A Summer large scale distribution of pelagic shrimps in the Liguro-Provencal Basin

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Crustacean Decapods are an important component of pelagic food webs. In the framework of a large scale macroplankton sampling in the Western Ligurian Sea aimed at the key species in the diet of large nekton (tuna, swordfish, cetaceans), we describe this taxocenosis in the 0-750 m range.

Sampling methods

Over a period of two weeks (August 17 - 29 1991) using the R/V *Minerva* (CNR), an area of 8600 sq. naut. mi. was covered, and 20 sampling stations were located along four transects: A, Genova-Calvi; B, Monaco-Calvi; C, Marseilles-Gulf of Porto; and D, perpendicular to B, from 43.13.89N 07.35.66E to 43.32.63N 08.15.49E (Fig.1). The standard haul for macroplankton, consisted in a oblique tow of a 15 feet open I.K.M.T. (2x2 mm mesh in the cod end), from 750 m to the surface in steps. The haul lasted two hours at a ship speed of about 3 knots. The net opening was calculated to be 17.55 m^2 on analogy with the 3 m I.K.M.T., whose opening is estimated to be 7.8 m^2 (FOXTON, 1969). The amount of filtered water per hour is 97571 m^3. The sampling time (beginning of the haul) ranged from 07.35 a.m. to 20.32 p.m.

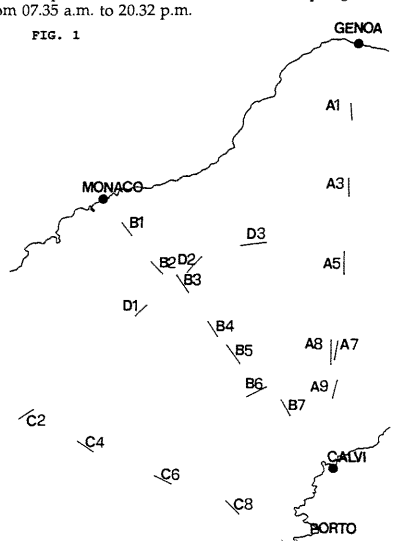
Results

A total of 3779 specimens were collected (Table 1) with an average of 183.2 ± 74 per station. The most abundant species were *Gennadas elegans* (39.7%), *Sergestes arcticus* (30.6%), and *Pasiphaea multidentata*, mainly represented by young individuals (13.5%).

Remarks

1) In the present offshore pool of Decapods the dominance of *G. elegans* is interesting : it represents a common feature with Atlantic areas (FOXTON, 1970, HARGREAVES, 1984). Nearest the coast S. *arcticus* (FRANQUEVILLE, 1971, VU DO, 1981, SARDOU and ETIENNE, 1988), and *P. sivado* (personal observation in the Gulf of Genoa) proved to play this role. Detailed information on distribution, density, sex ratio and size frequencies of *G. elegans* have been given (ORSI RELINI and TARTAGLIA, 1991).

FIG. 1



TAB. 1

Stations	Acanthephyra pelagica	Funchalia villosa	Funchalia woodwardi	Gennadas elegans	Pasiphaea multidentata	Pasiphaea sivado	Sergestes arcticus	Sergestes cornutum	Sergestes sargassi	Sergestes vigilax	Sergestes sp.	Sergia robusta	Totals
A1	--	--	--	101	22	9	11	3	1	3	1	--	151
A3	27	--	2	76	39	58	8	6	5	3	--	22	246
A5	--	1	--	38	35	6	15	9	1	2	--	--	107
A7	--	--	--	28	6	7	56	10	3	7	8	--	125
A8	9	--	--	108	55	16	92	23	13	16	--	11	343
A9	--	--	--	70	24	7	31	6	5	1	--	1	145
B1	--	--	--	76	24	30	53	5	1	4	--	--	193
B2	1	--	--	76	30	10	23	1	1	--	1	1	144
B3	--	--	--	1	5	25	49	--	9	1	--	--	90
B4	--	--	--	9	15	7	60	5	6	4	--	--	106
B5	1	1	--	165	17	8	50	3	2	1	--	2	250
B6	--	--	--	21	5	3	28	4	4	3	--	--	68
B7	12	--	--	97	27	6	49	9	1	3	--	6	210
C2	--	--	1	116	30	8	105	3	7	--	--	--	270
C4	--	1	--	114	10	6	189	8	2	6	--	--	221
C6	2	1	--	19	--	2	73	--	3	3	1	--	104
C8	--	--	--	150	19	1	70	17	--	10	--	--	267
D1	2	--	--	46	58	5	63	3	3	--	--	3	183
D2	--	--	--	84	35	11	36	2	5	--	--	--	173
D3	--	--	--	106	54	7	95	4	--	2	--	--	268
	54	4	3	1501	510	232	1156	121	72	69	11	46	3779

2) Besides the listed species, also *Lucifer typus*, *S. mollis* (FRANQUEVILLE, 1971) and *Acanthephyra eximia* (RELINI ORSI, 1973) have been recorded in the area. In particular, this last species is easily found in the Gulf of Genoa when sampling is effected below 1000 m.

3) Given that the vertical distribution of the listed species extends more than 750 m (FRANQUEVILLE, 1971), vertical migrations influences the catches. In particular, a group of "deep species" (*G. elegans, S. robusta, A. pelagica, F. woodwardi)* may be distinguished from the others. The correlation between time of sampling (in a fivepoint scale of light) and numbers of individuals collected in each station was tested for single species and for groups of species. The correlation proved positive for *G. elegans* (P=0.05) and for the above mentioned "deep group" (P=0.01) and absent for the others. In other words, a column of 750 m is probably the suitable sampling range only for the "less deep" species.

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Temporal and spatial distribution of neritic and mesopelagic fish larvae in the Gulf of Kisamos (NW Cretan Sea, SW Aegean Sea)

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The present study concerns with the assessment of the fish larvae composition and their temporal abundance in the neritic and mesopelagic zone. The study area is the Gulf of Kisamos which is connected to the open SW Aegean Sea. Although the total area of the Gulf of Kisamos is rather a small one, it is lined by a narrow continental shelf and an abrupt continental slope. This kind of geomorphological feature is expected to play an important role on the density of neritic and mesopelagic fish larvae, according to YOUNG *et al.* (1986). Relevant information are reported in our previous study (PAPASISSI and LYKAKIS, 1988). Other studies concerning with fish larvae of the Gulf of Kisamos are non-existing.

Day samples were collected from five sites (S1, S2, S3, S4 and S5 stations) of the Gulf of Kisamos in September and November 1988, and February, April, May and July 1989. Samples were taken by double oblique hauls in the upper 50m using a Bongo net with 500µm mesh size. 88 fish larvae species were identified in our samples. The identification was based on ABOUSSOUAN (1964), PAPASISSI and FROESE (1990), and other sources. Among all identified larval fish, 16 species were recorded in abundant densities.

A peak and minimum density of the total fish larvae group occurred in April 1989 (106.9 n.100m^{-3}) and November 1988 (11.7 n.100m^{-3}) respectively (Anova test, $p<0.05$). Density values of fish larvae in other collecting periods were: 15.3 n.100m^{-3} in September 1988, 42.6 n.100m^{-3} in February 1989, 64.11 n.100^{-3} in May 1989 and 42.3 n.100^{-3} in July 1989. Peak densities of fish larvae group coincided with mean maximum biomass of zooplankton (438.6 mg.100m^{-3}) while their minimum abundance occurred when minimum values of zooplankton biomass were recorded (51.2 mg.100^{-3}) (FRAGOPOULU, personal communication).

Higher mean annual densities of fish larvae were recorded at neritic stations S1 and S5 (53.96 and 95.6 n.100m^{-3} respectively), and station S2 (60.77 n.100m^{-3}) at the edge of the continental shelf (200m depth). Lower densities of fish larvae were found at pelagic stations S3 and S4 (at depth >200m) (13.8 and 10.4 n.100m^{-3} respectively). In addition, the diversity of fish larval species was found higher at neritic stations. To justify differences between neritic and pelagic station groups, Anova tests ($p<0.05$) were applied. It seems, that composition and differences of fish larvae assemblage are determined by temporal and spatial factors.

Among all different fish larval species identified in the Gulf of Kisamos, highest mean density values recorded for *Diplodus annularis, Boops boops, Gobius niger, Cyclothone braueri* and *Hygophum* sp.

Neritic and mesopelagic fish larval species were collected at all sampling stations. The following abundant neritic fish larvae were identified: *Crenilabrus* sp., *Chromis chromis, Anthias anthias, Serranus cabrilla, Crystallogobius linearis* and *Sprattus sprattus*.

Similarly, the following abundant mesopelagic fish larvae were recorded: *Ceratoscopelus maderensis, Lampanyctus pusillus, Lampanyctus crocodilus, Diaphus holti* and *Stomias boa*.

Most of the abundant fish larvae showed a well defined seasonal distribution. For example, the following larval fish are encountered in maximum densities in the indicated collecting periods. a) Neritic species: *Diplodus annularis* in April, *Boops boops* in April, *Gobius gobius* in May, *Anthias anthias* in September, *Chromis chromis* in September, *Crenilabrus* sp. in April, *Crystallogobius linearis* in November, *Serranus cabrilla* in July, and b) Mesopelagic species: *Hygophum* sp. in November, *Cyclothone braueri* in September, *Lampanyctus pusillus* in February, *Lampanyctus crocodilus* in April, *Diaphus holti* in February and *Stomias boa* in February. Larvae of *Sprattus sprattus* were found in very abundant densities in April while they are almost missing in the remaining sampling periods.

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