

BRIEF ARTICLE

Brood size of three swimming crabs from the Gulf of California, Mexico
(Decapoda: Portunidae)

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(Rec. 3-II-1995. Rev. 4-V-1995. Acep. 13-X-1995)

Resumen: Se estimó el número de huevos en hembras de *Euphyllax robustus*, *Portunus asper* y *P. iridescens* de la plataforma continental del sureste del Golfo de California, capturadas con redes camaroneras comerciales (5.7 cm luz de malla). Las hembras ovígeras fueron separadas del resto de la captura y se congelaron de inmediato a -20°C. La separación de huevos se hizo por el método propuesto por Choy, y su cuantificación por un método volumétrico. *E. robustus* presentó la mayor cantidad de huevos con un promedio de 1 005 148 huevos/hembra, seguido por *P. asper* con 332 666 huevos/hembra, mientras que el menor valor ocurrió en *P. iridescens* con 51 001 huevos/hembra.

Key words: *Euphyllax*, *Portunus*, brood size, Gulf of California, crabs.

Since 1950 a large commercial shrimp trawler fleet has operated in the Gulf of California and off the Pacific coast of Mexico (Paul & Hendrickx 1980). Portunid crabs are an important part of the shrimp by-catch, with densities as high as 16.9 kg/ha (Hendrickx 1985). Some aspects of the biology of portunid crabs from the coastal zone in the Gulf of California have been investigated (Paul & Hendrickx 1980, Paul 1981, 1982). However, there is very little information about offshore portunids. Garth and Stephenson (1966) reported the occurrence of *Portunus asper* (A. Milne Edwards 1861) ovigerous females from January to May and of *P. iridescens* Rathbun, 1893 from December to April. Brood size is an important data because it represents another way to know the fecundity of organisms, one of the staples of fishery science. Our objectives were to determine and compare the brood size (total number of eggs bore by a female) of the portunid crabs *Euphyllax robustus* A. Milne Edwards, 1874, *P. asper* and *P. iridescens*.

Specimens were obtained in February 1992 from the southeastern continental shelf of the Gulf of California, during the BIOCAPESS-V cruise on board the R/V "El Puma" of the Universidad Nacional Autónoma de México. Portunid crabs were caught with a 11.6 m commercial trawl net (5.7 cm stretched mesh) 120 m deep off the Presidio river mouth (23° 00' N, 106° 30' W). Berried females were sorted out and preserved immediately in a freezer at -20 °C. Only specimens having early stages of development were used in this study, because at later stages the possibility of eggs loss increases. Species identification was made using the characters described by Garth and Stephenson (1966) and Hendrickx (1984). The method of Choy (1985) was used to remove the eggs. Egg counts were obtained using a volumetric method. All measurements were made with digital caliper to the nearest 0.005 mm: carapace width (CW = breadth less last antero-lateral teeth) and carapace length (CL) are used throughout. Body weight (W) was obtained with an analytic balance (± 0.05 g).

TABLE I

Brood size and biometry of female portunid crabs *Euphyllax robustus*, *Portunus asper* and *P. iridescens*

		<i>E. robustus</i> (n= 18)	<i>P. asper</i> (n= 20)	<i>P. iridescens</i> (n= 17)
CL (mm)	Mean	55.19	35.6522.61	
	CV	3.7%	9.7%	7.55 %
CW (mm)	Mean	83.19	59.4735.89	
	CV	3.8%	5.88%	2.9%
W (g)	Mean	168.29	39.65	9.25
	CV	21.29%	10.88%	2.29%
B	Mean	1,005,148	332,666	51,001
	CV	29.75 %	36.45 %	33.28 %

(CL= carapace length; CW= carapace width, W= weight, B= brood size: eggs/female, CV= Coefficient of variation).

The relationships between brood size and carapace width/length are the following

<i>E. robustus</i>	lnF= 14.22 lnCW-49.31 n=18 r=0.923
<i>P. asper</i>	lnF=3.017 lnCW - 0.34 n= 20 r=0.837
<i>P. iridescens</i>	lnF= 3.45 lnCL + 2.614 n=17 r= 0.805

The biometrics and brood size results are summarized in Table I. Among the three species studied, *E. robustus* had the highest brood size with a mean value of 1 005 148 eggs/female (842 500 to 1 452 500 eggs/female). *P. asper* had 332 666 eggs/female (184 444 to 550 000 eggs/female) while the lowest average corresponded to *P. iridescens* with 51 001 eggs/female (33 273 to 81 188 eggs/ female). *E. robustus* is the largest species with a mean CW and W of 83.19 (\pm 3.88) mm and 168.29 (\pm 2.13) g respectively, followed by *P. asper* 59.47 (\pm 5.88) mm and 39.65 (\pm 10.88) g. The smallest mean values corresponded to *P. iridescens* 35.89 (\pm 2.9) mm and 9.25 (\pm 2.29) g.

Cushing (1975) suggested that growth may be regarded as an agent of fecundity, i.e. organisms grow big to be fecund in order to stabilize their stocks in adverse environments. Our observations confirm this, *E. robustus* had the highest brood size as well as the largest size,

while the smallest species *P. iridescens* has also the lowest brood size. Quijano (unpublished data) found that brood size is well correlated with carapace width in *Callinectes arcuatus* Ordway, 1863 a portunid crab from the coastal zone of the Gulf of California. Potter *et al.* (1983) reported a significant positive relation between body weight and number of eggs in *P. pelagicus* (Linnaeus 1758). In the present study brood size was well correlated with carapace width for *E. robustus* and *P. asper*, while for *P. iridescens* such correlation was rather weak; nevertheless, there was a high correlation between brood size and carapace length.

We are grateful to José Juan González Ruiz for his help on sample analysis and Albert van der Heiden for his comments and useful suggestions.

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