

# SPAWNING FREQUENCY OF PICAREL *SPICARA SMARIS* (L.) IN THE SARONIKOS GULF (GREECE)

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## Abstract

Monthly sampling of picarel, *Spicara smaris*, was carried out from January to May 2003 in the Saronikos Gulf (Greece). The spawning frequency was estimated at the peak of spawning (April-May 2003) by the use of post-ovulatory follicles, migratory-nucleus stage and hydrated oocytes. The percentage of the daily spawning females was found equal to 67.74%, which means that the female spawns every 1.48 days on average. Big females, which were predominant during the whole period except of May, accelerated their spawning rate in April forecasting thus the cessation of their spawning season.

**Keywords:** Aegean Sea, Spawning, Fishes, Demersal

**Introduction** In the Eastern Mediterranean, picarel (*Spicara smaris* L.) is a commercial and popular species [1]. About half of total landings of this species catch is taken by beach seines, while the other half is distributed between trawlers and nets. Picarel is a multiple spawner [2] with a peak of spawning in the Saronikos Gulf in April-May [3]. In the present study the spawning frequency of picarel was estimated at the peak of spawning in the Saronikos Gulf (Aegean Sea, Greece). This indicator is an important reproductive variable and a crucial parameter for the spawning biomass estimation of the pelagic species [4].

Tab. 1. Spawning frequency of picarel *Spicara smaris* from at the peak of spawning in the Saronikos Gulf (Greece)

Sampling Date	Spawning on the night of capture			%	Spawning the night before the capture		Mature females
	N				N		
	New pofs (<24 h old)	Late MN stage oocytes	Hydrated oocytes		Pof 1 day old	%	
April 15	5	16	0	44.68	13	27.66	47
April 29	24	28	2	84.38	56	87.50	64
May 13	18	55	8	90.00	65	72.22	90
Total	47	99	10		134		201
Mean %				73.02		62.46	

**Material and Methods** Samples of picarel were monthly (Jan-May 2003) collected by beach seiners, trawlers and gillnets. Specimens were randomly taken from the catch, measured (total length) to the nearest mm, sexed and females were classified to reproductive stages according to Nikolsky's [5] scale. A total of 201 mature ovaries (greater than stage II) out of 419 females, were sectioned. The spawning frequency was estimated at the peak of spawning [4] and was based on the incidence of post-ovulatory follicles (pofs), migratory-nucleus (MN) stage oocytes and hydrated (H) oocytes [6]. The best indicator of the time of spawning may be the occurrence of females with both H oocytes and new pofs [7], because these females have been caught while spawning. In our case H oocytes although with no follicle along with new pofs were indeed found in the samples during night (caught by trawlers or nets). Since the MN stage lasts in a number of species for about 24 h [6], it was assumed that females, which contained late MN stage oocytes or H oocytes (still within their follicles) would spawn on the night of capture, while those females, which contained new pofs had already spawned at the same night. The use of post-ovulatory follicle method [6] can be applied when the age of pofs (based on the extent of their deterioration) is known. Pofs resembling to collapsed structures with however identifiable thecal and granulosa layers (old pofs) indicate that an individual female had spawned 24 h before sampling (pof 1 day), while bigger and very convoluted pofs with linearly arranged granulosa cells (new pofs) indicate that spawning has taken place at the night of sampling (pof < 24 h) [8]. The histological characteristics that were identified in the sections and were used for the estimation of the time of spawning were: late MN stage oocytes or H oocytes or new pofs indicated spawning on the night of capture, while pofs 1 day old indicated spawning occurred the night before capture. Analysis of variance (ANOVA) was performed for the comparison of means.

**Results and Discussion** During night samplings of picarel, the occurrence of both H oocytes without follicles and new pofs in the ovaries indicated that spawning was indeed in progress at that particular night [6]. Spawning during night is a reproductive strategy for achieving better survival since it provides protection from predators [9]. The histological characteristics which were used to assign the females spawning at the night of capture (i.e. late MN stage oocytes, H oocytes within their follicles, or new pofs) could have never been observed in any possible combination in the ovary of a female spawning at the night of capture. The fact that during night samplings late MN nucleus

stage oocytes, hydrated oocytes or new pofs were never met in the same ovary indicates the validity of the methodology followed. The percentage of females spawning on one of the two different nights (the night of capture and/or the night before) per sampling date are presented in Table I. It was found that 73.02% of the mature females spawned on the night of capture, while 62.46% spawned the night before. Variance of the monthly percentages was found to be homogeneous for the two spawning nights ( $P > 0.05$ ). Thus, analysis of variance of the percentage of females spawning per day (by month as a covariate) on spawning night indicated that the difference was not significant ( $F = 0.21$ ;  $P = 0.67$ ). Subsequently, the mean of the two estimates gives the average percentage of the daily spawning females, which was found equal to 67.74%. This means that the female spawns every 1.48 days on average during the peak of spawning (15 April – 13 May: 28 days). Spawning females in April were significantly bigger in length than those caught in May ( $P < 0.001$ ). An increase of the spawning frequency more than two times was observed at the end of April (Table I). It seems that big females, which at that period are dominant, accelerate their spawning rate as they reach the cessation of their spawning season. Indeed in May only small females were left spawning, since picarel migrate immediately after spawning to the feeding grounds [10].

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