Genus	Vol. 16(2): 155-165	Wrocław, 30 VI 2005

Baetis chelif n. sp., a new mayfly from Algeria with notes on *B. sinespinosus* Soldán & Thomas, 1983, n. stat. (Ephemeroptera: Baetidae)

Tomáš Soldán[1], Roman J. Godunko[2] and Alain G. B. Thomas[3]

[1]Institute of Entomology, Academy of Sciences of the Czech Republic and Biological Faculty, University of South Bohemia, Branišovská 31, 37005 České Budějovice, Czech Republic; e-mail: soldan@entu.cas.cz

[2]State Museum of Natural History, National Academy of Sciences of Ukraine, Teatral'na 18, 79008 L'viv, Ukraine; e-mail: godunko@museum.lviv.net; godunko@seznam.cz

[3]Laboratoire d'Hydrobiologie, UMR CESAC, Univerisité Paul Sabatier, 188, route de Narbonne, 31062 Toulouse Cédex 4, France; e-mail: alain3d@cict.fr

Abstract. An illustrated description of male imago and larva of *Baetis chelif* n. sp. collected in Algeria (type locality Oued Chelif River) is given. This species belongs to the subgenus *Rhodobaetis* Jacob, 2003. Critical characters distinguishing it from closely related *B. baksan* Soldán, 1977, *B. ilex* Jacob & Zimmermann, 1978 and *B. ingridae* Thomas & Soldán, 1987 are discussed. Male imago of *B. sinespinosus* Soldán & Thomas, 1983 n. stat. is described and illustrated for the first time and its new status (originally in the subspecies rank) is proposed. Biology and distribution of these species are briefly mentioned.

Key words: Ephemeroptera, Baetidae, *Baetis*, *Rhodobaetis*, new species, new status, Algeria.

INTRODUCTION

The genus *Baetis* Leach, 1815 comprises more than 60 Westpalaearctic species. Of these, 13 species are now considered to constitute the subgenus *Rhodobaetis* Jacob, 2003 recently erected to distinguish the former *B. rhodani* species-group (Müller-Liebenau 1969, Jacob 2003). The present paper gives a description of the male imago and larva of a new species found in the humid zone of Algeria. Additionally, we describe male of *Baetis rhodani sinespinosus* Soldán

& THOMAS, 1983 and have raised it to the species rank. Biology and distribution of these species are briefly mentioned.

Baetis chelif n. sp.

ETYMOLOGY

The species is named after Oued Chelif, one of the principal watercourse in Algeria and type locality.

DESRIPTION

Male imago

Size: body length: 6.7-7.7 mm; fore wings length: 6.1-6.5 mm; cerci length: 9.0-10.5 mm; fore legs length: femora + tibiae = 2.7-2.9 mm; tarsal segments: T1 = 0.70-0.75 mm; T2 = 0.57-0.60 mm; T3 = 0.32-0.35 mm; T4 = 0.14-0.15 mm; general relative tarsal segments length ratio: 1>2>3>4 (Fig. 4).

General color of body light yellow to light brown. Head yellowish to light brown. Antennae light brown. Ocelli black in basal part, whitish to yellowish apically. Eyes surrounded by a yellowish ring. Turbinate eyes oval in dorsal view (Fig. 2), relatively wide, inner and external margins almost of the same contour, distinctly convex. Facetted surface of turbinate eyes yellow, slightly darker than the shaft. Shaft of turbinate eyes light yellow with hardly visible, diffuse grayish zone at the base (Fig. 3).

Lateral and dorsal part of thorax light brown with some darker spots on metanotum. Fore wings unicoloured, yellowish-gray, opaque. Pterostigmatic area generally of the same color than rest of wing, with 5-8 simple cross veins. Venation yellowish to yellowish-gray. Hind wings narrow, of the same color than fore wings, with three simple longitudinal veins and well visible costal process (Fig. 5). Legs generally light yellow. Distal part of tibiae and tarsi yellowish-brown, slightly darker than femora. Fore legs slightly darker than mid and hind ones. All femora without spots.

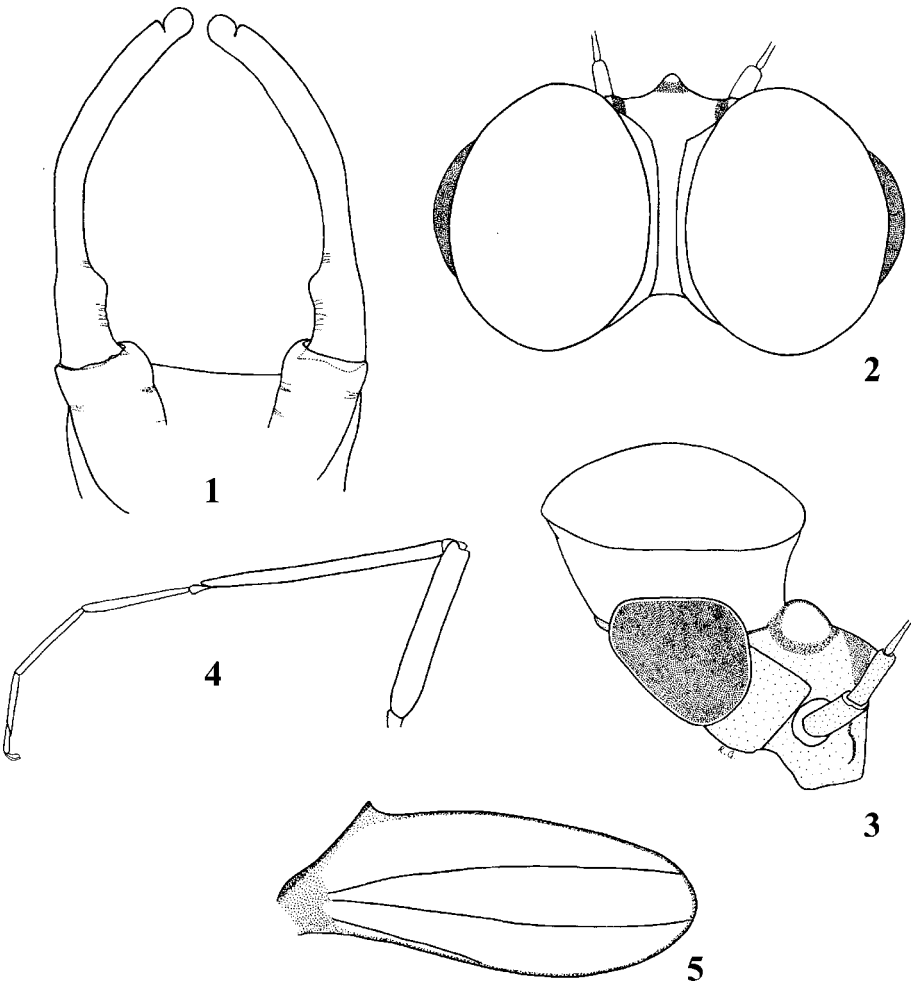
Abdominal tergum I brown, darker than others. Terga II-VIII lighter, unicoloured and yellow, with two small central brownish spots. Last two terga of abdomen darker, light brown. Sterna of the same color as terga. Cerci brownish at base, yellowish to yellowish-white distally. Genitalia light brown to brown. Basal segment of forceps slightly elongated, almost 1.5 times as long as wide. Segment 1 non-wide, slightly elongated, with clear concave inner margin. Segment 2 widening towards segment 3, the widened distal part as long as 1/2 of total segment length. Inner margin of segment 2 slightly concave, segment 3 almost oval (Fig. 1).

Female imago, and male and female subimago unknown.

Mature larva

Size: body length: 4.2-5.8 mm (male larvae), 4.9-6.7 mm (female larvae); cerci length: 3.8-4.5 mm; paracercus length: 1.9-2.5 mm.

General color yellowish-brown to grayish-brown. Head yellowish-brown, light near the base of compound eyes, antennae of the same color. Antennal pedicel and scape with relatively long and distinctly pointed scales (Fig. 14). Clypeal suture obtuse, nearly right-angled. Surface of frons with bluntly pointed scales, base of scales and fine hairs. Labrum wide (the width/length ratio = 1.22) with 1 + 6-9 submarginal bristles (Fig. 6). Mandibular incisors (Figs 7, 8) approximately quadrate with straight outer and anterior margins and several rounded teeth on the inner ones; right prostheca about as long as the incisors, elongate, triangular with tapered tip. Tip of segment 2 of maxillary palps rounded, with a single small spine situated either in subapical (Fig. 12) or apical (Fig. 13)



1-5. *B. chelif* n. sp., male imago (paratype): 1 - forceps, ventral view; 2 - head, dorsal view; 3 - head, lateral view; 4 - fore leg, dorsal view; 5 - left hind wing, dorsal view

position. Labial palps as in Figure 11, segment 3 apparently symmetrical and longer than its maximal width, nearly rounded at apex, covered with narrow pointed bristles and fine hairs, segment 2 triangular, with slightly concave inner margin. Glossae and paraglossae relatively narrow (Figs 9, 10). Paraglossae distally with four irregular rows of bristles (Fig. 10).

Thorax yellowish-brown or grayish-brown, distinctly darker than abdomen. Pronotum with a pair of diffused, inconspicuous darker bands, meso- and metanotum unicoloured with indistinct pairs of light circular spots near the bases of fore wings pads. Surface of thorax with bluntly pointed scales, base of scales and fine hairs. External margins of femora (Figs 15, 18) with sparse row of short pointed 15-22 bristles alternating with small pointed spines and hairs (Fig. 15); no distinct color patterns on femora. Tibiae (Fig. 16) and tarsi (Fig. 17) with rows of pointed spines especially near the posterior margins. Claws brownish, without apical bristles, with 10-15 teeth progressively enlarging apically (Fig. 17).

Abdominal terga light yellowish, terga VII and VIII slightly darker, terga II-IX with a pair of indistinct dark brownish circular spots. Sterna unicoloured, light yellowish. Posterior margin of terga with regularly triangular teeth alternating with irregular row of bluntly pointed and rounded scales; surface of terga densely covered with numerous semilunar impressions, hairs and scales very rare (Fig. 20). Gills oval, slightly asymmetrical, mid gills as long as about 1.5-2 abdominal segments (Fig. 21). Anterior gill margin with short pointed spines alternating with fine teeth and hairs; no such spines on posterior margin (Figs 22, 23). Inner margin of paraproct plate with 12-16 pointed teeth and stout pointed submarginal scales (Fig.19). Cerci unicolorous, yellowish-brown. Paracercus well development, shorter by 1/2 than cerci.

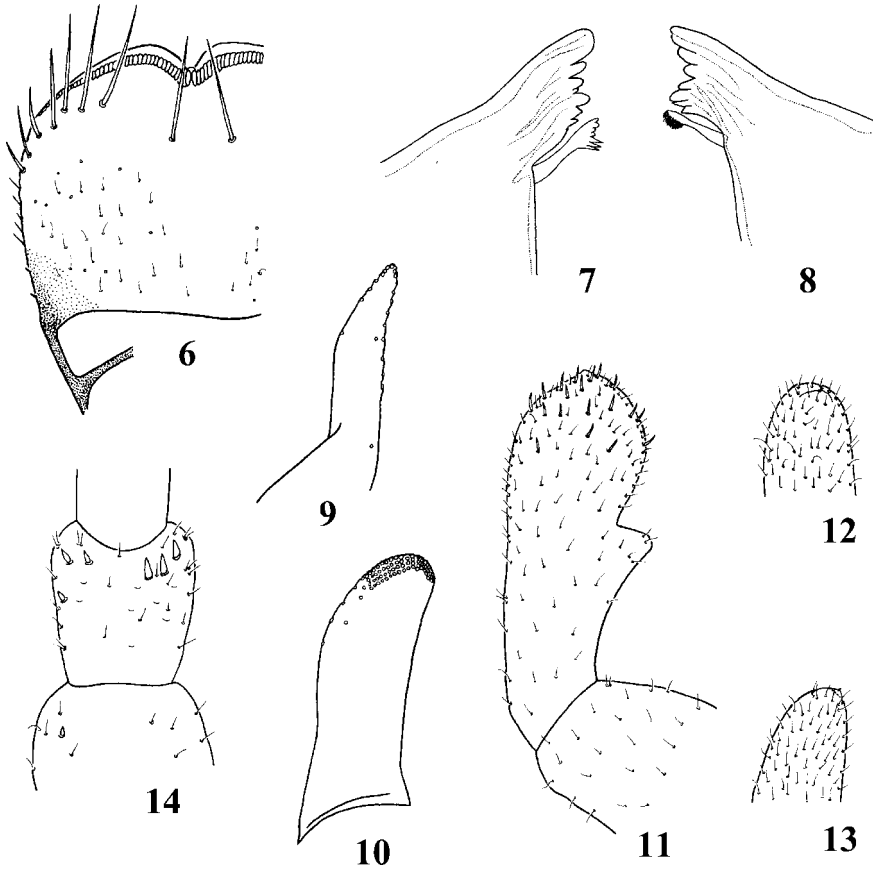
MATERIAL EXAMINED

Holotype: mature male larva, Algeria, Wilaya de Médéa, Oued Chelif River, Oued Chorfa, 20.X.1981, leg. T. Soldán. Paratypes: 3 larvae, Algeria, Wilaya de Blida, Oued Chiffa stream, Gorge de la Chiffa, Rousseau des Signes, 8-9.IX.1981, leg. T. Soldán; 1 male imago, 1 male imago (genitalia, fore leg and hind wing on slide), 11 larvae, from same locality and date. Other material studied (no types): 22 larvae, Algeria, Wilaya de Blida, Oued Chiffa stream, Gorge de la Chiffa, Rousseau des Signes, 8-9.IX.1981, leg. T. Soldán; 1 larva, Oued Mouzaia; 8-9.IX.1981, leg. T. Soldan. All specimens were preserved in 75% alcohol. The holotype and most of paratypes deposited in the Institute of Entomology, Academy of Sciences of Czech Republic, České Budejovice. Two paratypes (one on slide) deposited in the State Museum of Natural History, National Academy of Sciences of Ukraine, in L'viv, two paratypes in the Laboratoire d'Hydrobiologie, UMR CESAC, Univerisité Paul Sabatier, Toulouse, France.

DIFFERENTIAL DIAGNOSIS AND AFFINITIES

B. chelif n. sp. belongs to the subgenus *Rhodobaetis*. This species can be distinguished by the following combination of characters: in male imago: (1)

facetted surface of turbinate eyes yellow; (2) shaft of turbinate eyes light yellow with hardly visible grayish zone at the turbinate eyes base; (3) wings unicoloured, yellowish-gray; (4) hind wings narrow; (5) basal segment of forceps slightly elongated, almost 1.5 times as long as wide; in larva: (6) clypeal suture obtuse, nearly right-angled, (7) scales on pedicel long and pointed; (8) labrum with 1 + 6-9 bristles; (9) mandibular incisors with straight fore margin, right prostheca pointed; (10) a single rudimentary spine on tip of maxillary palps; (11) segment 3 of labial palps apparently symmetrical; (12) four rows of bristles on paraglossae; (13) posterior margin of terga with regularly triangular teeth and irregular row of bluntly pointed and rounded scales; (14) gills with pointed spines on anterior margin; (15) no bristles on claw tip; (16) paracercus as long as about half of cerci.



6-14. *B. chelif* n. sp., mature larva (paratype): 6 - labrum; 7 - incisors of the left mandible; 8 - incisors of the right mandible; 9 - glossa; 10 - paraglossa; 11 - labial palpus; 12 - apical portion of the last segment of maxillary palpus, specimen with subapical position of segment tip scale; 13 - apical portion of the last segment of maxillary palps, specimen with apical position of segment tip scale; 14 - antennal scape and pedicel

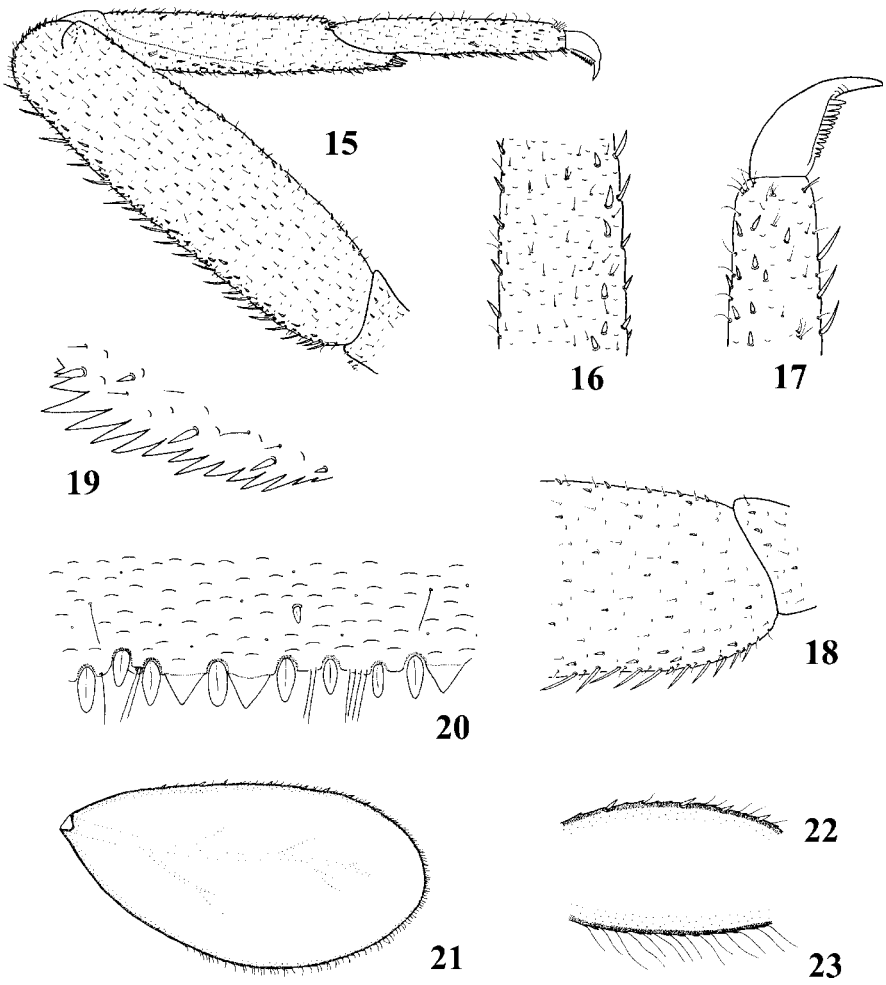
B. chelif n. sp. occupies a relatively independent position within the subgenus *Rhodobaetis*. While the relationships to species described from the Canary Islands (MÜLLER-LIEBENAU 1971), Crimea (ZIMMERMANN 1980), Middle East (THOMAS & DIA 1983), and to *B. gemellus* EATON, 1885 and *B. pseudogemellus* SOLDÁN, 1977 are very indistinct, the presence of gill spines brings *B. chelif* n. sp. closer to *B. rhodani rhodani* PICTET, 1843, *B. rhodani tauricus* GODUNKO & PROKOPOV, 2003 and *B. milani* GODUNKO, PROKOPOV & SOLDÁN, 2004, two species from Caucasus, namely *B. baksan* SOLDÁN, 1977, *B. ilex* JACOB & ZIMMERMANN, 1978 (SOLDÁN 1977; JACOB & ZIMMERMANN 1978; NOVIKOVA 1987; GODUNKO & PROKOPOV 2003, GODUNKO et al. 2004, Tabl. 1-3) and *B. ingridae* THOMAS & SOLDÁN, 1987 from Corsica (THOMAS & SOLDÁN 1987). *B. rhodani rhodani* and *B. rhodani tauricus* differ from *B. chelif* n. sp. in having rounded or bluntly pointed scales on pedicel and rounded scales on paraproct plate, broader labium (the width/length ratio = 1.28-1.32), more asymmetrical distal segment of labial palps, only 3 rows of bristles on paraglossae; more than 25 bristles on external margin of femora; paracercus long as 2/3-3/4 of cerci and different color pattern. *B. baksan* markedly differs from *B. chelif* n. sp. by very wide labrum (the width/length ratio = 1.45) with 1 + 11-14 bristles, triangular incisors, group of 3-9 spines on maxillary palps tip, hooked claw, and almost absent spines on gill margins. *B. ilex* can be easily distinguished by very long labrum (the width/length ratio = 1.15), toothed incisors, pointed, narrow and symmetrical apical segment of labial palps, absence of teeth on posterior margin of gills, no pointed scales on posterior margin of abdominal terga and well developed paracercus. *B. ingridae* can be easily distinguished from *B. chelif* n. sp. by rounded pedicel scales, rounded scales on posterior margin of abdominal terga, 3 rows of bristles on paraglossae, and different shape of segments 2 and 3 of labial palps. Finally, *B. chelif* n. sp. markedly differs from *B. milani* in the characters of structure of external margins of femora, posterior margin and surface of abdominal terga.

The combination of characters (1) – (5) distinguishes male imago of *B. chelif* n. sp. from other species with known adults (adult stage of *B. ilex* and *B. ingridae* have not been described so far). The most important character is represented by wing color. Contrary to evidently translucent wings of all species of *Rhodobaetis*, wings of *B. chelif* n. sp. are opaque, resembling typical subimaginal wing color pattern.

DISTRIBUTION AND BIOLOGY

B. chelif n. sp. has been known so far only from several localities of the humid zone of Algeria (Atlas Tellien) and most probably it is not distributed in semiarid areas of North Africa. The species seems to be very rare or local since it has not been collected so far despite numerous records on mayfly fauna from Morocco, Algeria and Tunisia (KRAÏNEM 1986; BOUMAÏZA & THOMAS 1986, 1995; GAGNEUR & THOMAS 1988). Larvae seem to prefer larger streams or submontane rivers with permanent water, however their habitat specialization does not seem to be strict

(the locality of the Oued Mouzaïa represents a rather small brook, about 0.5-1 m across). They were found at places with stony bottom, preferring predominantly cobbles or pebble, never ocurring on gravel or coarse sand, but usually not directly in the streamline, evidenly preferring places with about 0.3-0.6 $m.s^{-1}$ current velocity. Larvae were collected together with *B. rhithralis* SOLDÁN & THOMAS, 1983, *B. neglectus* NAVÁS, 1913, *B. pavidus* GRANDI, 1951, *B. sinespinosus* n. stat., *Oligoneuropsis skhounate* DAKKI & GIUDICELLI, 1980, *Procloeon stagnicola* SOLDÁN & THOMAS, 1983, *Choroterpes lindroti* PETERS, 1980 and *Potamanthus*



15-23. *B. chelif* n. sp., mature larva (paratype): 15 - hind leg; 16 - detail of distal part of tibia; 17 - detail of distal part of tarsus; 18 - detail of proximal part of femur; 19 - detail of the outer margin of paraproct; 20 - posterior margin of the fourth abdominal tergum; 21 - fourth gill; 22 - anterior margin of gill 4, detail; 23 - posterior margin of gill 4, detail

luteus (LINNAEUS, 1767). Contrary to these species (or even mass occurrence of *B. sinespinosus* n. stat., *B. pavidus* and *O. skhounate*), they are very rare or solitary at all known localities. Adults start to fly at morning dusk, the mating flight is completely finished about half an hour after sunrise. Judging from findings of mature larvae and male adults in September and October, the development and emergence seem to be continual (at least 2-3 generations a year) probably with interruption or slowing down of larval growth during cold winter months. Detailed data on the life cycle of *B. chelif* n. sp. remain unknown but it can be estimated to belong to the seasonal bivoltine summer-winter cycle (MBWs) or, more likely, seasonal bi- or polyvoltine one as defined by CLIFFORD (1982).

Baetis sinespinosus SOLDÁN & THOMAS, 1983 n. stat.

Baetis rhodani sinespinosus SOLDÁN & THOMAS, 1983: 359, Figs 13-21.

DESCRIPTION OF MALE IMAGO

Size: body length: 9.7 mm; fore wings length: 9.2-9.3 mm; cerci length: 10.5-11.0 mm; fore legs length: femora + tibiae = 4.87-4.97 mm; tarsal segments: T1 = 1.03-1.05 mm; T2 = 0.95-0.97 mm; T3 = 0.67-0.70 mm; T4 = 0.35 mm; general relative tarsal segments length ratio: 1>2>3>4 (Fig. 27).

General color of body dark, yellowish-brown to brown. Head and antennae brownish. Eyes and basal part of ocelli black. Eyes surrounded by a yellowish ring. Ocelli grayish-white apically. Turbinate eyes unicoloured, light brown, without shaft ring (Fig. 26), oval in dorsal view with slightly convex external margin (Fig. 25).

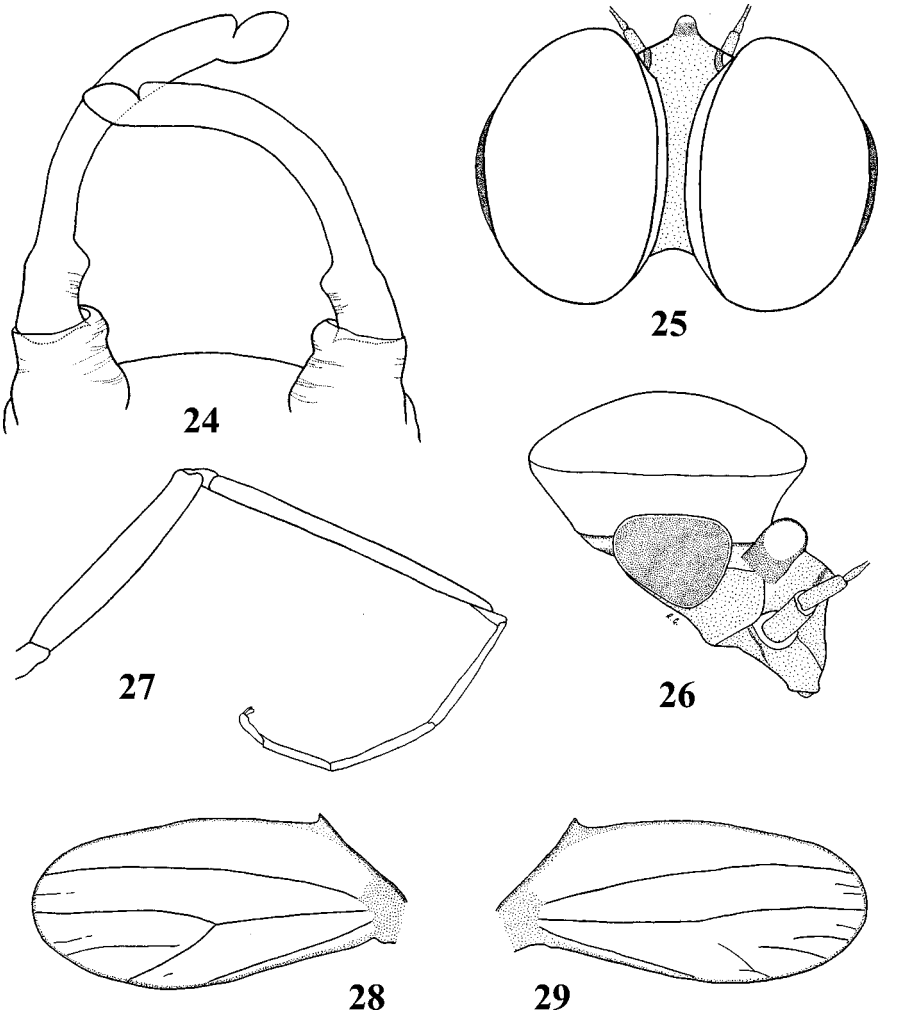
Thorax dark, light brownish to brown. Fore wings hyaline, translucent, and slightly yellowish in color. Pterostigmatic area opaque, distinctly yellowish, with 12-13 simple cross veins. Venation yellowish-brown. Hind left wing (Fig. 28) with three longitudinal simple veins and well developed costal process typical for the subgenus *Rhodobaetis* (Figs 28, 29). Hind right wing with branched (bifurcated) second vein and well visible costal process (Fig. 29). Legs yellowish-brown to brown. Fore legs darker than mid and hind legs, distinctly brown. All femora unicoloured without spots. Tarsal segments joints dark.

Abdominal terga dark, yellowish-brown, last segment slightly darker than others. Terga I-V with two uniformly brown and elongated spots in central area. Four brown spots on terga VI-XI and a pair of dark brown spots on tergum X. Sterna lighter than terga, yellowish-brown. Cerci generally brown, slightly lighter at the apex. Segments joints darker. Genitalia light brown. Basal segment of forceps nearly as long as wide. Segment 1 wide with convex inner margin. Segment 2 short, wide at the base, the widened part reaching approximately 1/2 of its total length. Inner margin of segment 2 concave. However, contrary to e.g. *B. rhodani rhodani*, there is no pronounced constriction at proximal third of this segment and the whole segment is widened gradually towards segment 3. Segment

3 distinctly elongated with truncate inner margin, almost 1.5-2 times as long as wide.

MATERIAL EXAMINED

1 male imago, Algeria, Saïda, April, 1981, leg. S. Ouglani. The specimen were pereserved in 75% alcohol and deposited in the Institute of Entomology, Academy of Sciences of the Czech Republic in České Budějovice.



24-29. *B. sinespinosus* n. stat., male imago: 24 - forceps, ventral view; 25 - head, dorsal view; 26 - head, lateral view; 27 - fore leg, dorsal view; 28 - right hind wing, dorsal view; 29 - left hind wing, dorsal view

Discussion

The original material collected at the type locality in Algeria (Soldán & Thomas 1983) was described as the subspecies of *B. rhodani*. Indeed, nearly all larval characters are very close to this species. Differences in e.g. the shape of scales on pedicel, number of labral bristles, absence of maxillary tip scales, number of bristle rows on paraglossa and structure and number of scales on abdominal terga surface and posterior margin (see Soldán & Thomas 1983, Godunko & Prokopov 2003, Godunko et al. 2004, Tabl. 1-3) seemed not to be sufficient to describe a new species at that time.

Male imago described in the present paper markedly differs from any other species known in the male imago stage of the subgenus *Rhodobaetis* in the following characters: (1) slightly yellowish wings; (2) branched second vein of hind wing; (3) structure of forceps segments and especially the shape of segment 3.

Hence, this material of male imago is clearly different from that of *B. rhodani* and the differences are undoubtedly much more pronounced than those e.g. between males of *B. rhodani rhodani*, *B. rhodani tauricus* and *B. gemellus*. The shape of segment 3 of the Algerian species is evidently more similar to *B. gemellus* than to both subspecies of *B. rhodani*. These are principial reasons to change the status of this species and, consequently, to transfer it to the species rank as *Baetis sinespinosus* Soldán & Thomas, 1983, n. stat.

Moreover, it is apparent today that the larva of *B. sinespinosus* n. stat. occupies clearly an isolated position in comparison with *B. rhodani rhodani* and *B. rhodani tauricus*. *B. rhodani* seems to be definitely a polytypic species but the geographic isolation of allopatric population does not play a substatial role in this case. This can be documented e.g. by the fact that in the quite isolated Madeira, only nominal subspecies of this species occurs (Hagen 1865, Eaton 1885, Brinck & Scherer 1961, and unpublished results). Although still not known in detail, habitats, habits, ecological range and life cycle of *B. sinespinosus* n. stat. in North Africa most probably do not substantially differ from those of *B. rhodani rhodani*, known data are summarized by Soldán & Thomas (1983).

Acknowledgements

Our thanks are due to the late M. Said Ouglani of the Institut National Agronomique, Alger, who provided us with the adult specimen of *Baetis sinespinosus*. Authors are very grateful to Ing. Jevgen D. Inkin (State Museum of Natural History NAS Ukraine) for technical assistance in processing of the figures.This research was partly supported by Research Project No. 1QS5000705O5 „Monitoring of Insect Biodiversity and evaluation of ecosystem changes applied in Nature Conservation." and the Institute of Entomology project No. Z 50070508 by the Grant Agency of the Academy of Sciences of the Czech Republic. This study has been caried out also thanks to the interacademic exchange between the Academy of Sciences of Czech Republic and the National Academy of Sciences of Ukraine and supported by the Kasa J. Mianowski (Warszawa, Poland).

REFERENCES

BRINCK, P., SCHERER, E., 1961. On the Ephemeroptera of the Azores and Madeira. Report No. 20 from the Lund University Expedition in 1957 to the Azores and Madeira. Bol. Mus. Municip. Funchal, **14** (47): 55-66.

BOUMAÏZA, M., THOMAS, A. G. B., 1986. Répartition et écologie des Ephéméroptères en Tunisie:1ére partie (Insecta, Ephemeroptera). Arch. Inst. Pasteur Tunis, **63** (4): 567-600.

—, 1995. Distribution and ecological limits of Baetidae, the other mayfly families in Tunisia: a first evaluation (Insecta, Ephemeroptera). Bull. Soc. Hist. Nat. Toulouse, **131**: 27-33.

CLIFFORD, H. F., 1982. Life cycles of mayflies (Ephemeroptera), with special reference to voltism. Quaest. Entomol., **18**: 15-90.

EATON, A. E., 1885. A revisional monograph of recent Ephemeridae or Mayflies. Trans. Linn. Soc. London, **3**, Ser. 2, Zoology: 352 pp. + 65 pls.

GAGNEUR, J., THOMAS A. G. B., 1988. Contribution à la connaissance des Ephéméroptères dAlgérie. I. Répartition et écologie (1ére partie) (Insecta, Ephemeroptera). Bull. Soc. Hist. Nat. Toulouse, **124**: 213-223.

GODUNKO, R. J., PROKOPOV, G. A., 2003. Mayflies of the Crimean Peninsula. I. *Baetis rhodani tauricus* sn. sp. (Ephemeroptera: Baetidae). Acta Zool. Cracov., **46** (3): 209-217.

GODUNKO, R. J., PROKOPOV, G. A., SOLDÁN T., 2004. Mayflies of the Crimean Peninsula. III. The descripion of *Baetis milani* sp. n. with notes on taxonomy of the subgenus *Rhodobaetis* JACOB, 2003 (Ephemeroptera: Baetidae). Acta Zool. Cracov., **47** (3-4): 231-248.

HAGEN, H. A., 1865. The Neuroptera of Madeira. Entomol. Mo. Mag., **2**: 25-26.

JACOB, U., 2003. *Baetis* LEACH 1815, sensu stricto oder sensu lato. Ein Beitrag zum Gattungskonzept auf der Grundlage von Artengruppen mit Bestimmungsschlüsseln. Lauterbornia, **47**: 59-129.

JACOB, U., ZIMMERMANN, W., 1978. Eine neue *Baetis*-Art der *rhodani*-Gruppe von Kaukasus – *Baetis ilex* n. sp. (Ephemeroptera, Baetidae). Ent. Nachr., **22** (6): 81-88.

KRAÏNEM, M., 1986. Contribution à l'étude hydrobiologique de trois cours ieau du nordouest de la Tunisie. Bull. mens. Soc. Linn. Lyon, **55** (3): 96-104.

MÜLLER-LIEBENAU, I., 1969. Revision der europäischen Arten der Gattung *Baetis* LEACH, 1815 (Insecta, Ephemeroptera). Gewässer und Abwässer, **48-49**: 1-214.

—, 1971. Ephemeroptera (Insecta) von den Kanarischen Inseln. Gewässer und Abwässer, **50-51**: 7-40.

NOVIKOVA, E. A., 1987. Mayflies of the family Baetidae (Ephemeroptera) of the USSR fauna. Unpublished PhD theses, Gornmental University of Leningrad. 250 pp. (in Russian).

SOLDÁN, T., 1977. *Baetis baksan* n. sp., new species of mayfly (Ephemeroptera, Baetidae) from Central Caucasus. Acta Entomol. Bohemoslov., **74**: 229-231 + 1 pl.

SOLDÁN, T., THOMAS, A. G. B., 1983. New and little-known species of mayflies (Ephemeroptera) from Algeria. Acta Entomol. Bohemoslov., **80** : 356-376.

THOMAS, A. G. B., DIA, A., 1983. *Baetis bisri* n. sp., Ephéméroptère nouveau du Liban (Baetidae). Annls Limnol., **19** (3): 213-217.

THOMAS, A. G. B., SOLDÁN, T., 1987. *Baetis ingridae* n. sp., Ephéméroptère nouveau de Corse (Baetidae). Annls Limnol., **23** (1): 23-26.

ZIMMERMANN, W., 1980. *Baëtis braaschi* n. sp., ein bisher unbekannter Vertreter der *rhodani* – Gruppe von der Krim (UdSSR) (Ephemeroptera, Baëtidae). Reichenbachia, **18**: 199-202.