

Studies on the males of the genus *Philopotamus* Leach in Turkey (Trichoptera, Philopotamidae)

Estudio de los machos del género *Philopotamus* Leach en Turquía (Trichoptera, Philopotamidae)

FÜSUN SİPAHİLER

Bardacık Sokak No. 11, 4 TR-06640 Ankara, Turkey
fusunsip@hacettepe.edu.tr

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Abstract

The males of the genus *Philopotamus* Leach are studied and the following new subspecies are described and illustrated from Turkey: *Philopotamus achemenus kemer* ssp. n., *P. achemenus mencilis* ssp. n., *P. achemenus namrun* ssp. n., *P. variegatus sapanca* ssp. n., *P. variegatus kumbet* ssp. n., *P. variegatus hasanyavuzi* ssp. n., and *P. tenuis sumela* ssp. n. A key for the species and subspecies of the genus *Philopotamus* is provided.

Keywords: Trichoptera, *Philopotamus*, distribution, species, new subspecies, Turkey.

Resumen

Se estudian los machos de las especies turcas del género *Philopotamus* Leach y se describen e ilustran las siguientes nuevas subspecies: *Philopotamus achemenus kemer* ssp. n., *P. achemenus mencilis* ssp. n., *P. achemenus namrun* ssp. n., *P. variegatus sapanca* ssp. n., *P. variegatus kumbet* ssp. n., *P. variegatus hasanyavuzi* ssp. n. and *P. tenuis sumela* ssp. n. Se proporciona una clave de identificación para todas las especies y subspecies turcas.

Palabras clave: Trichoptera, *Philopotamus*, distribución, especies, nuevas subspecies, Turquía.

INTRODUCTION

Herein seven new subspecies belonging to three species of the genus *Philopotamus* Leach are described. Five species of the genus *Philopotamus* are found in Turkey (Fig. 59). *Philopotamus montanus* (Donovan, 1813) occurs only in Thrace and is not found in the Asian part. *Philopotamus variegatus* (Scopoli, 1763) also occurs in Thrace and in the Asian part, and it is represented in Turkey by four subspecies, which are distributed mostly in the north. It is distributed through Artvin province and ends at the national border with Georgia, which is, according to current knowledge, the easternmost limit of its distribution. *Philopotamus achemenus* Schmid, 1959, described from Iran, is also found in Turkey, Greece, and Bulgaria, and it has three new subspecies; two subspecies are found in southern Anatolia, in Antalya and Mersin provinces, and one subspecies is found in Karabük province in northern Turkey. *Philopotamus*

tenuis Martynov, 1913 is described from Georgia and has a restricted distribution in the region; it is found in northeastern Turkey and its genitalia are given in detail for the first time. In addition, a new subspecies of *P. tenuis* is also described from Trabzon province.

Philopotamus tenuis and *P. variegatus hasan-yavuzi* ssp. n. are found sympatrically and *P. achemenus* is also found sympatrically with *P. variegatus* in several places.

Philopotamus giresunicus Sipahiler, 2010 (SIPAHILER, 2010), found in Giresun province in northeastern Turkey, indicates that the area in Giresun and part of the neighboring province of Trabzon is an important center of origin having four species and three subspecies.

MATERIALS AND METHODS

Specimens were collected over 30 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 at Hacettepe University (Beytepe, Ankara, Turkey). The male pupae are also included in the study. The genital terminology for *Philopotamus* species follows partly Botosaneanu (1960).

Remarks on *P. variegatus*, *P. montanus*, *P. achemenus*, and *P. tenuis*

Philopotamus variegatus (Scopoli, 1763), described from Slovenia (Carniola), was later found in many countries in Europe and also reported from Turkey (SIPAHILER & MALICKY, 1987; SIPAHILER, 2005). BOTOSANEANU (1960) studied the large material collected from Romania and Macedonia and suggested that the male genitalia have excellent characters for the identification of *P. variegatus* and *Philopotamus montanus* (Donovan, 1813), and these characters are nearly invariable. The phallic apparatus of *P. variegatus* is characterized by a robust spine located distally, a pair of spines, which are curved and close to each other, found in the middle, and a ductus ejaculatorius located at the base and has a typical shape. However, *P. montanus* has a long spine on the distal part, a pair of short and thin spines located in the middle, which can rarely be somewhat longer like in Macedonian

species, and a ductus ejaculatorius found at the base. According to the figure (BOTOSANEANU, 1960), the ductus ejaculatorius of *P. montanus* is composed of a median sclerotized spine and a larger, nearly butterfly-shaped sclerotized plate located on the distal part of the median spine. The inner surface of the coxopodite of the inferior appendage of *P. montanus* possesses a pointed projection located near the base and a membranous lobe near the apical edge; *P. variegatus* has no such pointed projection or membranous lobe, but the specimens in my collection collected from Romania (Cluj) have a membranous lobe. *Philopotamus achemenus* Schmid, 1959 was described based on the specimens collected from Iran, which is closely related to *P. montanus* and not to the Caucasian species *P. tenuis* Martynov, 1913 (SCHMID, 1959). Schmid stated that the differences between *P. achemenus* and *P. montanus* are restricted in the second segment of the inferior appendages, of which the upper branch is somewhat shorter than the lower branch; in segment X, which is longer and thinner than that of *P. montanus*; and the shape of the apical edge of segment X, which is sinuate. Both species have broad and distally rounded upper branches of the harpago. Although the shape of the harpago of both species is nearly the same, the sclerotized parts of the phallic apparatus of *P. achemenus* differ from those of *P. montanus* by the shape of the ductus ejaculatorius, which in *P. achemenus* is simple and not possessing a butterfly-shaped distal plate.

Philopotamus tenuis is a little known species described from Georgia. It also occurs in the Russian Caucasus and northeastern Turkey. It is closely related to *P. variegatus* but differs from this species by the shape of segment X, which is very narrow on the distal half, and the lateral prolongations are long (MARTYNOV, 1913); the sclerotized spines of the phallic apparatus possess only one pair of stout spines and the ductus ejaculatorius.

DESCRIPTIONS

Philopotamus montanus (Donovan, 1813) (Figs. 1-6)

Material. Turkey, Kırklareli, Vize, Demirköy, Kadinkule, 470 m, 41°52'N, 27°45'E, 1.8.1994, 2 males; İstanbul, Sarıyer, Çirçir Suyu, 50 m,

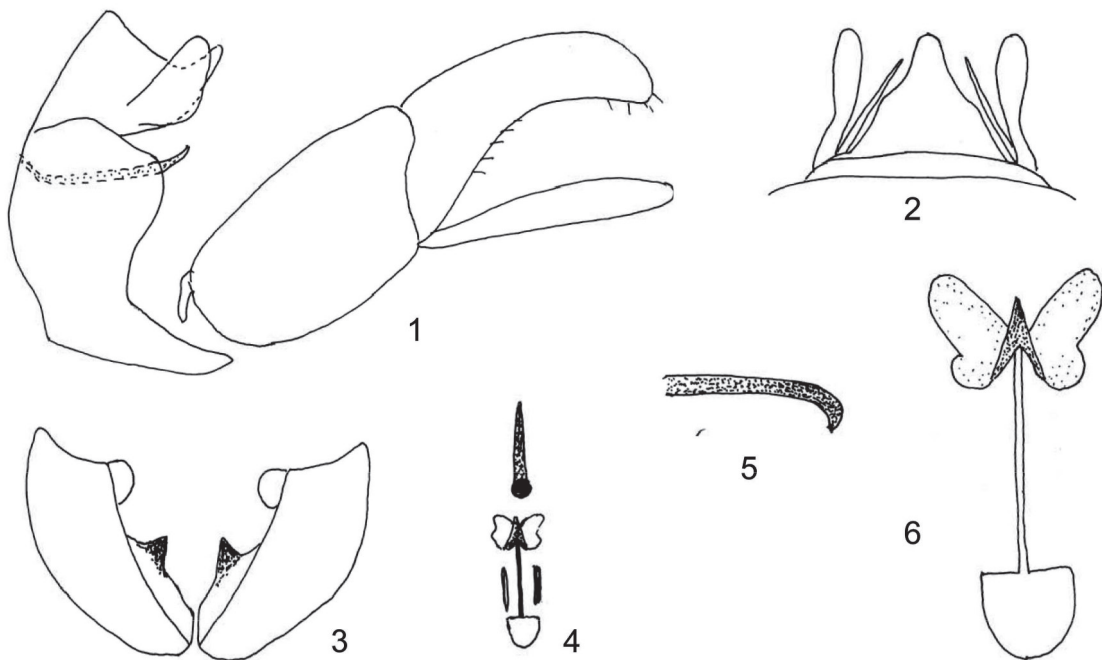
41°10'N, 29°02'E, 23.6.1990, 1 male, leg. and coll. Sipahiler.

Antennae, maxillary palps, wings and legs are brown, forewings with darker spots; the length of the anterior wings of males is 9.5-10 mm.

Male genitalia (Figs. 1-6). With the typical characteristics of *P. montanus*, namely the upper branch of the harpago of the inferior appendages as long as the ventral branch; coxopodites each possess on the inner surface near the base a strong projection and a rounded membranous lobe located distally. Segment X is almost triangular; the lateral

prolongations are rather long, somewhat shorter than the tip of segment X. The sclerotized parts of the phallic apparatus are composed of a long and strong spine located on the apical portion, a pair of thin and short spines found in the middle, and the ductus ejaculatorius, which has a butterfly-shaped sclerotized plate on the apical portion.

Remarks. *Philopotamus montanus* in Turkey is restricted to Thrace (fig. 59b); the materials of the previous records from different regions were identified as *P. achemenus* (SİPAHİLER, 2012, 2014, 2016).



Figures 1-6. *Philopotamus montanus* (Donovan, 1813) male genitalia; 1, lateral; 2, dorsal; 3, coxopodite of the inferior appendages, ventral; 4, sclerotized parts of the phallic apparatus, dorsal; 5, ventral sclerotized band of the phallic apparatus, lateral; 6, ductus ejaculatorius, dorsal (enlarged).

Figuras 1-6. *Philopotamus montanus* (Donovan, 1813) genitalia masculina; 1, lateral; 2, dorsal; 3, coxopodito de los apéndices inferiores, ventral; 4, partes esclerotizadas del aparato fálico, dorsal; 5, banda esclerotizada ventral del aparato fálico, lateral; 6, ductus ejaculatorius, dorsal (aumentado).

Philopotamus variegatus (Scopoli, 1763) (Figs. 7-11)

Material. Turkey, Konya, Akşehir, Sultan Mountains, 1450 m, 38°21'N, 32°27'E, 11.6.1994, 6 males; same place, 1800 m, 38°20'N, 31°17'E, 12.6.1994, 2 males; Manisa, Salihli, 22 km south, Birgi direction, 1000 m, 38°22'N, 28°05'E,

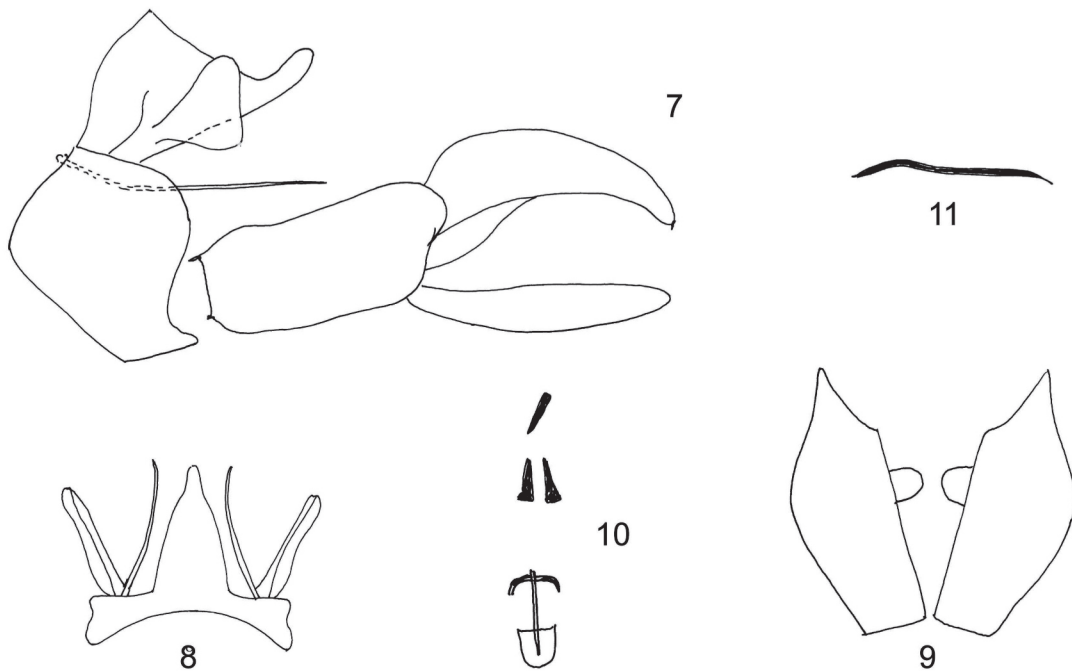
29.5.1988, 3 males; Bolu, Abant, 1400 m, 40°35'N, 31°17'E, 4.7.1981, 2 males; 1400 m, 26.6.1999, 1 male; Yedigöller, (light), 900 m, 40°50'N, 31°35'E, 10.6.2005, 3 males; Dirgine, Karadere, 860 m, 41°51'N, 31°54'E, 10.6.2005, 1 male; Mudurnu, Karamurat Lake, spring, (light), 650 m, 40°33'N, 30°57'E, 26.6.1994, 1 male; Samsun, Durağan-

Vezirköprü, Mezra-Kunduz Mountain direction, 1233 m, 41°09'N, 35°02'E, 14.7.2009, 1 male; Uzungöl, 1750 m, 40°37'N, 40°17'E, 18.8.2005, 3 males; Balıkesir, Edremit, Güre, Zeytinli direction, Kazdağları, Ayı Stream, 400 m, 39°40'N, 26°49'E, 7.8.1994, 1 male; Evciler, Ayazma, Kazdağları National Park, 500 m, 39°45'N, 26°59'E, 6.8.1994, 2 males; Kırklareli, Vize, Demirköy, 470 m, Kadinkule, 41°52'N, 27°45'E, 1.8.1994, 1 male; Romania, Cluj, Ocolis, 28.5.2007, 5 males; leg. and coll. Sipahiler.

Antennae and the maxillary palps pale brown yellowish, wings brown, pale yellowish spotted; the length of the anterior wing of males is 8-9 mm.

Male genitalia (Figs.7-11). Segment X nearly triangular; the lateral prolongations are as long as segment X; the coxopodite of the inferior appendages is as long as the harpago; the inner surface of the coxopodite with membranous lobe. The phallic apparatus has one distal spine, two median spines, and the ductus ejaculatorius; the ventral sclerotized band of the phallic apparatus is straight.

Remarks. *Philopotamus giresunicus* Sipahiler, 2010 is closely related to *P. variegatus* but differs from all species by the shape of segment X, which is quadrangular, with small triangular projections on the corners and fused sclerotized spines of the phallic apparatus (see Figs. 13, 14 in SİPAHİLER, 2010).



Figures 7-11. *Philopotamus variegatus* (Scopoli, 1763) male genitalia; 7, lateral; 8, dorsal; 9, coxopodite of the inferior appendages, ventral; 10, sclerotized parts of the phallic apparatus, dorsal; 11, ventral sclerotized band of the phallic apparatus, lateral.

Figuras 7-11. *Philopotamus variegatus* (Scopoli, 1763) genitalia masculina; 7, lateral; 8, dorsal; 9, coxopodito de los apéndices inferiores, ventral; 10, partes esclerotizadas del aparato fállico, dorsal; 11, banda esclerotizada ventral del aparato fállico, lateral.

***Philopotamus variegatus sapanca* ssp. n.**
(Figs. 12-17)

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3EBCA669-3DCA-40C4-A684-5F2BAEDA637A

Material. Holotype male and 1 female: Turkey, Sakarya, Sapanca, Mahmudiye, Mahmudiye Stream, 262 m, 40°39'N, 30°12'E, 10.6.2013;

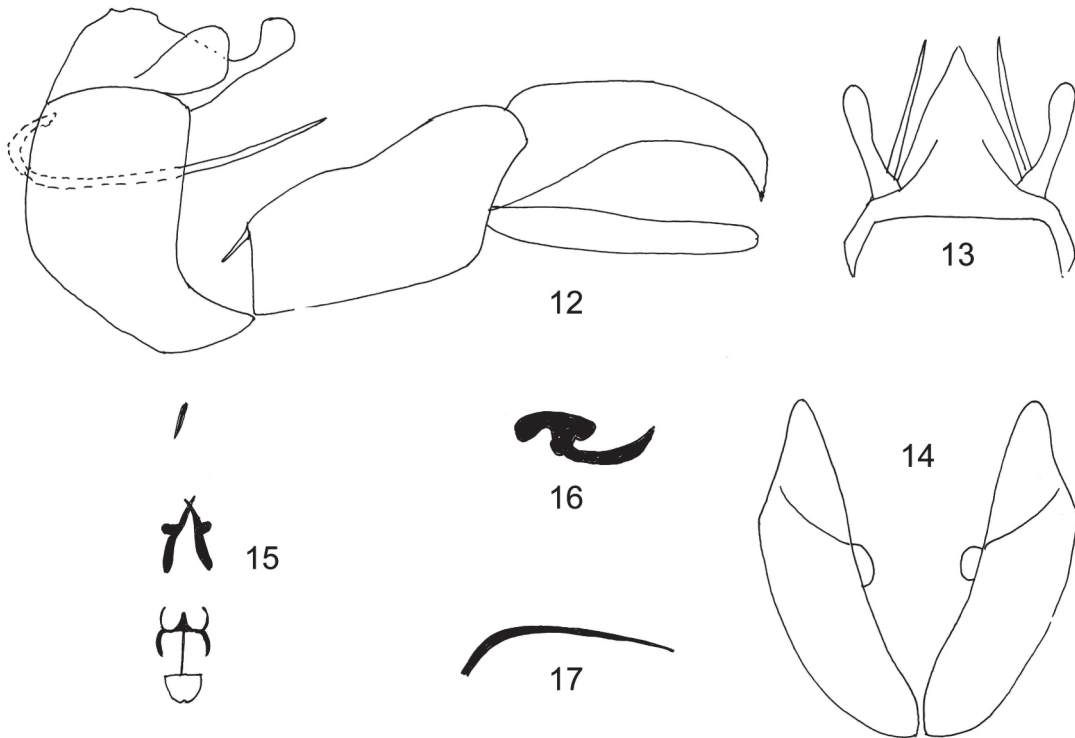
paratypes: İkramiye Village, Akçay, 510 m, 40°36'N, 30°15'E, 24.9.2012, 1 male; same place, 15.8.2013, 1 male, 2 females; Bursa, İznik, 60 km west, Narlıca, 200 m, 40°23'N, 29°28'E, 20.5.2000, 1 male; Sapanca, Mahmudiye, Dereiçi, 244 m, 40°39'N, 30°12'E, 24.9.2012, 1 female; leg. and coll. Sipahiler.

Antennae, maxillary palps, legs, wings brown, spots on the wings yellowish, the length of the anterior wing of males is 10.5-11 mm.

Male genitalia (Figs. 11-17). In dorsal view, segment X triangular, the lateral prolongations are long, longer than segment X. The apical sclerotized spine is thin and rather long, the pair of spines

located in the middle are long, with rounded parts in the middle; the dorsal sclerotized portion of the ductus ejaculatorius with additional dorsolateral sclerotized prolongations on the sides.

Remarks on distribution. The new subspecies occurs in northwestern Turkey (Fig. 59 b).



Figures 12-17. *Philopotamus variegatus sapanca* ssp. n., male genitalia; 12, lateral; 13, dorsal; 14, coxopodite of the inferior appendages, ventral; 15, sclerotized parts of the phallic apparatus, dorsal; 16, middle sclerotized spine, lateral; 17, ventral sclerotized band of the phallic apparatus, lateral.

Figuras 12-17. *Philopotamus variegatus sapanca* ssp. n., genitalia masculina; 12, lateral; 13, dorsal; 14, coxopodito de los apéndices inferiores, ventral; 15, partes esclerotizadas del aparato fállico, dorsal; 16, espina esclerotizada media, lateral; 17, banda esclerotizada ventral del aparato fállico, lateral.

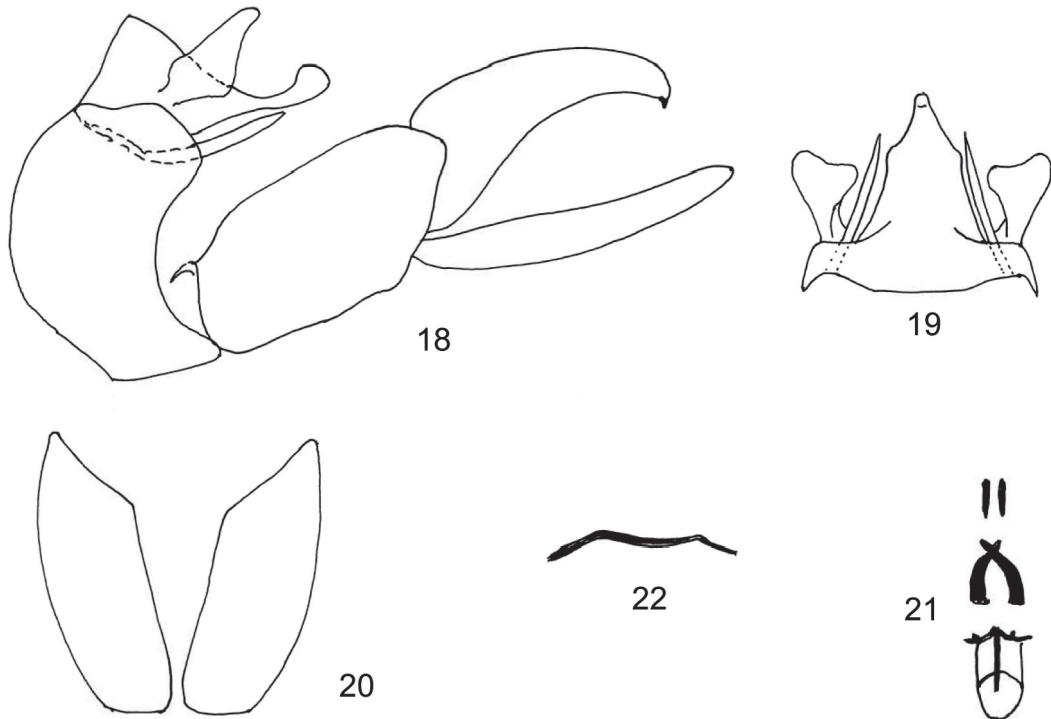
***Philopotamus variegatus kumbet* ssp. n.**
(Figs. 18-22)

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6E292BCF-C0DE-4CE7-AD69-2DC3ED60BEB2

Material. Holotype male: Turkey, Giresun, 45 km south, Kümbet Yaylası direction, 700 m, 41°34'N, 33°05'E, 6.7.2007; paratypes: Tamdere, Eğribel, 1450 m, 40°28'N, 38°23'E, 25.7.1973, 4 males; Şebinkarahisar direction, Eğribel pass, 2000 m, 40°28'N, 38°23'E, 9.7.2008, 1 male; leg. and coll. Sipahiler.

Antennae and the maxillary palps pale brown yellowish, wings brown, pale yellowish spotted; the length of the anterior wing of males is 11-12 mm.

Male genitalia (Figs. 18-22). In dorsal view, segment X triangular, the lateral prolongations are long, somewhat shorter than segment X. The phallic apparatus possesses two small and thin spines on the subdistal portion, the pair of spines, which are located in the middle, are large and long; the dorsal sclerotized part of the ductus ejaculatorius is thin.



Figures 18-22. *Philopotamus variegatus kumbet* ssp. n., male genitalia; 18, lateral; 19, dorsal; 20, coxopodite of the inferior appendages, ventral; 21, sclerotized parts of the phallic apparatus, dorsal; 22, ventral sclerotized band of the phallic apparatus, lateral.

Figuras 18-22. *Philopotamus variegatus kumbet* ssp. n., genitalia masculina; 18, lateral; 19, dorsal; 20, coxopodito de los apéndices inferiores, ventral; 21, partes esclerotizadas del aparato fállico, dorsal; 22, banda esclerotizada ventral del aparato fállico, lateral.

***Philopotamus variegatus hasanyavuzi* ssp. n.** (Figs. 23-27)

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33A07495-3675-4C9D-980E-2ECCB2306228

Material. Holotype male and paratypes (4 males): Turkey, Şavşat, Meydancık, Çermik Village, 1300 m, (light), 1300 m, 41°19'N, 42°03'E, 6.8.1996; other paratypes: Trabzon, Sumela, 5.7.1993, 2 males, leg. Chivojka, coll. Sipahiler; Rize, Cimil, İkizdere direction, 1500-2000 m, 40°44'N, 40°45'E, 21.8.1992, 1 male; Çamlıhemşin, Çat, Kale direction, 1500 m, Fırtına Stream, 40°51'N, 40°56'E, 24.8.1983, 1 male; Çat, 40°51'N, 40°56'E, 15.8.2005, 1 male; Çat, Elevit direction, Lakubar, 1440 m, 40°53'N, 40°56'E, 1440 m, 15.7.1984, 2 males; Çamlıhemşin, Ayder, 1400-1600 m, 40°54'N, 41°03'E, 1.8.1989, 2 males; Artvin, Arhavi, 8 km south, Ortacalar direction, 400 m, 41°16'N, 41°22'E, 21.4.1984, 1 male; Borçka, Camili, (Macahel), Uğurköy, 1300 m, 41°28'N,

42°02'E, 4.8.1995, 2 males; Uğurköy, Didrele Stream, 1000 m, 41°28'N, 41°58'E, 5.8.1995, 8 males; Uğurköy, 1000 m, 41°28'N, 41°58'E, 4 males; Maralköy, 745 m, 41°29'N, 41°56'E, 7.8.1995, 1 male; Şavşat, Meydancık, Gomvan Yaylası, (light), 2000 m, 41°25'N, 42°16'E, 1.8.1995, 15 males; Lodivake Yaylası, 850-1300 m, 41°25'N, 41°57'E, 10.8.1996, 4 males; Lodivake, (light), 1850 m, 11.8.2000, 3 males; Gorgit Yaylası direction 1400-1600 m, 41°25'N, 42°00'E, 13.7.1997, 3 males; Borçka, Camili, Uğurköy, Didrele Stream, 1000 m, 41°28'N, 41°58'E, 5.8.1995, 1 male; Camili, 500 m, 41°28'N, 41°53'E, 8.8.1995, 3 males; same place, (light), 41°28'N, 41°53'E, 14.7.1997, 4 males; Mereta Yaylası, 2300 m, 41°25'N, 42°03'E, 3.8.1995, 2 males; İmerhev, Mısırlı Village, 2250 m, 41°28'N, 42°12'E, 5.6.1996, 2 males, leg. and coll. Sipahiler.

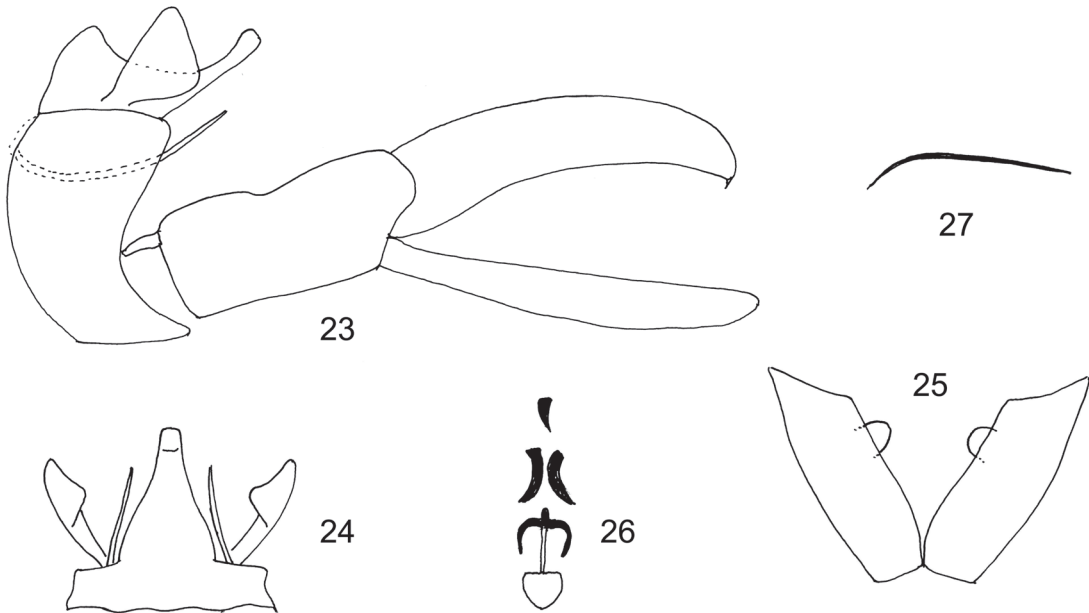
Antennae and the maxillary palps legs and wings pale brown, pale yellowish spotted; the length of the anterior wing of males is 8.5-10 mm.

Male genitalia (Figs. 23-27). In dorsal view, segment X triangular, the lateral prolongations are shorter, reaching two-thirds of the length of segment X. The coxopodite of the inferior appendages is shorter than the harpago, dorsal and ventral branches of the harpago are the longest parts of the genitalia. The dorsal sclerotized spine of the phallic apparatus is small and narrow.

Remarks on distribution. The new subspecies occupies rather a large area and is found in Trab-

zon, Rize, and Artvin provinces in northeastern Turkey (Fig. 59 b).

Etimology. *Philopotamus variegatus hasanyavuzi* ssp. n. is dedicated to the memory of Mr. Hasan Yavuz, an environment activist of Macahel (1955-2013), who helped during my field studies in Borçka, Camili (Macahel) region, as a mountain guide.



Figures 23-27. *Philopotamus variegatus hasanyavuzi* ssp. n., male genitalia; 23, lateral; 24, dorsal; 25, coxopodite of the inferior appendages, ventral; 26, sclerotized parts of the phallic apparatus, dorsal; 27, ventral sclerotized band of the phallic apparatus, lateral.

Figuras 23-27. *Philopotamus variegatus hasanyavuzi* ssp. n., genitalia masculina; 23, lateral; 24, dorsal; 25, coxopodito de los apéndices inferiores, ventral; 26, partes esclerotizadas del aparato fálico, dorsal; 27, banda esclerotizada ventral del aparato fálico, lateral.

Philopotamus tenuis Martynov, 1913 (Figs. 28-33)

Material. Rize, Ayder, Kaler, 1900 m, 41°55'N, 41°09'E, 17.7.1984, 2 males; Ayder, 1400-1600 m, 1.8.1989, 2 males; Çamlıhemşin, Tozkopan, 820 m, 15.7.1984, 3 males; İkizdere, Çiftköprü, Yerelma Köyü direction, 1210 m, 40°45'N, 40°33'E, 17.7.1984, 1 male; Çat, Meydan direction, 1250 m, 2 males; Artvin, Arhavi, 8 km south, Ortacalar direction, 400 m, 41°16'N, 41°22'E, 21.4.1984, 1 male; Borçka, Camili, Uğurköy, 1300 m, 41°28'N, 42°02'E, 4.8.1995, 2 males; Uğurköy, Didrele

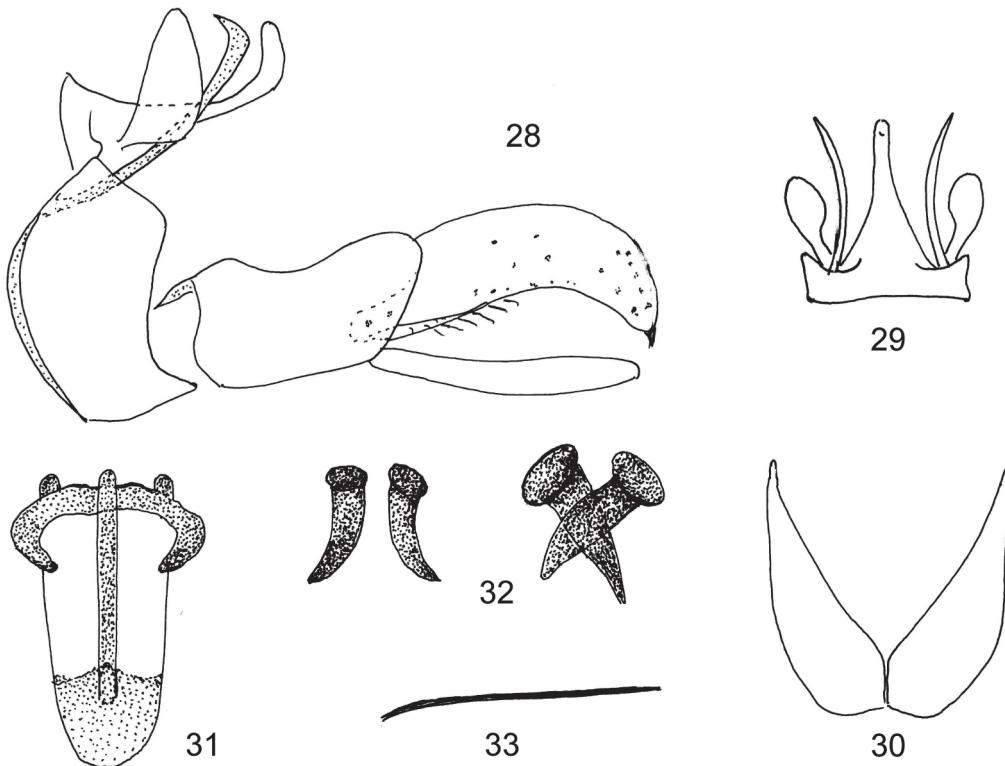
Stream, 1000 m, 41°28'N, 41°58'E, 5.8.1995, 8 males; Uğurköy, 1000 m, 41°28'N, 41°58'E, 4 males; Maralköy, 745 m, 41°29'N, 41°56'E, 7.8.1995, 1 male; Şavşat, Meydancık, Gomvan Yaylası, (light), 2000 m, 41°25'N, 42°16'E, 1.8.1995, 15 males; Şavşat, Meydancık, Çermik Village, 1300 m, (light), 41°19'N, 42°03'E, 6.8.1996, 13 males; Lodivake Yaylası, 850-1300 m, 41°25'N, 41°57'E, 10.8.1996, 4 males; Lodivake, (light), 1850 m, 11.8.2000, 3 males; Gorgit Yaylası direction 1400-1600 m, 41°25'N, 42°00'E, 13.7.1997, 3 males, leg. and coll. Sipahiler.

Antennae and palps are pale brown; legs and wings pale brown; pale yellowish spotted; the length of the anterior wings of males 7.5-8 mm.

Male genitalia (Figs. 28-33). In lateral view, segment X rather long and narrow, apical portion curved towards dorsal; in dorsal view, basal part broadly triangular, subdistal portion narrow; the lateral prolongations are long, somewhat shorter than segment X, the apical part curved towards dorsal. The coxopodite of the inferior appendages is slightly shorter than the harpago, the inner surface without projections and membranous lobes; the upper branch of the harpago broad, slightly longer than the ventral branch, the inner surface with small scarce spines. The phallic apparatus

possesses a pair of stout spines located on the distal portion, of which the bases are located posterior and the pointed parts are directed anterior and they are crosswise in the middle; the ductus ejaculatorius with median and dorsal sclerotized parts, the dorsal part possesses on each side a small sclerotized projection.

Remarks. *Philopotamus tenuis* is closely related to *P. variegatus* but differs from this species by the shape of segment X with a narrow and long distal portion and reduced sclerotized spines of the phallic apparatus. In *P. variegatus*, segment X is nearly triangular and in addition to the paired spines, which are not very stout as in *P. tenuis*, one distal spine is also found.

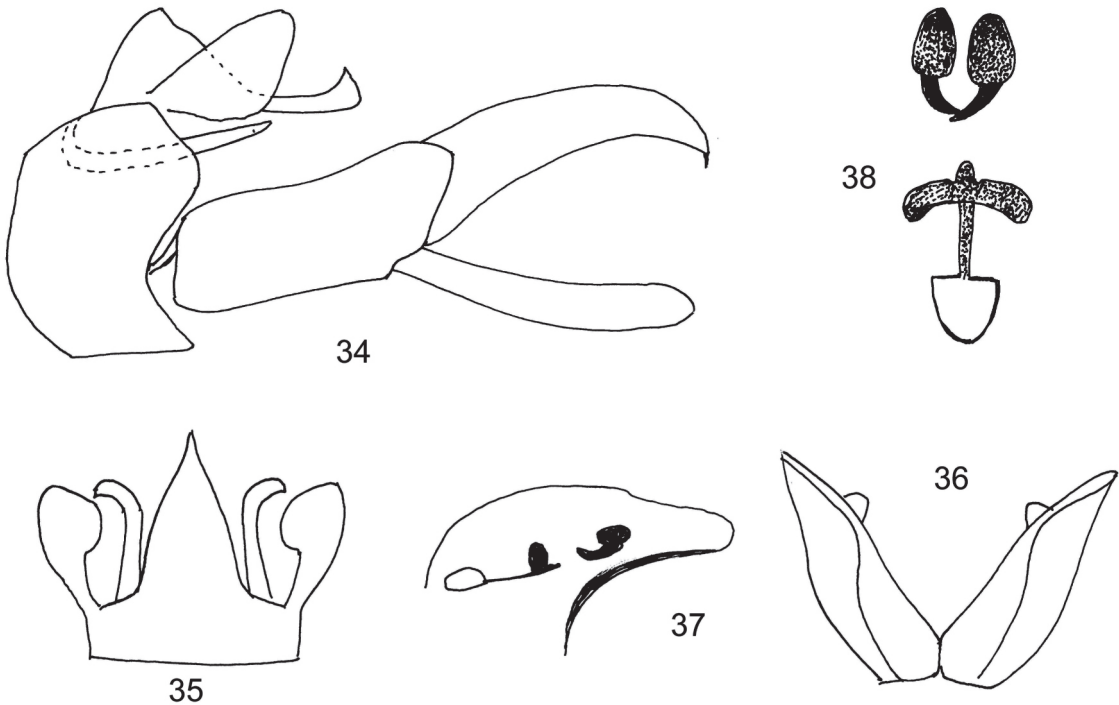


Figures 28-33. *Philopotamus tenuis* Martynov, 1913, male genitalia (Artvin Şavşat); 28, lateral; 29, dorsal; 30, coxopodite of the inferior appendages, ventral; 31, sclerotized parts of the phallic apparatus, dorsal; 32, variation of the paired spines (Rize); 33, ventral sclerotized band of the phallic apparatus, lateral.

Figuras 28-33. *Philopotamus tenuis* Martynov, 1913, genitalia masculina (Artvin Şavşat); 28, lateral; 29, dorsal; 30, coxopodito de los apéndices inferiores, ventral; 31, partes esclerotizadas del aparato fálico, dorsal; 32, variación de las espinas pares (Rize); 33, banda esclerotizada ventral del aparato fálico, lateral.

***Philopotamus tenuis sumela* ssp. n.** (Figs. 34-38)urn:lsid:zoobank.org:act:
62C90FB5-A85E-44E2-A9AC-20BB2D4F3D4A**Material.** holotype male and paratype male: Turkey, Trabzon, Sumela, 1200 m, 40°41'N, 39°39'E, 19.8.2005, leg. and coll. Sipahiler.

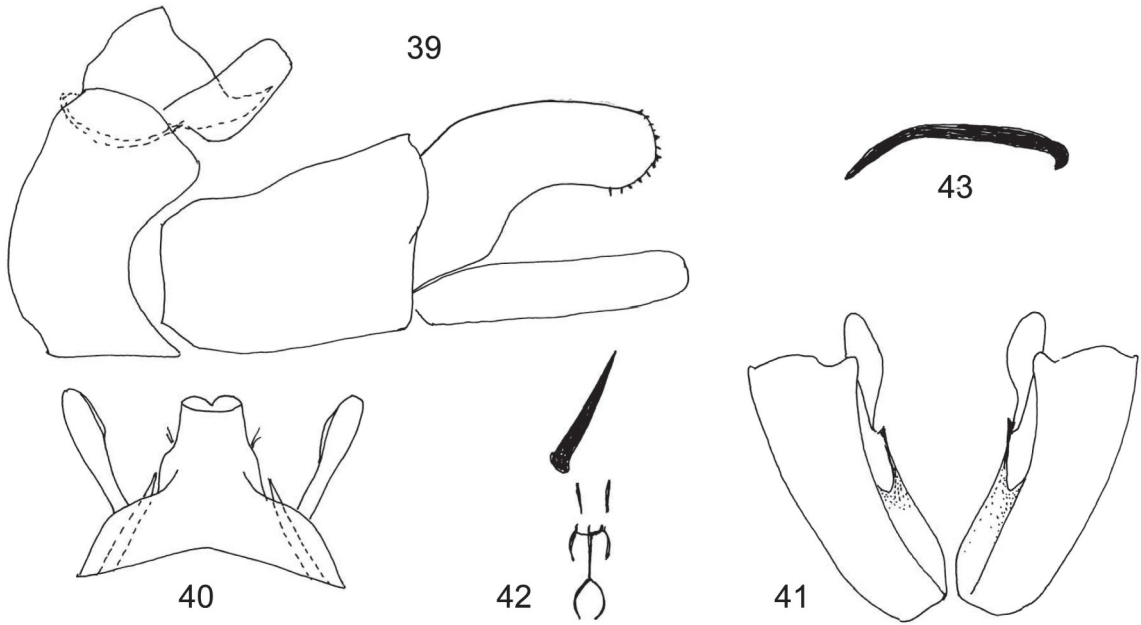
Antennae and maxillary palps are pale brown; legs pale brown; wings brown, forewings are pale yellowish spotted; the length of the anterior wings of males is 7-7.5 mm.

Male genitalia (Figs. 34-38). In dorsal view, segment X nearly triangular, the lateral prolongations reach the subdistal part of segment X; the apical parts are curved on the sides; distal spine pair with large and round apical part and narrow, nearly comma-shaped basal part. The coxopodite of the inferior appendages possesses small membranous lobes on the inner surfaces.**Remarks on distribution.** The new subspecies occupies a small area in Trabzon province in northeastern Turkey (Fig. 59a).**Figures 34-38.** *Philopotamus tenuis sumela* ssp. n., male genitalia (Trabzon), 34, lateral; 35, dorsal; 36, coxopodite of the inferior appendages, ventral; 37, the phallic apparatus, lateral; 38, sclerotized parts of the phallic apparatus, dorsal.**Figuras 34-38.** *Philopotamus tenuis sumela* ssp. n., genitalia masculina (Trabzon), 34, lateral; 35, dorsal; 36, coxopodito de los apéndices inferiores, ventral; 37, aparato fálico, lateral; 38, partes esclerotizadas del aparato fálico, dorsal.***Philopotamus achemenus* Schmid, 1959**
(Figs. 39-43)**Material.** Turkey, Bolu, Mudurnu, Akyokuşkavağı Village, Sülüklügöl, 700-1000 m, 40°32'N, 30°52'E, 26.6.1994, 11 males; same place, 25.6.1995, 13 males; Bolu, 10 km north, Hızardere, 1000 m, 40°48'N, 31°39'E, 5.6.1983, 7 males; Dirgine, Karadere, 860 m, 41°51'N, 31°54'E, 21.10.1986, 2 males; Abant, 29.5.1981, 1400 m, 40°35'N, 31°17'E, 1 male; 6.6.1983, 2 males; 1400 m, 26.6.1999, 1 male; Abant, Bulanık

Yaylası, 1400 m, 40°35'N, 31°17'E, 26.6.1999, 1 male; Sarıalan, Aladağ direction, 1500 m, 40°44'N, 31°44'E, 7.6.1983, 1 male; Sarıalan, Çay Stream, 1500 m, 40°38'N, 1°47'E, .6.1983, 1 male; Aladağlar, Kartalkaya, 1770 m, 40°36'N, 31°48'E, 31.10.2004, 3 males; Sülüklügöl, 40°32'N, 30°52'E, 13.6.2014, 1 male; Abant, 10 km northeast, (light), 600 m, 11.6.2014, 1 male; Gerede, Akyurt, 1300 m, 40°37'N, 32°25'E, 19.5.1996, 1 male; Yedigöller, 40°50'N, 31°35'E, 900 m, 21.10.1980, 4 males; 6.6.1981, 15 males; Yedigöller, 900 m, 40°50'N,

31°35'E, 10.6.2014, 1 male, 3 male pupae; Göynük, Sünnet Lake, 883 m, 40°26'N, 30°57'E, 22.10.2012, 11 males; 21.6.1997, 1 males; (light), 10.6.2005, 3 males; 10.6.2005, 2 males; same place: 733 m, 40°43'N, 31°02' E, 678 m, 12.6.2013, 1 male; 5.7.2013, 1 male; 710 m, 40°43'N, 31°03'E, 23.9.2012, 1 male; 5.7.2013, 2 males; 15.8.2013, 1 male; Bursa, Uludağ, Kirazlıyayla, Sarıalan direction, 1617 m, 40°06'N, 29°05' E, 7.8.1985, 1 male; Oylat, Saadet Village, 10 km southwest, 1000 m, 20.5.1994, 40°06'N, 29°05' E, 18 males; İnegöl, Oylat, Ortaca Village, Karagöz Yaylası, 20.5.1994, 7 males; Saadet Village, 15 km west, Keles direction, 1500 m, 39°56'N, 29°21' E, 20.5.1994, 3 males; Uludağ, Soğukpınar direction, 900 m, 40°03'N, 29°11' E, 3.6.1992, 12 males; Sinop, Bürmük, 1146 m, 41°39' N, 34°51' E, 12.7.2009, 5 males; Dikmen, Durağan direction, 917 m, 41°31'N, 35°09' E, 13.7.2009, 9 males; same place, 10.8.2009, 9 males; İzmir, Salihli, Birgi direction, 25 km south, 500 m, 38°22'N, 28°05' E, 22.5.1992, 1 male; 21 km south, Birgi direction, 800 m, 22.5.1992, 1 male; Bergama, Kozak direction, 500 m, 39°17'N, 26°59' E, 31.5.1992, 3 males; Isparta, Gelendost Akşehir direction, Sultan Mountains, 1200 m,

38°14'N, 31°22' E, 4.6.1993, 4 males; Manisa, Turgutlu, Bayındır direction, Çatma Mountain, 430 m, 38°15'N, 27°35' E, 21.5.1992, 6 males; Bayındır, Turgutlu direction, Kamberler Village, 350 m, 38°21'N, 27°35' E, 21.5.1992, 2 males; 5 km south, 600 m, 38°17'N, 27°35' E, 21.5.1992, 6 males; Akşehir, Sultan Mountains, 1450 m, 4.5.1994, 8 males; same place, 11.6.1994, (light), 31 males; same place, 1800 m, 12.6.1994, 3 males; Taşkent, Sarıveliler Village, 1700 m, 36°42'N, 32°37' E, 29.6.2000, 1 male; Taşkent, Ermenek direction, 26 km south, 1485 m, 36°45'N, 32°42' E, 28.6.2000, 1 male; Balıkesir, Edremit, Güre, Zeytinli direction, Kazdağları, Ayı Stream, 400 m, 39°41'N, 26°54' E, 7.8.1994, 22 males; Bayramiç, Evciler direction, 20 km east, Kazdağları, 500 m, 39°45'N, 26°59' E, 5.8.1994, 4 males; Ankara, Beypazarı, Karaşar, Eğriova, 1500 m, 40°22'N, 32°01' E, 19.5.1997, 1 male; same place, 1600 m, 1600 m, 40°27'N, 32°02' E, 8.8.2005, 1 male; Yaylabag Village, 1000 m, 39°47'N, 32°53' E, 9.5.2000, 2 males; Muğla, Fethiye, Kayabaşı, Söğüt, 1737 m, 36°59'N, 29°49' E, 6.5.1997, 1 male; Ordu, Gökkyöy, 1290 m, 40°40'N, 37°37' E, 11.5.1997, 15 males; Erzincan, Refahiye, Alacaatlı Village, 1800 m,



Figures 39-43. *Philopotamus achemenus* Schmid, 1959, male genitalia (specimen from Bolu, Sülüklü Göl); 39, lateral; 40, dorsal; 41, coxopodite of the inferior appendages, ventral; 42, sclerotized parts of the phallic apparatus, dorsal; 43, ventral sclerotized band of the phallic apparatus, lateral.

Figuras 39-43. *Philopotamus achemenus* Schmid, 1959, genitalia masculina (ejemplar de Bolu, Sülüklü Göl); 39, lateral; 40, dorsal; 41, coxopodito de los apéndices inferiores, ventral; 42, partes esclerotizadas del aparato fálico, dorsal; 43, banda esclerotizada ventral del aparato fálico, lateral.

39°53'N, 38°53'E, 12.5.1997, 1 male; Zonguldak, Alaplı, Gümeli, Bölüklü Yaylası, Bacaklı Yaylası direction, 41°02'N, 31°40'E, 1170 m, 12.7.2011, 1 larva; Alaplı, Gümeli, Bölüklü Yaylası direction, 41°03'N, 31°40'E, 1030 m, 24.6.2011, 1 male, (4 male pupae); same place, 12.7.2011, 1 male, 1 female pupa; Alaplı, Gümeli, Bölüklü Yaylası, 41°02'N, 31°40'E, 1075 m, 24.6.2011, 1 male; Karabük, Yenice, Karakaya, 958 m, 41°16'N, 32°34'E, 21.9.2011, 7 males; Çorum-Sinop province border, Kargı, north of Pelit yaylası, 1500 m, 41°11'N, 34°20'E, 11.7.2009, 5 males; Kayseri, Develi direction, Deresimli Village, 1420 m, 38°11'N, 35°54'E, 20.6.2008, 5 males; Isparta, Akşehir direction, Sultan Mountains, 1698 m, 38°15'N, 31°20'E, 2 males; Karabük, Kapullu, Başköy, 635 m, 41°15'N, 32°36'E, 22.10.2011, 1 male; Sinop, Hanönü- Ayancık direction, Çangal Mountain, 1140 m, 41°42'N, 34°38'E, 9.8.2009, 1 male; Çangal Mountain, 1190 m, 41°43'N, 34°40'E, 9.8.2009, 1 male, leg. and coll. Sipahiler.

Antennae, legs, and wings brown, yellow spotted; the length of the anterior wings of males is 10-11 mm.

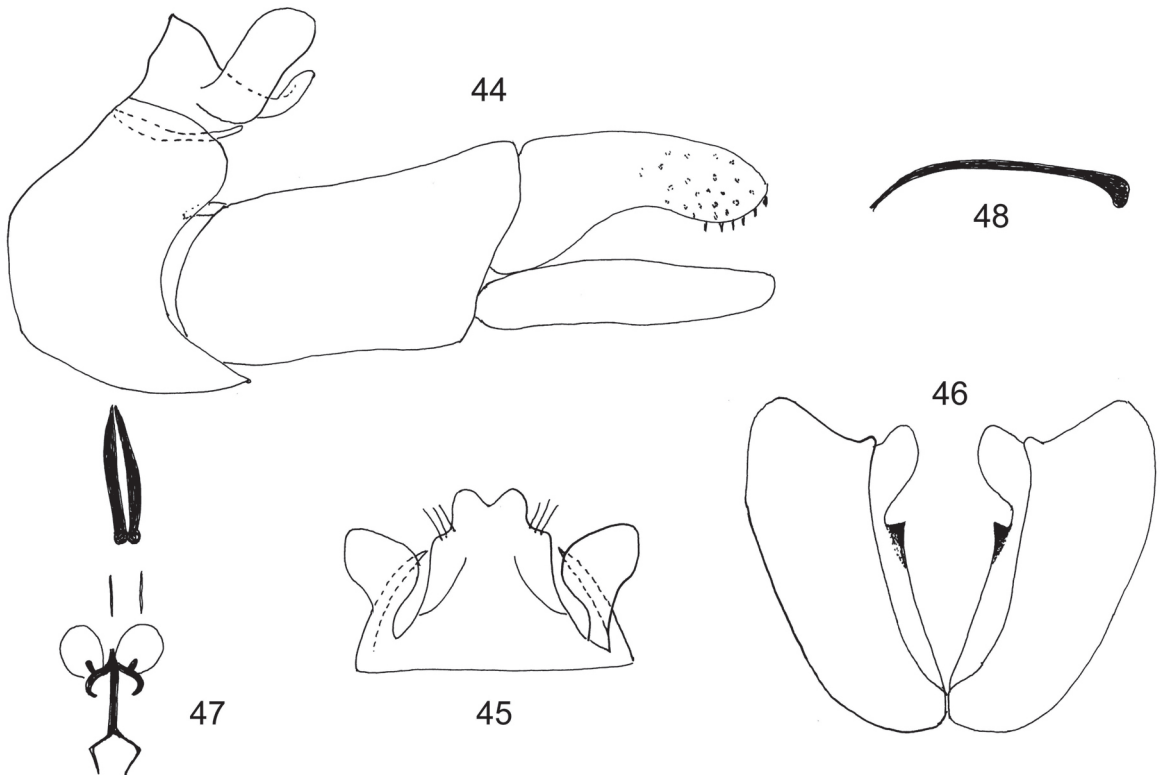
Male genitalia. Very close to *P. montanus* and not sufficiently distinguished without maceration of the genitalia. The difference is limited to the shape of the upper branch of the harpago, which is according to SCHMID (1959) somewhat shorter than the lower branch; but in some specimens found in Turkey the upper branch can also be equal in length or even longer; namely, sclerotized spines and the shape of the ductus ejaculatorius of the phallic apparatus are important features to identify them.

***Philopotamus achemenus namrun* ssp. n.**
(Figs. 44-48)

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372D3393-5F51-4461-A89B-7ECC39963034

Material: holotype male and paratypes (2 males): Turkey, Adana Namrun, Bahçe, 1050 m, 37°09'N, 34°35'E, 21.5.1993, leg. and coll. Sipahiler.



Figures 44-48. *Philopotamus achemenus namrun* ssp. n., male genitalia; 44, lateral; 45, dorsal; 46, coxopodite of the inferior appendages, ventral; 47, sclerotized parts of the phallic apparatus, dorsal; 48, ventral sclerotized band of the phallic apparatus, lateral.

Figuras 44-48. *Philopotamus achemenus namrun* ssp. n., genitalia masculina; 44, lateral; 45, dorsal; 46, coxopodito de los apéndices inferiores, ventral; 47, partes esclerotizadas del aparato fállico, dorsal; 48, banda esclerotizada ventral del aparato fállico, lateral.

Antennae, legs, and wings brown, spots on the wings are yellow; the length of the anterior wings of males is 10-11 mm.

Male genitalia (Figs. 44-48). Segment X in dorsal view broad at the base, the sides with right angle on the subdistal portions, possessing on each side three short setae, the apical edge curved inward. The first segment of the inferior appendages with a small projection on two-thirds of the inner surface, a membranous lobe is located above it; the upper branch of the harpago is almost the same length as the lower branch. The phallic apparatus with a ventral sclerotized spine curved apically; in dorsal view, the sclerotized parts are composed of a pair of long spines, which are connected at the base, beneath them two shorter and thinner spines and the ductus ejaculatorius, of which the median portion with a pointed short projection and two side projections each possessing an oval plate dorsally.

Remarks on distribution. The new subspecies occupies a small area in Adana province in southern Turkey (Fig. 59a).

***Philopotamus achemenus kemer* ssp. n.**
(Figs. 49-53)

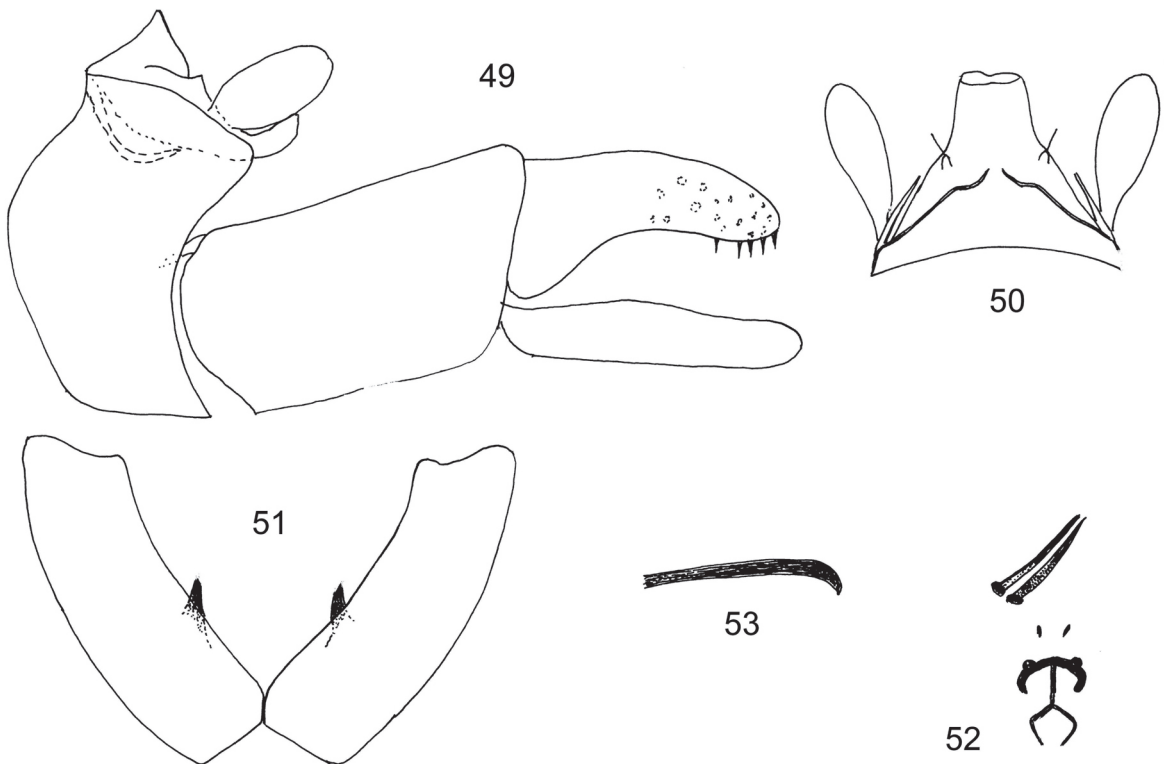
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Material. Holotype male and paratypes (4 males): Turkey, Antalya, Kemer, Çıralı, Ulupınar, (light), 39°11'N, 39°32'E, 15.7.2004, leg. and coll. Sipahiler.

Antennae, legs, and wings dark brown, slightly yellowish spotted; the length of the anterior wings of males is 7.5-9 mm.

Male genitalia (Figs. 49-53). Segment X in dorsal view trapezoidal, the apex with a small excision medially; a small rounded projection bearing a seta is located on each side nearly in the middle of the side edges. Inner surface of the inferior appendages with a small and stout projection in the middle; the upper branch of the harpago is slightly shorter than the lower branch. The phallic apparatus has distally a pair of long and thick sclerotized spines, which are connected at the base; beneath a pair of small sclerotized spines, and the ductus ejaculatorius has dorsally two small and rounded projections on the sides.



Figures 49-53. *Philopotamus achemenus kemer* ssp. n., male genitalia; 49, lateral; 50, dorsal; 51, coxopodite of the inferior appendages, ventral; 52, sclerotized parts of the phallic apparatus, dorsal; 53, ventral sclerotized band of the phallic apparatus, lateral.
Figuras 49-53. *Philopotamus achemenus kemer* ssp. n., genitalia masculina; 49, lateral; 50, dorsal; 51, coxopodito de los apéndices inferiores, ventral; 52, partes esclerotizadas del aparato fállico, dorsal; 53, banda esclerotizada ventral del aparato fállico, lateral

Remarks on distribution. The new subspecies occupies a small area in Antalya province in southern Turkey (Fig. 59a).

***Philopotamus achemenus mencilis* ssp. n.**
(Figs. 54-58)

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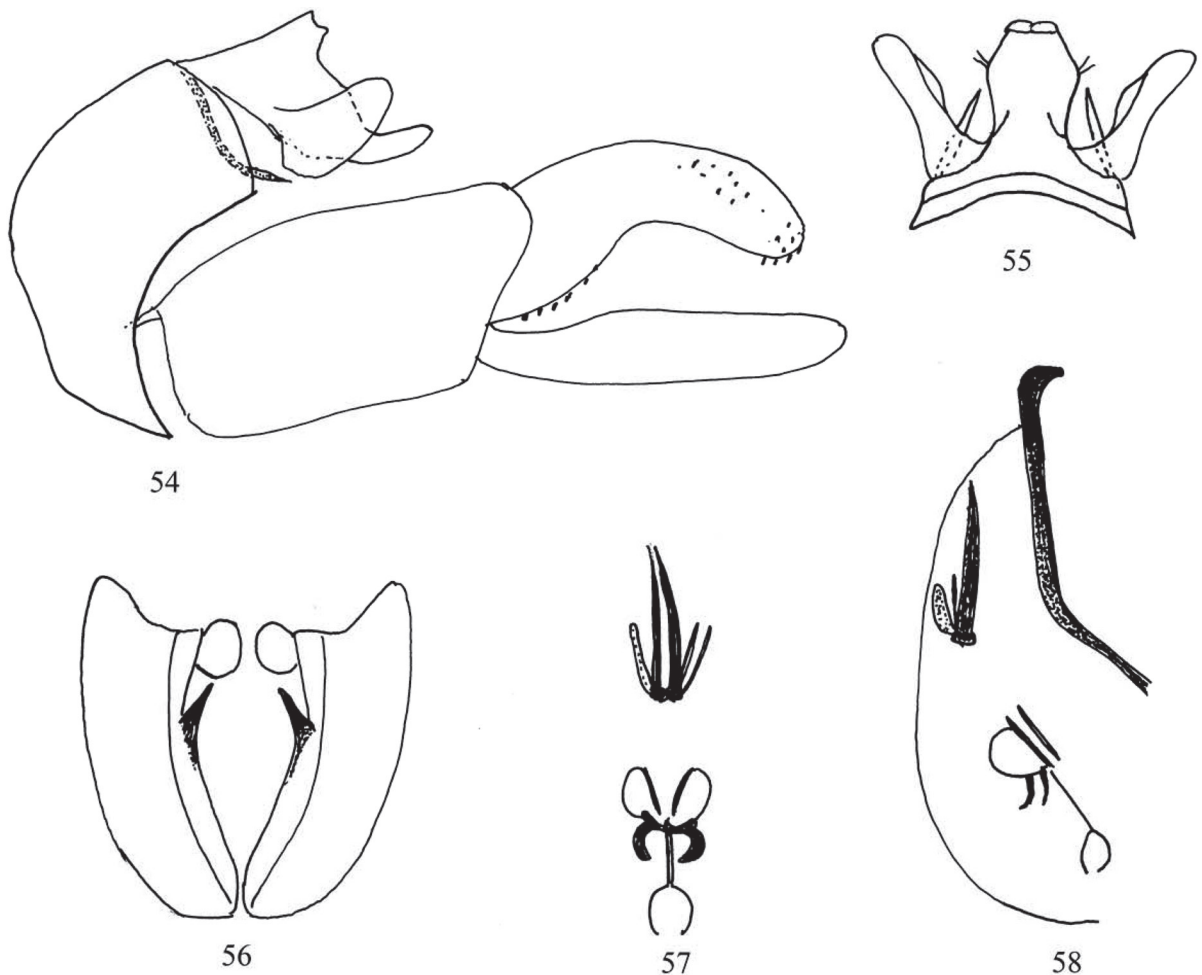
Material. 1 male (holotype), Turkey, Karabük, Safranbolu, Mencilis Stream, (light), 41°15'N, 32°47'E, 23.8.1993.

Antennae, maxillary palps, and wings brown, yellow spotted; the length of the anterior wing of male is 8 mm.

Male genitalia (Figs. 54-58). In dorsal view, the side edges of segment X largely dilated nearly in the middle, each possessing two short setae at the

tip; the apical margin with a small excision in the middle. The inner surface of the coxopodite with a pointed projection located two-thirds of the length of its length, thin, and close to the coxopodite; the apex with membranous rounded lobe; the upper branch of the harpago is shorter than the ventral branch. In dorsal view, the sclerotized spines of the phallic apparatus consist of two long and rather thin spines, which are located at the bases of these long spines; beneath them two oval sclerotized plates are connected to the two shorter spines (which are found separately in nominate subspecies) and found at the tip of the ductus ejaculatorius, which has dorsally a median and two lateral projections.

Remarks on distribution. The new subspecies occupies a small area in Karabük province in northwestern Turkey (Fig. 59a).



Figures 54-58. *Philopotamus achemenus mencilis* ssp. n., male genitalia; 54, lateral; 55, dorsal; 56, coxopodite of the inferior appendages, ventral; 57, sclerotized parts of the phallic apparatus, dorsal; 58, phallic apparatus, lateral.

Figuras 54-58. *Philopotamus achemenus mencilis* ssp. n., genitalia masculina; 54, lateral; 55, dorsal; 56, coxopodito de los apéndices inferiores, ventral; 57, partes esclerotizadas del aparato fálico, dorsal; 58, aparato fálico, lateral.

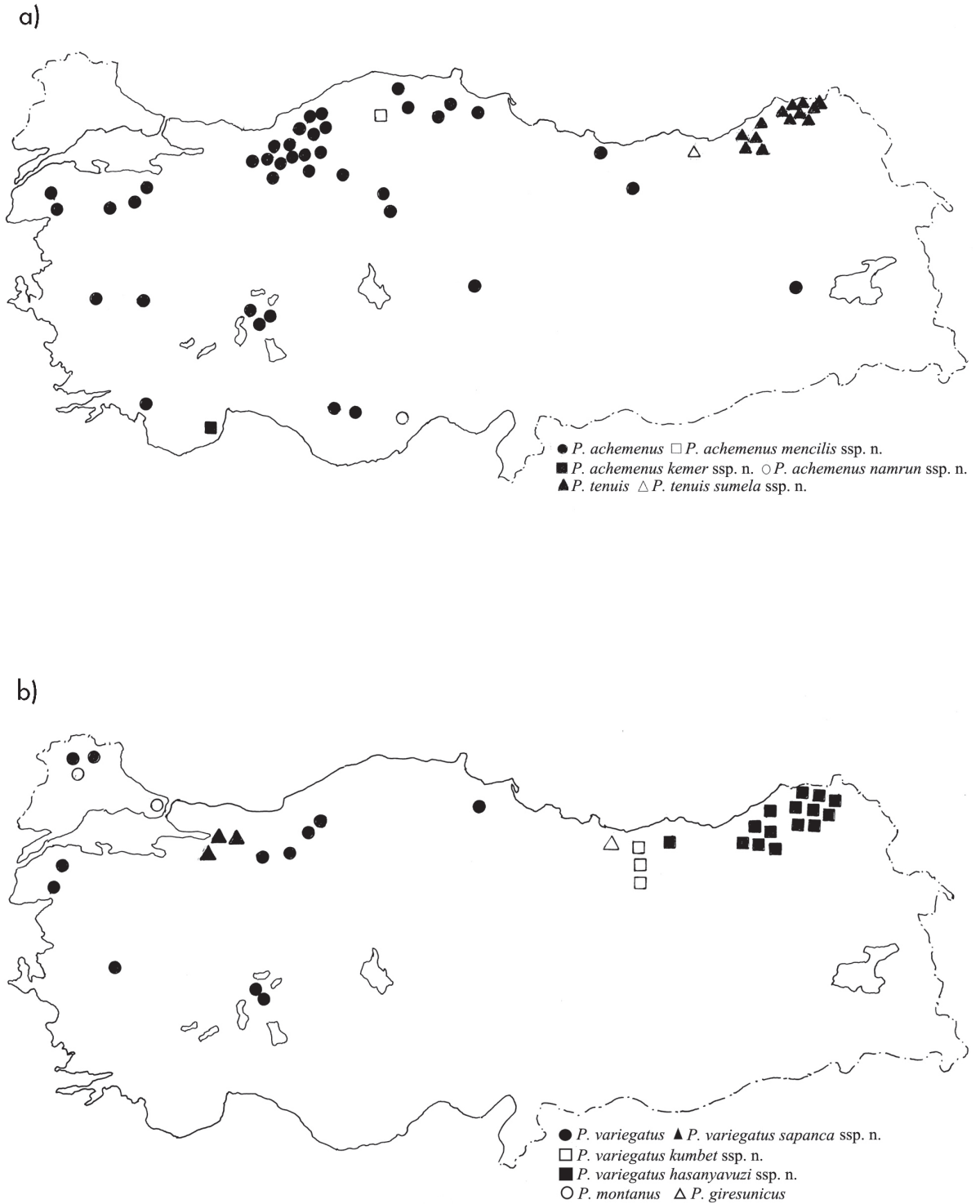


Figure 59. Distributions of the species/subspecies of the genus *Philopotamus* in Turkey.
Figura 59. Distribuciones de las especies y subspecies del género *Philopotamus* en Turquía.

Key to the turkish species/subspecies of *Philopotamus*

- (1) Ventral sclerotized band of phallic apparatus curved at apex (Figs. 6, 43, 48, 53)..... 2
 - Ventral sclerotized band of phallic apparatus straight..... 6
- (2) Ductus ejaculatorius distally butterfly-shaped (Fig. 5) *P. montanus*
 - Ductus ejaculatorius simple, not butterfly-shaped..... 3
- (3) Phallic apparatus with one long distal spine (Fig. 42) *P. achemenus*
 - Phallic apparatus with two long distal spines..... 4
- (4) Middle paired spines thin and short; spines of coxopodite located on basal half; membranous lobes lacking (Figs. 46, 47) *P. achemenus kemer ssp. n.*
 - Middle paired spines thin, moderately long; ductus ejaculatorius with rounded sclerotized plates on apex..... 5
- (5) Distal spine pair with three short spines at base; central spine pair located on inner side of rounded plates of ductus ejaculatorius; segment X with two short setae on each side (Figs. 54-58) *P. achemenus mencilis ssp. n.*
 - Distal spine pair without short spines at base; central spine pair moderately long and thin; segment X with three short setae on each side (figs. 44-48) *P. achemenus namrun ssp. n.*
- (6) Segment X dorsally triangular..... 7
 - Segment X quadrangular on subdistal part; paired sclerotized spines of phallic apparatus connected; ventral sclerotized band of phallic apparatus short and thin (SİPAHİLER, 2010: Figs. 11, 13, 14) *P. giresunicus*
- (7) Phallic apparatus possesses a pair of thick distal spines and ductus ejaculatorius..... 8
 - Phallic apparatus possesses distal spines, a pair of central spines, and ductus ejaculatorius..... 9
- (8) Phallic apparatus possesses a pair of thick distal spines and ductus ejaculatorius; segment X very narrow on distal half; lateral prolongations as long as segment X; coxopodite without membranous lobe on inner surface (Figs. 28-33) *P. tenuis*
 - Distal spines of phallic apparatus each with a rounded distal part and narrow ventral part; lateral prolongations of segment X short, reaching half of segment X; coxopodite with membranous lobe on inner surface (Figs. 34-38) *P. tenuis sumela ssp. n.*
- (9) Phallic apparatus with one distal spine, two central spines, and ductus ejaculatorius..... 10
 - Phallic apparatus with two distal spines (Fig. 21) *P. variegatus kumbet ssp. n.*
- (10) Harpago long, longer than coxopodite; central spine pair of phallic apparatus curved on each side (Figs. 23-27) *P. variegatus hasanyavuzi ssp. n.*
 - Harpago as long as coxopodite; central spine pair of phallic apparatus with tubercle in middle (Figs. 12-17) *P. variegatus sapanca ssp. n.*

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