

# A review of Turkish *Diglyphus* Walker (Hymenoptera: Eulophidae), with description of a new species

ZOYA YEFREMOVA<sup>(1)</sup>, HASAN SUNGUR CIVELEK<sup>(2)</sup>, PETER BOYADZHIYEV<sup>(3)</sup>, OKTAY DURSUN<sup>(2)</sup> & ATA ESKIN<sup>(2)</sup>

<sup>(1)</sup> Department of Zoology, Ul'yanovsk State Pedagogical University, pl. 100-letya, 4, RU 432700 Ul'yanovsk, Russia

<sup>(2)</sup> Muğla University, Science and Arts Faculty, Department of Biology, 48170 Kötekli/ Muğla, Türkiye

<sup>(3)</sup> Department of Zoology, University of Plovdiv "Paisii Hilendarski", 24 Tsar Asen St., 4000 Plovdiv, Bulgaria

**Abstract.** Two species *Diglyphus begini* Ashmead and *D. sabulosus* Erdős are new records for Turkey; one new species is described *Diglyphus sensilis* **sp. nov.**, three species have new host record *Liriomyza sativae* and *Chromatomyia horticola*; 10 species of *Diglyphus* from Turkey are keyed.

**Résumé. Une révision des *Diglyphus* Walker turcs (Hymenoptera : Eulophidae), avec la description d'une nouvelle espèce.** Deux espèces sont nouvelles pour la Turquie : *Diglyphus begini* Ashmead et *D. sabulosus* Erdős. Une espèce nouvelle est décrite : *Diglyphus sensilis* **sp. nov.** Trois espèces ont des nouvelles observations d'hôtes, *Liriomyza sativae* et *Chromatomyia horticola*. La clef des *Diglyphus* de Turquie comprend dix espèces.

**Keywords:** Eulophidae, *Diglyphus*, new species, Turkey, Palearctic Region.

*Diglyphus* Walker 1844 (Hymenoptera: Eulophidae) is a moderate sized genus of the subfamily Eulophinae, which has been recorded from Afrotropical, Nearctic, Neotropical, Oriental, and Palearctic regions (Noyes 2010). Species are almost exclusively parasitoids of leafmining Agromyzidae, although in a few cases species are also known to attack other leafmining Diptera or Lepidoptera. Due to their host preference, many are parasitoids of economically important pests of Agromyzidae (Noyes 2010). Investigation of Turkish parasitoids of Agromyzidae revealed several more species of *Diglyphus*, which appear to be economically important. Agromyzid populations are regulated by many hymenopteran parasitoids. 45 parasitoid species (Eulophidae) of leafminers have been identified in Turkey until this study (Çikman & Uygun 2003; Civelek & La Salle 2005; Gençer 2005; Çikman *et al.* 2006). To control the leafmining flies by non-chemical means, it is first necessary to identify the key of *Diglyphus* species.

The purpose of this paper: 1) to examine specimens reared out of pupae or larvae of agromyzids and collected in nature by sweeping and those kept in insect collection of Entomology Laboratory at Muğla University, 2) to describe new species, 3) to record

those newly found in Turkey; 4) to provide a key to Turkish *Diglyphus* species.

## Material and methods

The paper based on 168 specimens (126 ♀♀ 42 ♂♂) of *Diglyphus* that were found from 69 different localities belong to 17 provinces. With this study, 29 specimens were reared materials (17.26%) and 139 specimens were collected with sweeping net (82.74%). The field studies carried out in 6 regions every month between May-October in 2006 and between May-July in 2007.

A GPS (Global Positioning System) were used while the samples collecting. Also some sample of leaves infested by leaf miners were randomly collected during the study. Leafminer-infested leaves were taken to the laboratory at 25 ± 2 °C, 70 ± 5 % RH, photoperiod 14:10 (L:D) h for the emergence of pests and parasitoids. Specimens were collected by Z. Yefremova in 2000 and H.S. Civelek, O.Dursun and A.Eskin between 2006 and 2007. Thus, *D. pachyneurus* was found in Adiyaman province by Çikman (2006) as new record. The specimens were identified by Z. Yefremova and P. Boyadziev. New species is described by Z. Yefremova.

## Terms and measurements:

Line-drawings were made directly from slides and mounted specimens, using a drawing apparatus. Morphological terminology follows that used by Askew & Bouček (1968) and Gibson (1997). The following abbreviations and measurements are used in the text by Noyes (2010): Head: HW – head width in facial view; HD – depth of the head in side view; HH – the length of the head in facial view (excluding the mouth parts); HE- height of eye; WE- width of eye; POL – the minimum distance between the posterior ocelli; OOL – the minimum distance between the eye margin and the adjacent posterior ocellus; SL – length of scape; PL – length of pedicel; F1 – F2

E-mail: eulophids@mail.ru, chasan@mu.edu.tr, oktaydursun48@yahoo.com, biologist\_59@hotmail.com, boyadz@uni-plovdiv.bg

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– first and second segments of antennal funicle. Thorax: PL – length of propodeum; PW – width of propodeum; FL – length of forewing; FW – width of forewing; SMV – submarginal, MV – marginal, PMV – postmarginal, SV – stigmal veins. Gaster: LG – length of gaster, WG – width of gaster. Absolute measurements in millimetres (mm) are used for body and fore wings length of specimens. For all other dimensions relatively measurements are used.

The specimens dealt with are deposited in the following collections: ZISP, Zoological Institute, St. Petersburg, Russia and in Mugla University, ELUM, Art and Science Faculty, Entomology Laboratory, University of Mugla, Turkey.

## Results

### Genus: *Diglyphus* Walker 1844

*Diglyphus* Walker 1844: 409. [Type species: *Cirrospilus chabrias* Walker 1838: 451, designated by monotypy].

*Diaulus* Ashmead 1904: 356, 372. [Type species: *Diaulus begini* Ashmead 1904: 356, designated by monotypy; synonymized with *Diglyphus* by Peck 1963: 102; Bouček & Askew 1968: 69; Bouček 1988: 617].

*Diaulinus* Schulz 1906: 146. [New name for primary homonym: *Diaulus*; synonymized with *Diglyphus* by Peck 1963: 102; Bouček & Askew 1968: 69; Bouček 1988: 617].

*Cycloscapus* Erdős & Novicky 1951: 180. [Type species: *Cycloscapus pusztensis* Erdős & Novicky 1951: 181, designated by monotypy; synonymized with *Diglyphus* by Bouček 1959: 171].

**Generic diagnosis.** Notauli generally faint, incomplete or complete and curving to anterior margin of axillae; funicle 2 segmented; scutellum with sub-parallel sublateral grooves; propleura not meeting posteromedially and prosternum partly exposed; body entirely or almost entirely metallic in coloration; submarginal vein bears more than 3 setae on dorsal surface, smoothly joining marginal vein via parastigma (Zhu *et al.* 2000).

**Biology.** Ectoparasitoids of various leaf-mining flies (mainly Agromyzidae). Other hosts have been occasionally recorded in Curculionidae, Ephydriidae, Gracillariidae, Lyonetiidae, Nepticulidae, Tephritidae and Tortricidae (Noyes 2009).

**Distribution.** Their distribution is cosmopolitan including Afrotropical, Australian, Palaearctic, Nearctic, Neotropical, and Oriental regions.

### Key to the species of *Diglyphus* from Turkey

1. Speculum absent ..... 2
- Speculum present very narrow extending along parastigma.....or along 1/2 or more of MV ..... 3
2. POL 1.4 OOL, mouth 2.0 times of malar space; propodeum with median carina, clava 2 times as long as F2, tibia metallic with base and apical 1/5–1/6 yellow ..... *D. isaea* Walker
- POL 2.25 OOL, mouth 1.33 times of malar space; propodeum without median carina, clava 3.8 times as long as F2, tibia with two dark bands, last segment of clava with sensilla ..... *D. sensilis* Yefremova **n.sp.**
3. PMV 1.5 times as long as SV ..... 4
- PMV almost equal to SV ..... 5
4. Speculum extending along parastigma; scape 3.6 X as long as broad, clava 2.25 X as long as F2; antenna with black scape ..... *D. begini* (Ashmead)

- Speculum extending along 1/3 of MV, scape 3.0 X as long as broad; clava 2.5 X as long as F2; antenna brown with pale setae ..... *D. sabulosus* Erdős
- 5. Mouth almost equal to malar space ..... 6
- Mouth 1.5 times or more malar space ..... 7
- 6. Clava equal to length of funicle; POL 2.0 OOL, speculum extending along MV; scutellum violet in contrast to green mesoscutum ..... *D. pusztensis* Erdős & Novicky
- Clava 1.2 times longer than funicle; POL 1.66 OOL, speculum extending along 1/2 of MV; scutellum concolorous with mesoscutum; male wing veins swollen ..... *D. crassinervis* Erdős
- 7. Median carina on propodeum present ..... 8
- Median carina on propodeum absent or non complete ..... 9
- 8. Funical segments at least 1.5 times as long as broad; speculum short, extending along parastigma; scutellum with a purplish shine in contrast to dark metallic blue-black mesoscutum ..... *D. minoicus* Walker
- Funical segments almost as long as broad; speculum extending along more than 1/2 of MV; all tibia with dark markings at least 0.75 the length of tibia ..... *D. chabrias* Walker
- 9. F2 longer than broad, speculum extending along MV; legs yellow (except all coxae); male with wing veins thickened ..... *D. pachyneurus* (Graham)
- F2 subquadrate, speculum extending along 1/2 of MV; legs dark green; male with wing veins not thickened ..... *D. poppoea* Walker

### *Diglyphus begini* (Ashmead 1904)

*Diglyphus begini* Ashmead 1904: 525.

**Specimens examined.** 1♀, Muğla, Marmaris, Sediradası, 36°59' N 28°12'E, 2m, 12.V.2007 (O. Dursun & A. Eskin).

**Diagnosis.** Propodeal median carina incomplete; PMV 1.5 times as long as SV; cubital vein straight at base, antenna with black scape; legs dark green.

**Hosts.** An ectoparasitoid of *Agromyza*, *Liriomyza*, *Phytomyza* (Diptera: Agromyzidae) (LaSalle & Parrella 1991), and *Stigmella* sp. (Lepidoptera: Nepticulidae).

**Distribution.** Australian, East Palaearctic, Nearctic, Neotropical and Oriental regions (Noyes 2009). New record for Turkey.

### *Diglyphus chabrias* (Walker 1838)

*Cirrospilus chabrias* Walker 1838b: 451.

*Diglyphus chabrias* (Walker 1838): Walker 1844: 409.

**Specimens examined.** 12 ♀♀, Muğla, Ula, Arıcılar, 364 m, 7.IV.2007 (O. Dursun & A. Eskin); 1♂, Muğla, Ula, Karabörtlen, Geyik Canyon, 421m 15.X.2006 (O. Dursun & A. Eskin), 1♀, Trabzon, Maçka, Sümela, 1180 m, 20.VIII.2007 (O. Dursun & A. Eskin); 1♀, Kırklareli, Üsküp, 284 m, 17.V.2007 (H. Civelek); 1♀, Rize, İkizdere Road, Aksu locality, 82m, 21.VIII.2007 (O. Dursun & A. Eskin); 1♂, Çanakkale, Terziler Village, 122m, reared from *Chromatomyia horticola*, 28.IV.2007 (H. Civelek), 1♀, Çanakkale, Yeşilyurt, Assos Town entrance, Bridge locality, 155 m, 26.IV.2007 (H. Civelek); 1♀, Antakya, Belen 36°25.807' N 36°08.645' E,

reared from Agromyzidae, 04.VI.2008 (H. Civelek); 1♂, Kırklareli, Pınarhisar, Istranca (Yıldız) Mountains, 41°45.270' N 27°40.624' E 804 m, reared from *Liriomyza sativae* 18.V.2007 (H. Civelek).

**Diagnosis.** POL 2.0 X OOL; mouth 1.5 X malar space; scape 3.5 X as long as broad; propodeum with median carina, funical segment slightly longer than broad. Body green with metallic tint. PMV almost as long as SV.

**Hosts.** Parasitoid of *Agromyza* sp., *Liriomyza* sp., *Chromatomyia fiscula* (Hagvar *et al.* 1998), *Phytomyza* sp., *Phytoliriomyza* sp. (Diptera: Agromyzidae). *Chromatomyia horticola* and *Liriomyza sativae* new host records.

**Distribution.** Palearctic (Noyes 2009).

### *Diglyphus crassinervis* Erdős 1958

*Diglyphus crassinervis* Erdős 1958: 211.

**Specimens examined.** 1♀, Ankara, Beynam, 39°41' N 32°53' E, 1250 m, 21.VI.2000 (Z. Yefremova); 1♀, Muğla, Köteklü village, Muğla University Campus, 37° 10' N 28° 22' E, 645 m, 15.IX.2006 (H. Civelek, O. Dursun & A. Eskin); 1♂, Antalya, Kundu, 36° 53' N 30° 53' E, 2 m, 24.I.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Çanakkale, Gelibolu Peninsula, B.Anafartalar village, 40°16' N 26°17' E 33 m, 27.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Çanakkale, Gelibolu Peninsula, Eceabat plain, 40°12' N 26°20' E, 19 m, 27.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Kocaeli, İzmit, Bayraktar village, 40°46' N 30°04' E, 26 m, 20.V.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Afyonkarahisar, Çay Town, 38° 35' N 31° 02' E, 1030 m, 2.VI.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Mersin, Kızkalesi, Akkum, 36° 27' N 34° 08' E, 8 m, 2.VI.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Mersin, Mut, Hocantı (Derinçay) village, 36° 43' N 33° 19' E, 192 m, 31.V.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Trabzon, Akçaabat, 41° 02' N 39° 33' E, 30 m, 20.VIII.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Artvin, Borçka, Camili road, Maçehel Passageway, 41° 26' N 41° 50' E, 1658 m, 23.VIII.2007 (H. Civelek, O. Dursun & A. Eskin); 1♂, Amasya, City Center, 40° 38' N 35° 49' E, 420 m, 04.IX.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Muğla, Yenice Village, 37° 06' N 28° 19' E, 670 m, 08.X.2006 (H. Civelek, O. Dursun & A. Eskin); 1♂, Muğla, Yatağan, Bencik Village, Kayderesi local, 37° 12' N 27° 57' E, 461m 07.X.2006 (H. Civelek, O. Dursun & A. Eskin); 1♂, Muğla, Fethiye, Kemer Town, Esen Village, 36° 44' N 29° 22' E, 179 m, 14.X.2006 (H. Civelek, O. Dursun & A. Eskin); 1♂, Antalya, Düden Waterfall, 36° 57' N 30° 43' E, 75 m, 29.X.2007 (Reared material, host: *L. sativae*) (H. Civelek, O. Dursun & A. Eskin); 1♂, Muğla, Yılanlı Mountain, Fadıl Village, 37° 17' N 28° 37' E, 427 m, 30.IX.2006.

**Diagnosis.** POL 1.66 X OOL, mouth about equal to malar space; F1 at least 1.5 times as long as broad; MV 3.4 times as long as SV; PMV almost as long as SV; male MV thickened and stigma large, propodeum without median carina or very short.

**Hosts.** An ectoparasitoid (larval parasitoid) of *Agromyza* sp. and *Phytomyza* sp. (Diptera, Agromyzidae), and of species of Tortricidae (Lepidoptera) (Askew & Bouček 1968). *L. sativae* new host record.

**Distribution.** Nearctic, Oriental and Palearctic Regions (Noyes 2009).

### *Diglyphus isaea* (Walker 1838)

*Cirrospilus isaea* Walker 1838a: 386.

*Diglyphus isaea* (Walker 1938): Graham 1959: 178.

**Specimens examined.** 2♀♀, Muğla, Köteklü Village, Muğla University Campus, 37° 10' N 28° 22' E, 645 m, 15.IX.2006 (Reared material, host: *L. sativae*) (H. Civelek, O. Dursun & A. Eskin); 5♀♀, Muğla, Yılanlı Mountain, Yemişendere Village, 37° 14' N 28° 34' E, 580 m, 30.IX.2006 (H. Civelek, O. Dursun & A. Eskin); 1♀, Muğla, Yılanlı Mountain, Esençay Village, 37° 24' N 28° 37' E, 342 m, 18.IX.2007 (H. Civelek, O. Dursun & A. Eskin); 1♂, Muğla, Köyceğiz, 36° 59' N 28° 34' E, 53 m, 18.I.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Muğla, Ortaca, Dalyan, Eskiköy, Badur Farm, 36° 52' N 28° 40' E, 2 m, 18.I.2007 (H. Civelek, O. Dursun & A. Eskin); 4♀♀, Fethiye, Kargı Village, 36° 41' N 29° 04' E, 7 m, 19.I.2007 (H. Civelek, O. Dursun & A. Eskin); 2♀♀, Antalya, Kundu, 36° 53' N 30° 53' E, 2 m, 24.I.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Muğla, Gökseki, Dalaman Rivulet, 36° 55' N 28° 56' E, 153 m, 7.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 2♀♀, Muğla, Ula, Arıcılar, 37° 06' N 28° 36' E, 364 m, 7.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Muğla, Fethiye, Ören Water Source, 36°45' N 29°23' E, 204 m, 8.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 2♀♀, Balıkesir, Ayyalık, 39°19' N 26°43' E, 13 m, 26.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 1♂, Çanakkale, Truva National Park, 39°57' N 26°14' E, 41 m, 26.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 2♀♀; ♂; Çanakkale, Gelibolu Peninsula, B.Anafartalar Village, 40°16' N 26°17' E, 33 m, 27.IV.2007 (Reared material, host: *C. horticola*) (H. Civelek, O. Dursun & A. Eskin); 1♂, Çanakkale, Gelibolu Peninsula, Conkbayırı Place, 40°15' N 26°18' E, 272m, 27.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 3♀♀; 2♂♂, Çanakkale, Gelibolu Peninsula, Eceabat plain, 40°12' N 26°20' E, 19 m, 27.IV.2007 (Civelek& Dursun) (H. Civelek, O. Dursun & A. Eskin); 1♂, Çanakkale, Gelibolu Peninsula, Martyrdom Monument, Setrülbahir, 40°03' N 26°13' E, 64 m, 27.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Çanakkale, Gelibolu Peninsula, Conkbayırı Place, , 40°15' N 26°18' E, 272 m, 27.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 4♀♀, Çanakkale, City Center, 40° 08' N 26° 24' E, 54 m, 28.IV.2000 (H. Civelek, O. Dursun & A. Eskin); 1♀, Muğla, Merkez, 37° 13' N 28° 21' E, 29.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Muğla, Köyceğiz, Toparlar Waterfall, 36°59' N 28°38' E, 44 m, 11.V.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Kırklareli, Islambey Village, Pınarhisar, 41° 42' N 27° 37' E, 354 m, 18.V.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Kırklareli, Pınarhisar, Yenice Village, 41° 41' N 27° 37' E, 346 m, 18.V.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Kırklareli, Şeytan Brook, 41°42' N 27°15' E, 45 m, 18.V.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Kırklareli, Pınarhisar, Istranca (Yıldız) Mountains, 41° 45' N 27° 40' E, 804 m, 18.V.2007 (H. Civelek, O. Dursun & A. Eskin); 3♀♀, Kocaeli, İzmit, Bayraktar Village, 40° 47' N 30° 05' E, 55m 19.V.2007(Reared material, host: *C. horticola*) (H. Civelek, O. Dursun & A. Eskin); 3♀♀, Kocaeli, İzmit, Bayraktar Village, 40°46' N 30°04' E, 26 m, 19.V.2007 (H. Civelek, O. Dursun & A. Eskin); 2♀♀, Bursa, Görükle, 40° 14' N 28° 50' E, 81 m, 20.V.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Mersin, Mut, Yapıntı Village, 36° 41' N 33° 22' E, 148 m, 31.V.2007 (H. Civelek, O. Dursun & A. Eskin); 2♀♀, Mersin, Tarsus, Fakılar Village, 37° 10' N 34° 38' E, 1228 m, 1.VI.2007 (H. Civelek, O. Dursun & A. Eskin); 1♂, Mersin, Çamliyayla, Cehennem Brook, 37° 07' N 34° 31' E, 632m, 1.VI.2007



(Reared material, host: unknown) (H. Civelek, O. Dursun & A. Eskin); 1♀, Mersin, Kızkalesi, Akkum, 36° 27' N 34° 08' E, 8 m, 2.VI.2007 (H. Civelek, O. Dursun & A. Eskin); 6♀♀; 1♂, Çanakkale, Gelibolu Peninsula, Kilitbahir, Site of Havuzlar Şehitliği, 40° 07' N 26° 21' E, 2 m, 27.VII.2007 (Reared material, host: *C.horticola*) (H. Civelek, O. Dursun & A. Eskin); 1♀, Giresun, Tirebolu – Tirebolu Beach, 41° 00' N 38° 48' E, 10 m, 20.VIII.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Artvin, Borçka, Camili Road, Maçhel Passageway, 41° 26' N 41° 50' E, 1658 m, 23.VIII.2007 (H. Civelek, O. Dursun & A. Eskin); 2♀♀, 1♂, Artvin, Hatila Plateau, 40° 41' N 39° 39' E, 1172 m, 24.VIII.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Çanakkale, Atıkhisar Village, 40° 06' N 26° 32' E, 141 m, 28.04.2007 (Reared material, host: *C.horticola*) (H. Civelek, O. Dursun & A. Eskin); 1♀, Antalya, Kumluca, 36° 19' N 30° 16' E, 4 m, 23.I.2007 (H. Civelek, O. Dursun & A. Eskin); 1♂, Trabzon, Akçaabat, 41° 02' N 39° 33' E, 30 m, 20.VIII.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Muğla, Ortaca City Center, 36° 50' N 28° 44' E, 4 m, 22.IV.2007 (Reared material, host: *L. sativae*, *C. horticola*) (H. Civelek, O. Dursun & A. Eskin); 1♀, Bartın, Ulus, Küllü Village, Fışkı District 41°33.630 N 32°37.186 E, 334 m 24.VII.2008 (Reared material, host: unknown) (H. Civelek, O. Dursun & A. Eskin); 1♀, Bartın, Ulus, Pınarbaşı Road, Şirinler Village, 41°39.588' N 32°52.282' E, 806 m 24.VII.2008 (Reared material, host: unknown) (H. Civelek, O. Dursun & A. Eskin); 2♀♀, Kastamonu, Ağlı, Uzunöz Village, Ayazoğlu District road junction, 41°45.628 N 33°42.465 E, 1107 m 25.VII. 2008 (Reared material, host: unknown) (H. Civelek, O. Dursun & A. Eskin).

**Diagnosis.** POL 1.4 X OOL; mouth 2.0 malar space; notauli not complete; fore wings elongate densely setose, without speculum, cubital line curved, PMV almost as long as SV, propodeum with complete median carina; tibia dark with yellow spot on distal margin; body green.

**Hosts.** An ectoparasitoid of leaf-mining flies: *Agromyza*, *Liriomyza*, *Phytomyza*, *Napomyza*, *Phytoagromyza*, *Cerodontha* and *Chromatomyia* (Diptera, Agromyzidae) (Askew & Bouček 1968).

**Distribution.** Afrotropical, Australian, Palearctic, Nearctic and Oriental regions (Noyes 2010).

### *Diglyphus minoicus* (Walker 1838)

*Cirrospilus minoicus* Walker 1838a: 385.

*Diglyphus minoicus* (Walker 1838): Graham 1959: 178.

Specimens examined: 1♀, Ankara, Beynam, 39°41' N 32° 53' E, 1250 m, 21.VI.2000 (H. Civelek, O. Dursun & A. Eskin); 1♀, Muğla, Ortaca, Dalyan, 36° 50' N 28° 39' E, 0 m, 18.I.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Çanakkale, Truva National Park, 39° 57' N 26° 14' E, 41 m, 26.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Çanakkale, Gelibolu Peninsula, Settülbahir site among martyr monument, 40° 03' N 26° 13' E, 64 m, 27.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 1♂, Çanakkale, Gelibolu Peninsula, B. Anafartalar, Village, 40°16' N 26° 17' E, 33 m, 27.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Kocaeli, İzmit, Bayraktar village, 40° 47' N 30° 05' E, 55 m, 19.V.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Mersin, Kızkalesi, 36° 29' N 34° 10' E, 12 m, 31.V.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Mersin, Mut, Yapıntı Village, 36° 41' N 33° 22' E, 148 m, 31.V.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Giresun, Tirebolu – Tirebolu Beach, 41° 00' N 38° 48' E, 10 m, 20.VIII.2007

(H. Civelek, O. Dursun & A. Eskin); 1♂, 1♀, Trabzon, Maçka, Sümela Monastery, 40° 42' N 39° 37' E, 1180 m, 20.VIII.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Artvin, Borçka, Camili Road, Maçhel Passageway, 41° 26' N 41° 50' E, 1658 m, 23.VIII.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Muğla, Fethiye, Kemer Town, Esen Village, 36° 44' N 29° 22' E, 179 m, 14.X.2006 (Reared material, host: *L. sativae*) (H. Civelek, O. Dursun & A. Eskin).

**Diagnosis.** POL 2.25 X OOL; mouth 2.0 malar space; antennal segment at least 1.5 X as long as broad; PMV as long as SV; notauli incomplete; speculum very narrow or absent; scutellum short, rounded with a violet shine; all coxae with metallic tint; antenna dark brown.

**Hosts.** An ectoparasitoid of leaf-mining flies: *Agromyza* sp., *Liriomyza* sp. (Diptera, Agromyzidae), rarely of Gracillariidae (Lepidoptera) (Askew & Bouček 1968). *L. sativae* new host record.

**Distribution.** Palearctic, Neotropical and Oriental regions (Noyes 2009).

### *Diglyphus pachyneurus* Graham 1963

*Diglyphus pachyneurus* Graham 1963: 176.

Specimens examined. 1♂, 4♀♀, Adıyaman, City Center (Bağpınar), 20.X.2006 (E. Çikman).

**Diagnosis.** F2 longer than broad, clava 2.5 times as long as F2, scape 5 times as long as broad; PMV as long as SV, speculum extending along MV; legs yellow (except all coxae) basal half of hind femur metallic green; male with wing veins thickened.

**Hosts.** *Agromyza salicifolii*, *Japanagromyza* sp. (Diptera: Agromyzidae).

**Distribution.** Palearctic (Noyes 2009).

### *Diglyphus poppoea* Walker 1848

*Diglyphus poppoea* Walker 1848: 145, 235.

**Specimens examined.** 1♂, Muğla, Ula, Arıcılar, 37° 06' N 28° 36' E, 364 m, 7.IV.2007 (Reared material, host: *C. horticola*) (H. Civelek, O. Dursun & A. Eskin).

**Diagnosis.** POL about 2.0 X OOL; F1 at most 1.5 times as long as broad; mouth 1.5 of malar space; scutellum as long as broad; fore wing with large speculum; PMV as long as SV propodeum without median carina; scape of antenna whitish; body green.

**Hosts.** An ectoparasitoid of *Agromyza* sp., *Liriomyza* sp., *Phytomyza atricornis* (Diptera, Agromyzidae) (Askew & Bouček 1968), *C. horticola* (Noyes 2009).

**Distribution.** Palearctic.

### *Diglyphus pusztensis* (Erdős & Novicky 1951)

*Cycloscapus pusztensis* Erdős & Novicky 1951: Erdős 1951: 181.

*Diglyphus pusztensis* (Erdős & Novicky 1951): Bouček 1959: 171.

**Specimens examined.** 1♀, Bingöl, City Center, Karlıova Road Turn, 38° 54' N 40° 35' E, 1079 m, 8.IX.2006 (H. Civelek, O. Dursun & A. Eskin); 1♀, Muğla, City Center, Kötekli Village, 37° 08' N 28° 22' E, 645 m, 15.IX.2006 (H. Civelek, O. Dursun & A. Eskin); 2♀♀, Muğla, City Center, Kötekli Village, 37° 10' N 28° 22' E, 626 m, 29.IV.2006 (H. Civelek,

O. Dursun & A. Eskin); 1♀, Antalya, Kundu, 36° 53' N 30° 53' E, 2 m, 24.I.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Muğla, Ula, Arıcılar, 37° 06' N 28° 36' E, 364 m, 7.IV.2007 (H. Civelek, O. Dursun & A. Eskin); 1♀, Kocaeli, Izmit, Bayraktar Village, 40° 47' N 30° 05' E, 55 m, 19.V.2007 (H. Civelek, O. Dursun & A. Eskin).

**Diagnosis.** POL 2.0 X OOL; mouth almost equal to malar space; scape 3.5 times as long as broad, pedicel 1.5 times as long as broad; PMV as long as SV ; thorax reticulate; propodeum without median carina; body dark green with blue tint.

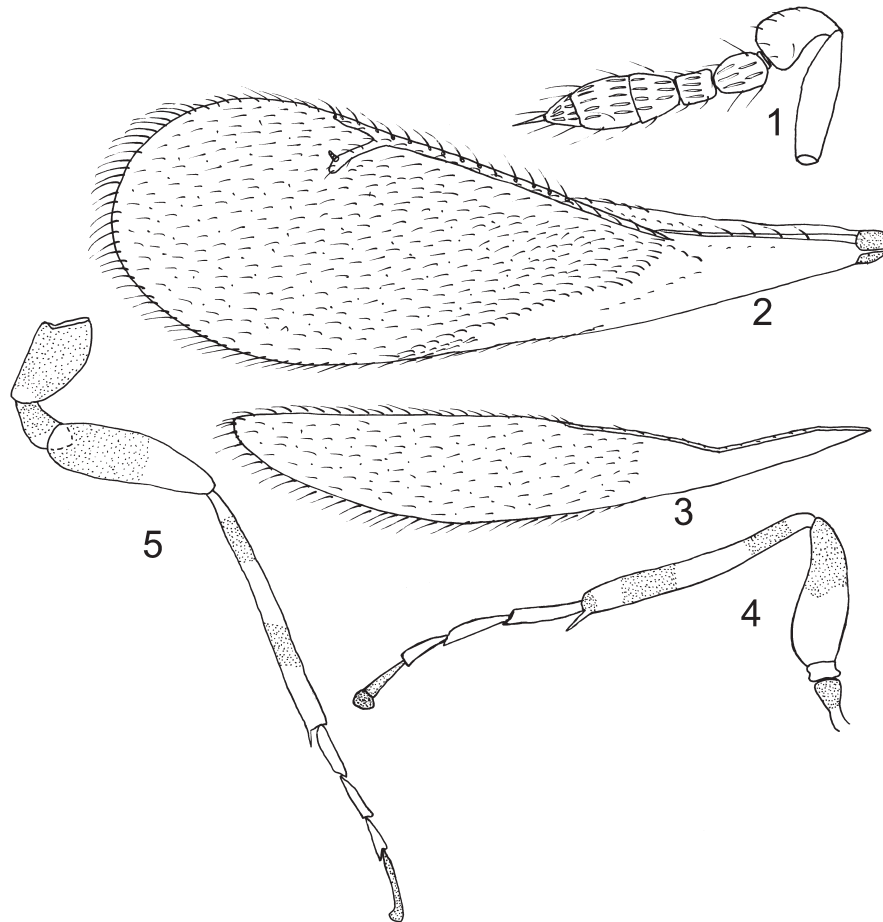
**Hosts.** An ectoparasitoid of *Agromyza* sp., *Liriomyza* sp., *Phytomyza* sp. (Diptera, Agromyzidae) (Askew & Bouček 1968).

**Distribution.** Palaearctic.

*Diglyphus sensilis* Yefremova sp.nov  
(Figs 1–9)

**Holotype** 1♀, Turkey, Muğla, Dalaman, Beyobası, 121 m, 7.IV.2007, wheat (ELUM ). **Paratypes** 7♀, Turkey, Muğla,

City Center, Kötekli Village, University Campus, 37° 10' N 28° 22' E, 645 m, 15.IX.2006 (H. Civelek, O. Dursun & A. Eskin) (ZISP); 1♀, Artvin, Borçka, Camili Road, Maçhel Passageway, 41° 26' N 41° 50' E, 1658 m, 23.VIII.2007 (H. Civelek, O. Dursun & A. Eskin) (ZISP); 1♀, Muğla, Yesilyurt Town, Sincan Site, 6.V.2007 (H. Civelek, O. Dursun & A. Eskin) (ELUM ); 1♀, Muğla, Yılanlı Mountain, Göktepe Village, 436 m, 1.X.2006 (H. Civelek, O. Dursun & A. Eskin) (ELUM); 8♂♂, Turkey, Muğla, Kötekli Village, University Campus, 37° 10' N 28° 22' E, 645 m, 15.IX.2006(one - in slide) (H. Civelek, O. Dursun & A. Eskin); 1♂, Çanakkale, Gelibolu Peninsula, Settülbahir Site Among Martyr Monument, 64 m, 27.IV.2007 (head in slide) (H. Civelek, O. Dursun & A. Eskin); 1♂, Kocaeli, Izmit, Bayraktar Village, 55 m, 19.V.2007 (H. Civelek, O. Dursun & A. Eskin); 1♂, Mersin, Tarsus, Sarıkoyak Village, 813 m, 1.VI.2007 (H. Civelek, O. Dursun & A. Eskin); 1♂, Artvin Borçka, Camili Road, Maçhel Passageway, 41° 26' N 41° 50' E, 1658 m, 23.VIII.2007 (H. Civelek, O. Dursun & A. Eskin); 1♂, Burdur, Yeşilova 37° 34' 778N 29° 52' 907 E, *Liriomyza sativae* (Agromyzidae: Diptera), 11.VI.2008 (H. Civelek, O. Dursun & A. Eskin); 1♂, Kastamonu, Ağlı, Uzunöz Village,



**Figure 1–5**  
*Diglyphus sensilis* Yefremova sp. nov. Female: 1, antenna; 2, fore wing; 3, hind wing; 4, mid leg; 5, hind leg. Scale lines = 0.1 mm.

Ayazoğlu District road junction, 41°45.628' N 33°42.465' E, 1107 m. 25.VII.2008 (ELUM).

Other specimens examined: 1♂, Kırklareli, Üsküp, Kızılıktepe, 274 m, 17.V.2007; 1♂, Mersin, Tarsus, Fakılar Village, 228 m, 01.VI.2007; 1♂, Muğla, Yenice Village, 670 m 08.X.2006; 1♂, Muğla, Kavaklıdere, Mentеше Yerküpe Cave, 897 m, 07.10.2006; 1♂, Muğla, Fethiye, Kemer Town, Esen Village, 179 m, 14.10.2006; 1♀, Mersin, Silifke-Mut Road, 104 m, 02.VI.2007; 1♂, Muğla, Fethiye, Ören Water Source, 204 m, 08.IV.2007.

**Diagnosis.** POL 2.25 OOL, mouth 1.33 malar space; median carina of propodeum absent; speculum absent; scutellum longer than mesoscutum; F1 longer than F2, long apical sensilla (Figs 1, 6) present on clava in both sexes. Body dark green, all tibiae with two brown bands.

**Description. Female.** (Figs 1–5). Body length 1.25 mm, forewing length 1.15 mm.

Body dark green with metallic tint; tegulae yellow with brown spot in middle; antenna brownish; mandibles yellow, labial and

maxillar palpa pale yellow, compound eyes pink-grey. Legs (Figs 4, 5) with dark green coxae, brown trochanters, anterior 0.5 to middle of all femora brown, posterior pale yellow, all tibiae with two brown broad bands and tarsi yellow, except brown last tarsal segment; wings hyaline.

**Head** 1.09 X as broad as high and 2.4 X as long as broad. POL 2.25 OOL. Frons with fine-meshed reticulation. Eyes with short setae. Frontal groove present, straight, running from middle margin of eyes. Toruli inserted at level the lower margin of eyes. Malar sulcus present, straight, mouth 1.33 of malar space; Maxillary palpus with 2 segments, labial palpus with 1 segment. Antenna (Fig.1) with scape 2.0 X as long as pedicel, pedicel 1.1 times as long as F1, one discoid anellus, F1 1.8 X as long as F2 and broader than F2, clava 3-segmented slightly shorter than scape and about 4.0X as long as F2. Relative measurements: HW 12, HL 5, HH 11, POL 8.0, OOL 3.5, SL 4.6, PL 2.2, F1 2.0, F2 1.1, LC 4.2, apical sensilla 0.5.

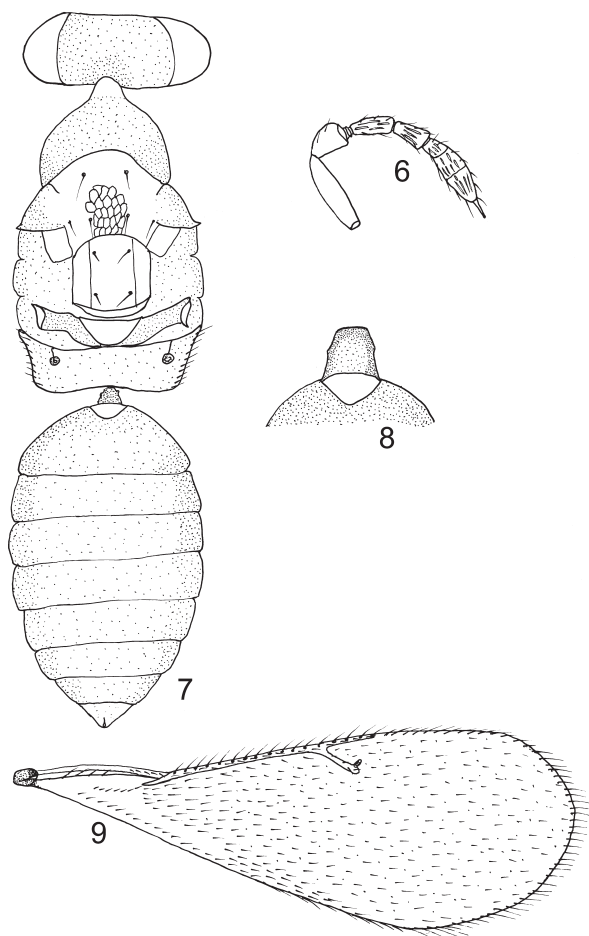
**Mesosoma.** Pronotum as long as mesoscutum, reticulate. Mesoscutum with notauli incomplete, distinct anteriorly, not reaching axilla, posteriorly not parallel, with strong reticulation and areolae larger than that on scutellum, with 3 pairs of long setae on mid lobe. Scutellum 1.6 times as long as mesoscutum and 1.2 times as broad as mesoscutum. Scutellum finely reticulate, with two straight sublateral grooves, with 2 pairs of short setae. Dorsellum finely reticulate. Propodeum 3.0 times as long as broad, smooth, without median carina. Spiracle round small with paraspiracular carina. Callus with numerous scattered setae. Fore wings (Fig. 2) 2.8 times as long as broad. SMV tapering to apex, with 5 setae dorsally. Costal cell with about 4 dorsal setae on anterior margin apically and incomplete row of 8 ventral setae. Speculum absent. MV 1.8 X longer than SMV; PMV 1.66 times shorter than SV. Hind wing apically slightly obtuse. Relative measurements: PL 5, ML 5, MW 10, SL 8, SW 8, PRL 12, PRW 4.0, FL 50, FW 18, SMV 10, MV 18, SV 5.0, PMV 3.0.

**Metasoma.** Petiole cylindrical, short. Gaster 2.5 times as long as broad. Ovipositor sheaths not protruding. Relative measurements: LG 25, WG 10.

**Male** ( Figs 6–9). Body length 0.95 mm. Similar to female in much of coloration and habitus, but differs in the following characters.

**Head** (Fig. 7) 1.1 X as broad as high, 2.75 X as long as broad and broader than thorax. Antenna (Fig.6) with scape 1.4 times as long as clava and 2.5 times as long as pedicel; pedicel 1.13 times as long as F1; with one discoid anellus; F1 1.33 times as long as F2; F2 2.6 times shorter than clava. Length of apical sensilla the same as in female. First segment of funicle slightly narrower than the second. Relative measurements: HW 11, HL 4, HH 10, SL 4.3, PL 1.7, F1 2.0, F2 1.5, LC 4.0, apical sensilla 0.5.

**Mesosoma** (Fig. 7). Pronotum as long as mesoscutum and slightly shorter than in female. Mesoscutum with numerous setae. Scutellum 1.37 times as long as mesoscutum and 1.2 times as broad as mesoscutum, finely reticulate with 2 pairs of short setae. Dorsellum finely reticulate. Propodeum smooth, 3.6 times as long as broad, without median carina. Spiracle round with strong paraspiracular carina. Callus with numerous setae. Fore wings 2.8 times as long as broad (Fig. 9); SMV tapering to apex, with 4 setae dorsally; speculum absent; MV 1.6 X longer than SMV; PMV 1.56 times shorter than SV. Relative measurements: PL 4, ML 4, MW 8, SL 6.5, SW 6.5,



**Figure 6–9**  
*Diglyphus sensilis* Yefremova **sp. nov.** Male: Male: 6, antenna; 7, body; 8, petiole; 9, fore wing. Scale lines = 0.1 mm.

PRL 9, PRW 2.5, FL 42, FW 15, SMV 3.5, MV 5.7, SV 4.7, PMV 3.0.

**Metasoma.** Petiole cylindrical, short (Fig.8). Gaster 1.5 times as long as broad. Genitalia protruding. Relative measurements: LG 13.5, WG 9.

**Variation** in both sexes in colour absent, the size of body varies slightly.

**Host.** *Liriomyza sativae* (Agromyzidae: Diptera).

**Distribution.** Turkey.

**Etymology.** species name is derived from the Latin *sensilis* (having sensilla) and refers to having long claval apical sensilla on both sexes.

**Comments.** *D. sensilis* is stated to be close to *Diglyphus isaea* (Walker) in having densely setose in forewing basal cell, absence speculum, F2 shorter than F1 and colour of body (except legs) but differs by following characters: POL 2.25 OOL (1.4 – in *D. isaea*), mouth 1.33 malar space (2.0 – in *D. isaea*), PMV slightly shorter than SV (subequal to SV in length – in *D. isaea*), forewing 2.8 times as long as broad (2 times – in *D. isaea*), propodeum without median carina (with carina – in *D. isaea*), pedicel 1.1-1.13 times as long as F1 (pedicel equal F1 – in *D. isaea*), clava with long apical sensilla (very short sensilla – in *D. isaea*), clava 3.8 times as long as F2 in female and 2.66 times – in male (2.2 times – in female of *D. isaea*), tibiae of mid and hind legs with two brown broad bands (Figs 4, 5) (dark brown in  $\frac{3}{4}$  of anterior part – in *D. isaea*).

### *Diglyphus sabulosus* Erdős 1951

*Diglyphus sabulosus* Erdős 1951: 197.

**Specimens examined.** 1♀, Artvin, Borçka, Camili Road, Maçehel Passageway, 41° 26'N 41° 50'E, 1658 m, 23.VII.2007 (H. Civelek, O. Dursun & A. Eskin).

**Diagnosis.** POL 1.75 X OOL; mouth almost equal to malar space; scpae 3X as long as broad; propodeum without median carina; PMV 1.5 X as long as SV; body green, legs dark, antenna brown with pale seate.

**Host.** *Liriomyza* (Diptera: Agromyzidae) Erdős 1956.

**Distribution.** Palearctic (European countries: Hungary, Romania, Slovakia, Slovenia, Czech Republic). New record for Turkey.

**Acknowledgments.** Dr John Noyes (The Natural History Museum, London, UK) is thanked for access to the collections of that museum in 2008.

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