

New records of two uncommon species, *Calappa tuerkayana* Pastore, 1995 (Decapoda, Calappidae) and *Parasquilla ferrussaci* (Roux, 1828) (Stomatopoda, Parasquillidae), from the Strait of Sicily (central Mediterranean Sea)

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Abstract

New records of two uncommon species, *Calappa tuerkayana* Pastore, 1995 (Decapoda, Calappidae) and *Parasquilla ferrussaci* (Roux, 1828) (Stomatopoda, Parasquillidae), from the Strait of Sicily (central Mediterranean Sea). The shamefaced crab *Calappa tuerkayana* Pastore, 1995 and the mantis shrimp *Parasquilla ferrussaci* (Roux, 1828) are two crustacean species rarely reported in the Mediterranean Sea. In December 2018, two specimens of *C. tuerkayana* and one specimen of *P. ferrussaci* were collected on a soft bottom at about 132 and 145 m depth during a trawl survey off Mazara del Vallo harbour (Strait of Sicily). This note reports the northernmost record of *C. tuerkayana* in the Strait of Sicily and confirms the occurrence of *P. ferrussaci* in the same area. An update of the spatial distribution of these crustacean species in the Mediterranean Sea is also presented.

Key words: Shamefaced crabs, Mantis shrimp, Trawl fisheries, Spatial distribution, Crustacean

Resumen

Nuevos registros de dos especies raras, *Calappa tuerkayana* Pastore, 1995 (Decapoda, Calappidae) y *Parasquilla ferrussaci* (Roux, 1828) (Stomatopoda, Parasquillidae), del canal de Sicilia (Mediterráneo central). El cangrejo calápido *Calappa tuerkayana* (Pastore, 1995) y la galera *Parasquilla ferrussaci* (Roux, 1828) son dos especies de crustáceos escasamente reportadas en el mar Mediterráneo. En noviembre de 2018 se recolectaron dos ejemplares de *C. tuerkayana* y un ejemplar de *P. ferrussaci* (Roux, 1828) en un estudio realizado mediante pesca de arrastre en aguas de Mazara del Vallo (canal de Sicilia), sobre un fondo blando a una profundidad aproximada de 132 y 145 m, respectivamente. Este trabajo refiere el registro más septentrional de *C. tuerkayana* en el canal de Sicilia y confirma la presencia de *P. ferrussaci* en esta misma área. Presenta asimismo una actualización de la distribución de estas especies de crustáceos en el mar Mediterráneo.

Palabras clave: Calappidae, Galeras, Pesca de arrastre, Distribución espacial, Crustáceos

Resum

Nous registres de dues espècies rares, *Calappa tuerkayana* Pastore, 1995 (Decapoda, Calappidae) i *Parasquilla ferussaci* (Roux, 1828) (Stomatopoda, Parasquillidae), del canal de Sicília (Mediterrani central). El cranc calàpid *Calappa tuerkayana* (Pastore, 1995) i la galera *Parasquilla ferussaci* (Roux, 1828) són dues espècies de crustacis escassament reportades al mar Mediterrani. El mes de novembre de 2018 es van recol·lectar dos exemplars de *C. tuerkayana* i un exemplar de *P. ferussaci* (Roux, 1828) en un estudi fet mitjançant pesca d'arrossegament en aigües de Mazara del Vallo (canal de Sicília), sobre un fons tou a una profunditat aproximada de 132 i 145 m, respectivament. Aquest treball refereix el registre més septentrional de *C. tuerkayana* al canal de Sicília i confirma la presència de *P. ferussaci* en aquesta mateixa àrea. També presenta una actualització de la distribució d'aquestes espècies de crustacis al mar Mediterrani.

Paraules clau: Calappidae, Galeres, Pesca d'arrossegament, Distribució espacial, Crustacis

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Introduction

Crustacean species are among the most economically important seafood products (Okpala et al., 2016; Scannella et al., 2017; Vitale et al., 2018a, 2018b) but some species within the Decapods and Stomatopods have little or no commercial significance and their biology and distribution are poorly understood (Swaby and Potts, 1990). In particular, little is known about the geographical distribution of the shamefaced crab *Calappa tuerkayana* Pastore, 1995 and the mantis shrimp *Parasquilla ferussaci* (Roux, 1828). *C. tuerkayana* is a decapod of the genus *Calappa* Weber, 1795. This genus consists of 46 species (WoRMS, 2020) distributed along the soft bottoms of tropical and subtropical shallow waters (Garcia, 2002; Spanò et al., 2004; Dulčić and Tutman, 2012). In particular, three species of this calappid crab genus have been recorded in the Strait of Sicily, namely: *C. granulata* (Linnaeus, 1758), *C. rosea* Jarocki, 1825 and *C. tuerkayana* Pastore, 1995. Among these, *C. granulata* is the most common and widely distributed species (Pipitone et al., 2018) whereas *C. tuerkayana* and *C. rosea* are uncommon species with only few specimens recorded in the Sicily–Malta channel (Pipitone et al., 2018) and eastward of Kerkenah Island (Spanò et al., 2004), respectively. Essentially, *C. tuerkayana* has a carapace not much wider than long, with the antero–lateral edge nearly even and the postero–lateral edge that has 7–8 thorny processes, increasing in size in a backward direction (Pastore, 1995). This crab species can be differentiated from *granulata* and *C. rosea* by the pigmentation of the carapace, which is rust–coloured with red bands on epigastric, urogastric and cardiac regions, and deep carapace grooves on either side of the epigastric–cardiac–urogastric region (Pastore, 1995; Pipitone and Vaccaro, 2011; Spanò et al., 2004). On the other hand, *P. ferussaci* is

a stomatopod belonging to the genus *Parasquilla* (Manning, 1995). This mantis shrimp is considered a rare species (Irmak et al., 2008; Corsini–Foka and Pancucci–Papadopoulou, 2012) recorded in the Eastern Atlantic from the Gulf of Guinea to the Gulf of Cadiz and the northern coasts of Portugal as well as the Mediterranean Sea (Irmak et al., 2008; Kapisir and Apostolidis in Zenetos et al., 2015). In particular, *P. ferussaci* is characterized by a carapace that narrows markedly anteriorly, lacking carinae, except for reflected marginals and a short irregular posterior portion of each lateral carina, while the telson is broader than long, with three pairs of marginal teeth (Manning, 1977), and lacking the two dark brown oval spots surrounded by a white ring, similar to eyes, typical of *Squilla mantis*. Importantly, *P. ferussaci* seems to be the only species of genus *Parasquilla* recorded in the Strait of Sicily. The present note reports a new record of *C. tuerkayana* and confirms the occurrence of *P. ferussaci* in the Strait of Sicily, providing an up-to-date geographical distribution of these uncommon species in the Mediterranean basin.

Material and methods

On December 2018, two specimens of *C. tuerkayana* (trawl haul point: 37° 33' 634" N, 12° 24' 193" E) and one specimen of *P. ferussaci* (trawl haul point: 37° 28' 915" N, 12° 27' 43" E) were collected during an experimental trawl survey within the Research flagship project (RITMARE) off Mazara del Vallo harbour (Strait of Sicily) at about 132 and 145 m depth (fig. 1), respectively. Thereafter, specimens (fig. 2) were transported to the laboratory of IRBIM–CNR in Mazara del Vallo where biometric data were collected. Specifically, individuals were photographed, weighed (accuracy 0.1 g) and measured. Measurements were carapace length (CL, distance between the centre of the anterior interorbital margin and the centre of the posterior margin, excluding the rostral plate for *P. ferussaci*) and carapace width (CW, maximal distance between the posterior anterolateral spines, carapace at its widest point for *P. ferussaci*) using callipers to the lowest millimetre. Total length (TL, distance between the anterior edge of the rostral plate and posterior extremity of the telson) was recorded only for the single individual of *P. ferussaci*. The specimens of *C. tuerkayana* were identified according to the descriptions provided by Pastore (1995) and d'Udekem d'Acoz (2001) whereas the specimen of *P. ferussaci* was identified according to Manning (1977). The sexual maturity of *P. ferussaci* was defined according to Mori et al. (1998). Furthermore, according to the available literature, an up-to-date geographical distribution of these uncommon species in the Mediterranean basin was mapped using Quantum GIS software (QGIS, 2020).

Results

Table 1 shows biometric data from measurements of *C. tuerkayana* and *P. ferussaci* specimens. Visual identification showed that both individuals of *C. tuerkayana* are males, of 42 and 31 mm CW and 37 and 27 mm CL, respectively (fig. 2A, 2B). The morphology of both individuals of *C. tuerkayana* was in agreement with the description presented by Pastore (1995) and d'Udekem d'Acoz (2001). As for weight, specimens of *C. tuerkayana* weighed 25 and 11 g, respectively. Regarding *P. ferussaci*, the specimen was a male with 23 mm of CL, 119 mm of TL and weighed 12 g (fig. 2C). The specimen of *P. ferussaci* was ascribed as a mature male; according to Mori et al. (1998), the estimated size at which *P. ferussaci* reaches first maturity is 20 mm CL whereas the morphological characteristics were in agreement with the description provided by Manning (1977).

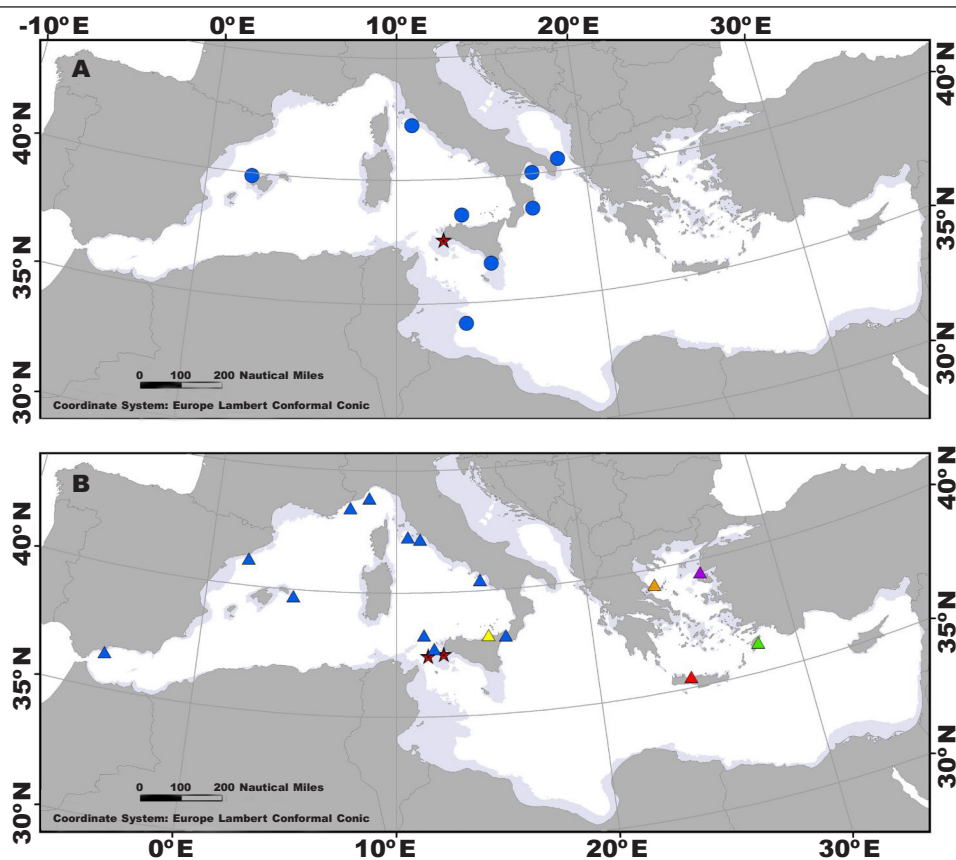


Fig. 1. Maps with known distribution of *Calappa tuerkayana* (A) and *Parasquilla ferussaci* (B) in the Mediterranean. Specific records include: blue circles (Pipitone et al., 2018); triangles in blue (Irmak et al., 2008), violet (Colmenero, 2009), red (Steudel and Dounas, 1994), green (Corsini–Foka and Pancucci–Papadopoulou, 2012), yellow (Castriota et al., 2004) and orange (Kapisir and Apostolidis, 2015). Red stars indicate the records of current study.

Fig. 1. Mapas en los que se indica la distribución conocida de *Calappa tuerkayana* (A) y *Parasquilla ferussaci* (B) en el Mediterráneo. Incluyen los registros específicos siguientes: círculos azules (Pipitone et al., 2018), triángulos azules (Irmak et al., 2008), triángulo violeta (Colmenero, 2009), triángulo rojo (Steudel y Dounas, 1994), triángulo verde (Corsini–Foka y Pancucci–Papadopoulou, 2012), triángulo amarillo (Castriota et al., 2004) y triángulo naranja (Kapisir y Apostolidis, 2015). Las estrellas rojas indican los registros de este estudio.

Discussion

Although the general appearance of *C. tuerkayana* may seem similar to other congeneric species, the features which allow its recognition can be found in the colour, morphology of the body, and the size of the specimens (García, 2002; Spanò et al., 2004). Thus, the



Fig. 2. *C. tuerkayana* Pastore, 1995: A, dorsal view; B, posterior view of carapace. *P. ferussaci* (Roux, 1828): C, dorsal view.

Fig. 2.. *C. tuerkayana* Pastore, 1995: A, vista dorsal; B, vista posterior del caparazón. *P. ferussaci* (Roux, 1828): C, vista dorsal.

Table 1. Basic biometric measures of *Calappa tuerkayana* and *Parasquilla ferussaci* collected in the Strait of Sicily: CL, carapace length; CW, carapace width; TL, total length; W, weight.

Tabla 1. Medidas biométricas básicas de *Calappa tuerkayana* y *Parasquilla ferussaci* recolectados en el canal de Sicilia: CL, longitud del caparazón; CW, ancho del caparazón; TL, longitud total; W, peso.

Specimen	Sex	CL (mm)	CW (mm)	TL (mm)	W (g)
<i>Calappa tuerkayana</i>	♂	37	42	-	25
<i>Calappa tuerkayana</i>	♂	27	31	-	11
<i>Parasquilla ferussaci</i>	♂	23	21	119	12

biometric measures and morphology of both specimens of the current study differed from the general characters of *C. granulata*. Specifically, the carapace of *C. granulata* is wider and the shell tubercula are flatter than those of *C. tuerkayana*. Moreover, the specimens of *C. tuerkayana* in the current study showed a carapace coloration with a crimson pattern and paler beige areas, chelae were brownish and the ventral area appears reddish–coloured whereas the colour patterns of *C. granulata* carapace is yellowish with scarlet spots are arranged regularly (Garcia, 2002). Indeed, the fresh specimens allowed a detailed description of the colour patterns of the individuals, providing a better distinction from other species of the genus *Calappa*. Little is known about habitat and geographical distribution of *C. tuerkayana* within the Mediterranean Sea. Specifically, the few previous studies reported the occurrence of *C. tuerkayana* on coarse detritus bottoms off western Libya (Pipitone et al., 2018), soft bottoms of Monte Argentario (Vignoli et al., 2004), and seagrass meadows of Ustica Island (Pipitone and Vaccaro, 2011) at a depth ranging from 10 up to 105 m. Moreover, the record in the Balearic Islands (Garcia, 2002) represents the westernmost occurrence of *C. tuerkayana* in the Mediterranean Sea while in the Levantine basin it is unreported (fig. 2A). The specimens of *C. tuerkayana* caught on the soft bottoms of the Adventure bank at a depth of 132 m confirmed this crab species as eurybathic and fitted well with the pattern of distribution in the central Mediterranean Sea showed by Pipitone et al. (2018). In particular, the *C. tuerkayana* specimens in the current study represented the northernmost as well as the deepest record of this species in the Strait of Sicily.

Regarding *P. ferussaci*, the biological knowledge of this crustacean species is scanty as little information is available regarding size at maturity, sexual dimorphism, growth (Mori et al., 1998) and feeding strategy (i.e. epibenthic predator) (Colmenero et al., 2009; Kapiris and Apostolidis in Zenetos et al., 2015). The distribution of *P. ferussaci* in the Mediterranean Sea takes place on the sandy/muddy habitats along the continental shelf and slope of the western basin (fig. 2B) at depths around 50 up to 700 m (Abelló et al., 1993–1994; Colmenero et al., 2009; Kapiris and Apostolidis in Zenetos et al., 2015). In addition, the records of this rare species on the soft bottoms of the Aegean Sea and eastern coasts of Rhodes Island at depths between 50 and 200 m suggest that its occurrence can extend to the Levantine basin of the Mediterranean Sea (Irmak et al., 2008; Corsini–Foka and Pancucci–Papadopoulou, 2012; Kapiris and Apostolidis in Zenetos et al., 2015). To the best of our knowledge, the first record of *P. ferussaci* in the Strait of Sicily was reported in the Talbot bank by Pipitone and Tumbiolo (1992) (fig. 2A) and no other specimens have since been recorded. The present specimen was caught in a fishing ground locally known as 'Gigibau', a few miles away from Talbot bank. In particular, Gigibau is an area of about 500 km² with a depth range of between 100 and 170 m, 10 nautical miles (SW) from Mazara del Vallo equally characterized by two different biocenoses namely: coastal detritus (DC) and coastal terrigenous mud (VTC) (Garofalo et al., 2004). Our record confirms the occurrence of this species eighteen years after its last record in an area of the Strait of Sicily where fishing activity targeting the deep water rose shrimp is high (*Parapenaeus longirostris* Lucas, 1846) (Russo et al., 2019; Sardo et al., 2020). The present study contributes to improving the extant spatial distribution knowledge of these uncommon species in the Mediterranean Sea. However, the occurrence of *C. tuerkayana* and *P. ferussaci* species in the Mediterranean Sea might be underestimated. Indeed, according to Pipitone et al. (2018) and Spanò et al. (2004), the habitat of *C. tuerkayana* overlaps that of other congeneric species with very similar morphology; new molecular evidence indicates that *C. tuerkayana* could represent the juvenile stage of *C. granulata* (Marco–Herrero et al., 2015). Regarding *P. ferussaci*, the paucity of records, as already supposed for other rare species, might be explained either by the absence of commercial interest (i.e. discarded species) (Swaby and Potts, 1990), and by a lack of adequate sampling methods (Falsone et al., 2017) and *ad hoc* research project (Geraci et al., 2019). Finally, closer collaboration with commercial fishing activities is of increasing priority to improve knowledge about the spatial distribution and the biological features of this rare crustacean species.

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