



Two Chydoridae species (Crustacea, Cladocera) new to Italy: *Alona rustica* and *Camptocercus uncinatus*

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INTRODUCTION

Two species of chydorids (Crustacea, Cladocera) new to Italy are described together with morphological differences from other European populations of the same species. Moreover, these new records of *Alona rustica* and *Camptocercus uncinatus* provide interesting data about the ecology and distribution of these relatively rare taxa, belonging to the Aloninae subfamily.

TAXONOMIC ACCOUNT

Alona rustica Scott, 1895

Alona rustica Scott, 1895: 189; Frey, 1965: 162; Flössner, 1967: 417; Flössner & Frey, 1970: 326; Smirnov, 1971: 360; Hollwedel, 1978: 158; Negrea, 1983: 288; Alonso, 1996: 323; *A. estonica* Mäemets, 1958: 260.

Description

Females: 0.42 - 0.52 mm. Shell marked with thin longitudinal lines. Valves with rounded posteroventral and posterodorsal corners; ventral margin almost straight and provided with three groups of feathered setae, the anterior ones being about twice as long as the shortest in the following group. Posterior setae also long. Posteriorly to the feathered setae there is a row of very small setules, which continues dorsally and is parallel to the posterior margin (Fig. 1).

Head with blunt rostrum, protruding beyond the ends of the antennules, but not exceeding their sensory setae. Anterior margin of antennules with four incisions, each with spinules (Fig. 2). Antennae with eight setae: 0-0-3 / 1-1-3 and three spines: 1-0-1 / 0-0-1. The seta of the first segment on the exopodite is very soft and only moderately longer than that of the second segment; the spine of the first segment on the endopodite is as long as that of the second segment (Fig. 4). Ocellus nearly as large as eye and located somewhat closer to the eye than to the tip of the rostrum. Three median pores connected at less than one interpore distance from the posterior margin of the head shield, the middle pore being about equidistant (Elba populations) or somewhat closer to the posterior than to the anterior pore (Val d'Aosta populations). Lateral pores, slit-like, much shorter than the distance between the middle and posterior pores (Fig. 3).

Labrum rounded with generally vertical posterior edge and provided with two groups of setae.

The thorax bears five pairs of limbs. First pair: exopodite with one long seta; outer ramus of endite showing one short hook-shaped seta and two long feathered setae (Fig. 6).

Second pair: gnathobase with three terminal elements and with cone-shaped outgrowth situated between them and the rows of stiff curved setules. Filtering fan

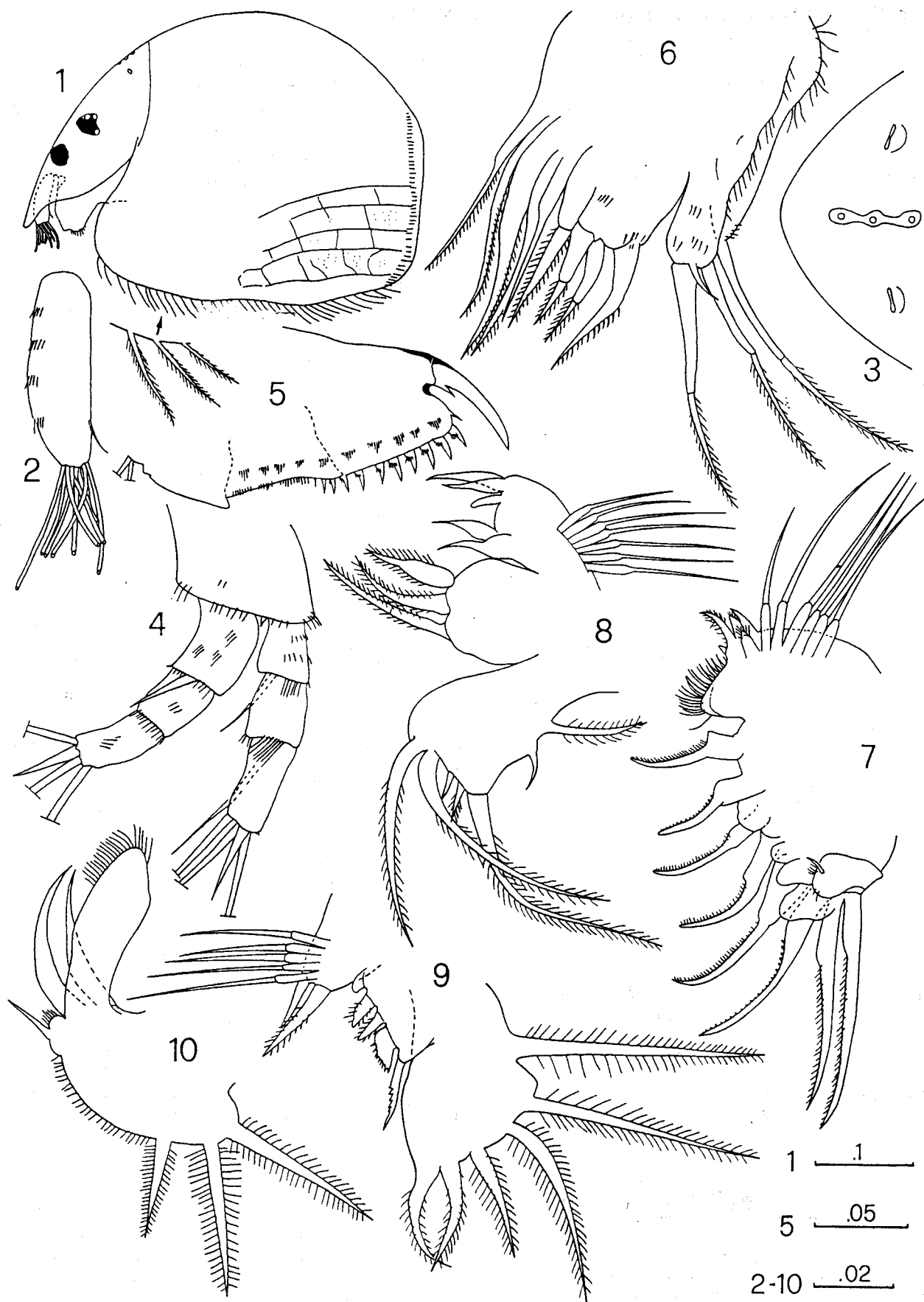
ABSTRACT

Alona rustica and *Camptocercus uncinatus* are two species of Chydoridae new to Italy; the former was found in some samples from the Island of Elba and Ayas Valley (Aosta), and the latter from Lakes Martignano and Bracciano. The typical morphology of these Italian populations is described in this paper together with differences compared to the European populations of the same species. Finally, information is given about their distribution and ecology.

KEY WORDS: *Alona rustica* - *Camptocercus uncinatus* - Chydoridae - Taxonomy - Italian Cladocera.

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Figs 1-10 - Morphological analysis of *Alona rustica*. 1, body shape. 2, antennule. 3, head pores. 4, antenna. 5, postabdomen. 6, trunk limb I. 7, trunk limb II. 8, Trunk limb III. 9, trunk limb IV. 10, trunk limb V. All scale bars are in mm.

of seven setae, the basal one of which is very short. Endite with eight biarticulated scrapers: the second and the sixth have the combs with denticles larger than those of the others (Fig. 7).

Third pair: exopodite with seven marginal setae, each with characteristic length and orientation. The second, fourth and fifth are short, while the third is only moderately longer than the others. Gnatobase with a filtering fan of seven setae (Fig. 8).

Fourth pair: exopodite very large with six moderately long feathered setae; gnatobase little developed with a filtering fan of five setae. The fourth seta of the endite outer lobe short with spinules; the robust external seta is spine-shaped and strongly denticulate (Fig. 9).

Fifth pair: exopodite very large with four setae, a small one on the anterior side and three on the posterior (Fig. 10).

Postabdomen (Fig. 5) narrowing distally; distal corner rounded, projecting beyond base of claws. Preanal corner distinct; anal margin concave, with groups of setae; anal part as long as postanal part of postabdomen. Dorsal margin of postabdomen with two rows with 8-9 well developed denticles. Distal teeth increase somewhat in size toward distal end of postabdomen, often with 1-3 smaller teeth or spinules around tip of postabdomen. Proximal teeth smaller, preceded by three groups of spinules along edge of anal groove. Lateral group of setae generally indistinct; middle setae are the longest in each group. Claws with one basal spine as long as basal width of claw.

Distribution

Alona rustica is a holarctic and neotropical species, restricted to low bicarbonate alkaline waters. It was collected from a plankton haul through vegetation in oligotrophic and dystrophic water bodies, by washing bryophytes from stream banks. It was also found in turoughs, which have a seasonal regime similar to shallow pools on bog surfaces (Duigan, 1992).

Remarks

In Italy, only parthenogenetic females have been recorded (Stoch, leg.) in two distinct places:

a) The Island of Elba (Vallaccia ditch, 300 m above Pomonte, Marciana - Livorno); the samplings were performed on 29.3.1994 and 6.7.1995.

b) The source WSW of the Arp shelter (2430 m) in Ayas Valley (Aosta); the sample was a squeezing of musks, collected on 26.7.1997.

The Italian populations conform to the general descriptions of European forms without tubercles and have a greater affinity to Spanish and Rumanian species due to the dimensions and position of head pores (Negrea, 1983; Alonso, 1996). The French (Masson B., 1990, unpubl. Ph.D. thesis, Univ. Claude Bernard-Lyon 1) and English (Frey, 1965) populations have the main head pores very near to the posterior margin of the head

shield, and the middle pore closer to the posterior than to the anterior pore. In northern Europe (i.e., Scotland, Estonia, Ireland, Denmark), many populations have tuberculate specimens with the shell covered by rounded protuberances, even though this morphological feature has been described as coarse pits or 'guttae' in the literature (Smirnov, 1971). Whiteside (1970) noticed within a sediment core that the tuberculate form was dominant in sandy levels, which suggests that this morphological feature may be an ecological adaptation.

Camptocercus uncinatus Smirnov, 1971

Camptocercus uncinatus Smirnov, 1971: 436; 1972: 395; 1998: 76; Van de Velde *et al.*, 1978: 400; Negrea, 1982: 112; 1983: 309; *C. australis* Bravo, 1917: 276; *C. latikae* Rane, 1985: 113.

Description

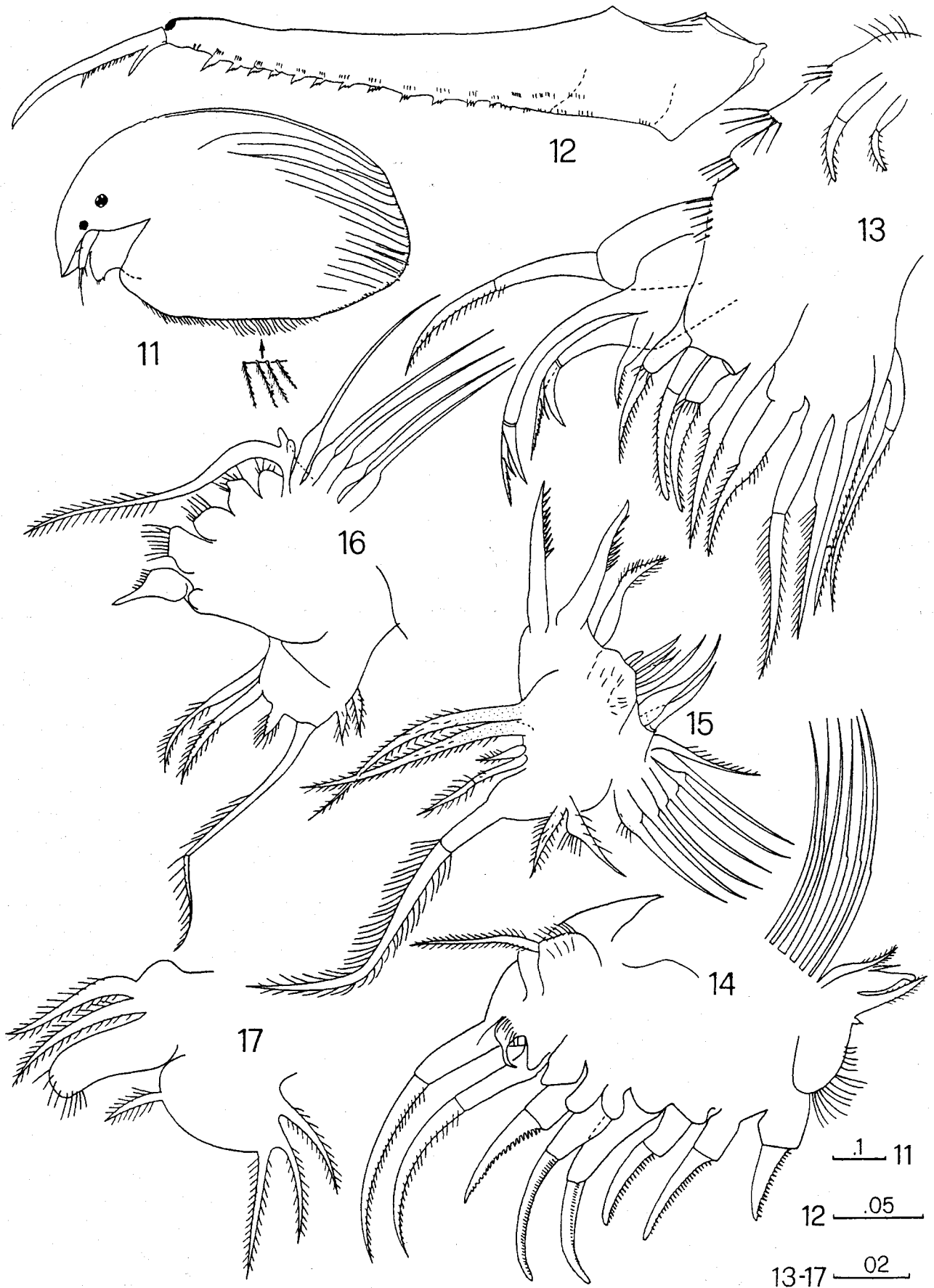
Females: 0.67-0.76 mm. Shell marked with distinct longitudinal lines. Dorsal margin of head and dorsal side of valves forming a smooth curve; posterior margin of valves curved without a distinct corner; posteroventral corner rounded without denticles, but with 0-4 very small spines. Ventral margin of shell with long and feathered setae in the middle (Fig. 11).

Head with a blunt rostrum, directed ventrally, but with the terminal point directed anteriorly. Antennules almost reaching the apex of rostrum with nine sensory papillae, two of which longer than the others. Antennae with seven setae: 0-0-3/0-1-3 and three spines: 1-0-1/0-0-1. Ocellus smaller than the eye and situated nearer to the eye than to the apex of rostrum. Head shield with keel and three connected main pores. Plate of the labrum with the anterior margin irregular and convex; ventral margin with very small setules and spines.

The trunk bears five pairs of limbs. First pair: the outer ramus of endite with three setae, one of them short. The basal setula on both long setae very large and hook-shaped. The remaining setulae on the distal part of these setae small, forming a continuation of the base of the seta, and appearing as an accessory flagellum (Fig. 13).

Second pair: the stiff setae of the endite differing in length and slightly in shape. Sixth seta with thick denticles; at the base of the eighth seta on the outer side, a small seta is found. On the edge of the gnatobase on the side of the stiff setae, there is a very small seta (Fig. 14).

Third pair: gnathobase with a filtering fan of seven setae; endite with eight hard setae, subdivided into two groups: that near gnathobase consisting of four setae of different length, and one very short situated near the interval between the two groups; the group near exopodite with two stiff comb-like and one feathered seta. Exopodite with seven setae, the third being longest (Fig. 15).



Figs 11-17 - Morphological analysis of *Camptocercus uncinatus*. 11, body shape. 12, postabdomen. 13, trunk limb I. 14, trunk limb II. 15, trunk limb III. 16, trunk limb IV. 17, trunk limb V. All scale bars are in mm.

Fourth pair: filtering fan of gnathobase with five setae. That on the apex of gnathobase long and parallel to those of the endite, which are short and hard: one with external spine and three planing-torch. Exopodite with six setae, the third is the longest while the fourth is as short as the first and second (Fig. 16).

Fifth pair: exopodite large and oval with four setae, one of them on the anterior and the other on the posterior side (Fig. 17).

Postabdomen (Fig. 12) with a distinct preanal corner and postanal corner absent. Anal denticles (14-16) decreasing in size proximally. Distal denticles with multicuspoid, and proximal ones forming groups; distally there are also 2-3 small single denticles. Laterally, 14-15 rows of setules, parallel to dorsal margin, which slightly exceed limit of anus. Claw with a row of setae on concave side increasing in size distally and resembling spinules toward the middle denticle. Basal spine of claw tapering.

Distribution

Numerous females of this species have been described by Smirnov from Lake Nikolaevskoe (Chita Region, Russia) and the White Nile ut Um-Arda in 1971, Lake Tana (Ethiopia) in 1997, and from Basrah (Iraq). In 1982, Negrea collected females and males in Romania from the lakes of the Danube flood zones and the Black Sea waters at the Danube delta.

In a new revision of the genus *Camptocercus*, Smirnov (1998) suggested that *C. uncinatus* was widely distributed, but its distribution is not well known because it has been described only recently. According to the available data, it was found in Romania, South West Siberia, the Yakutsk area, Lake Hula (Israel) (Bromley, 1993), Iraq, Ethiopia, Egypt, Lake Victoria, Guatemala and Central India (Rane, 1985).

Remarks

In Italy this species occurred first in Lake Martignano (Rome), in zooplankton samples collected in November 1995 in a pelagic zone at a depth of 10 m, and subsequently between September and December 1996 in the littoral zone among macrophytes at a depth of 4-12 m. In Lake Bracciano, laying in a neighbouring hydrographic basin, this species was found in the zooplankton samples collected in the littoral zone among macrophytes at a depth of 4-8 m, between September and December 1998. In the Italian populations, only parthenogenetic females have been recorded so far, and they are similar to the Rumanian ones in the morphology of their postabdomen, labrum, and shell.

In Italy, *C. australis* was found and described by Bravo (1917) (var. *pavesii*) and subsequently by Goulden (1970) in a fossil sample from Lake Monterosi. At first,

we thought it was only an occasional introduction and subsequent disappearance of that species from a rice-field. At present, in the light of these new records, it can be hypothesized that *C. australis* was really *C. uncinatus*, on the basis of the morphological description now carried out on this species.

In conclusion, in Italy the genus *Camptocercus* is represented by two species, the very widely distributed *C. rectirostris* and *C. uncinatus*; however, the latter could be more widely distributed in our country than is currently supposed.

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