

Aquatic Insects, Vol. 3 (1981), No.3, pp. 171-178.

On the Italian Species of the *Ecdyonurus lateralis* Group (Ephemeroptera, Heptageniidae)*

by

Carlo BELFIORE

ABSTRACT

Taxonomy and nomenclature of the Italian members of the *Ecdyonurus lateralis* group are reviewed, the three Italian species are keyed. *Ecdyonurus grandiae* sp. n. (= *Heptagenia lateralis* sensu Grandi, 1953) is named, some characters of *E. lateralis* (Curtis, 1834) (= *E. concii* Grandi, 1953; s y n . n.) and *E. gridellii* (Grandi, 1953) are also described. Lectotypes are designated for *E. concii* and *E. gridellii*.

INTRODUCTION

According to Grandi's monograph on Italian Mayflies (Grandi, 1960) three species of the *Ecdyonurus lateralis* group are found within Italy: Grandi named them *Heptagenia lateralis* (Curtis, 1834), *H. concii* Grandi, 1953 and *H. gridellii* Grandi, 1953, respectively. In her descriptions Grandi did not designate type-specimens for *H. concii* and for *H. gridellii*; recently I have examined all the specimens determined by Grandi as *H. concii* and *H. gridellii* available in her collection, the subjects of her original descriptions included, and I have compared this material with some *E. lateralis* specimens from Central Europe and with freshly collected material from Italy.

It may be pointed out that the *Ecdyonurus* specimens which Grandi (1953, 1960) identified as *Heptagenia lateralis* on the basis of Eaton's old description (Eaton 1883-1888) are notably different in some important characters from *E. lateralis* of Great Britain (see Kimmins 1972: fig. 16 L) and Central Europe; *E. lateralis* sensu Grandi is a new species, which here I name *Ecdyonurus grandiae* sp. n.. On the other hand the species described by Grandi (1953) as *Heptagenia*

* Research supported by a Rome University Grant, Res. Project: "Indagine sulle zoocenosi di un sistema reico del Lazio: il fiume Mignone."

concii resembles closely, especially in typical features of penis stem, the real *E. lateralis*: *Heptagenia concii* is in fact a junior synonym of *E. lateralis*. This is also confirmed by examination of nymphal skins of reared individuals.

For clarification of the taxonomic and nomenclatural problems some characteristic features of the new species, *Ecdyonurus grandiae*, and of the closely related *E. lateralis* are described. The only *E. gridellii* now available from Grandi's collection is also briefly dealt with.

***Ecdyonurus grandiae* sp.n. (Figs. 1b, 2b, 3, 4a, 5b)**

(= *Heptagenia lateralis*: Grandi, 1953; 1960; nec Curtis, 1834)

Identity of *E. grandiae* sp. n. with *H. lateralis* sensu Grandi was established by examination of a male and a female from Grandi's collection.

Male imago. Eyes brown in living specimens, after few days in alcohol they turn to pinkish grey. In comparison with eyes of *E. lateralis* they appear, in lateral view, more symmetrical (Fig. 1b). Thorax dorsally and ventrally brown with black spots, laterally pale yellowish; it lacks the yellow streak typical of fresh *E. lateralis* specimens (see Eaton 1883-1888: pag. 295). Wings transparent, *C*, *SC* and *R* not lighter than other veins. Fore legs brown, darker in the middle of fore femur, mid and hind legs pale yellow brown, tarsi darker.

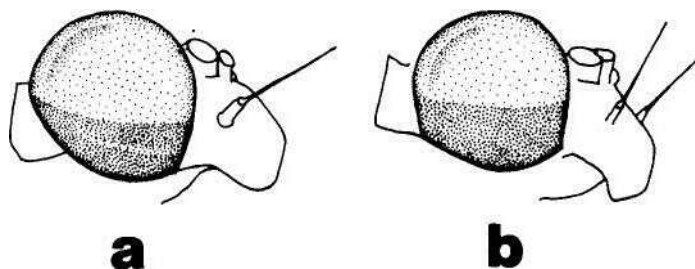


Fig. 1. Eyes of male imago in lateral view; a, *E. lateralis*; b, *E. grandiae*.

Abdomen yellow brown with reddish brown spots on tergites in the following pattern (Fig. 2b): two darker spots on hind corners of tergites, two nearly rectangular reddish spots on fore corners, two dark stripes from the middle of fore margin, slightly converging backwards. This pattern fades after a long conservation in alcohol. Some old specimens are quite uniformly yellowish, but in all the fresh material that I have examined the abdominal pattern is a constant character.

Gonopodes brown. Penis lobes (Fig. 3) slightly divergent, distally wider and truncate. In dorsal view the lateral sclerites, hardly visible, are turned forward. Lateral margin of penis stem without any step. Cerci brown, distally lighter.

Female imago. Females larger (up to 12 mm) than males collected at the same

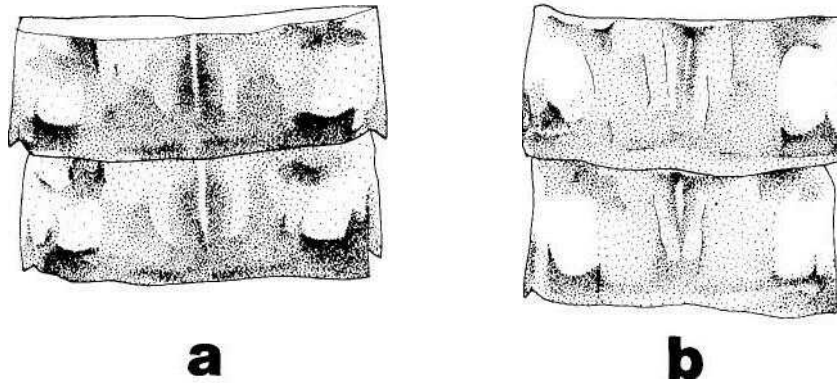


Fig. 2. Pattern of male imago 3rd and 4th tergites (from slides with fresh material): a, *E. lateralis*; b, *E. grandiae*.

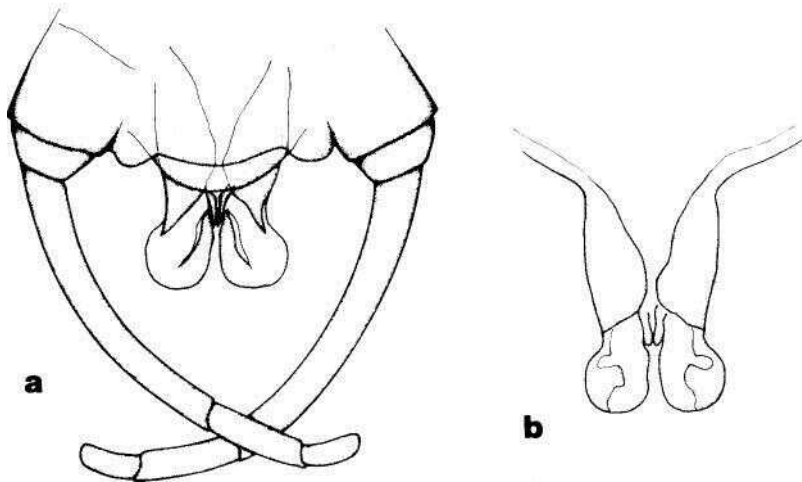


Fig. 3. Penis of *E. grandiae*: a, ventral view; b, dorsal view.

time. Excision on hind border of head usually well marked, strongly rounded: variability of this character is illustrated in Fig. 4a. Also the shape of ventral plate on VIII and IX segments is very variable in examined material. Tergites with dark spots on hind comers and lighter spots on fore corners: the fore spots disappear after few weeks of preservation in alcohol.

Eggs provide the main character for a correct determination of *E. grandiae* females: in all the material that I have examined they lack an evident adhesive apparatus on the chorion.

Nymph. For general features of *E. grandiae* nymphs see Grandi (1960: pag. 352. sub nom. *Heptagenia lateralis*). I did not find any diagnostic character in

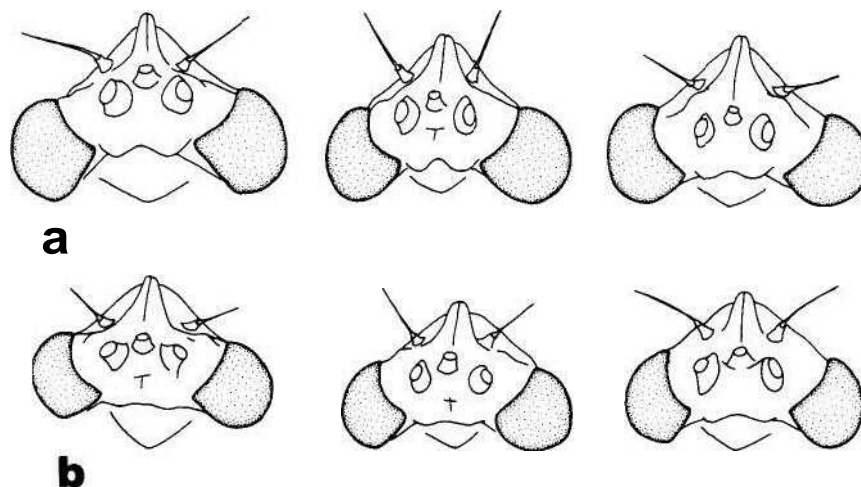


Fig. 4. Variability of hind border of female head in two populations from Central Italy; a, *E. lateralis* (R. Fiume, Roma); b, *E. lateralis* (F. Licenza, Roma).

abdominal pattern, mouthparts and gill shape (see Grandi 1960: fig. 142); in all the nymphs of *E. grandiae* which I have examined the spines on upper surface of the femora are short and rounded on fore femur and on distal end of mid femur, pointed elsewhere (Fig. 5b); moreover the hairiness on hypopharynx extends to the whole lateral lobes.

Affinities. In Europe we know the following species of the *E. lateralis* group, characterized by egg-shaped penis lobes: *E. lateralis* (Curtis, 1834), *E. affinis* Eaton, 1887, *E. gridellii* (Grandi, 1953), *E. quadrilineatus* (Landa, 1970), *E. fasciocolatus* Sowa, 1974, *E. ozrensis* (Tanasijevic, 1975); dubious and little known species are *E. mazedonicus* (Ikononov, 1954) and *E. trimaculatus* (Ikononov, 1963). *E. grandiae* is very closely related to *E. lateralis* s. str.: I will point out the differences between the two species in a short description of *E. lateralis* and in the keys below. According to Sowa's opinion (Sowa 1974), *E. fasciocolatus*, *E. trimaculatus* and probably *E. mazedonicus* may be considered more related with *E. affinis*, and are quite different from *E. lateralis* in some nymphal and adult characters. *E. ozrensis* differs from *E. grandiae* in abdominal marking (see Tanasijevic 1975: fig. 1), *E. gridellii* in abdominal marking and in some characters of penis, see below.

Material. Holotype: ITALY, Tolfa (Roma), Rio Fiume, Strada Provinciale 3b, Km 7,5/1♂ emerged on 10.V.1980 from a reared nymph collected on 1.V.1980, with its nymphal exuvia.

Paratypes: from the same locality: 1.V. 1980, 5 nymphs, 5 ♂♂; 31.V. 1980, 10 ♂♂, 5 ♀♀; Manziana (Roma), F. Mignone, 31.V. 1980, 5 ♂♂, all C. Belfiore leg. 5 paratype ♂♂ preserved in the Institute of Zoology, Rome University; holotype and other paratypes in my collection.

Other material. Liguria, Savona, 28.VI.1946: 1 ♂, 1 ♀, from Grandi's collection; Lazio, Rio Fiume, 24.IX. 1977: 9 ♂♂, 2 ♀♀; 1.V. 1980: 20 ♂♂, 32 ♀♀, (reared) with nymphal exuviae; 31.V. 1980:

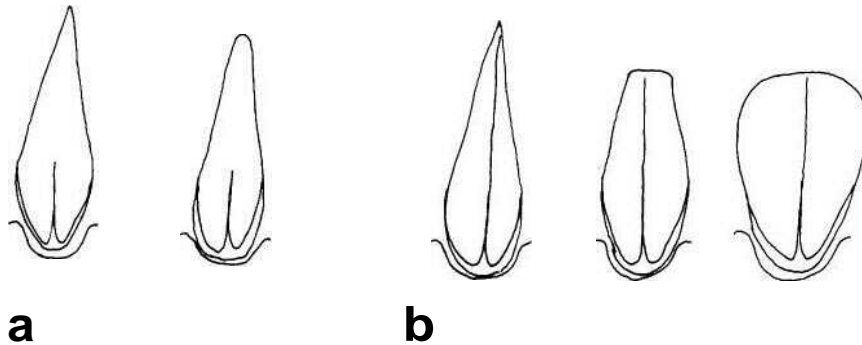


Fig. 5. Spines on upper surface of nymph femora: a, *E. lateralis*; b, *E. grandiae*, on the right the spines on distal end of fore and mid femora.

18 ♂♂, 15 ♀♀, (reared) with nymphal exuviae; Manziana (Roma), F. Mignone, 31.V. 1980: 34 ♂♂, 4 ♀♀; Toscana, Monticiano (Siena), T. La Gonna, 4.V. 1980: 4 ♂♂, 3 ♀♀, (reared) with nymphal exuviae, 8 nymphs.

***Ecdyonurus lateralis* (Curtis, 1834) (Fig. 1a, 2a, 4b, 5a, 6)**

(= *Heptagenia concii* Grandi, 1953: syn. nov.)

Conspecificity between *E. lateralis* (Curt.) and *E. concii* (Grandi) was established by comparison of imagines of *E. concii* with *E. lateralis* from Poland and with the descriptions of Eaton (1883-1888: pag. 294) and Kimmins (1972: pag. 47; fig. 16 L). Determination of *E. lateralis* adults was confirmed by rearing nymphs from Central Italy: their morphology fully agrees with Macan's detailed description (Macan 1958, sub nom. *Heptagenia lateralis*).

Males of *E. lateralis* are very similar to *E. grandiae* male imagines. I have examined a large number of individuals from only one population (Central Italy, Lazio: F. Licenza): most characters are not very constant. Main differences in comparison with *E. grandiae* are: eyes usually broader and more asymmetrical (Fig. 1a); in freshly collected material there is a bright yellow streak before the junctions of fore wings; also in fresh material *C*, *SC* and *R* are yellowish brown, lighter than other veins, abdominal pattern with two submedial arc-shaped light spots (Fig. 2a). Penis lobes usually not truncate at apex but ovoidal (Fig. 6). Main difference in genital apparatus is in lateral margin of penis stem on which, in *E. lateralis*, there is a little step (Fig. 6).

Females are also very similar to *E. grandiae*. Hind border of head is usually little excised (Fig. 4b). The last segment of mid and hind tarsus is not as short as figured by Grandi (1953, pag. 364: fig. XXXI) for *Heptagenia concii*, but similar in relative length to the last tarsal segment of *E. grandiae* females. Abdominal marking is more intense in *E. lateralis*, on a lighter background.

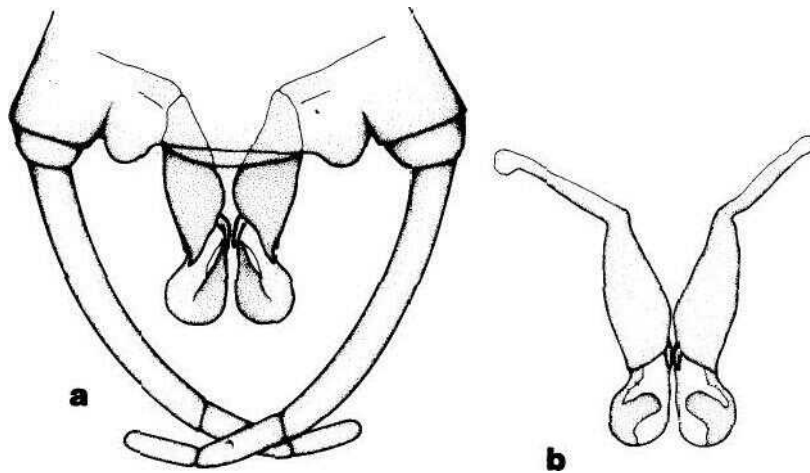


Fig. 6. Penis of *E. lateralis*: a, ventral view; b, dorsal view.

Eggs always have an evident adhesive apparatus on the chorion (see Degrange 1960: pl. X, fig. 19; sub. nom. *Heptagenia lateralis*).

Nymphs described in detail by Macan (1958) and Grandi (1953, 1960, sub nom. *Heptagenia concii*). Hairiness on hypopharynx does not extend to the whole lateral lobes (see Grandi; 1960: fig. 141, 3); spines on upper surface of femora are all pointed (Fig. 5a).

Material. ITALY. Liguria, Genova, 20.IV.1947, C. Conci leg.: 1 ♂, lectotype of *Heptagenia concii* Grandi, here designated; 1 ♂, 1 ♀, paralectotypes, in Grandi's collection. Lazio, F. Licenza (Roma), Strada Statale 314 Km 36,200, 30.X.1977: 10♂♂, 3♀♀; 26.IV.1980, 50 ♂♂, 20 ♀♀, (reared) with nymphal exuviae, 20 nymphs; 4. V. 1980: 30 ♂♂, 20 ♀♀, (reared) with nymphal exuviae; 4.VI.1980: 23 ♂♂, 35 ♀♀, (reared) with nymphal exuviae. Lazio, Orvinio (Rieti), 19.VI.1980: 10 ♂♂, 5 ♀♀, (reared) with nymphal exuviae, 20 nymphs. POLAND. Myslenice, F. Raba, 19.IV.1980, 5 nymphs, R. Sowa and C. Belfiore leg.. Some additional nymphs and males from Poland in R. Sowa's collection at Krakow were examined.

***Ecdyonurus gridellii* (Grandi, 1953) (Fig. 7)**

In Grandi's collection only one male imago referred to this species is preserved labelled: Trieste, Muggia, 25.IV.1951, E. Gridelli leg; I here designate it lectotype. It lacks fore legs and its eyes are in bad condition. Wings are less transparent than in *E. lateralis* and *E. grandiae*, very slightly tinged yellowish. Abdominal pattern figured by Grandi (1953) still visible in this specimen, although pale. Penis lobes (Fig. 7) are turned inwards, medial excision is U-shaped. There is, as in *E. lateralis*, a step on lateral margin of penis stem, but smaller than in Curtis' species.

The constancy of the diagnostic characters and the validity of the species will

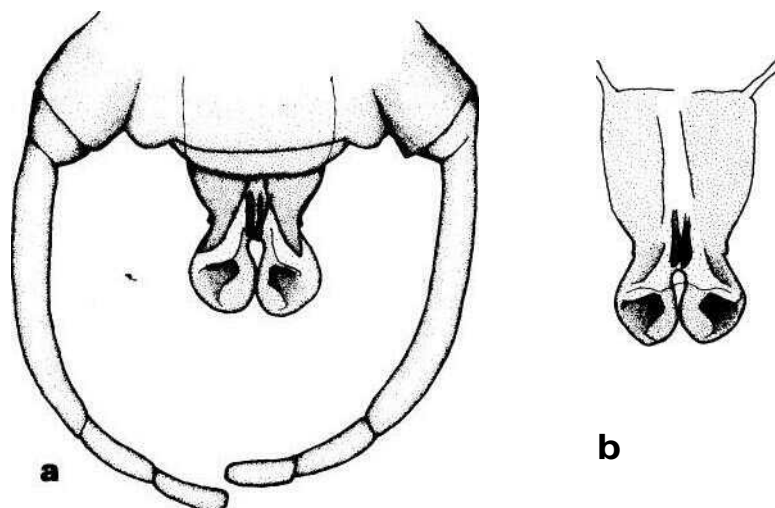


Fig. 7. Penis of an *E. gridellii*: a, ventral view; b, dorsal view.

have to be confirmed by study of more material; *E. gridellii* is only tentatively included in the key below. Its nymph is still unknown.

Keys to Italian species of the *Ecdyonurus lateralis* group

Male Imagines

- 1. A little step on lateral margin of penis stem (Fig. 6, 7) 2.
- Lateral margin of penis stem straight (Fig. 3) *E. grandiae* sp. n.
- 2. Penis lobes never separated by an U-shaped excision (Fig. 6). Wings transparent, except costal areas. Abdominal marking as in Fig. 2a (on fresh material) *E. lateralis* (Curt.)
- Penis lobes separated by an U-shaped excision (Fig. 7). Wings faintly tinged yellowish. Abdominal marking as figured by Grandi (1953: pag. 351, fig. XXIII) *E. gridellii* (Grandi)

Female Imagines

- 1. *C*, *SC* and *R* lighter than other veins (on fresh material). Eggs with adhesive apparatus on chorion *E. lateralis*
- *C*, *SC* and *R* brown like other veins. Eggs without adhesive apparatus *E. grandiae* sp. n.

Nymphs

- 1. Spines on upper surface of the femora all pointed *E. lateralis*
- Distal spines on fore and mid femora rounded ... *E. grandiae* sp. n.

ACKNOWLEDGEMENTS

I wish to thank Prof. M. Grandi, who kindly let me examine her collection, and Prof. R. Sowa for his kind hospitality at Krakow and for his precious suggestions.

REFERENCES

- CURTIS, F. (1834): Descriptions of some non descript British species of Mayflies of Anglers. - Lond. Edinb. Phil. Mag., 4, 103-122.
- DEGRANGE, C. (1960): Recherches sur la reproduction des Ephéméroptères. - Trav. Lab. Hydrobiol. Pise. Univ. Grenoble, 50/51, 7-193.
- EATON, A. E. (1883-1888): A revisionai monograph of recent Ephemeridae or Mayflies. - Trans. Linn. Soc., 2, 1-352.
- GRANDI, M. (1953): Contributi allo studio degli Efemeroidei italiani. XV11. Ecdyonuridae. - Boll. Ist. Ent. Univ. Bologna, 19, 307-386.
- (1960): Ephemeroidea. -Calderini, Bologna, 1-474.
- IKONOMOV, P. (1954): Novaspecija *Heptagenia* (Ephemeroptera) od Makedonija (Ecdyonuridae). - Fragm. Balcan. Mus. Mac. Sc. Nat., Skopje, 1, 57-68.
- (1963): Eintagsfliegen (Ephemeroptera) Macedoniens. Genus *Heptagenia* (Ecdyonuridae). -Ann. Fac. Sc. Univ. Skopje, 14, 155-165.
- KIMMINS, D. E. (1972): A revised key to the Adults of the British Species of Ephemeroptera with notes on their Ecology. - Freshw. Biol. Ass., 15, 2nd ed., 1-75.
- LANDA, V. (1970): *Ecdyonurus submontanus*, *Heptagenia quadrilineata*, *Rhithrogena hercynia*, new species of Mayflies (Ephemeroptera) of the family Heptageniidae from Czechoslovakia. - Acta entomol. bohemoslov., 67, 13-20.
- MACAN, T. T. (1958): Descriptions of the nymphs of the British species of *Heptagenia* and *Rhithrogena*. - Entomol. Gaz., 9, 83-92.
- SOWA, R. (1974): *Ecdyonurus fascioculatus* sp. n., espèce voisine d'*E. affinis* Eaton du midi de la Pologne (Ephemeroptera, Heptageniidae). - Bull. Acad. Pol. Sci., 22, 315-323.
- TANASIJEVIC, M. (1975): *Heptagenia ozrensis* sp. n. und der Fund von fünf Ephemeroptera-Arten in Bosnien und der Hercegovina. - Wiss. Mitt. Bosn-herzeg. Landesmus., 4-5, 243-246.

Address of the Author:
Dr. Carlo BELFIORE
Istituto di Zoologia dell' Università di Roma
Viale dell' Università, 32
00100 Roma, Italy