

THE DECAPOD CRUSTACEANS IN VARANO LAGOON (SOUTH ITALY): COMPOSITION AND DISTRIBUTION

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INTRODUCTION

The study analyses the composition, distribution and structure of Crustacean Decapods, in particular only group of crabs in Varano lagoon (S. Italy) for one year. Samplings monthly of Decapod Crustaceans were carried out from May 2012 to March 2013 in three different stations within the Varano lagoon (Capojale and Varano mouths and San Nicola Imbuti). In each station the main environmental parameters were recorded by mean multiparametric probe (T °C, S psu). This work contributes to the knowledge of Decapod Crustaceans populations in one of the largest lagoons in the Mediterranean. Control of these populations also in terms of composition could be a good method of indirect control of the environment.

MATERIALS AND METHODS

The Varano lagoon is located on the Northern coast of the Gargano Promontory (Southern Adriatic Sea) (41.88°N; 15.75°E). The lagoon covers an area of 6,500 ha, with a perimeter of 33 km. The average depth is 4 m, with a maximum value of 5 m in the central zone. The lagoon is partially isolated through a coastal barrier, characterized in both the western and eastern sides by the Capojale and Varano channels making possible the communication with the sea through the hydrodynamic balance produced by tide, wind strength and anthropogenic action (Fig.). Salinity values are relatively stable for a brackish lagoon, never dropping below 20 psu. Temperatures ranged between 5 and 30°C. The hydrological system consists of the lake itself, 2 connecting channels with the sea, freshwater inputs from local torrents and a drainage pumping station as well as several stream springs. Hydrological investigations on the water balance of the lagoon estimated a freshwater input of approximately 87,000 m³ d⁻¹ with an organic content mostly originating from urban and agricultural runoff, fish-farming and zoo-technique activities (Table 1).

RESULTS

The environmental data showed in Fig. 2 and 3. The stations characteristics was reported in Table 2. We found a total 351 specimens Crabs belong to five several families: Portunidae (89%), Grapsidae (4%), Menippidae (2%), Panopeidae (2%), Varunidae (4%). *Carcinus aestuarii* Nardo, 1847 (Portunidae) was the most abundant and widespread among the species found during the study period in all stations considered. The Fig. 4 Shows the catches of total crabs during sampling time. A total 311 specimens of *Carcinus aestuarii* Nardo, 1847 (291 males and 20 females) were caught (Table 3). The station most abundant in terms of crabs, seems to be Capojale, near the mouth of the northwest. 14 Individuals (11 males and 3 females) of *Brachinotus sexdentatus* (Risso, 1827) (Varunidae) were found in two station: S. Nicola and Varano mouth, but the station most abundant is S. Nicola. To follow the *Pachygrapsus marmoratus* (Fabricius, 1787) (Grapsidae) with 12 specimens (11 males and 1 female) were captured in three station but in the Capojale mouth is the most abundant. Only males of *Eriphia verrucosa* (Forskål, 1775) (Menippidae) were caught to the mouths (Capojale and Varano). The remaining 2% with the presence of 8 individuals (7 males and 1 female) is represented by *Dyspanopeus sayi* (Smith, 1869) found exclusively in the station of San Nicola. Fig. 5 The months with the highest number of catches of *C. aestuarii* were those late spring May / June the sex ratio for this species is found all over shifted in favor of males Fig. 6.

Table 2

Site	sand %	silt %	Clay %	Organic matter %	Temperature °C	Salinity Psu
Varano mouth	5,14	79,33	15,54	4,1409	19,58±7,13	28,92±3,38
Capojale mouth	6,7	73,01	20,28	6,269	19,7±6,99	29,12±5,93
S. Nicola place	19,73	65,77	14,5	12,6313	20,47±7,86	26,06±1

Table 3

Taxon	Family	Varano mouth	Capojale mouth	S. Nicola	total	%
<i>Carcinus aestuarii</i>	Portunidae	95	206	10	311	89
<i>Pachygrapsus marmoratus</i>	Grapsidae	1	9	2	12	3
<i>Eriphia verrucosa</i>	Menippidae	3	3	0	6	2
<i>Dyspanopeus sayi</i>	Panopeidae	0	0	8	8	2
<i>Brachinotus sexdentatus</i>	Varunidae	1	0	13	14	4
total		100	218	33	351	

Discussions and conclusions

Decapod crustaceans are important ecological components of the marine ecosystem and play a vital role in the intermediate trophic level (Farina et al., 1997). In particular on crabs group the information on the abundance, life cycle and functional role is still lacking for Varano lagoon. Environmental data showed a typical seasonal pattern in each sampling station. Among the species found there is the presence of an alien species of origin North-West Atlantic, the Panopeidae *Dyspanopeus sayi* (Smith, 1869) already reported for the Varano lagoon (Florio et al., 2008; Ungaro et al., 2012). The species *Eriphia verrucosa* was found only at stations located to the mouths (Varano and Capojale) and with a very small number of specimens (all males). This suggests that the species prefers areas markedly marine. *C. aestuarii* is the most abundant species as shown by the data presented in this work; this species colonized several regions outside its native ranges, including Australia, Tasmania, South Africa, Japan and both coasts of North America, probably due to its high tolerance to air exposure, starvation and variations in temperature and salinity (Yamada and Hauck, 2001; Roman and Palumbi, 2004). Portunid crabs are important predators that may locally control abundance and distribution of populations of their benthic prey. Along the Italian coasts, *C. aestuarii* is common in estuarine areas, such as the Lagoon of Venice and the Lagoon of Orbetello. The sex ratio shows that males clearly dominate over females as found by Lumare et al. (2009) in the Acquatina lake (South Adriatic Sea). This very preliminary work aimed to lay the groundwork of knowledge on the bio-ecology and biodiversity of crabs in Varano lagoon.

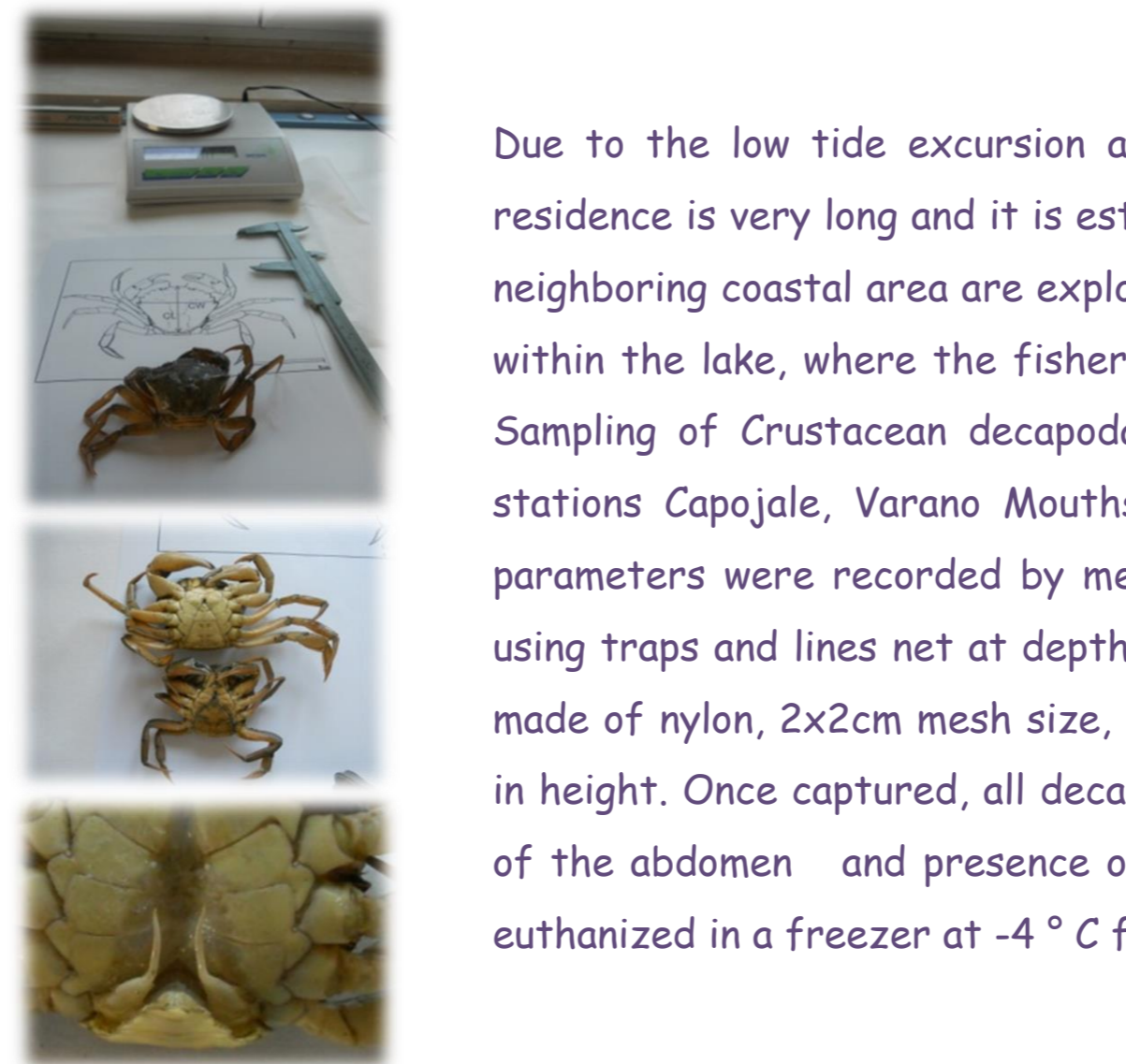
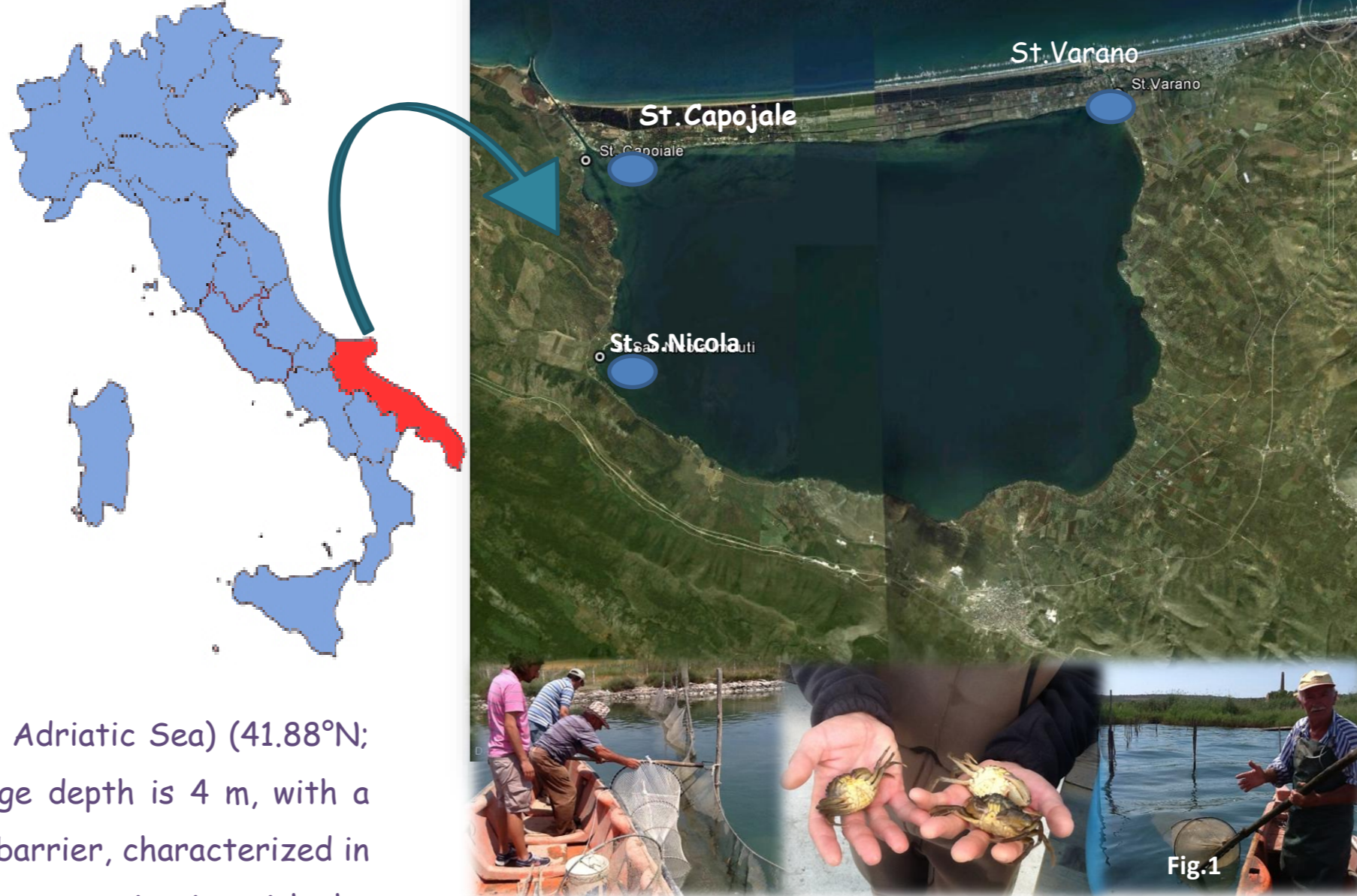


Table 1

Varano lagoon	
Coordinates	41,51°N; 15,47°E
Area (Km ²)	65
Average depth (m)	4
Maximum depth (m)	5,8
Residence time (year)	1,5
Temperature (°C)	8 - 30
Salinity (psu)	23-29
% Sand	17±23
% Silt	67±18
% Clay	15±8

Due to the low tide excursion and reduced exchange with the adjacent coastal area, water time residence is very long and it is estimated to about 1.5 years (Specchiulli et al., 2008). The lake and the neighboring coastal area are exploited by mussel farming, although such activity was recently reduced within the lake, where the fishery is now the most important resource (Breber and Scirocco, 1998). Sampling of Crustacean decapoda occurred monthly, from May 2012 to June 2013 in 3 different stations Capojale, Varano Mouths and San Nicola Imbuti. In each station the main environmental parameters were recorded by mean multiparametric probe (T in °C, S in psu). Crabs were captured using traps and lines net at depths no deeper than 2 m, deployed for approximately 32 h. Traps were made of nylon, 2x2cm mesh size, measuring approximately 145 cm in length, 65cm in width and 45 cm in height. Once captured, all decapods were sorted, counted, identified, sex determined by the shape of the abdomen and presence of eggs was also registered. transported into a laboratory and were euthanized in a freezer at -4 °C for 1 hour. Crabs were counted.

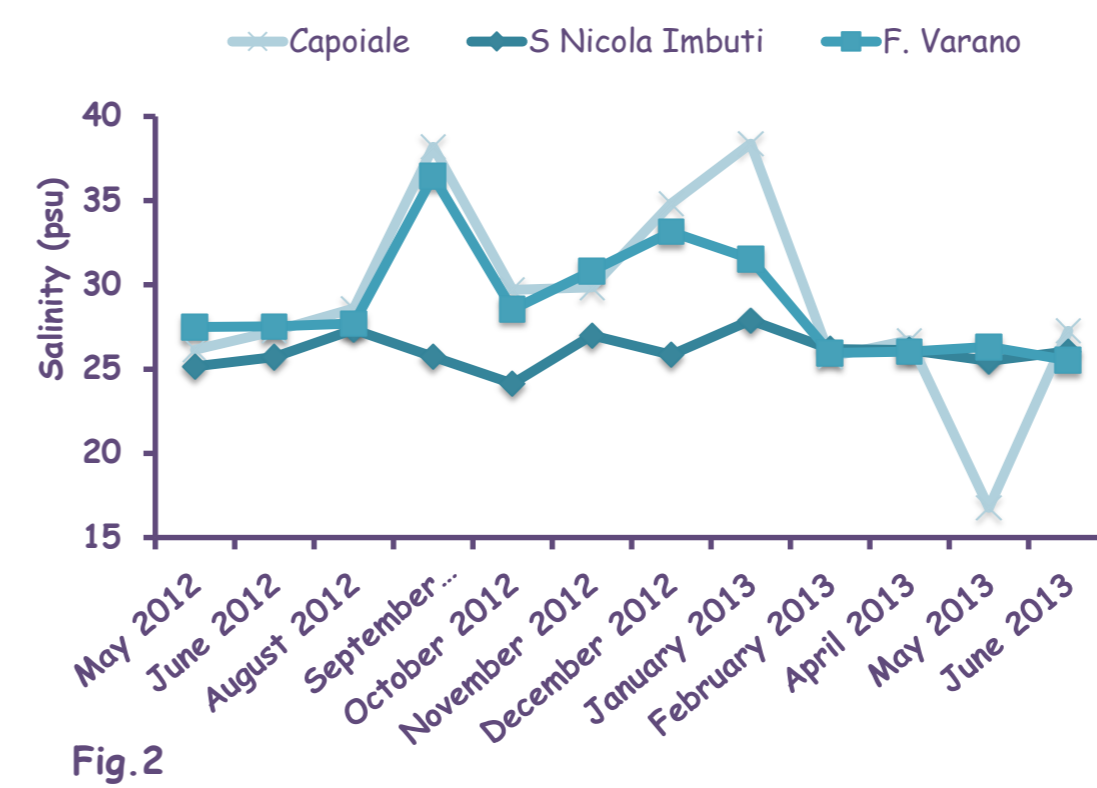


Fig. 2

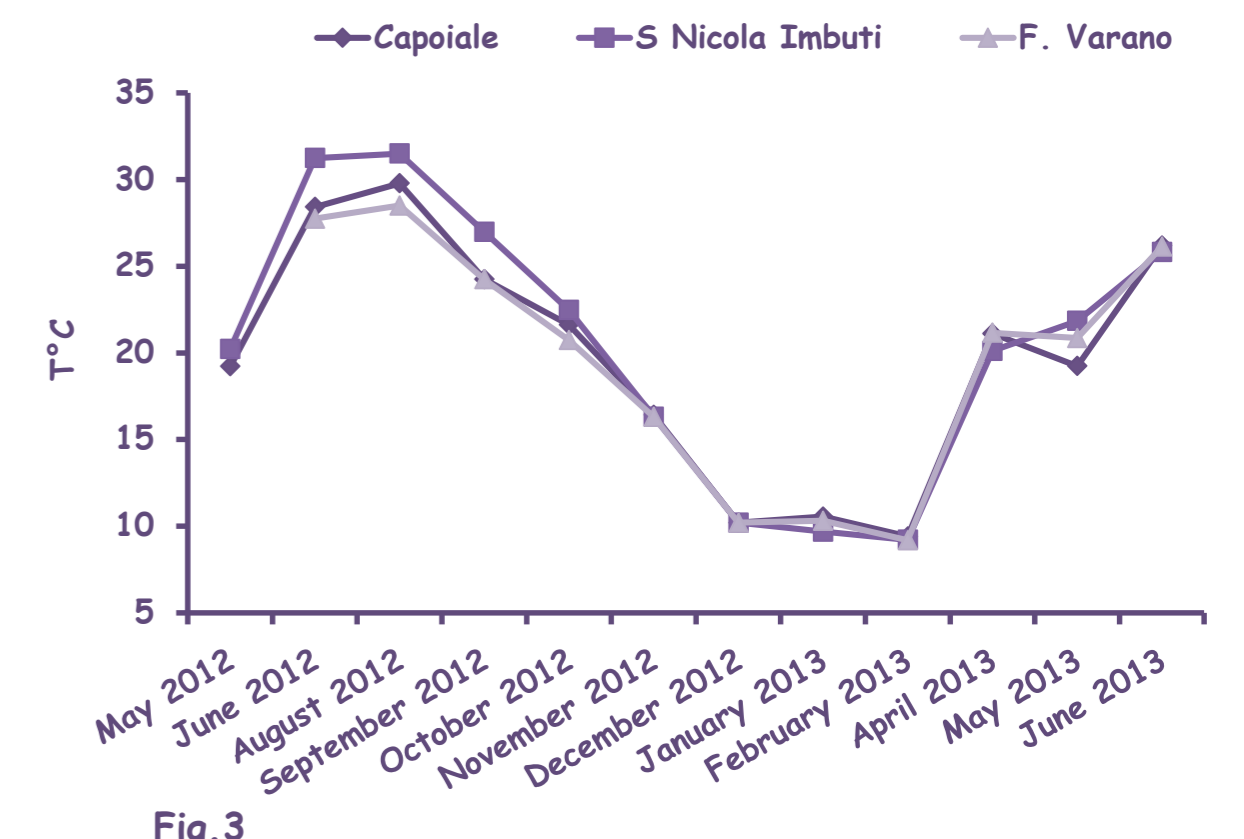


Fig. 3

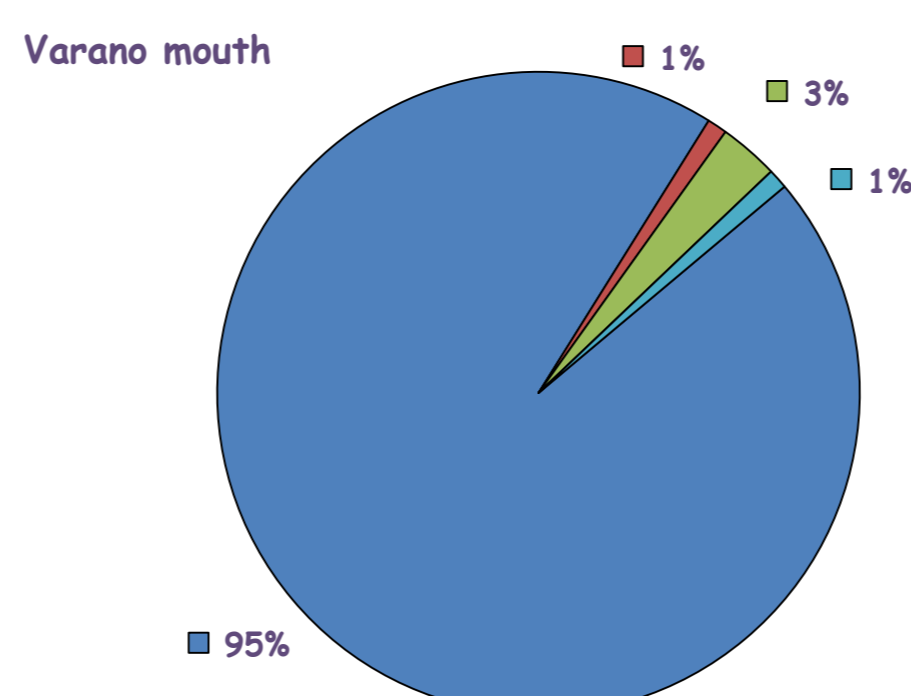
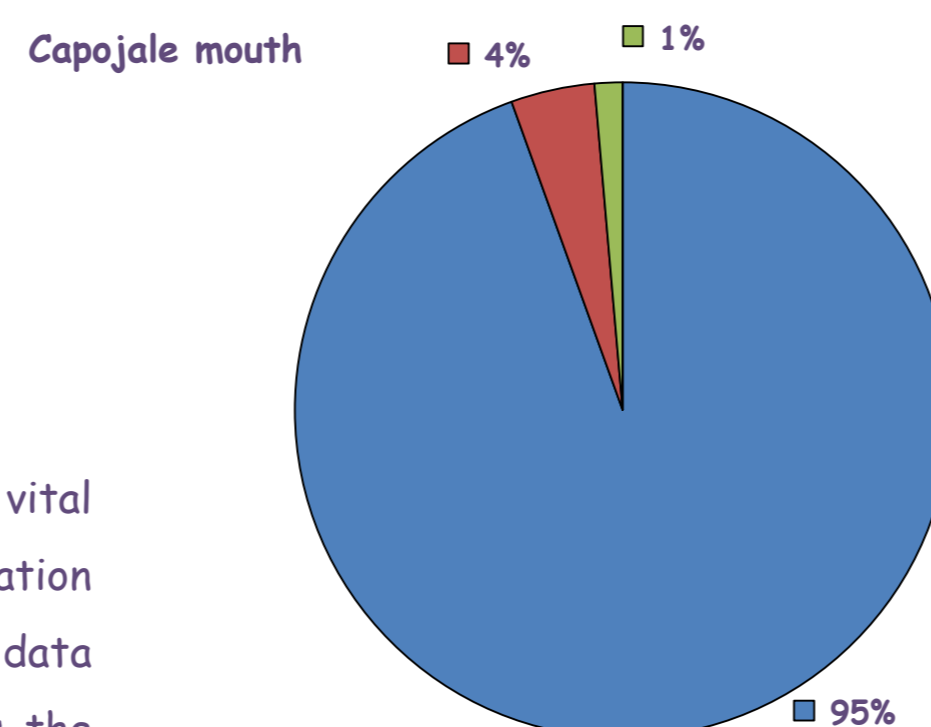
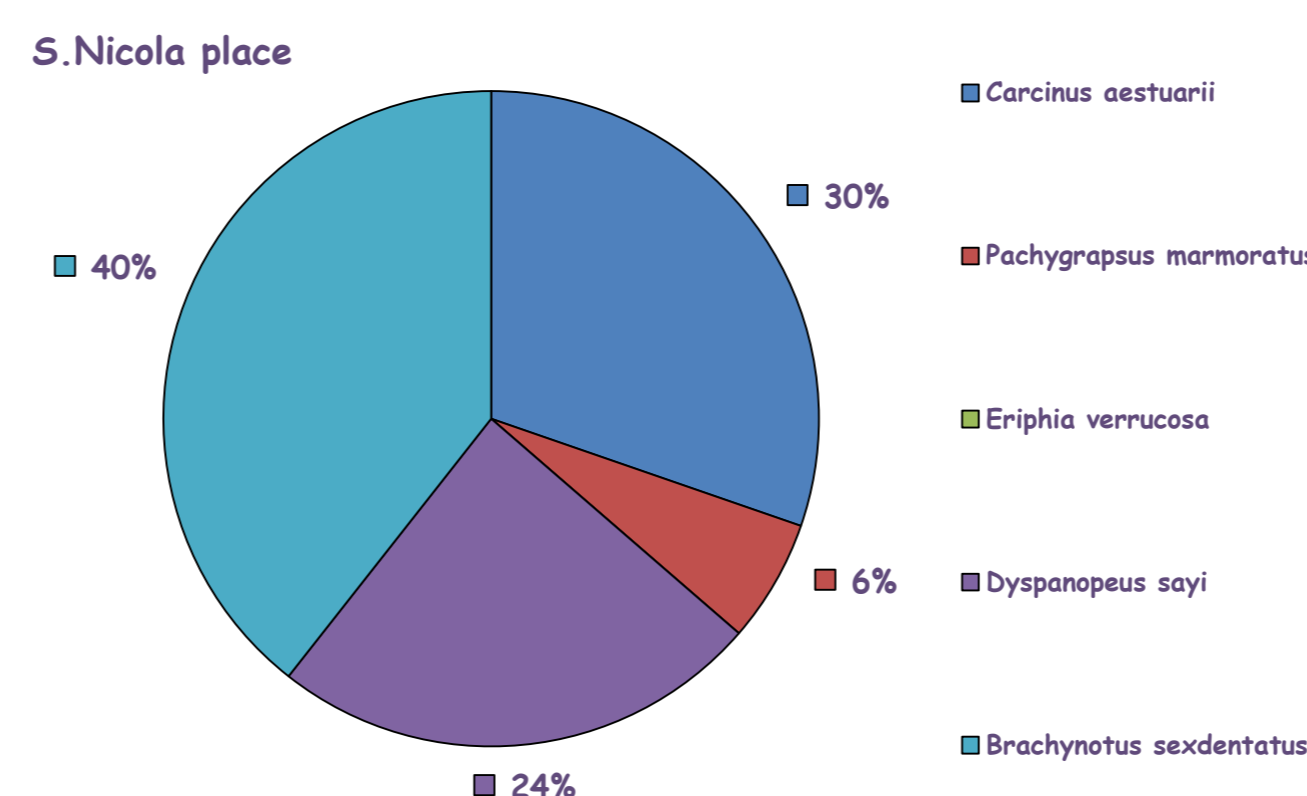


Fig. 5

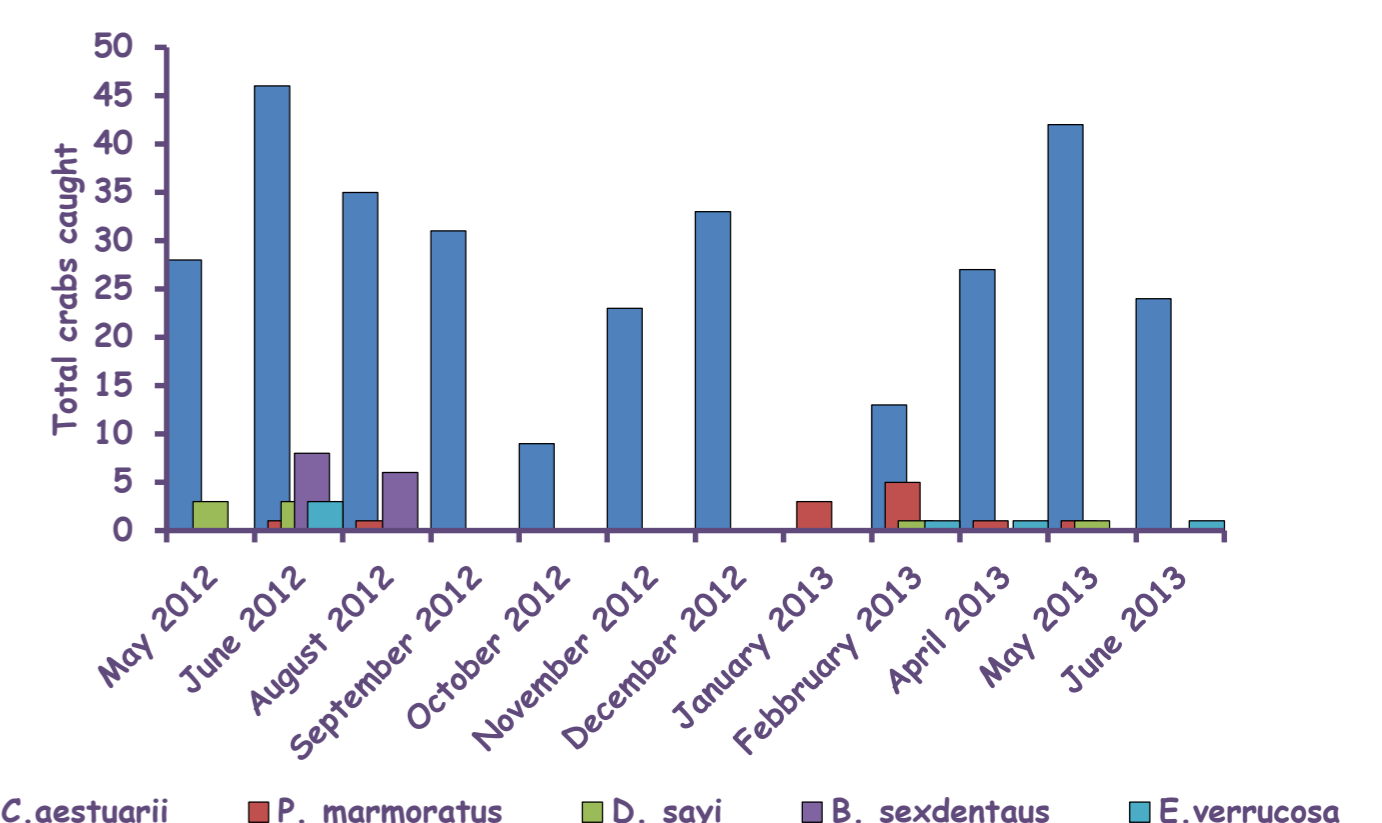


Fig. 4

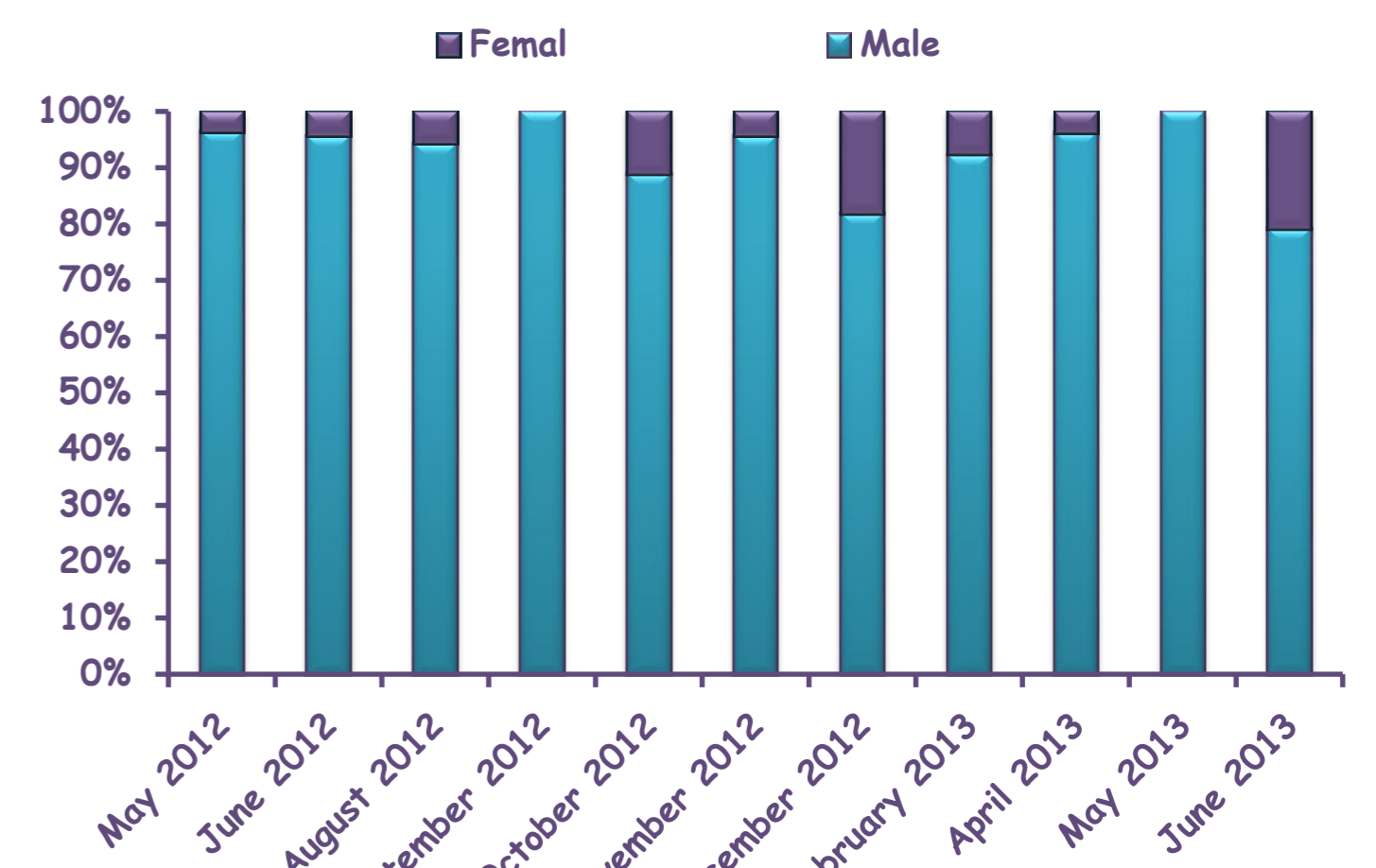


Fig. 6

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