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*CHOROTERPES (CHOROTERPES) SALAMANNAI*, A NEW SPECIES OF  
MAYFLY FROM CENTRAL AND SOUTH WEST SPAIN<sup>(1)</sup>

(Ephemeroptera Leptophlebiidae)

Two species of *Choroterpes* (*Choroterpes*) Eaton, 1881 are known in Europe: *Ch. picteti* Eaton, 1871 and *Ch. borbonica* Belfiore, 1988. In the Mediterranean area, two species from North Africa, have been described, namely *Ch. atlas* Soldan & Thomas, 1983 and *Ch. volubilis* Thomas & Vitte, 1988, and one from the Island of Lesbos, *Ch. lesbosensis* Gaino & Sowa, 1985.

The description of a new species of *Choroterpes* s.s. is here reported, based on female and male nymphs and eggs. The mating apparatus of the subimago has been illustrated by dissecting a mature male nymph which was about to emerge.

*Choroterpes (Choroterpes) salamannai* sp. n. (Figs. 1-3)

*Material examined* - Holotype ♀ nymph: Central Spain, Extremadura. Rio Almonte, 350 m a.s.l. near Jaraicejo, 4.VI.1992, leg. Gaino, Bongiovanni & Raineri. The specimen, part in alcohol and part in a slide, was deposited in the collection of the Museum of Natural History of Genova, Italy. Paratypes: 1♂ and 1♀ nymph; the mating apparatus of a subimago was dissected from a mature male nymph and mounted on a slide. The paratypes were deposited in the collection of The Museum of Natural History of Genova. Five nymphs from Rio Almonte (same sampling area as the holotype) and four nymphs from Andalucia, Rio Guadalimar, 6.VI.1992, leg. Gaino & Bongiovanni are in the personal collection of E. Gaino.

*Type locality* - Rio Almonte, near Jaraicejo, Extremadura, Spain.

*Description* - Female nymph (Figs 1-3): body length 9.2 mm, cerci 10 mm; head dusty brown; legs light yellow, without distinct spots, tibiae and tarsi pale; abdominal terga brown with a pale longitudinal stripe and two sub-medial pale spots near the fore margin (Fig. 1 A); ventral side of body yellow-brown.

*Mouthparts* - Inner mandibular incisor longer than the outer one (Fig. 1 B). Inner incisor of the left mandible with numerous denticles on the dorsal border only (Fig. 1 C). Distal segment of the labial palp 2.1 times longer than the base; it has one row of 5 setae and an indented apex (Fig. 1 D). Maxillary palp with the last segment two times longer than wide and ending in a double-pointed apex (Fig. 1 E). The middle segment of the maxillary palp with a few long bristles

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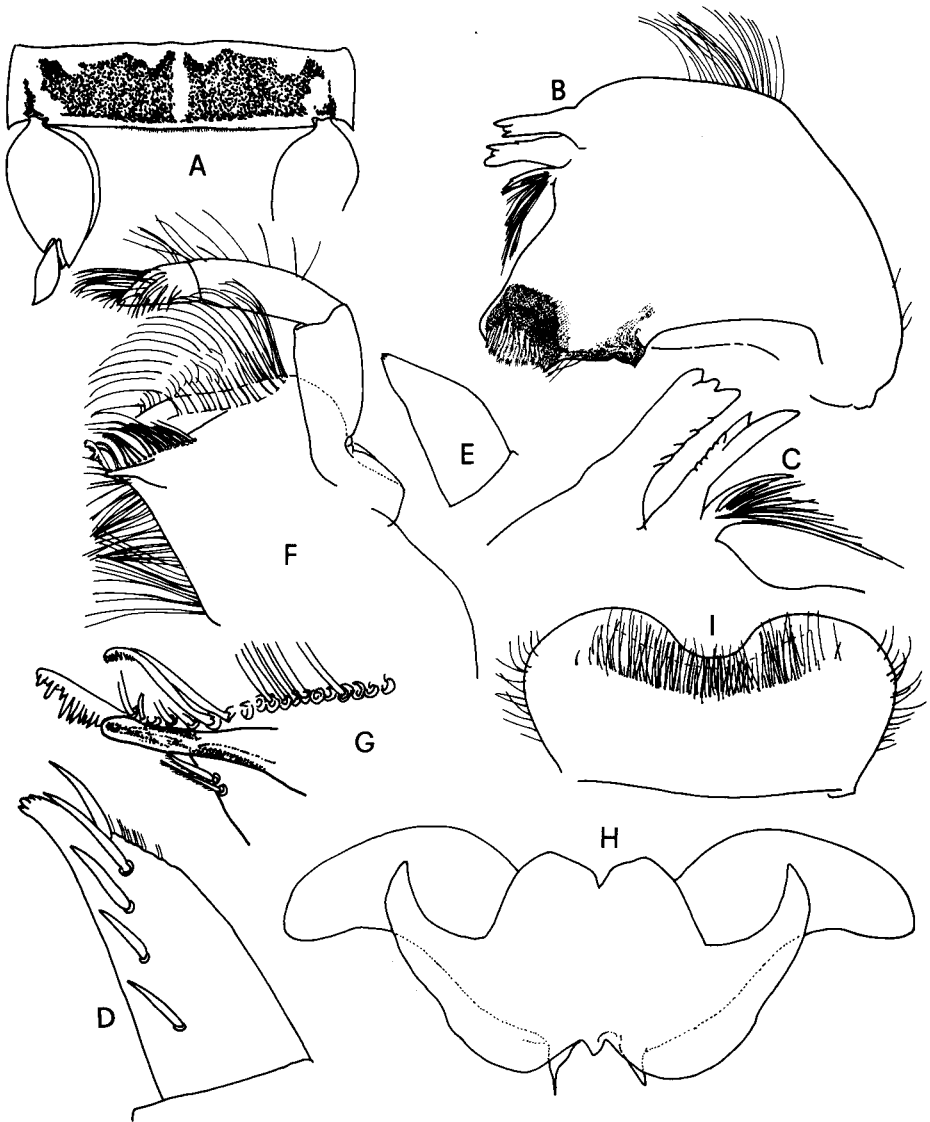


Fig. 1. *Choroterpes (Choroterpes) salamannai* sp. n. - A: tergite 6, colour pattern; B: right mandible; C: incisors and prostheca of the left mandible; D: segment 3 of the labial palp; E: apical segment of the maxillary palp; F: right maxilla; H: hypopharynx; I: labrum.

along the dorsal border (Fig. 1 F). Inner anterior margin of maxilla with a long, broad and apically rounded tooth-like projection (Fig. 1 G). Hypopharynx with the lateral processes of lingua pointed at the apex and not converging towards the

middle of the lingua (Fig. 1 H). Labrum with antero-median margin deeply incised (Fig. 1 I).

**Legs** - Fore femora with thin bristles and two types of spines along the dorsal margin (Fig. 2 A). The first type is represented by conical short elements (Fig. 2 B), while the second type, occurring from the middle to the anterior end of each article, is thin, straight and long (Fig. 2 C). The dorsal surface has short spines similar to those of the margin (Fig. 2 D). Fringed spines occur along the ventral border of the tibiae (Fig. 2 E). Claws slightly bent apically, apical denticle as long as the others (Fig. 2 F).

**Abdomen** - Tergites with the posterior margin with a row of long triangular spines intercalated with fringed scale-like bristles. These form two irregular rows immediately above the triangular spines (Fig. 3 C). Very thin long bristles are occasionally present along the posterior margin. Ninth sternum with a central emargination. Gill 1 is long, broad with pointed tip (Fig. 2 G), the other gills have a high tracheal net in both lamellae. Gill 4 with the central process of the dorsal lamella lanciolated and short (Fig. 2 H). Cerci pale.

**Male nymph** - Body length 7.4 mm, cerci 8.3 mm. It differs from the above described holotype in the ninth sternum which presents two clearly separated apical lobes.

By examining a mature male nymph, which was about to emerge, it was possible to discern the subimaginal mating apparatus and to detect the following characteristics: forceps with a pointed apex (Fig. 2 I); penis lobes apically divergent and bent ventrally with spines in the apical area (Fig. 2 J).

**Eggs** - Length 210  $\mu\text{m}$ , width 110  $\mu\text{m}$ . Chorion uniformly decorated by reliefs (Fig. 3 A). They converge towards a central disk forming repetitive raised units with a flower-like appearance (Fig. 3 B).

**Ecology** - Nymphs inhabit permanent streams with dominant substratum composed of stones. Emergence begins at the end of June.

**Derivatio nominis** - The species was named after Prof. G. Salamanna in recognition of his helpful support in sampling the material during several field expeditions in Spain.

**Remarks** - Nymphs of *Ch.(Ch.) salamannai* are distinguished by the following combination of characters: (1) abdominal tergites brown with a pale longitudinal stripe and two sub-median pale spots near the fore margin; (2) distal segment of the labial palp with one row of 5 setae; (3) numerous denticles present in the dorsal border of the inner incisor of the left mandible; (4) hypopharynx with the lateral processes not converging towards the middle of the lingua; (5) anterior margin of the fore femora with two different types of spines; (6) posterior margin of the tergites with long triangular spines intercalated with fringed scale-like bristles; (7) chorion with repetitive units raised on the egg surface in a flower-like pattern. The  $\sigma$  subimago is distinguished by penis lobes apically bent towards the ventral side and with denticles in their apical area.

**Affinity** - Penis lobes of the subimago of *Ch. (Ch.) salamannai* are somewhat intermediate between those of *Ch. picteti* and *Ch. atlas*. Indeed, they are bent ventrally, like *Ch. picteti* (Fig. 2 K) while having spines in the apical area, like *Ch. atlas*. Spines are also present in the penis lobes of *Ch. volubilis*, but the shape of

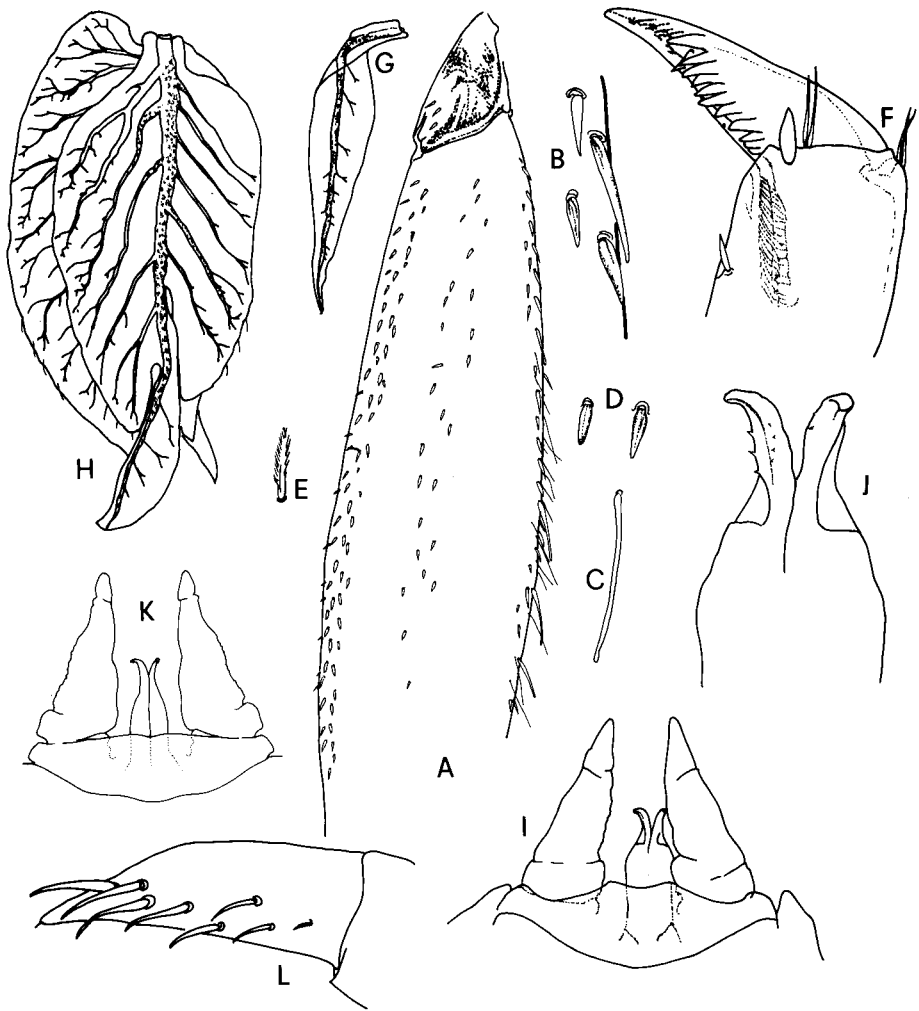


Fig. 2. *Choroterpes (Choroterpes) salamannai* sp. n. - A: fore femora; B: short spines of the anterior border of the fore femora; C: long spines of the anterior border of the fore femora; D: spines on the dorsal surface of the fore femora; E: fringed spines of the ventral border of the tibiae; F: claw; G: gill 1; H: gill 4; I: genitalia of ♂ subimago; J: details of the penis lobes; K: genitalia of the subimago of the subimago of *Ch. (Ch.) picteti*; L: segment 3 of the labial palp of *Ch. (Ch.) picteti*.

the penis lobes is markedly different. The lack of spines in *Ch. borbonica* distinguishes this species from *Ch. salamannai*. The nymph of *Ch. salamannai* differs from *Ch. picteti* in terms of colour pattern of the abdominal tergites, the more

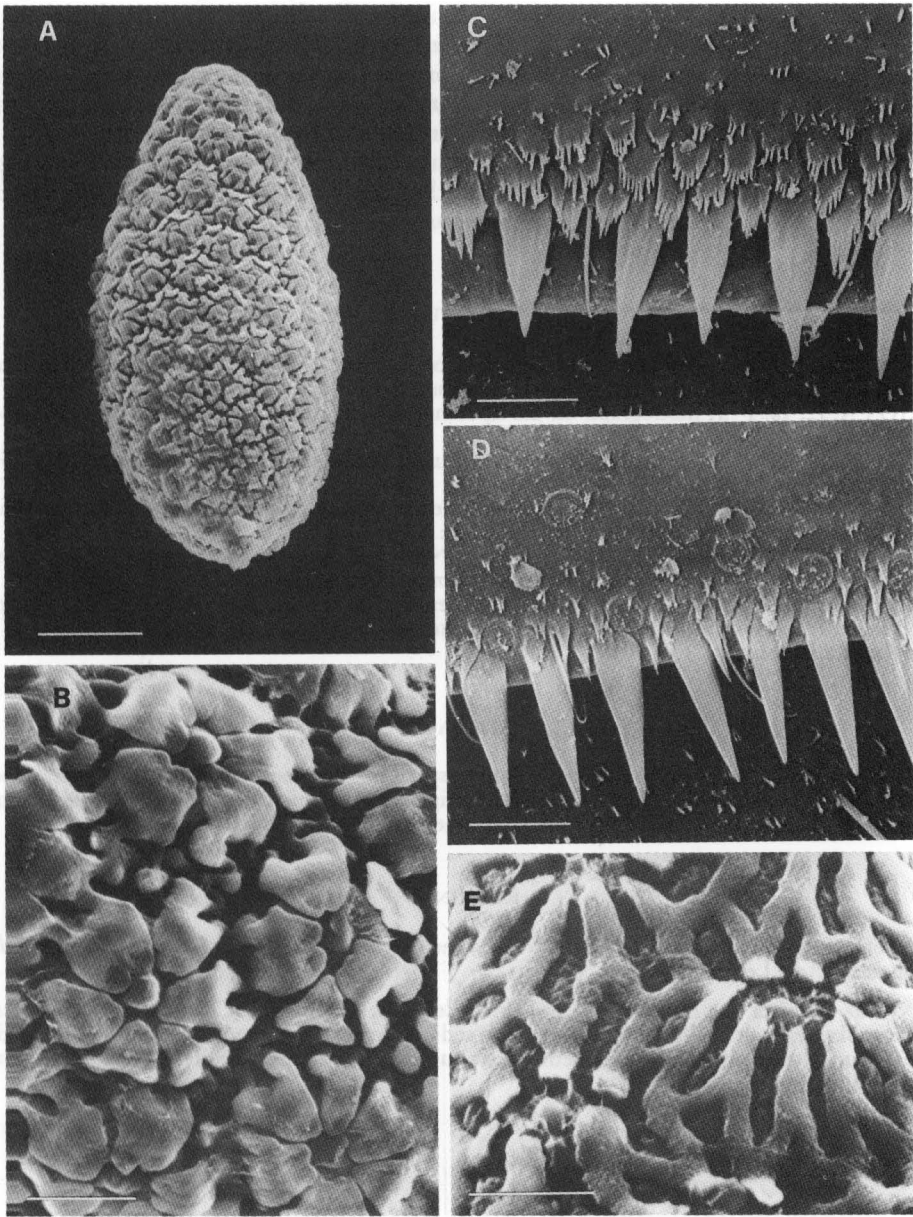


Fig. 3. Scanning electron microscopy view of: *Choroterpes (Ch.) salamannai* sp. n. (A, B, C) and *Choroterpes (Ch.) picteti* (D, E: a specimen for comparison collected in the Erro Stream, Piedmont, Italy). A: egg; B, E: details of the chorionic pattern; C, D: tergite 6, posterior margin. (A, bar = 50  $\mu\text{m}$ ; B, E bar = 10  $\mu\text{m}$ ; C, D bar = 15  $\mu\text{m}$ ).

complex ornamentation in the posterior border (compare Fig. 3 C with Fig. 3 D), and the occurrence of a row of 5 setae in the distal segment of the labial palp (compare Fig. 1 D with Fig. 2 L). *Ch. salamannai* differs from *Ch. borbonica* in both shape and distribution of the spines on the femora and in the presence of an extensive tracheal net in the gills. *Ch. salamannai* is different from *Ch. atlas* in both the pigmentation of the abdominal tergites and in the presence of a row of 5 setae in the distal segment of the labial palp. The chorionic pattern of the eggs (Figs 3 A, B) is completely different from that described in the other species: *Ch. picteti* (Fig. 3 E), *Ch. lesbosensis*, *Ch. borbonica* and *Ch. atlas*.

## LITERATURE

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## ABSTRACT

*Choroterpes (Choroterpes) salamannai* a new species of Leptophlebiidae from Central and South West of Spain is described. The relationships between this new species and other members of *Choroterpes* s.s. from Europe and from other Mediterranean areas are presented.

## RIASSUNTO

*Choroterpes (Choroterpes) salamannai* una nuova specie dalla Spagna centrale e sud-occidentale (Ephemeroptera Leptophlebiidae).

Viene descritta una nuova specie di Leptophlebiidae, *Choroterpes (Choroterpes) salamannai*, su esemplari raccolti nella Spagna centrale e sud-occidentale. Vengono illustrate le affinità di questa nuova specie con altri rappresentanti sia europei che dell'area mediterranea appartenenti al genere *Choroterpes* s.s.