MATURITY AND REPRODUCTIVE CYCLE OF THE COMMON GUITARFISH, RHINOBATOS RHINOBATOS (LINNAEUS, 1758), IN ISKENDERUN BAY (NORTHEASTERN MEDITERRANEAN)

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Abstract
In this study, maturity and reproductive cycle of *R. rhinobatos* was investigated in the Iskenderun Bay. Lengths at 50% maturity were 70.0 cm for males, and 86.0 cm for females. In the 2005 breeding season, there was one major period of spawning which lasted approximately 3 months, from April to July. In November and December, gonads of females were almost empty. The peak GSI was recorded in May (4.29 ±1.19 g) for females and in November (1.97 ±0.148 g) for males. Hepatosomatic index (HSI) was found to fluctuate widely in males and females. The annual HSI cycle in female *R. rhinobatos* begins with an increase in liver weight in January and February just prior to maximum GSI levels in May, followed by a decrease in September, October and November at the onset of mating.
Keywords: Fisheries, Fishes, Reproduction, Eastern Mediterranean

Introduction
Elasmobranches are generally long-lived with long gestation period, low fecundity and late maturity that make them susceptible to over fishing [1;2]. *R. rhinobatos* is an ovoviviparous fish having a gestation period of about nine months and a mean reproductive rate of 8 to 14 progeny per pregnancy [3]. If shark, skate and ray fishing is to be sustainable, management must be driven by the biological capacity of the sharks themselves. This will require better knowledge of the biology, ecology and the life history of the populations being exploited, and of rarer species that may be taken as bycatch [4]. The aim of this study was to investigate and gain additional information on the maturity and reproductive cycle of *R. rhinobatos* in Iskenderun Bay.

Material and Methods
A total of 114 common guitarfish were caught and examined. Fish ranged in size from 41 to 146 cm (TL). The sizes at 50% maturity for male and female *R. rhinobatos* were 70 cm and 86 cm in TL respectively (Figure 1). The GSI and the HSI were estimated from 114 specimens, measuring between 41 and 147 cm in total body length, sampled during the study period.

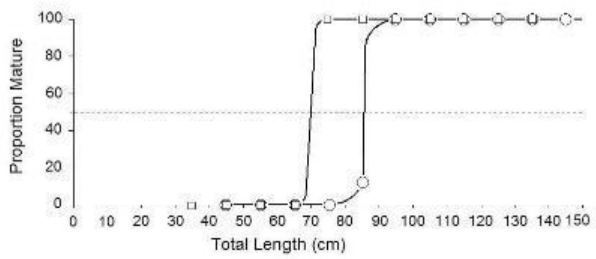

Fig. 1. Proportion of maturity against total length (cm) for males ([]) and females (O)

Results and Discussion
Results of the GSI and HSI calculations for females and males, from January 2005 to December 2005 are represented in Figure 2a, b. The peak GSI was recorded in May (4.29 ±1.19 g) for females and in November (1.97 ±0.148 g) for males. An increase in the average value of this index is interpreted as beginning of sexual maturation, while a sudden drop in this index is indicative of a spawning event. Changes in GSI in females and males did not follow a similar pattern during gametogenesis in *R. rhinobatos*. This founding is similar to that reported for other elasmobranches species, e.g. [5]. *R. rhinobatos* seems to spawn during the spring season as the GSI of females was the highest in May. As vitellogenessis proceeds in female *R. rhinobatos* GSI increases to a peak in May while HSI declines. This decline in HSI, continue throughout gestation (March, April, May, June) recovering to pre-ovulatory levels after parturition. This means that, *R. rhinobatos* devotes the resources to gonadal development. Hepatosomatic index was found to fluctuate widely in males and females. Similar fluctuations in female HSI are reported for the lesser sand shark, *Rhinobatos annulatus* [6] and spiny dogfish, Squalus acanthias [7]. Seasonal variation in HSI of the *R. rhinobatos* has been attributed to fluctuations in lipid content of the liver, which has been correlated with reproductive condition in female lesser sand shark *R. annulatus* [8]. The pattern of HSI was not consistent in female and male *R. rhinobatos* over the reproductive cycle may indicated that liver reserves (such as lipids and proteins used for oocytes growth) were stored and metabolised during different times of the reproductive cycle. This is in agreement to other ovoviviparous species such as *D. sabina* [5] and spiny dogfish, *Squalus acanthias* [7]. In elasmobranches, males and females are not sexually mature at the same size [8;9]. This knowledge is supported by the observation that, females matured lager sizes than males in this study. In addition the length at first maturity of *R. rhinobatos* in the recent study were similar for both males and females in some previous studies. The present result showed that, total body length ranged from 72 to 89 cm in 10 specimens, in which clasper lengths (mean 6.0 cm, ±1.13) were smaller than expected clasper length (mean 10.3 cm, ±0.67) in 5 specimens (total body length ranged from 71 to 89 cm) in the same length groups. It has suggested that, smaller clasper length in large specimens was not a sign of hermaphroditism, but was a sign of late maturity [10].

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