Introduction

*Echinolittorina punctata* (Gmelin, 1791) is a littorinid gastropod with a distribution extending from West Africa to the Mediterranean Sea (Williams & Reid, 2004). Its Mediterranean distribution has recently been reviewed by Antit et al. (2007). The species is known from Southern Spain, the North-African coasts, Israel and Lebanon. In Italy, the species has been known to live on the coasts of Sicily for several decades. However, Antit et al. (2007) hypothesized the species has reached Sicily only in the 19th century. In recent years, the Italian range of *E. punctata* has rapidly enlarged and several new records have been published: first on the eastern coasts of the Strait of Messina (Miccoli & Giovine, 1983), then in Calabria near Vibo Valentia (D’Anna, 1997), in Campania at several localities and in Lazio at S. Felice Circeo (D’Anna, 2001; Soppelsa et al., 2004). The most recent and most northern record in the Tyrrhenian Sea is to our knowledge at Borgo Sabotino, near Latina in Lazio (De Santis, 2008).

Italian coasts have been researched by amateur and professional collectors with great intensity since the 19th century, so the recent northwards expansion of the range of the species cannot be explained by a lack of information, and the hypothesis of an expansion driven by climatological changes acquires relevance. To further support the knowledge of the range changes of this species, new records of live populations from Puglia and comments on the historical presence of the species in the region are given.

Materials and methods

Field research was carried out at several localities on the Ionian coast of Puglia, especially within 20 km north and south of Gallipoli from December 2007 to July 2008 (Fig. 1). Specimens were photographed alive in the field to show *in situ* habits and in the laboratory to record the living animal. Living specimens were then fixed in ethanol.

Additional records of *E. punctata*, particularly from Puglia, were obtained from Italian collectors and institutional collections.

A bibliographical research was carried out to understand the historical distribution of the species in Puglia.
Discussion

The first authors’ record of *E. punctata* in Puglia dates back to December 6th, 2007 when shore collecting in Parco Regionale “Isola Sant’Andrea Litoranea Punta Pizzo” (a few kilometers south of Gallipoli) led to the discovery of a population living on mesolittoral rocks projecting from the surrounding sand. Although the rocky shore was narrow, a clear zonation between *E. punctata* and *Melarhaphe neritoides* (Linneé, 1758) was observed. *E. punctata* populated the lower part of the shore (mesolittoral) and *M. neritoides* the upper part (supralittoral). The population consisted of several tens of specimens. The same population was observed again in July 2008, showing that it is likely to be a stable one. Further research was then carried out during the following months hoping to localize further populations both north and south of Gallipoli, but results were poor. However, on June 25th, 2008 a new abundant population was found near Torre Sabea, a few kilometers north of Gallipoli. Here a low rocky coast is present and *E. punctata* was found in supralittoral rock pools together with *M. neritoides*. Isolated specimens were then found at Torre Inserraglio, 15 kilometers north of Gallipoli on June 29th and at Santa Caterina, 10 kilometers north of Gallipoli.

Contacts with several other collectors yielded data on 6 other lots of *E. punctata* from Puglia, all from the Ionian coast and within a few kilometers of Gallipoli, which seems to be the center of the distribution of the species at present. All records date to after the year 2000 (Tab. 1). Some collectors who extensively explored both the Adriatic and Ionian coasts of Puglia from 1960 to 2000 (G. Oriolo, P. Piani, B. Sabelli, pers. comm) did not record this species. Moreover, the census of marine molluscs along the Italian coasts by ENEA and Società Italiana di Malacologia which collected data from 1958 to 1997 did not report any finding of *E. punctata* from Puglia.

In the past, *E. punctata* has been cited from Puglia in the literature in only a few cases. Praus-Franceschini (1906) records the presence of a lot of this species in the Zoological Museum of Naples from Tricase. Tricase is a small town in southeastern Puglia a few kilometers from the sea. We were not able to recover this lot in the Museum (Maio, pers. comm.) and therefore have no data on the number of specimens and if dead or live collected. It would have been desirable to check identification (although *E. punctata* is a species difficult to confuse with others) and verify the content of the label to assess whether Praus-Franceschini referred to the town in Puglia or to any other place-name around Italy or the Mediterranean Basin, since he did not specify the province or region.

Trono (2006) revised the fauna of Salento, the southern part of Puglia, and recorded one empty shell from ~20 m at Santa Caterina (Lecce) in 1999. *E. punctata* is also cited in an old work by Parenzan (1961). This work describes the malacofauna of the entire Ionian Sea, considered by Parenzan to cover the coasts of central North Africa, Turkey, Greece and from Sicily to Puglia in Southern Italy. Parenzan did not specify the locality of the record he reported. However, in the manuscript list of Parenzan’s collection *E. punctata* is cited only from Sicily (Siracusa and Agrigento) and no specimens are recorded from Puglia. Since Parenzan himself (1970) reported that *E. punctata* was abundant at that time in southern Sicily, his record in 1961 is likely related to southern Sicily and not to Puglia.

The origin of populations in Puglia is difficult to determine. However, since summer surface currents are coun-

<table>
<thead>
<tr>
<th>Locality</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Date</th>
<th>Live specimens</th>
<th>Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecce</td>
<td>–</td>
<td>–</td>
<td>May 5th, 2000</td>
<td>3</td>
<td>Tisselli</td>
</tr>
<tr>
<td>Gallipoli (Lecce)</td>
<td>40°03’N</td>
<td>17°50’E</td>
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<td>Renda</td>
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<tr>
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<td>40°06’33’N</td>
<td>18°00’10’E</td>
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<td>Perugia</td>
</tr>
<tr>
<td>Gallipoli (Lecce) Lido S. Giovanni</td>
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<td>18°00’10’E</td>
<td>2005</td>
<td>20</td>
<td>Perna</td>
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<td>50</td>
<td>Perna</td>
</tr>
<tr>
<td>Gallipoli (Lecce) Lido S. Giovanni</td>
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<td>August 2007</td>
<td>200</td>
<td>Perna</td>
</tr>
<tr>
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<td>18°01’11’E</td>
<td>Dec. 6th, 2007</td>
<td>77</td>
<td>Albano, Trono</td>
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<td>Gallipoli, Rivabella, Torre Sabea</td>
<td>40°04’47’N</td>
<td>18°00’30’E</td>
<td>June 25th, 2008</td>
<td>50</td>
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<tr>
<td>Torre Inserraglio (Lecce)</td>
<td>40°10’34’N</td>
<td>17°56’02’E</td>
<td>June 29th, 2008</td>
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<td>Trono</td>
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<td>Santa Caterina (Lecce)</td>
<td>40°08’34’N</td>
<td>17°58’35’E</td>
<td>July 12th, 2008</td>
<td>8</td>
<td>Trono</td>
</tr>
</tbody>
</table>

Tab. 1. Records of *E. punctata* from Puglia (coordinates by datum WGS84).
ter-clockwise in the Ionian Sea, it is likely they come from Greece. Records from Greece are rare, however; Nicolay & Angiyo (1988) record specimens from Keratea in the Northwestern Aegean Sea, the Academy of Natural Sciences of Philadelphia, USA, has a lot in its collection from Rodi (collected before 1976, lot number 18579) and specimens have been recorded from Crete (Reid, pers. comm.). This is a different path of extension from the one described in recent literature from Sicily northwards to Calabria, Campania and Lazio which is favoured by the counter-clockwise Tyrrhenian Sea current. There is not a recent colour illustration of the animal and it is here provided in Figs 2, 3. The base of the foot is whitish. The foot and the snout are yellowish with dark surface pigmentation. The tentacles are yellowish with two pale grey longitudinal lines. The columellar muscle is white. The head has black pigmentation on the surface, but the red coloration of the buccal musculature is visible by transparency. This description is based on specimens from Puglia and Capo Mulini (Catania, Sicily) and matches the description of the animal given by Rosewater (1970), and accounts of other Echinolittorina species by Reid (2002, 2007).

Conclusions

The lack of records of live specimens of *E. punctata* before 2000, together with the lack of any reliable record in the literature, lead us to conclude that the colonization of the coasts of Puglia by *E. punctata* is a recent event. This may be seen in the context of a progressive extension of the range of this species which may be driven by changes in the physical characters of the seas with special concern to surface water temperature. Water temperature seems to play an important role in the reproduction of this species, activating the sexual cycle (Palant & Fishelson, 1968).

Acknowledgements

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![Fig. 2. Live animal of *Echinolittorina punctata*, Capo Mulini (Catania, Sicily), June 12th, 2008.](image)

![Fig. 3. Live animal of *Echinolittorina punctata*, Parco Regionale “Isola Sant’Andrea Litoranea Punta Pizzo” (a few kilometers south of Gallipoli, Puglia), December 6th, 2007.](image)
Renda, Bruno Sabelli, Morena Tisselli and several other friends gave information on their records of the species from Italy. David Reid (Natural History Museum, London) improved the manuscript with several comments and additions.

References


