

***Habroleptoides kavron* sp. n., a new species (Ephemeroptera,
Leptophlebiidae) from Eastern Black Sea Region (Turkey)
with ecological notes**

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ABSTRACT

1. *Habroleptoides kavron* sp. n. from Eastern Black Sea Region (Turkey), was described, illustrated and was compared with *H.confusa*.
2. Ecological characteristics of habitat of *Habroleptoides kavron* sp. n. were also given according to System A and System B of European Union Water Framework Directive.

KEYWORDS: Biodiversity, characteristics of habitat, Eastern Black Sea Region, ecology, Ephemeroptera, new species, Turkey, Water Framework Directive.

**Do u Karadeniz Bölgesi'nden (Türkiye) bir yeni tür,
Habroleptoides kavron sp. n. (Ephemeroptera,
Leptophlebiidae) ve ekolojik özellikleri**

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ÖZ

1. Do u Karadeniz Bölgesi'nden *Habroleptoides kavron* sp. n. yeni türü tanımlanmış ,
ekilleri çizilmiş ve *H.confusa* ile karılaştırılmıştır.
2. Avrupa Birliği Su Çerçeve Direktif 'nin Sistem A ve Sistem B sınıf amasına göre
Habroleptoides kavron sp. n.'nin habitatına ilişkin ekolojik özellikleri de verilmiştir.

ANAHTAR KELİMELER: Biyolojik çeşitlilik, Do u Karadeniz Bölgesi, ekoloji,
Ephemeroptera, habitat özellikleri, Su Çerçeve Direktif , Türkiye, yeni tür.

INTRODUCTION

Habroleptoides (Leptophlebiidae, Ephemeroptera) was established by Schoenemund (1929) for introducing *H. modesta* (Hagen 1864). *Habroleptoides* was considered by Biancheri (1953) as a subgenus of *Habrophlebia*. Grandi (1955) stated that *Habroleptoides* and *Habrophlebia* were synonym. However, Peters and Edmunds (1970) indicated and verified that *Habroleptoides* and *Habrophlebia* were completely separate genera (Peters 1979). According to Kluge (2011), *Habroleptoides* was represented in West Palaearctic region by sixteen species. According to Fauna Europaea (2011), this genus was represented by two species, *H. caucasica* Tshernova 1930 (Kazancı 2001) and *H. confusa* Sartori & Jacob 1986 (Tanatmı 2002) in Turkey. Updated check-list of *Habroleptoides* species in West Palaearctic Region is given in Table 1.

Table 1. *Habroleptoides* species in West Palaearctic Region.

Species of <i>Habroleptoides</i> *	Author	Country**	Ecoregion***
1. <i>Habroleptoides annae</i>	Sartori 1986	Spain	ER-1, ER-2
2. <i>Habroleptoides assefae</i>	Sartori & Thomas 1986	Morocco	ER-X
3. <i>Habroleptoides auberti</i>	(Biancheri 1954)	Austria, Italy, Germany, France, Switzerland	ER-3, ER-4
4. <i>Habroleptoides berthelemyi</i>	Thomas 1968	France, Spain	ER-1, ER-2, ER-13
5. <i>Habroleptoides budtzi</i>	(Esben-Petersen 1912)	Corsica	ER-3
6. <i>Habroleptoides carpatica</i>	Bogoescu & Crasnaru 1930	Bosnia & Herzegovina, Romania	ER-5, ER-10, ER-12
7. <i>Habroleptoides caucasica</i>	Tshernova 1930	Turkey, Caucasia	ER-Y
8. <i>Habroleptoides confusa</i>	Sartori & Jacop 1986	Austria, Bosnia & Herzegovina, Bulgaria, Croatia, Czech Republic, Turkey, France, Germany, Greece, Hungary, Italy, Luxemburg, Macedonia, Poland, Romania, Slovenia, Spain, Switzerland, Ukraine, Serbia	ER-1, ER-2, ER-3, ER-4, ER-6, ER-8, ER-9, ER-10, ER-11, ER-13, ER-14, ER-Y
9. <i>Habroleptoides filipovicae</i>	Gaino & Sowa 1985	Greece, Serbia	ER-5, ER-6
10. <i>Habroleptoides malickyi</i>	Gaino & Sowa 1983	Greece	ER-6
11. <i>Habroleptoides modesta</i>	(Hagen 1864)	Corsica, Sardinia, Spain, Holland	ER-1, ER-2, ER-3, ER-4, ER-5, ER-6, ER-8, ER-9, ER-10, ER-11, ER-13, ER-14, ER-15, ER-16, ER-Y
12. <i>Habroleptoides nervulosa</i>	(Eaton 1884)	Spain	ER-1
13. <i>Habroleptoides pauliana</i>	(Grandi 1959)	Italy, Sicily	ER-3
14. <i>Habroleptoides pontica</i>	Kluge 1994	Caucasia	ER-Y
15. <i>Habroleptoides thomasi</i>	Sartori 1986	Portugal, Spain	ER-1
16. <i>Habroleptoides umbratilis</i>	(Eaton 1884)	Italy, Spain, Switzerland	ER-1, ER-3
17. <i>Habroleptoides kavron</i> sp. n.		Turkey	ER-Y

* According to Phylogeny of Ephemeroptera (Kluge 2011)

** According to Fauna Europaea (2011)

*** According to Buffagni *et al.* 2009

H. modesta (Hagen 1864) is an endemic to Sardinia and Corsica even though its records from Spain and Holland (Belf ore, pers. com.).

***Habroleptoides kavron* sp. n.**

Material: 6 imagos, 1 imagos, 3 subimagos, 10 subimagos. TURKEY - Eastern Black Sea Region - Rize - Upper Kavron Highland - the stream inf owing Büyük Deniz Lake - Kaçkar Mountains, 40 51 58.45N, 41 09 42.75E, 2950m, 23.VII.1994.

Holotype (male imago)

Body Length: 11,3mm

Fore Wings: 9,1mm

Head: Slightly dark brown with lighter frontoclypeus; eyes close to each other and separated by ocellus, a distance approximately less than width of median ocellus, upper part of eyes dark yellow, lower portion black; antennae yellow, surrounding area of basal segment of antennae lighter yellow (Figure 3-4).

Thorax: Brown with black sutures, legs light brown, joint part between femur and tibia dark brown, tibia longer than tarsus (tibia:tarsus=4.13), one claw apically hooked, the other obtuse, pad-like (Figure 6); hind wings with distinct, slightly hooked and curled costal projection at the middle of costa (Figure 5). Hind wing with long subcostal vein and five cross veins in costal area (Figure 5).

Abdomen: Brown-dark brown terga with darker margins, each tergum with two median, slightly triangular, parallel, dark brown patterns lying down longitudinally (Figure 2).

Genitalia: Styliger cleft deep and narrow, with diverging inner distal margins (Figure 1). First segment of gonopod longer than second and third segments. Base of gonopods broad and with a distinct basal knob on inner margin (Figure 1). Inner margins of gonopods form a prominent process with rounded apex (Figure 1). Penis lobes diverged distinctly and incurved moderately. Incurved penial hooks are not reached to styliger plate (Figure 1).

Paratype (female imago)

Body Length: 9,1mm

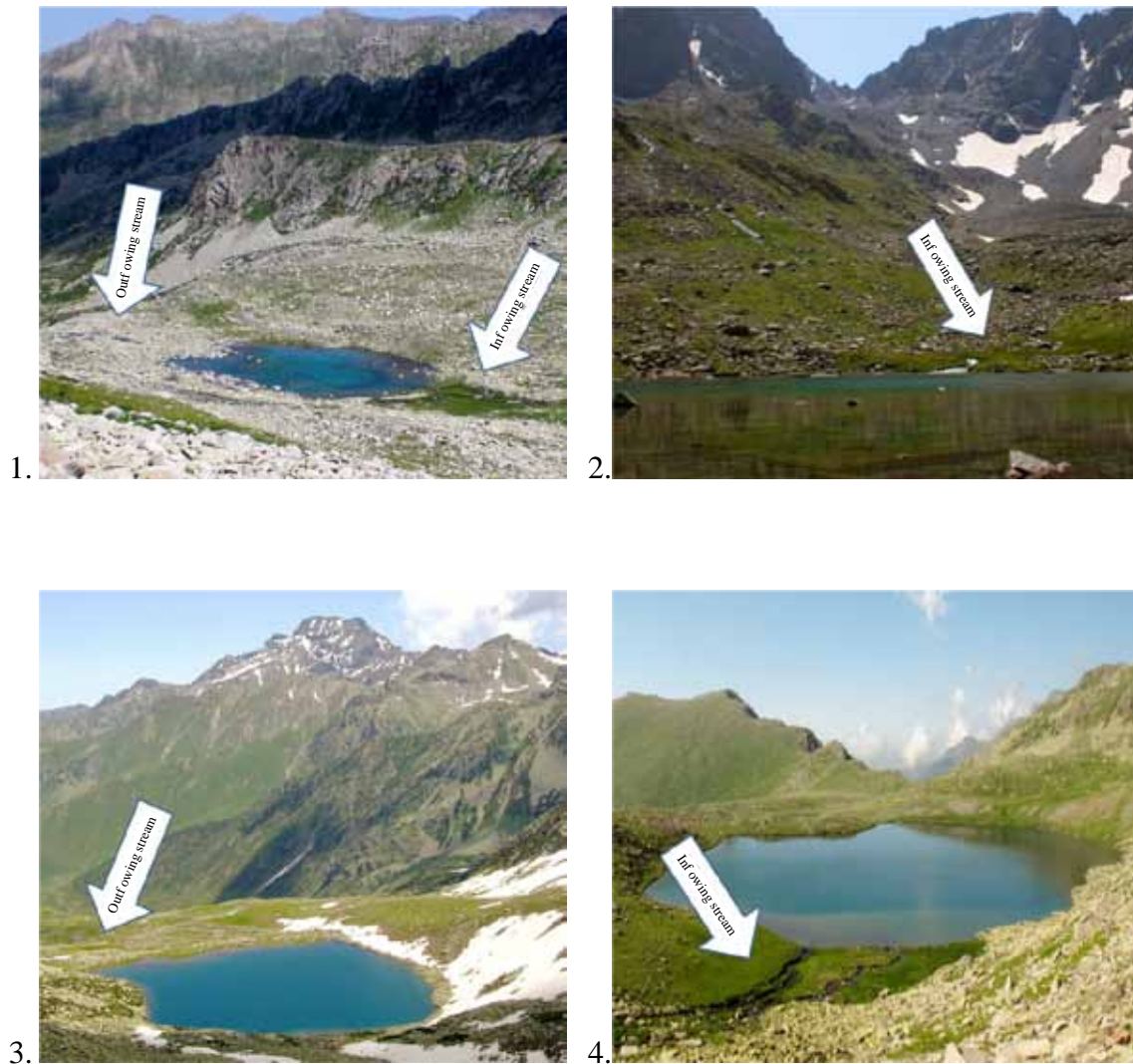
Fore Wings: 7,2mm

Head: Color similar to male but lighter. Eyes black, smaller than male's, not close to each other and well separated by a distance five times as great as width of eye.

Genitalia: Genital plate deeply cleft (Figure 7).

Subimago: Brown terga with lighter brown-yellow margins. Each tergum with distinct and pale two median, slightly triangular, parallel patterns lying down longitudinally. Hook on the costa of hind wings indistinct.

Ecology: The collecting site is situated at the highlands of Fırtına River Basin (Kavron Highland, Rize, Turkey), which covers 1150km² catchment area, with the altitude of 2950m. Inf owings coming from melting snows at Kaçkar Mountain Highs form many glacier lake at the region. The collecting site is situated at the stream inf owing to the Büyük Deniz Lake which is one of the glacier lakes (Photos 1-4). Some ecological characteristics which are required by System A and System B of EU Water Framework Directive (Council of European Communities 2000) and some physical characteristics of the collecting site are given in Table 2.



Photographs 1-4. Büyük Deniz Lake with inf owing and outf owing streams in spring and summer periods.

Table 2. Ecological characteristics of the collecting site according to System A and System B of EU Water Framework Directive.

Collecting Site	Altitude (System A)	Altitude (System B)	Catchment Area (System A)	Latitude (System B)	Longitude (System B)	Geology (System A and System B)
		2950m	High (>800m)	Large (1000-10000km ²)	40° 51' 58.45'' N	41° 09' 42.75'' E
Collecting Site	Substratum	Riparian Vegetation	Stream zone	Stream width in dry period	Stream width in wet period	
	%30 Stone %60 Gravel %10 Sand	10%	Hypocrenon	30cm	50cm	

Comparison. Sartori (1986) was reported that all *Habroleptoides* imagos constituted seven species groups according to wing venation and characteristics of gonopods and styli plates. *Habroleptoides kavron* sp. n. belongs to *carpatica*-group (Sartori 1986) characterized with more than three transverse costal veins in hind wing (five transverse costal veins in new species). *Habroleptoides kavron* sp. n. is closely related to *H.confusa* Sartori & Jacob 1986 in *carpatica*-group in structure of first segment of gonopods and in styli plate. *Habroleptoides kavron* can be distinguished from *H.confusa* by the following: The costal projection of hind wings are much more pointed and longer, costal area has 5 transverse veins (3 transverse veins in *H.confusa*), penial lobes are much more narrow, incurved penial hooks longer and separated, prominent process of first segment of gonopod is larger and its apex rounded in new species but pointed in *H. confusa*.

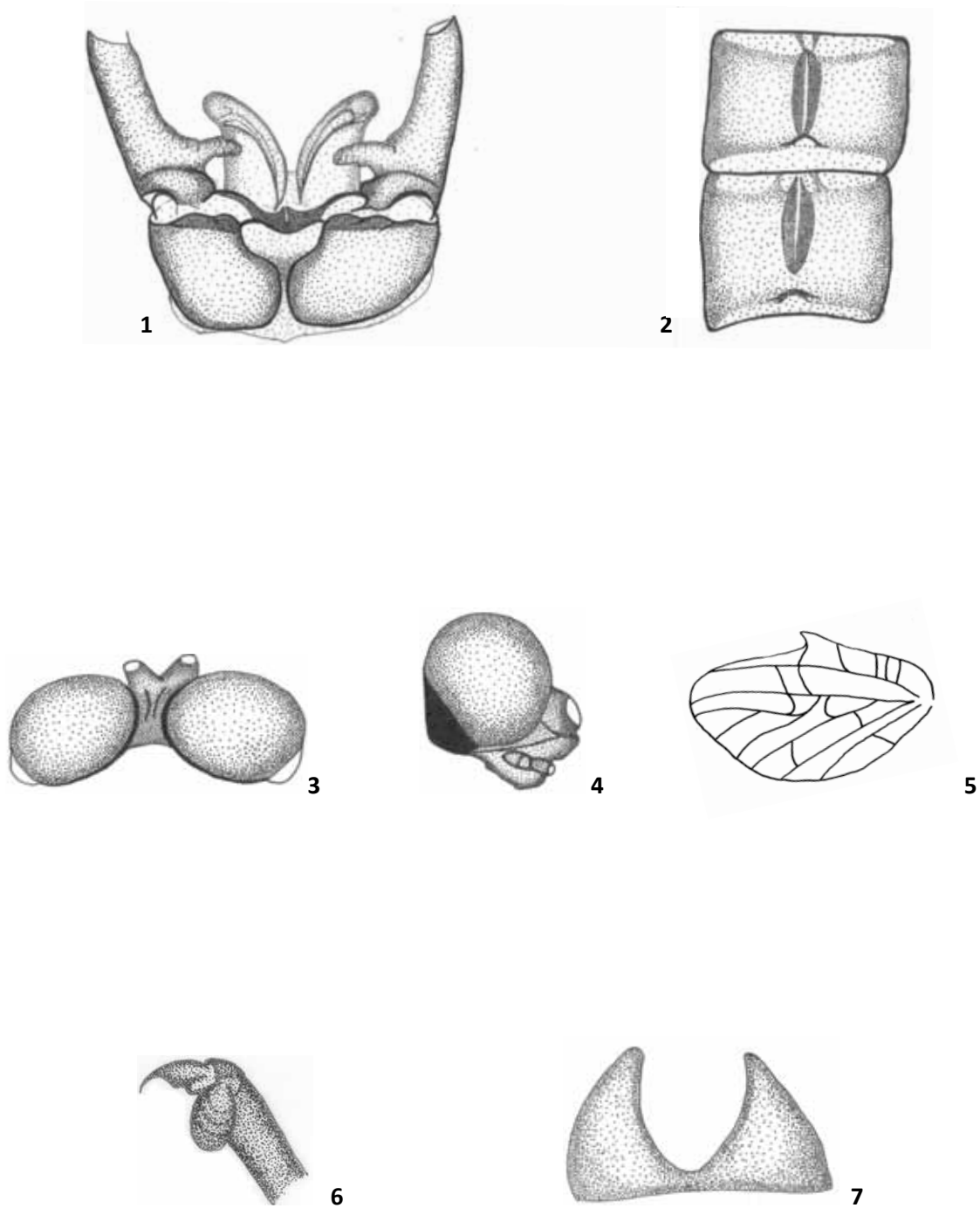
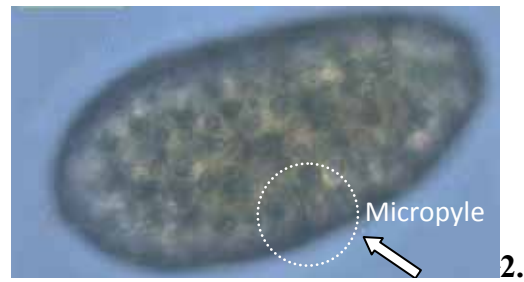


Figure 1-7. *Habroleptoides kavron* sp. n. imago. 1-6, male imago: 1, genitalia (100X). 2, abdominal tergum III-IV (32X). 3-4, head (32X) (dorsal and ventral view). 5, hind wing (20X). 6, claw of fore leg (80X). 7, genitale plate of female imago (45X).





Photographs 1-8. *Habroleptoides kavron* sp. n. imago. **1-2**, egg. **3-7**, male imago: **3**, genitalia. **4**, abdominal tergum III-IV. **5-6**, head (ventral and dorsal view). **7**, claw of fore leg. **8**, genital plate of female imago.

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