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Catch and effort of the bluefin tuna purse seine fishing in Turkish waters

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SUMMARY – Data on technical specifications, numbers, catch amounts, fishing power per boat and CPUE of purse-seining boats currently operated for tuna fishery in the Turkish waters, between the 1994-2000 period, are presented. The number of the purse-seining boats operating during the study period varied between 22 and 62. Larger fishing boats and powerful equipment in terms of boats engine, fishing nets, etc., intensive use of echosounders, as well as bird radars in recent years were the most important factors which caused a significant increase in the tuna fishery.

Key words: Bluefin tuna, fishery, purse seine, CPUE, Turkey.

RESUME – *"Capture du thon rouge et effort de pêche au senneur dans les eaux turques". Des données sont présentées sur les spécifications techniques, les nombres, les quantités capturées, la puissance de pêche par bateau et CPUE des senneurs qui opèrent actuellement pour la pêche au thon dans les eaux turques sur la période 1994-2000. Le nombre de senneurs opérant pendant la période de l'étude variait de 22 à 62. Les facteurs les plus importants ayant entraîné une augmentation de la pêche au thon sont des bateaux plus grands et des équipements plus puissants en termes de moteur du bateau, filets de pêche, etc., utilisation intensive d'échosondeurs de même que des radars à oiseaux pendant ces dernières années.*

Mots-clés : *Thon rouge, pêche, senneur, CPUE, Turquie.*

Introduction

In Turkey, the traditional fishing of the bluefin tuna has been carried out by means of fish traps and hand lines in the 1920s (Devedjian, 1926). The major fish traps for bluefin tuna have been set in the Sea of Marmara and in the Bosphorus Strait. Using those fish traps for catching bluefin tuna lasted until 1987. In Turkish seas, the bluefin tuna purse-seine fishery was started for the first time in the Sea of Marmara in 1950s (İyigüngör, 1957). Due to the significant development of the purse-seining boats particularly in the late 1980s nowadays, purse-seining is commonly used for catching bluefin tuna.

According to the FAO records, the catch of the bluefin tuna by Turkish fishing fleets was 3466 t in 1994 and it increased to 5899 t in 1998, however, this value decreased to 1407 t in 1999 and 1070 t in 2000.

Materials and methods

Data on technical specifications, numbers, catch amounts and days of fishing per year of bluefin tuna purse-seiners were collected from the boat owners and by the field surveys between 1994 and 2000. Fishing effort and catch for unit of effort were computed according to following formulae. In the present study, fork length (FL) and weight (TW) of 6171 bluefin tunas were recorded [Effort (E) = number of fishing days for each of the n boats; CPUE (t) = catches/E; CPU = catches/vessel].

Results

Bluefin tuna fishing fleet

The number of the purse-seining boats operated in the bluefin tuna fishery varied between 22 to

62. Those boats were 22 to 62 m in length, 24 to 694 grosstons, and powered by 300 to 2610 HP enginees (Table 1). The presence of echosounder and sonar devices, and the recent using of bird radars on purse-seining boats make possible to locate the schools of bluefin tunas precisely.

Table 1. Some of the technical specifications of bluefin tuna purse-seiners between 1994 and 2000

Year	Number of purse seine	Boat length (m)	GRT	HP
1994	51	19.4-55	24.5-496	300-1720
1995	60	24-55	48.5-496	435-1720
1996	61	25.15-62	76-694	470-2028
1997	62	28-62	148-694	800-2028
1998	62	25-62	92-694	400-2028
1999	22	20-62	90-694	470-2610
2000	26	28-62	120-694	470-2610

The length and the height of bluefin tuna nets depending on the boat size varied between 756 and 1980 m and 108 and 270 m, respectively.

Fishing area and fishing period

The main fishing grounds of bluefin tuna are the eastern Mediterranean Sea, and northern and central Aegean Sea; occasional catches of bluefin tunas were also recorded from the Sea of Marmara. Fishing activities are carried out close to the coast-line, as well as 30 to 40 miles off the shore.

Technically, the bluefin tuna fishery lasts all year round in Turkish seas, however, with the termination of the fishing season of bonito, anchovy and bluefish, the main fishing season for bluefin tuna begin in February and lasts until June.

Fishing effort and CPUE

Catch amounts, catch per unit of effort and fishing effort data are given in Table 2.

Table 2. The nominal CPUE of bluefin tuna in Turkish seas by purse-seine fishery

Year	Catch (t)	Effort (fishing days)	CPUE (t/F day)	CPU (t/vessel)	Mean FL (cm) ± SE	Mean weight (kg) ± SE
1994	3466	526	6.59	67.96	145.42 ± 1.74	60.20 ± 2.06
1995	4220	925	4.56	70.33	137.15 ± 1.04	48.31 ± 0.98
1996	4616	997	4.63	75.67	108.42 ± 0.49	23.77 ± 0.39
1997	5093	841	6.06	82.15	125.05 ± 0.57	36.44 ± 0.56
1998	5899	806	7.32	95.15	127.53 ± 0.72	39.52 ± 0.76
1999	1407	210	6.70	63.95	138.84 ± 2.23	57.81 ± 4.39
2000	1070	332	3.22	41.15	121.02 ± 0.76	35.00 ± 0.83

CPUE values varied between 3.22 to 7.32 t, with a mean of 5.58 t per year. The linear regression analysis of the obtained data indicates a decreasing in the CPUE data as 0.112 t per year. CPU values show a decreasing of 2.633 t per year (Fig. 1). A variations is seen in the numbers of days of fishing per year.

The annual catch amounts of the bluefin tuna showed an increasing trend between 1994 and 1998 (5899 t), while they exhibited a significant reduction in 1999 (1407 t) and 2000 (1070 t). Similarly, the

CPUE showed a decrease since 1998. Parallel increasing and decreasing were observed in the numbers of the boats and days of fishing (Fig. 2). Days of fishing and CPUE were inversely proportioned. The value of CPUE decreases as the days of fishing increase (Fig. 3).

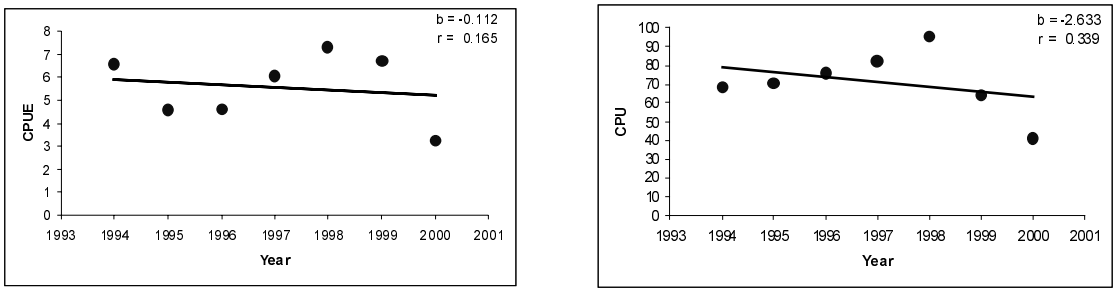

Fig. 1. Annual CPUE and CPU values in purse-seine fishery of bluefin tuna.

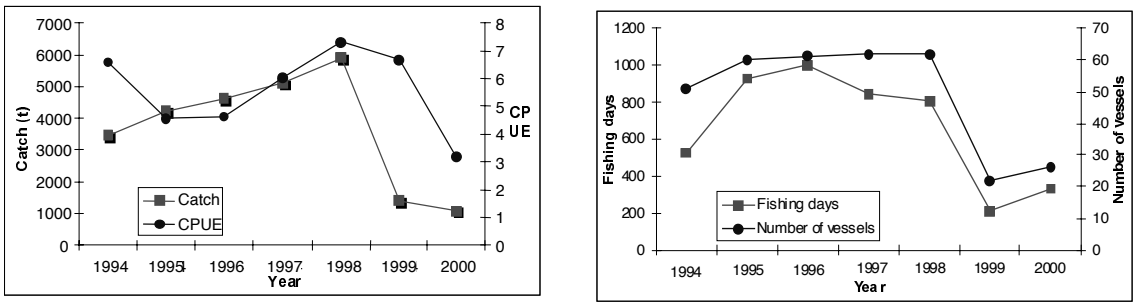

Fig. 2. Catch amounts and fishing effort, days of fishing and number of vessels for bluefin tuna purse-seine fishery.

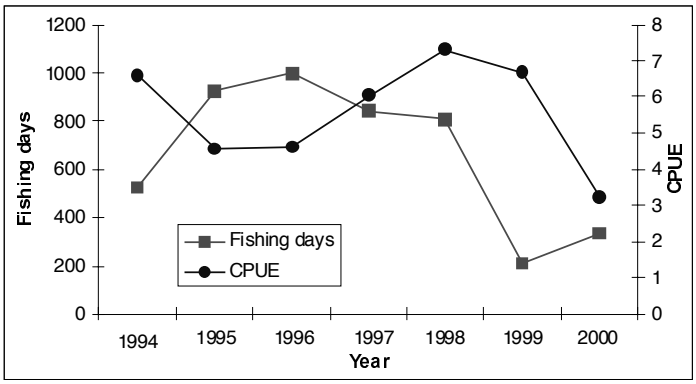

Fig. 3. Days of fishing and CPUE for bluefin tuna purse-seine fishery.

Catch-at-size

Mean lengths and mean weights of bluefin tunas with regards to years are given in Table 2. Maximum value of the mean weight (60.2 kg) was recorded in 1994 and the minimum value (23.77 kg) recorded in 1996.

Conclusions

In Turkey, the bluefin tuna fishery is commonly carried out by means of purse-seining.

Furthermore, hand-liners and swordfish harpooning boats also capture some bluefin tunas. The pelagic long-lining is not used for bluefin tuna fishery in Turkish seas.

The rapid development of the bluefin tuna fishery caused an increase in the size and enginee power of the purse-seining boats, as well as a development in their fishing nets. Echosounder and sonar devices, and most recently the bird radars, are commonly used by the purse-seiners.

Very close cooperation is existed among the bluefin tuna fishermen. Locating the schools of bluefin tunas and entrapment operations are carried out collectively. During the fishing in 30 to 40 miles offshore, all of the captured bluefin tunas are transferred to one of large purse-seiners and placed in its cold-storage, and this boat immediately returns to fishing port for landing the catch. This collective fishing strategy allows the other boats pursuing the schools of bluefin tunas without waste time.

Due to the drastic reduction in stocks of the bluefin tuna, ICCAT set some quotas for export. Following this, Turkey has received a letter of warning which concerns the overexploitation of bluefin tunas. The bluefin tuna is an important item of export in Turkey and, therefore, the Ministry of Agriculture and Rural Affairs has set new fishing regulations for protecting this pelagic fish against overfishing. Following this new regulations, the annual catch amount of the bluefin tuna decreased to 1407 t in 1999 and the observed reductions in the values of CPU, CPUE and days of fishing in that year resulted from this reason.

According to the regulations set by the Ministry of Agriculture and Rural Affairs, catching bluefin tunas smaller than 90 cm (15 kg), and catching bluefin tunas by purse-seining boats between June 1st and September 1st are strictly forbidden (Anonymous, 2000). Most of the fishermen respect these regulations. In comparison with the recommendations of ICCAT (1999) which aim to prevent the catch of bluefin tunas smaller than 6.4 kg in the Mediterranean Sea, the limitations in Turkey seem more realistic.

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