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GENUS *SCHISTOSTOMA* BECKER, 1902 (DIPTERA: MICROPHORIDAE) OF TUNISIA. FAUNISTIC, MORPHOLOGICAL AND TERATOLOGICAL DATA [Results of „Punia" 2006 expedition]

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Abstract. The results of the identification of a material of the genus *Schistostoma* Becker colected by the „Punia" 2006 expedition, in March, in Tunisia, is presented. The number of the known species from Tunisia rises from 1 to 4. New faunistic, morphological, teratological and systematical data are presented together with detailed figures and a pictorial key for the identification of the females of 7 species after the apical acanthophorites.

Résumé. On présente le résultat de l'identification d'un matériel du genre *Schistostoma* Becker collecté par l'expédition „Punia" 2006 au mois de mars en Tunisie. Le nombre d'espèces connues en Tunisie monte de 1 à 4. On offre aussi de nouvelles données fauniques, morphologiques, tératologiques et systématiques accompagnées d'une illustration détaillée et d'une clé pictoriale pour l'identification des femmelles de 7 espèces sur la base des acanthophorites apicales.

Key words: Tunisia, „Punia" expedition, Diptera, Microphoridae, *Schistostoma*, 4 species, morphology, teratology, distribution.

INTRODUCTION

Microphoridae family was divided by Chvála (1983) and it is closely related with Dolichopodidae family, forming together a monophyletic subgroup. The adults are black or grey small dipterans, of 1.5-3 mm long.

The family includes 40 species, out of which 17 are Palaearctic. Genus *Schistostoma* has nine Palaearctic species spread in southern areas (Chvála, 1989).

The species of *Schistostoma* occur in sandy biotopes, on the beaches and deserts.

A team, consisting in three scientists from "Grigore Antipa" National Museum of Natural History (Bucharest): Dr. Dumitru Murariu, the author and Dr. Gabriel Chișamera, and several members of the „Oceanic-Club" Socienty of Oceanographical Exploration and the Protection of the Marine Environment (SEOPMM), an NGO of Constanța, led by the biologist Răzvan Popescu–Mirceni made an expedition in Tunisia, in March 2006. Among others, a lot of specimens of the genus *Schistostoma* were collected, identifying 4 species. That time only *S. nigrescens* Becker, described from Sfax in 1907, was reported from Tunisia.

Both the distribution and literature which is used in the species identification of the genus are incomplete. In the systematical treaty of the Palaearctic Empididae (Engel, 1940) only two species are included, and after Chvála's revision on the Palaearctic species of this genus (1987) the data and illustration for the species described before 1950 are insufficient, mainly because we observed a variability of the colour and some anomalies which can lead to identification errors. In this paper

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we complete the illustration of the external morphology, present the anomalies and the detailed drawings of the genitalia in both sexes, describe the unknown female of *S. cucullatum* Collin and we present a plate with the female acanthophorites which make easier the identification of eight species.

MATERIAL AND METHOD

Using the entomological net and some Barber traps, 75 specimens were collected in sandy areas, either on the beaches or inside, sometimes from salty grounds – usually, in these biotopes there are short bloomed plants (Fig. 1). The material was preserved partially dried and another part put in 70% alcohol. Dissections by melting in KOH 10 % were made in all species, and then drawings, using the microscope.

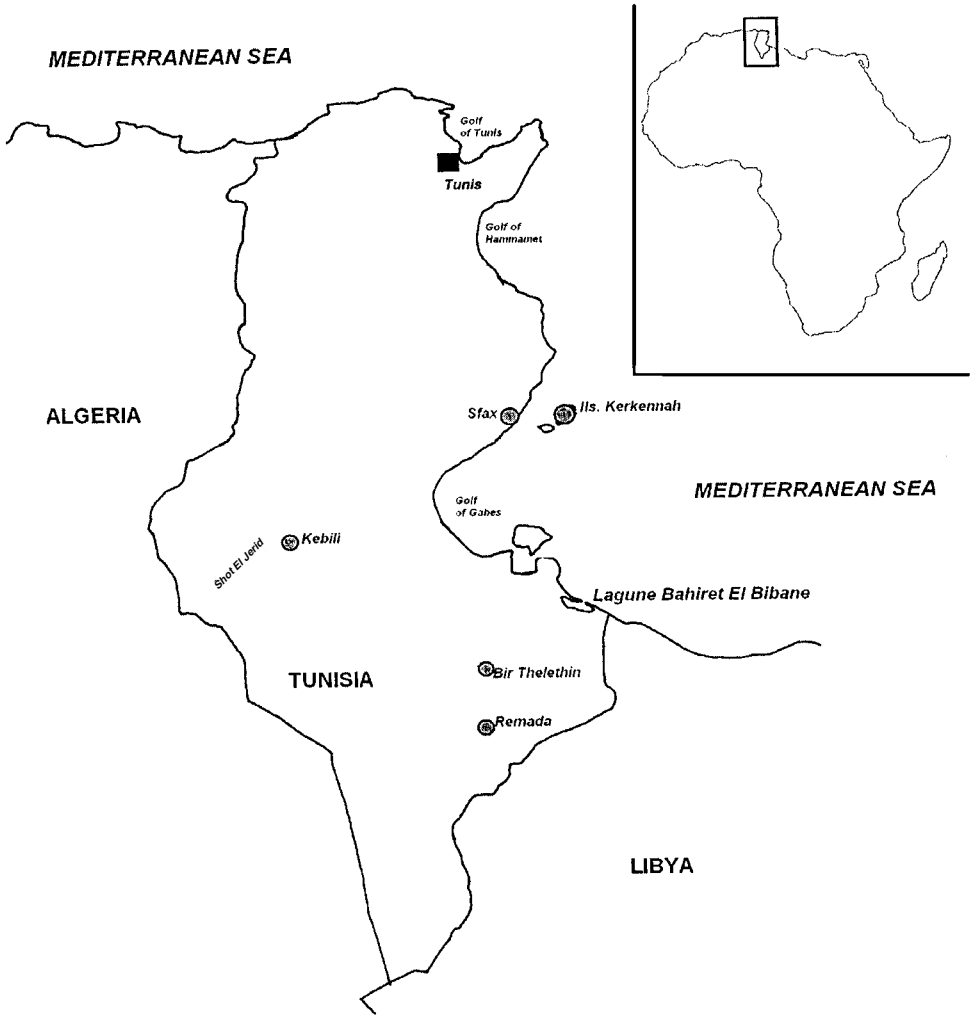

Fig. 1 – The map of Tunisia with collecting sites.

RESULTS

The list of the species with the collecting data and their distribution.

Schistostoma discretum Collin, 1949: 10 ♂♂, Remada, 10.III.2006, leg. C. Pârvu, R. Popescu-Mirceni, 12 ♂♂, 4 ♀♀, Bir Thelethin, 10-12.III.2006, 10 Barber traps, leg. C. Pârvu (salty swamps with specific vegetation, 1 ♀ with anomalies), 2 ♂♂ Kebili, 14.III.2006, leg. C. Pârvu (date tree plantation), 10 ♂♂, Kerkenah Islands, 20.III.2006, leg. R. Popescu-Mirceni.

Distribution: Egypt, Canare Islands. *New report for Tunisia.*

S. cucullatum Collin, 1949: 10 ♂♂, 5 ♀♀ and 11 ♂♂, 6 ♀♀ on Kerkenah Islands, on 21.III., leg. C. Pârvu, R. Popescu-Mirceni.

Distribution: Egypt. *New report for Tunisia*.

S. grootaerti Chvála, 1987: 1 ♀, Bir Thelethin, 12.III., 10 Barber traps, leg. C. Pârvu, 1 ♀, Bir Ali, 19.III., leg. G. Chişamera. Anomaly in ♀ genitalia.

Distribution: Iran, Turkmenia, the Caucasus. *New report for Tunisia and for Africa*.

S. nigrescens Becker, 1907: 1 ♂, 2 ♀♀, Kerkenah Islands, 20.III., leg. C.Pârvu, R. Popescu-Mirceni. Colour variability in a female tarsi.

Distribution: Tunisia (Sfax), Egypt.

DISCUSSIONS

Schistostoma discretum Collin, 1949

Morphological data. In literature, only the male antenna is illustrated but very summary; we present drawing of the antenna in both sexes from which it results that *discretum* has the longest hairs on the article 3 and the „spines" from the article 2 are the strongest in comparison with the other 3 species (Fig. 2 A, B). After dissecting the male genitalia we present its dorsal view (Fig. 2 E) besides the lateral one (Fig. 2 C), and especially the 2 gonocoxites (Fig. 2 D, F).

Teratological data. Some male specimens had a gonocoxite with anomaly: one of the appendices was curved and folded from apex to the base; these elements could lead to an undescribed species because the genitalia seemed to have an additional structure in lateral view (Fig. 2 F). We ourselves occurred anomalies in an enpidid of the genus *Hilara* from Romania (Pârvu, 2006).

We observed another anomaly, more complex, in a female of *discretum* which had all legs depigmented; they were yellowish instead of black, and instead of the thorax it had a deep ditch from pronotum to scutellum. This phenomenon of a division along the median line of an uneven organ was named „bipartition" by Balazuc (1947). He illustrated it in coleopterans either for the head (schistocephaly) or for the thorax (schistothoracy), as in the case of ♀ of *S. discretum* (mesonotoschisis). In the beginning we thought it was about an unknown species because in literature there were not drawings of the abdominal apex of the female of this species; dissecting normal females and the teratological one we made their drawings and we realized the the specimen with anomalies belonged to the same species, *discretum* (Fig. 3).

Variability. On mesonotum there are black and yellow hairs, palpi having a variability in length.

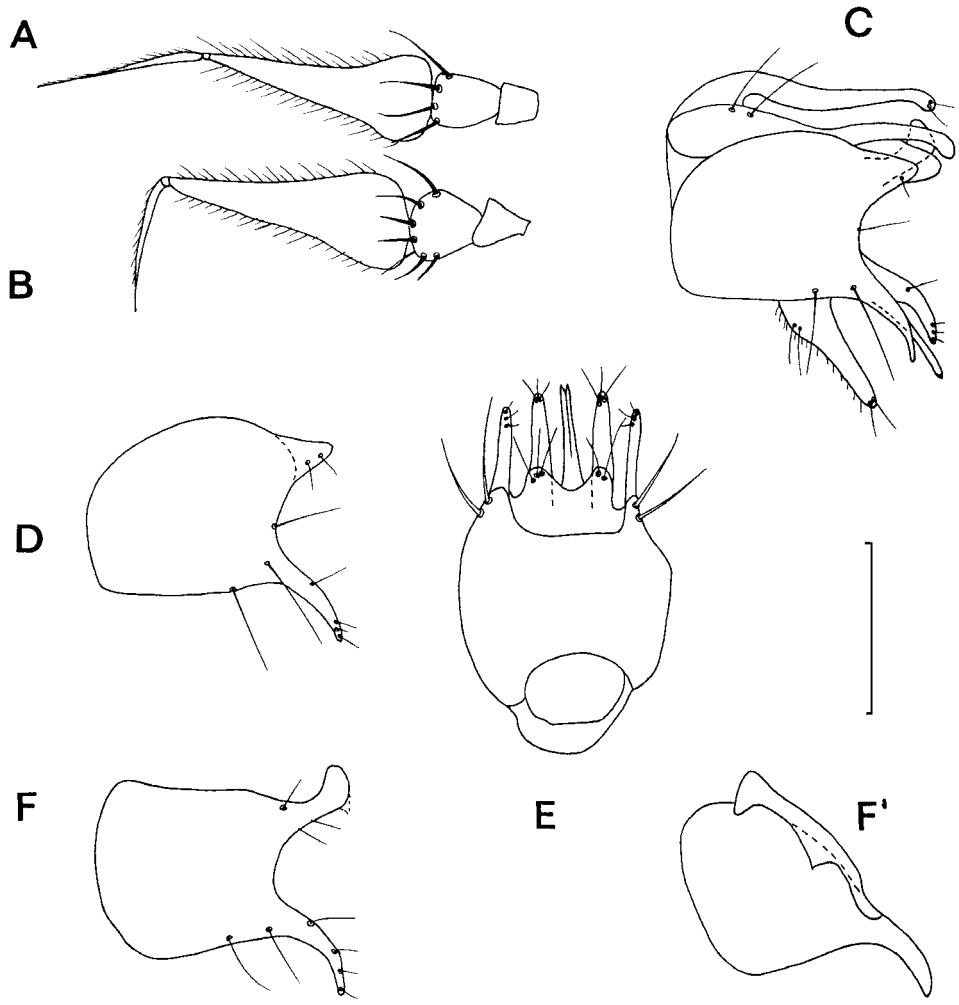

Fig. 2 – *Schistostoma discretum*. A - antenna of ♂; B – antenna of ♀; C – genital capsule (♂) in lateral view; D – left gonocoxite; E – genital capsule in dorsal view; F – right gonocoxite; F' – teratologic right gonocoxite. Scale (in mm): 0.2.

Schistostoma cucullatum Collin, 1949

Data on the male morphology.

The drawing of the antenna, took over by Chvála (1987) is summary. For instance, the difference between the length of the pilosity which cover the antennary segment 3 in *S. cucullatum* and in *S. discretum* cannot be seen, although it is an element of differential diagnosis; that is why we figured the antenna in both sexes and the difference between the pilosity of the a3 in *S. discretum* and in *S. cucullatum* can be clearly seen in illustration (Fig. 4 A, B).

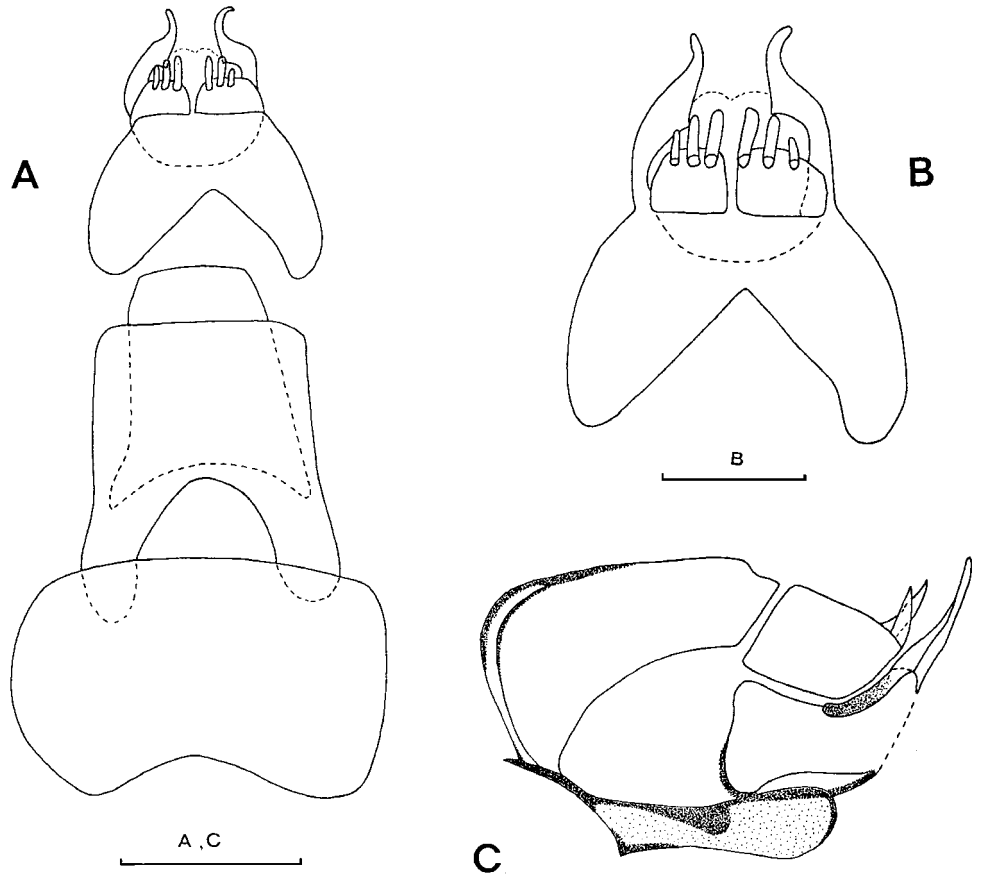

Fig. 3 – *Schistostoma discretum*, ♀. A – abdomen in dorsal view; B – female terminalia; C – apex abdominal in lateral view. Scales (in mm): A, C 0.2; B 0.1.

For the abdominal apex there is a single drawing made after a specimen whose genitalia was not detached. We detached the capsule, we drew it in lateral and dorsal view and we figured the two gonocoxites of the capsule (Fig. 4 C-F).

Data on the female morphology.

From the information we have at our disposal it results that the female was not found, as yet. The 11 females which we found resemble very much with the male in colour and size: 3 (2.9) mm. Antenna as in the figure (Fig. 4 B). Mesonotum has a grey background with a brownish area, rather large; in the antero-posterior 2 dark coloured stripes distinguish, which are absent in the posterior half. The abdomen has lateral whitish hairs almost as strong as in the male; the legs have a strong pilosity on the dorsal side of the femur I, on the dorsal and ventral side of the femur III and on the dorsal side of the tibia III. The weakest pilosity (and without long ventral

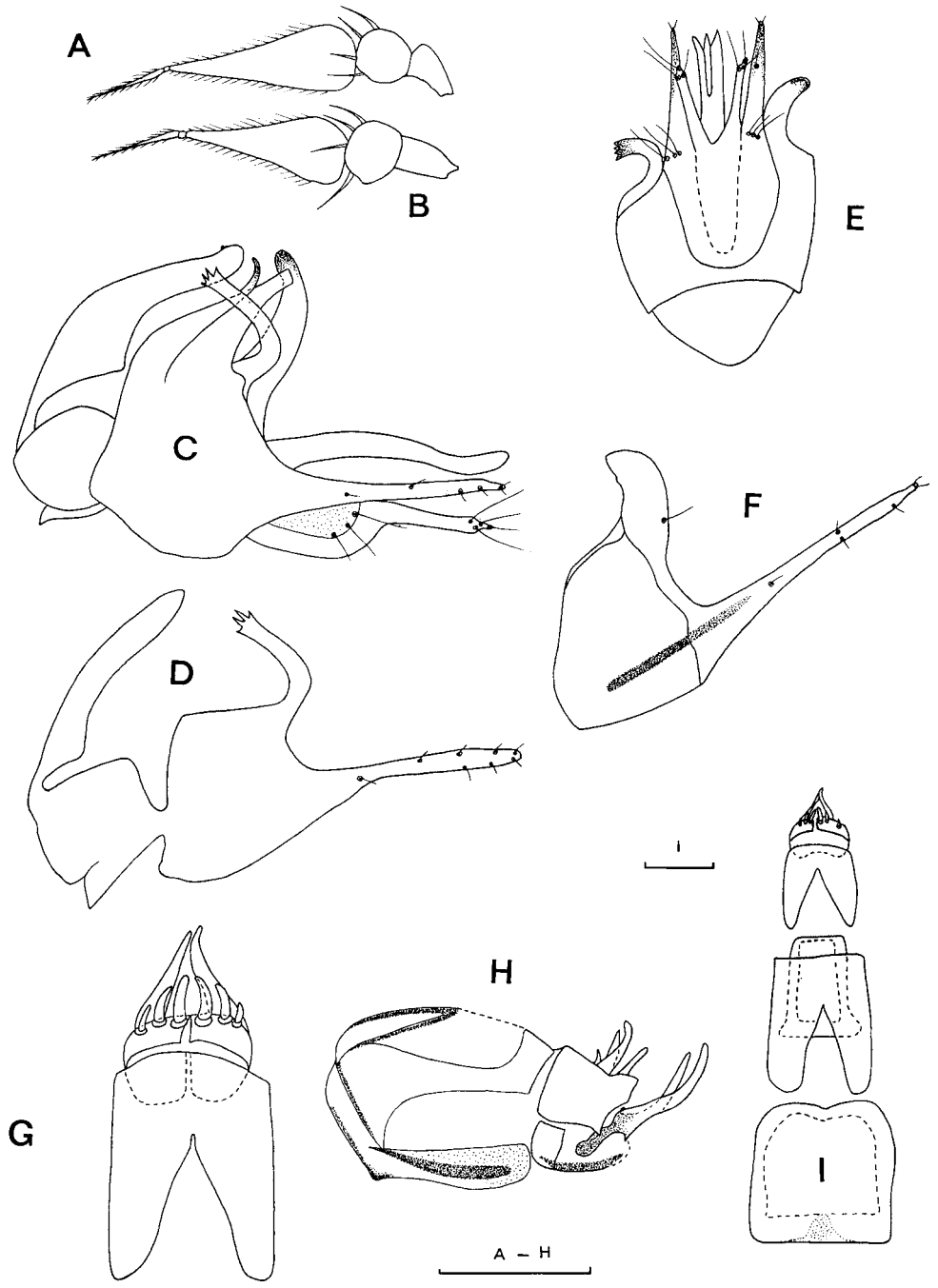

Fig. 4 – *Schistostoma cucullatum*. A – antenna of male; B – antenna of female; C – genital capsule (♂) in lateral view; D – right gonocoxite with prohipandrium; E - genital capsule (♂) in dorsal view; F – left gonocoxite; G – female terminalia in dorsal view; H – abdominal apex in lateral view; I – female abdomen in dorsal view. Scales (in mm): A – H 0.2; I 0.5.

hairs) occurs on the leg II. Also, we figured the abdominal apex and terminalia of an acanthophorid type (Fig. 4 G-I) of the female, for the first time in literature.

Schistostoma grootaerti Chvála, 1987

The two females can be included in the description given by the author of the species. We figured the antenna (Fig. 5 A), and terminalia in lateral view, for the normal specimen (Fig. 5 C). A specimen has an straight unilateral anomaly, on the tergite 9: instead of 3 acanthofores, it has 4 (Fig. 5 B).

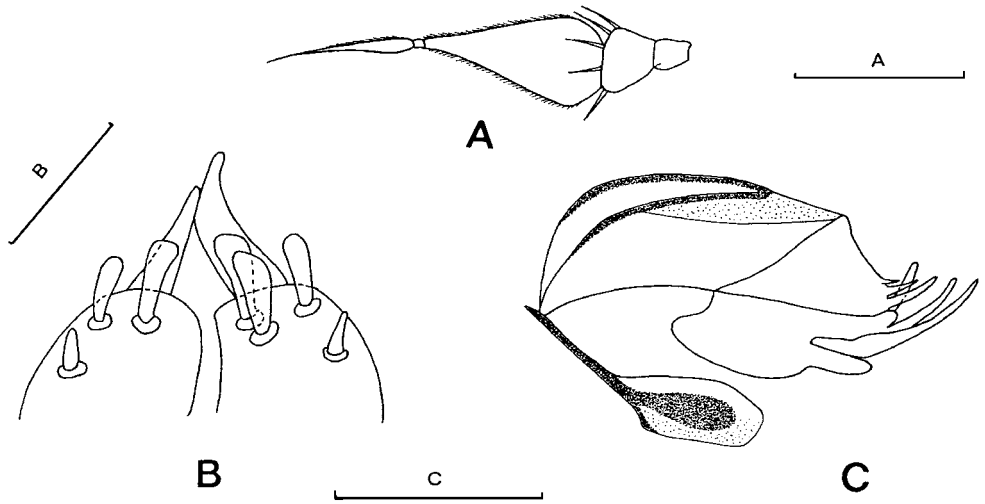

Fig. 5 – *Schistostoma grootaerti* ♀. A – antenna; B – 9, 10 tergites in dorsal view; C – abdominal apex in lateral view. Scales (in mm): A – C 0.2; B 0.1.

Schistostoma nigrescens Becker, 1907

Morphological data. In literature there is a single drawing of the male abdominal apex for this species, drawing which was took over by Chvála (1987) in his revision.

We figured the antennae in both sexes, genitalia in male, in lateral and dorsal view, and the abdominal apex and terminalia in ♀ (Fig. 6).

Variability data. A ♀ specimen, the one from the salty swamp of Bir Thelethin has the tarsi of the leg III reddish instead of black; dissecting both females we observed that they are conspecific; also we observed a different intensity of the pigmentation of the legs in *S. discretum.*

Remarks

Besides these data we made a plate with the apical acanthophorites (♀♀) for eight species, using the illustration of Chvála, 1987 and the drawings after the specimens dissected by us; because these paired organites has an obvious taxonomical value by shape and ratio between them we think that the plate will be very useful in the identification process (Fig. 7).

Conclusions

Genus *Schistostoma* Becker reported in Tunisia by a single species, *S. nigrescens*, described from Sfax, is known now by four species.

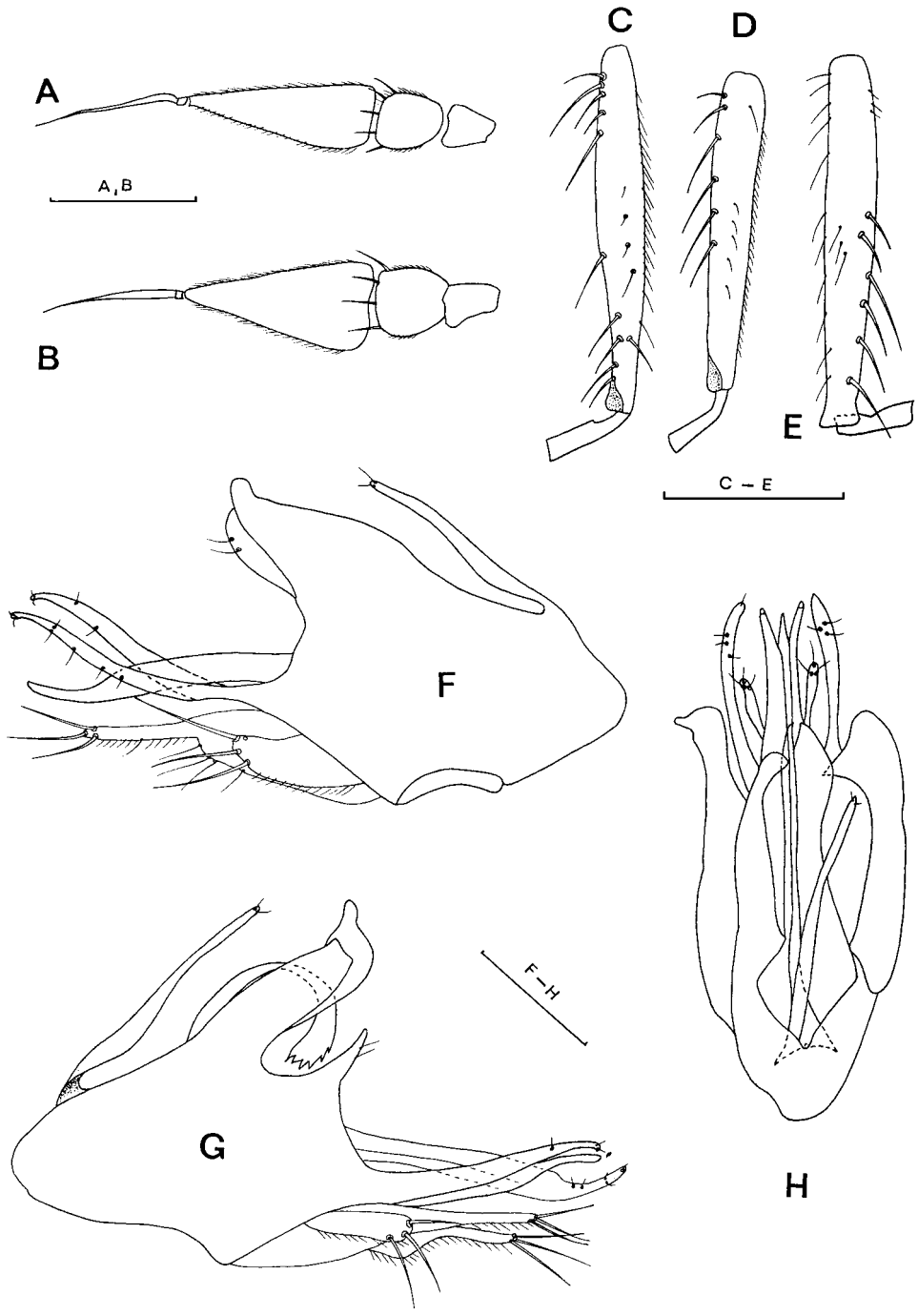

Fig. 6 – *Schistostoma nigrescens*. A – antenna of ♂; B – antenna of ♀; C – fore femur; D – mid femur; E – hind femur; F – genital capsule (♂), right side; G – genital capsule, left side; H – genital capsule in dorsal view. Scales (in mm): A, B, F – H 0.2; C, D, E 0.5.

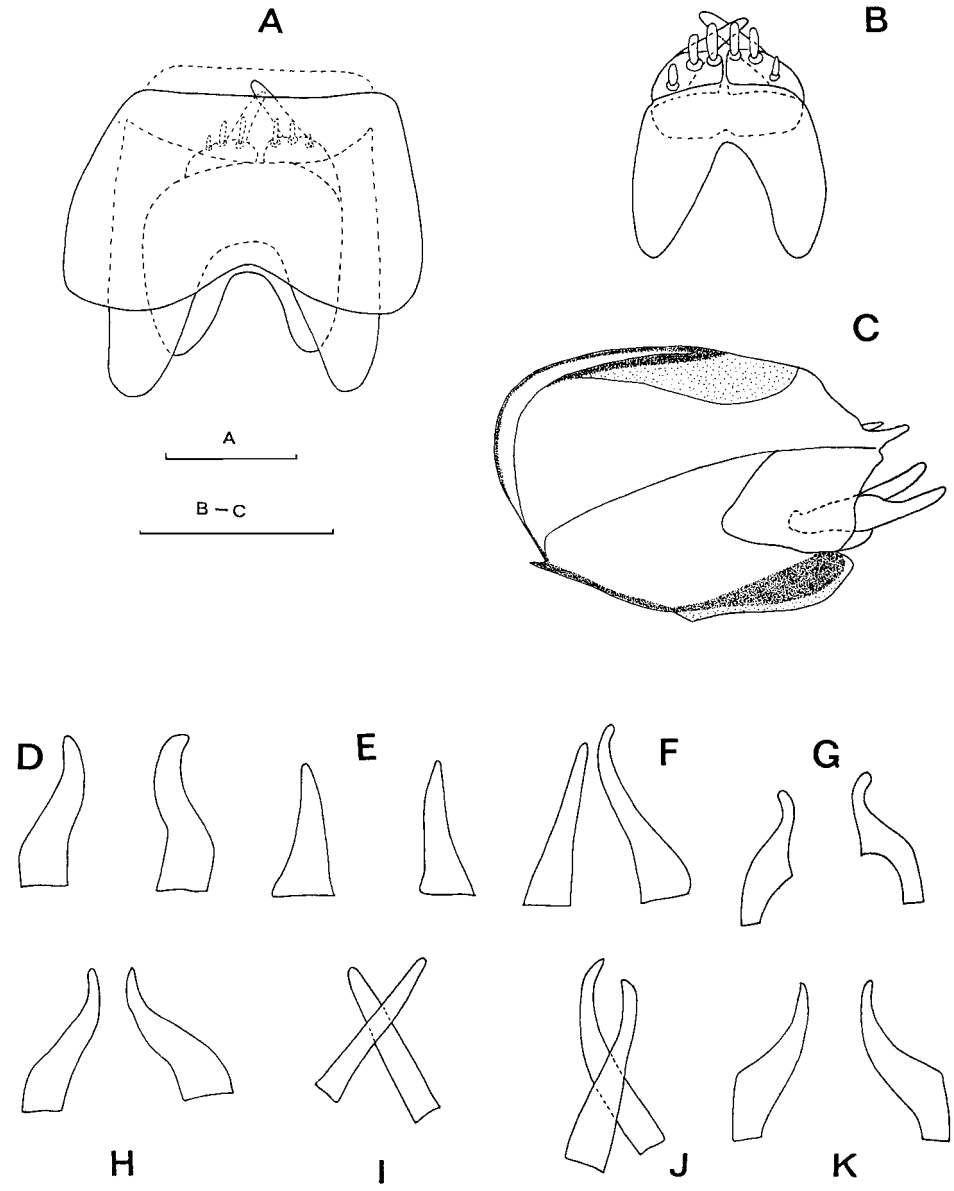

Fig. 7 – *Schistostoma nigrescens* ♀. A – abdominal apex (invaginated); B – female terminalia; C – abdominal apex in lateral view; D – *S. flavipes* Chvála (after Chvála 1987, modified); E – *S. eremita* Beck (after Chvála op. cit., modified); F – *S. cucullatum* Collin (original); G – *S. discretum* Collin (original); H – *S. nigrosetosum* Chvála (after Chvála op. cit., modified); I – *S. nigrescens* Beck (original); J – *S. grootaerti* Chvála (original); K – *S. thalhammeri* Chvála (after Chvála op. cit., modified). Scales (in mm): A 0.5; B, C 0.2.

New morphological, teratological and variability elements complete the possibility of a correct identification of these species.

Anomalies can explain by the hard environment factors: the great difference of temperature between day and night or the hyper-salty environment.

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GENUL *SCHISTOSTOMA* BECKER, 1902 (DIPTERA: MICROPHORIDAE) DIN TUNISA. DATE FAUNISTICE, MORFOLOGICE ŞI TERATOLOGICE [Rezultatele expediției „Punia" 2006]

REZUMAT

În luna martie 2006 o expediție comună în Tunisia a Muzeului Național de Istorie Naturală „Grigore Antipa" (București) cu ONG „Oceanic Club" din Constanța a adus și un material de diptere din familia Microphoridae din genul *Schistostoma* Becker (75 exemplare). Până în prezent în Tunisia se cunoştea o singură specie regăsită de noi, la care se adaugă încă 3 nesemnalate din această țară. Întrucât nu toate aceste specii beneficiau de literatură și ilustrație suficientă și de asemenea exemplarele au relevat o serie de anomalii, variabilitatea coloraţiei (ce au făcut și mai dificilă identificarea speciilor), noi am efectuat desene pentru masculi și femele și am alcătuit o planșă cu acantoforite ale femelelor utilă pentru determinarea a 8 specii. Aceste contribuții faunistice, morfologice, teratologice și sistematice vor facilita determinarea altor materiale și stabilirea unor noi conexiuni zoogeografice.

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