

Order Diptera, family Ulidiidae

Elena P. Kameneva & Valery A. Korneyev

INTRODUCTION

The picture-winged flies (Ulidiidae) occur almost worldwide, with more than half of the species and 75% of the genera in the Neotropical Region. The fauna of the Afrotropical Region is very poor, when compared with the Palaearctic, Nearctic and Neotropical Regions; it includes only 19 species (Steyskal, 1980; Barraclough, 2000).

The material from Arabian Peninsula contains almost exclusively species of the genus *Physiphora* Fallén. One species has previously been recorded by from Yemen by Hendel (1913).

MATERIALS AND METHODS

In the course of intensive field work 565 specimens of Ulidiidae were collected, almost all with Malaise and light traps, all by A. van Harten. The holotype of the new species is deposited in the Schmalhausen Institute of Zoology, Kiev, Ukraine (SIZK). Other specimens are mostly divided between the United Arab Emirates Invertebrate Collection (UAEIC), the National Museums and Galleries of Wales, Cardiff, Wales, UK (NMWC), and the Schmalhausen Institute of Zoology. The following abbreviations are used: NARC = National Avian Research Centre; LT = light trap; MT = Malaise trap.

SYSTEMATIC ACCOUNT

Terminology of morphological structures and abbreviations is adopted from McAlpine (1981). The specimens examined are listed according to localities in alphabetical order, and to collecting dates in cases where a species was collected more than once at the same locality. All the listed taxa are recorded from the UAE for the first time.

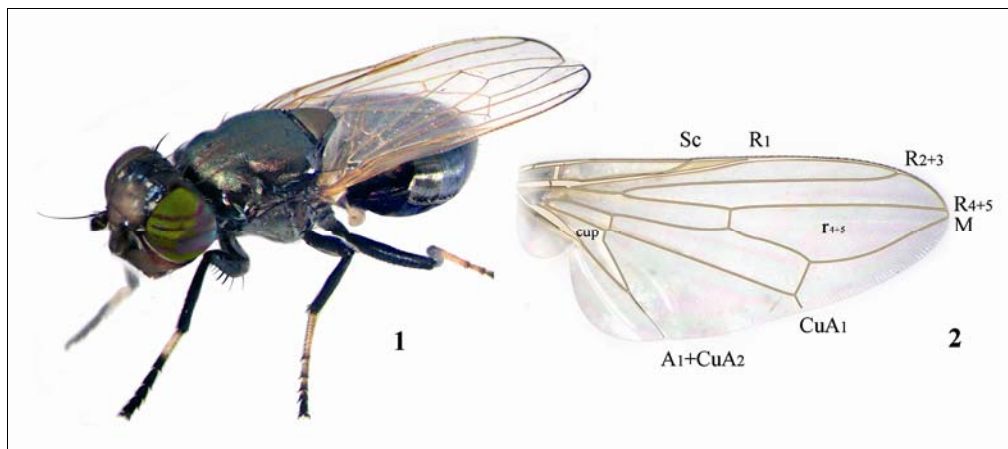
Subfamily **Ulidiinae** Macquart, 1835

Tribe **Ulidiini** Macquart, 1835

Genus ***Physiphora*** Fallén, 1810

Physiphora Fallén, 1810: 11. Type species: *Chrysomyza splendida* Fallén, 1817 (= *Musca alceae* Preyssler, 1791), by subsequent monotypy in Fallén, 1817: 3.

Description: Body mostly black, often with strong green to red metallic sheen. Head at most a little longer than high. Frons smooth or rarely pitted; frontal vitta often without setulae, in posterior part sometimes with four low longitudinal swellings, usually with one or two spots of whitish microtrichia. Vertical plates with 2–4 short setae; ocellar triangle with pair of short ocellar setae. Face saddle-like, slightly concave in profile, usually white microtrichose in dorsal portion (at least between antennae), with shallow, usually gray microtrichose antennal grooves. Parafacial and facial bare or with longitudinal stripes of white microtrichia; gena bare, rarely with patches of microtrichia. Pedicel short. Scape with rather deep triangular incision. First flagellomere short oval, not over three times as long as wide, rounded at apex. Palpus flattened oval, not widened apically, usually as long and as wide as flagellomere 1, white microtrichose, with 12–15 lateral and ventral setae almost as long as palpus is wide.

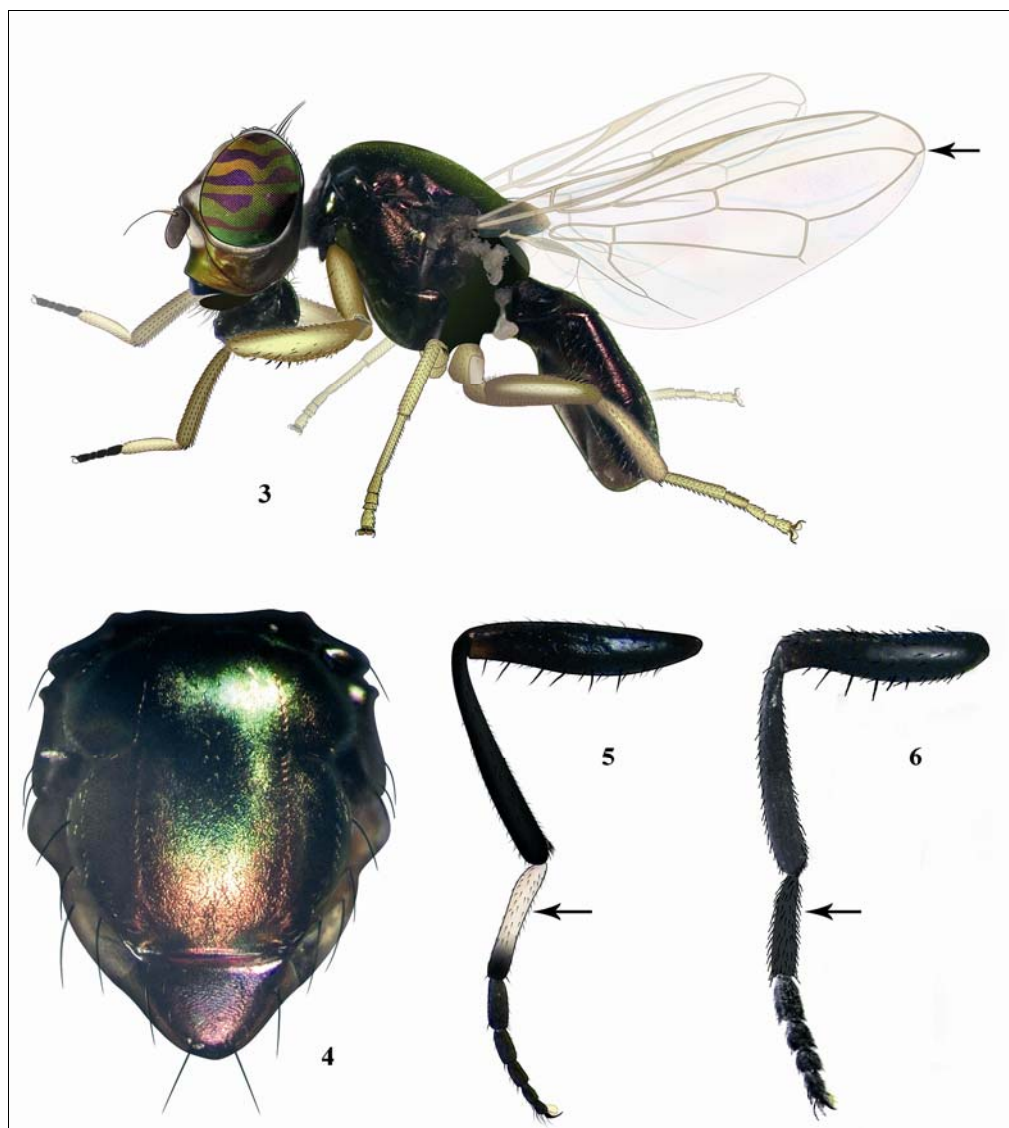


Plates 1–2. 1: *Physiphora alceae* (Preyssler), ♂, total view; 2: *P. sericea* (Hendel), wing. Abbreviations: veins — Sc, R₁, R₂₊₃, R₄₊₅, M, CuA₁, A₁+CuA₂; cells — r₄₊₅, cup.

Thorax entirely black, mostly with metallic greenish, copper, golden, blue or purple sheen. Postpronotal lobe with 1 seta and 3–5 setulae; proepisternum with one long and 7–8 shorter setae. Prosternum transverse, trapezoidal, without conspicuous setae. Mesonotum with scutum and postero-dorsal part of anepisternum densely shagreened. Anterior part of mesonotal scutum and postero-dorsal part of anepisternum setose; rest of scutum usually bare, sometimes with dorsocentral and acrostichal row of very fine and short setulae. 2 notopleural, 2 postsutural supraalar, 1 intraalar and 1 postalar seta present. Dorsocentral and acrostichal setae very fine, inconspicuous or absent. One strong seta and 5–6 shorter setulae on posterior margin of anepisternum; katepisternum with one strong posterodorsal seta. Scutellum triangular, flattened, shagreened, with 2 pairs of scutellar setae and fine setulae on disc and margins; posteroventral margin bare or microtrichose. Subscutellum matt, short microtrichose. Mediotergite slightly shagreened, subshining green.

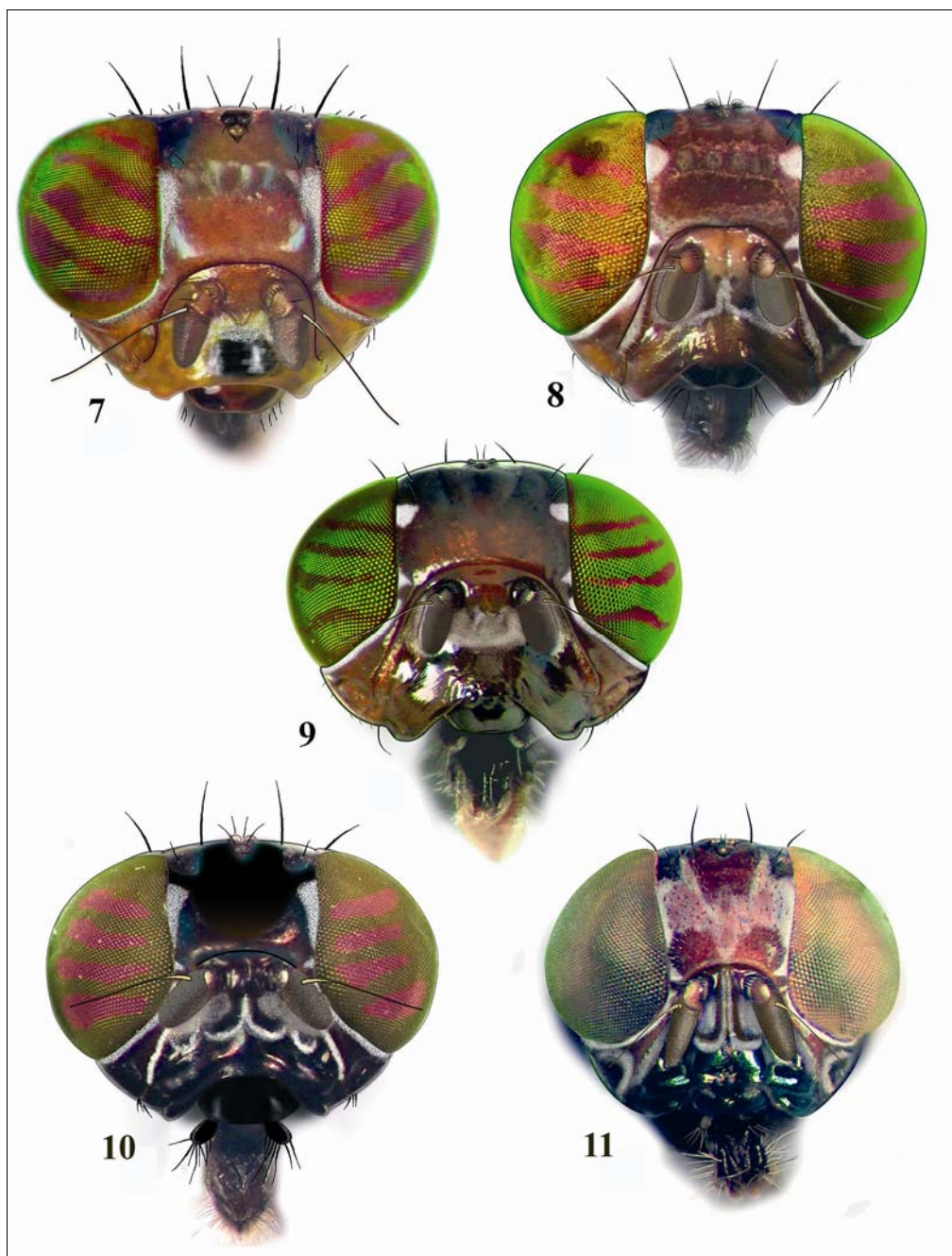
Wing entirely hyaline with yellow veins (rarely partly brown), vein R₁ bare, cell r₄₊₅ apically narrowed or closed, sometimes with short petiole; cell cup with long extension at posteroapical corner, usually as long as the remaining vein A₁+CuA₂.

Male abdomen with 5 preabdominal segments. Male postabdomen: membranous pouch between tergite 5 and postabdomen, dorsolateral, densely microtrichose; sternite 8 setulose; epandrium large, short surstyli separated by seam; proctiger low, not protruding posteriorly, usually with pair of short submedial nipple-like ventral projections bearing single apical short setula (absent in *P. leucotricha* nov. spec.); subepandrial sclerite flat, V- or U-shaped, without thickened tooth-like setulae (prensisetae); hypandrium U-shaped, asymmetrical: right gonite ovoid, with sclerotized lateral sclerite, left gonite almost inconspicuous; both gonites without setulae; apodeme of hypandrium Y-shaped, vanes of fultella inconspicuous; sensillar plates at sides of phallus base rounded, simple; phallus large, thick and mostly bare, with single membranous sack-like projection subapically and apical area (glans) bearing several semi-free hook-like sclerotized appendages; epiphallus not expressed; ejaculatory apodeme wide fan-like, with short apical portion and relatively small sperm pump.



Plates 3–6. 3–4: *Physiphora clausa* (Macquart). 3: ♂, total view, left lateral, arrow shows petal at r_{4+5} cell apex; 4: Mesonotum, dorsal view); 5: *P. alceae* (Preyssler), foreleg (arrow shows metatarsus); 6: *P. sericea* (Hendel), same.

Female similar to male; abdomen with 6 visible segments; tergite 2 in all examined species (*P. alceae* (Preyssler, 1992), *P. clausa* (Macquart, 1843), *P. longicornis* (Hendel, 1909), *P. sericea* (Hendel, 1913), *P. smaragdina* (Loew, 1852) and *P. violacea* (Hendel, 1910)) with pair of dimple-like structures: round matt spots lacking metallic sheen and having hexagonal cellular structure at sides (Plates 46–47: ds); sternites 3–6 without anteromedial apodemes; tergite and sternite 6 subequal, conspicuously narrower and shorter than tergite 5;



Plates 7–11. *Physiphora* heads, anterior. 7: *P. alceae* (Preyssler); 8: *P. clausa* (Macquart); 9: *P. leucotricha* nov. spec.; 10: *P. sericea* (Hendel); 11: *P. smaragdina* (Loew).

postabdomen: Oviscape short, at most as long as tergite 5 and 0.25–0.3 times as long as aculeus; eversible membrane (Plate 25) as long as aculeus, with 2 pairs of bare taeniae almost reaching its posterior margin; membrane finely microtrichose in anterior 0.8 and covered with fine multidentate scales in posterior 0.2 of its length. Aculeus (Plates 26, 48) narrow and long, 6.5–12 times as long as wide, with elongate oval cercal unit (Plates 27, 49) bearing 2 pairs of long setae (basal dorsal and subapical latero-ventral) and several shorter setulae on ventral and latero-ventral side; anal opening (slit) on dorsal side of cerci; sternite 8 well-sclerotized, with 11–12 setulae on each side; medial groove covered with monodentate scales; vagina (= genital chamber) with simple, finger-like ventral receptacle (Plates 29, 30); 3 spherical (or collapsed to mushroom-like shape) spermathecae, single right and 2 left on Y-shape bifurcated common duct (Plates 28, 50).

Remarks: The genus was revised by Hendel (1909; 1913); later, Séguy (1941) described and keyed several Afrotropical species. Recently, Chen & Kameneva (2007) revised Chinese species. However, Afrotropical fauna needs further thorough revision.

In the present study, we found that there are at least five *Physiphora* species occurring in the UAE. One of them is a previously unknown species described below. Here, we provide species diagnoses, descriptions, illustrations and a key to the included species. In addition to *Physiphora* species, one species of *Melieria* Robineau-Desvoidy, 1830, is recorded from the UAE.

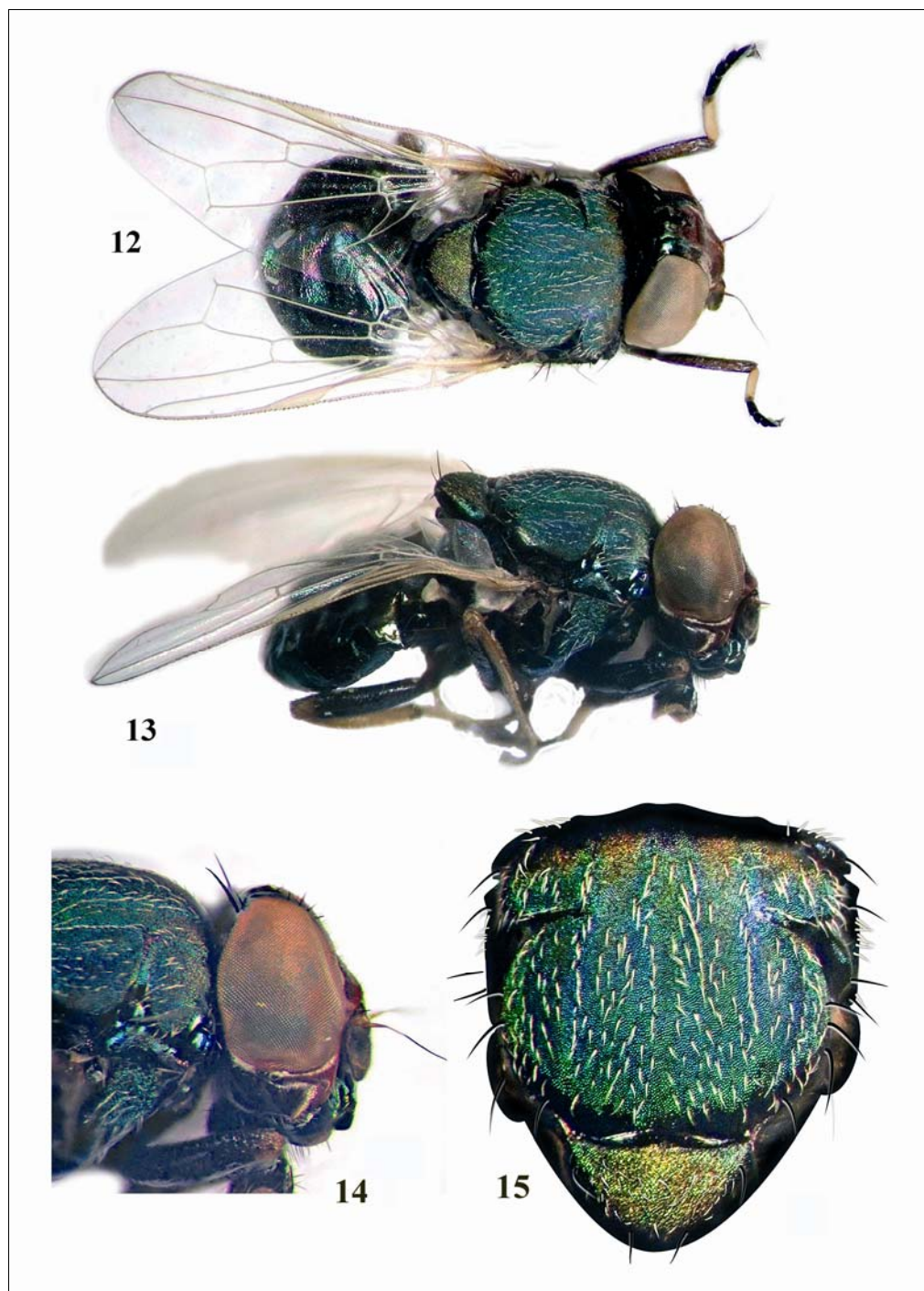
Recognition: *Physiphora* differs from *Ulidia* Meigen, 1826, and *Timia* Wiedemann, 1824, by having the face saddle-like (without sharply raised medial carina or deeply emarginated antennal grooves), eyes of live specimens with purple and bright green pattern of the compound eye (not known in *P. aperta* Steyskal, 1952, and *P. leucotricha* nov. spec.), metallic shiny thorax, hyaline wing without a pattern and with the medial vein strongly curved anteriorly and the female abdominal tergite 2 with pair of dimple-like structures (not examined in *P. aperta* Steyskal and *P. leucotricha* nov. spec.).

The sexual behaviour of *Physiphora* also differs from that in *Timia* and partly from *Ulidia*: Flies of the latter genera usually demonstrate spotted wings and white and yellow pattern of their bodies, whereas *Physiphora* demonstrate mainly patterned eyes or foretarsi (Alcock & Pyle, 1979).

Phylogenetic relationships of *Physiphora*: Monophyly of *Physiphora* is supported by having patterned eyes (?synapomorphy); metallic shiny thorax (synapomorphy), hyaline wing without a pattern (synapomorphy) and female abdominal tergite 2 with pair of dimple-like structures (?synapomorphy) in combination with the face being saddle-like without sharply raised medial carina (symplesiomorphy).

Most species of *Physiphora* possess male proctiger with pair of nipple-like structures bearing short trichoid sensillum on its tip (Plate 33: ns), which does not occur in other ulidiids and is a synapomorphy of them, as well as the absence of extensive microtrichose area and long setulae on frons, mesonotum and anepisternum. On the contrary, *P. leucotricha* nov. spec. has the proctiger without such nipple-like structures (Plates 37, 38), frons with extensive white microtrichose area (Plate 9) and mesonotum and anepisternum with numerous and long whitish setulae (Plates 13, 15), which represent plesiomorphic states of these characters often occurring in the outgroups (*Ulidia* and *Timia*), therefore forming a sister lineage to the rest of *Physiphora*. In this species, fore basitarsomere is partly yellow (Plate 12).

Four species, *P. obscura* (Hendel), *P. sericea* (Hendel), *P. smaragdina* (Loew) from the Afrotropical Region and *P. chalybea* Hendel, 1909, from Central Asia have fore basitarsomere entirely black, which is believed to be their synapomorphy (compared to *P. leucotricha* nov. spec. as an outgroup). At least two of them, *P. sericea* and *P. smaragdina*



Plates 12–15. *Physiphora leucotricha* nov. spec., holotype ♂. 12: Total view, dorsally; 13: Same, right laterally; 14: Head, same; 15: Mesonotum.

also possess highly modified structure of the phallus glans: the basalmost sclerotized projections are opposite and saber-like.

The remaining species of *Physiphora* share yellow fore basitarsomere (symplesiomorphy). Three of them, *P. flavipes* (Karsch, 1888), *P. clausa* (Macquart) and *P. africana* Hendel, 1909, have the wing cell r_{4+5} closed, and the two latter species with the petiole joining it with costal vein; these species are believed to form another monophyletic cluster. Other species of the genus with the yellow fore basitarsomere, including *P. alceae*, form a paraphyletic group. Most of them require additional taxonomic study.

Distribution: *Physiphora alceae* and *P. clausa* are widespread in all the zoogeographical regions. There are 12 species of *Physiphora* occurring in the Afrotropical Region. Only *P. chalybea* Hendel was described from Central Asia, and 3 species occur in North Africa as well as tropical Africa. *Physiphora aperta* Steyskal, 1952, is endemic to Solomon Islands. Five species were listed from the Oriental Region, one of them (*P. longicornis* Hendel) occurs in Taiwan and Ceylon, *P. euphorbiae* N. Krivosheina & M. Krivosheina, 1997, found in India, and *P. hainanensis* X.-L. Chen, 2007, was described from Southern China (Chen & Kameneva, 2007).

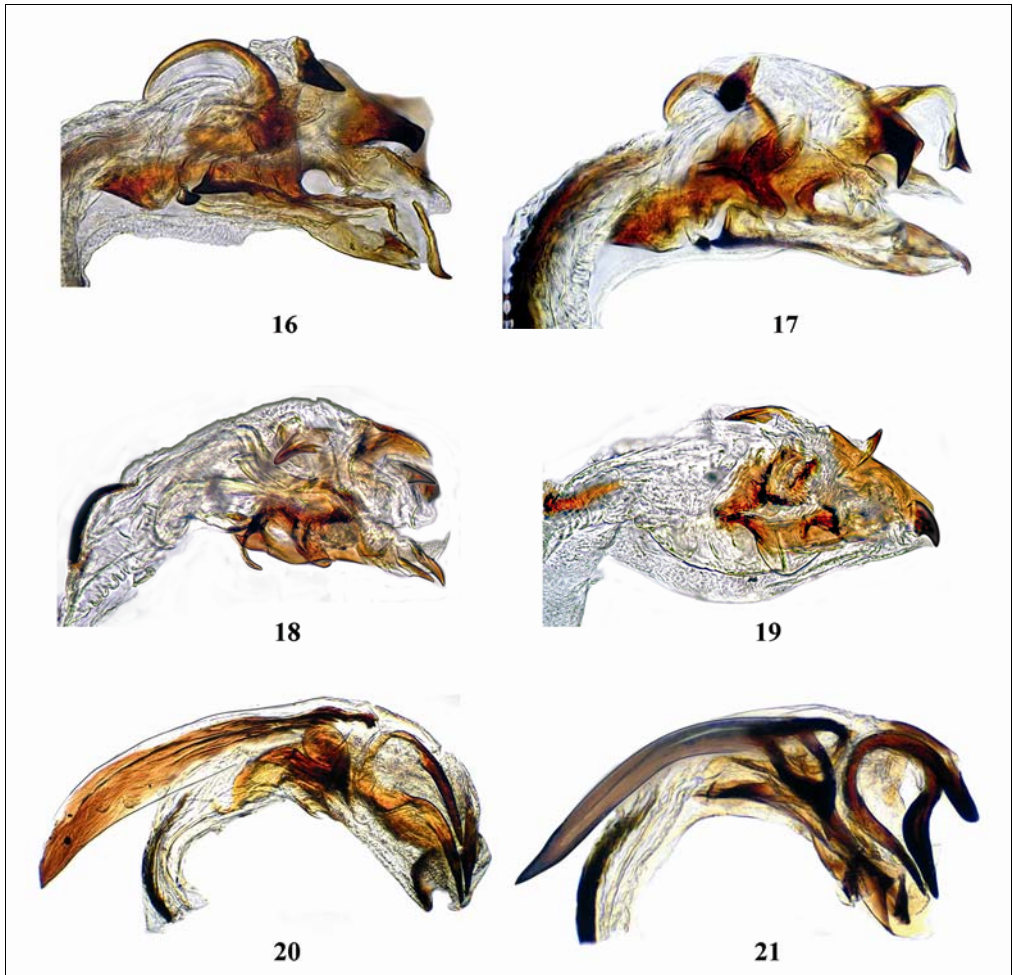
Key to the species of *Physiphora* occurring in the UAE

- 1 Fore basitarsomere yellow with white microtrichia and setulae (Plate 5) 2
- Fore basitarsomere entirely black (Plate 6) 4
- 2 Forefemur yellow or at most with black basal patch. Cell r_{4+5} completely closed, with apical petiole connected to costal vein (Plate 3) *P. clausa* Macquart
- Forefemur black. Cell r_{4+5} almost closed, but without apical petiole (Plates 2, 12) 3
- 3 Frons shining orange to dark brown in the middle, except for 2 (often connected) narrow white microtrichose patches at each side. Mesonotum almost bare, at most with pair of postsutural rows of fine brown dorsocentral setulae in shallow pits (Plate 1). Facial carina and antennal grooves with entire area of greyish microtrichia (Plate 7). Gena reddish, without white microtrichia *P. alceae* Preysslser
- Frons microtrichose in the middle, with pair of subshining reddish brown spots in anterior half and matt brown spot in posterior half, anterior to ocellar triangle. Mesonotum and anepisternum with numerous, but rather sparse white setulae (Plates 13, 15). Facial carina with narrow inverted Y-shaped pattern of white microtrichia separated from antennal grooves by pair of shining black vittae (Plate 9). Gena brown with C-shaped white microtrichose area at postgena border (Plate 14) *P. leucotricha* nov. spec.
- 4 Frons dull black, rarely opalescent or with satin bluish sheen, without swellings in the middle; anterolateral corners and vertical plates with metallic dark blue or greenish sheen (Plate 11) *P. sericea* Hendel
- Frons uniformly shining, brown to brownish black; vertical plates black with greenish metallic sheen; four longitudinal oval swellings at frons middle (Plate 10) *P. smaragdina* Loew

Physiphora alceae (Preysslser, 1792)

Plates 1, 5, 7, 16, 22–30

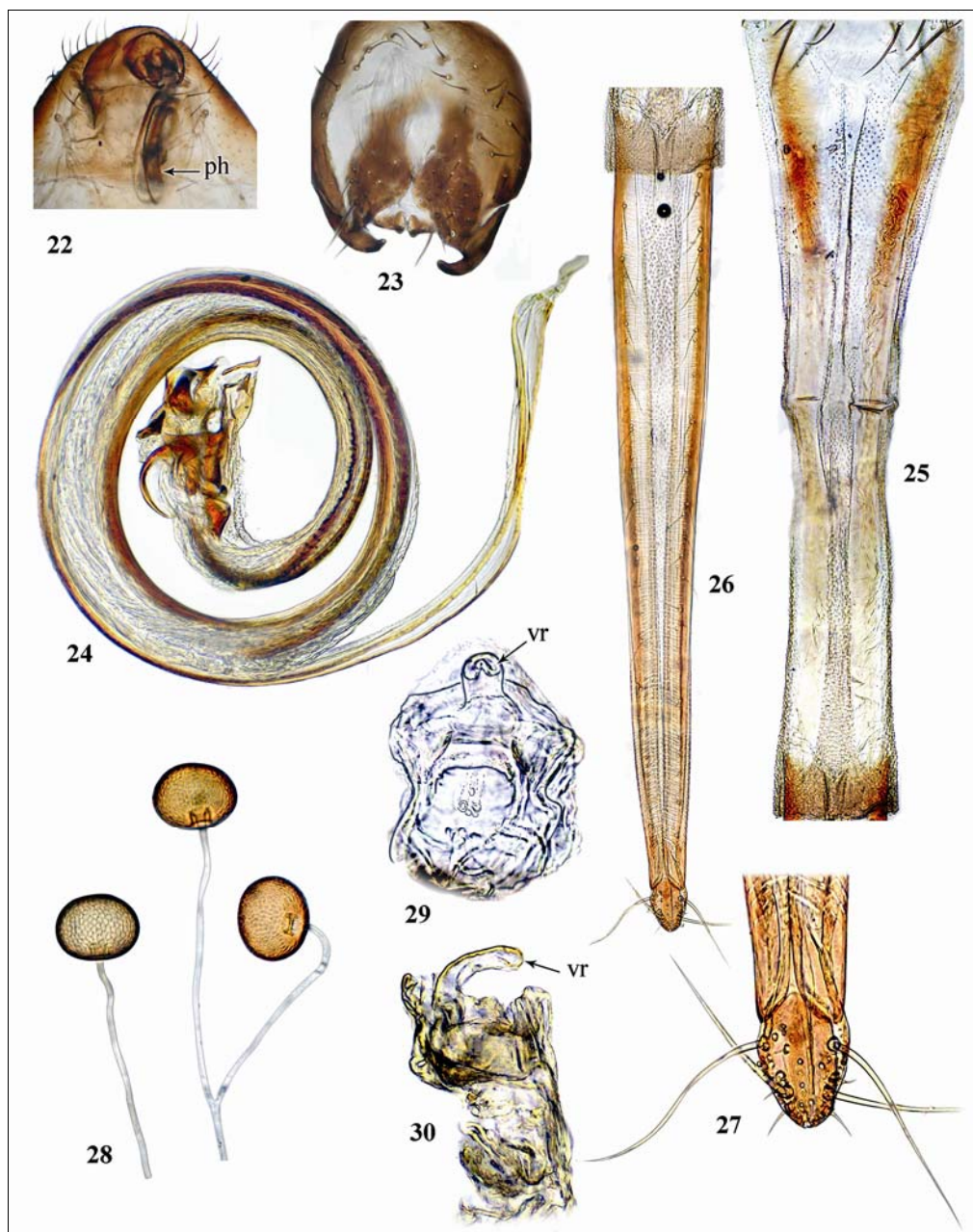
Specimens examined: Al-Ajban, 8♂, 5♀, 6–25.vii.2006, MT; 2♂, 13♀, 26.ii–2.iv.2006, MT; 4♂, 26.ii–27.iii.2006, LT; 1♂, 1♀, 6–22.v.2006, LT. Bithnah, 15♂, 7♀, 31.xii.2005–2.ii.2006, LT. Fujairah, 1♂, 1♀, 2–30.i.2006, LT; 32♂, 33♀, 28.ii–21.iii.2006, LT; 3♂, 6♀, 28.ii–1.iv.2006, LT; 13♂, 13♀, 20–27.v.2006, LT. Hatta, 43♂, 12♀, 19–28.iii.2006, LT; 30♂, 11♀, 8–26.iv.2006, LT; 28♂, 18♀, 24–



Plates 16–21. *Physiphora* glans of phallus. 16: *P. alceae* (Preyssler); 17: *P. clausa* (Macquart); 18–19: *P. leucotricha* nov. spec. (different aspects); 20: *P. sericea* (Hendel); 21: *P. smaragdina* (Loew).

30.v.2006, LT. Near Mahafiz, 1♂, 2♀, 10–29.xii.2005, LT; 2♂, 3♀, 29.xii.2005–7.i.2006, LT. Sharjah-Khor Kalba, near tunnel, 6♂, 3♀, 16–31.i.2006, LT; 6♂, 10♀, 7–22.iii.2006, LT. NARC, near Sweihan, 24♂, 5♀, 16.xi–21.xii.2005, LT. Wadi Madaq, 11♂, 2♀, 27.iv–4.v.2006, LT. Wadi Safad, 13♂, 4♀, 27.xi–22.xii.2005, LT.

Description: Head (Plate 7). Frons yellow-brown, rarely to dark brown, satin shining, very sparsely and finely, almost inconspicuously setulose, with one pair of tomentose areas adjacent to eye margins, with two pairs of oval swellings in posterior to its middle and slightly concave anterior half, 1.2 times as long as wide. Vertical plates usually black, with greenish or dark blue sheen, bearing 2 pairs of black, short, slightly reclinate orbital setae. Face reddish yellow to reddish brown, dorsal half of median carina and antennal grooves gray microtrichose. Lunule shining orange to brown. Facial ridge, parafacial and gena shining orange or brown, gena 1/3 times as high as eye; only parafacial with narrow white



Plates 22–30. *Physiphora alceae* (Preyssl) ♂ (22–24) and ♀ (25–30), genitalia: 22: Abdomen apex and hypopygium, ventral view; 23: Epandrium, posterior view; 24: Phallus; 25: Eversible membrane of ovipositor; 26: Aculeus, ventral view; 27: Same, apex, ventral view; 28: Spermathecae; 29–30: Genital chamber (=vagina), different aspects. Abbreviations: ph — phallus; vr — ventral receptacle.

microtrichose stripe along anteroventral eye margin. Occiput black, with yellowish brown area behind ocellar triangle and postgena; orbit between posterodorsal eye margin and row of black postocular setae with very narrow white microtrichose stripe or without it. Medial vertical seta half as long as frons is wide, 1.5 times as long as lateral vertical and 3–5 times as long as ocellar, orbital and postocellar setae. Antenna reddish brown, greyish microtrichose; flagellomere 1 rounded apically, 1.5 times as long as wide; arista bare, yellow in basal 1/4, remainder black. Clypeus orange to brown. Palpus brown to black, microtrichose, with moderately long black setulae. Mouthparts black.

Thorax (Plate 1). Scutum and scutellum brown to black, with dull green metallic sheen, shagreened, except antepronotum, posterior surface of postpronotal lobe and notopleuron, as well as pleura strongly shining, except posterodorsal part of anepisternum shagreened; supraalar area and tympanal fossa matt black, postscutellum black, gray microtrichose; postero-ventral margin of scutellum without microtrichose area. Mesonotal scutum with short medial row of setulae in anterior portion, pair of regular dorsocentral and intraalar rows, all setae very fine and short, black; pair hair-like acrostichal and dorsocentral seta. One postpronotal, 2 postsutural supra-alar, one intraalar and one postalar setae strong, black. Scutellum with very fine and short black setulae and 2 pairs of black scutellar setae.

Wing. Entirely hyaline, with pale yellow veins; cell r_{4+5} almost closed, not forming petiole; postero-apical extension of cell cup 1.5 times as long as vein $A_1 + CuA_2$, and 4 times as long as transverse section of vein CuA_2 . Costal vein from middle of costal cell to middle of r_1 cell with alternate thickened and thin setae in antero-dorsal and antero-ventral rows.

Legs. Black except foretarsus with basitarsomere creamy yellow in basal 3/4, mid- and hindtarsi yellow; all setae black; forefemur postero-ventrally with 5–7 thickened, but rather short setae in apical half.

Abdomen. Both tergites and sternites brown or black-brown, with very weak bluish or greenish reflection, with black setulae; female abdominal tergite 2 with pair of matt gray spots (= dimple-like structures) laterally; tergite 5 in both male and female conspicuously shagreened, subshining black. Male postabdomen brown to black; epandrium as on Plate 23, phallus glans as on Plates 16 and 24. Female terminalia: aculeus (Plate 26) 6.5–8 times as long as wide at base; 3 spherical spermathecae (Plate 28).

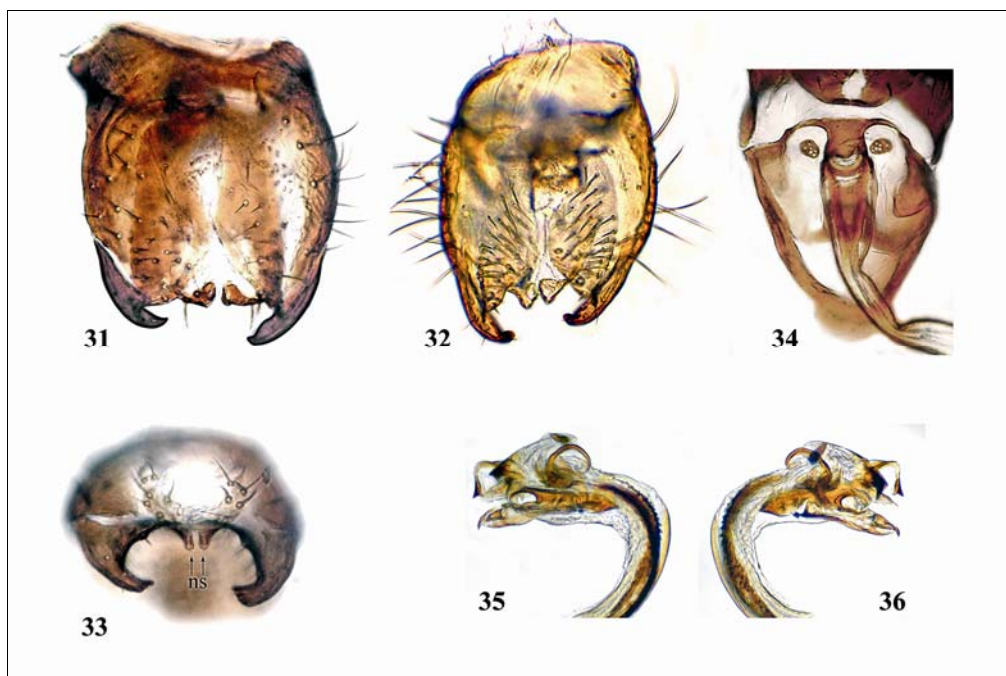
Distribution: Subcosmopolitan, except subpolar regions.

***Physiphora clausa* (Macquart, 1843)**

Plates 3, 4, 8, 17, 31–36

Specimens examined. Fujairah, 32♂, 33♀; 28.ii–21.iii.2006, LT; 3♂, 28.ii–1.iv.2006, LT; 6♂, 1♀; 2–30.i.2006, LT. Hatta, 39♂, 35♀, 19–28.03.2006, LT. Wadi Madaq, 1♂, 27.ivv4.v.2006, LT.

Description: Head (Plate 8). Frons yellow-brown to red-brown, satin shining, without conspicuous setae, with one pair of tomentose areas adjacent to eye margins, with two pairs of oval swellings in posterior to its middle and slightly concave anterior half, 1.2 times as long as wide. Vertical plates usually black, with greenish sheen, bearing 2 pairs of black, short, slightly reclinate orbital setae. Face reddish yellow to reddish brown, often with dark brown or black medioventral portion, dorsal half of median carina and antennal grooves gray microtrichose. Lunule shining brown. Facial ridge, parafacial and gena shining brownish yellow or brown, gena 1/3 times as high as eye; only parafacial with narrow white microtrichose stripe along anteroventral eye margin. Occiput black, with yellowish brown area behind ocellar triangle and postgena; orbit between posterodorsal eye margin and row of black postocular setae with narrow white microtrichose stripe. Medial vertical seta half as long as frons wide, twice as long as lateral vertical and 4–5 times as long as ocellar, orbital and postocellar setae. Antenna reddish brown, sparsely greyish microtrichose; flagellomere 1



Plates 31–36. *Physiphora clausa* (Macquart), ♂ genitalia: 31–33: Epandrium. 31: Posterior view; 32: Anterior view; 33: Ventral view; 34: Hypandrium; 35–36: Glans of phallus, different aspects. Abbreviations: ns — nipple-like structure.

rounded apically, 1.5 times as long as wide; arista bare, yellow in basal $\frac{1}{4}$, black in the rest. Clypeus brown to black, often with greenish sheen. Palpus brown to black, microtrichose, with moderately long black setulae. Mouthparts black.

Thorax. Scutum and scutellum (Plate 4) brown to black, with green, usually transiting into yellowish, red or purple metallic sheen, finely shagreened, except antepronotum, posterior surface of postpronotal lobe and notopleuron, as well as pleura strongly shining, except posterodorsal part of anepisternum shagreened; supraalar area and tympanal fossa distinctly matt grey, with sparse, curled microtrichia, as well as postscutellum; postero-ventral margin of scutellum white microtrichose. Mesonotal scutum with one (or two very close) medial row of setulae becoming disperse at posterior end, pair of regular dorsocentral and intraalar rows (latter having shape of digit '3'), all setae very fine and short, yellow or brown; pair of very tiny, hair-like dorsocentral seta twice as long as setulae anterior of it, and pair of acrostichal setae hardly distinguishable from setulae. One postpronotal, 2 postsutural supra-alar, one intraalar and one postalar setae black. Scutellum with fine and sparse yellow setulae scattered over its disc and 2 pairs of black scutellar setae.

Wing (Plate 3). Entirely hyaline, with pale yellow veins; cell r_{4+5} closed, forming petiole at wing tip; postero-apical extension of cell cup 1.5 times as long as vein CuA_2+A_1 , and twice as long as transverse section of vein CuA_2 . Costal vein from middle of costal cell to middle of r_1 cell with alternate thickened and thin setae in antero-dorsal and antero-ventral rows.

Legs. Yellow except forefemur often with black or dark brown spot, foretibia sometimes brown to black and foretarsus black with basitarsomere entirely yellow; forecoxa white

setulose anteriorly; fore coxa with black or yellow setulae; postero-ventrally with 5-7 thickened, but rather short setae in apical half.

Abdomen. Both tergites and sternites brown or black-brown, with green, red-golden, purple or blue reflection; abdominal tergite 2 yellowish white setulose on sides, in female, with pair of matt gray spots laterally. Male postabdomen yellow, otherwise similar to that of *P. alceae*; phallus glans as in Figures 35–36, with sclerotized projections short. Female terminalia: aculeus 6.5–8 times as long as wide at base; 3 spherical spermathecae.

Distribution: Afrotropical (incl. Seychelles and Mauritius) and Oriental Regions, Australia, North and South Americas, Oceania (Hawaii, Fiji).

***Physiphora leucotricha* Kamenева & Korneyev nov. spec.** Plates 9, 12–15, 18–19, 37–41

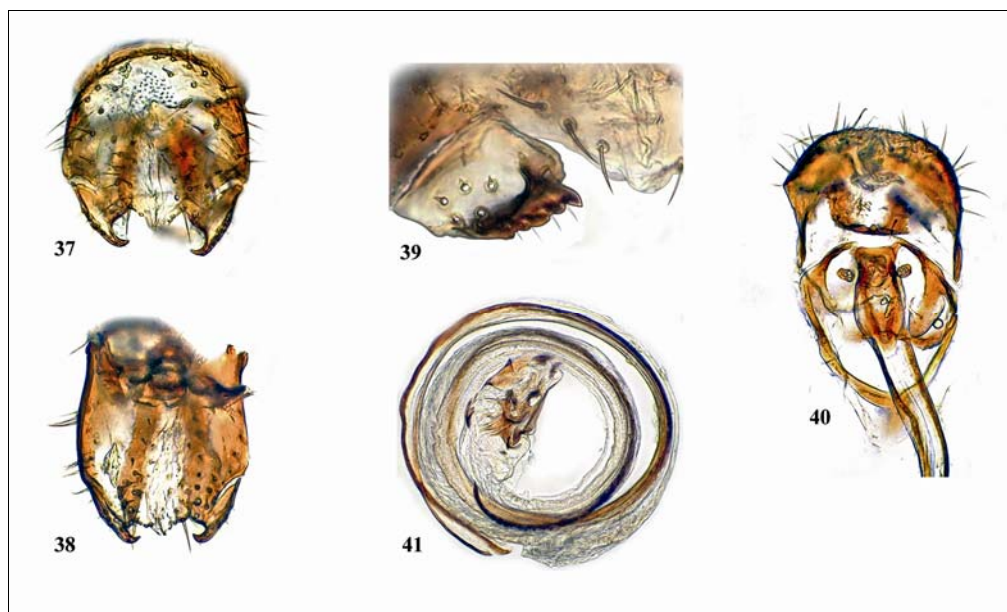
Specimens examined: Holotype: ♂, United Arab Emirates, Wadi Safad, 25°13'N 56°19'E, 31.i–21.ii.2006, in light trap, leg. A. van Harten (SIZK).

Description: Head (Plates 9, 14) black. Frons reddish-brown in medial part, black at posterior and postero-lateral margins, microtrichose in the middle, with pair of matt brown, bare spots in anterior half and matt brown spot in posterior half, antieriad to ocellar triangle; fine and short white setulae forming two oblique irregular rows between vertical plates and middle of anterior margin; 1.3 times as long as wide, 1.2 times as wide as eye, parallel-sided. Ocellar triangle and vertical plates black, with dark blue or greenish sheen in posterior half; vertical plates shagreened at middle and white microtrichose in anterior part, bearing 3-4 short black laterocline setae; ocellar triangle with pair of short black ocellar setae. Occiput with black medial and lateral vertical setae. Face black with greenish sheen, except lunule brown, facial carina with inverted Y-shaped white microtrichose mark, separated from entirely gray microtrichose antennal grooves by shining black vitta, but joining to them ventro-laterally by tips of ventral branches. Facialium brown, with narrow microtrichose stripe from antennal groove to ventral end of ptilinal suture; supravibrissal setulae fine, white. Parafacialium with narrow white microtrichose orbit from bare spot at antennal corner to occiput. Gena brown, 1/3 as high as eye, with C-shaped white microtrichose mark along genal dilation of occiput. Occiput black. Antenna red-brown, scape very short, with blackish setulae; pedicel white microtrichose, with black setulae along rather deep incision; flagellomere 1 rounded apically, 1.5 times as long as wide, white microtrichose; arista bare, yellow in basal 1/4, black in the rest. Palpus blackish brown, microtrichose, with moderately long black setulae. Mouthparts black; labellum long yellow setulose.

Thorax (Plates 13, 15) mostly shining black with green or dark blue sheen, mesonotal scutum subshining, with fine cellular sculpture, except anterior part, transverse suture, posterior portion of notopleural triangle and postalar area shining black with faint green tinge; scutellum and posterior portion of anepisternum with tiny cellular sculpture similar to that of mesonotal scutum. Scutellum gray microtrichose on postero-ventral margin. Dorsocentral and acrostichal setae absent, 2 pairs each of supra-alar and scutellar setae; all setae black. Mesonotal scutum, scutellum and anepisternum with sparse, moderately long ($1/4-1/3 \times$ as long as setae) white setulae.

Wing (Plate 12). Entirely hyaline, postero-apical extension of cell cup long, twice as long as transverse section of vein CuA_2 , cell r_{4+5} almost closed, but not petiolate (Plate 13). Wing length 3.3 mm.

Legs. Coxae, trochanters and femora dark brown to black, except knees yellow; fore tarsus brown, mid- and hindtibiae yellow; foretarsus black except basal tarsomere almost entirely pale yellow to creamy white, mid- and hindtarsi yellow, except 2 apical tarsomeres brownish. Abdomen black, with green sheen; abdominal tergite 2 black setulose on sides, with 1-2 rows



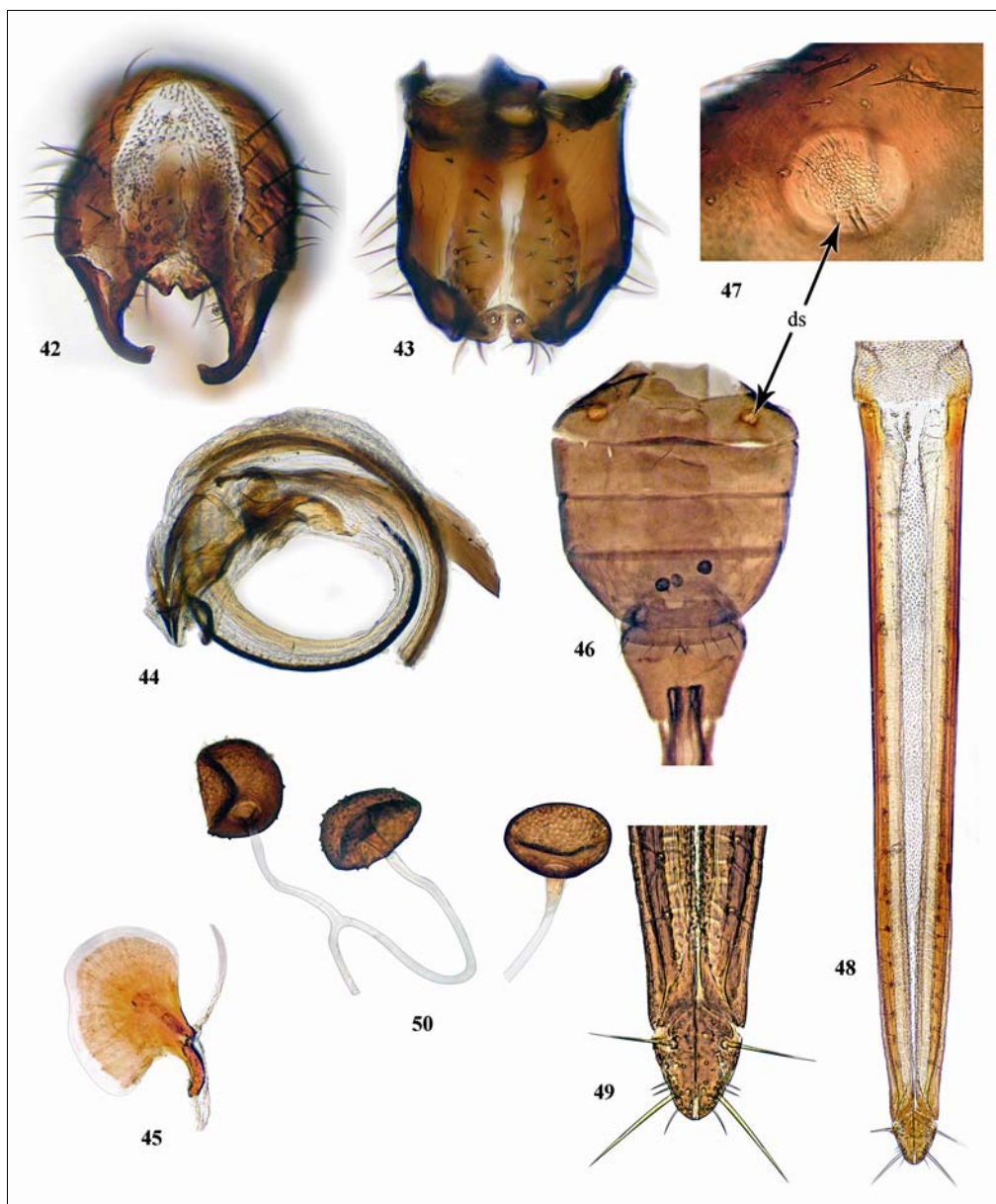
Plates 37–41. *Physiphora leucotricha* nov. spec., holotype ♂, genitalia. 37–38: Epandrium. 37: Posterior view; 38: Anterior view; 39: Apex of surstylus, ventral view; 40: Hypandrium; 41: Phallus.

of whitish yellow setulae on antero-dorsal part except middle, tergites 3 and 4 with rather dense yellowish setulae at sides (on ventro-lateral and dorso-lateral surfaces), very sparsely setulose at middle; tergite 5 sparsely yellow to white setulose, with 15 brown marginal setae; sternites 2–5 shortly yellowish setulose, with 1–2 pairs of short lateromarginal setae. Male postabdomen: sternite 8 short setulose; hypandrium as in other species of the tribe Ulidiini; epandrium setose dorsally, lateral (=outer) surstylus separated from it by a seam, short, claw-like in posterior aspect (Plate 37), with ventral (apical) lobe spatulate, slightly serrate, bearing 4–5 setulae on edge (Plate 39); medial surstyli (=bacilliform, subepandrial sclerite) tape-like, very narrowly joined at anterior margin to each other, each with 12–13 short setulae, including 2–3 longer setulae at level of lateral surstyli, but without thickened prensisetae (Plate 38); proctiger setulose, poorly sclerotized, without nipple-like structures antero-ventrally; hypandrium (Plate 40) and phallus (Plate 41) as in other Ulidiini, glans with short triangular sclerotized projections (Plates 18–19). Female unknown.

Remarks: The new species is somewhat similar to *P. alceae* in having brownish frons, black femora, whitish fore basitarsomere, gray microtrichose postero-ventral margin of scutellum and non-petiolate cell r_{4+5} , differing from all known species of the genus by having white microtrichose frons and white setulae on mesonotal scutum, scutellum, anepisternum and abdominal tergite 5, as well as by male cerci without nipple-like antero-ventral structures.

Distribution: Only known from the holotype from the UAE.

Etymology: Species epithet is from the Greek ‘λευκος’, *white, light, pure*, and ‘θριξ, gen. τριχας’, *hair*, that means ‘white setose’ or ‘white trichose’, reflecting the presence of white setulae on the body.



Plates 42–50. *Physiphora sericea* (Hendel), ♂ (42–45), ♀ (46–50), genitalia. 42–43: Epandrium. 42: Posterior view; 43: Antero-ventral view; 44: Phallus; 45: Ejaculator apodeme; 46: Abdomen (ovipositor partly detached); 47: Dimple-like structure, enlarged; 48: Aculeus, ventral view; 49: Same, apex, ventral view; 50: Spermathecae. Abbreviations: ds — dimple-like structure.

***Physiphora sericea* (Hendel, 1913)**

Plates 2, 6, 10, 20, 42–50

Specimens examined: Al-Ajban, 1♀; 26.ii–27.iii.2006, LT. Fujairah, 4♀, 20–27.v.2006, LT; 1♀; 2–30.i.2006, LT. Hatta, 1♀; 19–28.iii.2006, LT. NARC, near Sweihan, 2♂, 26.ii–2.iv.2006, LT.

Description: Head (Plate 10). Frons matt black, with faint satin bluish tinge, except antero-lateral corners shining brown, without conspicuous setae, with one pair of tomentose areas adlacent to eye margins, without swellings, 1.1–1.2 times as long as wide. Vertical plates as in *P. alceae*. Lunule shining brown. Face dark brown to black, facial carina with inverted Y-shaped pattern of white microtrichia separated from antennal grooves by shining sides of carina and fused to ventrally microtrichose bottom of antennal groove; ventral half of face shining black with bronze sheen. Parafacial with narrow white microtrichose stripe along anteroventral eye margin. Gena brown, shining, without microtrichose areas except at orbit. Occiput entirely black. Setae as in *P. alceae*. Antenna reddish brown, sparsely greyish microtrichose; flagellomere 1 rounded apically, 1.5 times as long as wide; arista bare, yellow in basal 1/4, black in the rest. Clypeus orange to brown, often with greenish sheen. Palpus brown to black, microtrichose, with moderately long black setulae. Mouthparts black.

Thorax. Scutum and scutellum black, with yellowish green to greenish dark blue metallic sheen, pitted or wrinkled, except antepnotum, posterior surface of postpronotal lobe and notopleuron, as well as pleura strongly shining, except oblique area on notopleuron from antero-dorsal margin to base of posterior notopleural seta and posterodorsal part of anepisternum shagreened or pitted; supraalar area and tympanal fossa matt brown to black, with sparse grayish microtrichia; postscutellum matt black. Mesonotal scutum with pair of rather diffuse and inconspicuous dorsocentral and intraalar rows, and some loose, very fine and short, whitish setulae, mainly in postsutural area; pair of tiny, hair-like dorsocentral setae. Setae as in *P. alceae*. Scutellum with very fine and short brown setulae and 2 pairs of black scutellar setae; its postero-ventral margin without microtrichose area.

Wing. As in *P. alceae*; postero-apical extension of cell cup 2 times as long as vein CuA_2+A_1 , and 4 times as long as transverse section of vein CuA_2 .

Legs. Black, including whole foretarsus; mid- and hindtarsi yellow; all setae black; forefemur postero-ventrally with 5–7 thickened, but rather short setae in apical half; basal tarsomere of foretarsus entirely black, on ventral surface with brush of brown setulae.

Abdomen. As in *P. alceae*. Male postabdomen: Brown to black, lateral surstyli elongated dorso-ventrally, mesally curved at apex; proctiger with nipple-like structures (Plates 42–43); phallus as on Plate 44, glans with basalmost sclerotized projection long, saber-like and opposed in direction to phallus itself, and with 3 long subapical sclerotized structures as on Plate 20; apodeme of ejaculator as on Plate 45. Female preabdomen: Tergite 2 with pair of dimple-like structures (Plates 46–47). Female terminalia: Aculeus (Plates 48–49) 6.5–8 times as long as wide at base; 3 spermathecae with papillose surface: spherical, often collapsed and appearing mushroom-like (Plates 50).

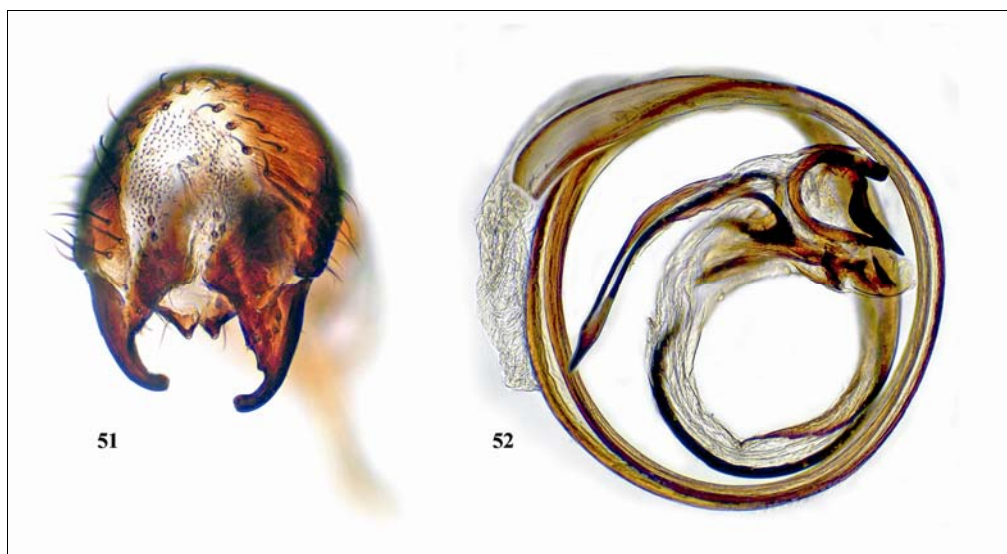
Distribution: Ethiopia (Steyskal, 1980).

***Physiphora smaragdina* (Loew, 1852)**

Plates 11, 21, 51–52

Specimens examined: Hatta, 1♂; 19–28.iii.2006, LT. Near Mahafiz, 2♂, 10–29.xii.2005, LT.

Description: Head (Plate 11). Frons red-brown to brownish-black, satin shining, without conspicuous setae, with one pair of tomentose areas adjacent to eye margins, with two pairs of faint oval swellings in posterior to its middle; 1.3–1.5 times as long as wide. Vertical plates black, with bluish sheen, bearing 2 pairs of black, short, slightly reclinate orbital setae. Face dark brown, lunule shining, facial carina with inverted Y-shaped pattern of white microtrichia separated from antennal grooves by shining sides of carina and fused to it ventrally; ventral



Plates 51–52. *Physiphora smaragdina* (Loew), ♂ genitalia. 51: Epandrium, posterior view; 52: Phallus.

half of face brown or shining black, with faint bronze sheen. Facial ridge with white microtrichose stripe fused with microtrichose bottom of antennal groove; parafacial with narrow white microtrichose stripe along anteroventral eye margin. Gena brown, shining, without microtrichose areas except at orbit. Occiput entirely shining black to dark brown; orbit between posterodorsal eye margin and row of black postocular setae shining black, without microtrichia. Setae as described for *P. alceae*. Antenna as in *P. alceae*, dark brown to black; flagellomere 1 1.5–1.7 times as long as wide. Clypeus shining black. Palpus black, microtrichose, with moderately long black setulae. Mouthparts black.

Thorax. Scutum and scutellum black, with dull green, blue or reddish metallic sheen, finely pitted, as described for *P. alceae*. Mesonotal scutum with pair of dorsocentral and intraalar rows of very fine whitish setulae with sockets hardly distinguishable among cellular sculpture; no acrostichal or dorsocentral seta; medial and supraalar setulae very fine, whitish and disperse, not forming regular rows. Other setae strong and black, as described for *P. alceae*. Scutellum without distinctive setulae, with 2 pairs of black setae.

Wing. As described for *P. alceae*; postero-apical extension of cell cup 2–3 times as long as vein CuA_2+A_1 , and 1.5–2 times as long as transverse section of vein CuA_2 .

Legs. Black, including whole foretarsus; mid- and hindtarsi creamy white to yellow; all setae black; forefemur postero-ventrally with 6–7 thickened, short setae in apical half; basal tarsomere on ventral surface with brush of creamy white setulae.

Abdomen. Both tergites and sternites black, tergites 1–4 shining, with very weak greenish reflection, male tergite 5 sparsely dotted, with bluish sheen and inconspicuous whitish setulae and microtrichia. Male postabdomen brown to black, epandrium (Plate 51) as in *P. sericea*; phallus glans (Plates 21, 52) similar to that of *P. sericea*. Female abdomen and terminalia not examined.

Distribution: Widespread in Africa (incl. Cabo Verde).



Plates 53–54. *Melieria nigratarsis* (Loew), ♀. 53: Left lateral view; 54: Dorsal view. (Photographs © James Turner / NMWC)

Subfamily **Otitinae** Aldrich, 1932

Tribe **Otitini** Aldrich, 1932

Genus **Melieria** Robineau-Desvoidy, 1830

Melieria Robineau-Desvoidy, 1830: 715. Type species: *Melieria gangraenosa* Robineau-Desvoidy, 1830: 716, by subsequent designation by Rondani, 1869: 8, 19.

Diagnosis: Antennae with flagellomere 1 acute, arista pubescent, mesonotum with 2–4 postsutural and usually with 1–2 presutural dorsocentral setae, wing with veins R_{4+5} and M parallel or divergent at apex; epandrium of male usually with elongate surstyli bearing 2–5 thickened setulae (prensisetae); female with sausage-like or oval prensisetae. Adult flies occur in association with *Artemisia maritima*, *Phragmites* spec. and *Typha* spec. along lakes, rivers and salty marshes.

Recognition: Hennig, 1939.

Distribution: The genus *Melieria* includes over 40 species occurring mainly in the Palaearctic and Nearctic Regions (see Kameneva, 1997, for references).

Melieria nigratarsis Becker, 1903

Plates 53–54

Specimens examined: Wadi Bih Dam, 1♀, 18–24.vi.2008, LT.

Recognition: This species can be recognized by the combination of presutural dorsocentral setae present, abdominal tergites uniformly sandy-gray microtrichose without brown posterior margins, wing with spotted pattern, including brown spot on R_{2-5} fork, and short pubescence of arista. The specimen reported was identified by J. Deeming, Cardiff, UK.

Distribution: Described from Egypt; recently recorded from Tunis, South of European Russia, Syria, Iraq, Iran, Turkmenistan, and Western China (Hennig, 1939), Kenya, Namibia, Nigeria (Steyskal, 1980) and from Republic of South Africa (Barraclough, 2000).

ACKNOWLEDGEMENTS

We thank first of all Antonius van Harten (UAE) for launching the project and giving us the privilege to study this interesting material, and his never failing technical help during the preparation of the paper. John Deeming (Cardiff, Wales, UK) supplied us with some pinned and labeled specimens from the NMWC and James Turner (also Cardiff) made the perfect photographs of *M. nigratarsis*.

REFERENCES

- Alcock, J. & D.W. Pyle (1979): The complex courtship behavior of *Physiphora demandata* (F.) (Diptera: Otitidae). *Zeitschrift für Tierpsychologie*, 49: 352–362.
- Barraclough, D.A. (2000): A review of the Southern African Ulidiidae (Diptera: Schizophora), with descriptions of two new genera. *Annals of the Natal Museum*, 41: 77–101.
- Becker, Th. (1903): Aegyptische Dipteren. (Fortsetzung und Schluss). *Mitteilungen aus dem zoologischen Museum Berlin*, 2 (3): 67–195.
- Chen, X.-L. & E.P. Kameneva (2007): A review of *Physiphora* Fallén (Diptera: Ulidiidae) from China. *Zootaxa*, 1398: 15–28.
- Hendel, F. (1909): Revision der, *Chrysomyza*-Arten. *Zoologischer Anzeiger*, 34 (20/21): 612–622.

- Hendel, F. (1913): Neues über afrikanische *Chrysomya*-Arten. *Wiener entomologische Zeitung*, 32 (7-9): 217–218.
- Hennig, W. (1939): Otitidae. Pp. 1–78 & 13 plates in: E. Lindner (ed.), *Die Fliegen der Palaearktischen Region*. Volume 5, 46–47.
- Hennig, W. (1940): Ulidiidae. Pp. 1–34 & 6 plates in: E. Lindner (ed.), *Die Fliegen der Palaearktischen Region*. Volume 5, 45.
- Kameneva, E.P. (1997): Revision of the Palearctic species of *Melieria* R.-D. (Diptera, Ulidiidae, Otitinae). 1. The groups of species assigned to *Hypochra* Loew. *Vestnik Zoologii*, 1996 (6): 19–46
- McAlpine, J.F. (1981): Morphology and terminology - adults. Pp. 9–63 in: J.F. McAlpine, B.V. Peterson, G.E. Shewell, H.J. Teskey, J.R. Vockeroth & D.M. Wood (eds), *Manual of Nearctic Diptera*. Volume 1. Research Branch, Agriculture Canada, Monograph 27.
- Séguy, E. (1941): Diptères recueillis par M.L. Chopard d'Alger à la Côte d'Ivoire. *Annales de la Société Entomologique de France*, 109 (1940): 109–130.
- Steyskal, G.C. (1980): 44. Family Otitidae. Pp. 575–577 in: R.W. Crosskey (ed.), *A catalogue of the Diptera of the Afrotropical Region*. London: British Museum (Natural History).

Authors' addresses:

Dr. E.K. Kameneva & Dr. V.A. Korneyev, General and Applied Entomology Section, I.I. Schmalhausen Institute of Zoology, Bogdan Chmielnicki 15, 01601 Kiev, Ukraine; e-mails: kameneva.elena@gmail.com & valery.korneyev@gmail.com