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NEW SPECIES OF *PLATYCLEIS* FIEBER, 1853
OF THE SUBGENUS *DECORANA* ZEUNER, 1941
IN THE NATURE RESERVE OF TRAPANI SALTPANS
(SICILY, ITALY) (*Insecta Orthoptera Tettigoniidae*)

SUMMARY

A new species of *Platycleis* (*Decorana*) is described from the Trapani salt pans (Sicily), rather related to northafrican species, but easily distinguished from them; the authors point out the precariousness of the sole population so far known and the importance of its peculiar habitat conservation, actually lying within a Nature Reserve and Site of Communitary Importance.

RIASSUNTO

Nuova specie di Platycleis Fieber, 1853 del sottogenere Decorana Zeuner, 1941 nella Riserva Naturale delle Saline di Trapani (Sicilia, Italia) (Orthoptera Tettigoniidae). Gli autori descrivono *Platycleis (Decorana) drepanensis*, specie nuova della Riserva Naturale e Sito d'Interesse Comunitario Saline di Trapani, appartenente ad un sottogenere brachittero in precedenza non noto per l'Italia, ma presente con diverse specie in Nord Africa, penisola Iberica e Medio Oriente. La nuova specie è affine a *P. kabila* Finot, 1893 dell'Algeria, ma riconoscibile per i caratteri sessuali e la forma delle tegmine. Nonostante le ricerche intense in tutti gli ambienti salmastri dell'area costiera del Trapanese, caratterizzati dalla presenza di Chenopodiaceae, la nuova specie risulta attualmente presente in una sola ristretta area, che meriterebbe una particolare attenzione nell'immediato futuro.

On the first week of May 2006 our friends Roy Kleukers, Baudewijn Odé and Luc Willemse collected in the salt pans of Trapani one immature male of a *Platycleis* Fieber, 1853, which reared in the laboratory, resulted to belong to the subgenus *Decorana* Zeuner, 1941, hitherto unknown in Italy. In the following months of July and August, BM, informed by Dutch col-

leagues of the interesting record, visited the same collecting area, finding a fair number of males and females, which, after their accurate analysis, resulted to belong to a species previously unknown. We report here its description. *Decorana* is one of the subgenera established by ZEUNER (1941), which, together with others, should be considered as a valid genus; nevertheless, now the systematic arrangement still treats it as a subgenus of *Platycleis* and we follow it.

MATERIAL AND METHODS

Specimens were collected in May, July and August; dissection of males consented to perform titillators examen and to count the egg number within the female abdomen. Stomach analysis consented to establish main feeding habits. Apart from the collecting locality, BM carried out a careful research on the same habitat along the entire coast from Trapani to Mazara del Vallo (loc. Capo Feto) in order to find possible other populations of this species.

Males were recorded separately in the laboratory to restrict interactions by FMB and PF. A DAT recorder (Sony TCD 100) with condenser microphone (Sennheiser K30AV module with ME80) was used and sampled fragments (44.1 kHz, 16 bits) from the recordings were analysed. The song terminology follows RAGGE & REYNOLDS (1998): *Calling song* (the song produced by an isolated male); *Syllable* (the sound produced by one complete opening and closing movement of the fore wings); *Hemisyllable* (the sound produced by one unidirectional movement (opening or closing) of the fore wings); *Echeme* (a first-order assemblage of syllables).

RESULTS

Platycleis (Decorana) drepanensis n. sp.

Examined specimens: Trapani Salt pans, loc. Nubia (Nature Reserve Saline di Trapani) 15.V.2006 (1 ♂, reared in laboratory, paratypus), leg. L. Willemse, R. Kleukers, B. Odé; 18.VII.2006 (4 ♂♂, 2 ♀♀, holotypus, allotypus and paratypi); 2.VIII.2006 (2 ♂♂ paratypi), 10.VIII.2006 (1 ♂, 2 ♀♀ paratypi), 25.VIII.2006 (4 ♂♂, 4 ♀♀ paratypi), leg. B. Massa. Holotypus and allotypus deposited in the Museo Civico di Storia Naturale of Milan, 2 paratypi ♂ and ♀ in the Museo Civico di Storia Naturale of Genua, 1 paratypus ♂ in the coll. L. Willemse, 2 paratypi ♂ and ♀ in the coll. P. Fontana (Isola

Vicentina), 2 paratypi ♂ and ♀ in the coll. F. M. Buzzetti, 11 paratypi, 7 ♂♂ and 4 ♀♀ in the coll. B. Massa (University of Palermo).

Diagnosis. It is a *Platycleis* belonging to the subgenus *Decorana* characterized by the shape of the male cerci, the shape of the last male tergite, titillators and the shape of subgenital plate of female (Figs 1, 2).

Description of the male. Body surface brown and black. Head from above brown marbled coloured showing two small black spots between the eyes and the pronotum edge, interrupted by one white stripe, pronotum brown showing a black V on the center and wide black areas on the sides, inferiorly and posteriorly surrounded by a white stripe; posterior border of pronotum rounded (Figs 3a, 3c, 3d). Tegmina roughly reaching the third tergite, brown, second pair of wings atrophic, short about 2/3 of the first one. The stridulatory file (Figs 4f, 4g) is 1.8 mm long and bears 48 pegs of which the longest (widest portion of stridulatory file) is 0.1 mm long. Two large black bands on the sides of meso and metanotum are evident (Figs 3a, 3c). Legs brown coloured, front and medium femurs bearing a more or less continuous black line on the upper border, hind femurs with a wide lateral black stripe as long as the broad area of femur, inferiorly edged by reddish-brown, and a fine black stripe on the upper border (Fig. 3a). Abdomen superiorly grey, laterally showing a wide brownish-black band, inferiorly yellow. Front tibiae bearing 3 outer-upper spines and 5 inner-lower and outer-lower, medium tibiae with 6 outer-lower spines and 5-6 inner-lower, 2 outer-upper and 4 inner-upper, hind tibiae bearing 12 outer-lower spines and 11 inner-lower + 2 apical and 30 outer-upper and 34 inner-upper + 1 apical.

10th tergite pointed, right, ending with a wide V shaped concavity, characterized by two black lines from the fore border to the middle of the tergite (Figs 4a, 4e); lateral borders of the V concavity just extruded (Fig. 4e), cerci bearing one inner tooth on the apical third, stout and long, brown coloured; tooth evidently forwarded (Figs 4c, 4d). Subgenital plate ending with a narrow V shaped concavity (Fig. 4b). More or less long hairs characterize the hind border of the last tergites, the V concavity and cerci (Figs 4c, 4d, 4e). Styli narrow, their length is as long or just shorter than cerci (Figs 4a, 4b). Titillators symmetrical, showing a wide and stout base and a curved and pointed apex, the latter provided by spines (Figs 4h, 4i).

Description of the female. Coloration and other characters as those of the male (Figs 3b, 3e, 3f), with the exception of: 9th sternite bearing a small swelling, subgenital plate ending with a wide V shaped concavity (Figs 5a, 5c), in lateral view short ovipositor brown, evidently upcurved, nearly long as the hind femurs (Fig. 5b); cerci slender and long. Eggs are pale and measure 5.2-5.3 x 0.9-1.0 mm (Fig. 5d).



Fig. 1 — Male of *Platycleis (Decorana) drepanensis* n. sp. (Photo: F. M. Buzzetti).



Fig. 2 — Female of *Platycleis (Decorana) drepanensis* n. sp. (Photo: B. Massa).

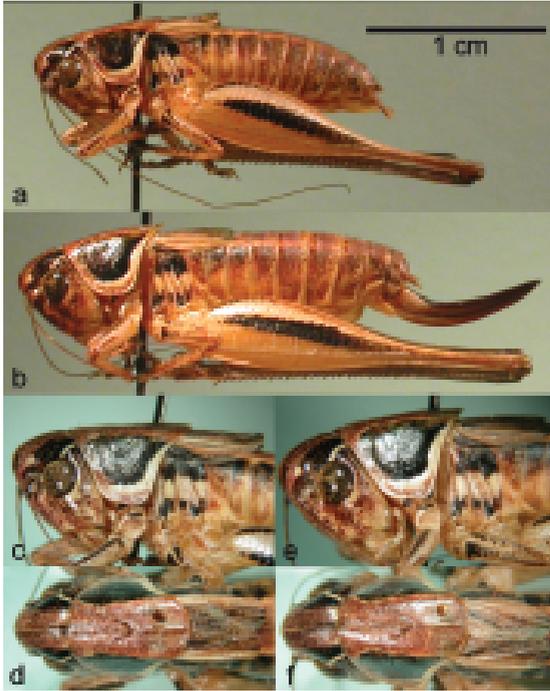


Fig. 3 — *Platycleis (Decorana) drepanensis* n. sp.; a) male in lateral view; b) female in lateral view; c) head, pronotum and tegmina of male in lateral view; d) head, pronotum and tegmina of male from above; e) head, pronotum and tegmina of female in lateral view; f) head, pronotum and tegmina of female from above (Photo: P. Fontana).

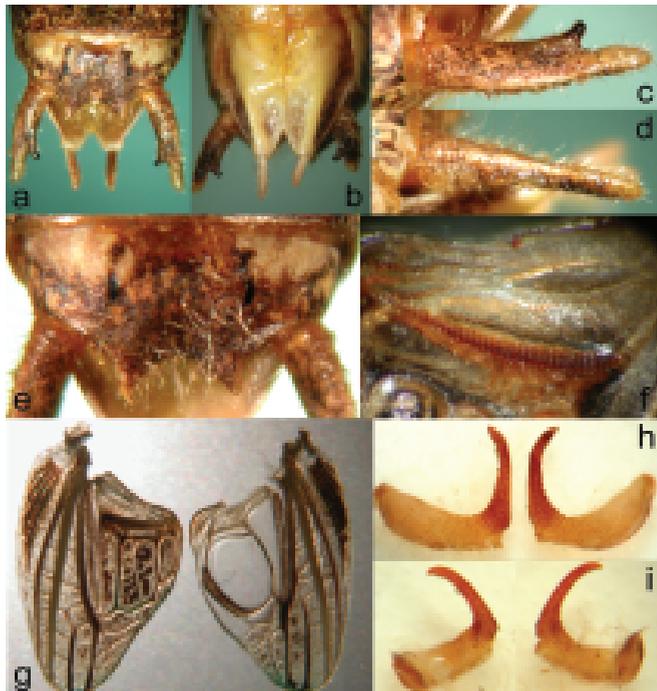


Fig. 4 — *Platycleis (Decorana) drepanensis* n. sp., characters of the male; a) 10th tergite, cerci and styli from above; b) subgenital plate and styli; c) left cercus from above; d) left cercus in lateral view; e) 10th tergite; f) pars stridens; g) tegmina isolated from the body; h) titillators from above; i) titillators from below (Photo: P. Fontana).



Fig. 5 — *Platycleis (Decorana) drepanensis* n. sp., characters of the female; a) subgenital plate from below; b) ovipositor and cerci in lateral view; c) 9th sternite and subgenital plate in lateral view; d) egg (Photo: P. Fontana).

Measurements (in mm)

Total length from the head to the apex of hind femurs: ♂♂ 29.46 ± 0.74 (min = 28.5, max = 30.45); ♀♀ 28.93 ± 1.79 (min = 27.0, max = 31.0); pronotum length: ♂♂ 5.84 ± 0.13 (min = 5.7, max = 6.0); ♀♀ 5.88 ± 0.50 (min = 5.3; max = 6.7); pronotum height: ♂♂ 4.46 ± 0.19 (min = 4.3, max = 4.8); ♀♀ 4.6 ± 0.32 (min = 4.3; max = 5.2); length of tegmina: ♂♂ 4.33 ± 0.13 (min = 4.1, max = 4.5); ♀♀ 3.93 ± 0.19 (min = 3.7; max = 4.2); length of hind femurs: ♂♂ 19.21 ± 0.77 (min = 18.2, max = 20.1); ♀♀ 18.98 ± 1.14 (min = 17.2; max = 20.2); height of hind femurs: ♂♂ 4.23 ± 0.11 (min = 4.1, max = 4.4); ♀♀ 4.05 ± 0.19 (min = 3.9; max = 4.4); ovipositor length: 10.25 ± 0.59 (min = 9.5, max = 11.0).

There is an inappreciable size dimorphism, with males showing longer and higher femurs and longer tegmina than females and females longer and higher pronotum than males.

Bioacustics

The songs of two males were recorded and the song pattern obtained was almost identical from them. Due to the bad resolution of one of these songs, the detailed description is based on the song of a single male. The calling song (Fig. 6A-E) of *P. (Decorana) drepanensis* n. sp. consists of polysyllabic echemes separated by intervals of about 5 seconds and lasts for about 30 seconds. Each echeme (Fig. 6D) has an average length of 264.83 msec (range 234

Fig. 6 — *Platycleis* (*Decorana*) *drepanensis* n. sp., oscillograms of male calling song.

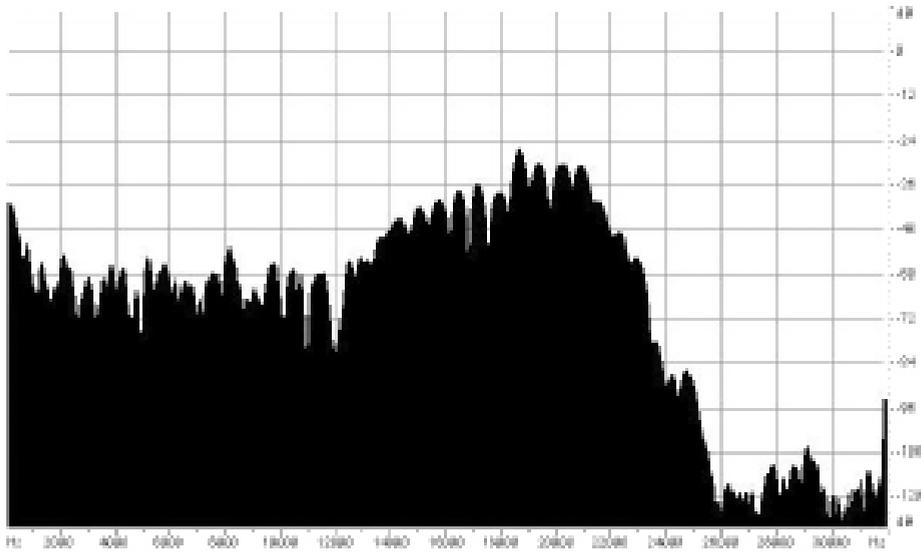
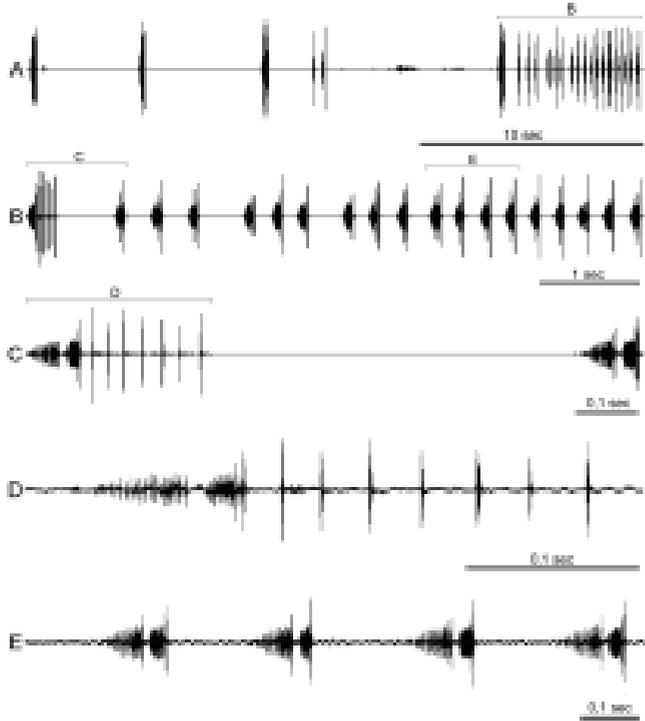


Fig. 7 — *Platycleis* (*Decorana*) *drepanensis* n. sp., spectrogram of male calling song.

to 297), it consists of one dyplosyllable with mean length of 90.33 msec (range 86 to 95) followed by a series of 5 to 8 microsyllables, each long from 1 to 3 msec and repeated at intervals of 25-30 msec. Dyplosyllables are composed of one longer opening hemisyllable (length 53 msec with range 50 to 55) plus a shorter and louder closing hemisyllable (length 21.16 msec with range 18 to 23). Echemes can be emitted isolated or followed by series of dyplosyllables (2 to 18) (Fig. 6B). Such repeated dyplosyllables are very similar in length and intensity to echemes starting dyplosyllables and have a repetition rate of 2 to 4 per sec. Within the recorded interval (up to 25 kHz), frequency shows the main peak at 19 kHz (Fig. 7).

Compared with the song of the only related species of which bioacoustics are known, i. e. *Platycleis (Decorana) decorata* (Fieber, 1853), as illustrated by HELLER (1988), differences are recognisable in the structure of the whole song and of its components. While in *P. (Decorana) decorata* the calling song consists of repeated dyplosyllables followed by an echeme composed of one dyplosyllable plus a series of microsyllables, in *P. (Decorana) drepanensis* n. sp. the order of the emitted components is inverted being the echemes eventually followed by dyplosyllables. Though the echeme ground structure is rather similar in these two species, the number of microsyllables in *P. (Decorana) drepanensis* n. sp. echeme appears to be lower than in *decorata*, being 5-8 vs 9. Furthermore in *P. (Decorana) drepanensis* n. sp. the echeme microsyllables are much more intense than preceding dyplosyllable while in *P. (Decorana) decorata* are of comparable or lower intensity. Audible frequency peak in *P. (Decorana) drepanensis* is lower (19 kHz) than in *P. (Decorana) decorata* (20 kHz).

Derivatio nominis: this species is named after the Nature Reserve "Saline di Trapani", using the adjective *drepanensis* from Drepanum, the old name of Trapani city.

Affinities

According to ZEUNER (1941), RAMME (1951) and HARZ (1969), the subgenus *Decorana* is characterized by the presence of a median keel in the pronotum and by the ovipositor slender, elongate, with lamella thickened, somewhat downcurved; this consents to tell apart some (but not all) species considered belonging to the subgenus *Incertana* Zeuner, 1941, which shows an ovipositor rather curved upward at the base, similar to that of *Tessellana*. We compared the new species with the following three species living in the western Mediterranean, that we consider belonging to the subgenus *Decorana*.

Platycleis (Decorana) decorata Fieber, 1853

Examined specimens: Spain, (Cadiz) Medina Simonia, 10.VII.1976, leg. F. Willemse & J. Scherpbier, 1 ♂ and 1 ♀ (coll. PF); Portugal, Foia Monchigue, 28.VII.1938, Ebner, 1 ♂; Morocco, El Hajeb 22.VII.1932, A. Nadig, 1 ♂ and 1 ♀ (Naturhistorisches Museum, Vienna).

10th tergite of male, in lateral view, short and a little downcurved, cerci stout and short; from above it is evidently larger and less concave than that of *P. drepanensis*, with lateral apices right; a wide concavity lies in the middle of the tergite. Stridulatory file of *P. drepanensis* bears almost the same number of pegs than that of *P. decorata*, being 48 and 46 respectively. Titillators more stout and short. The shape of subgenital plate of the female is clearly larger than that of *P. drepanensis*, ovipositor is longer than hind femurs. This species is distributed over a wide area, from Iberian peninsula to Morocco and shows some variability, but characters consenting its identification remain the shape of 10th tergite and cerci of the male and subgenital plate of female.

Platycleis (Decorana) seniae (Finot, 1893)

Examined specimens: Algeria, Oran, Brunner, 1 ♂ and 1 ♀; Bou, 1 ♀ (Naturhistorisches Museum, Vienna); Oran, 1 ♂ holotypus, 3 ♂♂ and 3 ♀♀ (Museum National d'Histoire Naturelle, Paris).

10th tergite of male, in lateral view, short and a little downcurved, cerci much stout, a little upcurved and innercurved, styli shorter than those of *P. drepanensis*; from above it is very narrow and protruded and shows a wide concavity in its middle; titillators are very stout and short in respect to those of *P. drepanensis*. Female subgenital plate is very large, even if variable, in lateral view it is evidently longer than that of *P. drepanensis*; female cerci are more stout than those of *P. drepanensis*. Ovipositor is clearly shorter than hind femurs.

Platycleis (Decorana) kabila (Finot, 1893)

Examined specimens: Algeria, Chabet el Aneur, 1 ♂, Finot (holotypus) (Museum National d'Histoire Naturelle, Paris).

Only the type male is known of this species. Its 10th tergite on lateral view is downcurved and shorter than that of *P. drepanensis*, cerci are a little upcurved, with inner tooth clearly upcurved, styli longer than cerci; from above it shows a small blackish concavity ending with a narrower V than *P. drepanensis*. Tegmina a little longer (5.1 mm) than those of *P. drepanensis*.

Biological notes

P. drepanensis resulted active during the day, less in the hottest hours, when it prefers to hide himself inside the soil crevices and within the vegetation; during the first hours of the day (between 8:00 and 11:00), when the sun

begins to heat the vegetation, it may go out from it, remaining over the plants, unless disturbed. Stomach analysis revealed the presence of vegetal residuals, mainly constituted by Chenopodiaceae; only one specimen contained remnants of small Hemiptera nymphs. Thus, we may consider it a herbivorous species which could predate some insects. Abdomen of females collected on 18th July and 10th August did not contain eggs, while those collected on 25th August had a number variable of eggs, between 12 and 55. According to our data, phenology of *P. drepanensis* is summer-autumnal and possibly, as other sicilian Tettigoniidae, eggs overwinter, neanids hatch in spring and develop in early summer.

IMPORTANCE OF HALOPHYTIC HABITATS OF TRAPANI COAST

During the researches carried out in July-August 2006 between the salt-pans of Trapani and the salty marshes of Capo Feto (Mazara del Vallo) almost all the habitats considered suitable to this species were unfruitfully visited to search for its presence; actually, the sole known population seems to be that found in a small area within the Trapani salt-pans, not wider than 500 m²; the habitat to which the species is linked is dominated by a vegetation of Chenopodiaceae, mainly constituted by *Arthrocnemum glaucum*. Within the area inhabited by *P. drepanensis* other three interesting species have been found: *Platycleis (Tessellana) tessellata* (Charpentier, 1825) (a short-winged form), *Pterolepis elymica* Galvagni & Massa, 1980 (endemic to Trapani coast) and *Platypigius platypigius* (Pantel, 1886) (in Italy known only for Sardinia and Sicily, previously unknown for Trapani salt-pans); researches in other similar habitats, dominated by Chenopodiaceae, from Trapani to Mazara del Vallo consented to find, other than the species above listed, also another two interesting taxa, namely *Ctenodecticus siculus* Ramme, 1927 (endemic to Sicily, where few populations are currently known) and *Heteracris adspersa* (Redtenbacher, 1889) (so far recorded in Sicily only from Gela and named as subspecies *massai* Galvagni, 1978).

As regards insects belonging to other orders, halophytic habitats of Trapani salt-pans are inhabited by four species of Heteroptera Miridae linked to Chenopodiaceae (*Phytocoris salsolae* (Puton, 1875), *Orthotylus divisus* Linnavuori, 1961, *O. roseiceps* Wagner, 1968 and *O. curvipennis* Reuter, 1875), one Lepidoptera Lymantriidae (*Orgyia dubia arcerii* Ragusa, 1923) (endemic to Trapani coast), three Coleoptera Carabidae (*Cephalota litorea goudoti* (Dejean, 1829), *Cephalota circumdata imperialis* (Klug, 1834) and *Cassolaia maura cupreothoracica* Korell & Cassola, 1987) very local and endangered (ROMANO *et al.*, 2006).

We believe that the only characteristic distinguishing the area inhabited by *P. drepanensis* from other halophytic habitats of Trapani coast is its high dryness and scarce moistness (Fig. 8). Nonetheless, the area where *P. drepanensis* has been found lies within the Nature Reserve “Saline di Trapani e Paceco”, established by the Regione Siciliana on 1995 and managed by the World



Fig. 8 — Habitat of Trapani salt pans Nature Reserve, where *Platycleis (Decorana) drepanensis* n. sp. has been found, characterized by *Arthrocnemum glaucum* and other Chenopodiaceae (Photo: B. Massa).

Wildlife Fund, and, according to Habitat Directive 92/43/CEE and Birds Directive 409/79/CEE, within the Site of Community Importance and Special Protection Area ITA010007 “Saline di Trapani” (definitively established on 19 July 2006 by Commission deliberation 2006/613/CE), characterized by the presence of the following coastal and halophytic habitat included in the Appendix I of Habitat Directive: Mediterranean and thermo-Atlantic salt marshes and salt meadows (*Sarcocornetea fruticosi*). This should guarantee its future conservation and possible actions to manage positively it; it is noteworthy that the Reserve manager authority (WWF) identified the area inhabited by the

new *Platycleis* within those deserving special protection, proposing its acquisition and ecological restoration, which are in progress by Azienda Foreste Demaniali Regione Siciliana (Sicilian Forestry Body), within the Piano Operativo Regionale (Regional Operational Plane) of Sicily 2000-2006. Future actions could improve the demography of its small population.

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