

## Three species of Mountain Cicadas *Cicadetta montana* (sensu lato) found in northern Italy

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### Abstract

During June and July 2007, we investigated the areas of Aosta Valley, Piedmont (Turin, Biella, Novara), Lombardy (Varese, Lecco, Como) and Liguria (Genoa, La Spezia) with bioacoustic methods and found three species of mountain cicadas [*Cicadetta montana* (sensu stricto), *Cicadetta brevipennis*, *Cicadetta cerdaniensis*], which are the first acoustically proven records for Italy.

**Key words:** bioacoustics, Cicadoidea, *Cicadetta montana* (sensu stricto), *Cicadetta brevipennis*, *Cicadetta cerdaniensis*.

### Introduction

Based on present knowledge, cicada species (Hemiptera Cicadidae) of *Cicadetta montana* (sensu lato) can be separated with certainty only by bioacoustic (figure 1) and/or molecular characters (Gogala and Trilar, 2004; Gogala, 2006; Sueur and Puissant, 2007; Gogala *et al.*, 2008). We found three species of mountain cicadas, which are the first acoustically proven records for Italy.

### Materials and methods

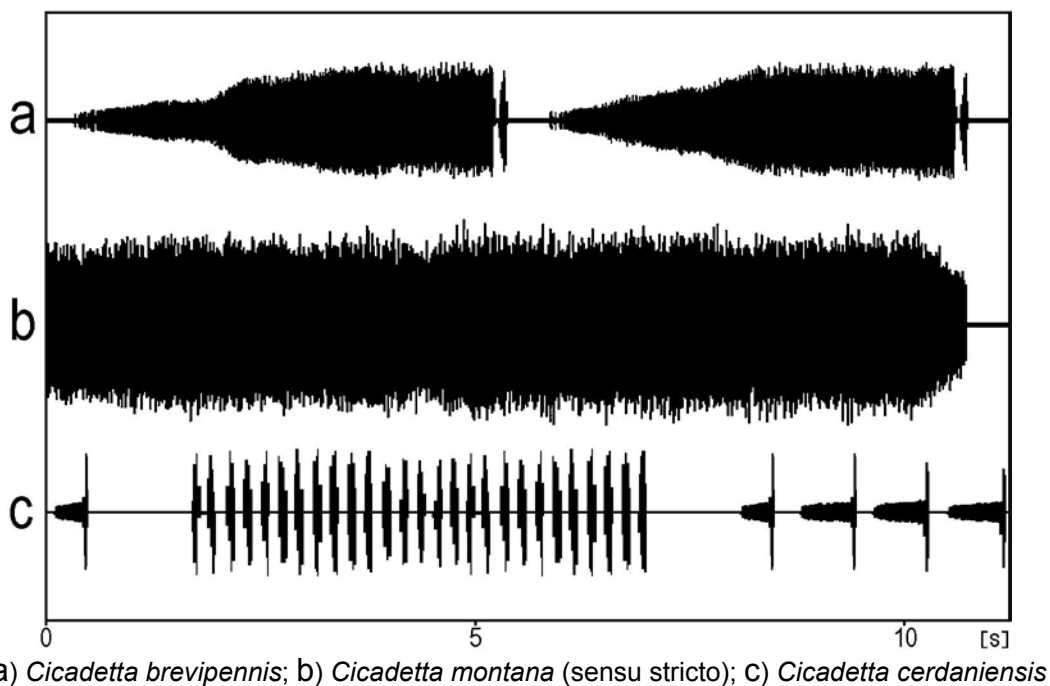
During our fieldwork in June and July 2007, we investigated the areas of Aosta Valley, Piedmont (Turin, Biella, Novara), Lombardy (Varese, Lecco, Como) and Liguria (Genoa, La Spezia) with bioacoustic methods.

We devoted special attention to the sister species of the *C. montana* complex.

For sensitive detection of high pitched sounds of mountain cicadas we used in this study an ultrasonic microphone (Pettersson) mounted on a Telinga parabola (parabola diameter 57 cm) and connected to an ultrasonic detector Pettersson D-200 in combination with a Solid State recorder Marantz PMD660.

The recordings were transferred to the hard disk of a computer. Software used for viewing, editing and analysing the song signals was Raven 1.2.1 (Cornell Lab of Ornithology).

The collected specimens are preserved in the collection of the Slovenian Museum of Natural History (PMSL), Ljubljana, Slovenia and in the private collection of Thomas Hertach, Otelfingen, Switzerland. The sound recordings are stored by Thomas Hertach and in the Slove-



**Figure 1.** Comparison of song patterns as oscillograms in the same time scale.

nian Wildlife Sound Archive housed in the Slovenian Museum of Natural History. Selected samples are available also on the web pages "Songs of the European singing cicadas" (<http://www2.pms-lj.si/european-cicadas/>).

## Results and discussion

### Faunistic data

The following abbreviations are used: **C** - collected, **R** - acoustic recording, **H** - songs were heard but not recorded.

#### *Cicadetta montana* (Scopoli 1772)

AOSTA VALLEY: Valpelline, Ollomont, Rey, 1150 m, 10.VI.2007, **R**; Aosta, Avise, Plan, 920 m, 12.VI.2007, **R**.

#### *Cicadetta brevipennis* Fieber 1876

AOSTA VALLEY: Valle del Gran S. Bernardo, Doues, west of Meylan, 950 m, 10.VI.2007, **R**; Valle del Gran S. Bernardo, Doues, west of Diale, 1120 m, 10.VI.2007, **R**; Valpelline, Cheillon, 1150 m, 10.VI.2007, **R**.

#### *Cicadetta cerdaniensis* Puissant et Boulard 2000

LOMBARDY: Varese, Rasa, Monte Chiusarella, 580-740 m, 14.VI.2007, **R**, **C**; Lecco, Galbiate, Monte Barro, 700-850 m, 16.VI.2007, **R**; Como, Como-Brunate, 350 m, 22.VII.2007, **H**; Como, Durino-Rovenna, 440 m, 23.VII.2007, **H**.

LIGURIA: Genoa, Moneglia, Smeraldo, 220 m, 13.VII.2007, **H**; Genoa, Moneglia, Valle Grande, 350 m, 13.VII.2007, **R**; Genoa, Portofino, above San Fruttuoso, 200 m, 14.VII.2007, **H**; Genoa, Portofino, Semaforo nuovo, 200-320 m, 14.VII.2007, **R**; Genoa, Portofino southwest of San Nicolò, 250 m, 14.VII.2007, **R**; La Spezia, Cinque Terre, above Volastra, 570 m, 16.VII.2007, **H**; La Spezia, Cinque Terre, Monte Cuna, 730 m, 16.VII.2007, **H**; La Spezia, Cinque Terre, Monte Capri, 730 m, 16.VII.2007, **H**; La Spezia, Cinque Terre, Monte Gaginara, 650 m, 16.VII.2007, **R**, **C** (nymph).

For all three species of mountain cicadas, these are the first acoustically proven records for Italy.

*C. cerdaniensis* has been described from the Pyrenees by Puissant and Boulard (2000), who also assumed that the species could be a Pyrenean endemic (Puissant and Boulard, 2000; Sueur and Puissant, 2007). Hertach

(2007) found the species also in the nearby Ticino in Switzerland. Our record on Monte Chiusarella is a western extension of the known distribution in the Alps and the discovery on Monte Barro is an extension of the range to the east, while records from Liguria are an extension to the south.

We expected also the presence of *Cicadetta cantilatrix* Sueur et Puissant 2007, but it was not found. Many suitable habitats, especially in the Aosta Valley, did not yield any mountain cicada species.

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