

FIRST RECORD OF *PACHYGRAPSUS TRANSVERSUS* (GIBBES, 1850)
(BRACHYURA, GRAPSIDAE) IN ITALIAN WATERS

BY

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ABSTRACT

Pachygrapsus transversus (Gibbes, 1850) is reported for the first time from Italian waters. This crab was collected at Ustica Island and at several other localities on NW Sicily (southern Tyrrhenian Sea) on vermetid reefs, an intertidal habitat frequent in the sampling area. *P. transversus*, whose distributional range covers the warm and warm-temperate areas of the eastern and western Atlantic and the eastern Pacific, was already known from the eastern Mediterranean since the 1920s; prior to this paper it was recorded in the western Mediterranean only in 1980 and 1994 with very few specimens.

There are no data to ascertain the origin of the Sicilian population, i.e., natural or ship-mediated diffusion; either is considered possible in theory. Yet, the presence of young specimens (around 5 mm carapace length) and ovigerous females, as well as the numerical abundance at one of the Sicilian sites, suggest that the NW Sicily population is stable and well acclimatized.

RÉSUMÉ

Pachygrapsus transversus (Gibbes, 1850) est signalé pour la première fois dans les eaux italiennes. Ce crabe a été récolté à l'île d'Ustica et dans plusieurs autres localités du nord-ouest de la Sicile (partie sud de la mer Tyrrhénienne) sur des trottoirs à vermetes, un habitat intertidal fréquent dans la zone de récolte. *P. transversus*, dont la zone de distribution couvre les zones tièdes et tempérées de l'Atlantique est et ouest et l'est du Pacifique était déjà connu dans l'est de la Méditerranée depuis les années 1920; il a été antérieurement signalé dans la partie ouest de la Méditerranée seulement en 1980 et 1994 avec peu de spécimens.

Aucune donnée ne permet d'affirmer l'origine de la population sicilienne, naturelle ou arrivée par bateaux; en théorie les deux sont possibles. Cependant, la présence de jeunes spécimens (autour de 5 mm de longueur de carapace) et de femelles ovigères, ainsi que l'abondance numérique sur l'un des sites sicilien, suggère que la population NO de la Sicile est stable et bien acclimatée.

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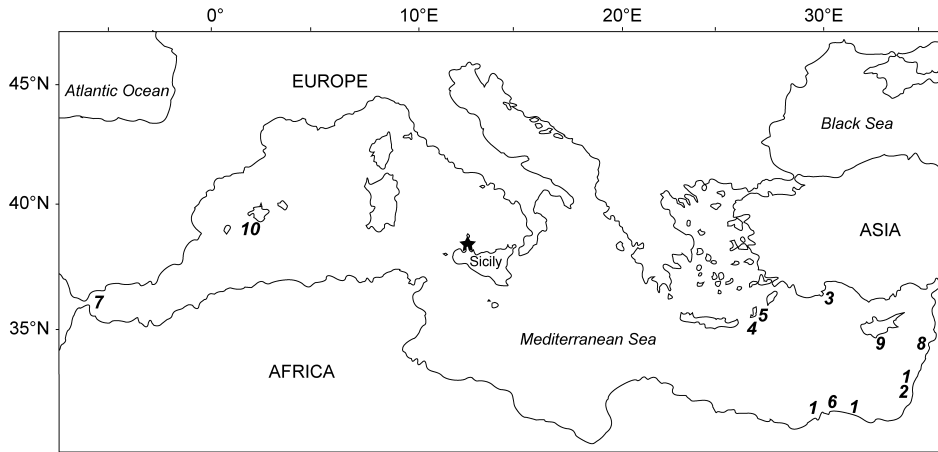


Fig. 1. Map of the published records of *Pachygrapsus transversus* (Gibbes, 1850) in the Mediterranean. 1, Holthuis & Gottlieb (1958); 2, Forest & Guinot (1958); 3, Holthuis (1961); 4, Kinzelbach (1964); 5, Koukouras (1972); 6, Ramadan & Dowidar (1972); 7, García Raso & Jiménez Millán (1980); 8, Shiber (1981); 9, Lewinsohn & Holthuis (1986); 10, Garcia (1994); *, present paper.

INTRODUCTION

The genus *Pachygrapsus* occurs with three species in the Mediterranean Sea: *P. marmoratus* (Fabricius, 1787), *P. maurus* (Lucas, 1846), and *P. transversus* (Gibbes, 1850). *P. transversus* is easily distinguished from the two other species by the presence of one postorbital tooth (compared to *P. marmoratus*, which is armed with two postorbital teeth), and of two or three spines in the distal region of the posterior margin of the fifth pereopod (compared with *P. maurus*, which lacks such spines) (Zariquiey Alvarez, 1968). Christiansen (1969) gave a detailed description of this species.

P. transversus lives in the intertidal and upper infralittoral in rocky and sandy habitats, including also gravel, mangrove roots, sabellariid worm reefs, mussel beds, as well as eutrophic areas with dense algal cover (Forest & Guinot, 1958; Gore et al., 1978; Manning & Holthuis, 1981; Williams, 1984; Gonzalez Perez, 1995; Flores & Negreiros-Fransozo, 1999). It has a wide distribution range extended over the warm and warm-temperate regions of the eastern and western Atlantic, the eastern Pacific, and the Mediterranean (d'Udekem d'Acoz, 1999), although it has occasionally been introduced by ship-mediated transport to colder areas, e.g., Marseille (Mediterranean coast of France: Catta, 1876, in Bouvier, 1940) and Copenhagen (Denmark: Bertelsen & Ussing, 1936, in Christiansen, 1969). The presence of this species in the Indo-West Pacific area, as reported by some authors, was excluded by Holthuis & Gottlieb (1958).

The Mediterranean distribution of *P. transversus*, in the light of its published records, is patchy and irregular (fig. 1). Until the early 1970s it was known

only from the eastern basin (Forest & Guinot, 1958; Holthuis & Gottlieb, 1958; Holthuis, 1961; Kinzelbach, 1964; Ramadan & Dowidar, 1972). The only previous western records were three specimens from Malaga, Alboran Sea (García Raso & Jiménez Millán, 1980), and one specimen from the Balearic Islands (Garcia, 1994). *P. transversus* was not included in either the checklist of Italian decapods (Froggia, 1995), or, more recently, among Sicilian decapod crustaceans (Pipitone & Arculeo, 2003).

This paper reports the first record of *Pachygrapsus transversus* from Italian waters. It is based on specimens collected at Ustica Island and at several other localities around NW Sicily, and gives some remarks on the Mediterranean habitat of the species.

MATERIALS AND METHODS

Fourteen *Pachygrapsus transversus* were collected between 2002 and 2004 in NW Sicily; several other specimens were identified in the field and then returned back to sea. The first specimen was collected during a study on the decapod fauna of the island of Ustica on 11 July 2002, near Scoglio del Colombaro. About two years later, on 27 May 2004, during a study on the ethology of brachyuran crabs⁴), one of the present authors (A.M.V.) collected two specimens at Addaura. In the following month, the authors surveyed other nearby localities to confirm the occurrence of *P. transversus* in the area. Other decapod crustaceans occurring at the same sites were *P. marmoratus*, *P. maurus*, *Eriphia verrucosa* (Forskål, 1775), *Xantho* sp., and *Clibanarius erythropus* (Latreille, 1818). Hermit crabs were identified at the species level only at Ustica.

The specimens were hand-collected, then frozen. In the laboratory they were sexed and measured (maximum carapace length, CL, and width, CW), fixed in a seawater-formaldehyde solution, then preserved in 70% ethanol, and stored in the decapod collection of the Laboratorio di Ecologia Marina, Castellammare del Golfo.

RESULTS

***Pachygrapsus transversus* (Gibbes, 1850)**

Material examined — Ustica (Scoglio del Colombaro), 38°43.16'N 13°10.96'E, 11 July 2002, 1 ♂ (CL 12.0 mm, CW 15.6 mm), A.M. Vaccaro and C. Pipitone leg.; Addaura, 38°11.48'N 13°21.25'E, 27 May 2004, 1 ♂ (CL 13.2 mm, CW 18.1 mm), 1 ♀ (CL 8.7 mm, CW 11.1 mm),

⁴) Gomei, M., 2004. La plasticità comportamentale in brachiuri dell'intertidale e sublitorale roccioso del Mediterraneo: 1-221. (Ph.D. Thesis, Dept. of Animal Biology and Genetics "Leo Pardi", University of Florence, Florence).

A.M. Vaccaro leg.; Isola delle Femmine (mainland), 38°12.01'N 13°14.51'E, 24 June 2004, 1 ♂ (CL 7.0 mm, CW 9.2 mm), 1 ♂ (CL 7.6 mm, CW 9.4 mm), A.M. Vaccaro and C. Pipitone leg.; Mongerbino, 38°06.63'N 13°31.90'E, 4 August 2004, 1 ♂ (CL 9.2 mm, CW 11.8 mm), 1 ♂ (CL 8.0 mm, CW 11.0 mm), 1 ♂ (CL 7.2 mm, CW 9.0 mm), 1 ♂ (CL 7.1 mm, CW 9.0 mm), 1 ♂ (CL 5.7 mm, CW 7.2 mm), 1 ♂ (CL 5.5 mm, CW 7.2 mm), 1 ♀ ov. (CL 7.1 mm, CW 9.2 mm), 1 ♀ ov. (CL 5.8 mm, CW 7.8 mm), 1 ♀ ov. (CL 5.0 mm, CW 6.8 mm), A.M. Vaccaro and M. Pontenani leg.

All specimens were found during diurnal low tide on the vermetid reef (“trottoir à vermets”: Pérès & Picard, 1952). The crabs occupied different parts of the reef (inner margin, outer margin, and internal pool or “cuvette”: see Molinier & Picard (1953) for a description of the reef morphology), and they stayed inside or immediately outside the small holes present on the substratum. The reef surface was covered by a dense algal canopy; algae were not identified at the sampling sites except at Mongerbino, where the dominant species were *Jania rubens* (Linnaeus) J.V. Lamouroux, *Chondrophycus papillosus* (C. Agardh) Garbary & J. Harper, *Cladophora albida* (Nees) Kützing, and *Gelidium spinosum* (S.G. Gmelin) P.C. Silva. *Pachygrapsus marmoratus* and *P. maurus* were always co-occurring at each site, and always in larger numbers, except at Mongerbino, where *P. transversus* (at a visual inspection of the reef) seemed to outnumber both its congeners.

DISCUSSION

The first known Mediterranean records of *Pachygrapsus transversus* come from the Egyptian coast and Israel (Holthuis & Gottlieb, 1958). At that time, the known geographic range of the species included the eastern and western Atlantic and the eastern Pacific. *P. transversus* could have accidentally reached the Mediterranean coasts by man-mediated transport (as suggested by Holthuis & Gottlieb, 1958 and d’Udekem d’Acoz, 1999). Wolff (1954) included *P. transversus* among the decapods found attached to ship hulls. Although such method of dispersal for shallow water crabs was probably much more common when wooden hulls were in use, as opposed to the more modern metallic hulls with antifouling paints (Rodríguez & Suárez, 2001), all the same it cannot be excluded nowadays. Also a passive transport on floating objects, as observed for the congeneric *P. marmoratus* and *P. maurus*, should be kept into consideration (Garcia, 1994). Until the early 1970s the Mediterranean occurrence of *P. transversus* was apparently limited to the warmer eastern basin. As suggested by Garcia (1994), such skewed distribution closely resembles that of *Ocypode cursor* (Linnaeus, 1758), a subtropical crab very frequent along the west African coast and present in the eastern Mediterranean. *P. transversus* was found for the first time in the western basin only in 1980 (García Raso & Jiménez Millán, 1980) and again in 1993 (Garcia, 1994), in a

very limited number of specimens. There are no data to assess if those occurrences were due to ship transport, or rather to natural spreading from either the eastern Mediterranean, or the eastern Atlantic populations. Pipitone et al. (2001) suggested long larval life (as is generally the case for grapsid crabs) and/or climate changes as possible reasons for the recent diffusion of the exotic grapsid crab, *Percnon gibbesi* (H. Milne Edwards, 1853) in the western and central Mediterranean. The same theories could be applied to *Pachygrapsus transversus* of NW Sicily; nevertheless, the presence of young specimens (around 5 mm CL) and ovigerous females as well as the numerical abundance (Mongerbino site), suggest that there is a stable and well acclimatized population there.

P. transversus occupies a wide array of habitats along its distributional range. Like most grapsid crabs, it inhabits the intertidal, although it also occurs in the upper infralittoral. In the Mediterranean, *P. transversus* has usually been found in rocky habitats covered with algae, often in proximity of a sandy bottom, and sometimes in the presence of fresh water. All the Sicilian specimens listed in this paper were found on the vermetid reef, an intertidal bioconstruction common along the NW Sicily coast and especially frequent in the eastern Mediterranean basin, built by the sessile gastropod *Dendropoma petraeum* (Monterosato, 1884) (cf. Antonioli et al., 1999). Vermetid reefs occur along the coasts of all tropical and subtropical seas, and are morphologically and ecologically complex habitats with a high biodiversity (Chemello et al., 2000). The ecology and biology of *P. transversus* are unknown in the Mediterranean. Gore et al. (1978) have included *P. transversus* among the dominant species of the decapod community associated to another bioconstruction, the intertidal sabellariid reefs of the Indian River region in eastern Florida, where they find shelter and food. This crab might play an important role as a predator as well as a prey in the Mediterranean vermetid reef habitat, as noted by Gore et al. (1978) for the Indian River region and by Abele et al. (1986) for the rocky intertidal of the Bay of Panama. Unfortunately, the animal community inhabiting the Sicilian vermetid reefs (as opposed to the algal community: see Mannino, 1992) is still poorly known, with the exception of gastropod molluscs (Pandolfo et al., 1992, 1996). The present data do not allow us to draw further conclusions, but ad hoc studies on *P. transversus* of the Mediterranean, and especially so on topics related to resource partitioning and to possible competition with co-occurring grapsid crabs, would be able to shed light on the ecology of this species.

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