

THE EFFECT OF WATER TEMPERATURE ON MOVEMENTS AND HOME RANGE OF THE BLUE CRAB *CALLINECTES SAPIDUS* IN A MEDITERRANEAN LAGOON: PRELIMINARY RESULTS

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The blue crab *Callinectes sapidus* Rathbun, 1896 (Decapoda: Portunidae), native from the Western Atlantic coasts, is now a well-established invasive alien species in the Mediterranean Sea. Recorded for the first time in 1949 from the Venice Lagoon, it is now widely spread in the whole basin where it is perceived as a commercial resource but also as a threat to coastal fisheries and open-sea aquaculture plants, likely due to the scarcity of natural competitors and predators. Although many aspects of its biology and ecology have been studied in the native areas, there is a lack of knowledge about the adaptations of blue crab to the Mediterranean climate and environment. This poster contains some preliminary data on the effects of water temperature on the movements and home range of blue crab in a Western Mediterranean coastal lagoon.

Ten adult blue crabs (5 males 19.20 ± 0.84 cm CW, 5 females 17.60 ± 1.14 cm CW) were tracked by ultrasonic telemetry in the S'Ena Arrubia lagoon (Sardinia, Western Mediterranean) from December 2022 to September 2023. A miniaturized transmitter was glued to the carapace of each specimen (Fig. 1c). An array of 15 receivers was deployed on the bottom of the lagoon at a depth of about 0.8 m (Fig. 1a,b). Temperature loggers were put in three receiver stations.

Based on the number of detections recorded by the receivers, the daily home range (HR) during the actual detection period was estimated for each crab.

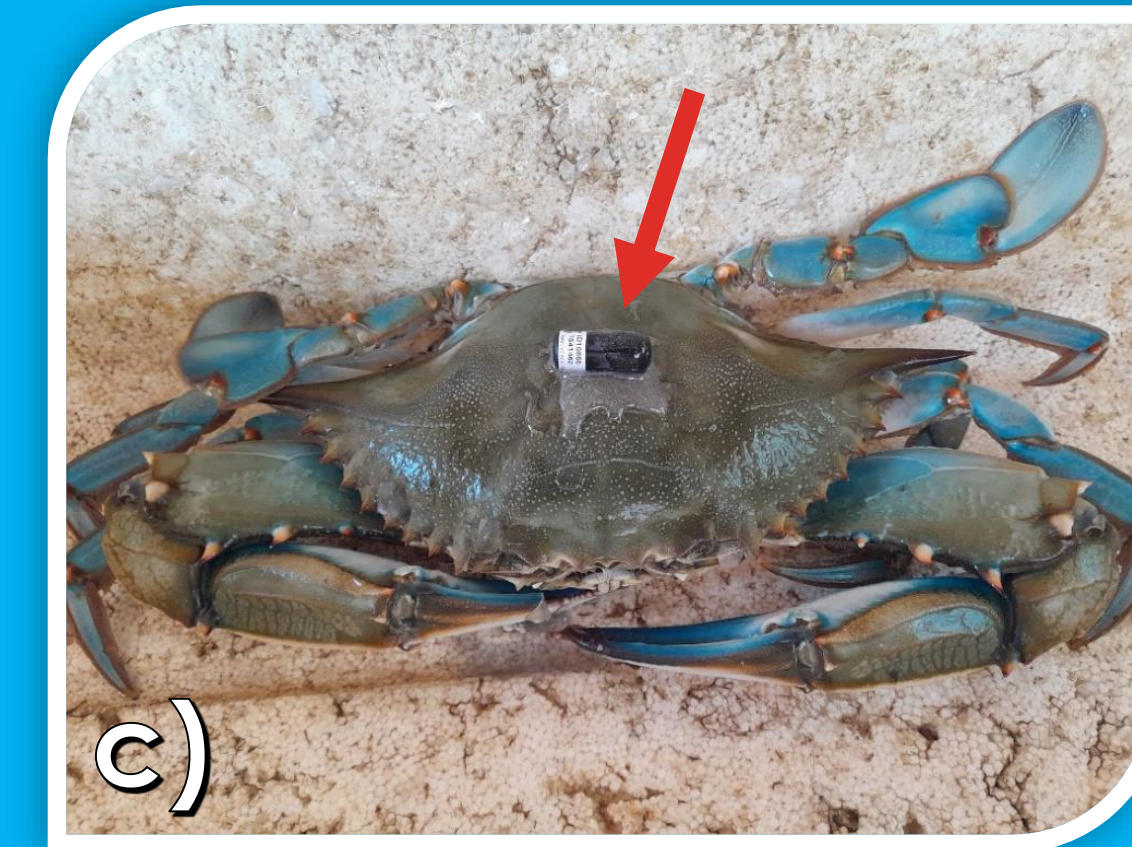
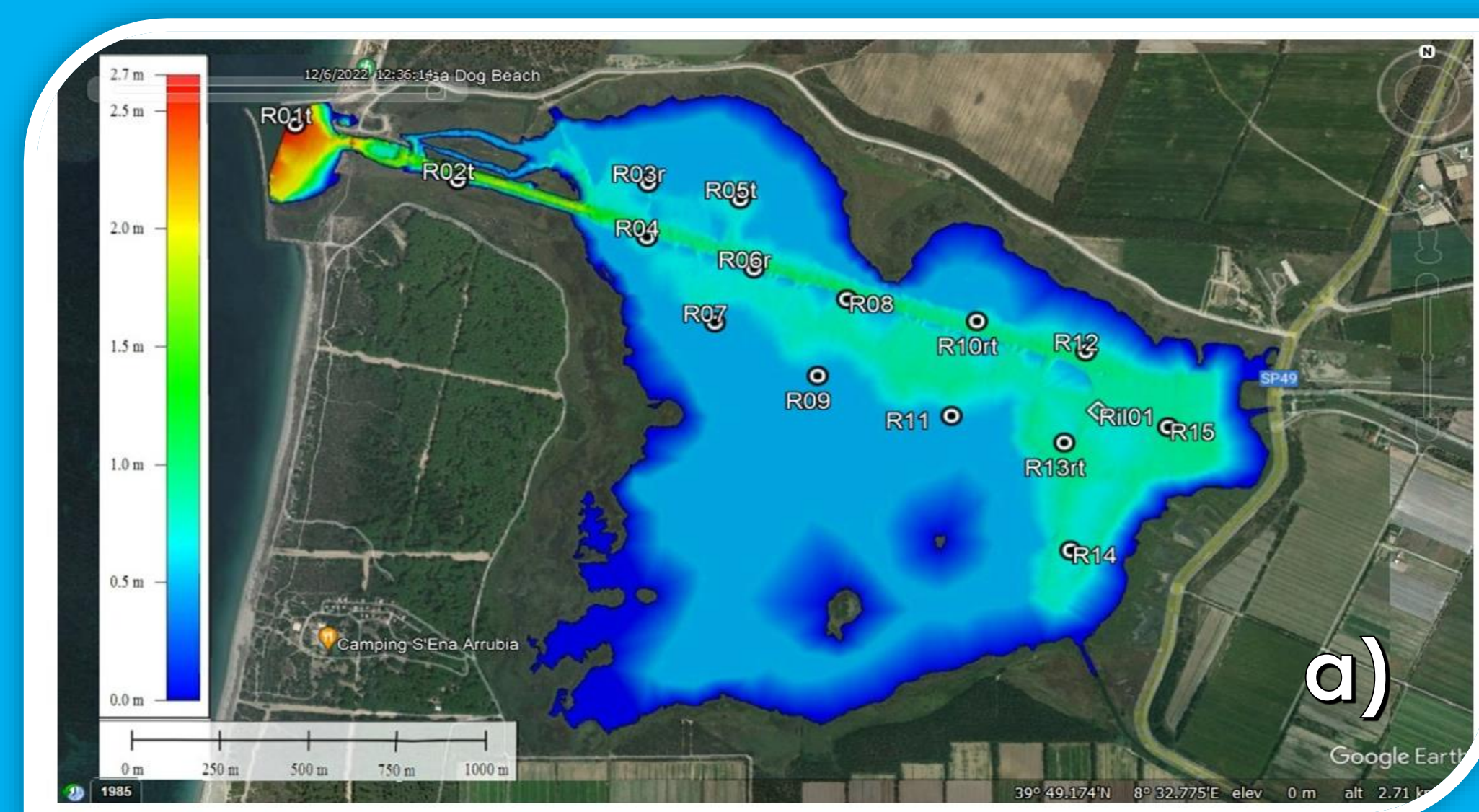


FIG. 1 - a) Map of the study area with depth gradient and receivers positions. b) Receiver fixed on the muddy bottom. c) Tagged blue crab.

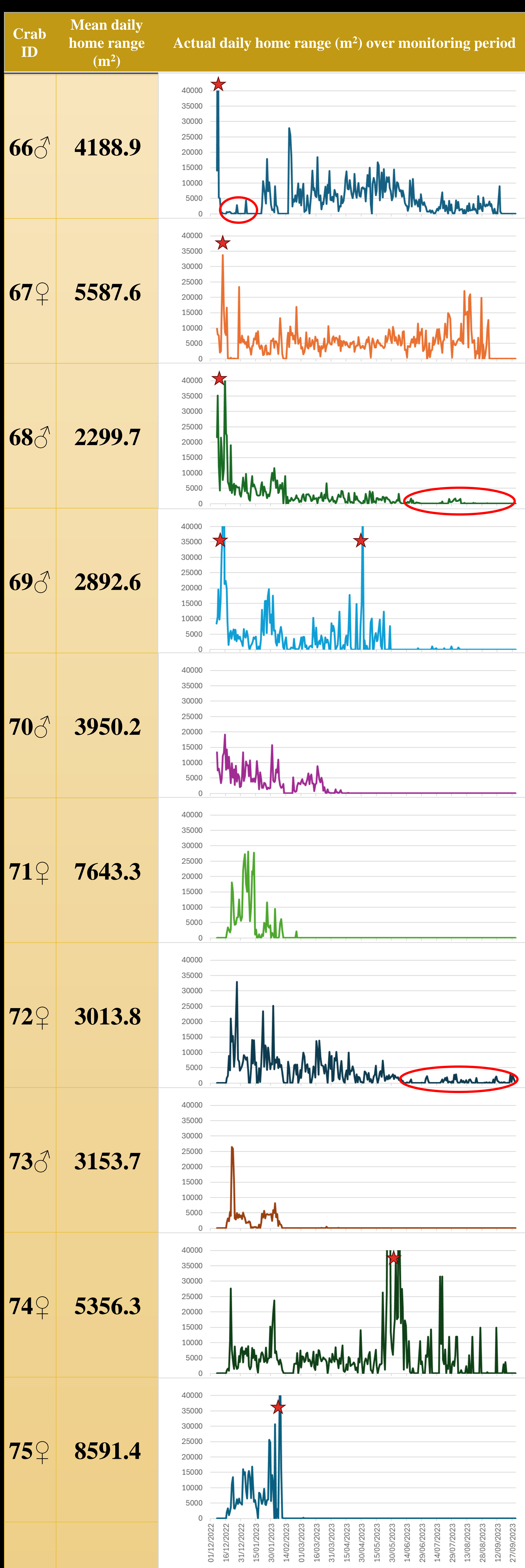


FIG. 2 - Mean and actual daily home range (m²) of each tagged crab during the monitoring period.

○ Signals from an area with poor receiver coverage: possibly underestimated daily HR surface.

★ Peaks representing extraordinary movements (homing behaviour?), likely related to initial crab release or to unrecorded recapture-and-release events.

Crabs were tracked for a minimum of 2 months up to a maximum of 9 months (Fig. 2). The tracking period included the coldest months (January and February) for all individuals. The mean daily HR was 4668 ± 2111 m² with a range of 2300 - 8591 m² (Figs. 2-3). Water temperatures ranged 7°-31°C (45°-88°F) i.e., a mean of 12°C (50°F) in January and 28.4°C (83°F) in July (Fig. 3).

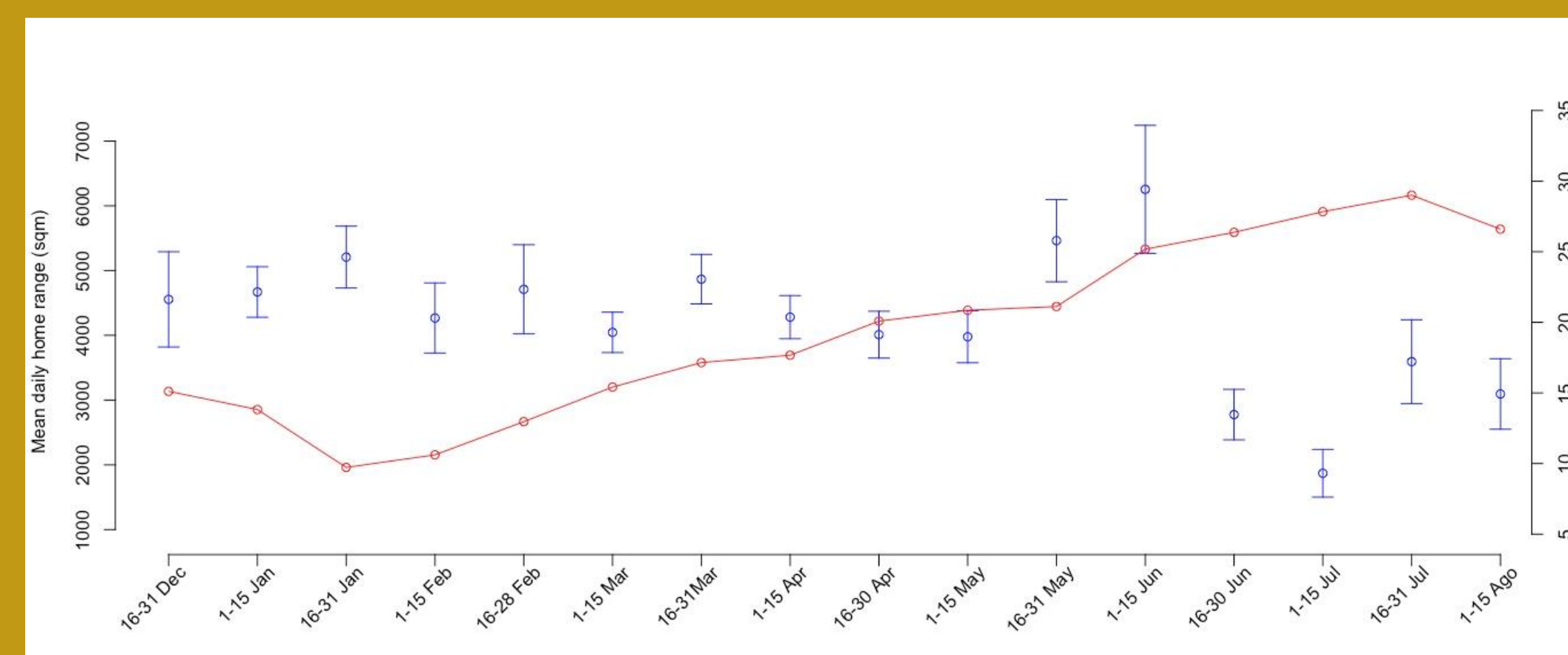


FIG. 3 - Temperature (red line) and home range (blue dots) for five better-tracked crabs (cumulated data) across the study period. Mean values with s.e.

The mean HR surface of the five better-tracked crabs was homogeneous across months, with the exception of smaller values in summer.

A comparison with the water temperature trend in native areas (Chesapeake Bay, Fig. 4), where a hibernation of blue crabs occurs during the colder months (Millikin & Williams, 1984; see also Marchessaux et al., 2022 for thermal optimum), suggests a different activity pattern in the Western Mediterranean, with continuing winter activity - which means an uninterrupted impact on the biotic community in terms of predation, competition and other interactions - and its reduction during the hottest period.

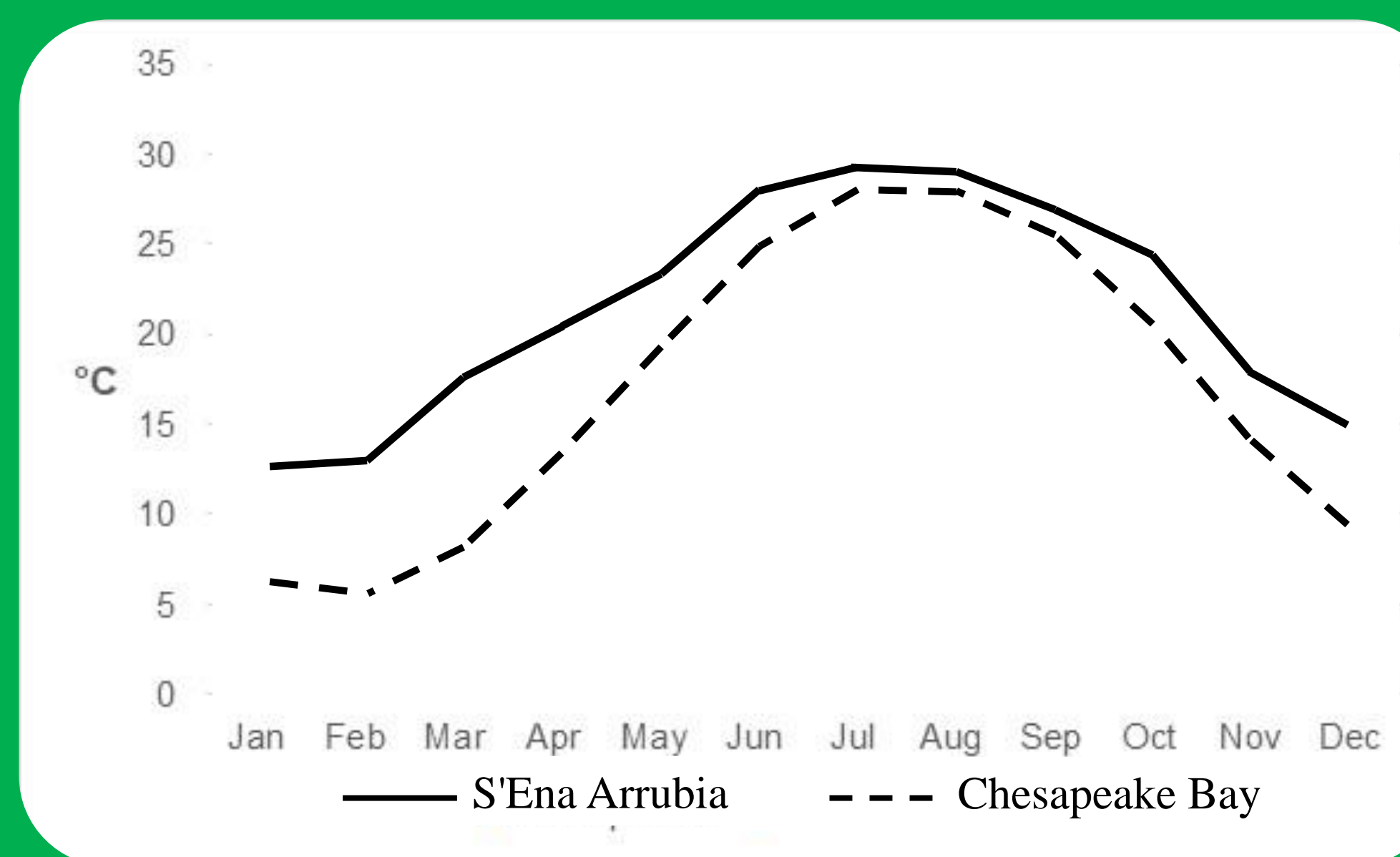


FIG. 4 - Comparison of mean water temperature in the S'Ena Arrubia lagoon (pers. observ.) and in Chesapeake Bay (www.seatemperature.info).

• Marchessaux G., Bosch-Belmar M., Cilenti L., Lago N., Mangano M.C., Marsiglia N., Sarà G. (2022) - The invasive blue crab *Callinectes sapidus* thermal response: Predicting metabolic suitability maps under future warming Mediterranean scenarios. *Front. Mar. Sci.*, 9: 1055404.
 • Millikin M.R., Williams A.B. (1984) - Synopsis of Biological Data on the Blue Crab, *Callinectes sapidus* Rathbun. *FAO Fish. Synop.* 138: 39 pp.