

New data on the Helophoridae Latreille, 1802 species from Tunisia (Coleoptera)

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Summary.— In this present work a list of the *Helophorus* species known in Tunisia is presented with their distribution in Tunisia and the rest of the world. Three species; *Helophorus milleri* Kuwert, 1886, *Helophorus paraminutus* Angus, 1986 and *Helophorus cincticollis* Guillebeau, 1893 are recorded in Tunisia for the first time, and reviewed according to our specimens.

Résumé.— Dans cet article nous présentons une liste des espèces d'*Helophorus* connues en Tunisie, avec leur aire de distribution dans ce pays et dans le reste du monde. Trois espèces: *Helophorus milleri* Kuwert, 1886, *Helophorus paraminutus* Angus, 1986 et *Helophorus cincticollis* Guillebeau, 1893 sont citées de Tunisie pour la première fois et révisées en se référant à nos spécimens.

Key words.— Coleoptera, Helophoridae, taxonomy, biogeography, Tunisia.

Introduction

The Helophorinae are among the most easily distinctive of all the aquatic beetles. The adults are clearly recognizable by the pattern of grooves and intervals sculpting the upper surface of pronotum, except for *Helophorus rufipes* where this pattern is modified. The Helophorinae subfamily comprises a single genus *Helophorus* Fabricius, 1775 with 180 species of which about 150 occur in the palearctic area, 41 are known from the Nearctic and 10 have an holarctic distribution (ANGUS, 1992).

Adults of most species are considered truly aquatic, several species are usually encountered slightly above the water line and therefore seem to be facultatively aquatic or riparian; only few species are strictly terrestrial, larvae are riparian or strictly terrestrial. This family is well explored; new discoveries are not common, but molecular studies might yield new siblings (JÄCH & BALKE, 2008).

Material and Methods

The study area covers the most important streams located in the north of Tunisia (Fig. 1 and Tab. 1); the samples were collected by means of a sieve and net having a diameter of 0.3 mm pore from shallow areas of the various running water, springs and streams over the course of a year (from May 2005 to April 2006). The beetles were killed within 70% alcohol solution then aedeagus were dissected out under the stereo microscope and were left to be exposed in 10% KOH solution. The figures of aedeagophore were drawn using a *Leica* type microscope. The examination of 303 specimens allowed the identification of six species including two new recorded species.

Systematics

Body shape rather elongate, pronoto-elytral contour interrupted. Head and pronotum having a distinct pattern of impressed furrows (HANSEN, 1987). The upper surface of head bears a distinct Y-shaped groove; its base may be either narrow, parallel sided or wide and usually expanded anteriorly (ANGUS, 1992). Antennae 8 or 9 segmented, maxillary palpi are approximately as long as antennae and their terminal segment are longer than the penultimate. Pronotum may be almost flat but it is generally weakly arched transversely (HANSEN, 1987). Abdomen with 5 visible sternites, legs are generally rather slender and tarsi five segmented. Dorsal side of meso- and metatarsi has fine, sometimes even rather long swimming hairs or small stiff setae. Each elytron bears ten punctuate striae or at least ten longitudinal rows of serial punctures separated by intervals (ANGUS, 1992).

Genus *Helophorus* Fabricius, 1775

Subgenus *Helophorus* Fabricius, 1775

Helophorus (Helophorus) milleri Kuwert, 1886

Diagnosis. The species belongs to the *maritimus* complex, probably to the *var. milleri* Kuwert, 1886 according to Dr. Angus, chromosome data are consequently needed. Body 6.1 mm in length. Head varied of black and brown with bronze reflects, densely, finely et uniformly punctuated, Y-depression well marked showing straight angle, maxillary palpi testaceous, apical segment asymmetrical oval and apically darken, antennae testaceous, eyes well developed. Pronotum brown-bronze dark, twice large as long, sides arched and serrated, suprapleural area narrow throughout, median groove narrow and intervals large, granulation reduced at the external intervals. Elytra yellow, slightly brownish, doubly punctuated with great points deep and organized into striae and fine points bronze and irregular decorating interstriae. Seventh abdominal sternite with large, square and distinct teeth at the apical margin. Ventral side black, slightly brownish, densely covered by fine hairs. Elytral flanks visible from below and less wide than epipleurs. Legs testaceous with tarsi slightly darken and fringed by long stiff hairs.

Aedeagus (Fig. 2 a) robust, parameres with external margins sub-linear, exceeding the tube which is apically sharp. Struts short and basally arched.

Material examined: Chiâbet el Magroun, 31-V-2005, 1 ♂; Mrij, 31-V-2005, 3 ♀♀; Ksar el Mezouar, 13-XI-2005, 2 ♀♀, 10-XII-2005, 2 ♂♂ + 2 ♀♀; Joumine aval, 10-XII-2005, 1 ♀, 28-IV-2006, 1 ♀; Kloufi, 28-IV-2006, 1 ♀; Zaout el Magaiez, 27-IV-2006, 1 ♂; Lebna, 27-IV-2006, 1 ♀; Chiba amont, 27-IV-2006, 1 ♂ + 3 ♀♀.

Distribution. Typical species of the Mediterranean area. *H. milleri* ranges from Crete, through Corfu and Italy (Rome) to Corsica and Sardinia. The Spanish material has been identified as *H. milleri* is *H. maritimus* Rey, and *H. occidentalis* Angus. Moroccan is *H. occidentalis* (Angus, 1992). NORMAND (1933) recorded the sub-species *H. maritimus maritimus* Rey, 1885 in some Tunisian localities: Aïn Draham, Fernana, Kairouan, Teboursouk and Tunis. Tunisian material may be *H. milleri*, but chromosomal data (from living material) are needed. *H. brevipilis* Guillebeau, from, Al Kantara (near Biskra, Algeria) may be the same – again, chromosomal data are needed.

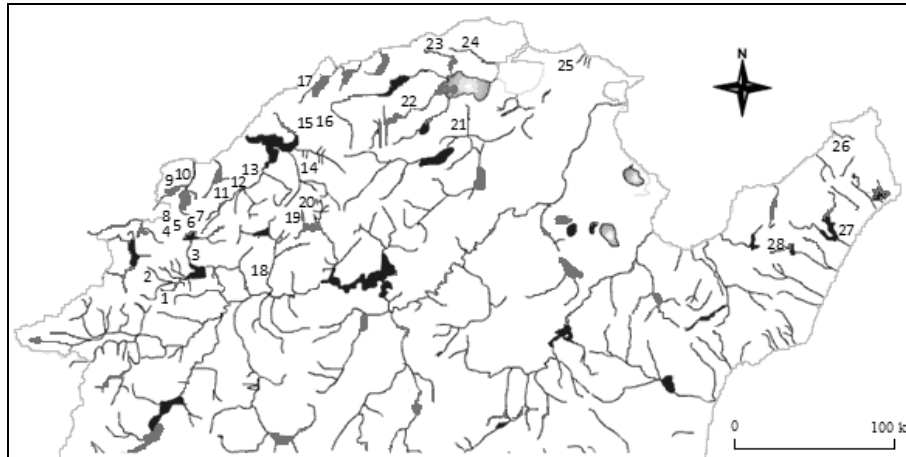


Fig. 1.– Map of the study area showing the different prospected sites: 1.– Ghrib; 2.– Chiâbet el Magroun; 3.– Ellil aval; 4.– Edmen; 5.– Mrij; 6.– Lebgaâ; 7.– Bransia; 8.– Ennour; 9.– Amor amont; 10.– Amor aval; 11.– Bouterfes; 12.– Titria amont; 13.– Titria aval; 14.– Maâden; 15.– Tamra; 16.– Magsbaya; 17.– Ziatine; 18.– Kasseb; 19.– Béja; 20.– Ksar el Mezouar; 21.– Joumine aval; 22.– Maleh; 23.– Kloufi; 24.– Douimis; 25.– Henna; 26.– Zaout el Magaiez; 27.– Lebna; 28.– Chiba amont.

Subgenus *Rhopalhelophorus* Kuwert, 1886

Helophorus (Rhopalhelophorus) algericus Motschulsky, 1860

Material examined: Ghrib, 30-IV-2006, 1 ♂ + 3 ♀♀; Edmen, 25-V-2005 1 ♂; Ennour, 30-IV-2006, 2 ♀♀; Mrij, 25-V-2005, 2 ♂♂, 30-IX-2005, 1 ♂; Lebgaâ, 25-V-2005, 5 ♂♂ + 4 ♀♀, 28-VI-2005, 1 ♂ + 1 ♀, 31-VIII-2005, 1 ♂, 30-X-2005, 1 ♀, 30-IV-2006, 1 ♂; Bransia, 24-V-2005, 18 ♂♂ + 23 ♀♀, 31-VIII-2005, 2 ♂♂ + 16 ♀♀, 30-IX-2005, 1 ♀, 30-X-2005, 5 ♂♂ + 4 ♀♀, 30-XI-2005, 4 ♂♂ + 3 ♀♀, 31-III-2006, 1 ♂, 30-IV-2006, 5 ♀♀; Amor amont, 30-IV-2006, 1 ♀; Amor aval, 30-IV-2006, 19 ♂♂ + 16 ♀♀; Bouterfes, 30-IV-2006, 2 ♂♂ + 1 ♀; Titria amont, 24-V-2005, 1 ♂; Titria aval, 30-IV-2006, 2 ♂♂ + 3 ♀♀; Tamra, 24-V-2005, 3 ♂♂; Maâden, 30-

IV-2006, 4 ♂♂ + 4 ♀♀; Magsbaya, 24-V-2005, 1 ♀, 30-IV-2006, 1 ♂; Maleh, 20-V-2005, 1 ♀; Douimis, 13-XI-2005, 2 ♂♂, 28-IV-2006, 1 ♂.

Distribution. Species recorded in the North Africa (LÖBL & SMETANA, 2004). In Tunisia, it was recorded by NORMAND (1933) in some localities; Kairouan and Kebili.

***Helophorus (Rhopalhelophorus) asturiensis* Kuwert, 1885**

Material examined: Ghrib, 16-II-2006, 1 ♂, 30-IV-2006, 1 ♀; Lebgaâ, 25-V-2005, 1 ♀, 31-VIII-2005, 5 ♂♂ + 6 ♀♀; Amor amont, 30-IV-2006, 1 ♀; Ziatine, 30-IV-2006, 2 ♀♀; Kasseb, 30-IV-2006, 1 ♂; Béja, 16-II-2006, 1 ♂, 27-III-2006, 3 ♀♀, 28-IV-2006, 1 ♀; Ksar el Mezouar, 27-III-2006, 1 ♀; Joumine aval, 27-III-2006, 2 ♀, 28-IV-2006, 2 ♂♂; Kloufi, 27-III-2006, 2 ♂♂ + 2 ♀♀; 28-IV-2006, 1 ♀; Douimis, 28-IV-2006, 1 ♂; Henna, 29-IV-2006, 1 ♀; Zaouit el Magaiez, 31-XII-2005, 1 ♂; Lebna, 28-IX-2005, 1 ♀, 27-IV-2006, 2 ♀♀; Chiba amont, 19-I-2006, 2 ♀♀, 26-III-2006, 3 ♀♀.

Distribution. The distribution area of the species includes the north of Africa, from Morocco to Tunisia, Spain, Portugal and France where it ranges from the Mediterranean to north-west, also occurs in Sicily, but apparently not in mainland Italy (ANGUS, 1992).

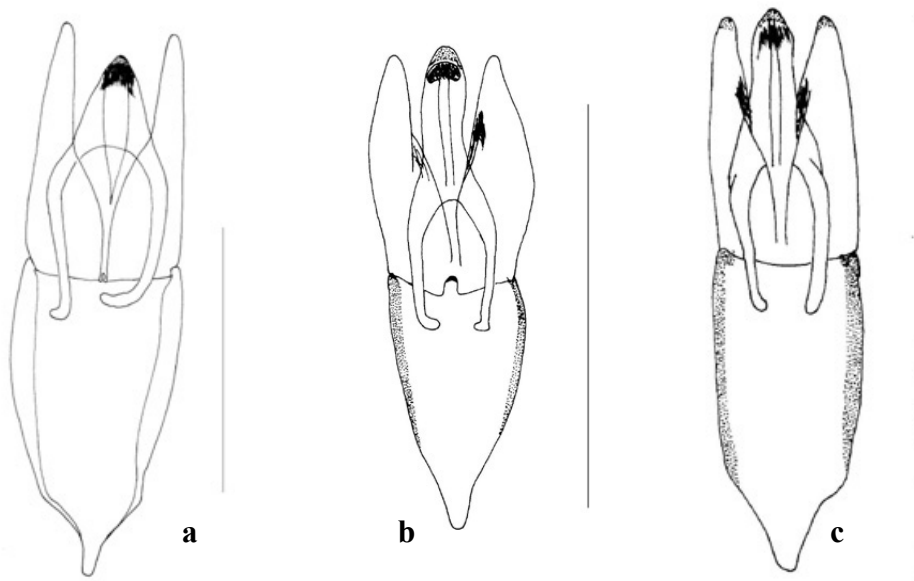


Fig. 2.—Aedeagus: a.—*Helophorus maritimus*; b.—*Helophorus cincticollis*; c.—*Helophorus paraminutus*. Scale: 0.5 mm.

***Helophorus (Rhopalhelophorus) cincticollis* Guillebeau, 1893**

Diagnosis. New recorded species in Tunisia. Body 3.2 mm in length. Head black, slightly brownish, finely and densely punctuated, Y-groove distinct, maxillary palpi testaceous with last segment asymmetrical oval and apically brownish, and antennae testaceous with darken pubescent club. Pronotum almost twice as large as long, varied of yellow and reddish, usually orange, shining

and basally arched, sides slightly rounded, intervals wider than grooves, granulation of the internal and median intervals reduced, suprapleural area regularly narrow without reaching the hind pronotal border. Elytra yellowish, usually slightly with black blots, moderately striated, without intercalary striae, interstriae smooth and almost as wide as striae, flanks visible from below and half as wide as epipleurs, legs testaceous with metatarsi covered by stiff hairs. Aedeagus (fig. 2 b) robust, parameres large and with curved margins, tube few widen, slightly exceeding parameres. Struts short and weakly convergent and basal piece gradually narrow posteriorly.

	Sites	Coordinates	A (m)	H. mi	H. alg	H. as	H. ci	H. pa	H. alt
1	Ghrib	36°36'57.42''N08°41'6.94''E	255		*	*			*
2	Ch. Magroun	36°39'0.96''N08°40'48.72''E	239	*					
3	Ellil aval	36°41'24.38''N08°44'21.96''E	237					*	
4	Edmen	36°43'24.58''N08°41'28.58''E	631		*				
5	Mrij	36°45'6.05''N08°41'26.98''E	577	*	*				
6	Lebgaâ	36°44'58.27''N08°41'49.20''E	563		*	*			
7	Bransia	36°46'51.78''N08°45'6.31''E	588		*		*		
8	Ennour	36°48'2.53''N08°39'31.33''E	418		*				
9	Amor amont	36°55'18.38''N08°44'25.87''E	12		*	*			
10	Amor aval	36°55'42.41''N08°45'20.79''E	3		*		*	*	*
11	Bouterfes	36°57'12.05''N08°54'45.52''E	100		*				
12	Titria amont	36°57'25.88''N08°56'8.01''E	125		*				
13	Titria aval	36°57'50.08''N08°58'11.53''E	68		*				
14	Maâden	36°58'12.22''N09°5'6.11''E	32		*				
15	Tamra	37°2'36.42''N09°6'24.51''E	54		*				
16	Magsbaya	37°3'25.28''N09°13'48.61''E	136		*				
17	Ziatine	37°11'53.11''N09°13'31.81''E	7			*		*	*
18	Kesseb	36°36'36.37''N09°1'14.34''E	122			*			*
19	Béja	36°45'39.00''N09°11'39.82''E	176			*			*
20	K. Mezouar	36°46'58.34''N09°20'11.98''E	236	*		*			
21	Joumine aval	37°1'48.30''N09°39'47.84''E	16	*		*	*		
22	Melah	37°6'22.66''N09°32'24.93''E	16		*				
23	Kloufi	37°11'46.37''N09°35'7.36''E	2	*		*			*
24	Douimis	37°12'3.51''N09°37'26.59''E	6		*	*		*	*
25	Henna	37°9'13.23''N10°3'39.75''E	45			*			*
26	Z. Megaiez	36°56'39.76''N10°53'15.33''E	16	*		*	*		*
27	Lebna	36°56'39.76''N10°53'15.33''E	7	*		*			
28	Chiba amont	36°43'11.76''N10°44'4.79''E	94	*		*	*		

Table 1.– Different sites of the studied area with their coordinates and altitudes; H.mi: *Helophorus milleri*; H.ci: *Helophorus cincticollis*; H.alg: *Helophorus algiricus*; H.as: *Helophorus asturiensis*; H.pa: *Helophorus paraminutus*; H.alt: *Helophorus alternans*.

Material examined: Bransia, 31-III-2006, 1 ♂; Amor aval, 30-IV-2006, 1 ♂; Joumine aval, 26-IX-2005, 1 ♂, 13-XI-2005, 1 ♂; Zaouit el Magaiez, 27-XI-2005, 1 ♂; Chiba amont, 26-III-2006, 2 ♂♂.

Distribution. The species is apparently very widespread in Morocco and Algeria, its European distribution is based on material captured near Malaga in the south of Spain by Balfour-Browne in 1931 (ANGUS, 1992).

Species	Altitudes (m)	FC%	Habitat	Occurrence period (months)
<i>H. cincticollis</i>	3 - 588	9.80	2	I, II, IX, XI
<i>H. algericus</i>	3 - 631	31.37	2	IV, V, VI, VIII, IX, X, XI
<i>H. paraminutus</i>	3 - 237	7.84	2	IV, V, VI, VIII
<i>H. asturiensis</i>	2 - 563	27.45	2	I, II, III, IV, V, IX, XII
<i>H. milleri</i>	2 - 577	15.68	1	IV, V, VIII, XI, XII
<i>H. alternans</i>	2 - 255	17.64	2	II, III, IV, X

Table 2.— Some ecological data of the different *Helophorus* species.

***Helophorus (Rhopalhelophorus) paraminutus* Angus, 1986**

Diagnosis. Species belonging to the *minutus* group, probably *H. paraminutus*, not known from the North Africa, chromosome information are consequently required. Body 2.3 mm in length, morphology very similar to its congener *H. minutus*. Head black-brown with bronze reflects, punctuation dense and fine, Y-depression distinct and punctuated, maxillary palpi testaceous with the last segment asymmetrical oval and elongated, antennae testaceous and nine-segmented. Pronotum brown blackish, finely and densely punctuated with bronze reflects, intervals wider than grooves, suprapleural area irregularly wide. Elytra yellow, slightly brownish, without intercalary striae, doubly punctuated, moderately striated with interstriae finely punctuated and more wide than striae, flanks slightly visible from below and narrower than epipleurae, legs testaceous, enough long and tarsal stiff hairs moderate.

Aedeagus (fig. 2 c); very similar to *minutus*'s one, but it is more large and more robust, the tube can exceed the parameres by invagination. Struts sub-linear and slightly convergent.

Material examined: Ellil aval, 28-VI-2005, 1 ♂; Amor aval, 30-VIII-2005, 1 ♀, 30-VI-2006, 5 ♂♂ + 4 ♀♀; Ziatine, 24-V-2005, 12 ♂♂ + 17 ♀♀, 29-IX-2005, 1 ♂, 30-IV-2006, 2 ♂♂ + 5 ♀♀; Douimis, 28-IV-2006, 1 ♂.

Distribution. Species described from Karasuk and Novosibirsk, on the west Siberian steppe, extended also in the west, south and Center European Russia to the black sea coast and the Neusiedler See district of Austria (ANGUS, 1992). According to Dr. Angus (personal

communication), the *H. minutus* complex in North Africa needs chromosomal revision. Some specimens do resemble *H. paraminutus*, but others don't.

Subgenus *Trichohelophorus* Kuwert, 1886

Helophorus (Trichelophorus) alternans Gené, 1836

Material examined: Ghrib, 30-IV-2006, 1 ♂; Amor aval, 30-IV-2006, 1 ♂ + 1 ♀; Ziatine, 30-IV-2006, 1 ♂; Kasseb, 30-IV-2006, 1 ♂; Béja, 28-IV-2006, 1 ♂; Kloufi, 28-II-2006, 1 ♂, 27-III-2006, 1 ♂ + 1 ♀; Douimis, 28-IV-2006, 2 ♂♂ + 1 ♀; Henna, 25-II-2006, 1 ♀, 29-IV-2006, 1 ♀, 31-III-2006, 1 ♂; Zaouit el Magaiez, 23-IX-2005, 1 ♂.

Distribution. It's a Mediterranean species, known from Greece, Italy, Spain, Portugal, north of Morocco, Algeria, Tunisia and extending northwards France to southern England, Belgium, Holland and Germany (ANGUS, 1992). Species recorded in Tunisia by NORMAND (1933) under the synonym of *H. mauritanicus* Sharp in some localities; Fernana, Souk-el-Arba and Sousse.

Discussion

For the present, thirteen species of *Helophorus* are known in Tunisia. Of these, six were sampled from the study area. *H. paraminutus* Angus, 1986 and *H. cincticollis* Guillebeau, 1893 are collected in Tunisia for the first time. Furthermore, we have some doubts whether the specimens sample are *H. paraminutus* Angus, 1986 and *H. milleri* Kuwert, 1886 or not, because Angus could not decide whether these specimens refer to these species. We still believe that this record of identification needs classification by examining much more samples, especially in genetic point of view.

Most species of *Helophorus* occur in a wide range of aquatic habitats from sea level (kloufi at an altitude of about 2 m) to the zone high mountains (Edmen at an altitude of about 631 m). Less frequently, species occur in small, slow flowing streams such as our sampling sites. Most species seem to prefer standing shallow water with plenty of organic debris, such as edges of small to medium sized water bodies (MART & ERMAN, 2001).

Most species have widespread seasonal distribution as they are collected at the grassy edges of streams mainly in spring, but also in summer and autumn (tab. 2). They live in clean, moderately fast running streams. Some species (*H. algericus*, *H. asturiensis*, *H. alternans* and *H. milleri*) show a wide ability of dispersal over the study area, in contrast to the other less frequent species (*H. cincticollis* and *H. paraminutus*) considered as scarce.

Acknowledgements.— We are very thankful of Dr. Angus, professor at the "School of Biological Sciences Royal Holloway, University of London Egham, Surrey, TW20 OEX, United Kingdom" who accepted the revision of our *Helophorus* species.

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