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Leuctra vinconi aubertorum, a new subspecies of *Leuctra* from the Ticino canton, Switzerland (Plecoptera Leuctridae)

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Adult males and females of *Leuctra vinconi aubertorum* ssp. n., belonging to the *L. brevipennis* group (RAVIZZA & RAVIZZA DEMATTEIS, 1992), are described. The subspecies appears to be a geographical race endemic to the Mount Tamaro, where it occurs in autumn in small springs and spring rivulets at altitudes ranging from 970 to 1'270 m a.s.l. The description is supported by original drawings of the abdomen tip of both the new race, and the typical form. Ecological and zoogeographical comments as well as a distribution map of these forms and the related *L. brevipennis* RAVIZZA, 1978 are added.

Keywords: mountain stream fauna, Plecoptera, new subspecies, Alps.

INTRODUCTION

In the description of *Leuctra vinconi* (RAVIZZA & RAVIZZA DEMATTEIS, 1993b), we noticed that the population of this species, inhabiting the northern slopes of Mount Tamaro in the South of the Ticino canton in Switzerland, probably belongs to a different race. The study of several specimens that we had the opportunity to collect there in a few rivulets and exiguous springs, allows us to identify some morphological differences between the adult males of the type series of *Leuctra vinconi*, and those of Mount Tamaro which constitute a geographical race of it.

DESCRIPTION

Leuctra vinconi aubertorum ssp. n.

Material examined

Switzerland, Ticino canton, Mount Tamaro northern slopes, Vira valley, very small springs and spring rivulets tributaries to the brooklets crossing the car road climbing from Vira to the Neggia Pass, Holotype 1 ♂, 970-1'190 m a.s.l., 1.X.1990; Paratypes 1 ♂, 970-1'190 m a.s.l., 17.IX.1988; 12 ♂♂, 13 ♀♀, 1'270 m a.s.l., 1.X.1990; 27 ♂♂, 24 ♀♀, 1.X.1990.

Holotype ♂ and 32 ♂♂ 27 ♀♀ paratypes are at present in the Ravizza collection. Other paratypes are deposited in the collection of the Musée zoologique, Lausanne, Switzerland (3 ♂♂, 3 ♀♀), of the Limnologische Flußstation, Schlitz, Germany (3 ♂♂, 3 ♀♀) and of Gilles Vinçon, Grenoble, France (3 ♂♂, 3 ♀♀).

Etymology

We have pleasure in dedicating this new race to Prof. Jacques AUBERT, his wife Mrs. Cecile AUBERT-PETIT and their son Charles-Edouard AUBERT, who collected the first male of this form during their researches carried out for many years on the Ticino canton Stonefly fauna.

Diagnosis

A small to medium-sized short winged *Leuctra*, belonging to the *brevipennis*-group. The male differs from *Leuctra vinconi vinconi*, by the longer 8th tergum Y-shaped unpaired process, whose anterior arms are on average more open, by the smaller vesicle of the 9th sternum and by the slender stalk of the epiproct shaped like the cap of a mushroom. The female subgenital plate, is very similar to that of the type species, it differs only by the paired slender appendices, asymmetrical and a little different in shape from each other.

Description

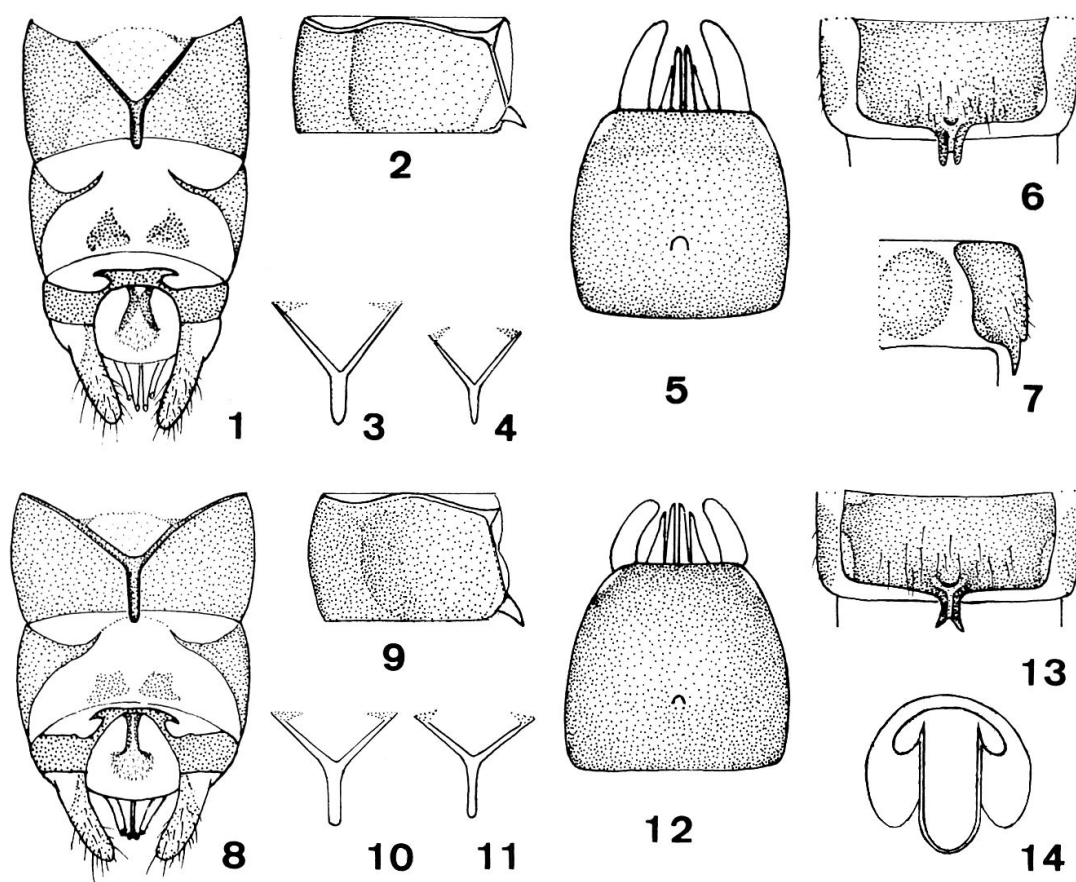
Wings shortened in both sexes. The wings leave exposed the 8th, 9th and 10th abdominal terga. Body and appendages dark brown. Body length, male 6-8 mm, female 7-9 mm; forewing length, male 3.5-4.0 mm, female 4.0-4.5 mm.

Male abdomen (Figs. 8-12).

7th tergum mostly membraneous with a slim sclerotized anterior margin connected to the narrow lateral plates. 8th tergum provided with an unpaired sclerotized median Y-shaped process shaped like a lengthened spatula. The anterior arms of this Y-shaped process that form an obtuse angle of 100-110°, constitute the anterior V-shaped margin of the 8th tergum, connected to the inner anterior corner of the lateral plates. In lateral view the top of this process looks like a sparrow beak projected obliquely upwards and backwards. Lateral plates of the 9th tergum with the inner anterior corner thinned and gently curved inwards and forwards towards the centre of the 8th tergum hind margin. 9th tergum with two paired quadrangular spots. 9th sternum with a very small vesicle a little wider than long. Posterior margin of the 10th tergum with a deep U-shaped notch, from the centre of which projects a slender stalk with thin lateral markings and a membraneous epiproct on the top that looks like a mushroom cap. Paraprocts with styles clearly shorter than specilla. Cerci normal.

Female abdomen (Fig. 13).

The 8th sternum and the subgenital plate have a pattern very similar to that of the nominal species. The subgenital plate has wide contiguous, posterior lobes each bearing at their medial sides a slender pigmented appendix, directed backwards, frequently asymmetrical and a little different in shape from each other, the apex of which is often slightly outwardly diverging. These appendices, from their base to two thirds of their length, are joined to each other by a pigmented membraneous strip. Ahead of the base of these extensions there is a very small and short tubercle, sometimes difficult to see because of the long and pale hairs that cover it. These hairs are much more abundant and thick than is shown in Fig. 13. The armature of



Figs. 1-7. *Leuctra vinconi vinconi* RAV. & RAV. DEM. Tip of the ♂ abdomen in dorsal (1) and ventral view (5); the tips of styles and specilla are schematic. 8th ♂ abdominal segment in lateral view (2). Variability of the 8th abdominal segment ♂ unpaired process (3-4). Subgenital plate of the ♀ in ventral (6) and lateral view (7).

Figs. 8-14. *Leuctra vinconi aubertorum* ssp. n. Tip of the ♂ abdomen in dorsal (8) and ventral (12) view; the tips of styles and specilla are schematic. 8th abdominal segment in lateral view (9). Variability of the 8th abdominal segment ♂ unpaired process (10-11). Subgenital plate of the ♀ in ventral view (13). Armature of the ♀ spermatheca (14).

the spermatheca (Fig. 14) is very similar to that of *L. brevipennis* (see Figs. 6-7, in RAVIZZA, 1978), and lacking any difference from that of the typical subspecies.

Nymph unknown.

Affinities

The features distinguishing males of *L. vinconi vinconi* from those of *L. vinconi aubertorum* are the anterior arms of the Y-shaped process of the 8th tergum less open forming either a right or a feebly acute angle (80-90°), the unpaired process from a quarter to a third shorter, the hind median portion of the 8th tergum at each side of the central process less pigmented than the external sides, the vesicle on the 9th sternum approximately twice as big and the epiproct globular on the top of a strong stalk with wide lateral markings (Figs. 1-5).

The female subgenital plate of *L. vinconi vinconi* is very similar to that of *L. vinconi aubertorum*, from which it differs by the paired subcylindrical process at the medial sides of the posterior lobes, symmetrical and parallel to each other or, rarely, just a little outwardly diverging (Figs. 6-7).

Ecological notes

L. vinconi aubertorum is an autumnal emerger; adults have been collected in September and October. It is a rheophilic species living in very small springs and spring rivulets between 800 and 1'200 m a.s.l. All the adults collected concentrated exclusively in the surrounding of the mentioned biotopes. No specimen was found in the nearest creeks, of which the rivulets are tributaries, that flow at a distance of very few metres.

Like all the other species of the *brevipennis* group as far as known, *L. vinconi aubertorum* is also short winged and unable to fly. The extensive Pleistocene glacier that descended the Ticino valley extending throughout Lake Maggiore up to the Po plain, constituted for thousands of years an impassable barrier for such flightless species. So the populations of *L. vinconi* that lived in the mountains situated on the right side of the Ticino catchment basin were separated from those of the left side. The geographical isolation of the two populations of *L. vinconi* was evidently

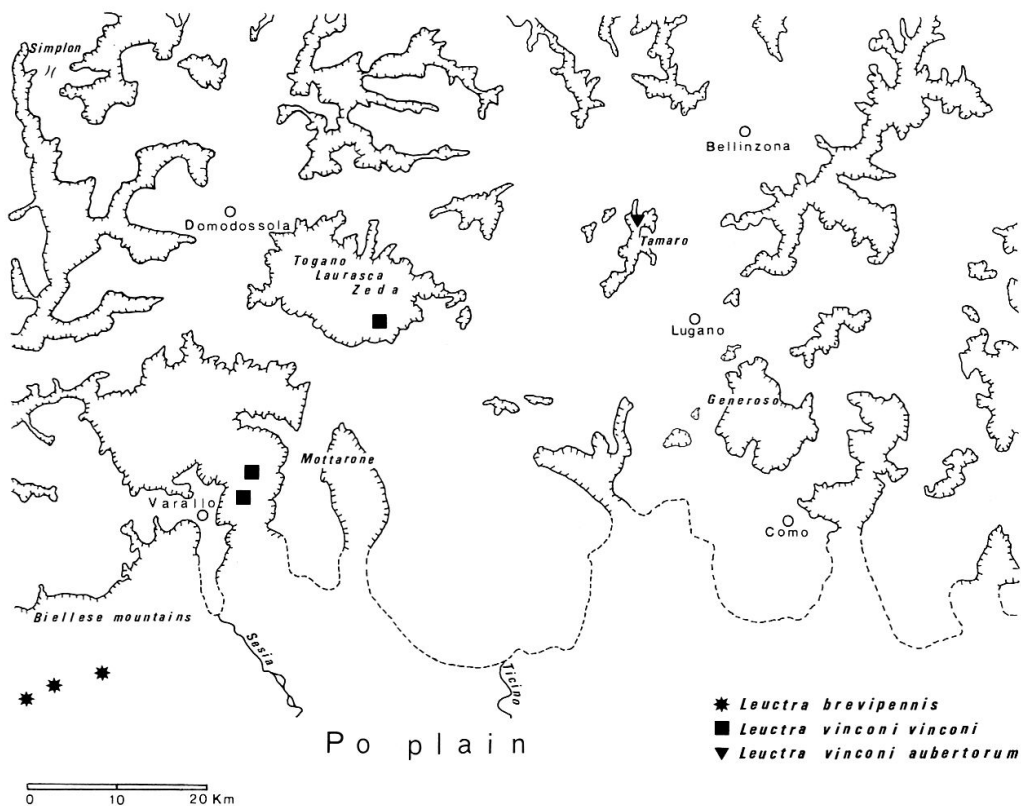


Fig. 15. Sketch of the southern portion of the Ticino canton and adjacent areas during the Würm glaciation (after JAECKLI, 1970, schematised), showing the present distribution of *Leuctra brevipennis*, *L. vinconi vinconi* and *L. vinconi aubertorum*. The ancient front of the glaciers which extended down to the Po plain is shown by outlined lines.

the principal factor determining the evolution of different races: *L. vinconi vinconi* which occurs in the mountains between the Sesia valley and the western side of Lake Maggiore, and *L. vinconi aubertorum* restricted to Mount Tamaro.

Zoogeographical remarks

In two preceding papers (RAVIZZA & RAVIZZA DEMATTEIS, 1992, 1993a), we have pointed out that all the members of the *L. brevipennis* complex live at present in springs and small watercourses (brooks, trickles and spring rivulets) in restricted areas scattered along the southern edge of the Alps, that were Pleistocene glacial refugia. In the Alps, during the Pleistocene glacial advances, areas free from ice were more numerous and widespread than assumed by zoologists until a few decades ago. That appears clearly on the map of Switzerland during the maximum Würm glaciation, about 15'000-20'000 years ago (JAECKLI, 1970), in which ranges such as Togano-Laurasca-Zeda and M. Tamaro are just recorded as nunataks. Fig. 15 shows the distribution of *Leuctra brevipennis*, *L. vinconi vinconi* and *L. vinconi aubertorum* plotted on a portion of Jaeckli's map. We may notice that the present distribution of these species coincide with ranges or peaks that were free from ice during the latest glaciation. Further investigations in similar restricted areas along the southern edge of the Western Alps could produce other species belonging to the *brevipennis* complex, provided that available biotopes exist and are free from alteration due to human influences.

RÉSUMÉ

Les auteurs décrivent le mâle et la femelle de *L. vinconi aubertorum* ssp. nov. Le mâle diffère de celui de *L. vinconi vinconi* RAV.& RAV.DEM. par la structure et la dimension de l'appendice sclérifié du 8^{ème} tergite, par la taille de la lamelle ventrale et par la conformation de l'épiprocte du mâle. La femelle de *L. vinconi aubertorum* diffère de celle de *L. vinconi vinconi* seulement par les appendices pairs de la plaque sous génitale, qui sont asymétriques et parfois un peu dissemblables entre eux. Tous les spécimens de *L. vinconi aubertorum* ont été récoltés en automne uniquement au bord de quelques petites sources et ruisselets entre 800 et 1'250 m, sur le versant nord du Mont Tamaro (Tessin). Quelques remarques écologiques et zoogéographiques, ainsi qu'une carte de répartition des deux sous-espèces de *L. vinconi* et de l'espèce affine *L. brevipennis* RAV., concluent cette note.

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