

New Ephemerellidae from Spain (Ephemeroptera)

by

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ABSTRACT

The nymphal descriptions of four species of Ephemerellidae from Spain are given. The genera *Serratella* Edmunds and *Drunella* Needham are cited for the first time in the Palearctic Region. The paper includes a key to the Iberian Ephemerellidae species.

INTRODUCTION

The family Ephemerellidae was cited in the Iberian Peninsula (Puthz, 1978) and included the species *Ephemerella hispanica* Eaton, 1887 and *Ephemerella ignita* Poda, 1761. Subsequently, Keffermüller and da Terra (1978) described *Ephemerella (Eurylophella) iberica* from Portugal and other authors have cited additional species of this family including *Ephemerella (Torleya) major* Klapalek, 1905 from some localities of the Centre and South East of Spain (González del Tánago, 1978; Alba Tercedor, 1981; Alba Tercedor & Sánchez Ortega, in press; Herranz Sanz & González del Tánago, in press), *Ephemerella mesoleuca* Brauer, 1857 and *Ephemerella (Chitonophora) ikonomovi nevadensis* Alba Tercedor (1983) from Sierra Nevada (South of Spain) (Alba Tercedor, 1981, in press).

At the Third International Symposium of Ephemeroptera, Allen (1980) reclassified the subfamily Ephemerellinae and reappraised the status of the taxa considering *Torleya* Lestage, 1917 and *Eurylophella* Tiensuu, 1935 as genera, as well as other American subgenera as genera.

During a study carried out in the Duero Basin (North West of Spain) the authors have collected species of Ephemerellidae including all the species cited in Spain until now, except *E. ikonomovi nevadensis*, and some new species belonging to Nearctic genera unknown in the Palearctic Region. Nymphal descriptions of species belonging to these previously unrecorded genera are given in this paper.

***Serratella albai* sp. n.**

Description of the nymph:

Dimensions (lengths): Body of mature nymph: 6-8 mm. Cerci: 5 mm.

Coloration: Uniform light brown, without distinctive pattern on the body, but sometimes with lighter regions on the middle of abdominal tergites.

Head: Without contrast of color between frontal and occipital regions. No occipital tubercles. Second article of antennae much darker than remained. Mouthparts: Maxillary palpi absent (fig. 1f); labium with the glossae circular, as long as broad; sclerite of mentum subrectangular, not divided, approximately four times wider than long; lateral margins of submentum slightly convex (fig. 1e).

Thorax: Uniformly colored, without dorsal tubercles. Anterior and lateral margins of pronotum straight, without expanding more than the dimensions of the segment. Meso- and metathorax without tubercles. Legs: Fore femora with a transversal row of 4-5 long spines in the anterodistal region and a group of spines irregularly distributed on the posterior region and outer margin (fig. 1c). Middle and hind femora with a group of short dorsal spines and some longer ones bordering the posterior margin (fig. 1b). Tarsal claws with the most distal denticle bigger than remained.

Abdomen: Without dorsal tubercles on tergites. Abdomen slender and cylindrical, the middle segments little broader than the rest (fig. 1a). Surface of tergites 5-8 with spine-like setae slightly acuminate, three times as broad as long. Posterior margin of tergites with only spines on the middle region similar to the dorsal ones but a little shorter. Posterolateral spines of abdomen present on segments 4-9, little developed. Plate-like gills on segments 3-7, slightly acuminate in the distal margin (fig. 1d). Caudal filaments of same color as body, without any dark ring at base; whorls of spines at apex of each segment but no intersegmental setae on them.

Affinities: The nymph of *Serratella albai* possesses the characteristics of the genus as described by Allen and Edmunds (1963a) and seems to be morphologically similar to *S. deficiens* Morgan which inhabits the boreal eastern North American Region. The genus *Serratella* can be distinguished from the other Spanish genera of the family Ephemerellidae by the absence of filamentous gills on the first abdominal segment and the absence of maxillary palpi. The size, coloration of the body and shape of labium are good characteristics identifying this species from others in the same genus.

Distribution: The nymphs of *S. albai* have been collected from October to August in the upper reaches of the rivers Carrión, Tera, Tormes and Agueda of the Duero Basin, where soft waters and stony substrata exist. They were always found in the lotic parts of the rivers.

Holotype and 9 paratype nymphs: River Agueda, in El Payo (Salamanca, Spain) 13.VIII.1981. Coll. González del Tánago (Dpto. Zoología, E.T.S. de Ingenieros de Montes in Madrid).

This species is named for Dr. J. Alba Tercedor (Granada).

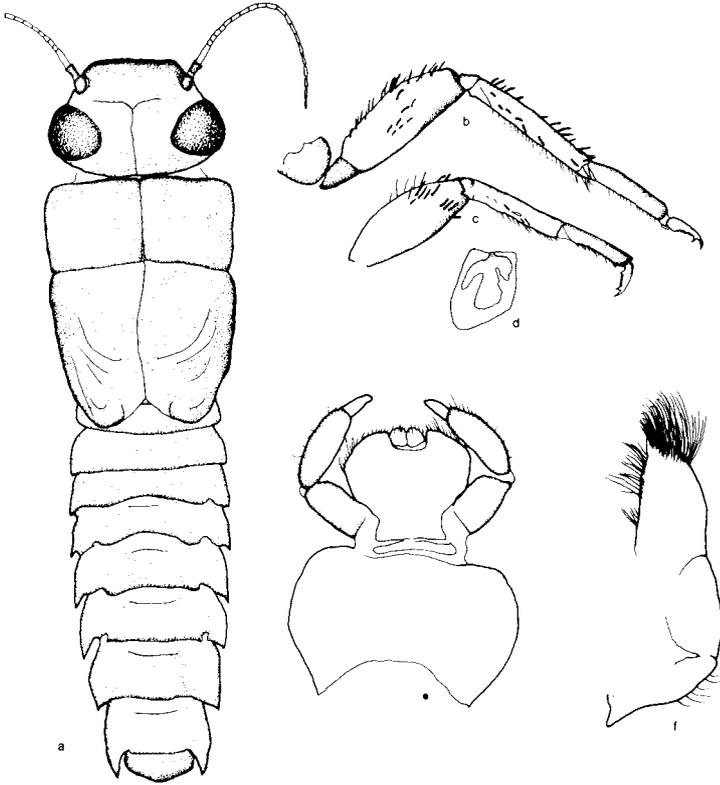


Fig. 1. *Serratella albai*, nymph. a, dorsal view of body, gills not shown; b, hind leg; c, fore leg; d, first lamellate gill; e, labium; f, maxilla.

Serratella hispanica (Eaton, 1887)

(= *Ephemerella hispanica* Eaton, 1887)

The nymphs described herein were collected in the Eresma River, in Valsain (Segovia, Spain), very near to San Ildefonso where the adults of *Ephemerella hispanica* Eaton, 1887 were first found and described. The correlation between our larvae and the adults described by Eaton was first based on the ventral dark lines on the abdominal sternites present in nymph and subimago, and also, taking into account that this is the only species in the area except for *Ephemerella ignita* Poda, which is easily distinguished. Subsequently, we have also had an opportunity to examine some material reared by R. Meneu and verifying the identification of our larvae.

Description of the nymph:

Dimensions (lengths): Body of mature nymph: 6-7 mm. Cerci: 3 mm.

Coloration: Light brown with darker regions on head and abdomen.

Head: Frontoclypeal region much darker than posterior region. Without occipital tubercles (fig. 2a). Second segment of antennae darker than remainder. **Mouthparts:** Maxillary palpi absent (fig. 2f); labium with glossae longer than broad, much less developed than paraglossae (fig. 2e); sclerite of mentum divided; lateral margins of submentum strongly convex (fig. 2e).

Thorax: Some light spots limited by darker lines on prothorax. Anterior margin of pronotum straight or slightly concave (fig. 2a). Mesothorax with two dark spots in middle and a low median tubercle on posterior margin. **Legs:** Fore femora with a transversal row of 5-7 spines on the anterodistal region and others distributed irregularly on the posterior side and along the posterior margin (fig. 2c). Middle and hind femora with a dorsal longitudinal row of short spines and posterior margin bordered by longer spines (fig. 2b). Tarsal claws with the most distal denticle slightly larger than others.

Abdomen: Tergites light brown with a transversal dark line on anterior margin of each segment (fig. 2a). Sternites with three longitudinal dark lines, one on the middle and the others on the lateral regions of each segment forming continuous lines along abdomen. Dorsal tubercles on abdominal segments absent. Surface of terga with truncate spine-like setae in middle, approximately two times longer than broad; posterior margin of tergites 4-7 without spine-like setae or with a reduced number, similar in shape to dorsal ones. Posterolateral spines of abdominal segments well developed, conspicuous from segment 3. Plate-like gills present on segments 3-7, slightly acuminate in the inner distal margin (fig. 2d). Caudal filaments: Same color to remained body, with one dark ring at base. Numerous dark spines bordering the posterior margin of each segment, without intersegmental setae (fig. 2g).

Affinities: The nymph of *Serratella hispanica* also possesses the characteristics of the genus *Serratella* Edmunds as described by Allen & Edmunds (1963a) and is similar to *S. albai*. Distinguishing features are: The color pattern on head and abdomen of *S. hispanica* does not exist in *S. albai*; also, the elongate glossae and the divided sclerite of mentum in *S. hispanica* (fig. 2e) are quite different from *S. albai* (fig. 1e).

Distribution: Nymphs of this species have been collected in two localities of the Sistema Central only: Eresma River, in Valsain (Segovia) and Adaja River, in Pradosegar (Avila). Both localities have soft waters, low temperatures and stony substrates being in the Rhithron zone of the rivers. The nymphs were found in lotic and lentic parts of the current from February to June. This species develops before *Ephemerella ignita* Poda, which lives in the same localities but has a later larval growth period.

Material examined: Eresma River in Valsain (Segovia, Centre of Spain), 2 nymphs 16.III.1981, 6 nymphs 12.VI.1981. Adaja River, near its source (Avila), 19.III.1981, 3 nymphs. Coll. González del Tánago (Dpto. Zoología, E.T.S. de Ingenieros de Montes, Universidad de Madrid).

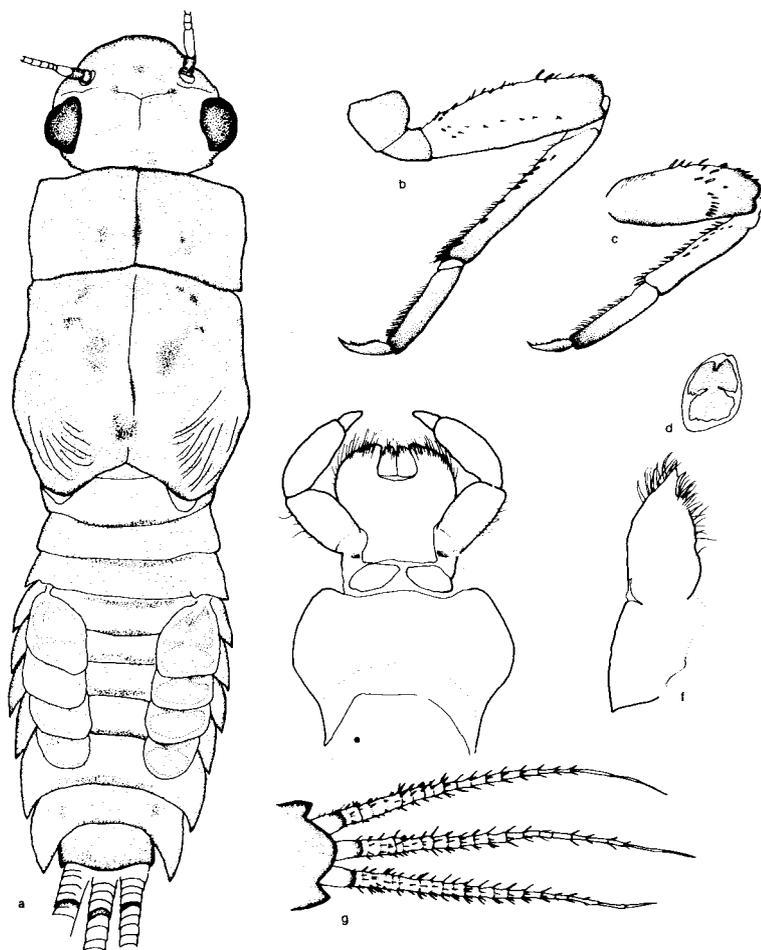


Fig. 2. *Serretella hispanica*, nymph. a, dorsal view of body; b, hind leg; c, fore leg; d, first lamellate gill; e, labium; f, maxilla; g, caudal filaments.

***Drunella paradinasi* sp. n.**

Description of the nymph:

Dimensions (lengths): Body of mature nymph: 8-9 mm. Cerci: 6 mm.

Coloration: Uniform dark brown, without distinctive pattern.

Head: Two occipital tubercles conspicuously developed (fig. 3b, f). Insertion of antennae in a head depression with posterolateral margins angled. Second segment of antennae darker than remained. Mouthparts: Maxillari palpi present (fig. 3h);

labium with glossae little longer than broad, much less developed than paraglossae (fig. 3g); lateral margins of submentum slightly concave (fig. 3g).

Thorax: Pronotum with paired submedian ridges and submedian tubercles; anterior margin concave with lateral edges expanding forwards; lateral parts covering partially the pleural region and exceeding the dimensions of segment (fig. 3a). Mesonotum with small paired submedian tubercles on anterior margin, paired submedian ridges near middle of mesonotum and a single posterior tubercle between bases of wing pads (fig. 3f). Legs: Fore femora with long spines irregularly distributed on dorsal distal region and posterior margin bordered by long spines and thin setae (fig. 3d). Middle and hind femora with no spines on dorsal region (fig. 3c). Tarsal claws with the most distal denticle similar to remained.

Abdomen: Similar coloration to remained of body. Dorsal tubercles present on segments 2-9, well developed forming spine-like processes which are divergent and enlarge progressively, having the maximum size on the segment 8 where they are as long as segment 9 (fig. 3f). Posterolateral spines present from segment 4 with

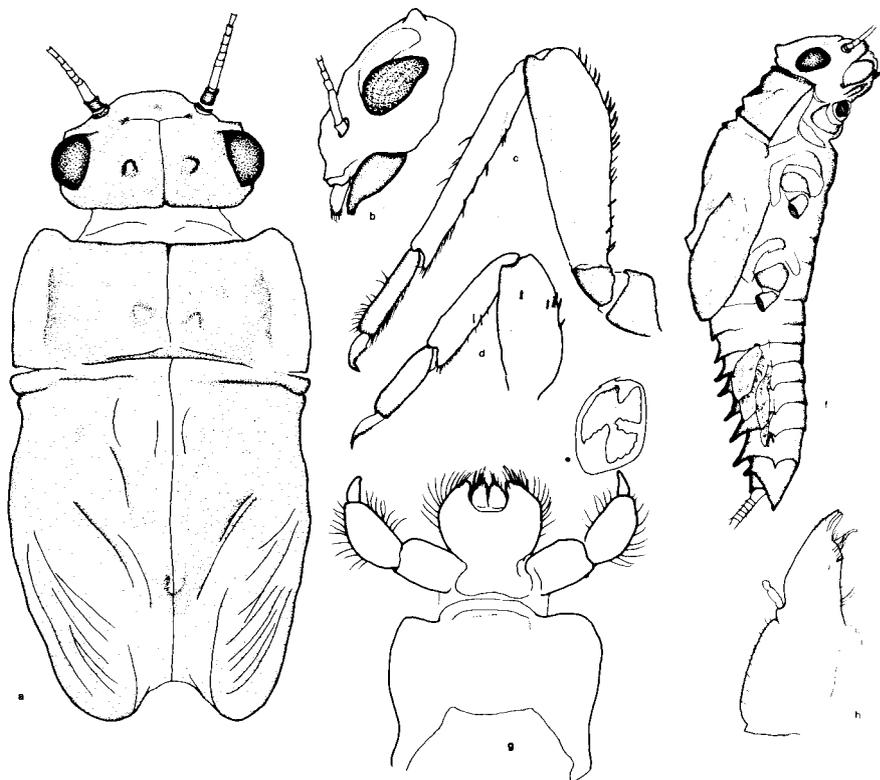


Fig. 3. *Drunella paradinasi*, nymph. a, dorsal view of head and thorax; b, lateral view of head of male nymph; c, hind leg; d, fore leg; e, first lamellate gill; f, lateral view of female nymph; g, labium; h, maxilla.

short spine-like setae bordering the outer margin. Plate-like gills present on segments 3-7, slightly acuminate at the distal corner (fig. 3e). Caudal filaments: Similar color to the rest of the body, without darker rings at base. Numerous long spines on the posterior margin of each segment, without intersegmental setae.

Affinities: The nymphs of this species possesses the characteristics of the genus *Drunella* Needham as described by Allen and Edmunds (1962). Taking into account the nymphal characters of *D. paradinasi* it seems to be related to *D. grandis* Eaton and *D. spinifera* Needham group (Allen & Edmunds, 1962), being morphologically similar to *D. grandis grandis* Eaton which inhabits the Western North American region.

Distribution: Nymphs of *Drunella paradinasi* have been collected in the Tera River below Sanabria lake (Zamora, North West of Spain) and in the Tormes River near its source (Avila, Central Spain), where other species of Ephemerellidae also occur. They have been found from June to August, in lotic and lentic parts of the rivers, in stony substrates or vegetal microhabitats. The two localities cited are in the Rhithron zone of the rivers and have soft waters with a pH value slightly below 7 and hardness less than 20 mg/l CaCO₃.

Holotype and 6 paratypes nymphs: Tera River upstream Trefacio (Zamora, Spain), 22.VI.1981. Coll. González del Tánago (Dpto. Zoología, E.T.S. de Ingenieros de Montes in Madrid).

This species is named for Dr. Eduardo Rodríguez Paradinas (Madrid).

***Eurylophella iberica* Keffermüller et da Terra, 1978**

The female nymph of *Eurylophella iberica* has been described by Keffermüller & da Terra (1978). Allen & Edmunds (1963b) reported for the genus *Eurylophella* Tiensuu some sexual characters as "head tubercles present in female nymphs of all species, but not necessarily present and often variably developed in male nymphs". The male nymph of *E. iberica* lacks head tubercles and also the coloration pattern of the body described in the female. These features as well as other nymphal characters of *E. iberica* not mentioned before are exposed in this section.

Description of the nymph (male):

Dimensions (lengths): Body of mature nymph: 12-14 mm. Cerci: 7 mm.

Coloration: Brownish with lighter spots on dorsal surface of head, thorax and abdomen (fig. 4a), lacking the conspicuous pattern on abdomen described for the female nymph by Keffermüller & da Terra (1978).

Head: Same coloration as other parts of the body. Without occipital tubercles. Antennae pale with the second segment similar in color to remainder. Dorsal and lateral regions with many conspicuous setae, irregularly distributed (fig. 4a). Mouthparts: Maxillary palpi absent (fig. 4e). Labium with glossae and paraglossae similar in size and shape, having numerous setae at apex (fig. 4d).

Thorax: Without tubercles. Pronotum with anterior margin straight with many long setae and lateral edges slightly concave (fig. 4a). Many setae along median longitudinal line of tergites. Meso- and metathorax with no special features. Legs: Fore femora with some spines on dorsal curved rib and long setae intercalated

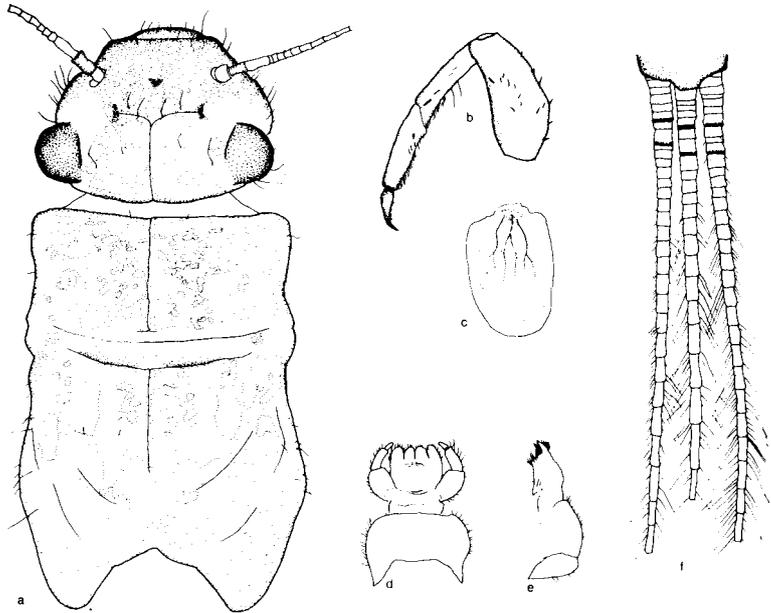


Fig. 4. *Eurylophella iberica*, male nymph. a, dorsal view of head and thorax; b, fore leg; c, first lamellate gill; d, labium; e, maxilla; f, caudal filaments.

with short spines on posterior margin (fig. 4b). Middle and hind femora with some spines and long setae on dorsal longitudinal rib and posterior margin.

Abdomen: Dorsoventrally depressed, with lateral expansions of segments 4-8 well developed and wider than others, midlengths of segments 5, 6 and 7 shorter than remainder. Dorsal abdominal tubercles present on segments 2-7, visible on 2 and 3 and more conspicuous on 4-7. Surface of abdominal tergites with several setae and small rounded scales irregularly distributed; anterior margin glabrous in middle and with some setae on lateral extremes. Posterolateral projections present from segment 2, well developed from 4 with many short spines and long setae along outer margins. Filamentous gills present on first segment. Plate-like gills present on segments 4-7, rounded at distal margin (fig. 4c); first lamellae larger than others, semioperculate, brownish with lighter spots similar to remainder of body. Caudal filaments: Slightly lighter than remainder of body, with two or three dark rings at base (fig. 4f); segments without spines on posterior margin but with many long intersegmental setae.

Distribution: Nymphs of this species have been collected by us only in one locality of the Duero Basin, in the Tera River near Sanabria Lake (Zamora, Northwest of Spain) and always in lentic parts of the river, among the bryophyte and detritus microhabitats, we took 3 nymphs on 20.II.1981, and 6 nymphs on 14.II.1982. In the same locality of the Tera River there are some additional species of Ephemerellidae

(*E. ignita*, *S. albai* and *D. paradinasi*). Of all, *E. iberica* has the earliest period of larval development, reaching the adult stage before June.

The correlation between the male nymphs described here and female nymphs and adults of *E. iberica* has been worked out by R. Meneu who has reared the nymphs.

DISCUSSION AND KEY TO NYMPHS

Although a holarctic distribution has been assigned to *Serratella* and *Drunella* (Edmunds et al., 1976), there had before been no actual records of these genera from the Palaearctic region.

The presence of these genera as well as of the other species mentioned before provides further evidence of the great richness and particularity of the Iberian fauna. The Iberian peninsula is a relatively isolated area, with the Pyrenees as a selective barrier. The Atlantic Ocean has maintained some areas with Atlantic climate and there are others under Mediterranean influence, with connections to the North African fauna. Thus the Iberian fauna conserves immigrants from other continents that have not reached the rest of Europe, in addition to many endemic species.

To facilitate identification of nymphs of the Iberian species of Ephemerellidae we propose the following key:

KEY TO NYMPHS OF IBERIAN SPECIES OF EPHEMERELLIDAE

1. Lamellate gills present on abdominal segments 4-7; filamentous gills present on first abdominal segment *Eurylophella iberica* Keff. et Terra
- Lamellate gills present on abdominal segments 3-7; no filamentous gills on first abdominal segment 2
2. Head, thorax and abdomen with well developed tubercles (fig. 3) *Drunella paradinasi* sp. n.
- Tubercles smaller than above or absent 3
3. Abdominal tergites 2-7 each with small median tubercles 4
- Abdominal tergites without median tubercles 5
4. Abdominal segment 9 long and slender; a distinctive pattern on abdomen formed by dark trapezoidal marks on tergites 4-7 *Ephemerella ikonovici nevadensis* Alba
- Abdominal segment 9 short, similar in width to segment 8; coloration not as above *Ephemerella ignita* (Poda)
5. Lamellate gills on abdominal segments 3-6 similar in size, regularly imbricated; body elongate
- Lamellate gills on segments 3-6 dissimilar, the first one longer and almost completely covering the others; body hairy and of heavy appearance *Torleya major* (Klapálek)
6. Maxillary palpi present; a light median longitudinal band on head and thorax *Ephemerella mesoleuca* (Brauer)
- Maxillary palpi absent; pattern not as above 7
7. Frontal region of head darker than remainder; abdominal sternites with three longitudinal dark lines; glossae longer than wide; mentum divided; lateral margins of submentum strongly concave (fig. 2) *Serratella hispanica* (Eaton)
- Coloration pattern on head and abdomen not as above; glossae as long as broad; mentum not divided; lateral margins of submentum slightly concave (fig. 1) *Serratella albai* sp.n.

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REFERENCES

- ALBA TERCEDOR, F. J. (1981): Efemerópteros de Sierra Nevada: Ciclos de desarrollo, taxonomía y ecología de las ninfas. — Tesis Doctoral, 475 pp., Universidad de Granada.
- (1983): *Ephemerella (Chitonophora) ikonomovi nevadensis* n.ssp. de Sierra Nevada, España. (Ephemeroptera, Ephemerellidae). — Bol. Asoc. Esp. Entomol.: in print.
- ALBA TERCEDOR, F. J. & SANCHEZ ORTEGA, A. (1983): Presencia del género *Torleya* Lestage, 1917 (Insecta, Ephemeroptera: Ephemerellidae) en la península ibérica. — Bol. R. Soc. Esp. Hist. Nat. 6: 285-293.
- ALLEN, R. K. (1980): Geographic distribution and reclassification of the subfamily Ephemerellinae (Ephemeroptera: Ephemerellidae). — In: Advances in Ephemeroptera Biology. Ed. J. F. FLANNAGAN & K. E. MARSHALL. Plenum Publ. Co. p. 71-91. New York.
- ALLEN, R. K. & EDMUNDS, G. G. (1962): A revision of the Genus *Ephemerella* (Ephemeroptera). V. The Subgenus *Drunella* in North America. — Misc. Publ. Entomol. Soc. Amer. 3: 147-179.
- (1963a): A revision of the Genus *Ephemerella* (Ephemeroptera: Ephemerellidae) VI. The Subgenus *Serratella* in North America. — Ann. Entomol. Soc. Amer. 56: 583-600.
- (1963b): A revision of the Genus *Ephemerella* (Ephemeroptera: Ephemerellidae) VII. The Subgenus *Eurylophella*. — Canad. Entomol. 95: 597-623.
- EDMUNDS, G. F., JENSEN, S. L. & BERNER, L. (1976): The Mayflies of North and Central America. — Univ. Minnesota Press, 330 pp., Minneapolis.
- GONZALEZ DEL TANAGO, M. (1978): Efemerópteros, Plecópteros y Odonatos del Coto Nacional de las Sierras de Cazorla y Segura. — Tesis Doctoral, 172 pp., Univ. Polit. de Madrid.
- HERRANZ SANZ, J. M. & GONZALEZ DEL TANAGO, M. (in press): Contribución al estudio de la distribución y biología de algunos efemerópteros raros en la península ibérica. I Congr. Asoc. Esp. Limnol. 1981.
- KEFFERMÜLLER, M. & DA TERRA, L. S. W. (1978): The second European species of the subgenus *Eurylophella* Tiensuu (Ephemeroptera, Ephemerellidae, *Ephemerella*) Bull. Acad. Pol. Sc. 25: 29-33.
- PUTHZ, V. (1978): Ephemeroptera. — In: Limnofauna Europaea. Ed. J. ILLIES. p. 256-263. G. Fischer Verlag. Stuttgart.

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