

Studies on the males of the *Hydropsyche pellucidula* species group in Turkey (Trichoptera, Hydropsychidae)

Estudio de los machos de las especies del grupo de *Hydropsyche pellucidula* en Turquía (Trichoptera, Hydropsychidae)

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Abstract

The males of the *Hydropsyche pellucidula* species group found in Turkey are studied. Eight new species are described and illustrated: *Hydropsyche boyabat* sp. n., *Hydropsyche harsitica* sp. n., *Hydropsyche cerkesica* sp. n., and *Hydropsyche trabzonica* sp. n. from northern Turkey; *Hydropsyche belisirma* sp. n. and *Hydropsyche konya* sp. n. from central Turkey; *Hydropsyche patara* sp. n. from southern Turkey; and *Hydropsyche savur* sp. n. from southern and southeastern Turkey. The previously recorded species *H. pellucidula* Curtis, 1834 is not found. The known species *Hydropsyche botosaneanui* Marinkovic, 1966, *Hydropsyche alarensis* Sipahiler, 2004, *Hydropsyche alanya* Sipahiler, 1987 and *Hydropsyche incognita* Pitsch, 1993 are also described and figured. Diagnostic characters for the separation of the species are given as well as distributional data.

Keywords: Trichoptera, *Hydropsyche*, *Hydropsyche pellucidula* species group, new species, distribution, Turkey.

Resumen

Se estudian los machos de las especies pertenecientes al grupo de *Hydropsyche pellucidula* presentes en Turquía. Se describen e ilustran ocho nuevas especies: *Hydropsyche boyabat* sp. n., *Hydropsyche harsitica* sp. n., *Hydropsyche cerkesica* sp. n. e *Hydropsyche trabzonica* sp. n., del norte de Turquía; *Hydropsyche belisirma* sp. n. e *Hydropsyche konya* sp. n., de Turquía central; *Hydropsyche patara* sp. n., del sur de Turquía e *Hydropsyche savur* sp. n., del sur y sudeste de Turquía. *H. pellucidula* Curtis, 1834, especie previamente citada del país, no ha sido encontrada. Las especies *Hydropsyche botosaneanui* Marinkovic, 1966, *Hydropsyche alarensis* Sipahiler, 2004, *Hydropsyche alanya* Sipahiler, 1987 e *Hydropsyche incognita* Pitch, 1993 han sido también descritas e ilustradas. Se proporcionan los principales caracteres diagnósticos para la identificación de las especies así como datos relativos a su distribución.

Palabras clave: Trichoptera, *Hydropsyche*, grupo de especies de *Hydropsyche pellucidula*, nuevas especies, distribución, Turquía.

INTRODUCTION

The *Hydropsyche pellucidula* species group was known by its widely distributed species, namely

H. pellucidula Curtis, 1834, and *H. brevis* Mosely, 1930, which occur in southwestern Europe and could easily be identified (MALICKY, 1999, 2004). In 1993 *H. pellucidula* was divided into two species

based on the male genitalia, especially the apex of the phallic apparatus, which narrowly ended in *H. pellucidula* and was broader in *H. incognita* (PITSCH, 1993). The third widely distributed species is *H. dinarica* Marinkovic, 1979, which is similar to *H. incognita* but there are evident differences in habitat and phenology (MALICKY, 1999). In fact, the differences among these species are minimal, and the distinguishing characters of *H. pellucidula* and *H. incognita* are only seen in the central European populations and the southern European populations are accepted as *H. incognita* (MALICKY, 1999). The species of the *pellucidula* species group found in Turkey, like the species of the *instabilis* group of the genus *Hydropsyche*, are variable; therefore, only the specimens that can be clearly separated using the classical methods of taxonomy were studied.

MATERIALS AND METHODS

Specimens were collected over thirty years in Turkey. The adults were collected by hand net and light trap with a blacklight tube (6 W), which was set up near rivers and streams. They were preserved in alcohol (80%) and deposited in the author's collection. The male pupae are also included in the study. Only the specimens that have clear distinct morphological characters are described as new species. The genital terminology follows several authors (BOTOSANEANU & MARINKOVIĆ-GOSPODNETIĆ, 1966; TOBIAS, 1972; MALICKY, 1999).

DESCRIPTIONS

Hydropsyche harsitica sp. n. (Figs. 1-5)

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77B39B40-579C-49F8-912A-85DA835D81AC

Material. Holotype male and paratypes: (46 males): Turkey, Gümüşhane, Harşit Stream, 40° 41' N, 39° 03' E, 951 m, (light), 10.8.2007; other paratypes: Gümüşhane, Torul, Özkürtün, Harşit Stream, 40° 39' N, 39° 08' E, 675 m, 13.9.1999, 2 males, (light); leg. and coll. Sipahiler.

Diagnosis. Pale species; dorsal keel narrow, triangular; apical edge of segment X with short triangular projection; harpago narrowed towards apex, pointed at tip; laterally phallic apparatus equal

in width, broadly ended, lateroapical projections small.

Description. Antennae and maxillary palps are pale yellowish; legs are yellowish; wings are pale brown. The length of the anterior wings of males is 9-10 mm.

Male genitalia (Figs. 1-5). The dorsal keel of segment IX is rather broad at the base, narrowed at the tip, triangular; in lateral view, the dorsal edge of segment X is roundly dilated; the apical edge is straight on the dorsal portion, forming a small triangular projection on the ventral half, the ventral edge is straight; the harpago of the inferior appendages is rather narrow; almost equal in breadth, curved on the subdistal portion; the apex is smooth, pointed on the ventral corner; in lateral view, the phallic apparatus is equal in width, the basal part is rather long and the apical portion is broad; the lateroapical projections are small, pointed.

Remarks. *Hydropsyche harsitica* sp. n. resembles *H. cerkesica* sp. n. The distinguishing characters are giving below.

Hydropsyche cerkesica sp. n. (Figs. 6-10)

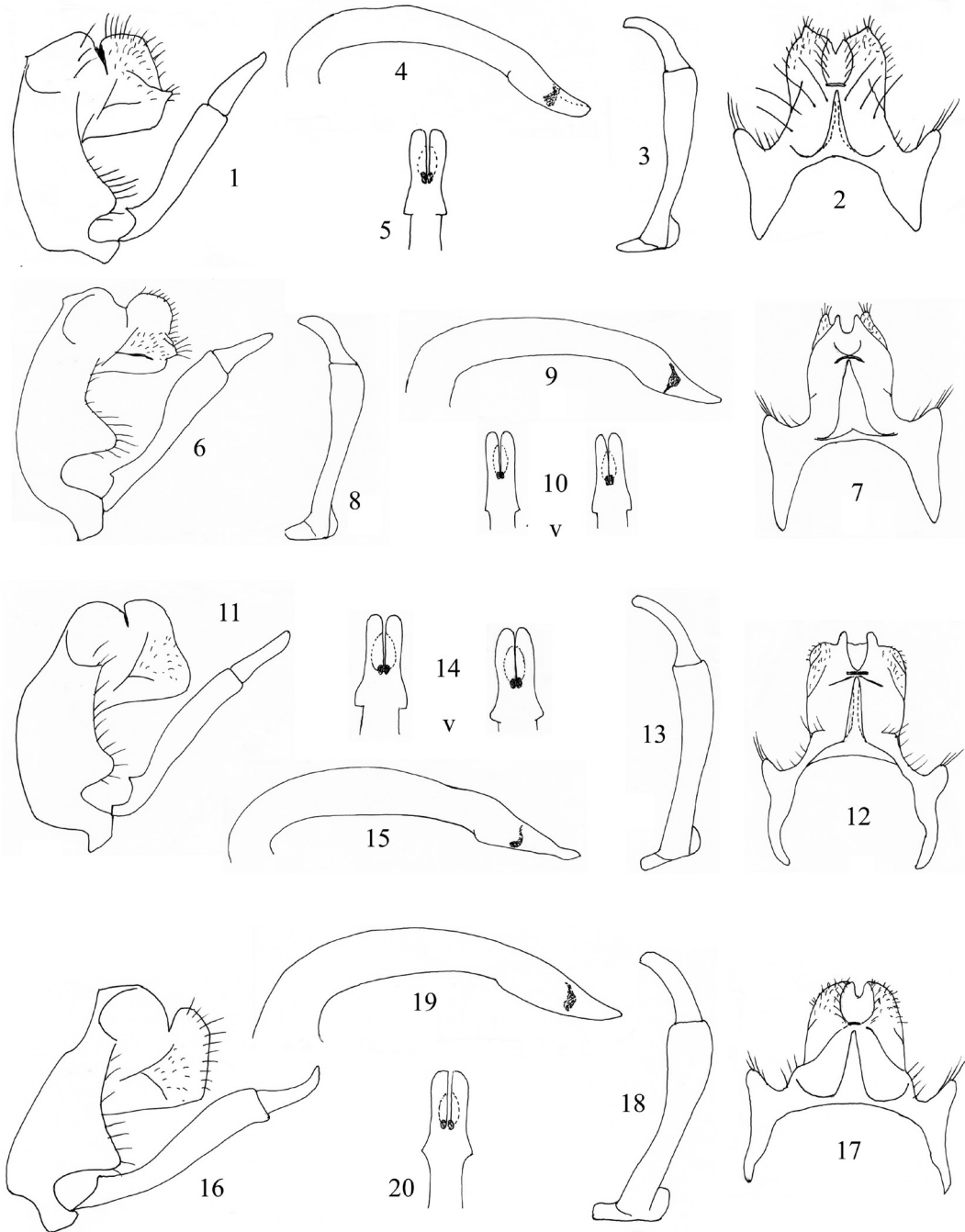
urn:lsid:zoobank.org:act:
B72380BF-6429-4755-A7A3-BF9BAB6D08E2

Material. Holotype male and paratypes (3 males): Turkey Çankırı, Çerkeş, Göynükçukuru, 40° 49' N, 32° 39' E, 800 m, 28.7.1980, leg. and coll. Sipahiler.

Diagnosis. Segment X broad, apical margin with short lobe, possessing spines. Apical part of phallic apparatus thin in ventral view, lateroapical projections very small.

Description. Antennae, palps, legs, and wings pale brown yellowish; the length of the anterior wing of males is 9-10.5 mm.

Male genitalia (Figs. 6-10). The dorsal keel of segment IX is broad, triangular; in lateral view, segment X is broad, the dorsal margin as high as the dorsal keel of segment IX, the posterior margin is straight; there is a large and short tubercle near the hairy area, which has longer spines. The harpago of the inferior appendages is somewhat broad and rounded on the subdistal part, becoming thinner at the apex. The phallic apparatus is broad at the base, narrower before the apical part; the apical part is



Figures 1-20. 1-5: *Hydropsyche harsitica* sp. n., male genitalia: 1, lateral; 2, dorsal; 3, right inferior appendage, ventral; 4, phallic apparatus, lateral; 5, phallic apparatus, ventral. 6-10: *Hydropsyche cerkesica* sp. n., male genitalia: 6, lateral; 7, dorsal; 8, right inferior appendage, ventral; 9, phallic apparatus, lateral; 10, phallic apparatus, ventral; v, variation. 11-15: *Hydropsyche trabzonica* sp. n., male genitalia: 11, lateral; 12, dorsal; 13, right inferior appendage, ventral; 14, phallic apparatus, ventral; v, variation; 15, phallic apparatus, lateral. 16-20: *Hydropsyche konya* sp. n., male genitalia: 16, lateral; 17, dorsal; 18, right inferior appendage, ventral; 19, phallic apparatus, lateral; 20, phallic apparatus, ventral.

Figuras 1-20. 1-5: *Hydropsyche harsitica* sp. n., genitalia masculina: 1, lateral; 2, dorsal; 3, apéndice inferior derecho, ventral; 4, aparato fálico, lateral; 5, aparato fálico, ventral. 6-10: *Hydropsyche cerkesica* sp. n., genitalia masculina: 6, lateral; 7, dorsal; 8, apéndice inferior derecho, ventral; 9, aparato fálico, lateral; 10, aparato fálico, ventral; v, variación. 11-15: *Hydropsyche trabzonica* sp. n., genitalia masculina: 11, lateral; 12, dorsal; 13, apéndice inferior derecho, ventral; 14, aparato fálico, ventral; v, variación; 15, aparato fálico, lateral. 16-20: *Hydropsyche konya* sp. n., genitalia masculina: 16, lateral; 17, dorsal; 18, apéndice inferior derecho, ventral; 19, aparato fálico, lateral; 20, aparato fálico, ventral.

narrow and long, the lateroapical projections are very small.

Remarks. *Hydropsyche cerkesica* sp. n. resembles *H. harsitica* sp. n., the following features separate these species: in *H. harsitica* sp. n. the dorsal keel is narrow; the phallic apparatus is laterally broad at the tip, the lateroapical projections are small, whereas in *H. cerkesica* sp. n. the dorsal keel is large, the phallic apparatus laterally narrow at the tip, the lateroapical projections are very small.

***Hydropsyche trabzonica* sp. n.** (Figs. 11-15)

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9F6DF3B2-BCDB-4F14-98CB-29C5721C600F

Material. Holotype male and paratypes (2 males): Turkey, Trabzon, Uzungöl, (light), 16.6.2010, 1750 m; Tokat, Niksar, Ordu direction, Tifi Stream, 40° 42' N, 37° 01' E, 914 m, 7.8.2007 1 male; same place, 14.8.2008; paratypes: same place, 14.8.2008, 7 males; Kars, Ardahan, Taşlıdere Village, 41° 05' N, 42° 45' E, 1950 m, 21.7.1988, 13 males; Ardahan, Çağıstan Forest, a tributary of Kura River, 41° 09' N, 43° 06' E, 1950 m, 20.7.1988, 2 males, leg. and coll. Sipahiler.

Diagnosis. Phallic apparatus narrow at base, medially broad, very narrow at apex; lateroapical projections large, triangular, harpago narrow, rather long, almost equal in breadth, apex rounded.

Description. Antennae, maxillary palps, and wings are brown, legs pale brown, tarsal segments brown; head and thorax dorsally dark brown; the length of the anterior wing of males 10-12 mm.

Male genitalia (Figs. 11-15). The dorsal keel of segment IX is narrow, triangular; the posterior edge of segment X is somewhat roundly dilated towards the ventral edge; the harpago of the inferior appendages is rather thin, almost equal in breadth with a rounded apex. In lateral view, the phallic apparatus is narrower at the base, dilated medially, the apical part is narrow and long, narrower on the subdistal portion; in ventral view the lateroapical projections are moderately long.

Remarks. *Hydropsyche trabzonica* sp. n. differs from the other species of the group by the shape of the phallic apparatus, which is very thin on the subdistal portion. A close relationship is not evident.

***Hydropsyche konya* sp. n.** (Figs. 16-20)

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D4C87EEB-9930-48FD-A83E-D92EECF20892

Material. Holotype male: Turkey, Beyşehir, Konya direction, Sarıköy, 1100 m, 37° 47' N, 31° 48' E, 22.7.1998; Paratypes: Beyşehir, Konya direction, Üçpınarlar, 37° 49' N, 31° 49' E, 22.7.1998, 1 male; Ankara, Kızılcahamam, Çeltikçi, 30.7.1980, 41° 19' N, 32° 19' E, 1 male, leg. and coll. Sipahiler.

Diagnosis. Dorsal keel of segment IX narrow, triangular, apex pointed; segment X short, narrow; apical margin nearly straight; harpago moderately broad, somewhat dilating subdistally; phallic apparatus curved at base, almost equal in width, apically narrow; lateroapical projections very small.

Description. Antennae, palps, legs, and wings pale brown yellowish; thorax and head dorsally dark brown; the length of the anterior wing of males 10-11 mm.

Male genitalia (Figs. 16-20). The dorsal keel of segment IX is rather narrow, triangular, the apex is pointed; X is short and narrow, the apical margin laterally almost straight. The harpago of the inferior appendages is moderately broad, somewhat dilated subdistally, the apex is rounded. The phallic apparatus is curved at the base, the shaft is almost equal in width; in ventral view, the lateroapical projections are very small.

Remarks. *Hydropsyche konya* sp. n. resembles *H. belisirma* sp. n. The distinguishing characters are giving below.

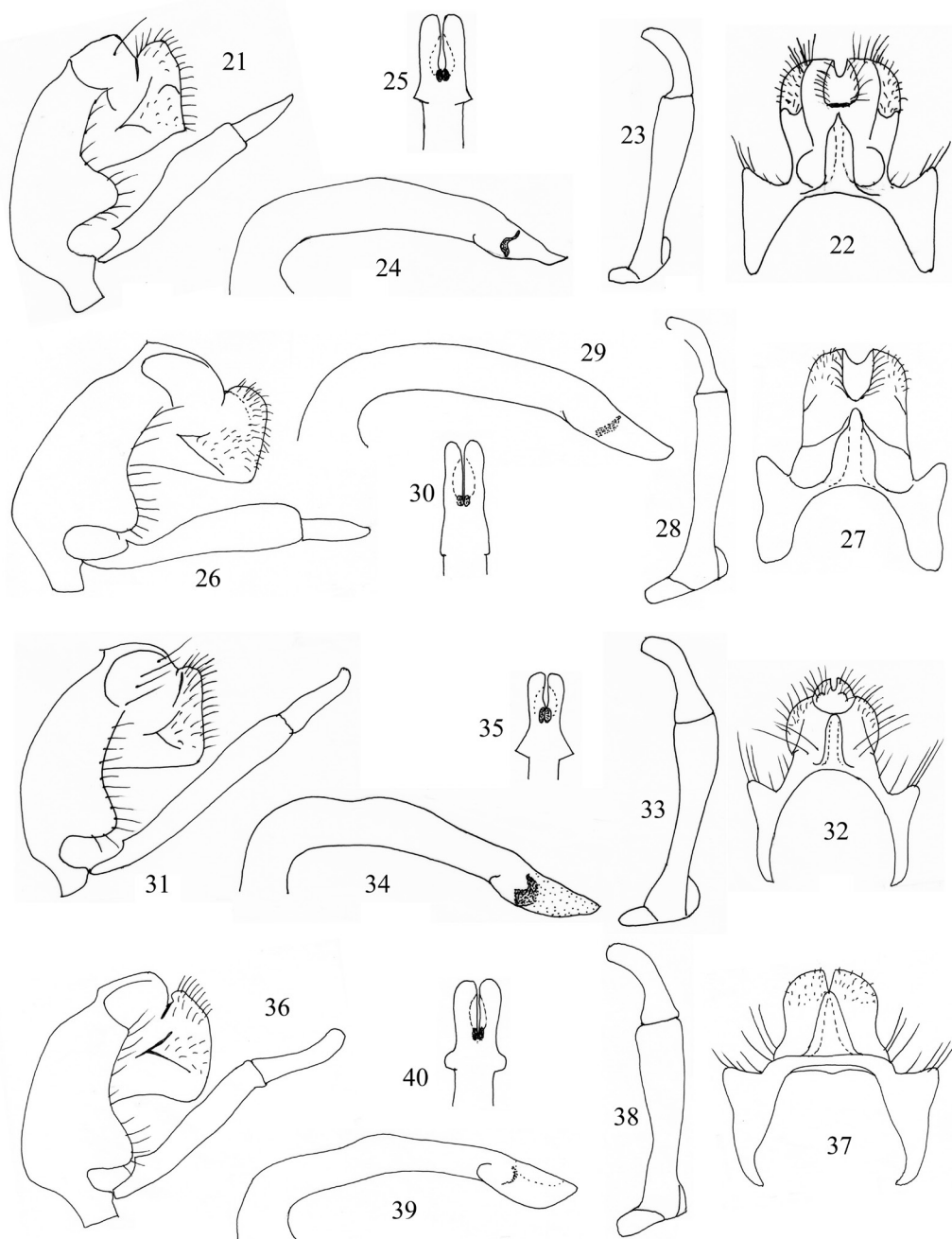
***Hydropsyche belisirma* sp. n.** (Figs. 21-25)

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7435084A-2852-44D8-A43B-FA73E72EDD02

Material. Holotype male and paratype: Turkey, Aksaray, 30 km southeast of Aksaray, Belisirma Village, 38° 16' N, 34° 17' E, 1400 m, 15.5.1993; Aksaray, Ihlara Valley, 38° 15' N, 34° 17' E, 1000 m, 9.5.1981 1 male; leg. and coll. Sipahiler.

Diagnosis. Phallic apparatus large, narrowing only on distal portion, basal part longer; dorsal keel moderately broad, almost quadrangular with pointed apex, apical margin of segment X almost straight.



Figures 21-40. 21-25: *Hydropsyche belisirma* sp. n., male genitalia: 21, lateral; 22, dorsal; 23, right inferior appendage, ventral; 24, phallic apparatus, lateral; 25, phallic apparatus, ventral. 26-30: *Hydropsyche patara* sp. n., male genitalia: 26, lateral; 27, dorsal; 28, right inferior appendage, ventral; 29, phallic apparatus, lateral; 30, phallic apparatus, ventral. 31-35: *Hydropsyche boyabat* sp. n., male genitalia: 31, lateral; 32, dorsal; 33, right inferior appendage, ventral; 34, phallic apparatus, lateral; 35, phallic apparatus, ventral. 36-40: *Hydropsyche savur* sp. n., male genitalia: 36, lateral; 37, dorsal; 38, right inferior appendage, ventral; 39, phallic apparatus, lateral; 40, phallic apparatus, ventral.

Figuras 21-40. 21-25: *Hydropsyche belisirma* sp. n., genitalia masculina: 21, lateral; 22, dorsal; 23, apéndice inferior derecho, ventral; 24, aparato fálico, lateral; 25, aparato fálico, ventral. 26-30: *Hydropsyche patara* sp. n., genitalia masculina: 26, lateral; 27, dorsal; 28, apéndice inferior derecho, ventral; 29, aparato fálico, lateral; 30, aparato fálico, ventral. 31-35: *Hydropsyche boyabat* sp. n., genitalia masculina: 31, lateral; 32, dorsal; 33, apéndice inferior derecho, ventral; 34, aparato fálico, lateral; 35, aparato fálico, ventral. 36-40: *Hydropsyche savur* sp. n., genitalia masculina: 36, lateral; 37, dorsal; 38, apéndice inferior derecho, ventral; 39, aparato fálico, lateral; 40, aparato fálico, ventral.

Description. Antennae, maxillary palps, wings, and legs pale brown yellowish, head and thorax dorsal brown; the length of the anterior wing of males is 11 mm.

Male genitalia (Figs. 21-25). The dorsal keel of segment IX is rather broad, the sides are parallel, narrowing subdistally, and the apex is pointed. In lateral view, the apical edge of segment X is nearly straight, the lateral straps are rounded. The harpago of the inferior appendages is curved near the base and dilated on the dorsal edge on the subdistal portion. In lateral view, the phallic apparatus is curved at the base, broad, narrowed on the distal portion; the apical part is somewhat short; in ventral view the lateroapical projections are moderately long.

Remarks. *Hydropsyche belisirma* sp. n. resembles *H. konya* sp. n. but the following differences are seen in the male genitalia: in *H. belisirma* sp. n. laterally the base of the phallic apparatus is rather long and curved, the shaft is broad and narrow at the tip; the dorsal keel is moderately broad and the side margins are rather rounded; the harpago is larger on the subdistal portion, blunt at the tip and curved inside, whereas in *H. konya* sp. n. the apical part of the phallic apparatus is laterally broad, lateroapical projections are small, the shaft is of normal width; the dorsal keel is narrow, triangular; the harpago is nearly straight, only slightly curved inward, not dilated subdistally and rounded at the tip.

***Hydropsyche patara* sp. n.** (Figs. 26-30)

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75796A28-D16C-4A5E-BA36-E8AA086A96C6

Material. Holotype male: Turkey, Fethiye, Patara, Karaköy-Kınık direction, 36° 50' N, 29° 35' E, 1148 m, 7.7.1989, leg. and coll. Sipahiler.

Diagnosis. Dorsal keel of segment IX broad, apex and side margins rounded; apical margin of segment X straight; harpago rather thin, dilated subdistally; phallic apparatus broadly curved at base, apically broad, lateroapical projections very small, stout.

Description. Antennae, maxillary palps, and legs pale yellowish, wings pale brown; the head and the thorax dorsal brown; the length of the anterior wing of male is 9.5 mm.

Male genitalia (Figs. 26-30): The dorsal keel of segment IX is broad, the side margins and the apex are rounded; in lateral view, the apical margin of segment X is straight. The harpago of the inferior appendages is rather narrow, slightly dilating subdistally, the apex is rounded. In lateral view, the phallic apparatus is broader at the base, the apex is broad; in ventral view, the lateroapical projections are very small and stout at the tips.

Remarks. *Hydropsyche patara* sp. n. resembles *H. konya* sp. n. In both species the apical margin of segment X is straight, but the following differences separate these species: the dorsal keel of *H. patara* sp. n. is broad and the side margins are rounded, the harpago is longer, the subdistal portion is somewhat broader and the apex is rounded; the lateroapical projections of the phallic apparatus are very small and obtuse at the tips, whereas in *H. konya* sp. n. the dorsal keel is narrow, triangular, the phallic apparatus is narrower at the tip, the lateroapical projections are larger and pointed at the apex, the harpago is almost equal in width and slightly narrowed towards the tip.

***Hydropsyche boyabat* sp. n.** (Figs. 31-35)

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54034F4E-FD5D-408F-A142-3C4BE4A352E4

Material. Holotype male: Turkey, Sinop, Boyabat, Gökırmak River, 15.7.2009 (light), 41° 27' N, 34° 58' E, 340 m, leg. and coll. Sipahiler.

Diagnosis. Dorsal keel moderately broad with rounded apex; segment X short, apical margin laterally straight; phallic apparatus long at basal portion, curved at right angle directing towards the ventral, lateroapical projections large, triangular.

Description. Antennae, maxillary palps, and legs pale brown, tarsal segments dark brown; wings pale brown-yellowish, on the forewing fork I apically with dark brown spot; the length of the anterior wing is 10 mm.

Male genitalia (Figs. 31-35). The dorsal keel of segment IX is moderately broad, the apex is rounded. Segment X is short; in dorsal view, the median part is large, the apical margin with a narrow and short excision in the middle; in lateral view, the apical margin is straight, the dorsal part is rounded. The harpago of the inferior appendage is rather long, subdistally slightly broader curving inside and narrowing towards the rounded apex. In lateral

view the basal portion of the phallic apparatus is long, curved at a right angle, the dorsal edge is dilated medially and slightly dilated subdistally narrowing towards the apex; in ventral view the lateroapical projections are large, triangular.

Remarks. *Hydropsyche boyabat* sp. n. is related to *H. konya* sp. n., both species have a straight apical margin of segment X, which is narrower in *Hydropsyche boyabat* sp. n. The following differences are also seen: the phallic apparatus of *H. boyabat* sp. n. is long and curved at a right angle at the base directing towards the ventral, the lateroapical projections are large, the harpago is curved on the subdistal portion, and the dorsal keel of segment IX is broader than in the related species.

***Hydropsyche savur* sp. n.** (Figs. 36-40)

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674CD532-CA30-47BD-8973-4A6EB2F4D3C9

Material. Holotype male and 1 paratype male: Turkey, Mardin, Savur, 37° 30' N, 40° 51' E, 1000 m, 12.6.2000; 1 paratype male: Konya, Hadim, Göksu River, Yerköprü, 37° 01' N, 32° 42' E, 806 m, 7.6.1998, leg. and coll. Sipahiler.

Diagnosis. Dorsal keel broad; apical part of phallic apparatus ventrally dilated; lateroapical projections rounded at tips; dorsolateral cavity of segment IX and X deep; dorsomedian part of segment X narrow.

Description. Antennae, maxillary palps, legs, and wings are reddish brown; the length of the anterior wing of males is 10-10.5 mm.

Male genitalia (Figs. 36-40). The dorsal keel of segment IX is broadly triangular, the apex is rounded. Dorsal cavity of segment IX and X is deep; in dorsal view, the median part of segment X is narrow, the apical margin rounded; in lateral view the dorsal margin is obliquely truncated, and the posterior margin nearly straight. The harpago of the inferior appendage is basally broad, after that almost equal in width, the apex is rounded. The phallic apparatus is curved at the base, the dorsal edge somewhat sinuate, the apical part dilated ventrally and the apex is pointed; the lateroapical projections are rather large and rounded.

Remarks. *Hydropsyche savur* sp. n. differs from the other species found in Turkey by the shape of the phallic apparatus, especially the lateroapical projections, which are rounded. It resembles

H. cyrnotica Botosaneanui & Giudicelli, 1981 (BOTOSANEANU & GIUDICELLI 1981; MALICKY, 1999) found in Corsica; the following differences are seen in the genitalia: in *H. cyrnotica* the dorsal keel is narrow, the median portion of segment X is large, with two pointed projections apically; in lateral view, the phallic apparatus somewhat curved at the base and the shaft is nearly straight, whereas in *H. savur* sp. n. the dorsal keel is broadly triangular, the median part of segment X is deeply excised, the phallic apparatus is laterally strongly curved at the base, the apical part is dilated towards the ventral.

***Hydropsyche incognita* Pitsch, 1993** (Figs. 41-45)

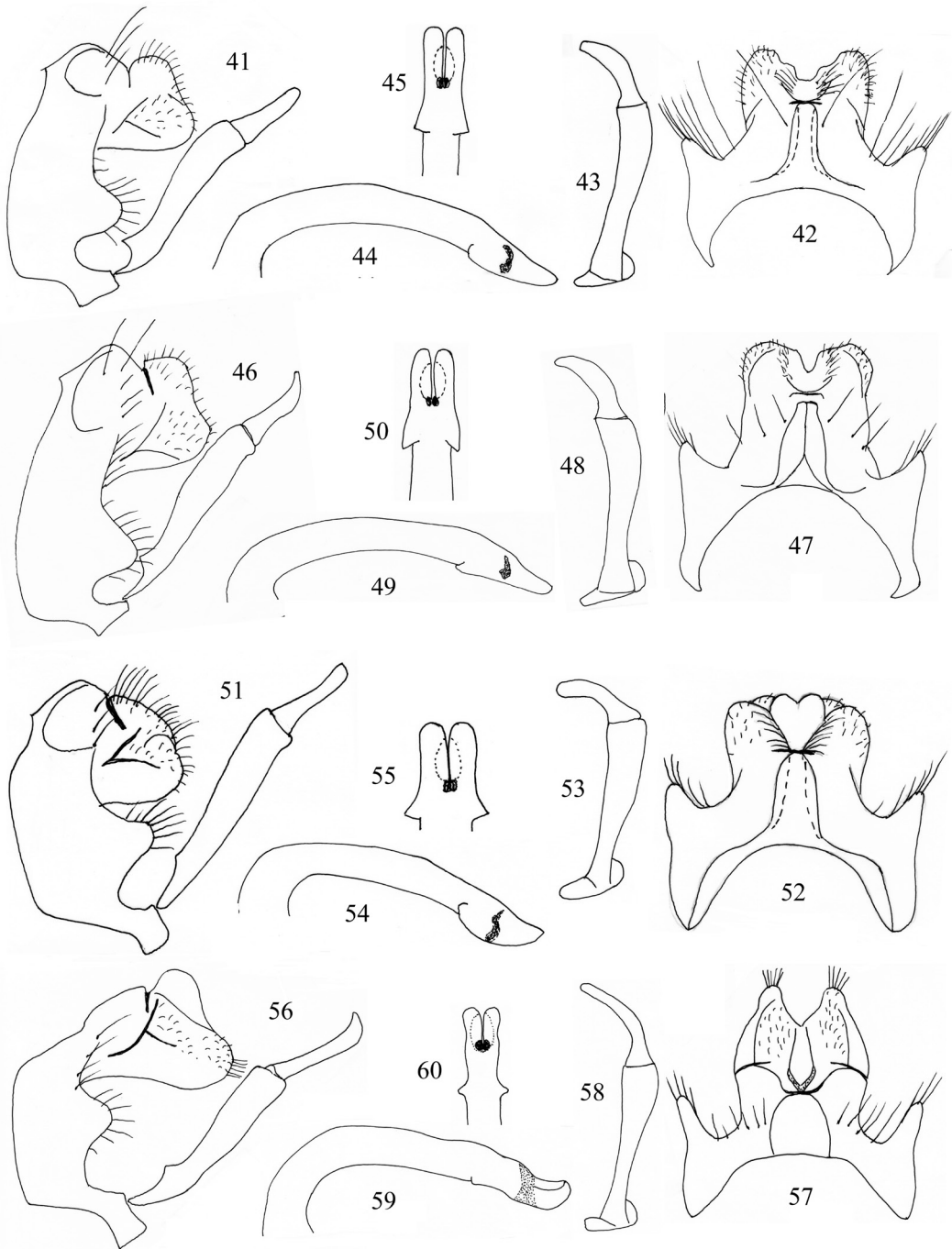
Material. Bulgaria, Strantzha Mountains, 8.6.1981, 5 males, leg. K. Kumanski, coll. Sipahiler; Sakarya, Karasu, Maden deresi, 41° 00' N, 34° 46' E, 100 m, 12.6.2013, 1 male, 5 females; Zonguldak, Safranbolu, Mencilis (light), 41° 15' N, 32° 47' E, 23.8.1993, 690 m, 1 male; Zonguldak, Alaplı, Bölüklü direction, 41° 05' N, 31° 35' E, 240 m, 24.6.2011, 1 male pupa; leg. and coll. Sipahiler.

Diagnosis. Dorsal keel moderately broad, segment X roundly dilated on ventral half; harpago dilated medially; phallic apparatus shortly curved at base, apically broad, lateroapical projections large triangular.

Description. Antennae, maxillary palps, legs, and wings brown, head, thorax, and abdomen dorsally dark brown; the length of the anterior wing of male 11.5 mm, of females 11.5-12.5 mm.

Male genitalia (Figs. 41-45). The dorsal keel of segment IX is moderately broad, broader at the base, slightly narrowed towards the rounded apex. In lateral view, the apical margin of segment X is sinuate, the ventral half is roundly dilated and longer than the dorsal half. The harpago of the inferior appendages is dilated on the dorsal edge nearly in the middle, the apex is smooth. In lateral view, the phallic apparatus is shortly curved at the base, the apex is broad; the lateroapical projections are large, triangular.

Remarks. The specimens were compared with the Bulgarian material identified by Kumanski and no important differences were found. The specimens are large, dark brown with brown wings, like the European specimens.



Figures 41-60. 41-45: *Hydropsyche incognita*, male genitalia: 41, lateral; 42, dorsal; 43, right inferior appendage, ventral; 44, phallic apparatus, lateral; 45, phallic apparatus, ventral. 46-50: *Hydropsyche botosaneanui*, male genitalia: 46, lateral; 47, dorsal; 48, right inferior appendage, ventral; 49, phallic apparatus, lateral; 50, phallic apparatus, ventral. 51-55: *Hydropsyche alarensis*, male genitalia: 51, lateral; 52, dorsal; 53, right inferior appendage, ventral; 54, phallic apparatus, lateral; 55, phallic apparatus, ventral. 56-60: *Hydropsyche alanya*, male genitalia: 56, lateral; 57, dorsal; 58, right inferior appendage, ventral; 59, phallic apparatus, lateral; 60, phallic apparatus, ventral.

Figuras 41-60. 41-45: *Hydropsyche incognita*, genitalia masculina: 41, lateral; 42, dorsal; 43, apéndice inferior derecho, ventral; 44, aparato fálico, lateral; 45, aparato fálico, ventral. 46-50: *Hydropsyche botosaneanui*, genitalia masculina: 46, lateral; 47, dorsal; 48, apéndice inferior derecho, ventral; 49, aparato fálico, lateral; 50, aparato fálico, ventral. 51-55: *Hydropsyche alarensis*, genitalia masculina: 51, lateral; 52, dorsal; 53, apéndice inferior derecho, ventral; 54, aparato fálico, lateral; 55, aparato fálico, ventral. 56-60: *Hydropsyche alanya*, genitalia masculina: 56, lateral; 57, dorsal; 58, apéndice inferior derecho, ventral; 59, aparato fálico, lateral; 60, aparato fálico, ventral.

***Hydropsyche botosaneanui* Marinkovic, 1966** (Figs. 46-50)

Material. Turkey, Sinop, Erfelek, 41° 48' N, 34° 47' E, 750 m, (light), 3.6.2002, 2 males, 2 females; Kastamonu, Azdavay, Nalbantoğlu district, 41° 38' N, 33° 17' E, 910 m, 21.6.1996, 1 male, 13 females; 6.6.1983, 1 male pupa; leg. and coll. Sipahiler.

Diagnosis. Lateroapical projections of phallic apparatus directed towards the base; dorsal keel moderately broad, apical margin of segment X sinuate.

Description. Antennae, maxillary palps, and wings brown, legs pale brown, wings without spots; head and thorax dorsally dark brown; the length of the anterior wing of males is 11-12 mm, of females 12-13 mm.

Male genitalia (Figs. 46-50). The dorsal keel of segment IX is rather broad, the side margins are slightly rounded, and the apex is smooth; the cavity of segment IX is deep. In lateral view, the apical margin of segment X sinuates, slightly larger on the ventral half. The harpago of the inferior appendages is curved near the base, moderately broad narrowing towards the apex. The apical part of the phallic apparatus is rather broad, the lateroapical projections are pointed at the apex directing anteriorly; in lateral view, the basal part is curved, the shaft is almost equal in width.

Remarks. *Hydropsyche botosaneanui* is a variable species, described from Bosnia, characterized by plat apical parts of the phallic apparatus and the lateroapical projections, which are directed towards anterior (MARINKOVIĆ-GOSPODNETIĆ, 1966). The specimens from Hessen (PITSCH, 1993) and Fulda show these characters (MALICKY, 1999). The lateroapical projections and the dorsal keel of the Turkish specimens are variable, namely the specimens from Kastamonu province (Figs. 47, 50) have somewhat bigger lateroapical projections and larger dorsal keel than that of the specimen from Bolu province (MALICKY, 1999).

***Hydropsyche alarensis* Sipahiler, 2004** (Figs. 51-55)

Material: Turkey, Antalya, Gündoğmuş, Güneycik Village, Alara Stream, Ali Köprüsü,

(light), 11.8.1993, 38 males, 209 females (Types), 36° 46' N, 31° 56' E, 900 m, leg. and coll. Sipahiler.

Diagnosis. Pale species, dorsal keel of segment IX large, apical margin of segment X short on dorsal part, sinuate, possessing small lobe located on dorsal and ventral part.

Description. A pale brown species; antennae, maxillary palps, legs, wings, thorax, and head are pale brown; the tergites of the abdomen darker brown spotted, especially on the margins. The length of the anterior wing of males is 9-10 mm, of females 10.5-12 mm.

Male genitalia (Figures. 51-55). Dorsal keel of segment IX is rather broad; segment 10 in lateral view is very narrow on the dorsal part, directing ventrally; the posterior margin is roundly dilated and sinuate, forming small rounded lobes on the dorsal and ventral portions; in dorsal view the median part of segment 10 is covered with longer hairs; the apical margin is shortly excised medially. The harpago of the inferior appendages is curved inside; almost equal in breadth both at the base and at the apex; the apex is rounded. The lateroapical projections of the phallus are large, triangular, connecting at a right angle to the shaft; the apex is somewhat larger than the shaft.

Remarks. *Hydropsyche alarensis* is a pale yellowish and relatively small species. It differs from all the known species of the species-group by the shape of the large and thick apical part of the phallic apparatus and the harpago of the inferior appendage, which is strongly curved inward.

***Hydropsyche alanya* Sipahiler, 1987** (Figs. 56-60)

Material. Turkey, Alanya, Tosmur Village, Dimçay, 36° 33' N, 32° 10' E, 370 m, 17.5.1986 (Types: pupae); Muğla, Köyceğiz, Dalaman River, 36° 49' N, 28° 46' E, 100 m, 24.4.1987, 1 male, 1 female; Muğla, Fethiye, Gelemiş, Seki Stream, Kanyon, 36° 20' N, 29° 14' E, 21.5.1999, 2 males, 1 female; Antalya, Manavgat, Beşkonak, Köprüçay, 37° 19' N, 31° 17' E, 220 m, (light), 65 males, 3 females; leg. and coll. Sipahiler.

Diagnosis. Dorsal keel of segment IX large, harpago long and very thin, apical part of phallic apparatus long.

Description. Antennae, maxillary palps, legs, thorax, and abdomen are dorsally pale brown-yellowish; intersegmental portions are whitish;

forewing is scarcely spotted on the apical margin; in dorsal view, the head has a large, dark brown spot, located medially on the anterior portion. The length of the anterior wing of males 8-9 mm, of females is 8.5-9.5 mm.

Male genitalia (Figs. 56-60). The dorsal keel is broad; the dorsal cavity of segment IX is very small; the cavity of segment 10 is rather deep; in lateral view, segment 10 is short on the dorsal margin, dilated through the ventral edge, a small lobe protruding near the ventral corner; this small lobe is somewhat darker than the rest of the segment and possesses dense hairs; in dorsal view, the apical margin has a small excision in the middle; the dorsomedian area is covered with rather long hairs; the harpago of the inferior appendages is long; slightly shorter than the coxopodite; very slender; curved inside; the apex is rounded. The apical part of the phallus is long (apical part/entire length of the phallus=1/3.3); the lateral projections are pointed at the tips; the apex is broad and rounded; the margin between the apex of the phallus and the lateral projection is sinuate; the swelling on the preapical portion is smaller than the apex.

Remarks. *Hydropsyche alanya* was described based on the pupa, collected from Dimçay, near Alanya (SIPAHILER, 1987). Here a description is given based on the adult specimens, which are collected from the same region. This endemic species differs from the other species of the *pellucidula*-group by the shape of many parts of the genitalia, especially the large dorsal keel of segment IX, the long and thin harpago, and the apical part of the phallic apparatus, which is also longer than in the related species of the group. A close relationship is not evident.

NOTES ON DISTRIBUTION

Previously, two species from Turkey, *H. alanya* Sipahiler, 1987 and *H. alarensis* Sipahiler, 2004 (SIPAHILER, 1987, 2004) belonging to the *pellucidula* species group were described; both species occur in southern Turkey near the Mediterranean coast, have strongly different characters in their genitalia, and are easily separated from the known species of the group. Others species of the group, which were collected over thirty years from several parts of Turkey, were identified as the “*pellucidula* species

group”. In the present study, these specimens were studied and eight new species are described. Among them, *H. savur* sp. n. differs from the species of the group found in Turkey in having rounded lateroapical projections on the phallic apparatus. This species resembles the endemic species *H. cyrnotica* Botosaneanu & Giudicelli, 1981 (BOTOSANEANU & GIUDICELLI 1981; MALICKY, 1999) found in Corsica, nearly 3500 km west of the type place of *H. savur* sp. n., indicating the morphological convergence and the difficulties in identification of the species of the *pellucidula* group. This new species occurs in southern and southeastern Turkey. Among the known species, which are largely distributed in Europe, *H. botosaneanui* Marinković, 1966 and *H. incognita* occur in northwestern Turkey, but according to the present knowledge *H. pellucidula* is not found.

Geographically over the half of the species occur in northern Turkey. These are *H. incognita*, *H. botosaneanui*, *H. boyabat* sp. n., *H. harsitica* sp. n., *H. trabzonica* sp. n. and *H. cerkesica* sp. n.; in central Anatolia, two species, *H. konya* sp. n. and *H. belisirma* sp. n., occur. *H. patara* sp. n., *H. alanya*, and *H. alarensis* are found in southern Turkey and *H. savur* sp. n. in southern and southeastern Turkey.

REFERENCES

- BOTOSANEANU, L. & GIUDICELLI, J. (1981). Les *Hydropsyche* de Corse (Insecta, Trichoptera). *Bulletin Zoologisch Museum Universiteit van Amsterdam*, 8: 13-19.
- BOTOSANEANU, L. & MARINKOVIĆ-GOSPODNETIĆ, M. (1966). Contribution à la connaissance des *Hydropsyche* de groupe *fulvipes-instabilis* : étude des genitalia mâles. *Annales de Limnologie*, 2(3): 503-525.
- MALICKY, H. (1999). Bemerkungen über die Verwandtschaft von *Hydropsyche pellucidula* Curtis (Trichoptera, Hydropsychidae). *Linzer Biologische Beiträge*, 31(2): 803-821.
- MALICKY, H. (2004). *Atlas of European Trichoptera*. 2nd edition. The Netherlands: Springer, pp xxvii + 359.
- MARINKOVIĆ-GOSPODNETIĆ, M. (1966). New species of Trichoptera from Yugoslavia. *Bulletin scientifique - Conseil des Academies des*

- Sciences et des Arts de la RSF Yougoslavie*.
Sect. A11:110-112.
- PITSCH, T. (1993). Zur Kenntnis der *Hydropsyche pellucidula*–Gruppe in Mitteleuropa (Trichoptera, Hydropsychidae). *Braueria*, 20: 27-32.
- SİPAHİLER, F. (1987). Türkiye’deki *Hydropsyche* cinsi *instabilis* grubu (Trichoptera, Hydropsychidae) erkeklerinin sistematik yönden incelenmesi. *DOGA, TU Zooloji D.C.*, 11(3): 161-178.
- SİPAHİLER, F. (2004). Descriptions of new species of the genus *Hydropsyche* and some unknown females of Trichoptera (Rhyacophilidae, Hydropsychidae, Limnephilidae). *Braueria*, 31: 29-31.
- TOBIAS, W. (1972). Zur Kenntnis europäischer Hydropsychidae (Insecta, Trichoptera), I. *Senckenbergiana Biologica*, 53: 59-89.