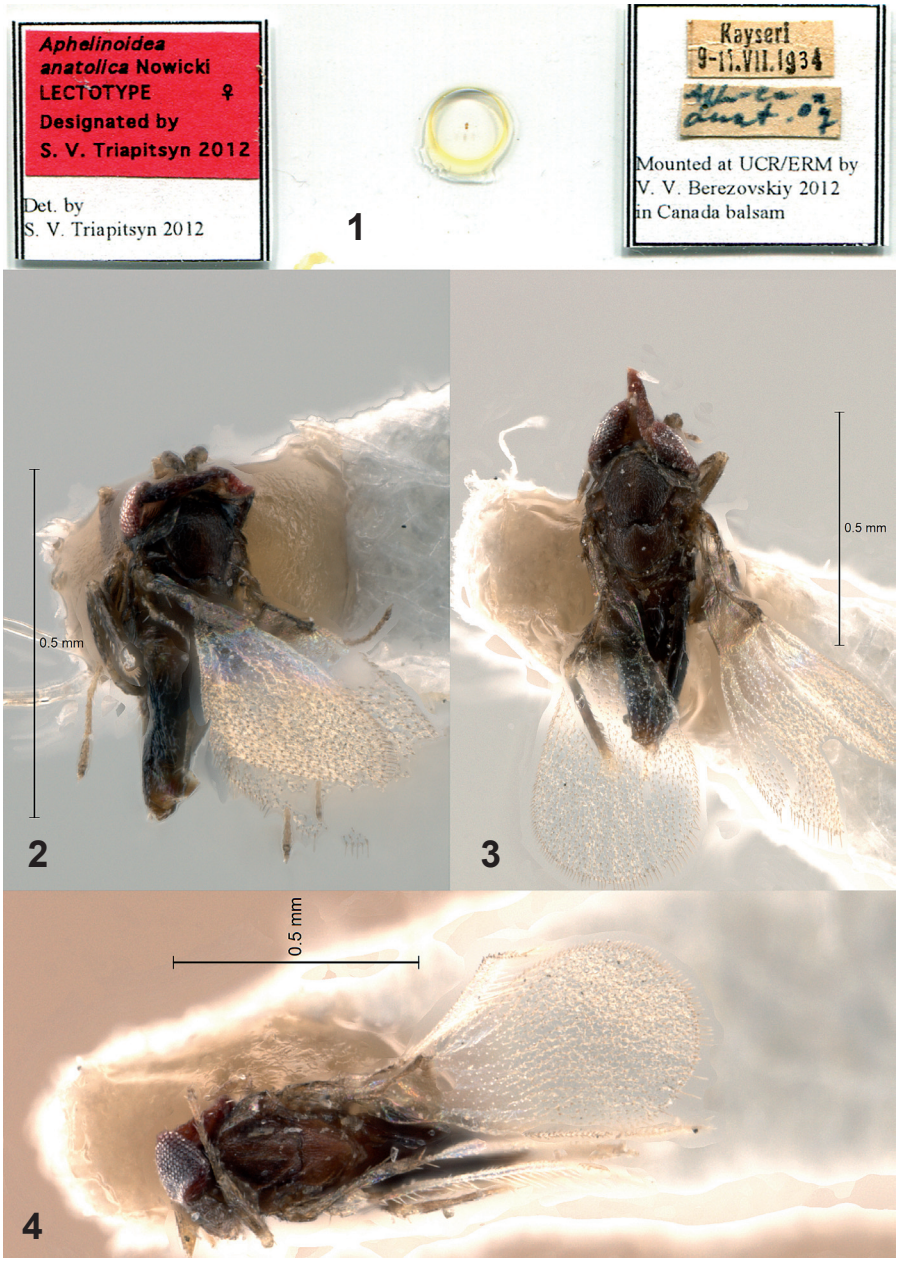
Aphelinoidea halepensis Nowicki: Doutt & Viggiani 1968: 529 (listed as synonym of *A. anatolica*).

Aphelinoidea "A" (error for *A. anatolica*): Clausen 1978: 55–56 (20 specimens released in California, USA, of Libya origin).

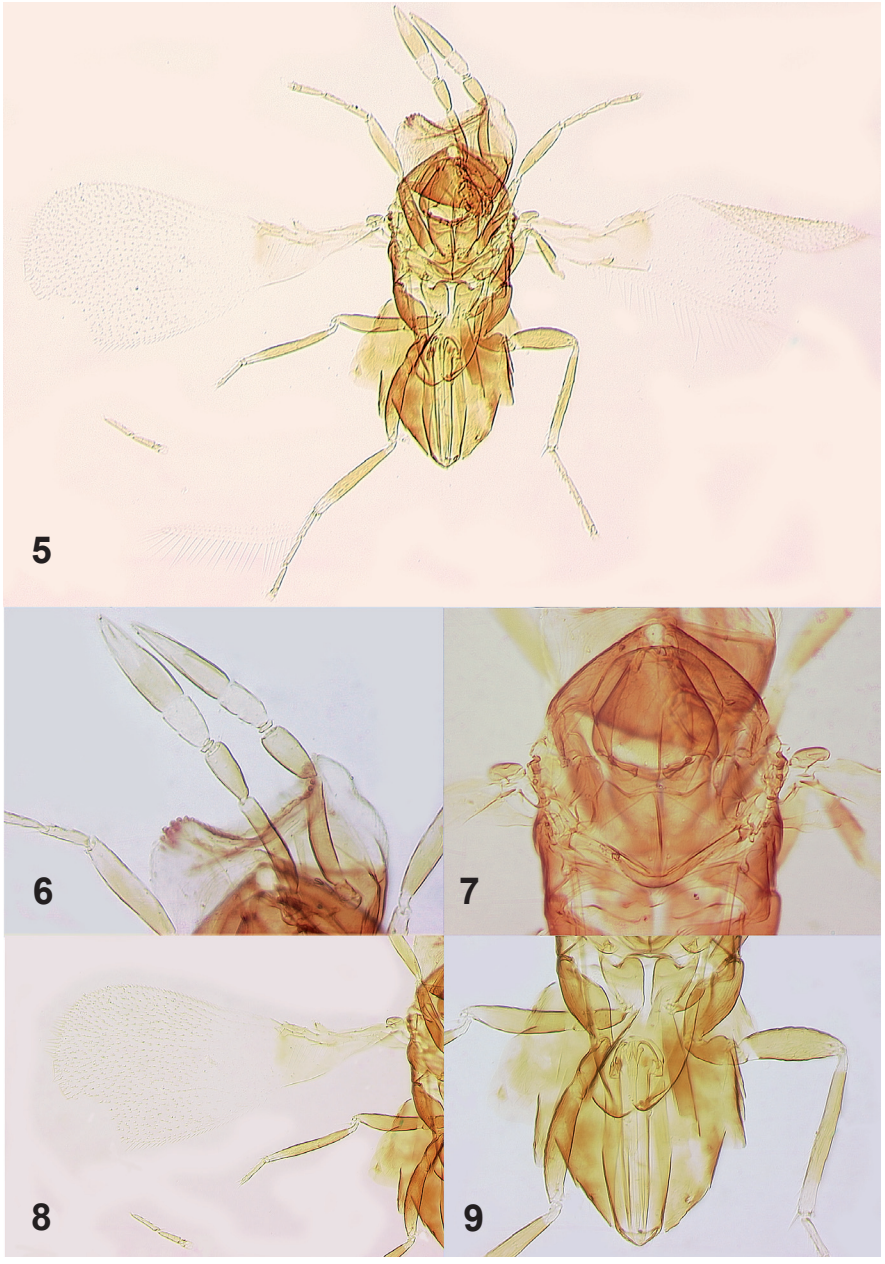
Aphelinoidea (Aphelinoidea) anatolica Nowicki: Trjapitzin 1995: 302 (listed in the *anatolica* species group of *Aphelinoidea s.str.*), 305 (key, distribution), 307–308 (compared with *A. melanosoma* and *A. turanica*); Hu & Lin 2005: 151 (key), 153–155 (redescription, distribution, illustrations) [as *A. anatolica* Novicky].

Aphelinoidea anatolica halepensis Nowicki: Walker *et al.* 2005: 10, 12 (discussion).

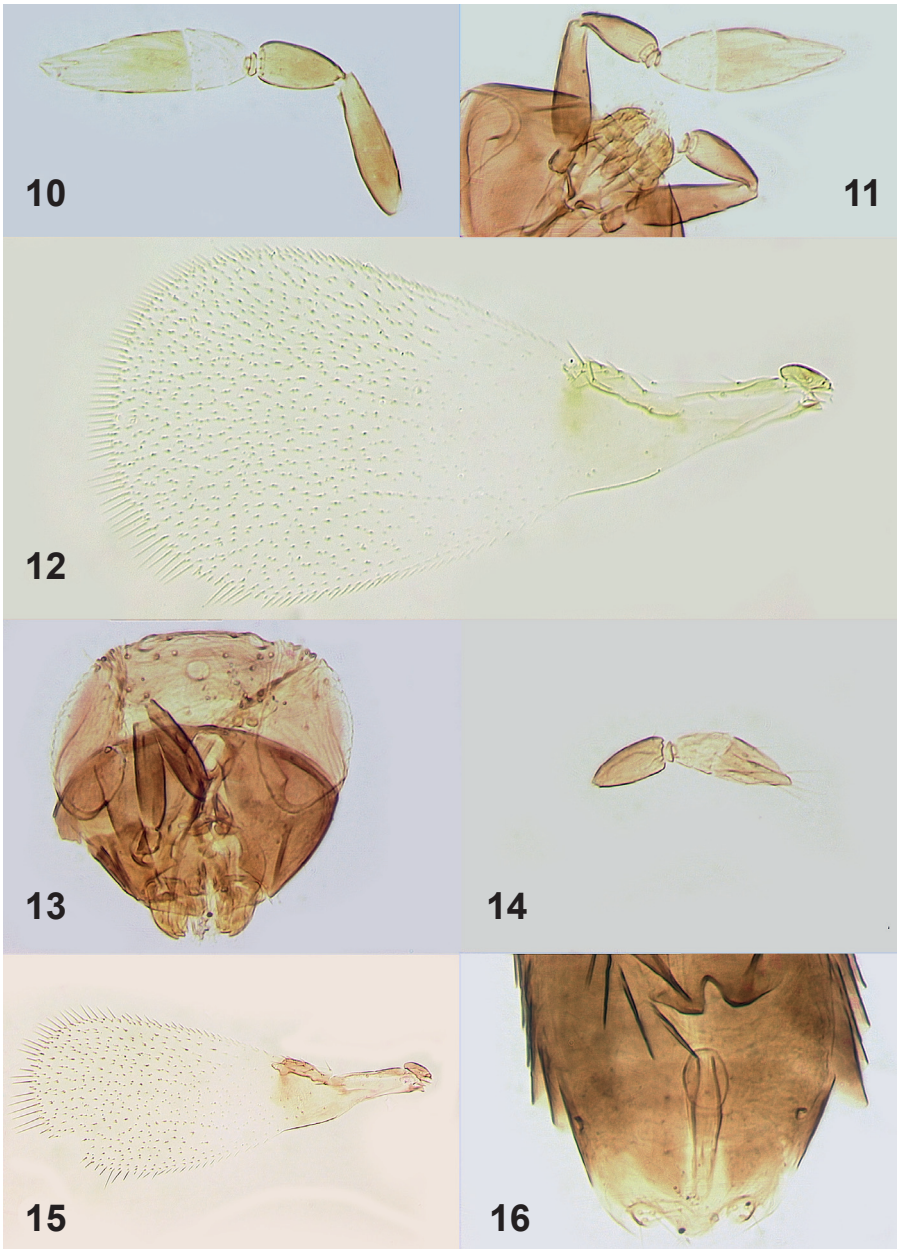
Diagnosis: *Aphelinoidea anatolica s.str.* belongs to the *A. (Aphelinoidea) plutella* species group as defined by Walker *et al.* (2005) (= the renamed *anatolica* species group of Trjapitzin 1995), because it has a hyaline, sparsely setose (with very short, light-colored microtrichia) transverse path on the fore wing disc just beyond the venation (Figs 8, 12). The mesosoma of female is more or less uniformly



Figs 1–4: *Aphelinoidea (Aphelinoidea) anatolica* Nowicki, female: (1) slide, lectotype; (2) habitus, paralectotype from Kayseri, Turkey; (3, 4) habitus, paralectotypes from Konya, Turkey.



Figs 5–9: *Aphelinoidea (Aphelinoidea) anatolica* Nowicki, female (lectotype): (5) body; (6) head and antennae; (7) mesosoma; (8) fore wing; (9) metasoma.



Figs 10–16: *Aphelinoidea (Aphelinoidea) anatolica* Nowicki, paralectotypes: (10–12) females from Kayseri, Turkey: (10, 11) antennae; (12) fore wing; (13–15) males from Konya, Turkey: (13) head in frontal view and scapes; (14) antenna without scape; (15) fore wing; (16) genitalia.

brown (Figs 2–5, 7), and its gaster has no clear yellow subapical spot mentioned by Fursov (2007) in the key. Thus, this species is very difficult to diagnose and separate from similar taxa such as *A. melanosoma* Nowicki, *A. plutella*, and *A. turanica* (Table 1).

Redescription: Female (lectotype of *A. anatolica s.str.*). Head reddish brown, mesosoma brown, gaster dark brown except its apex a little lighter (brown); appendages brown except basal claval segment pale and apex of metatibia light brown.

Antenna (Fig. 6) with scape minus short radicle 5.3× as long as wide; pedicel 2.25× as long as wide; first anellus much larger than second, the latter partially imbedded into first claval segment; clava 4.45× as long as wide and 2.7× length of pedicel; apical segment of clava 2.3× length of basal segment, the latter obliquely subdivided in middle on its inner side; basal segment of clava with 1 mps, apical segment with several mps.

Mesoscutum and scutellum (Fig. 7) with faint cell-like sculpture; midlobe of mesoscutum with incomplete median groove, scutellum with almost complete median groove. Fore wing (Figs 5, 8) 2.15× as long as wide; disc faintly, inconspicuously infuscate behind venation, slightly more conspicuously so just behind stigmal vein (as diffuse darker spot), with distinct hyaline, sparsely setose (most setae very short and light) path across wing just beyond venation, more or less uniformly setose beyond hyaline area except for a few distinct setal lines. Hind wing with disc almost hyaline and with 3 rows of setae (2 of them admarginal).

Ovipositor short, occupying about 0.7× length of gaster (Fig. 9), 1.2× length of metatibia, and not exserted beyond its apex. Hypopygium extending to about 0.5× length of gaster.

Measurements of remounted lectotype (μm). Body, 658; mesosoma, 270; metasoma, 300; ovipositor, 218. Antenna: radicle, 15; rest of scape, 97; pedicel, 55; clava (given as lengths of basal/apical segments), 44/103. Fore wing, 606:282. Hind wing, 460. Metatibia, 182.

Variation (paralectotypes of *A. anatolica s.str.*). Body length of dry-mounted specimens 460–790 μm, of slide-mounted specimens 645–800 μm. Mesosoma usually brown (Figs 2, 3) but occasionally orange-brown (Fig. 4). Antenna (Figs 10, 11) with scape minus radicle 3.5–4.5× as long as wide; clava 2.9–4.5× as long as wide and 2.4–2.8× length of pedicel; apical segment of clava 2.0–2.8× length of basal segment (usually 2.1–2.3×). Fore wing (Fig. 12) 2.05–2.2× as long as wide; longest marginal seta about 0.1× maximum wing width. Ovipositor occupying 0.6–0.7× length of gaster, 1.1–1.3× length of metatibia (usually 1.1–1.2×).

Male (paralectotypes of *A. anatolica s.str.*). Similar to female except as follows. Antenna (Figs 13, 14) with scape 4.0× as long as wide; clava shorter than in female, 2.7× as long as wide, its apical segment 1.3× as long as basal segment. Fore wing (Fig. 15) 2.5× as long as wide. Genitalia (Fig. 16) with aedeagal apodemes.

Type material examined: Lectotype ♀ [DEZA], here designated to avoid confusion regarding the status of the type specimens of this taxon, selected and slide-mounted at UCRC in January 2012 from a series of 37 dry, badly shriveled female syntypes (many of them incomplete) inside a piece

of plastic tube both sides of which were plugged by small pieces of cotton, on slide (Fig. 1) labeled: (1) [the original label inside the tube, printed] "Kayseri 9-11.VII.1934", (2) [the original label on the pin inserted through the tube, in blue ink] "*Aph-ea anat.* ♂♀", (3) "Mounted at UCR/ERM by V.V. Berezovskiy 2012 in Canada balsam", (4) "*Aphelinoidea anatolica* Nowicki, 1936 LECTOTYPE ♀ Designated by S.V. Triapitsyn 2012". The lectotype is in good condition, complete. Nowicki (1936), however, listed only 11 females from that locality, and the published (correct) collection date was 9.vi.1934.

Paralectotypes: 21♀ on slides [19♀, DEZA; 2♀, UCRC] and 15♀ on points [13♀, DEZA; 2♀, UCRC] (apparently, these are females but specimens are badly shriveled and many incomplete, so some males may be present instead), same data as the lectotype (mounted at UCRC in January 2012 from the same tube, all collected by Ś. Nowicki); 2♀ and 1♂ on points (all badly shriveled) [DEZA], mounted at UCRC in January 2012 from a piece of plastic tube both sides of which were plugged by small pieces of cotton, labeled: (1) [the original label inside the tube, printed] "Konya 7.VI.34", (2) [the original label on the pin inserted through the tube, in black ink] "*Aphelinoidea anatolica* Nov"; also 1♀ and 3♂ [DEZA] from Konya, Konya Province, Central Anatolia Region, Turkey (all collected by Ś. Nowicki), remounted at UCRC in January 2012 from a dried water-soluble mountant on the original Ś. Nowicki-style individual micro-slides on pins (Viggiani 2011) onto a normal slide in Canada balsam and labeled, respectively, as follows (the original labels): "Konya ♀ 7.6.34 *Aph-ea an.*" and "Konya 7.6.34 *Aph-ea anat.* ♂". Some of them were listed by Nowicki (1936: 147) as "a male and a female at Konya on the grass of irrigated land of the state "çiflik" 7th of the same month" [i.e., June 1934], but in fact more specimens with the same label were found. All the specimens mentioned above are treated here as syntypes because it is impossible to know which of them were counted and listed in the original description, and Nowicki (1936) did not designate a holotype. The remaining specimens from the syntype series of *A. anatolica* from Turkey listed by Nowicki (1936), one female taken by him at the railway station Beylik Köpri on 28.v.1934 (on the way between Eskişehir and Ankara in Central Anatolia region of Turkey) and two females collected in the evening on a high, common, white-flowered weed at Bunar Başi (North of Konya) on 6.vi.1934, are missing from the Nowicki collection in DEZA.

Also missing from there is the holotype of *A. anatolica* subspecies *halepensis* Nowicki (Nowicki 1936: 147), described from the single female collected "by sweeping poor vegetation near the ruined walls and under pistacia-trees along the road to the aviation-place in the eastern direction from the town, June 16, 1934" at Aleppo, Syria. It is listed here under *A. anatolica* as a *nomen dubium*, since its short original description without any illustrations does not allow for its recognition.

Additional material examined: Israel: 1♀, Southern District, Negev Desert, Eilat Mountains Nature Reserve, 29°34.73'N 34°53.62'E, 444 m, 15–30.iv.1995, M.E. Irwin [UCRC]. **Kyrgyzstan:** 1♀, Issyk-Kul, 5 km NNW of Karasaj, 41°36'16"N 77°52'54"E, 3530 m, 3.ix.1998, C.H. Dietrich [UCRC]. **Niger:** 1♀ 4♂, Tamesna, 15 km SW of In-Abangharhit, "ex pitfall trap *Schouwia thebaica*" (Brassicaceae) [BMNH].

Distribution: China (Xinjiang) (Hu & Lin 2005), Syria, Turkey (Nowicki 1936), as well as Israel, Kyrgyzstan and Niger (new records). Its records from Libya (Huffaker *et al.* 1954; Clausen 1978 [erroneously indicated as Spain, see Walker *et al.* 2005: 10]; Trjapitzin 1995) need to be verified, as mentioned by Walker *et al.* (2005) and also discussed here under *A. turanica*. Also probably in need of verification are the records of *A. anatolica* from Xinjiang, China (Hu & Lin 2005; Huang *et al.* 2007) because the female antenna of the Chinese specimens (Hu & Lin 2005: 155, fig. 3A) differs significantly in the length and width of the claval segments from that of the lectotype of *A. anatolica* (Fig. 6) and also its drawing in the original description (Nowicki 1936: 144, fig. 19b).

Hosts: Unknown, unless the identifications of *A. anatolica* from Libya in Huffaker *et al.* (1954) and Clausen (1978) from *Neoaliturus tenellus* (Baker) [as *Circulifer tenellus* (Baker)] were actually correct. The host records of beet leafhopper, *N. te-*

nellus [as *Circulifer tenellus*] for *A. anatolica* by Walker *et al.* (1997, 2005) should be referred to *A. (Aphelinoidea) gerlingi* n. sp. described below.

Comments: Because the holotype of *A. anatolica halepensis* is lost, we probably will never find out about its true identity, also due to the short, poor original description and the lack of illustrations of this subspecies. Therefore it is considered, at least for the time being, to be a *nomen dubium*. Designation of a neotype for this subspecies thus would be necessary to resolve the issue of its identity but collecting in or near its type locality is not feasible now. There is nothing dramatic in its original description (the noted differences in the morphological features are quite minor) that would easily separate it from the nominate subspecies, collected in Turkey, which definitely belongs to the *plutella* species group. The suggestion by Walker *et al.* (2005) that the species introduced from Iran into California, USA, and misidentified by them and also by Walker *et al.* (1997) (the misidentifications were actually mine) as *A. anatolica* might belong to *A. anatolica halepensis* were therefore far too speculative, being based mainly on body color. It is also very unlikely that Nowicki would have overlooked a striking difference of presence versus absence of a hyaline path in the fore wing chaetotaxy if *A. anatolica halepensis* had no such feature. The species from Iran misidentified by Walker *et al.* (1997, 2005) as *A. anatolica* has no distinct hyaline path on the fore wing (Figs 31, 32, 35) and thus belongs to the *semifuscipennis* species group as defined by Trjapitzin (1995). I consider it to be conspecific with the specimens from northern Africa reported as *Aphelinoidea* sp. "O" by Clausen (1978) from Morocco and referred to as an undescribed species (from Algeria, Egypt, and Morocco) from the *semifuscipennis* species group by Trjapitzin (1995). It is described here as *A. (Aphelinoidea) gerlingi* n. sp.

Aphelinoidea (Lathromeroides) bischoffi (Novicky, 1946)

(Figs 17–19)

Lathromeroides (*Lengerkeniola*) *bischoffi* Novicky, 1946: 45–46. Type locality: Kalvarienberg [park, ca. 47°56'40"N 16°51'56"E], Neusiedl am See, Burgenland, Austria. Holotype ♀ [DEZA], not examined.

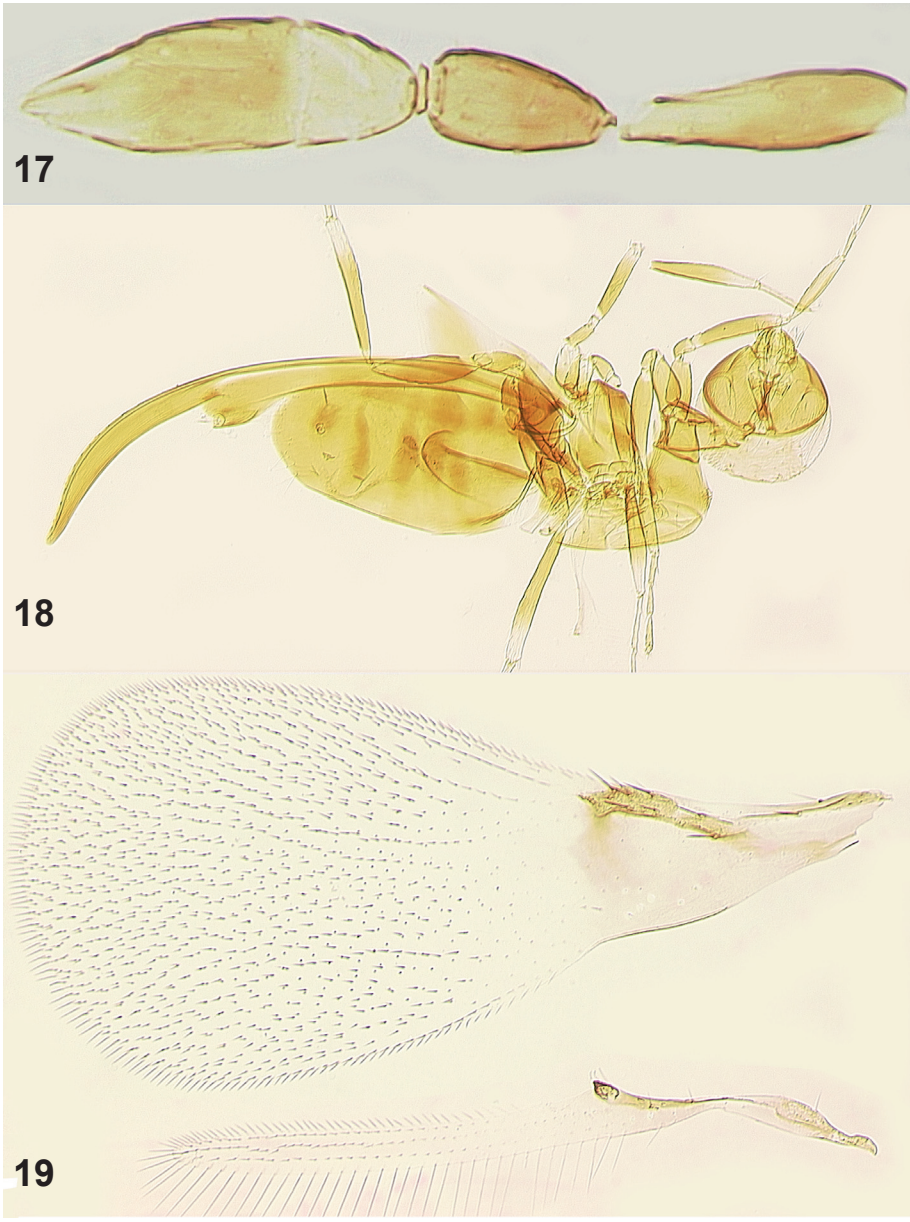
Aphelinoidea bischoffi (Novicky [as Nowicki]): Doutt & Viggiani 1968: 529 (list).

Aphelinoidea (Lathromeroides) bischoffi (Novicky): Trjapitzin 1995: 304 (key [as *A. bischoffi* (Nowicki)], distribution).

Aphelinoidea bischoffi (Novicky) [as Nowicki]: Fursov 2007: 966 (key, distribution, illustrations); Viggiani 2011: 104–106 (list, synonymy, taxonomic history, diagnosis, distribution, type information, illustrations).

Aphelinoidea cultrocaudata Wang, He, Zhang & Hu in Wang *et al.*, 2009: 316–319. Type locality: Akeqizhen (near Kaba) [as "Akesi Town"], 48°03.156'N 86°26.354'E, Habahe County, Xinjiang Uyghur Autonomous Region, China. Holotype ♀ [ICXU], examined during my visits there. Synonymy under *A. bischoffi* by Viggiani (2011: 105).

Diagnosis: This distinct species is easily recognizable by its very long (occupying the entire length of the gaster and at least 3.8× length of the metatibia), scimitar-shaped ovipositor (Fig. 18) which is markedly exserted beyond the gastral apex



Figs 17–19: *Aphelinoidea (Lathromeroides) bischoffi* (Novicky), female (Lajsu Ravine, Karakuldzha, Osh, Kyrgyzstan): (17) antenna; (18) body; (19) fore and hind wings.

(best observed in lateral view). Also see the detailed original description, as well as the nice drawings in Fursov (2007) and Viggiani (2011). Illustrated here, to facilitate its recognition, are its female antenna (Fig. 17) (clava 2.8–2.9× as long as wide) and fore and hind wings (Fig. 19). The fore wing is 2.4–2.9× as long as wide and its disc has a narrow, distinct hyaline path just beyond the venation.

Material examined: Kyrgyzstan: 1♀, Osh, Karakuldzha, Lajsu Ravine, 40°31'20"N 73°37'10"E, 1815 m, 25.vi.1999, C.H. Dietrich [UCRC].

Distribution: Austria, China (Xinjiang), Croatia, Moldova, Spain, Ukraine (Novicky 1946; Trjapitzin 1995; Fursov 2007; Wang *et al.* 2009; Viggiani 2011), and Kyrgyzstan (new record). Its listings from Germany (e.g., Viggiani 2011) are incorrect, as both localities of the type series are in Burgenland, Austria, the other one (of the unspecified number of paratypes) being Jungerberg (near [W of] Jois, 47°57'38"N 16°46'44'E) between Jois and Winden am See (Novicky 1946: 46, as "Jungenberg").

Hosts: Unknown.

Aphelinoidea (Aphelinoidea) deserticola Nowicki, 1936

(Figs 20–26)

Aphelinoidea (Aphelinoidea) deserticola Nowicki, 1936: 141–144. Type locality: Biskra, Biskra Province, Algeria ("one female taken" "at Biscra (Northern Sahara) by sweeping grass in the palm orchard on June 24th, 1931").

Aphelinoidea deserticola Nowicki: Doutt & Viggiani 1968: 529 (list); Lin 1994: 84 (compared with *A. retiruga*); Fursov 2007: 968–969 (illustrations, key, distribution); Viggiani 2011: 104 (list); Khan & Anis 2016: 90 (compared with *A. yousufi*).

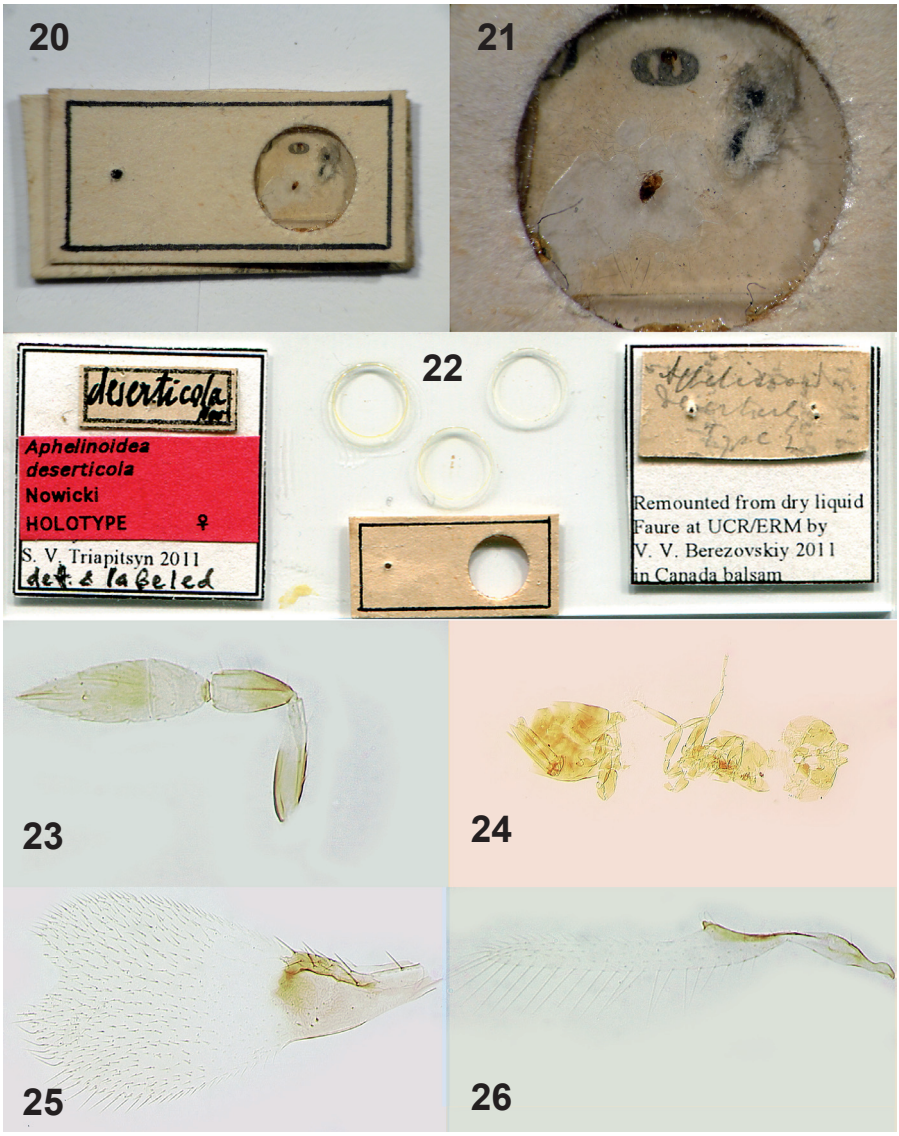
Aphelinoidea (Aphelinoidea) deserticola Nowicki: Trjapitzin 1995: 302 (listed in *anatolica* species group of *Aphelinoidea s.str.*), 305 (key, distribution), 307 (compared with *A. subexserta* Nowicki).

Diagnosis: *Aphelinoidea deserticola* belongs to the *plutella* species group of *A. (Aphelinoidea)* as defined by Walker *et al.* (2005) (= the renamed *anatolica* species group of Trjapitzin 1995) because it has a hyaline, sparsely setose path on the fore wing disc beyond the venation (Fig. 25). The species is difficult to recognize from other similar members of the same species group (Table 1) except for its characteristic fore wing with the disc strongly darkened behind venation, and darkening also projecting a little beyond the apex of venation (Fig. 25).

Redescription: Female (holotype). See good original description of body color. In slide-mounted specimen, mesosoma mostly light brown except propodeum a little darker.

Antenna (Fig. 23) with scape minus radicle 3.9× as long as wide; pedicel 1.85× as long as wide; first anellus larger than second, the latter partially imbedded into first claval segment; clava 3.1× as long as wide and 2.3× length of pedicel; apical segment of clava 2.3× length of basal segment, the latter incompletely, obliquely divided in middle on its inner side; basal segment of clava with 1 mps, apical segment with several mps.

Mesoscutum and scutellum (Fig. 24) with faint cell-like sculpture. Fore wing (Fig. 25) probably about 2.2× as long as wide (both are incomplete so it is impossible to measure their length precisely); disc faintly, inconspicuously infumate



Figs 20–26: *Aphelinoidea (Aphelinoidea) deserticola* Nowicki, female (holotype): (20, 21) original micro-slide prior to re-mounting; (22) slide after re-mounting; (23) antenna; (24) body; (25) fore wing; (26) hind wing.

and with very strong darker cloud (infuscation) behind venation (also projecting slightly beyond apex of venation), with distinct hyaline, sparsely setose (most setae very short and light-colored) path across wing just beyond venation, more or less uniformly setose in apical part of wing beyond hyaline area except for a few distinct setal lines; longest marginal seta 0.14× greatest width of wing. Hind wing (Fig. 26) about 11.7× as long as wide, disc slightly infumate (more so behind the venation) and with 3 rows of setae; longest marginal seta 1.8× greatest width of wing.

Ovipositor 1.6× length of metatibia, occupying about 0.75× length of gaster (Fig. 24), and not exserted beyond its apex.

Measurements of the remounted holotype (μm). Ovipositor, 239. Antenna: scape minus radicle, 85; pedicel, 56; clava (given as lengths of basal/apical segments), 40/91. Fore wing width, 218; longest marginal seta, 30. Hind wing, 351:30; longest marginal seta, 55. Metatibia, 148.

Variation (non-type specimen from Israel). Clava 2.4× length of pedicel, apical segment of clava 2.2× length of basal segment; fore wing about 2.0× as long as wide.

Male. Unknown.

Type material examined: Holotype ♀ [DEZA], remounted at UCRC in December 2011 from a completely dried (cracked and leaving almost no medium around the body, Fig. 21), slightly darkened water-soluble mountant in the original Nowicki-style micro-slide on a pin (Fig. 20) (Viggiani 2011) onto a normal slide in Canada balsam (Fig. 22) and labeled as follows: (1) [original label glued onto the underside of the original micro-slide with a fragmented specimen, faintly in pencil] "*Aphelinoidea deserticola* Type ♀ 4.VI.31.", (2) [?original identification label] "*deserticola* Nov.", (3) [added after remounting] "Remounted from dry liquid Faure at UCR/ERM by V.V. Berezovskiy 2011 in Canada balsam", (4) [added after remounting] "*Aphelinoidea deserticola* Nowicki, 1936 HOLOTYPE ♀ Det. by S. V. Triapitsyn 2011". Most likely, "2" in the date of collection was cut off from the original label making it "4.VI.31". The holotype is in very poor condition, now under three coverslips, with one fore wing missing (the following parts are detached from the body: head with one antenna attached, the other antenna, one fore wing, and both hind wings).

Other material examined: Israel: 1♀, Southern District, Negev Desert, Eilat Mountains Nature Reserve, 29°34'45"N 34°53'38"E, 440 m, 15–22.iv.1996, M.E. Irwin [UCRC].

Distribution: Algeria, Ukraine (Nowicki 1936; Trjapitzin 1995; Fursov 2007), and Israel (new record). However, its records from Ukraine need to be verified as it is unlikely that this desert-dwelling species would occur as far north in a temperate environment.

Hosts: Unknown.

Comments: The two female specimens of *A. melanosoma* Nowicki from Krasnodar, Karasnodar Territory, Russia, key to *A. deserticola* in Fursov (2007). His illustrations of the female of the latter taxon (Fursov 2007: 968, fig. 543) seem to be based on a misidentified specimen, quite possibly of *A. melanosoma*, as the drawing of the adult female (Fursov 2007: 968, fig. 543–1) clearly shows a very short ovipositor, which is definitely notably shorter (relative to the length of metatibia) than that in the holotype of *A. deserticola*.

Aphelinoidea (Aphelinoidea) gerlingi n. sp.

(Figs 27–37)

Aphelinoidea "O": Clausen 1978: 56 (97,015 specimens released in California, USA, of Morocco origin); Trjapitzin 1995: 302 (undescribed species from *semifuscipennis* species group of *Aphelinoidea s.str.* from Algeria, Egypt, and Morocco).

Aphelinoidea anatolica Nowicki (misident.): Bayoun *et al.* 1998: 133–135 (introduction from Iran to California, USA), 2008: 415, 420, 423 (egg parasitoid of *Neoaliturus tenellus* [as *Circulifer tenellus*] in California).

Aphelinoidea (Aphelinoidea) anatolica Nowicki (misident.): Walker *et al.* 2005: 3 (apparent establishment in California), 5 (origin of the cultures), 9–12 (key, distribution, host association, illustrations, discussion), 14 (illustration); 16 (illustration), 19–20 (illustrations); Rakitov & Triapitsyn 2013: 544 (distribution [in part]).

Aphelinoidea anatolica subsp. *halepensis* Nowicki: Walker *et al.* 2005: 10, 12 (misidentification, discussion).

LSID: urn:lsid:zoobank.org:act:FFC50243-E222-49D8-8D3D-2A3B72BFDCC2.

Etymology: The new species is named after the late Prof. Dan Gerling of the University of Tel Aviv, who liked to visit Riverside, California, and was always very kind to me.

Diagnosis: *Aphelinoidea (A.) gerlingi* belongs to the *semifuscipennis* species group of *A. (Aphelinoidea)* as defined by Trjapitzin (1995), because it lacks a hyaline, sparsely setose path on the fore wing disc beyond the venation (Figs 31, 32, 35). Its female differs from those of the Oriental species *A. (Aphelinoidea) longiclavata* Yousuf & Shafee from India and the Holarctic *A. semifuscipennis* by the features indicated in the key, as follows.

Key to females of the Holarctic and Oriental species of the *semifuscipennis* species group of *Aphelinoidea (Aphelinoidea)*

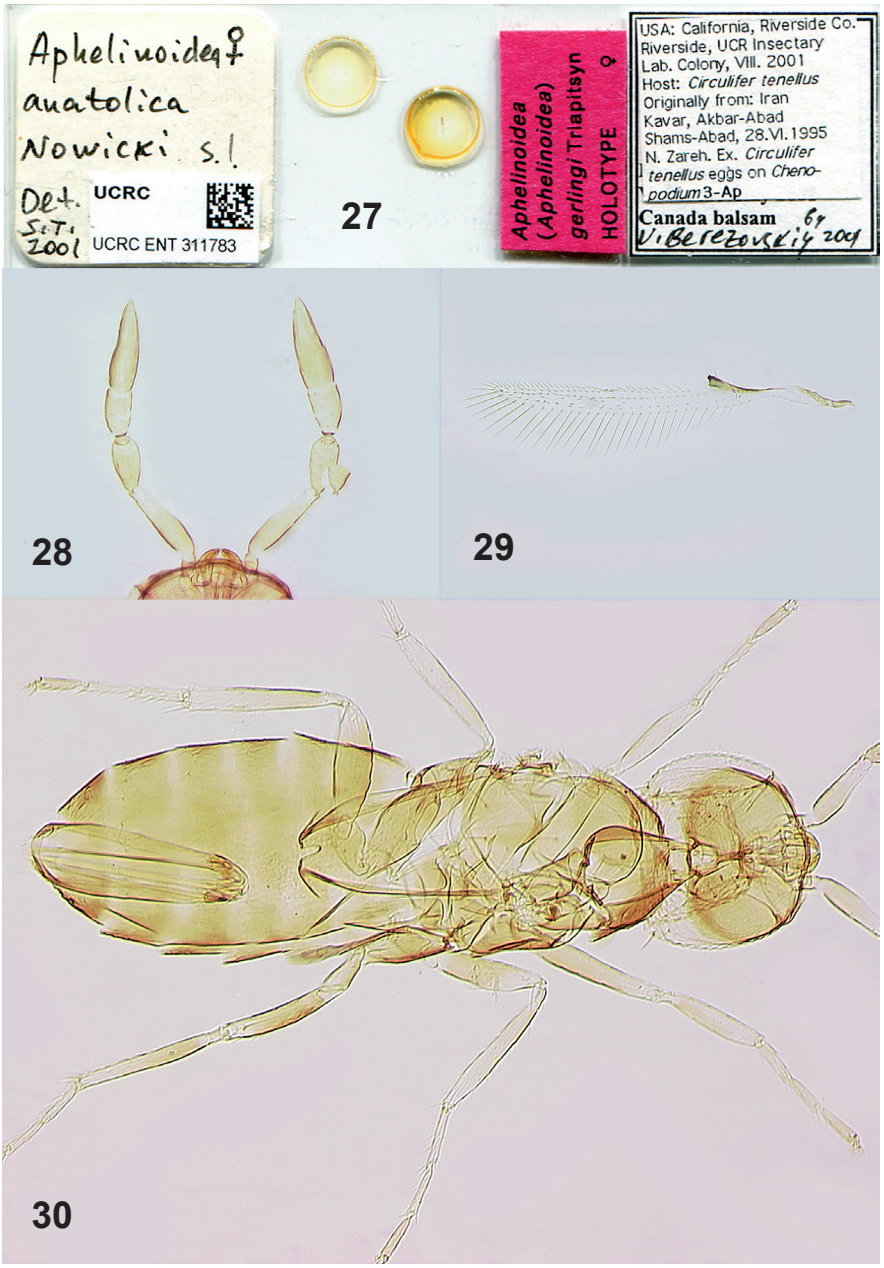
1 Pronotum yellow, mesoscutum orange-yellow (Fig. 32); clava at least 3.7× as long as wide, its apical segment at least 2.1× as long as basal segment.... ..... *A. (A.) gerlingi* n. sp.

– Pronotum brown, mesoscutum pale brown or brown to dark brown; clava at most 3.2× as long as wide, its apical segment at most 2.0× as long as basal segment 2

2 (1) Mesoscutum and scutellum brown to dark brown .... *A. (A.) semifuscipennis* Girault

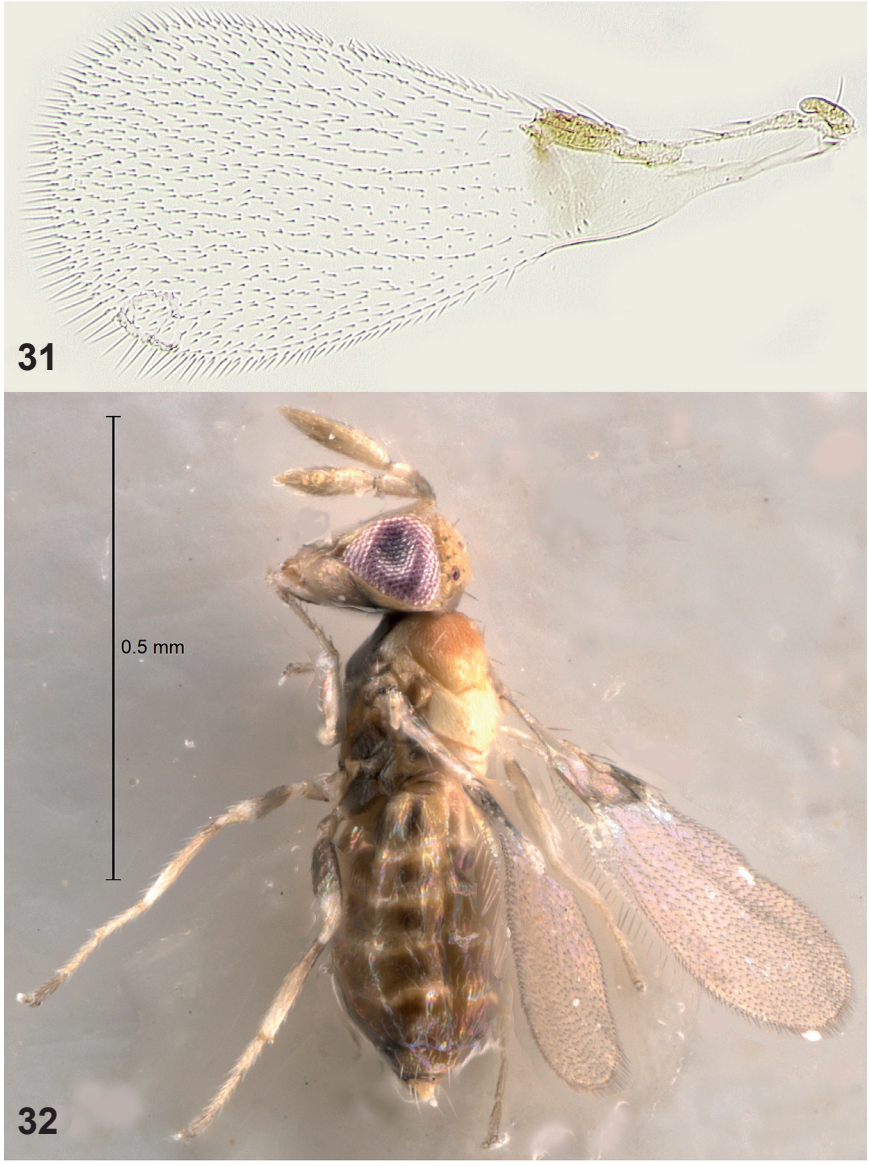
– Mesoscutum pale brown, scutellum yellow .... *A. (A.) longiclavata* Yousuf & Shafee

Description: Female (slide-mounted holotype). Body color as in Fig. 32. Head dirty yellow except gena brownish; scape and pedicel brownish with apices pale, basal segment of clava pale, apical segment brown; pronotum, scutellum, and metanotum bright yellow, mesoscutum and propodeum orange-yellow (mesoscutum darker orange proximally than distally); gaster brown with some orange-brown; legs light brown to brown with apices of tibiae pale.



Figs 27–30: *Aphelinoidea (Aphelinoidea) gerlingi* n. sp., female (holotype): (27) slide; (28) antennae; (29) hind wing; (30) body.

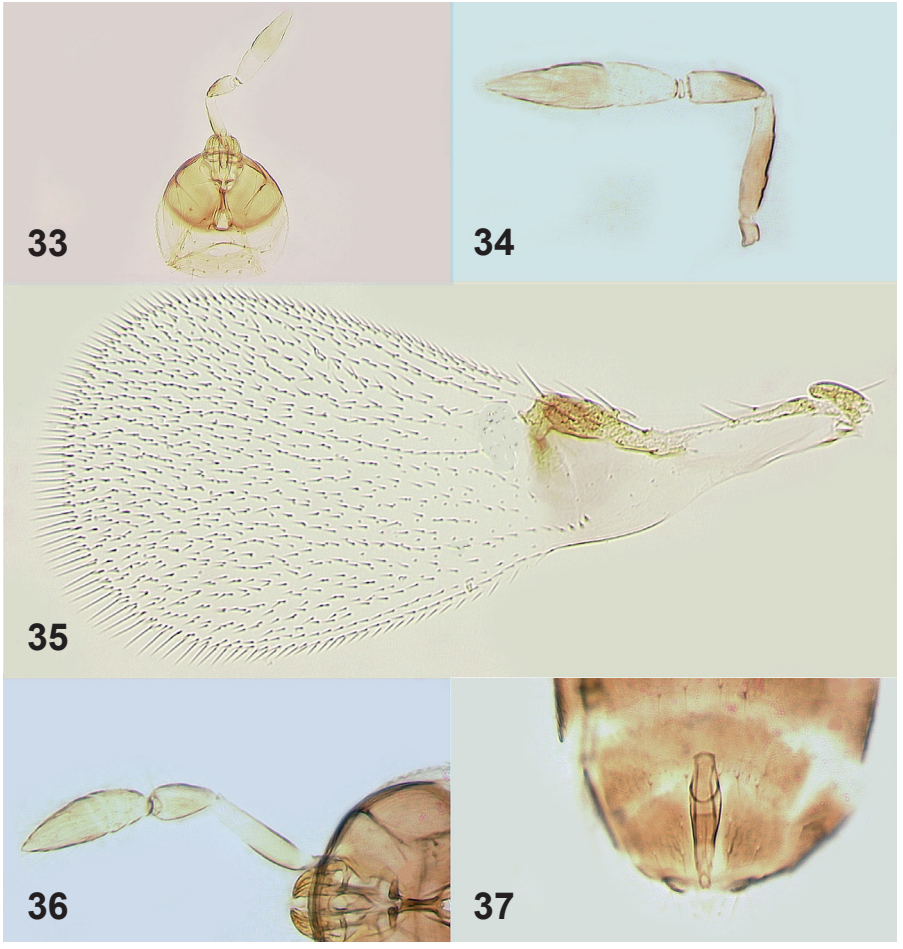
Head (Fig. 30) about as wide as mesosoma; face and vertex with sculpture. Antenna (Fig. 28) with scape minus radicle at least 3.2× as long as wide (not in good lateral view); pedicel 2.3× as long as wide; first anellus much larger than second,



Figs 31, 32: *Aphelinoidea (Aphelinoidea) gerlingi* n. sp., female: (31) fore wing, holotype; (32) habitus, paratype from UCRC insectary colony '3-Ap' of Kavar, Fars, Iran origin.

the latter partially imbedded into first claval segment; clava 4.5× as long as wide, 2.0× as long as pedicel; apical segment of clava 2.2× length of basal segment, the latter incompletely, obliquely divided in middle on its inner side; basal segment of clava with 1 mps, apical segment with several mps.

Mesosoma (Fig. 30) shorter than metasoma. Pronotum faintly sculptured and mediolongitudinally divided. Mesoscutum and scutellum with faint sculpture, each with two pairs of strong setae. Fore wing (Fig. 31) 2.25× as long as wide; marginal vein thickened, stigmal vein short; disc mostly hyaline except notably infuscate



Figs 33–37: *Aphelinoidea (Aphelinoidea) gerlingi* n. sp., paratypes: (33, 34) female, from Eilat Mountains Nature Reserve, Negev Desert, Israel: (33) head and antenna; (34) antenna; (35–37) male, from UCRC insectary colony '3-Ap' of Kavar, Fars, Iran origin: (35) fore wing; (36) antenna; (37) genitalia.

behind venation and more or less uniformly setose beyond venation except for a few distinct setal lines; longest marginal seta 0.13× greatest width of wing. Hind wing (Fig. 29) 13.1× as long as wide, disc almost hyaline except slightly infuscate behind venation, and with 3 rows of setae; longest marginal seta 2.0× greatest width of wing.

Ovipositor short, 1.3× length of metatibia, occupying about 0.55× length of gaster (Fig. 30) and not exserted beyond its apex. Hypopygium extending to about 0.8× length of gaster.

Measurements of the holotype (μm). Body, 695; head, 148; mesosoma, 233; metasoma, 339; ovipositor, 186. Antenna, radicle, 15; rest of scape, 79; pedicel, 39; clava (as lengths of basal/apical segments), 39/85. Fore wing, 485:215; longest marginal seta, 29. Hind wing, 394:30; longest marginal seta, 61. Metatibia, 141.

Variation (paratypes). Body length of dry-mounted specimens 560–660 μm, of slide-mounted specimens 690–800 μm. In slide-mounted specimen from Israel, head mostly yellowish except gena brown; antenna light brown to brown except apices of scape, pedicel and first segment of clava pale; dorsum of mesosoma mostly yellow or light brownish except propodeum a little darker; gaster brown; legs brownish except apices of tibiae yellowish or light brown. Antenna (Figs 33, 34) with scape minus radicle 4.1–4.7× as long as wide; clava 3.7–4.5× (usually at least 4.0×) as long as wide and 2.5–2.6× length of pedicel; apical segment of clava 2.1–2.2× length of basal segment. Fore wing 2.05–2.30× as long as wide. Ovipositor 1.2–1.5× length of metatibia; hypopygium extending to 0.75–0.8× length of gaster.

Male (paratypes). Body length of dry-mounted specimens 560–630 μm, of slide-mounted specimens 720–790 μm. Similar to female except sometimes mesosoma slightly darker. Antenna (Fig. 36) with clava 2.7–3.0× as long as wide. Fore wing (Fig. 35) 2.2–2.3× as long as wide. Genitalia (Fig. 37) length 85–94 μm; aedeagal apodemes present. Note that these are absent in *A. semifuscipennis* Girault (Fig. 66) but present in *A. retiruga* Lin from Fujian, China (cf. Lin 1994: 84, fig. 52F). Thus, this diagnostically important feature can be variable within the *semifuscipennis* species group of *A. (Aphelinoidea)* if it is defined solely on the fore wing disc chaetotaxy (Trjapitzin 1995); Pinto (2006) indicated that aedeagal apodemes are absent in the male genitalia of the *semifuscipennis* species group but that most likely was based only on the examination of the males of *A. semifuscipennis*.

Holotype: ♀ [UCRC] on slide (Fig. 27) labeled: (1) "USA: California, Riverside Co. Riverside, UCR Insectary Lab. Colony, VIII.2001 Host: *Circulifer tenellus* Originally from: Iran, Kavar, Akbar-Abad Shams-Abad, 28.VI.1995 N. Zareh. Ex. *Circulifer tenellus* eggs on *Cheno-podium* 3-Ap", (2) "Canada balsam by V. Berezovskiy 2001", (3) [magenta] "*Aphelinoidea (Aphelinoidea) gerlingi* Triapitsyn HOLOTYPE ♀", (4) "*Aphelinoidea* ♀ *anatolica* Nowicki s.l. Det. S. T. 2001", (5) [database barcode label] "UCRC UCRC ENT 311783". The holotype is in good condition, complete, with the wings dissected under a separate coverslip.

Paratypes: 1♀ [donated to TAU from UCRC] on slide labeled: (1) "ISRAEL: NEGEV, Elat Mts. Nat. Res., Wadi Shelonv, 297 m. IV-15/30-1995 29°34'73"N 34°53'62"E. M.E. Irwin, coll.", (2) "*Aphelinoidea* ♀ [illegible in pencil, in J.D. Pinto's handwriting] ? sp. O 95-04-30-01 [J.D. Pinto database code] balsam (grp) [i.e., slide-mounted by Gary R. Platner]". The original data label of this

paratype has mistakes, so its should rather read as follows: **Israel:** Southern District, Negev Desert, Eilat Mountains Nature Reserve, "Wadi Shelon" [not found on any available map but there is a wadi at the following coordinates at the foot of Mount Solomon (Mount Sh[e]lomo)], 29°34.73'N 34°53.62'E, 444 m, 15–30.iv.1995, M.E. Irwin. **USA:** California, Riverside Co., University of California at Riverside (UCR) quarantine laboratory (in 1995 only), then insectary colony '3-Ap' (Bayoun *et al.* 1998) on *Neoaliturus tenellus* eggs (originally from **Iran:** Fars Province, Kavar, Akbarabad, 28.vi.1995, N. Zareh, from leafhopper eggs on *Chenopodium* sp., UCR Quarantine shipping & receiving number S&R 95-40-3), I.M. Bayoun: vii–ix.1995 (progeny generations F1–F3) [3♀ on slides, UCRC]; ii.1996 (F7–F8) [3♀ 3♂ on slides, UCRC]; viii.2001 [2♀ 2♂ on cards, DEZA; 9♀ (2 on slides, 7 on cards), 8♂ (2 on slides, 6 on cards), UCRC].

Other material examined: Algeria: 1♀ 3♂, Algiers, "Monsevrré", 29.v.1954, C.B. Huffaker, on *Chenopodium* sp. (University of California, Berkeley (UCB) quarantine (at Gill Tract, Albany, California, USA) receiving number 54-16) [EMEC]. **Morocco:** 1♂, 26 km from Agadir, 15.iii.1954, C.B. Huffaker ("Shipment 54-3 Bag #2 ex *Circulifer* on *Mathiola* [sic] Emerged in Quar. Albany, Calif") [EMEC]. **Oman:** 1♀, 24 km N of Salalah on Thumrait Rd., 23.ii.1986, J.T. Huber [UCRC]. **USA:** California, Alameda County, Albany, UCB quarantine: 30.vi.1954, J. Nakata ("ex *Circulifer tenellus* on sugar beet. 1st Gen. from Egypt material") (*Aphelinoidea* "O") [3♀ 2♂, EMEC]; 2.vii.1954, J. Nakata ("Quarantine or Insectary Culture ex eggs of *Circulifer tenellus* on sugar beet From Egypt") [4♀ 1♂, EMEC]; 13.iv.1955, F.E. Skinner ("Insectary Culture ex eggs of. *Circulifer tenellus* on sugar beet Coll. No. 309") (*Aphelinoidea* "O" of unknown origin, possibly from Morocco (Clausen 1978)) [numerous ♀ and ♂ on 3 slides, EMEC].

Distribution: Algeria, Egypt, Morocco (Clausen 1978; Trjapitzin 1995 [as *Aphelinoidea* "O"), Iran (Walker *et al.* 2005 [as *A. anatolica*]), Israel, and Oman; introduced from Iran and apparently established in California, USA (Walker *et al.* 1997, 2005 [as *A. anatolica*]) but later present there only in small numbers (Bayoun *et al.* 2008 [as *A. anatolica*]).

Host: Beet leafhopper, *Neoaliturus tenellus* (Baker) (Cicadellidae).

Aphelinoidea (Aphelinoidea) laticlavia Fursov, 2007

Aphelinoidea laticlavia Fursov, 2007: 967 (illustrations), 969 (in key). Type locality: Bogorodichnoye, Donetsk Region, Ukraine. Holotype ♀ [SIZK], not examined.

Diagnosis: The species belongs the *plutella* species group of *A. (Aphelinoidea)* (fore wing disc with a transverse hyaline path just beyond venation).

Female. Clava 2.4× as long as wide and 1.5× length of pedicel; apical segment of clava 1.8× length of its basal segment (Fursov 2007).

Male. Unknown.

Distribution: Ukraine.

Hosts: Unknown.

Comments: A very brief original description and illustrations of only a female antenna and a pair of wings preclude proper recognition of this taxon.

Aphelinoidea (Aphelinoidea) longiclavata Yousuf & Shafee, 1988

(Figs 38, 39)

Aphelinoidea longiclavata Yousuf & Shafee, 1988: 105 (key, description), fig. 16I–J. Type locality: Aligarh, Uttar Pradesh, India. Holotype ♀ in ZDAMU (not examined).

Aphelinoidea retiruga Lin, 1994: 83–84, 234 (diagnosis and type information in English). Type locality: Xianyou County, Fujian, China. Holotype ♀ in FAFU (not examined). **N. syn.**
Aphelinoidea longiclavata Yousuf & Shafee: Khan & Anis 2016: 91–92 (taxonomic history, diagnosis, distribution in India, key), 96 (illustrations).

Material examined (all in UCRC)**: India:** 2♀ 1♂, National Capital Territory of Delhi, 11.v.1985, J. LaSalle; 1♀ 1♂, National Capital Territory of Delhi, New Delhi, Indian Agricultural Research Institute, 28°37'51"N 77°09'50"E, 220 m, 5.xi.2003 (1♂), 28°38'00"N 77°09'53"E, 227 m, 3.xi.2003 (1♀), J.M. Heraty.

Distribution: India (Yousuf & Shafee 1988; Khan & Anis 2016), China (Fujian) (Lin 1994 [as *A. retiruga*]). All known specimens of this species are from the Oriental Region.

Host: According to Yousuf and Shafee (1988), the holotype and four female paratypes were obtained from eggs of *Apoderus sissu* G.A.K. Marshall (Coleoptera: Curculionidae), which is also sometimes placed in Attelabidae as *Pseudallapoderus sissu* (G.A.K. Marshall).

Comments: In the female specimen from the series collected in 2003, the clava is 2.7× as long as wide and its apical segment is 1.9× as long as the basal segment (Fig. 38), while the fore wing (Fig. 39) is 2.4× as long as wide and the ovipositor is 1.4× length of the metatibia. That is consistent with the redescription of *A.*

Figs 38, 39: *Aphelinoidea (Aphelinoidea) longiclavata* Yousuf & Shafee, female (Indian Agricultural Research Institute, New Delhi, India): (38) antenna; (39) fore wing.

longiclavata given in Khan and Anis (2016). However, in the otherwise similarly looking female from the series collected in 1985, the ovipositor is relatively longer and constitutes 2.1–2.4× length of the metatibia.

Aphelinoidea retiruga is considered a junior synonym of *A. longiclavata* as the original description and illustrations (Lin 1994) fit quite well both the original description (Yousuf & Shafee 1988) and redescription and illustrations (Khan & Anis 2016) of the latter species.

Aphelinoidea (Aphelinoidea) melanosoma Nowicki, 1940

(Figs 40–50)

Aphelinoidea (Aphelinoidea) anatolica Now[icki]. subsp. *melanosoma* Nowicki, 1940: 659–660. Type locality: Warsaw, Poland ("taken by sweeping grass on the Warsawian town-filters").

Aphelinoidea melanosoma Nowicki: Doutt & Viggiani 1968: 530 (list); Fursov 2007: 967 (key, distribution); Walker *et al.* 2005: 10, 12 (discussion; paratype in BMNH); Viggiani 2011: 104 (list); Rakitov & Triapitsyn 2013: 544 (key, distribution).

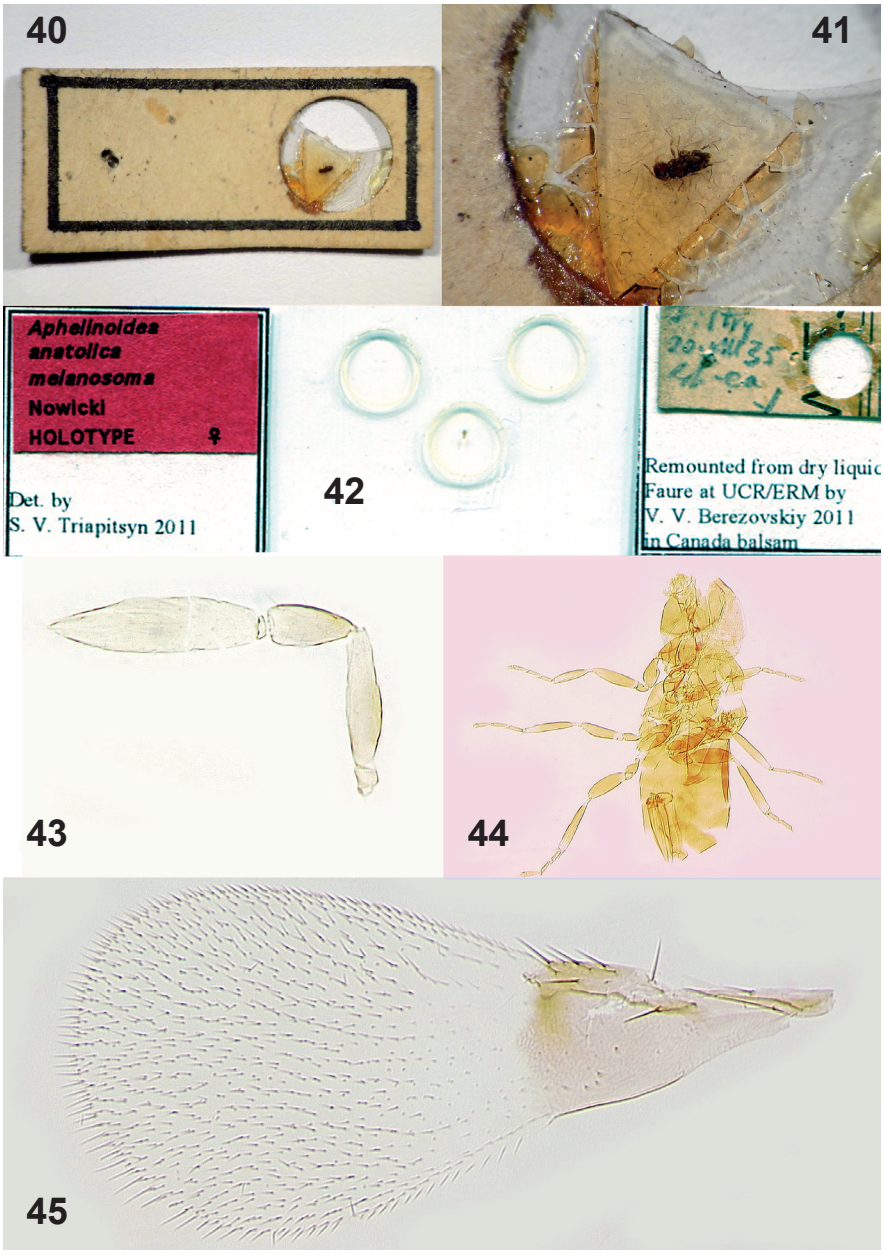
Aphelinoidea (Aphelinoidea) melanosoma Nowicki: Trjapitzin 1995: 302 (listed in the *anatolica* species group of *Aphelinoidea s.str.*), 305 (key, distribution), 307–308 (compared with *A. anatolica* and *A. turanica*).

Diagnosis: *Aphelinoidea melanosoma* belongs to the *plutella* species group of *A. (Aphelinoidea)* as defined by Walker *et al.* (2005) (= the renamed *anatolica* species group of Trjapitzin (1995)), because it has a hyaline, sparsely setose path on the fore wing disc beyond the venation (Figs 45, 50). It is almost indistinguishable from *A. anatolica* (Table 1) except for the darker color of the mesosoma, but that may be due to its more northern distribution where specimens can be often darker colored than the conspecific ones from more southern areas. However, in the absence of any supporting biological or molecular data it would be premature to speculate any further about their possible conspecificity. Also in this mix of the difficult to recognize nominal species of the *plutella* species group of *Aphelinoidea s.str.* is the eastern Nearctic *A. plutella* Girault (Table 1), which could also potentially occur in the western Palearctic region, being possibly described there under one of Nowicki's names.

Redescription: Female (holotype). Head of slide-mounted specimen (Fig. 44) apparently much lighter than rest of body; mesosoma and gaster apparently mostly dark brown except mesoscutum and scutellum apparently slightly lighter (? brown); antenna mostly brown except first segment of clava a little lighter; legs brown to dark brown except apices of tibiae light brown.

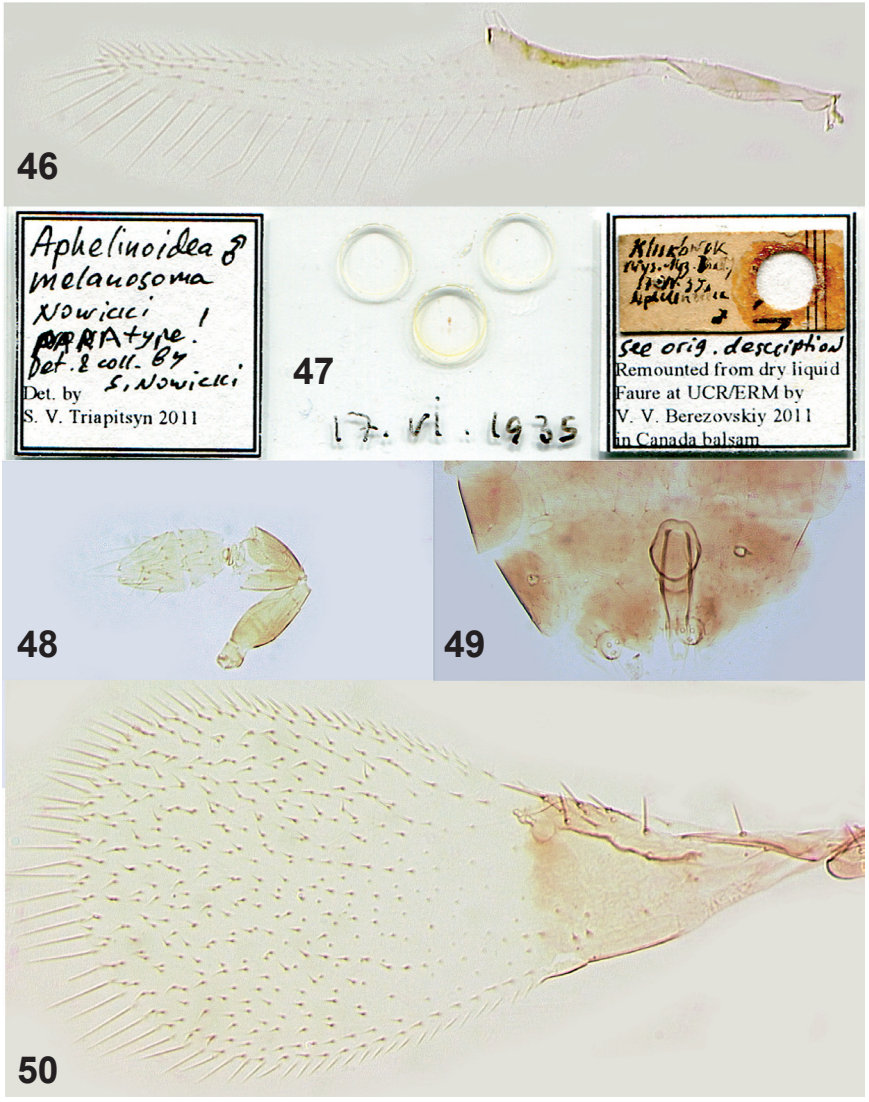
Antenna (Fig. 43) with scape minus radicle 3.8× as long as wide; pedicel 2.05× as long as wide; first anellus much larger than second, the latter partially imbedded into first claval segment; clava 3.8× as long as wide, 2.5× length of pedicel; apical segment of clava 2.1× length of basal segment, the latter incompletely, obliquely divided in middle on its inner side; basal segment of clava with 1 mps, apical segment with several mps.

Mesosoma (Fig. 44) shorter than metasoma. Mesoscutum and scutellum with faint cell-like sculpture. Fore wing (Fig. 45) 2.2× as long as wide; disc almost



Figs 40–45: *Aphelinoidea (Aphelinoidea) melanosoma* Nowicki, female (holotype of *A. (Aphelinoidea) anatolica* subspecies *melanosoma* Nowicki): (40, 41) original micro-slide prior to re-mounting; (42) slide after re-mounting; (43) antenna; (44) body; (45) fore wing.

hyaline beyond and strongly infuscate behind venation, with a distinct hyaline, sparsely setose (most setae very short) path across wing just beyond venation, more or less uniformly setose in apical 0.45 of wing (beyond hyaline area) except for a few distinct setal lines; longest marginal seta 0.11× greatest width of wing.



Figs 46–50: *Aphelinoidea (Aphelinoidea) melanosoma* Nowicki, paratypes of *A. (Aphelinoidea) anatolica* subspecies *melanosoma* Nowicki (from [Wyszonki-]Klukówek, Podlaskie, Poland): (46) female hind wing; (47) male slide after re-mounting; (48) male antenna; (49) male genitalia; (50) male fore wing.

Ovipositor short, 1.2× length of metatibia, occupying about 0.5× length of gaster (Fig. 44) and not exserted beyond its apex. Hypopygium apparently extending to about 0.8× length of gaster.

Measurements of the remounted holotype (µm). Body, 756; mesosoma, 289; metasoma, 351; ovipositor, 197. Antenna, radicle, 15; rest of scape, 92; pedicel, 59; clava (given as lengths of basal/apical segments), 47/98. Fore wing, 536:239; longest marginal seta, 27. Metatibia, 167.

Variation (paratypes and non-type specimens of Nowicki). Antenna with scape minus radicle 3.2× as long as wide; clava 3.2× as long as wide and 2.6× length of pedicel; apical segment of clava 2.8× length of basal segment. Hind wing (Fig. 46) about 12× as long as wide, disc almost hyaline (slightly infuscate behind venation) and with 3 rows of setae; longest marginal seta 1.4× greatest width of wing. Ovipositor 1.3–1.4× length of metatibia.

In the specimens from Krasnodar, Russia, the fore wing is a little narrower, 2.4× as long as wide.

Male (paratype). Body length 763 µm (slide-mounted, remounted specimen, Fig. 47). Similar to female in color. Antenna (Fig. 48) with scape minus radicle 2.3× as long as wide; clava 1.75× as long as wide. Fore wing (Fig. 50) 2.2× as long as wide. Genitalia (Fig. 49) with aedeagal apodemes.

Type material examined: Holotype ♀ of *A. anatolica* subspecies *melanosoma* [DEZA], remounted at UCRC in December 2011 from a cracked, slightly darkened water-soluble mountant (Fig. 41) in the original Nowicki-style micro-slide on a pin (Fig. 40) onto a normal slide in Canada balsam (Fig. 42) and labeled as follows: (1) [on the underside of the original micro-slide, written faintly in pencil] "Filtry [i.e., filters in Polish] 20.VIII.35 *Aph-ea*"; (2) [added after remounting] "Remounted from dry liquid Faure at UCR/ERM by V.V. Berezovskiy 2011 in Canada balsam"; (3) [red, added after remounting] "*Aphelinoidea anatolica melanosoma* Nowicki, 1940 HOLOTYPE ♀ Det. by S. V. Triapitsyn 2011". The holotype is in fair condition, almost complete (of the wings, only one fore wing and bases of the other fore wing and one hind wing remain).

Paratypes (those from Poland remounted at UCRC from the original individual Nowicki-style micro-slides): **Hungary:** Pest County, Vác, Tudóc Hill, 13.vii.1930, L. Biró [1♀ in a darkened medium in a Nowicki-style micro-slide on a pin, BMNH] (labeled: (1) "Vácz.Tudócdomb, Biró.1930. VII.13.", (2) "Det. S. Novickij ♀ *Aphelinoidea melanosoma* var. *angustipennis* n.ssp. [a manuscript name of Ś. Nowicki] Type", (3) "B.M. 1981–209 Novitzky", (4) "♀ *Aphelinoidea anatolica* ssp. *melanosoma* Now. Det. Z. Bouček, 1981 PT: 1940.Z.aE.26:660", (5) [yellow circle] "Para-type"; (6) [barcode database label] "NHMUK011507543"). **Poland:** Masovian Voivodeship, Warsaw, "E.K.D." (specimens were collected by Ś. Nowicki using an aspirator on window panes in cars of the electric train Warsaw – Grodzisk Mazowiecki; it is an abbreviation standing for "Elektryczne Koleje Dojazdowe" in Polish, the suburban railway line that operated during 1922–1947), 2.vii.1938 [1♀, DEZA] (original labels: (1) [in pencil, on the underside] "EKD 2 VII 38", (2) "*melanosoma* Nov"); Podlaskie Voivodeship, Wysokie Mazowieckie County, "swept in the woods of the estate Klukówek" (Nowicki 1940: 660; probably now within Wyszonki-Klukówek Village in the administrative district of Gmina Klukowo), 17.vi.1935 [1♀ 1♂, DEZA] (original labels as in Fig. 47).

Other material examined: Poland: 3♀, Masovian Voivodeship, ?Warsaw, "E.K.D." (see above), 19.vi.1939, 6.vii.1939, vi.1941 [DEZA]. **Russia:** 2♀ 1♂, Krasnodar Territory, Krasnodar, All-Russian Research Institute of Biological Plant Protection, 11–12.viii.2001 (1♂), 17–18.viii.2001 (1♀), 26–27. viii.2001 (1♀), V.V. Kostjukov [all UCRC]. **Spain:** 1♀, Madrid Province, Sierra de Guadarrama, Valle de los Caídos, 1200 m, 21.v.1988, L. Masner [UCRC]. **Country and locality unknown** (almost certainly from Europe: illegible handwriting of the collection localities): 2♂ 17.vi.1942, 16.vii.1942 [DEZA] (these non-type specimens were collected and identified as *A. melanosoma* by Ś. Nowicki and remounted at UCRC from his original individual micro-slides).

Distribution: Czech Republic (Kalina 1989), Hungary and Poland (Nowicki 1940), as well as Russia and Spain (new records).

Hosts: Unknown.

Aphelinoidea (Lathromeroides) neomexicana (Girault, 1915)

(Figs 51–59)

Lathromeroides neomexicanus Girault, 1915: 5. Type locality: Las Vegas, San Miguel County, New Mexico, USA. Holotype ♀ [USNM], examined (during a visit there).

Aphelinoidea (Krygeriola) dolichoptera Nowicki, 1934: 4–5. Type locality: Parco Gussone (as "Park of the Royal Agricultural College"), Portici, Metropolian City of Naples, Campania, Italy. Holotype ♂ [DEZA], not examined. **N. syn.**

Aphelinoidea (Krygeriola) dolichoptera Nowicki: Nowicki 1936: 141 (illustrations of the wings of the male holotype).

Lathromeroides dolichoptera (Nowicki): Nowicki 1940: 657–659 (illustrations, description of female, distribution, diagnosis); Novicky 1946: 44–46 (mentioned).

Aphelinoidea dolichoptera Nowicki: Doutt & Viggiani 1968: 529 (list); Fursov 2007: 966–967 (key, distribution, illustrations); Wang *et al.* 2009: 315 (key); Viggiani 2011: 104–108 (list, taxonomic history, diagnosis, distribution, discussion).

Aphelinoidea neomexicanus (Girault): Doutt & Viggiani 1968: 530 (list).

Aphelinoidea gwaliorensis Yousuf & Shafee, 1985: 303–304. Type locality: Gwalior, Madhya Pradesh, India. Holotype ♀ [ZDAMU], not examined. **N. syn.**

Aphelinoidea gwaliorensis Yousuf & Shafee: Lin 1994: 84–85 (redescription, illustrations, records from Fujian, China); Wang *et al.* 2009: 315 (key); Khan & Anis 2016: 90–92 (taxonomic history, diagnosis, distrubution, key), 95 (illustrations).

Aphelinoidea (Lathromeroides) neomexicana (Girault): Trjapitzin 1995: 301 (host), 303–304 (key, distribution); Walker *et al.* 2005: 9 (list); Pinto 2006: 88 (list).

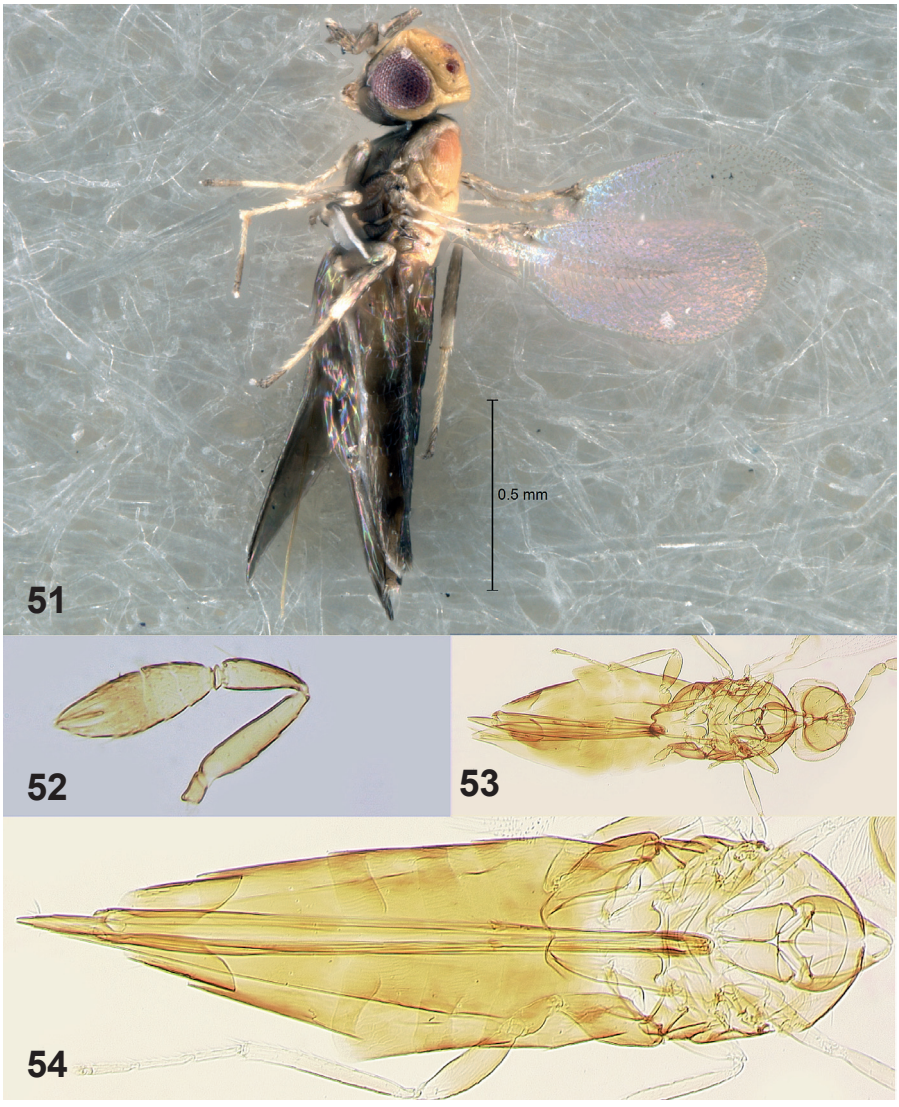
Aphelinoidea (Lathromeroides) dolichoptera Nowicki: Trjapitzin 1995: 304 (key, distribution); Hu & Lin 2005: 150 (key), 151–152 (redescription, distribution, illustrations) [as *A. dolichoptera* (Novicky)].

Diagnosis: Female (specimens from the Nearctic). Body length 600–1185 μm (dry-mounted specimens). Face brown, vertex yellow, gena brownish (Fig. 51); mesonotum pale or bright yellow except propodeum a little darker (often orange-brown), or mesoscutum sometimes mostly orange; gaster either uniformly dark brown or sometimes with several pale or orange transverse stripes. Antenna (Fig. 52) with clava 2.2–3.1× as long as wide, its apical segment 1.2–1.8× length of basal segment. Fore wing (Fig. 55) 2.3–2.4× as long as wide, with disc setose beyond venation; marginal vein thickened. Hind wing (Fig. 56) with 3 or 4 rows of discal setae. Gaster elongate; ovipositor occupying usually about 0.9× of its entire length (arising from base of second gastral tergum, Fig. 53) but sometimes its entire length or, occasionally, slightly projecting forward underneath mesosoma up to about middle of scutellum (Fig. 54), 3.0–3.9× length of metatibia, exserted a little beyond gastral apex; hypopygium extending to apex of gaster (Fig. 51).

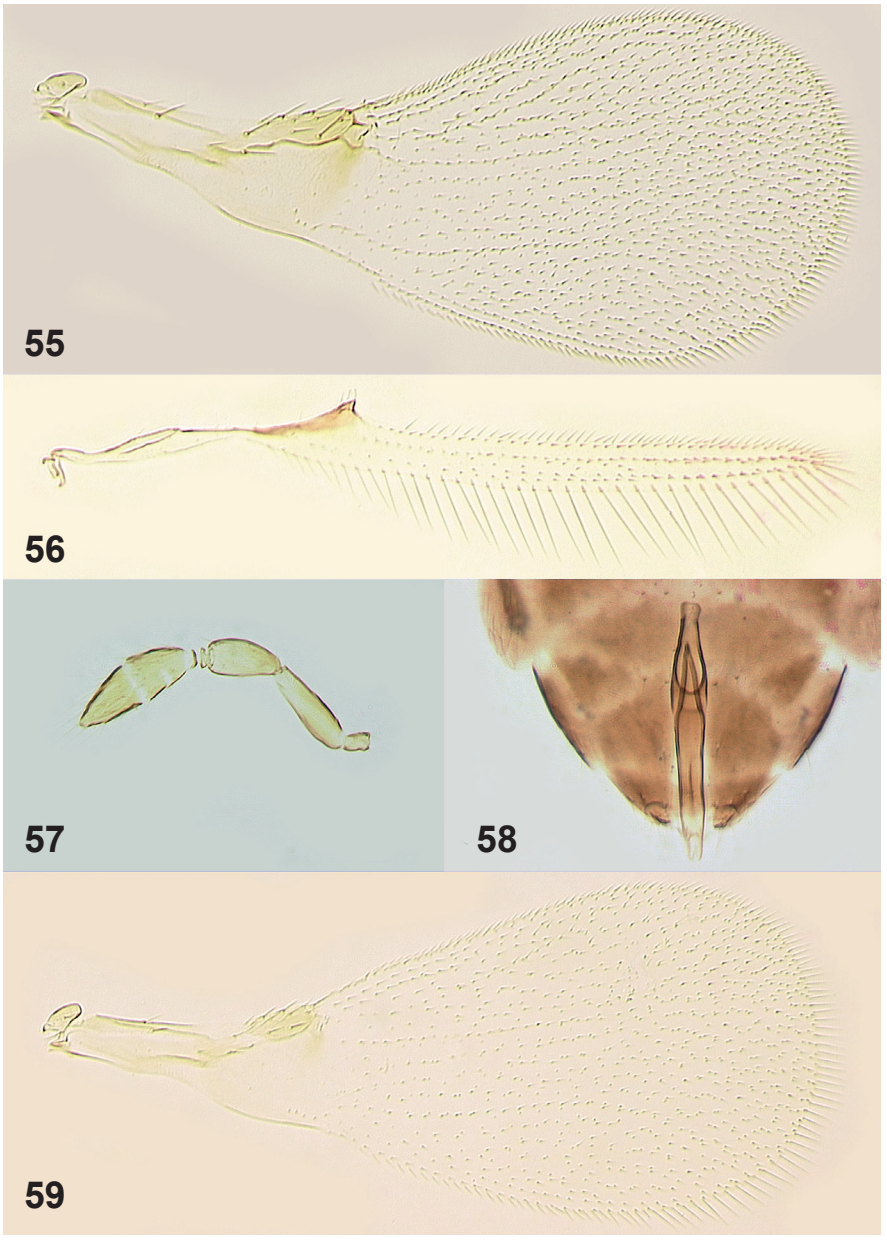
Male (specimens from the Holarctic). Body length 560–850 μm (dry-mounted specimens). Antenna as in Fig. 57 and genitalia as in Fig. 58. Clava 2.4–2.9× as long as wide; fore wing (Fig. 59) 2.3–2.4× as long as wide.

Also see the descriptions of the male of *A. dolichoptera* (Nowicki 1934, 1936) and the consequent description of the female (Nowicki 1940), as well as the important corrections to its diagnosis by Viggiani (2011).

Material examined (all in UCRC): **Kyrgyzstan:** 1♂, Naryn, Arpa Valley, 40°47'40"N 74°41'37"E, 2810 m, 18.vii.2000, C.H. Dietrich; 1♂, Osh, Ikizyak River, 39°42'51"N 73°46'30"E, 3100 m, 9.vii.2000, C.H. Dietrich. **Canada:** 2♀, Alberta, 16 km S of Magrath, McIntyre Ranch, 19–21. vi.1990, 26.viii–9.vi.1990, D. Griffiths; 2♀ 1♂, Writing-on-Stone Provintial Park, 24–30.viii.1990 (1♀ 1♂), 30.viii–10.ix.1990 (1♀), M. Klassen; 1♀, Yukon, Herschel Island, 24.viii.1971, W.R.M. Mason. **Costa Rica:** 1♀, Guanacaste, Santa Rosa National Park, Hacienda, 29.xi–20.xii.1986. **USA:**



Figs 51–54: *Aphelinoidea (Lathromeroides) neomexicana* (Girault), females: (51) habitus, nr Hanksville, Utah, USA; (52, 53) antenna and body, Williamsville, Missouri, USA; (54) mesosoma and metasoma, Big Bend National Park, Texas, USA.



Figs 55–59: *Aphelinoidea (Lathromeroides) neomexicana* (Girault), (55, 56) Williamsville, Missouri, USA, (57, 59) from 39°42'51"N 73°46'30"E, Osh, Kyrgyzstan, (58) from 40°47'40"N 74°41'37"E, Arpa Valley, Naryn, Kyrgyzstan: (55) female fore wing; (56) female hind wing; (57) male antenna; (58) male genitalia; (59) male fore wing.

Arizona: 1♀, Coconino County, 13 mi. S of Jakob Lake, 2682 m, 26.vi.1993, J.D. Pinto; 1♀, La Paz County, 34°17'15"N 114°04'54"W, 185 m, 21.iii.2003, D. Yanega; *California*: 1♀, Imperial County, 4 mi. W of Hwy 86 on Hwy 78, 17.iii.1992, J.D. Pinto; 1♀ 2♂, Inyo County, Shoshone, 21.v.1991, J.D. Pinto; Riverside County: 1♀, Menifee Valley, 33°39'N 117°13'W, 508 m, 19.vii–1.viii.1995, J.D. Pinto; 2♀, San Jacinto Mountains, Tamarack Valley, 2780 m, 13–17.viii.2001, J.D. Pinto, G.R. Platner; San Bernardino County: 1♀ 2♂, Clark Mountains, 35°31'18"N 115°38'34"W, 1390 m, 23.v.2001 (1♀ 1♂), 35°31'45"N 115°38'15"W, 1490 m, 21.v.2001 (1♂), J.D. Pinto; 1♀, 14 mi. N of 29 Palms, 12.iv.1984, J.T. Huber; 5♀ 1♂, Jack and Marilyn Sweeney Granite Mountains Desert Research Center, Granite Cove, 34°48'N 115°39'W, 14–17.v.1994, J.D. Pinto, G.R. Platner; 1♀, San Bernardino Mountains, Road 2N93 1 mi. N of Highway 38, 2350 m, 24.vi.1997, J.D. Pinto; 1♀, San Gorgonio Wilderness, Fish Creek Trail, 20.vi.1984, J.T. Huber; *Michigan*: 1♀ 2♂, Clinton County, Bath Charter Township (near Rose Lake), 42°47'55.5"N 84°22'50.8"W, 259 m (canopy trap in black locust trees, *Robinia pseudoacacia*), 15.ix.2015 (1♂), 6.x.2015 (1♀ 1♂), T. Petrice; *Missouri*: 3♀, Wayne County, Williamsville, 10–20.ix.1987, 21.x–11.xi.1987, 20.ix–20.x.1988, J.T. Becker; *Oregon*: 1♂, Harney County, Fifteen Cent Lake (NE end), 10.vii.1999, J.D. Pinto; 1♀, Malheur County, 4.5 mi. W of Jordan Valley, 11.vii.1999, J.D. Pinto; *Texas*: 2♀ 1♂, Brazos County, College Station, Lick Creek Park, 30.vii.1987, J.B. Woolley (1♀), 26.viii.1987, J.B. Woolley, G. Zolnerowich (1♀ 1♂); 4♀ 3♂, Brewster County, Big Bend National Park, 29°34'02"N 103°16'04"W, 17–21.iii.1992, J.B. Woolley, R. Wharton; 1♀ 1♂, Burnet County, Inks Lake State Park, 22.iii.1986, J.B. Woolley, G. Zolnerowich; 3♀ 2 ♂, Hidalgo County, Bentsen-Rio Grande Valley State Park, 19.vi.1986, J.B. Woolley; 2♀ 4♂, Jim Wells County, W of Ben Bolt, La Copita Research Station, 20.v.1987, J.B. Woolley (1♀), 23.iii.1990, G. Zolnerowich (2♂), 24.iii.1990, G. Zolnerowich (1♀ 2♂); 2♀ 5♂, Presidio County, Big Bend Ranch State Park: 29°26'18"N 103°54'24"W, 19.v.1990, G. Zolnerowich (1♀), 2.8 mi. E of La Sauceda, 27–28.iv.1991, G. Zolnerowich (3♂), 29°30'45"N 103°51'56"W, 7–9.viii.1991, J.B. Woolley, G. Zolnerowich (1♀ 2♂); 1♀ 1♂, Robertson County, 8 mi. E of Hearne, M. Hallmark, 3–27.x.1990 (1♀), 10–17.xi.1990 (1♂); *Utah*: 3♀, Garfield County, 7.2 mi. S of Ticaboo, Cane Springs Desert, 20.v.1995, J.D. Pinto; 24♀ 10♂, Wayne County: 6 mi. W of Caineville, 29.vi.1993, J.D. Pinto (1♀); SE of Hanksville, 38°20.26'N 110°41.26'W, 9–10.v.2000, J.D. Pinto (7♀ 4♂), 13–14.x.2002, J.D. Pinto (8♀), 25–26.vii.2004, J.D. & D.G. Pinto (8♀ 6♂).

Distribution: Austria (Novicky 1946 [as *A. dolichoptera*]), China (Fijian (Lin 1994 [as *A. gwaliorensis*] and Xinjiang [Hu & Lin 2005 [as *A. dolichoptera*]), Croatia, Hungary, Italy, Poland, Ukraine (Nowicki 1934, 1936, 1940; Trjapitzin 1995; Fursov 2007; Viggiani 2011 [as *A. dolichoptera*]), India (Yousuf & Shafee 1985; Khan & Anis 2016 [as *A. gwaliorensis*]), and USA (Girault 1915; Trjapitzin 1995), as well as Canada, Costa Rica, and Kyrgyzstan (new records).

Hosts: Unknown. This species was reared in New Mexico, USA, from eggs of a leafhopper (jassid) (Girault 1915).

Aphelinoidea (Aphelinoidea) sariq Triapitsyn & Rakitov, 2013

Aphelinoidea sp.: Rakitov & Appel 2012: 10–12, 16, 18 (host association, natural history information, illustrations).

Aphelinoidea (Aphelinoidea) sariq Triapitsyn & Rakitov in Rakitov & Triapitsyn, 2013: 539 (key), 540–543. Type locality: Ecocenter "Dzheyran", 39.5789°N 64.7230°E, 224 m, Kagan Distr., Bukhara Prov., Uzbekistan. Holotype ♀ [UCRC], examined (Rakitov & Triapitsyn 2013).

Diagnosis: Member of the *plutella* species group of the nominate subgenus of *Aphelinoidea*. Body mostly yellow. Also see Rakitov and Triapitsyn (2013).

Distribution: Uzbekistan.

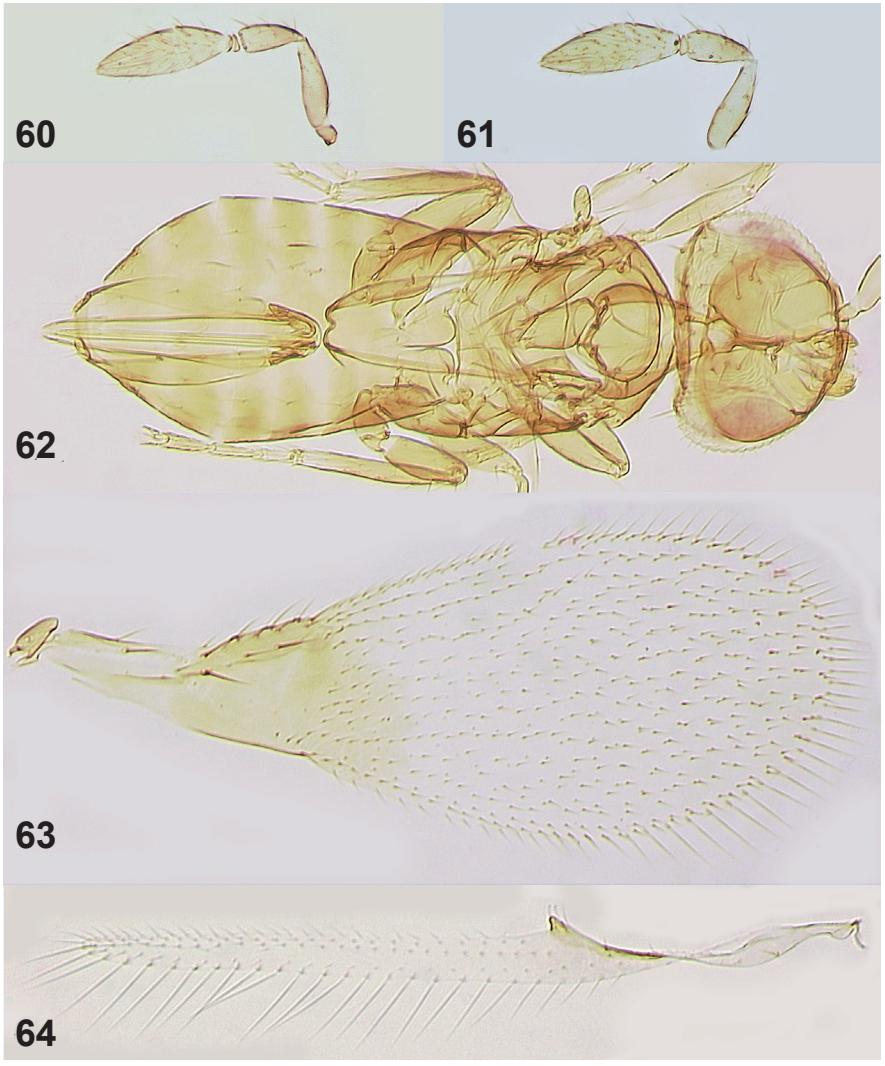
Host: *Scenergates viridis* (Vilbaste) (Cicadellidae) (Rakitov & Appel 2012 [as *Aphelinoidea* sp.]; Rakitov & Triapitsyn 2013).

Aphelinoidea (Aphelinoidea) semifuscipennis Girault, 1911

(Figs 60–67)

Aphelinoidea semifuscipennis Girault, 1911: 4–6. Type locality: Centralia, Illinois, USA. Lectotype ♀ [INHS], designated by Frison 1927: 224, examined (Trjapitzin 1995).

Aphelinoidea semifuscipennis variety *allipes* Girault, 1914: 328. Type locality: Río Piedras, San Juan, Puerto Rico (USA). Syntypes 8♀ 1♂ [USNM], not examined. Listed as a synonym of *A. semifuscipennis* by Doutt & Viggiani 1968: 530.



Figs 60–64: *Aphelinoidea (Aphelinoidea) semifuscipennis* Girault, females from Centralia, Illinois, USA (60, 62–64) and from Fryazevo, Moscow Region, Russia (61): (60, 61) antenna; (62) body; (63) fore wing; (64) hind wing.

Aphelinoidea semifuscipennis Girault: Girault 1912: 296 (discussion); Doutt & Viggiani 1968: 530 (illustrations, list); Walker *et al.* 2005: 9 (mentioned), 23 (brief diagnosis).

Aphelinoidea (Aphelinoidea) semifuscipennis Girault: Trjapitzin 1995: 302–305 (lectotype information, discussion, key, distribution).

Aphelinoidea (Aphelinoidea) sp. (*semifuscipennis* [species] group): Pinto 2006: 143 (illustration of fore wing).

Diagnosis: Member of the *semifuscipennis* species group of the nominate subgenus of *Aphelinoidea*. Fore wing with marginal vein thickened and stigmal vein very short and often inconspicuous (Figs 63, 67).

Female. See the key given in the diagnosis of *A. gerlingi* above. In the specimens from USA, mesosoma brown except propodeum usually contrastingly lighter, pale or yellow (Fig. 62). Antenna (Fig. 60) with clava 2.7–3.2× as long as wide, its apical segment 1.5–2.0× length of basal segment; fore wing (Fig. 63) 2.5–2.8× as long as wide, with basal infuscation on the disc projecting a little beyond apex of venation; hind wing as in Fig. 64; ovipositor 1.6–1.8× length of metatibia.

Male. Antenna (Fig. 65) with clava 2.4–2.9× as long as wide; fore wing (Fig. 67) 2.5–2.6× as long as wide, longest marginal seta notably longer than in female, 0.22–0.28× greatest width of wing; genitalia (Fig. 66) without aedeagal apodemes, as first noted by Pinto (2006: 88), length 94–100 μm.

Material examined (all in UCRC): **Russia:** 1♀, Moscow Region, Noginsk District, Fryazevo, 13.vi.2002, M.E. Tretiakov. **Bermuda:** 1♀, Southampon Parish, 4 Munro Lane, 16–24.x.2001, R. Kaufhold. **USA:** *California*: 1♀, Fresno County, Glenn Rd., 8.iv.1993, S.V. Triapitsyn (on *Erodium* sp. and *Plantago* sp.); *Illinois*: 1♀, Centralia, 4.ix.1983, J.D. & D. Huber; 1♀, Carl Hall Park, 7.ix.1993, J.D. Pinto; 1♀, 1 mi. N of Centralia, Community Beach Drive, near Old Reservoir, 12–17. ix.1995, S.V. Triapitsyn; *Indiana*: 3♀, Posey County, New Harmony, 5.ix.1983, J.T. Huber; *Missouri*: 15♀ 1♂, Wayne County, Williamsville, vii.1987 (1♀), viii.1987 (7♀), 10–26.ix.1987 (2♀), x.1987 (1♀), 16.vii–16.viii.1988 (1♀ 1♂), 8–31.viii.1988 (1♀), 1–20.ix.1988 (2♀), J.T. Becker; *New Mexico*: 4 ♀, Hidalgo County, Gray Ranch, Cienaga, 31°31.721'N 108°52.826'W, 7–8.viii.2002, J. George, M. Gates; 1♂, Quay County, Tecumcari, 4.vi.2003, M.L. Buffington; *Oklahoma*: 2♀ 2♂, Latimer County, Red Oak, vii.1993 (1♀ 2♂), x.2001 (1♀), K. Stephan.

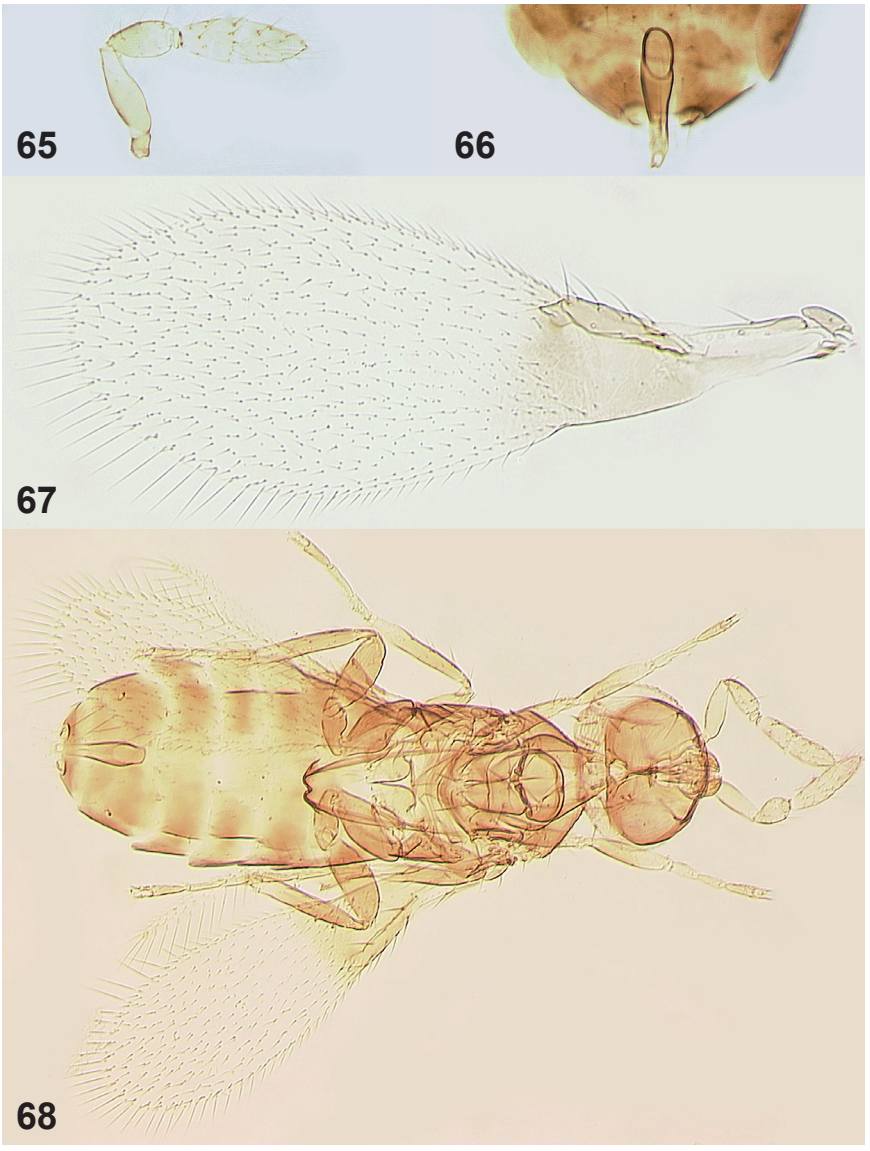
Distribution: Mexico (Jalisco) (Moya-Raygoza *et al.* 2012, 2014), USA (including Puerto Rico) (Girault 1911, 1914; Trjapitzin 1995), as well as Bermuda and Russia (new records).

Hosts: *Dalbulus elimatus* (Ball) (Moya-Raygoza *et al.* 2014) and *D. maidis* (DeLong) in Mexico (Moya-Raygoza *et al.* 2012, 2014) (Cicadellidae). Its record from *Hortensia similis* (Walker) (Cicadellidae) by De Santis (1979) needs to be verified. *Aphelinoidea semifuscipennis* variety *allipes* was reared in Puerto Rico from egg clusters of a leafhopper (Cicadellidae) (Girault 1914).

Comments: The male originally described by Girault (1911) as *A. semifuscipennis* was later described by him as *A. plutella* Girault (Girault 1912), although mistakenly as a female (Trjapitzin 1995).

The sole female from the European part of Russia is mostly indistinguishable from the conspecific specimens of *A. semifuscipennis* from North America. Its midlobe of the mesoscutum, scutellum, and dorsum of the gaster are ginger-brown, the antenna is pale, and the head is pale with the vertex brown. The antenna (Fig.

61) has its clava 2.8× as long as wide, and its apical segment is 1.7× length of the basal segment. The fore wing is 2.4× as long as wide, and the ovipositor is 1.6× length of the metatibia.



Figs 65–68: (65–67) *Aphelinoidea (Aphelinoidea) semifuscipennis* Girault, male (Red Oak, Oklahoma, USA) and (68) *A.* ?*semifuscipennis*, male (from St. Petersburg, Florida, USA): (65) antenna; (66) genitalia; (67) fore wing; (68) habitus.

One unusual male (USA: Florida, Pinellas County, St. Petersburg, 28.xii.1982, W.A. Gregory, underneath *Pinus palustris* [UCRC], Fig. 68) may belong to *A. semifuscipennis* as its has typical genitalia, but its fore wing is notably narrower, 3.2× as long as wide, and the longest marginal seta is about 0.4× greatest width of the wing.

Aphelinoidea (Aphelinoidea) shawanica Hu & Lin, 2005

(Figs 69–73)

Aphelinoidea shawanica Hu & Lin, 2005: 151 (key [as *A. (Aphelinoidea) shawanica*]), 152–153. Type locality: Shawan County, Xinjiang Uyghur Autonomous Region, China.
Aphelinoidea shawanica Hu & Lin: Huang *et al.* 2007: 313, 315–316 (♀ antenna structure, illustrations, key); Wang *et al.* 2009: 316 (key).

Diagnosis: *Aphelinoidea shawanica* is very similar to *A. (Aphelinoidea) subexserta* Nowicki except for the marginal vein of the fore wing being apparently relatively (about 1.5×) thicker in the latter species (Fig. 80) than in *A. shawanica* (Fig. 73). The hypopygium of *A. shawanica* extends to 0.7–0.8× length of the gaster (Figs 70, 71). The examined holotype and paratypes of this species are particularly similar (e.g. the fore wing, Fig. 73) to the smaller female paratype "a" of *A. subexserta* from Nagy Hortobágy in the Hungarian Puszta (Hortobágy National Park, W of Debrecen, Hajdú-Bihar County), Hungary (Nowicki 1940) (Figs 85–87). In both *A. shawanica* and *A. subexserta* the marginal setae on the fore wing are about the same length, and chaetotaxy and the basal infuscation on the disc are very similar, but the ovipositor, which occupies almost the entire length of the gaster, is a little but clearly exserted beyond its apex in *A. shawanica* (Figs 70, 71). The antenna of *A. shawanica* female (Fig. 69) has the clava somewhat collapsed in the examined type specimens so its width could not be measured precisely. Also see the measurements relevant to its recognition (Table 1). Thus, the existence of apparent intermediate forms between these two species prompt further investigation of their likely conspecificity.

Aphelinoidea yousufi Khan & Anis from India (Khan & Anis 2016) seems to be very similar to *A. shawanica*, particularly the venation of their fore wings, except for a relatively shorter ovipositor which is about 1.5× length of the metatibia in *A. yousufi* (Khan & Anis 2016) but at least about 2.1× in *A. shawanica*.

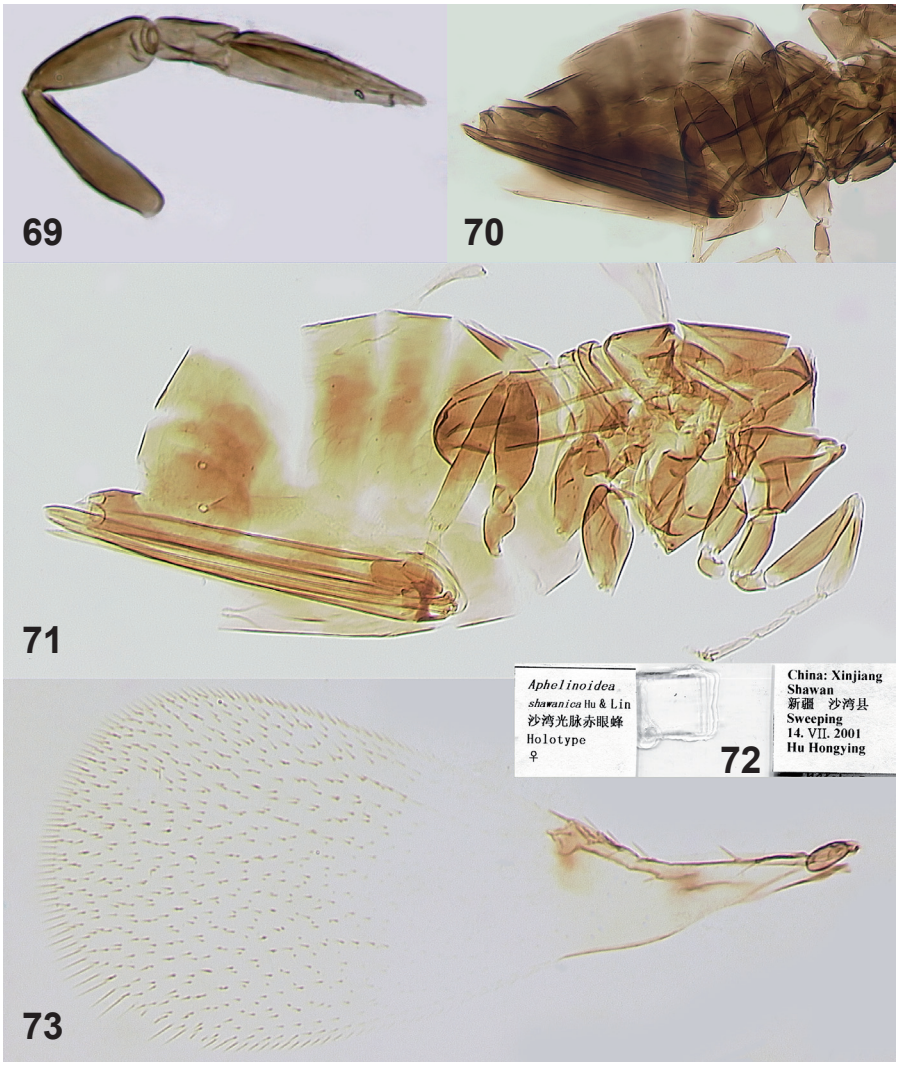
Type material examined: Holotype ♀ [ICXU] on slide (Fig. 72) labeled: (1) "China: Xinjiang Shawan [Chinese characters] Sweeping 14.VII.2001 Hu Hongying"; (2) "*Aphelinoidea shawanica* Hu & Lin [Chinese characters] Holotype ♀". The holotype is dissected in several body parts.

Paratypes [ICXU]: 1♀ on slide labeled: (1) "China: Xinjiang Shihezi [Chinese characters] 150 [Chinese character] Sweeping 12.VII.2001 Hu Hongying", (2) "*Aphelinoidea shawanica* Hu & Lin [Chinese characters] Paratype ♀"; 2♀ on slides labeled: (1) "China: Xinjiang Wenquan [Chinese characters] Sweeping 16.VII.2001 Hu Hongying", (2) "*Aphelinoidea shawanica* Hu & Lin [Chinese characters] Paratype ♀".

Distribution: China (Xinjiang) (Hu & Lin 2005), and also possibly Kyrgyzstan (see Comments below).

Hosts: Unknown.

Comments: The following female may belong to *A. shawanica*, although its marginal vein is more like in typical *A. subexserta*: Kyrgyzstan, Jalal-Abad, Chandalash River, 41°44'19"N 70°52'22"E, 1630 m, 20.vi.1999, C.H. Dietrich [UCRC]. Its ovipositor is 2.5× length of the metatibia, occupies the entire length of the gaster, and is exserted a little, but yet quite notably, beyond its apex like in some *A. shawanica*.



Figs 69–73: *Aphelinoidea (Aphelinoidea) shawanica* Hu & Lin, female paratypes from Shihezi, Xinjiang, China (69) and from Wenquan, Xinjiang, China (70), and holotype (71–73): (69) antenna; (70) metasoma; (71) mesosoma and metasoma; (72) slide; (73) fore wing.

Aphelinoidea (Aphelinoidea) stepposa Fursov, 2007

Aphelinoidea stepposa Fursov, 2007: 968 (illustrations), 969 (in key). Type locality: 10 km N of Morskoye, Crimea, Ukraine (now Russia). Holotype ♀ [SIZK], not examined.

Diagnosis: Member of the *plutella* species group of the nominate subgenus of *Aphelinoidea* (fore wing disc with a transverse hyaline path just beyond venation).

Female. Clava 2.5–3.1× as long as wide and 1.9–2.0× length of pedicel; apical segment of clava 2.0–2.2× length of its basal segment (Fursov 2007).

Male. Unknown.

Distribution: Crimea.

Hosts: Unknown.

Comments: The non-type specimen from Campania, Italy, listed below under *A. subexserta* Nowicki keys to *A. stepposa* in Fursov (2007). His illustrations of the latter taxon (Fursov 2007: 968, fig. 542) seem to fit *A. subexserta*, particularly the rather long ovipositor relative to the length of the metatibia, as the tentative ratio of ca. 2.0 (Table 1), calculated from the measurements taken from the drawing of an adult female *A. stepposa* (Fursov 2007: 968, fig. 542–1). Thus, their likely conspecificity needs to be confirmed after examination of the holotype of *A. stepposa*, which was unavailable to me.

Aphelinoidea (Aphelinoidea) subexserta Nowicki, 1940

(Figs 74–87)

Aphelinoidea (Aphelinoidea) subexserta Nowicki, 1940: 659 (illustration), 660–661. Type locality: Szépvölgy District of Budapest, Hungary ("by sweeping grass in the wood and in the field").

Aphelinoidea subexserta Nowicki: Doutt & Viggiani 1968: 530 (list); Fursov 2007: 969 (key, distribution [as *A. subexerta*, misspelling]); Viggiani 2011: 104 (list [as *A. subexerta*, misspelling]); Hu & Lin 2005: 153 (compared to *A. shawanica*) [as *A. subexserta* Novicky].

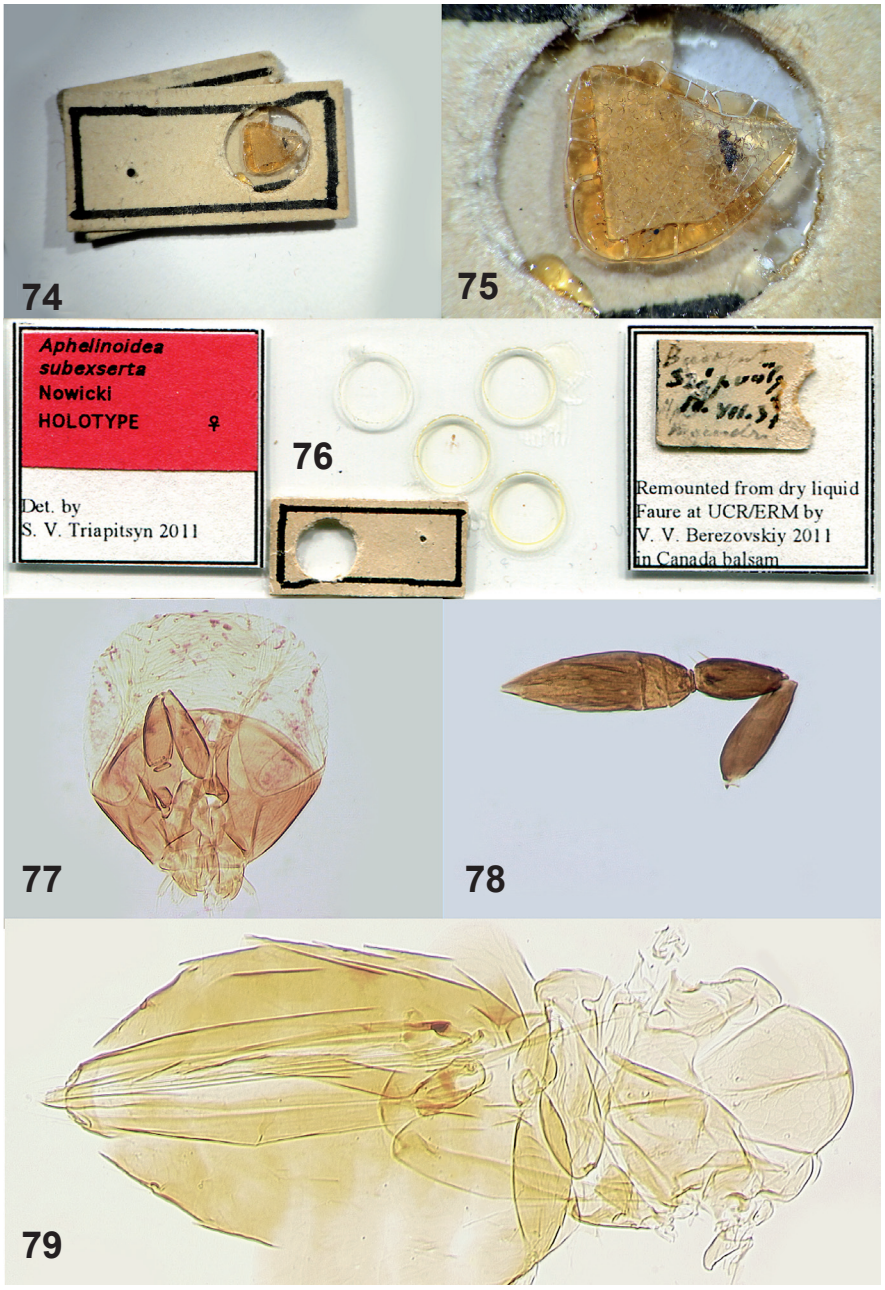
Aphelinoidea (Aphelinoidea) subexserta Nowicki: Trjapitzin 1995: 302 (listed in the *anatolica* species group of *Aphelinoidea s.str.*), 305 (key), 307–308 (compared with *A. melanosoma* and *A. turanica*).

Aphelinoidea monocroma [Nowicki]: Viggiani 2011: 104 (list). *Nomen nudum*.

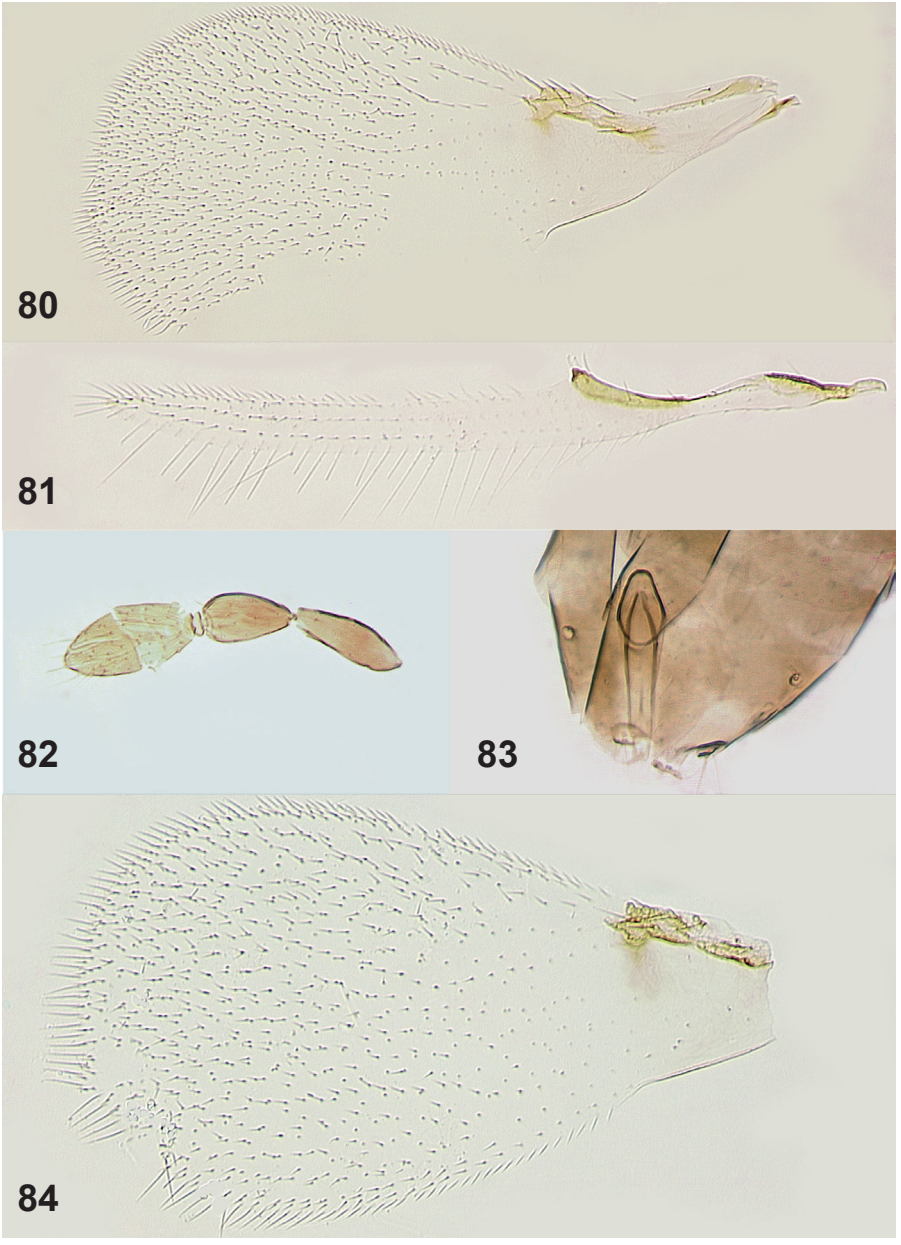
Diagnosis: *Aphelinoidea subexserta* belongs to the *plutella* species group of *A. (Aphelinoidea)* as it has a hyaline, sparsely setose path on the fore wing disc beyond the venation (Figs 80, 84, 86). It is very similar to, and quite likely conspecific with, *A. shawanica* in having a relatively long ovipositor (1.8–2.1× length of metatibia), as discussed in the diagnosis of the latter above.

Redescription: Female (holotype). Head of (Fig. 77) lighter than rest of body (except gena dark brown); mesosoma notably lighter than gaster and apparently brown (Fig. 79); gaster dark brown; antenna mostly brown except first segment of clava a little lighter; legs brown to dark brown except apices of tibiae light brown.

Antenna (Fig. 78) with scape minus radicle 3.1× as long as wide; pedicel 2.2× as long as wide; first anellus much larger than second, the latter partially imbedded



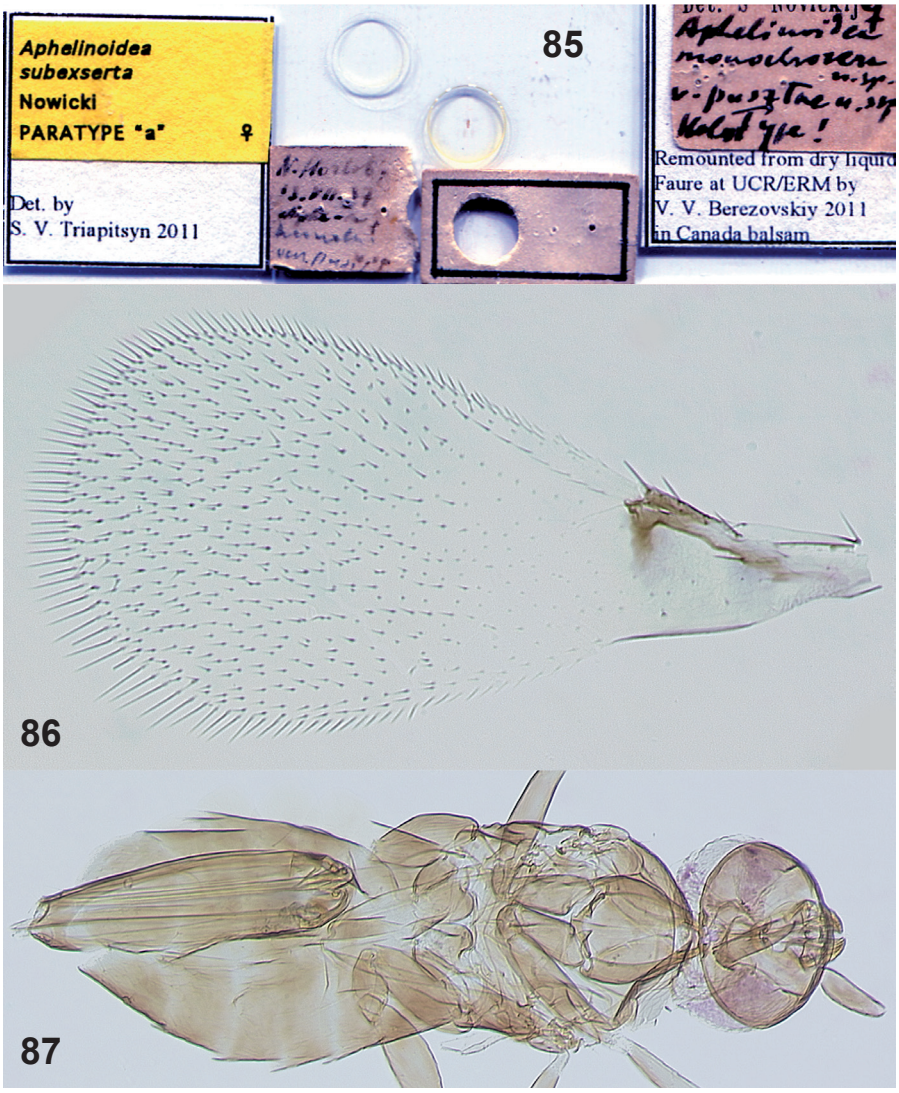
Figs 74–79: *Aphelinoidea (Aphelinoidea) subexserta* Nowicki, female (holotype): (74, 75) original micro-slide prior to re-mounting; (76) slide after re-mounting; (77) head and antenna without clava; (78) antenna; (79) mesosoma and metasoma.



Figs 80–84: *Aphelinoidea (Aphelinoidea) subexserta* Nowicki: (80) female holotype fore wing; (81–84) specimens from ?Warsaw, Poland: (81) female hind wing; (82) male antenna; (83) male genitalia; (84) male fore wing.

into first claval segment; clava 3.1× as long as wide, 2.1× length of pedicel; apical segment of clava 3.0× length of basal segment, the latter incompletely, obliquely divided in middle on its inner side; basal segment of clava with 1 mps, apical segment with several mps.

Mesoscutum and scutellum with faint cell-like sculpture and each with mediolongitudinal groove (Fig. 79). Fore wing (Fig. 80) disc almost hyaline beyond



Figs 85–87: *Aphelinoidea (Aphelinoidea) subexserta* Nowicki, female (paratype "a", Nagy Hortobágy, Hungary): (85) slide after re-mounting; (86) fore wing; (87) body.

venation and slightly infuscate behind venation (more so just behind stigmal vein as small darker spot), with distinct hyaline, sparsely setose (most setae very short except for a few distinct setal lines) path across wing just beyond venation, more or less uniformly setose in apical 0.5 of wing (beyond the hyaline area) except for a few distinct setal lines.

Ovipositor relatively long, 2.0× length of metatibia, occupying about 0.85× length of gaster (Fig. 79) and exserted slightly beyond its apex. Hypopygium extending to about 0.6× length of gaster.

Measurements of the remounted holotype (μm). Metasoma, 400; ovipositor, 354. Antenna, radicle, 18; rest of scape, 83; pedicel, 63; clava (given as lengths of basal/apical segments), 33/98. Fore wing length, 603. Metatibia, 176.

Variation. Paratype "a": body length 713 μm. Non-type, slide-mounted specimens of Nowicki: body length 683–818 μm; mesosoma brown to dark brown; antenna with scape minus radicle 2.7–3.6× as long as wide, clava 2.5–3.0× as long as wide and 2.1–2.3× length of pedicel, apical segment of clava 2.3–2.7× length of basal segment; fore wing 2.0–2.1× as long as wide, longest marginal seta about 0.07× greatest width of wing; hind wing (Fig. 81) 12.7× as long as wide, disc almost hyaline (except slightly infumate behind venation) and with 3 rows of setae, longest marginal seta 1.5× greatest width of wing; ovipositor 1.8–2.1× length of metatibia (usually 1.9–2.0×), sometimes occupying almost entire length of gaster.

Description: Male (previously unknown; non-type specimens of Nowicki from Europe). Body length 713–800 μm (slide-mounted specimens). Similar to female in color. Antenna (Fig. 82) with scape minus radicle 3.3× as long as wide; clava 2.0–2.6× as long as wide. Fore wing (Fig. 84) about 2.1× as long as wide. Genitalia (Fig. 83) length 124–130 μm, aedeagal apodemes present.

Type material examined: Holotype ♀ [DEZA], remounted at UCRC in December 2011 from a dried (cracked), darkened water-soluble mountant (Fig. 75) in the original Nowicki-style micro-slide on a pin (Fig. 74) (Viggiani 2011) onto a normal slide in Canada balsam (Fig. 76) and labeled as follows: (1) [data label glued onto the underside of the original micro-slide] "Budapest [in pencil] Szépvölgy 10.VII.37 [in blue ink] *Aph. monochroma* [faintly in pencil]", (2) [added after remounting] "Remounted from dry liquid Faure at UCR/ERM by V.V. Berezovskiy 2011 in Canada balsam", (3) [added after remounting] "*Aphelinoidea subexserta* Nowicki, 1940 HOLOTYPE ♀ Det. by S. V. Triapitsyn 2011". The holotype, whose collecting date was indicated by Nowicki (1940) as 11.vii.1937, is in poor condition, with the following remaining parts now mounted under separate coverslips: the head with one antenna (lacking the clava) and radicle of the other antenna attached to it, the other antenna without a radicle, the body with most leg segments detached and fragmented, and the incomplete fore wings.

Paratype: Viggiani (2011) mentioned seven specimens of this species in Ś. Nowicki's collection at DEZA (misspelled as "*subexerta*") and also six specimens of "*A. monocroma*" (*nomen nudum*, misspelling of Nowicki's manuscript name "*A. monochroma*" which he changed to *A. subexserta* in its original description). Examined was paratype "a" [1♀, DEZA] (Figs 85–87) of *A. subexserta* (Nowicki 1940) from **Hungary:** Nagy Hortobágy in the Hungarian Puszta (Hortobágy National Park, W of Debrecen, Hajdú-Bihar County), similarly remounted at UCRC into Canada balsam from the original darkened, completely dried micro-slide labeled (the data label glued onto its underside): (1) "N. Hortobágy 13.VII.37 *Aphe-a* female [an illegible name followed by "var." and another illegible name, written very faintly in pencil] n. sp.", (2) [originally on the same pin with some other micro-slides of *A. subexserta* including the holotype and several non-type specimens, and obviously initially

intended to be the holotype of this species under a different manuscript name] "Det. S Novickij [printed] ♀ *Aphelinoidea monochroma* n. sp. v. *pusztae* [i.e., of the undescribed variety of the Puszta] n. sp. HoloType!" [in India ink] (Fig. 85). This paratype of *A. subexserta* is now in fair condition but lacking most of both antennae (except for the scapes), both hind wings, some leg segments, and also the very tip of the ovipositor which is broken off; its fore wing (Fig. 86) and body (Fig. 87) are illustrated here to facilitate recognition of this species.

Other material examined: Italy: 1♀, Campania, Benevento Province, 1.8 km E of Faicchio, 41°16.329'N 14°29.884'E, 210 m, 7–8.vi.2003, M. Bologna, J. Munro, A. Owen, J.D. Pinto [UCRC]. **Poland:** 3♀, Masovian Voivodeship: "E.K.D." (specimens were collected by Ś. Nowicki using an aspirator on window panes in cars of the electric train Warsaw – Grodzisk Mazowiecki; it is an abbreviation standing for "Elektryczne Koleje Dojazdowe" in Polish, the suburban railway line that operated during 1922–1947): 16.vii.1939 (listed in the original description as a "large female" collected during summer 1939 in Warsaw but not included in the type series), 25.vi.1940, 12.vii.1940 [all DEZA]; 6♀ 3♂, ?Warsaw [illegible handwriting, abbreviated as 'Wz."], 1.vi.1947 [or, possibly, ?1942], Ś. Nowicki [DEZA]. These non-type specimens of *A. subexserta* collected by Ś. Nowicki in Europe were all remounted at UCRC from his individual micro-slides.

Distribution: Hungary, Poland (Nowicki 1940; Trjapitzin 1995), Slovakia (Kalina 1989), and Italy (new record).

Hosts: Unknown.

Aphelinoidea (Aphelinoidea) turanica S. Trjapitzin, 1995

Aphelinoidea (Aphelinoidea) turanica S. Trjapitzin, 1995: 303 (illustrations), 305–309. Type locality: Riverside, Riverside County, California, USA, from a colony on *Neoaliturus tenellus* eggs at University of California at Riverside quarantine laboratory, of Turkmenistan (Mary Welayat, Kara-Kum Desert, near Intercollective Farm Cattle Breeding Complex) origin. Holotype ♀ [ZIN], examined (Trjapitzin 1995).

Aphelinoidea turanica S. Trjapitzin: Anonymous 1997: 11 (establishment in California from Turkmenistan origin); Bayoun *et al.* 1998: 133–135 (introduction from Iran to California, USA); Bayoun *et al.* 2008: 415–423 (egg parasitoid of *Neoaliturus tenellus* [as *Circulifer tenellus*] in California); Rakitov & Triapitsyn 2013: 543–544 (key, synonymy).

Aphelinoidea (Aphelinoidea) turanica S. Trjapitzin: Walker *et al.* 2005: 3 (apparent establishment in California, USA), 10 (key), 11 (illustrations), 13–14 (illustrations), 16 (illustration), 18–20 (taxonomic history, distribution, host association, diagnosis, illustrations).

Aphelinoidea scythica Fursov 2007: 967 (in key), 968 (illustrations). Type locality: Sviatogorsk (as the old name Slavianogorsk), Donetsk Region, Ukraine. Holotype ♀ [SIZK], only digital images examined (Rakitov & Triapitsyn 2013). Synonymized under *A. turanica* by Rakitov and Triapitsyn (2013: 543–544).

Diagnosis: See Trjapitzin (1995) and Walker *et al.* (2005).

Material examined: Kyrgyzstan: 1♀, Osh, Ikizyak River, 39°42'51"N 73°46'30"E, 3100 m, 9.vii. 2000, C.H. Dietrich [UCRC].

Distribution: Iran and Turkmenistan, as well as Ukraine (Fursov 2007 [as *A. scythica*]) and Kyrgyzstan (new record); introduced to California, USA, from Turkmenistan and Iran and established (Trjapitzin 1995; Anonymous 1997; Walker *et al.* 1997, 2005) but later present there only in small numbers (Bayoun *et al.* 2008). Also, possibly, Libya (Huffaker *et al.* 1954; Trjapitzin 1995) [as *A. anatolica*] but that needs to be verified (Walker *et al.* 2005).

Host: *Neoaliturus tenellus* (Baker) (Trjapitzin 1995; Walker *et al.* 1997, 2005; Bayoun *et al.* 2008 [as *Circulifer tenellus* (Baker)]).

Aphelinoidea (Aphelinoidea) waterhousei (Blood & Kryger, 1928), **rev. stat.**

(Figs 88–92)

Diaclava waterhousei Blood & Kryger, 1928: 214. Type locality: Burnham Beeches ("near the stream"), Buckinghamshire County, England, UK.

Aphelinoidea (Diaclava) waterhousei (Blood & Kryger): Doutt & Viggiani 1968: 528 (illustrations of ♂, apparently of the holotype), 531 (list); Trjapitzin 1995: 302 (short diagnosis).

Aphelinoidea waterhousei (Blood & Kryger): Fursov 2007: 966 (key, distribution [as *A. waterhousei* Blood & Kryger]).

Diagnosis: Female. Unknown.

Male. Apical segment of clava contrastingly darker than the basal segment, the latter apparently at least partially subdivided (Fig. 89); clava about 3× as long as wide. Fore wing (Figs 90, 92) 3.6× as long as wide, longest marginal seta about 0.5× greatest width of wing; marginal vein notably thickened and stigmal vein short, inconspicuous; disc setose beyond venation and slightly infuscate behind venation, more conspicuously so just behind stigmal vein.

Type material examined: Holotype ♂ [BMNH] on slide (Fig. 91) labeled: (1) "Burnham Beeches 14.7.13 C. Waterhouse", (2) "J. P. Kryger prep. *Diaclava waterhousei* B.M. TYPE 5.2224", (3) [red circle] "Holo-type", (4) [barcode database label] "010158671 NHMUK". The holotype, which was examined during one of my visits to the BMNH, is uncleared, with head detached from the body (Fig. 88).

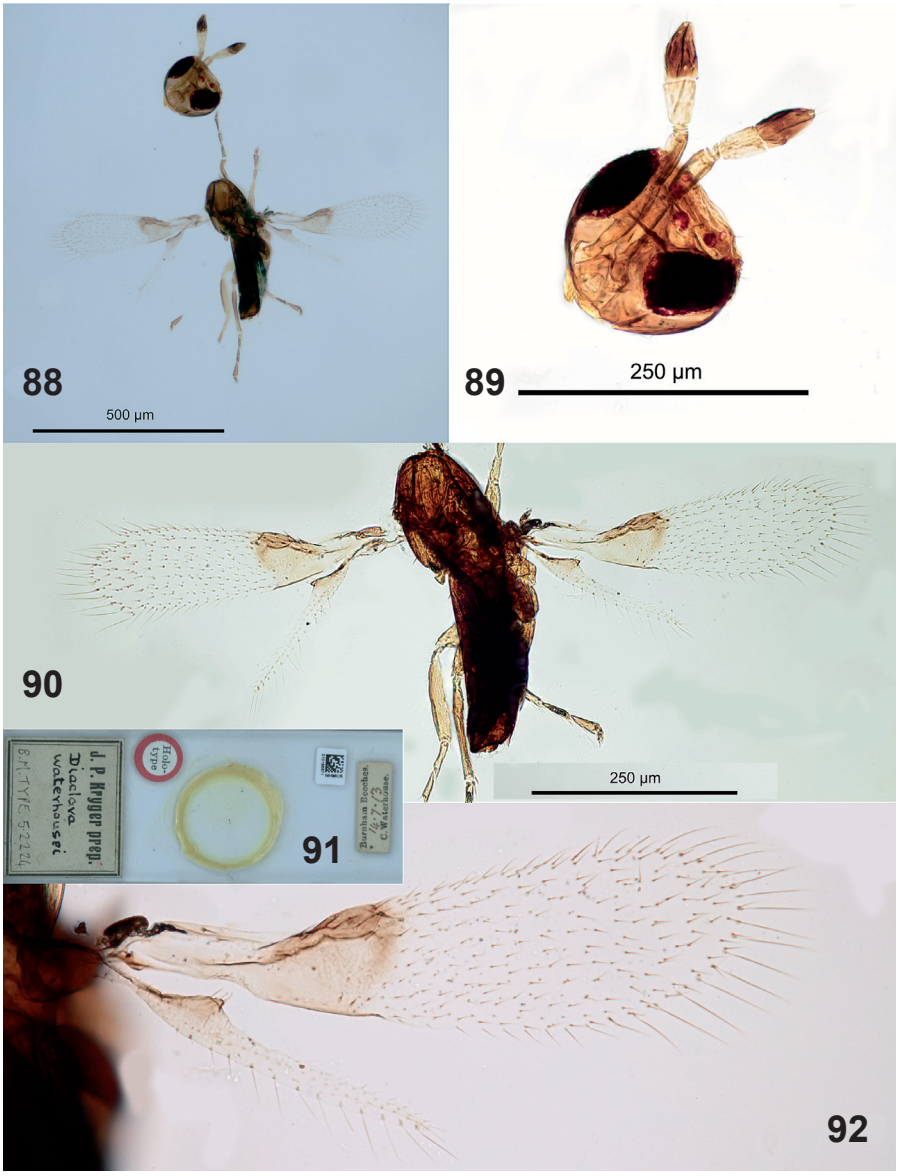
Distribution: UK (England).

Hosts: Unknown.

Comments: The genus *Diaclava* Blood & Kryger was synonymized under *Aphelinoidea* and treated as its subgenus by Doutt and Viggiani (1968), who separated it in their key from the other subgenera based on the dark apical segment of the clava, an unusually narrow fore wing (both in my opinion are not good as subgeneric defining characters), and also on an incorrect assessment of the stigmal vein. Examination of the digital images of the holotype of *Diaclava waterhousei* leaves no doubt that it is a representative of the *semifuscipennis* species group of the nominate subgenus *A. (Aphelinoidea)*, as in *A. semifuscipennis* the stigmal vein is also very short and often inconspicuous, and the marginal vein is similarly thickened (Figs 63, 67). Indeed, one can see a short, inconspicuous stigmal vein somewhat similar to that of *A. semifuscipennis* in the holotype of *D. waterhousei* (Figs 90, 92). Also, even though its male holotype is uncleared (Fig. 88), under magnification it is possible to see that the basal segment of the clava is at least partially subdivided (Fig. 89). Thus, the subgenus *Aphelinoidea (Diaclava)* (Blood & Kryger), n. syn. is synonymized under the nominate subgenus, *A. (Aphelinoidea)* Girault, and its type species *Diaclava waterhousei* Blood & Kryger is transferred to the latter as *A. (Aphelinoidea) waterhousei* (Blood & Kryger), rev. stat.

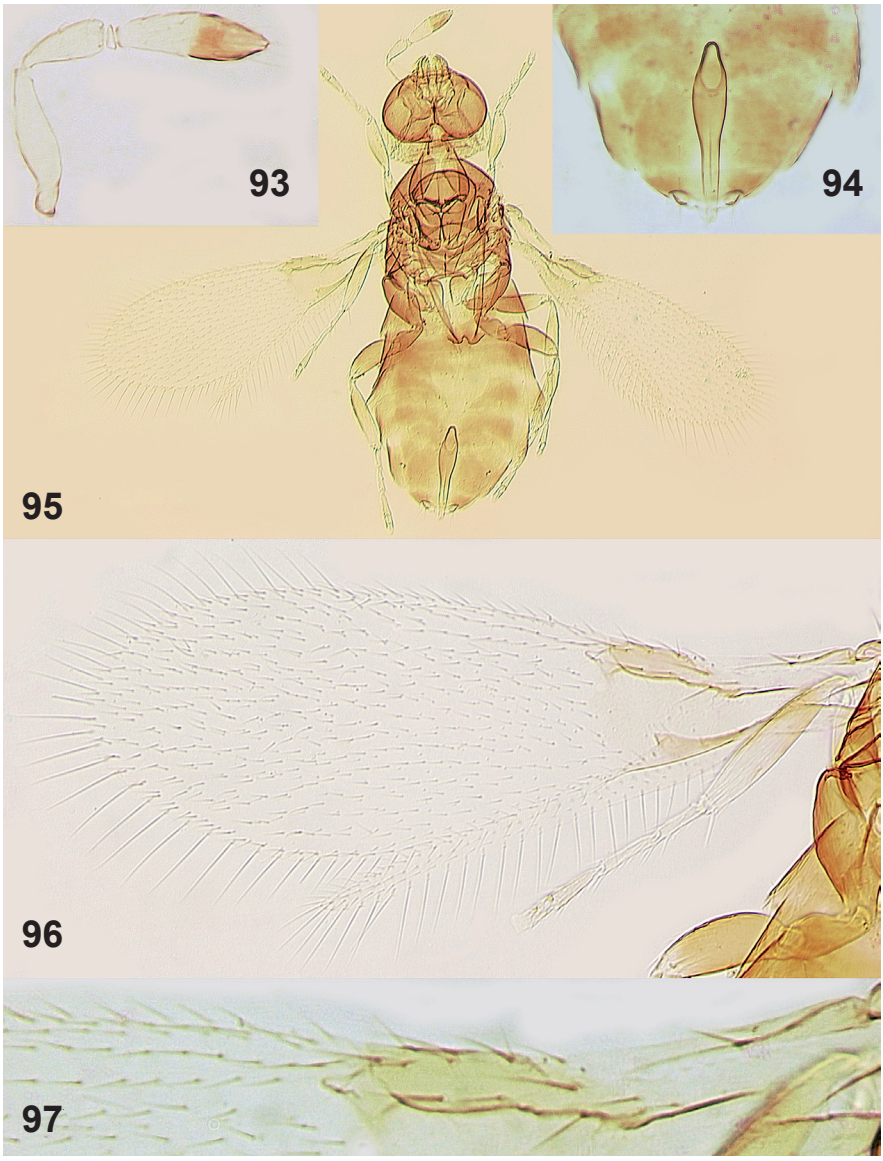
A matching female of *A. waterhousei* from or near its type locality is needed to further clarify its identity and status. Unfortunately, the male genitalia of its holotype cannot be seen within the uncleared, laterally mounted gaster (Figs 88, 90). *Aphelinoidea waterhousei* could likely represent a valid species somewhat similar

to *A. semifuscipennis*, but distinct from the latter in having a peculiarly colored clava, with its apical segment being contrastingly much darker than the whitish basal segment. Indeed, one unusual specimen (USA: Nebraska, Buffalo County,



Figs 88–92: *Aphelinoidea (Aphelinoidea) waterhousei* (Blood & Kryger), male (holotype of *Diaclava waterhousei* Blood & Kryger): (88) habitus; (89) head and antennae; (90) mesosoma, metasoma and wings; (91) slide; (92) fore and hind wings.

6.8 mi. E of Odessa, 29.viii.1983, J.D. Pinto [1♂, UCRC], Fig. 95) from the *semi-fuscipennis* species group of the nominate subgenus of *Aphelinoidea* seems to be very similar to *A. waterhousei*, but probably still not belonging to that species due



Figs 93–97: *Aphelinoidea (Aphelinoidea)* sp. near *waterhousei* (Blood & Kryger), male (6.8 mi. E of Odessa, Nebraska, USA): (93) antenna; (94) genitalia; (95) habitus; (96) fore and hind wings; (97) fore wing venation.

to differing proportions of the claval segments and a relatively wider fore wing with relatively shorter marginal setae (Fig. 96). It was identified by J.D. Pinto as "*Aphelinoidea (Diaclava)* n. sp.". It has a similar, very dark apical segment of the clava, with its basal segment being contrastingly whitish (Fig. 93). It is definitely not *A. semifuscipennis* because its genitalia (Fig. 94), which also lack aedeagal apodemes, are notably more elongate (cf. Fig. 66), 167 µm long. Its body is 787 µm long; the antenna (Figs 93, 95) with scape 3.0× as long as wide, clava about 3.3× as long as wide and about 1.8× length of pedicel, apical claval segment about 1.1× length of basal segment; the fore wing (Fig. 96) is 2.95× as long as wide and the longest marginal seta is 0.34× greatest width of the wing, with stigmal vein short and inconspicuous (Fig. 97), similar to that in *A. waterhousei* (Fig. 92).

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