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Updated list and community structure of Tettigonioidae and Acridoidea (Insecta: Orthoptera) of the Alta Murgia plateau (Italy)

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Abstract

Alta Murgia calcareous plateau (southeast Italy) is thought to represent one of the most important area for Orthoptera in southern Italy, both due to its biogeographical concern and its unique richness in semi-natural dry grasslands. Since the half of the last century, no recent synthesis has been proposed for the Orthopterofauna of this area and a revision of old observations was still needed. This paper propose a reviewed list of Tettigonioidae and Acridoidea species from the Alta Murgia plateau, also providing information on local community structure and ecology. Based on the revision of previously published lists of species and on data collected during recent field works, a number of 37 species of grasshoppers and katydids is reported. The majority of species found in literature were confirmed, and six species were recorded as new for the area. Data collected during recent field works also enable to provide information about community structure, with particular focus on grassland habitat. This study also gives suggestions for replicable monitoring of Orthoptera assemblages in this area, as it is a valuable information for habitat surveillance purposes and ecosystem conservation strategies.

Key words: semi-natural grassland, Apulia, checklist, Tettigoniidae, Acrididae, Pamphagidae

Introduction

The Orthoptera fauna of Italy is highly varied, in total covering more than 340 species and 144 endemic taxa (Fontana *et al.* 2001, Massa *et al.*, 2013). Throughout the last 150 years, researchers have contributed to the knowledge of Italian Orthoptera with information scattered over many publications. A checklist was published in 1997, also providing a preliminary distribution map, within the framework project “Checklist and distribution of invertebrates” (1999–2000, Italian Ministry of Environment), then recently brought together in a volume of the series “Fauna d’Italia” (Massa *et al.* 2013) which represents the most important effort to gather the thousands previous works carried out in Italy, although a lack of updated information still affects some regions. The majority of the Italian endemics occurs in mountain areas and islands, in response to obvious isolation phenomena, while a number of species are only found in southeast peninsula of Apulia, as this was separated from the remaining part of the country during Quaternary and, at the same time connected with Balkans. Due to this peculiarity, Apulia region represents a sort of biogeographical island and it is particularly rich in taxa belonging to eastern fauna (La Greca 1967). Up to the first half of the twentieth century, the knowledge on Orthoptera of the region was only described by scattered notes (Costa 1870–1874, Costa 1871, Paoli 1937, La Greca 1948) and very few studies were able to provide an overview on the faunal assemblage. Moreover, the majority of the Apulian and southeast Italic endemic species were only described in the last century (Capra 1927, Ramme 1933, La Greca 1959). A fundamental step was reached by La Greca (1959), who carried out an extensive field campaign during 1956–1957 along the region, thus providing a checklist of 79 Orthoptera taxa and contributing to some of the most important Italian studies of biogeography (La Greca 1959, La Greca 1996). He also mentioned the value of Orthoptera assemblage of Alta Murgia calcareous plateau, lying in the central portion of Apulia, at the junction of the areals of trans-Adriatic and trans-Ionian taxa, and in proximity of Apennines. Despite its relatively low altitude (never exceeding 700 m.a.s.l.) and its lack of major barriers, Alta Murgia seems to represent a hotspot of biodiversity, mainly due to its geographical location and its unique richness in semi-natural dry grasslands. Moreover Orthoptera are known to

The site 1 correspond to a grassland area plowed during spring, with subsequent loss of the majority of grassland species: few species were thus found on remaining grass clumps (*T. liliifolia*, *P. intermedia*), while some were colonizing the newly bared soil (e.g., *Oedipoda spp.*, *D. maroccanus*).

Discussion

This work enables to confirm several species listed in previous studies regarding the Alta Murgia territory (La Greca 1959, Massa *et al.* 2013, Sorino *et al.* 2009), also allowing to mention six species as new for the area (*Phaneroptera nana*, *Platycleis falx laticauda*, *Anacridium aegyptium*, *Locusta migratoria cinerascens*, *Acrotylus patruelis*, *Pallasiella turcomana*). In particular, the observation of *P. turcomana* represents an interesting finding for this territory, primarily because of its biogeographical concern (La Greca 1959).

More investigations will be necessary to confirm the previous observation of *Oedipoda charpentieri* and taxonomic studies should be carried out on the local populations of *O. charpentieri*, *Pallasiella turcomana* and *Platycleis falx*, as these are found to be disconnected from their main distribution range within the Mediterranean basin. Other taxa should be researched in Alta Murgia, as previously encountered in adjacent areas (La Greca 1959), for instance, *Platycleis romana* Ramme, *Tessellana nigrosignata* (Costa), *Eupholidoptera chabrieri* (Charpentier), *Pterolepis germanica* (Herrich-Schäffer), *Uromenus elegans* (Fischer), *Sphingonotus caeruleus* (Linnaeus), *Chorthippus vagans* (Eversmann).

In this study, more information was collected in 2010 and 2012 about the structure of Orthoptera communities, especially those related to grassland habitats. Due to the necessity of implementing a quick sampling method for recent field works, quantitative data of *Calliptamus barbarus* and *C. italicus* were generalized as *Calliptamus spp.* Further studies should be carried out with the aim of investigating the quality and quantity of niche allocation between these important species, that seemed to be equally abundant in most of the studied sites. Moreover, both *Calliptamus* species arouse interest for their local outbreaks and damage to annual cultivations (Louveaux *et al.* 1988, Stolyarov 2000).

Despite the presence of few species dominating the overall assemblage, *Calliptamus spp.*, *P. intermedia* and *T. liliifolia*, a remarkable variability of species combination was recorded among sample sites. Some species were found to be associated with main ecological patterns driving vegetation successional dynamics, e.g., local soil and climate condition or overgrazing activity, while some particular assemblages were presumably induced by local phenomena of habitat loss and fragmentation. These findings are challenging for future ecological studies, also giving suggestions for replicable monitoring of Orthoptera assemblages in Alta Murgia. Such information could be suitably used both for habitat surveillance purposes and for wildlife conservation strategies.

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