

## Presence's mapping of *Brachytrupes megacephalus* (Lefebvre, 1827) (Orthoptera Gryllidae) within the Natural Reserve of Vendicari (Noto, Siracusa, Italy)

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### ABSTRACT

*Brachytrupes megacephalus* (Lefebvre, 1827) (Orthoptera Gryllidae) is a species included in the Annexes II and IV of EU Directive 92/43 as taxon requiring strict protection. The authors summarize the researches aimed to recognize the localization of this species within the natural reserve of Vendicari, protected area along the south eastern Sicilian coast in the territory of Noto (province of Siracusa). The presence of the specimens was ascertained by detecting its holes on the soil surface. The holes position was recorded using GPS and utilized for mapping the presence of the species as tool for its protection management in the reserve territory.

### KEY WORDS

monitoring; wildlife management; protected areas; mapping.

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### INTRODUCTION

The *Brachytrupes megacephalus* (Lefebvre, 1827) (Orthoptera Gryllidae) (Figs. 1, 2), described on specimens from Sicily, is a South-Mediterranean species widespread in the sandy environments of Sicily, Aeolian Islands, Maltese Islands, southern Sardinia, Northern Africa (included the Saharan oases): it is an exclusively sandy adapted cricket.

This species is considered as a biodiversity element of particular interest thanks to its complex eco-biology. Previous works (see Conti et al., 2014) investigated the biological cycle, swimming ability and digging technique, reproductive mode, coupling pattern and more. Due to its current rarefaction in Europe, this species has been included

in the Annexes II and IV of EU Directive 92/43 as a species requiring strict protection.

The reserve of Vendicari lies in the south-eastern extremity of Sicily and is part of a vast wetlands system that is one of the most important of the island; it extends for about 8 km of coastline and 0.3-1.5 km inland and includes a series of different environments (sweet-water wetlands, coastal lagoons, garrigue scrubland, Mediterranean maquis) and a very rich biodiversity: a wide description of the reserve was edited by Petralia (2010). *B. megacephalus*, having been already monitored in Vendicari a little bit more than ten years ago (Petralia et al., 2003), is one of the main component of the artropodological fauna in the reserve (Petralia & Russo, 2010).

This research was aimed to map the localization of the species in order to provide basic information useful to manage the protection of the species itself.

The study was carried out during the breeding season (from March to early May of 2012) when the digging activity of the specimens (surface active again after the winter suspension, for mate) is particularly intense and easily detectable: the location of individuals was carried out by detecting the position of the holes that the animals burrow into the sand and where the animals remain for most of their life, also where they die after spawning. The traces that indicate the presence of the animals are two (Figs. 3, 4): the mouths of the burrows and the little sandy cones occluding those; also the piercing sound-calls emitted by the males to attract the females provide further information about the presence of individuals.

The survey in the reserve was conducted in the sandy sectors of the A zone (integral reserve) in the potential habitats for the presence of *B. megacephalus* (Figs. 5, 6). The concerned areas are: 1, the

mouth of the Tellaro river (Eloro) at the extreme north of the reserve; 2, the sandy dunes of Calamosche; 3, the sandy south western area of the Vendicari island; 4, the southern dune belt where the GPS position of each detected burrow was recorded.

## RESULTS AND COMMENTS

The presence of the species was ascertained within the areas marked with numbers 1 and 4 (Fig. 6).

In the latter the GPS burrow records (290 in 18 ha) allowed to obtain the representation of the area where the species localizes (Fig. 7) using gvSIG program: the animals dwell exclusively on the sandy belt and do not intrude both the sandy beach (seaward) and inland; it is also possible to observe particular concentrations of burrows in the extreme north of the sandy belt (Fig. 8).

In the Vendicari island were not found specimens of the monitored species. Probably that is due



Figures 1, 2. Specimens of *B. megacephalus* photographed before their release: on the male's forewings (Fig. 1) is visible the stridulatory organ, absent on the female (Fig. 2). Figures 3, 4. Examples of burrow's mouth of *B. megacephalus* (Fig. 3) and little sandy cone that close the burrow on the soil surface (Fig. 4) (Photos by A. Petralia).

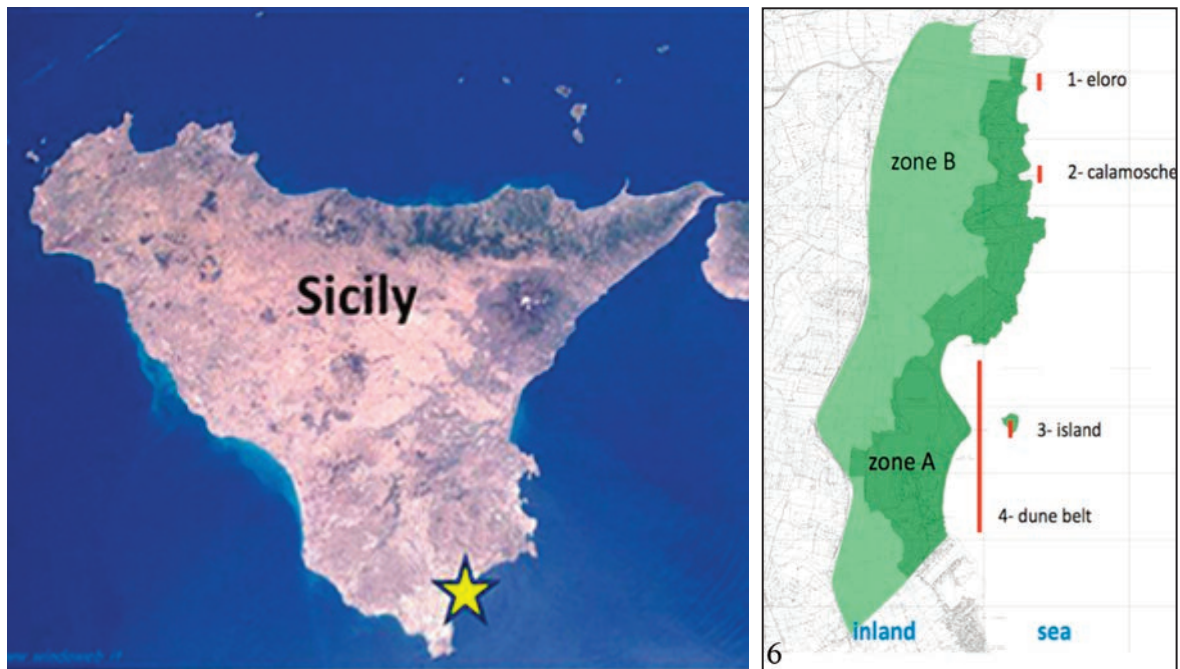


Figure 5. Localization (yellow star) of the reserve of Vendicari along the south western Sicilian coast. Figure 6. In dark-green the A zone of the reserve, in light-green the B zone; 1 to 4 the potential habitats of *B. megacephalus*.

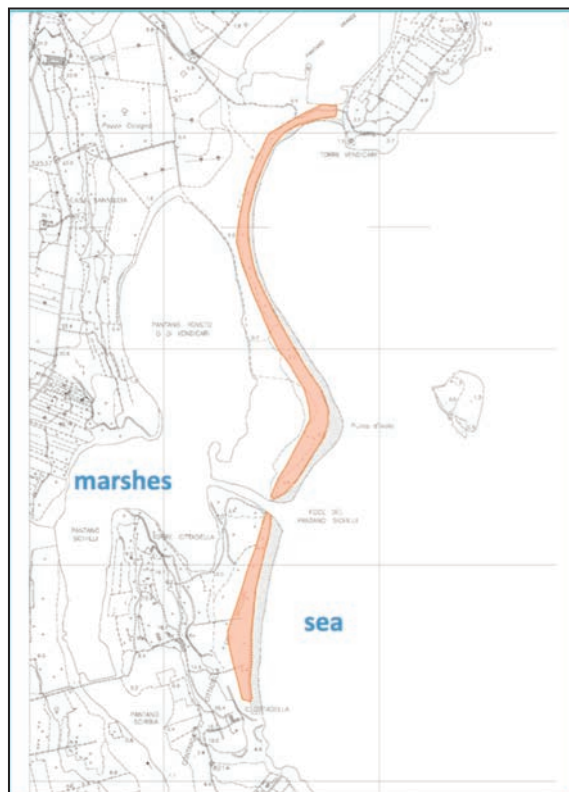


Figure 7. Mapping of the *B. megacephalus* presence along the dune belt in the southern part of the reserve of Vendicari.

to the not good condition of the sandy habitat: too narrow extension of the sandy surface in the island, too windy and not protected because of scarce vegetation, too brackish.

Also in the area marked with number 2 (Calamosche) the species was not detected: it is important to emphasize that in the previous monitoring carried out in 2003 (Petralia et al., 2003) the species was present in these sandy dunes. Probably the disappearance here of this species can be related with the strong anthropic pressure on the dunes just behind the beach of Calamosche: in particular the anarchic trampling on the sand (and the consequent destruction of nests, eggs and young specimens of *B. megacephalus* especially during the early stages of development) to reach the beach for swimming in the summer months, which increased over time, could have acted as a decisive factor in habitat degradation and, as consequence, in disappearance of the species.

We can conclude that the protection of *B. megacephalus* depends on a very severe protection of the stability of his habitat. The results of the mapping here described, indicate the areas in which is opportune to concentrate the actions aimed to ensure the safeguard of the species: firstly a very strict prevention

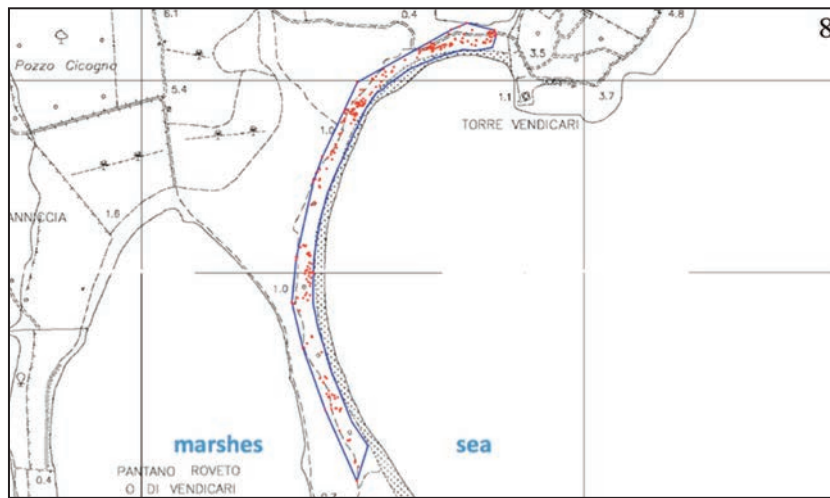


Figure 8. Northern sector of the dune belt referred to the Fig. 4 to show the particular concentrations of burrows highlighted by red dots.

Figure 9. Calamosche in winter (photo by [www.ternioggi.it](http://www.ternioggi.it)) and in summer (Figure 10, photo by [www.itineraricamper.it](http://www.itineraricamper.it)): the very heavy human pressure on the beach in summer could have generated negative effects on the conditions for the survival of *B. megacephalus* in the back dunes, from which the species has disappeared.



of the trampling (by humans and by cars) on the dune, given its destructive effects on the sandy habitat integrity.

The Calamosche situation (Figs. 9, 10) (in particular the disappearance of the species in this area) represents in this sense a clear warning signal that induces a very careful control in the Eoro area (number 1 in Fig. 6) and along the dune belt also exposed to trampling in violation of the protection rules provided for the A area where the dunes are located.

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