

Egg-Case of the Dogfish *Scyliorhinus canicula* (L., 1758) from Sicilian Channel (Mediterranean Sea). I.- Test of the intraspecimen size diversity

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The smallspotted catshark, *Scyliorhinus canicula*, has a wide-spread distribution in the Sicilian Channel, where it constitutes an important by-catch species for local fisheries (probably most of the 1833 t catch of *Scyliorhinus spp.* landed in 1982; Cingolani et al. 1986) and is commonly commercialized fresh and peeled (actual price ca. 44/kg). Nevertheless, no information is available on the situation of this resource in the area of the Sicilian Channel investigated by the I.T.P.P.-C.N.R. of Mazara during two years (May. 85-Feb. 87) of experimental trawl surveys (Levi, 1988).

Using data collected in this occasion and during an "ad hoc" elaborated research program (SCYCAN), a random stratified sample (see the companion paper, Ragonesse & Jereb, 1990) of 147 females of *S. canicula* with egg-cases in the oviducts was selected. For each specimen intra-oviducal egg-cases differences in length (median length = ML; 0.1 mm), width (maximum width = MW; 0.1 mm) and "virtual surface" (SF = ML*MW; mm²; Fig.1) were tested by using a paired t-test (Sokal & Rohlf, 1969).

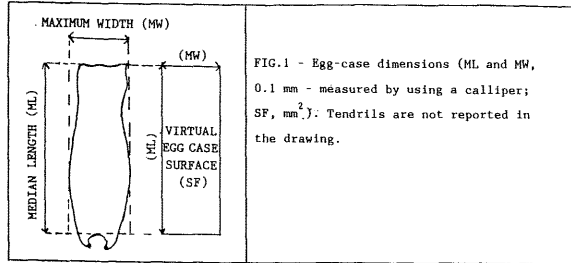


FIG.1 - Egg-case dimensions (ML and MW, 0.1 mm - measured by using a calliper; SF, mm²). Tendrils are not reported in the drawing.

The null hypothesis (no difference) was always not disproved (Tab.1) but the test on the virtual surface fitted better the assumption "... left and right egg-cases are equivalent...", containing more information than the other two variables. Further, the basic assumption of the paired t-test (normal distribution of paired differences) was met for SFdif (p= 0.256) and not for MLdif (p= 0.015) neither for MWdif (p=0.010) according to the Kolmogorov-Smirnov one sample test using standard normal distribution (Lilliefors, 1967). The correspondence of rectangular approximation (virtual surface, fig.1) with the actual surface (computed by using a digital planimeter PLANIX 7, TAMAYA) covered by egg-case was evaluated on 18 egg-cases (3 for 6 dimensional classes); virtual surfaces are high significantly correlated to the actual ones (Pearson correlation coefficient = 0.975; p<0.01), the slight overestimation (virtual/actual>1) being compensated by the easier computation.

	ML dif	MW dif	SF dif	
MINIMUM	-1.9	-0.9	-40.1	TAB.1 - Paired t-test on left-right differences (dif): degree of freedom = 146; level of confidence = 0.05 (two sided); critical t value = 1.97; H ₀ : μ dif = 0; ND = not disproved.
MAXIMUM	2.1	1.1	45.2	
MEAN	0.061	-0.008	0.638	
STANDARD ERROR	0.054	0.025	1.252	
t	1.20	0.32	0.51	
H ₀	ND	ND	ND	

These results confirm, also on statistical bases, for *S. canicula* trawled in the Sicilian waters the "twin" nature of egg-cases (i.e. they are practically equivalent; Mellinger, 1983) but indicate in the virtual surface a more useful statistic than length or width individually considered.

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Egg-Case of the Dogfish *Scyliorhinus canicula* (L., 1758) from the Sicilian Channel (Mediterranean Sea). II.- Morphometric relationships

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Looking at the geographical variation in the egg-cases dimensions of different populations of *Scyliorhinus canicula*, a positive relationship between egg-case size and total length of specimens has been pointed out (Capapé, 1977). Within a wider research program on the smallspotted catshark of the Sicilian Channel (see the companion paper, Ragonesse & Jereb, 1990), relationships between median length (ML; 0.1 mm), maximum width (MW; 0.1 mm) and virtual surface (SF = ML*MW; mm²) of the egg-cases and total length (TL; 0.5 cm; fig.1) gonadic weight (GW; 0.1 gr) and somatic weight (SW; 0.1 gr) of specimens were studied. Length index (LI = ML/TL %), surface index (SI = SF/TL %) and gonadic index (GI = GW/SW %) were also analysed. A set of 156 egg-cases (one for each specimen) constituted the data-base.

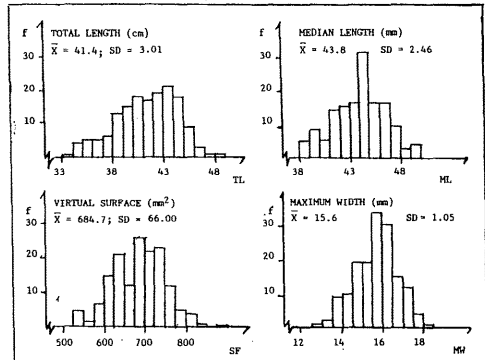


FIG.1 - Frequency distribution and descriptive statistics (X mean; SD = standard deviation) of egg-cases (ML, MW and SF) and specimens (TL) dimensions; f = absolute frequencies.

Median length and maximum width ranges observed (ML: 3.8 - 4.9 cm; MW: 1.3 - 1.8 cm) correspond to those reported for the Tunisian waters (Capapé, 1977), are lower but still comparable to those from the Adriatic Sea (Jardas, 1979) and the french Mediterranean (Mellinger et al., 1984), but, as expected, are different from those reported for the Atlantic (Mellinger et al., 1984). Total length, median length, maximum width and virtual surface frequency distributions are reported in fig.1. With only one exception (TL; p=0.023), all frequency distributions (variables reported in tab.1) were significantly comparable to the normal one (Kolmogorov-Smirnov one sample test using standard normal distribution; Lilliefors, 1967), even thought that of the maximum width in a marginal way (p=0.058).

	ML	MW	SF	TL	GW	SW	LI	SI
MW	.234	-						
SF	.7391	.8271	-					
TL	.399	.526	.591	-				
GW	.324	.572	.587	.530	-			
SW	.385	.574	.617	.922	.626	-		
LI	.3521	-.370	*.0511	-.7141	-.307	-.641	-	
SI	.5311	.5251	.6731	*.1961	.216	-.094	.5941	-
GI	*.005	*.177	*.134	*.192	.6651	*.1381	*.181	.326

TAB.1 - Correlation matrix: 1 = Autocorrelated variables (e.g. SF = ML*MW); * = H₀: p₁₂ = 0 not rejected at α = 0.01 (2 sided).

Qualitative analysis of the scatter-plots generally indicated a wide-spread distribution of points, suggesting the use of no particular regression model than the linear one. Pearson correlation matrix (tab. 1) shows that egg-case dimensions (ML, MW and SF) are, all together, more correlated to the somatic weight (SW) and highly significantly independent (p<0.01) of the gonado-somatic index (GI). Considering also the autocorrelation problem when using indexes, the individual parameter more correlated to size variations (total length and somatic weight) seems to be the maximum width, as pointed out for the french Mediterranean by Mellinger (1983); nevertheless, the virtual surface, as derived by the two variables median length and maximum width, constitutes a more useful variable. Anyway, only a small portion (less than 40-50 %) of the observed variability is explained by these correlation coefficients. Thus, other physiological and/or environmental factors beyond those strictly related to geographical different areas, seem to affect the kind of relationship existing between egg-case dimensions and size of the specimen.

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