CEPHALOPODS CAUGHT WITH TWO TYPES OF DRAGGED GEAR OFF THE CATALAN COAST (NORTHWESTERN MEDITERRANEAN)

Pilar SÁNCHEZ

Instituto de Ciencias del Mar. Paseo Joan de Borbó s/n, 08039 Barcelona, Spain

In experimental tows a comparison was made between two different types of fishing gear, the bottom-trawl and a special type of dragged gear, locally known as "rastell", in depths ranging from 3.3 to 28.8 m in the case of the "rastell", and from 21.6 to 37.8 m in the case of the bottom-trawl. Both were utilized in the same area (the ports of Vilanova and Sant Carles in the Spanish Mediterranean). In the course of these tows, four species of cephalopod were caught with both gears.

In spite of the fact that both gears trawl the sea bottom, the structure of each of them determines the type of species which they catch. The "rastell" is distinguished by a mouth formed by an oval or rectangular metal structure with a small aperture (1.5 m). Because it is fitted with chains, it is dragged along the bottom. The bottom-trawl is characterized by otter boards and a large mouth aperture (more than 3 m), and it is not in such firm contact with the bottom as the "rastell". In addition, the speed of fishing with the bottom-trawl is somewhat greater than is fishing with the "rastell". These features made it possible to establish the lower distribution limit of each species, as well as their behaviour.

Of the four species caught with the two gears, two are nektonic (*Loligo vulgaris* and *Alloteuthis media*), and two are benthonic (*Octopus vulgaris* and *Sepia officinalis*). *L. vulgaris* was very rarely caught with the "rastell" (2 tows out of 59) and quite frequently taken with the bottom-trawl (10 out of 19). *A. media*, the other nektonic species, appeared in practically all the hauls made with the bottom-trawl (17 out of 19), but was taken only sporadically with the "rastell" (13 out of 59). *O. vulgaris* was caught more frequently with the bottom-trawl (10 out of 19) than with the "rastell", while *S. officinalis* was found more often in the "rastell" hauls (34 out of 59) than in the bottom-trawl hauls (10 out of 19).

The frequency of appearance in the catches is shown in terms of the abundance ($kg^* h^{-1}$) of the species by fishing gear (Table 1). The two nektonic species present a very low mean biomass, although it was slightly higher in the hauls made with bottom-trawl than in those taken with the "rastell". The two benthonic species display a greater abundance, especially *O. vulgaris*; *S. officinalis* seems to be caught more efficiently with the "rastell" than with the bottom-trawl.

Given the difference in size of the adult individuals of the four species, and as a result in their weight, abundance in weight is not sufficient to provide a satisfactory picture of their abundance. For that reason, the number of specimens per hour of trawling was analyzed. The two nektonic species show a high mean number in those catches made with the bottom-trawl, which is not the case with the "rastell". The number of *O. vulgaris* caught is low and quite similar for the two gears, while the number of *S. officinalis* caught with the "rastell" is high.

There are several reasons which explain these results :

- 1) *A. media* and *L. vulgaris* are caught at the lower limit of their distribution (20 m), while the distribution of the two benthonic species is more coastal still, particularly that of the *S. officinalis*.
- 2) The nektonic species carry out daily migrations in which they are closer to the bottom during the daylight hours. This behaviour, together with the greater mouth size of the bottom-trawl, made it possible that, the nektonic specimens were more abundant in the catches obtained with this gear than in the "rastell" catches. The benthonic species closely linked to the sea bottom, particularly *S. officinalis*, which sometimes buries itself, are fished efficiently with both gears.
- 3) The number of specimens caught of each different species is a reflection of their behaviour. The nektonic species live together in schools, which is why, in spite of the sporadic nature of the catches and the fact that these gears are not ideal for their fishery, when they appear, they do so in relatively high numbers, particularly in the case of *A. media*. The benthonic species, especially *O. vulgaris*, are territorial and therefore live more dispersed. In spite of this, however, the number of *S. officinalis* taken with the rastell can be rather high.

		($kg*h^{-1}$) TRAWL	RASTELL	($no*h^{-1}$) TRAWL	RASTELL	DEPTH (m) TRAWL	RASTELL
	min	0.008	0.014	0.6	2.3	21.6	17.3
Loligo	max	1.644	0.042	73.0	4.7	36.9	23.8
vulgaris	mea	0.250	0.028	20.8	3.5	27.4	20.5
	std	0.472	0.014	24.1	1.2	4.4	3.3
	min	0.023	0.003	10.1	1.2	21.6	17.3
Alloteuthis	max	1.930	0.103	266.1	9.3	36.9	25.0
media	mea	0.672	0.046	97.1	4.6	27.0	22.0
	std	0.597	0.029	83.9	2.6	4.7	2.2
	min	0.021	0.006	1.0	0.7	21.6	6.0
Octopus	max	10.833	6.837	17.8	15.0	37.8	28.8
vulgaris	mean	3.680	1.612	7.9	5.2	31.6	18.6
	std	3.284	1.995	5.5	4.0	5.0	5.9
	min	0.090	0.028	1.0	0.8	21.6	3.3
Sepia	max	3.440	13.330	32.0	205.7	36.9	28.8
officinalis	mean	0.663	1.938	7.2	23.5	28.6	17.4
	std	0.951	3.364	8.7	43.9	5.3	6.8

Table 1. Abundances ($kg^* h^{-1}$ = kg per hour and $no^* h^{-1}$ = number of individuals per hour) of the four species caught with the conventional dragged gear and with the rastell, as well as the depths at which they were caught.

THE EXISTENCE OF 4 IMMIGRANT FISH SPECIES FROM THE RED SEA IN THE SYRIAN COAST (THE ORIENTAL MEDITERRANEAN)

Miskal SBAIHI[1] and Adib SAAD[2]

[1] Depart. Natural Sciences. Fac. of Sciences, University of Tishreen,
[2] Depart. Fundamentals Sciences. Fac. of Agriculture, University of Tishreen, Lattakia, Syria

In order to make an environmental and systematic survey on fishes in the Syrian coast, we begin in May 1991 to collect fish specimen directly from the sea by sailing with demersal trawl launches which belong to the marine fishing center in Lattakia, and with small and big boats which belong to fishermen. These boats and launches use many methods in fishing (long line, many kind of seines ...). Our voyages have covered all the region from the Turkish bounderies in the north to Banias city in the south.

Consequently, we have determined 150 species which belong to 112 genera which follow 69 families, which follow in turn 15 orders, which belong to the super order Teleostei.

In a very artistic and scientific way, we have preserved samples of these fishes insid glass vessels which are firmly closed in the laboratory of Oceanography and Aquatic Environment in Tishreen University. In our research, we have recorded the existence of 4 species for the first time in the Syrian regional water. Comparing the systematic properties with the modern systematics keys (WHITEHEAD *et al.*, 1986; FISHER *et al.*, 1987), we found that these species belong to the fishes of the Indian Ocean and the Red Sea. These fishes migrated to the Mediterranean through the Suez canal. Ben-Tuvia was the first to point to the migration of these species and to record their existence in the Mediterranean, in the southern Israelian coasts. We are not aware of any further evidence supporting the existence of these species in the Eastern Basin of the Mediterranean (PAPACONSTANTINOU, 1988; MOUNEIMNE, 1977).

This migration tooks place as a result of the environmental changes which happened to the Eastern Basin of the Mediterranean sea. The environmental characteristics of the Mediterranean water became so close of those of the Red Sea and this in turn explains the migration of these fishes toward east of the Mediterranean. Are there other reasons ?

Family	species	date	method of fishing	depth
Apogonidae	*Apogon taeniatus*	3/12/92	demersal trawl	45 m
Callionymidae	*Callionymus filamentosus*	1/7/93	demersal trawl	65 m
Cynoglossidae	*Synoglossus sinusarabici*	25/3/93	dynamite	3 m
Gobiidae	*Silhoueta aegyptia*	2/4/93	demersal trawl	45 m

Table 1 : Names of immigrant species, Family, Depth of caught, methods and date of fishing.

	A. taeniatus	*C. filamentosus*	*S. sinusarabici*	*S. aegyptia*
Total length C.m	10,5	10,8	12,5	11
Standard length C.m	9,3	8,2	11,7	8,8
Body depth C.m	3,4	1,5	3,7	1,8
Head length Cm	3,2	2,4	2,3	2,7
Eye diameter C.m	0,8	0,6	0,3	0,7
First dorsal fin rays	VII	IV	100	VI
Second dorsal fin rays	I+8	9	-	I+10
Anal fin rays	II+6	9	78	11
Scales in lateral series	25	-	-	26

Table 2 : Morphometric and meristic characteristics (We have taken the average of 5 indviduals)

REFERENCE

BEN-TUVIA A.,1978. Immigration of fishes through the Suez canal. *Fish bull*, 76 (1) : 24 -255

FISHER W., BOUCHOT M-L., SCHNEIDER M., 1987, Fiches FAO d'identification des espèces pour les besoins de la pêche, Méditerranée et mer Noire, Zone de pêche 37. Vol. 11 : 761 - 1530

MOUNEIMNE N., 1977. Les poissons de la côte du Liban (Méditerraneée orientale), *Cybium* 3e serie I : 37 - 66.

PAPACONSTANTINOU C., 1988. Fauna Graeciae, check-list of marine fishes of Greece. 251 p . Athens.

WHITEHEAD P.J.P. , BOUCHOT M -L., HUREAU J-C., NIELSEN J., TORTONESE E., 1986 . Fishes of the North-eastern Atlantic and the Mediterranean, Ed. Unesco. Vol. I, II, III. 1473 p.

V