ABUNDANCE AND SIZE DISTRIBUTION OF *DIPLODUS VULGARIS* OF THE NATIONAL PARK OF THE CABRERA ARCHIPELAGO (BALEARIC ISLANDS) DURING SUMMER

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Diplodus vulgaris (E. Geoffroy Saint-Hilaire, 1817) is one of the littoral species which is catched by both sporting and small-scale fisheries. This work shows the size distribution and density of *D. vulgaris* in the waters around Cabrera National Park, where since 1991 only small-scale fishing has been permitted.

The following stations have been studied : 3 stations of rocky blocks at 5 and 25 m depth (RB1-3, photophilic algal community), 1 station at 40 m (SAC, sciaphilic algal community), and 2 stations of vertical cliffs (VC1-2, photophilic algal community) at 5 and 15 m. Quantitative estimates of abundance and size (accurate to 4 cm) of *D. vulgaris* were carried out in transects 100 to 210 m long by 10 m average width, using a visual census technique. Censuses were repeated for at least 5 consecutive days between June and August 1993 between 10.00 and 14.00 g.m.t. Size frequencies and depths at each station were compared using the similarity percentage index, using the VITMAN program (J. LLEONART, unpubl.). This index

Stations	Abundance(S.E./C.L.95%)	Biomas(S.E.)
RB 1 (5 m)	26,11(20,76 - 32,8)	3000,0± 943,6
RB 1 (25 m)	25,03(18,88 - 30,5)	7729,2±1749,3
RB 2 (5 m)	9,91(5,11 - 18,3)	1423,4± 470,0
RB 2 (25 m)	46,94(33,12 - 66,7)	8086,1±2264,5
RB 3 (5 m)	103,58(72,96 -147,4)	17689,5±4861,8
RB 3 (25 m	69,10(33,12 -144,0)	11100,6±3012,6
SAC	4,15±0,91	590,5± 171,5
VC 1 (5 m)	3,72±0,49	306,9± 105,2
VC 1 (15 m)	2,35±0,66	190,5± 66,5
VC 2 (15 m)	6,50±1,39	381,7± 141,0

Table 1.- Abundance, biomass and standar error of *D. vulgaris* per 1000 m2

measures the area of intersection of distributions in relation to the area of their union. Biomass is calculated by applying values of the weight-length relationship derived from the literature (C.G.P.M., 1980) to the average frequencies by size class. The greatest abundance and biomass of *D. vulgaris* was obtained in the stations with the photophilic algal community blocks (Table 1). Amongst these, station RB3 showed the greatest abundance in shallow waters, probably due to the greater hydrodynamism of this area. The results obtained are similar to those of GARCIA-RUBIES and ZABALA (1990) for exposed zones located inside and outside the Medes Islands reserve. Maximum biomass values were obtained at the two depths of station RB3.
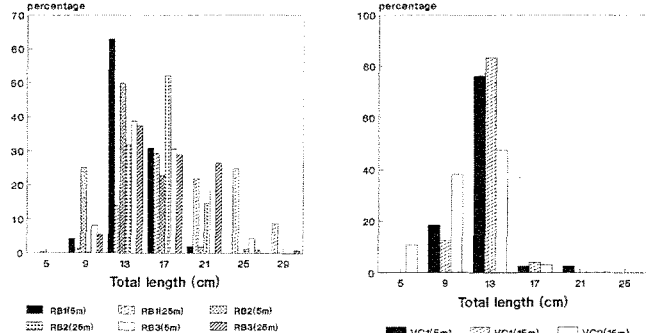

Fig. 1 and Fig. 2- Length of *D. vulgaris* in rocky block (Fig.1) and vertical clifs (Fig. 2) with photophilic algal community.

The observed size ranges vary between 5 and 32 cm at those stations over photophilic algal community blocks, 5 and 20 cm at cliffs, and 12 and 25 cm over the sciaphilic algal community blocks (Fig. 1 and 2). With the exception of the 25-m-depth blocks of stations RB1 and RB2, modal size is between 13 and 16 cm. At 25 m, modal size is less homogeneous at stations RB1 and RB2. An increase in size was noted with depth, the mode being 17- 20 cm. Moreover, at station RB2, a second, less pronounced mode is seen at 25-28 cm size. Values of similarity index of size distribution are given in Table 2. The greatest similarity in size frequency appears between the two depth levels of stations 2 (0.91) and 3 (0.91). There is a general clear tendency for size increase with depth, both within the same station and throughout the study area.

	RB1(5	RB1(25	RB2(5)	RB2(25)	RB3(5	RB3(25)	VC1(5)	VC1(15)
RB 1 (25m)	0.47							
RB 2 (5m)	0.79	0.40						
RB 2 (25m)	0.65	0.59	0.57					
RB 3 (5m)	0.76	0.67	0.72	0.8				
RB 3 (25m)	0.73	0.68	0.67	0.77	0.91			
VC 2 (5m)	0.72	0.21	0.73	0.37	0.52	0.48		
VC 2 (15m)	0.71	0.19	0.66	0.36	0.51	0.47	0.91	
VC 3 (5m)	0.55	0.18	0.76	0.35	0.50	0.46	0.69	0.63
SAC 3	0.84	0.54	0.76	0.82	0.77	0.57	0.55	0.53

Table 2.- Similarity matrix of size distribution of *D. vulgaris* between differents stations and depht.

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ASPECTS ON THE BIOLOGY OF BLACKSPOT SEABREAM, *PAGELLUS BOGARAVEO* (BRUNNICH, 1768) IN THE NORTHERN AEGEAN SEA (GREECE)

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Pagellus bogaraveo is a demersal fish, common in the western coast of the Atlantic Ocean and the Western Mediterranean, but quite rare in the Eastern Mediterranean or absent from the Black Sea (FISHER *et al.*, 1987). Although some works on the biology of the species in the Western Mediterranean and the Atlantic have been published (COUPE, 1954; RAMOS & CENDRERO, 1967; SANCHEZ, 1983; KRUG, 1989), no information is available from the Eastern Mediterranean and especially the Greek waters. A total of 5 271 individuals was collected seasonally from June 1992 to December 1993, by a 400HP commercial trawler equipped with a cod-end mesh size of 14 mm, in the Thermaikos Gulf, the Gulfs of Chalkidiki and the Thracian Sea (Greece). Fork length, weight and sex were recorded. Age was determined by otolith reading. FISHPARM (PRAGER *et al.*, 1989) was used for the estimation of von Bertalanffy growth parameters. The length-frequency diagram of the caught blackspot seabreams showed that fork lengths ranged from 70 to 175 mm (Fig.1). Since larger individuals are known to exist in the Greek waters (pers. observ.), the main bulk of the fished individuals, ranging from 90 to 140 mm, could be considered as representative of the young blackspot seabreams. Young-of-the-year were fished mainly in December, but they appeared in the trawl net until March. Blackspot seabreams were caugh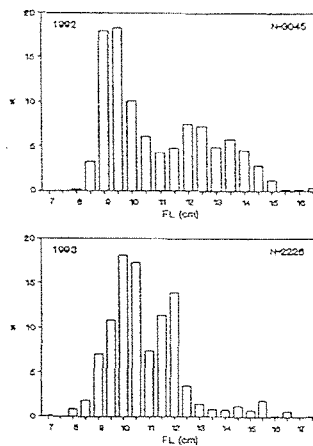t from 22 to 316 m of depth. The smaller individuals (<110 mm) were maily found in shallow waters (< 50 m) and near the mouth of the rivers, while the greater ones (>110 mm) in deeper waters (> 50 m).

Fig. 1 Length-frequency distribution of *P.bogaraveo*
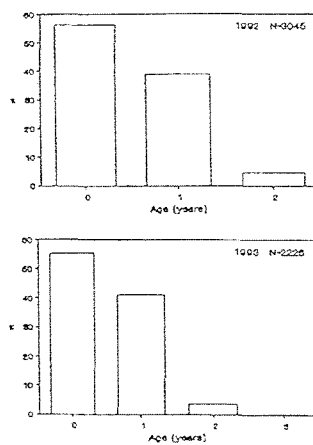
Otolith reading revealed 4 age groups, from age group 0+ to age group 3 (Fig. 2, Table 1). Otolith ring formation was considered to be annual. The examination of annual increment showed that the period of annulus formation was mainly in December, extending until March. The fork length-otolith radius relationship was found as follows : $\log Fl = 0.702427 + 0.948959 \log R$ (N = 384, r = 0.96).

Mean lengths-at-age were estimated from the backcalculation (Table 2) using the following equation : $\log Fln = \log Fl + 0.948959$ ($\log Rn$ - $\log R$). Annual increament was found to be greater during the first year of life (Table 2).

Fig.2. Age composition of *P.bogaraveo*

Von Bertalanffy growth parameters (Floo = 251.2 mm, k = 0.186 and to =- 2.72), found from the observed lengths of 385 individuals, could not be considered as the growth parameters of the species, since old individuals (> 4 yrs) were not present in the samples. Fork length - Weight relationship was found to be : $\log W = 0.000025 + 2.926 \log Fl$ (N = 694, r = 0.92)

All fished individuals were found immature. Since blackspot seabream is a protandrous hermaphrodite species, it could be assumed that the sampled individuals will mainly function as males. Comparing the results of the present work with those found in the literature, we could suggest that all the above estimations could be attributed to the young blackspot seabreams.

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Length classes	0	1	2	3	N
70 - 80	1	0	0	0	1
80 - 90	7	0	0	0	7
90 - 100	55	0	0	0	55
100 - 110	64	10	0	0	74
110 - 120	13	52	0	0	65
120 - 130	0	71	0	0	71
130 - 140	0	53	1	0	54
140 - 150	0	27	23	0	50
150 - 160	0	1	5	0	6
160 - 170	0	0	1	0	1
170 - 180	0	0	0	1	1
N	140	214	30	1	385
Mean FL	100.2	126	146	175	

Table 1. Length-age key of *P.bogaraveo* in the North Aegean Sea

Age group	N	Mean obs. FL	Age 1	Age 2	Age 3
1	214	126	111.7		
2	30	146	114.1		142.7
3	1	175	118.9	152.8	175
Mean FL			112.0	143.1	175
Annual increament			112.0	31.1	31.9

Table 2. Mean backcalculated lengths of *P.bogaraveo* in the North Agean Sea