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Summertime diel variations in the diet composition and feeding periodicity of red pandora (*Pagellus erythrinus*) in Hisarönü Bay

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In summer 1997, the stomach contents of 235 red pandora collected by bottom trawl from Hisarönü Bay in the southern Aegean coast of Turkey, were analysed. It was observed that red pandora is predominantly a diurnal feeder. More intensive feeding started in the afternoon, reaching its maximum value in the evening and continued until dusk. The minimum feeding intensity occurred during the night. The diet was found to consist primarily of polychaetes, especially Glyceridae, and crustaceans, mainly Natantia. No significant diel variation was observed in the diet composition of red pandora.

The diet of red pandora (*Pagellus erythrinus* Linnaeus, 1758) has been widely investigated in several regions of the Mediterranean Sea. While previous investigations provide information on the general or seasonal diet composition of red pandora, this study is the first to document its diel feeding habits in the Mediterranean Sea.

A total of 235 red pandora were collected by bottom trawl during a 24 h sampling period with 2-h intervals in Hisarönü Bay, which is located in the southern Aegean coast of Turkey during the summer of 1997. In each trawl haul, when available, 20 specimens with no sign of regurgitation were randomly sampled. Each specimen was measured to the nearest mm and weighed with an accuracy of 1 g prior to dissection for stomach removal. Stomach contents of sampled fish were weighed wet with an accuracy of 0.0001 g and identification of ingested prey taxa was carried out only to the general taxonomic levels. In order to evaluate the relative importance of various prey types in the diet and to provide a quantitative description of stomach contents, three common measures were used: percentage frequency of occurrence (%F), percentage composition by number (%N), and percentage composition by weight (%W) (Hyslop, 1980; Bowen, 1996). For determination of the relative feeding intensity during diel cycle, the percentage ratio of the weight of a fish's stomach contents to its total body weight [fullness index (%FI)] was calculated.

Most intensive feeding period of red pandora was observed to be at 1800 hours according to the calculated %FI values. Red pandora appeared to start its main feeding period around 1600 hours and continued until nightfall, 2200 hours. During the night the feeding intensity was observed to be low. Following the sunrise feeding intensity began to increase. The observed percentages of empty stomachs (%ES) and also %W values of unidentified food remains (%WUFR) coincide with the calculated %FI values (Figure 1). Our results showed that red pandora is a continuous feeder with varying feeding intensity over the time of day.

During the investigation period of 24 h, the overall diet of red pandora was found to consist primarily of polychaetes, especially Glyceridae, and crustaceans, mainly Natantia. The other and relatively less abundant groups of prey were echinoderms, molluscs and fish. These three groups were dominated by members of Ophiuroidea, Cephalopoda and Gobiidae, respectively. Diel variations in the diet composition of red pandora are presented in terms of %F, %N and %W in Table 1, respectively. There were no observed clear diel variations in diet composition of red pandora.

Since the objective of the present study; investigation of the diel feeding habits of red pandora, differs from all other earlier studies which aimed at looking into its diet composition in a larger time-scale, relevance of relating the current findings to those obtained from earlier work may be somewhat limited. However, the domination in the diet by polychaetes and crustaceans, as observed in this study, was also noted by the other workers in various regions of the Mediterranean Sea (Rijavec & Zupanovic, 1965; Ardizzone & Messina, 1983; Rosecchi, 1983; Ghannudi, 1984; Andaloro & Giarritta, 1985; Caragitsou & Papaconstantinou, 1988).

The sample size of this study was somewhat small in order to explain precisely the diel feeding habits of red pandora. However, it should be considered that the collection of red pandora samples in a desired quantity by trawling from one specific site during a diel period is an extremely difficult task. This circumstance was considered an unavoidable bias source,

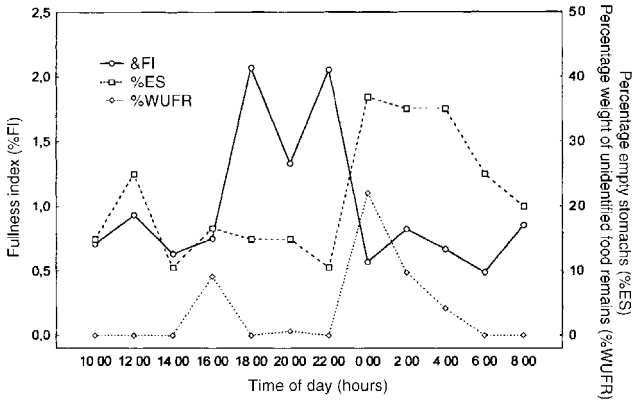

Figure 1. Variations in feeding intensity of red pandora during a 24 h sampling period.

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Table 1. *Percentage distributions of major prey groups in diel diet composition of red pandora (weight of unidentified material found in stomachs are excluded in the table, it was showed in Figure 1 as %WUFR).*

		Prey organisms				
Sampling time (hours)	Measures (%)	Crustacea	Polychaeta	Echinodermata	Fish	Mollusca
1000	%F	82.4	47.1	23.5	5.9	11.8
	%N	47.1	29.4	11.8	2.9	8.8
	%W	74.4	16.3	7.1	1.7	0.5
1200	%F	60.0	60.0	40.0	13.3	0.0
	%N	16.9	71.4	7.8	3.9	0.0
	%W	47.0	39.8	8.9	4.4	0.0
1400	%F	76.5	52.9	35.3	23.5	5.9
	%N	27.7	48.9	12.8	8.5	2.1
	%W	41.8	35.8	7.1	13.9	1.4
1600	%F	80.0	66.7	6.7	20.0	53.3
	%N	27.8	38.9	1.9	7.4	24.1
	%W	53.1	25.2	1.4	4.0	7.2
1800	%F	70.6	76.5	47.1	5.9	23.5
	%N	11.5	76.9	6.2	1.5	3.8
	%W	22.9	36.5	6.1	18.5	16.0
2000	%F	70.6	70.6	52.9	17.6	29.4
	%N	14.7	65.1	8.3	2.8	9.2
	%W	37.5	28.5	20.6	5.7	6.9
2200	%F	47.1	70.6	41.2	35.3	5.9
	%N	6.3	82.4	5.7	4.4	1.3
	%W	13.2	61.7	11.7	12.8	0.6
0000	%F	25.0	33.3	25.0	8.3	16.7
	%N	12.9	67.7	9.7	3.2	6.5
	%W	30.7	31.9	6.2	1.4	7.7
0200	%F	38.5	30.8	7.7	38.5	7.7
	%N	15.2	60.6	3.0	18.2	3.0
	%W	24.6	21.6	0.2	23.0	20.8
0400	%F	46.2	69.2	46.2	7.7	23.1
	%N	11.9	73.1	9.0	1.5	4.5
	%W	11.9	52.5	6.8	2.4	22.2
0600	%F	33.3	86.7	20.0	13.3	6.7
	%N	11.4	72.7	6.8	6.8	2.3
	%W	9.4	59.9	8.1	17.5	5.1
0800	%F	37.5	81.3	25.0	31.3	0.0
	%N	7.9	77.6	5.3	9.2	0.0
	%W	22.3	51.3	4.9	21.5	0.0

which can be eliminated by repetitive surveys in a longer term. These surveys are intended to be conducted in the near future.

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