Situation Of The Dikili Gulf Fishes For Sustainable Fisheries

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Abstract

Conservation fish stocks in the aquatic ecosystem is important for sustainable fish production. Continuation of the fish species generations in a habitat is affected by environmental conditions and hunting pressure. For the sustainability of the reproductive abilities of fishes, it is essential to know interactions with the the other species that live in habitat. In this way the production models, that encourage the fish to grow in its natural habitat, can be developed. In this study, the fish species that live in Dikili Bay of Izmir City and their economic features were investigated. Fish species that live in Dikili Bay were examined systematically and biologically; also identification keys of the species were formed. Morphometric and meristic characters of obtained species were identified. In the examination, 70 species belonging to 39 families were identified. 9 species of these belong to chondrichythyes and 61 to osteichtyes. 31 of these species are economically important species and are hunted. 2 of them (Sea bream and sea bass) are farmed in Turkey, also. As a result of inadequate protection measures and mindless hunting, it was observed 31 economically important and identified species, that live

in the Dikili bay, began to extinction day by day. Due to the sea bottom is sandy, it provides appropriate conditions to trawl fishing. By hunting with this method leads to deterioration of marine ecosystems. Unlike the other surface fishnets, the trawling disrupts the fish shelters and nests and makes them irreversible. In this context, placement of an artificial fish shelters, both will form habitat for fish and with this way trawling can be prevented partially. In addition, to protect the natural balances of the economically important fish species, stock enhancement programs, that used for terrestrial water resources, are able to apply for local marine fish species. By the stock enhancement programs, the natural fish stocks will increase and the sustainable fisheries will be provided in the natural environment.

Keywords: Dikili Bay, Sustainable Fisheries, fish stocks, stock enhancement, trawling.

1.INTRODUCTION

People used to use seas for two aims; fishing and trade since first ages. It is accepted by everyone that seas contain a lot of biological sources which can be effective in all kinds of lives of increasing world population. That's why the countries which have coasts to these seas and their scientists have begun working on getting to know, introducing and saving those seas which can be life savers and the biological sources in them, intensively. (Geldiay & Kocatas, 2005)

Nowadays food and nutrition are the two main problems of people of the fast growing world population. All studies and technologies are centered (intensified) on producing healthy food sources and saving natural food sources. Especailly today, instead of breeding special kinds (species), saving and retaining genetic variety in natural sources have special importance besides aquacultural studies. The increase of endemic kind population which is important especially in terms of biological variety and making them profitable financially have great importance. On our unstabil earth, studies the continuity of the kinds (species) in natural stocks (reserves) which have genetic composition with high variable adaptation ability will provide a basis for the future studies.

At the same time, saving biological variety will provide a basis in gaining alternative kinds of fish to the economy of our country in addition to existing cultivation.

Fish pricing with a wide inference (meaning), is improving (cultivating) the existing natural source by artificial interference to the echosystem from outside. Commercially, fish pricing is described (named) as increasing stocks of all kinds of water sources (like; river, lake, fishery, dam, etc). Today escpecially in fishing, an important amount of product is gained from fish pricing as a third way besides other two which are hunting and breeding from the natural sources (Sezgin, 2006)

Sea pollution and the demand for water products have caused an excessive decrease of fish stocks to meet the increase of pretein need with the growth of world population potential, and biological variety in natural stocks has also been affected negatively.

In this study, the variety of fish, their place in systematic and biological features in Dikili Bay are examined (searched) and the assingment key has been formed (created).

2.Materials and methods

Providing material (obtaining material)

The research has been carried out in about 12-month period, in Dikili Bay from August 2001 to September 2002. Collecting samples involved 15-day periods or monthly periods according to the weather conditions.

Material has been provided by communicating (contacting) with trawl net and haul seine boats which come to the fishing ports in the towns in Dikili, Izmir and the hunters hunting for sports. Deep trawl net has been used for fishing demersal fish.

The depth of fishing places have been detected with sonar and echo-sounder devices. 28 meter long, 820-HP-motor, 22 mm aperture size and 800 mesh, deep trawl, Reis Boat, which has been registered to Trabzon Harbour and tied to Dikili was used.

2.1.Evaluating the samples

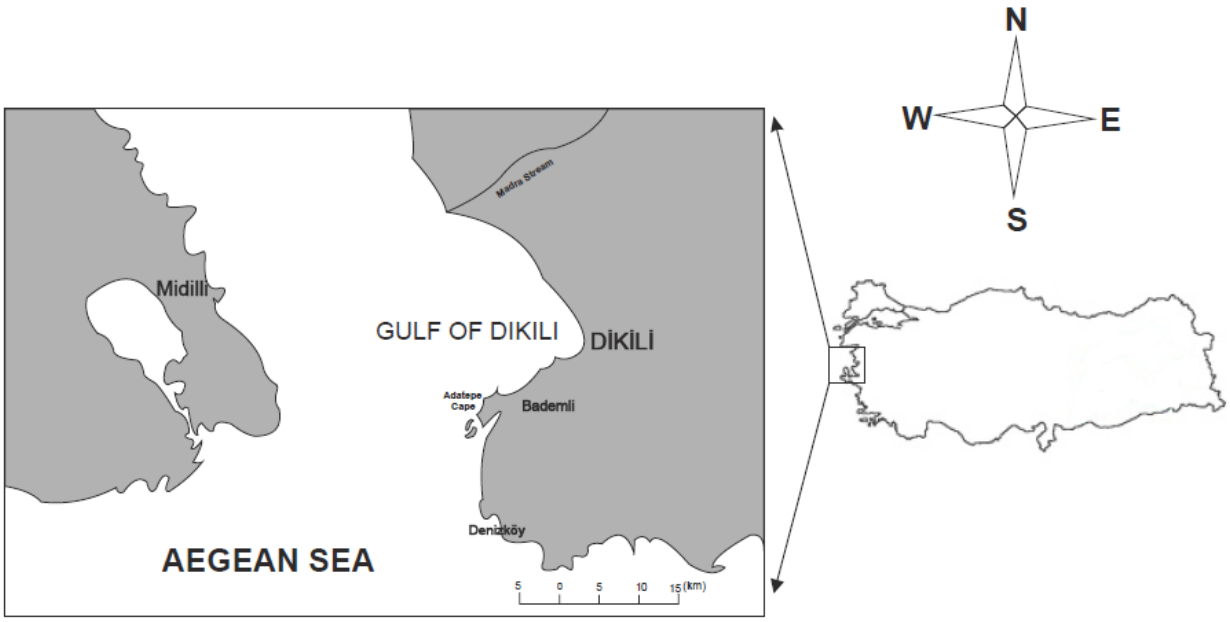
Collected samples have been washed immediately and got through %70 alcohol or %4 formaldeyde solution. The ones taken out from the sea have been recorded and photographed before the process because of the colour corruption of the types (kinds) put in alcohol and formaldeyde. In the recognition of the samples in the studies morfometric and meristic characters have been used. For measuring the types' morphometric characters 0.5 mm sensitivity vernier has been used. For detecting meristic characters binocular has been used. As metric characters; total length (TL), body height (BH), Head length (HL), eye diameter (ED), in addition to those for the fish which has disc shaped body with cartilage, disc width (DW), and disc length (DL) have been measured. As disc width, the distance between the tips of pectoral fins, and as disc length, the distance between the tips of muzo and pectoral fins are measured. As meristic characters dorsal, anal, ventral and pectoral fin beams, dorsal and anal pinules, pilork cheka, gill spines, lateral line, and lateral cycle (serial) scales have been counted according to the types (kinds). Simple (spine) beams have been indicated (shown) in Roman numerals, soft (branched) beams have been indicatged (shown) in normal numerals. For the ones that have 5 or more samples body ratio is measured about %95.

Determining the morphologic characters Whitehead and ark.(1984-86) have been used.

In the research mostly the fish type which has been taken out with deep trawl exist. In systematic order of the types from Dikili Bay GOLANI (1996) and for naming those types Whitehead, ark.(1984-86), Fischer and ark.(1987), Wheeler (1992) have been based on.

2.2.Land Information

This study has taken place in the inner part of the line which connects Adatepe Cape and Madra Stream which are between 39 10' 00" N-30 02' 30" N latitude and 26 46' 00" E-26 48' 48" E.



Dikili Bay is surrounded by Candarli Bay in south, Midilli Island in west and Edremit Bay in north. It has a sandy ground. There is pebble and sand in the shallow parts and mud in the deep. There are limnetic exists undersea. The study area is under the effect of coastal and deep impure, local drifts, waves, topography of land, sea morphology and the materials that rivers carry to the sea. (Eryilmaz & Eryilmaz, 2007)

According to the morpholigical features Eagean Sea is divided into three different regions; Northern part, Middle Part and Southern Part. The average depth of Northern Part is about 120-200m. (Tokac, et al. 2010)

2.3.Features of water

It has been observed that the heat of the water mass in Eastern Eagean sea is 9-26 degrees and the amount of oxygen is 4-10 ml/l. (Artüz, 1970; Benli and Kucuksezgin, 1988; Ergin and others, 1933a)

Bay is affected by the cold surface water coming from the Dardanelles and Marmara which belongs Black Sea originally. 6-7 degrees difference exists between Norhtern Eagean and Southern Eagean in winter. In summer there is no notable difference. The heat of the surface water is 14-15 degrees under 200 m whereas it is variable (chageable). (Culha, 1994)

Saltiness is affected by Black Sea flows, it is less common than other regions of Eagean Sea. (‰ 33) (Culha, 1994)

In accordance with nutritious salts it is seen that Northern Eagean is richer Black Sea and Marmara. If we study the the vertical distribution of the nutritious salts, we see that the concentration up to 200 m is low whereas in deeper parts which is more than 200 m, the values of nitrate, phosphate and silicate increase. (Frilligos, 1981)

Species discovered

Phylum: CHORDATA	
Subphylum: VERTEBRATA	
Superclass: GNATHOSTOMATA	
1.Class: CHONDRICHTHYES	
LAMNIFORMES	
SCYLIORHINIDAE	*Scyliorhinus canicula (Linnaeus, 1758)*
TRIAKIDAE	*Mustelus mustelus (Linnaeus, 1758)*
RAJIFORMES	
TORPEDINIDAE	*Torpedo marmorata Risso, 1810*
RAJIDAE	*Raja asterias Delaroche, 1809*
	Raja clavata Linnaeus, 1758
	Raja miraletus Linnaeus, 1758
	Raja radula Delaroche, 1809
	Raja naevus Müller&Henle, 1841
DASYATIDAE	*Dasyatis pastinaca (Linnaeus, 1758)*
2.Class: OSTEICHTHYES	
ANGUILLIFORMES	
CONGRIDAE	*Conger conger ([Artedi, 1738] Linnaeus, 1758)*
CLUPEIFORMES	
CLUPEIDAE	*Sardina pilchardus (Walbaum,1792)*
ENGRAULIDAE	*Engraulis encrasicolus (Linnaeus, 1758)*
GADIFORMES	
GADIDAE	*Trisopterus minutus capelanus (Lacepede, 1800)*
MERLUCCIDAE	*Merluccius merluccius (Linnaeus, 1758)*
LOPHIFORMES	
LOPHIDAE	*Lophius piscatorius Linnaeus, 1758*
BELONIFORMES	
BELONIDAE	*Belone belone gracilis Lowe, 1839*
SYNGATHIFORMES	
SYNGNATHIDAE	*Syngnathus acus (Linnaeus, 1758)*
	Hippocampus hippocampus (Linnaeus, 1758)
ATHERINIFORMES	
ATHERINIDAE	*Atherina hepsetus Linnaeus, 1758*
ZEIFORMES	
ZEIDAE	*Zeus faber Linnaeus, 1758*
SCORPAENIFORMES	
SCORPAENIDAE	*Scorpaena notata Rafinesque,1810*
	Scorpaena porcus Linnaeus, 1758
	Scorpaena scrofa Linnaeus, 1758
TRIGLIDAE	*Trigla lucerna Linnaeus, 1758*
	Trigla lyra Linnaeus, 1758
	Triglaporus lastoviza (Brünnich, 1768)
PERISTEDIDAE	*Peristedion cataphractum (Linnaeus, 1758)*
PERCIFORMES	
SERRANIDAE	*Serranus cabrilla (Linnaeus, 1758)*
	Serranus hepatus (Linnaeus, 1758)
	Serranus scriba (Linnaeus, 1758)
POMATOMIDAE	*Pomatomus saltatrix (Linnaeus, 1766)*
CARANGIDAE	*Trachurus mediterraneus (Steindachner, 1868)*
	Trachurus trachurus (Linnaeus, 1758)
SPARIDAE	*Boops boops (Linnaeus, 1758)*
	Diplodus annularis (Linnaeus, 1758)
	Diplodus vulgaris (Geoffroy Saint-Hilaire, 1817)
	Pagellus acarne (Risso, 1826)
	Pagellus bogoraveo (Brünnich, 1768)
	Pagellus eriytrhinus (Linnaeus, 1758)
	Sarpa salpa (Linnaeus, 1758)
	Sparus aurata Linnaeus, 1758
	Spondyliosoma cantharus (Linnaeus, 1758)
CENTRACANTHID	*Spicara flexuosa Rafinesque,1810*
	Spicara smaris (Linnaeus, 1758)
MULLIDAE	*Mullus barbatus Linnaeus, 1758*
	Mullus surmuletus Linnaeus, 1758
POMACENTRIDAI	*Chromis chromis (Linnaeus, 1758)*
CEPOLIDAE	*Cepola rubescens Linnaeus, 1758*
MUGILIDAE	*Chelon labrosus (Risso,1826)*
	Liza aurata (Risso, 1810)
LABRIDAE	*Coris julis (Linnaeus, 1758)*
	Symphodus ocellatus Forskal, 1775
	Sympodus rostratus (Bloch, 1797)
	Symphodus tinca (Linnaeus, 1758)
TRACHINIDAE	*Trachinus draco Linnaeus, 1758*
URANOSCOPIDAI	*Uranoscopus scaber Linnaeus, 1758*
BLENNIDAE	*Blennius ocellaris Linnaeus, 1758*
CALLIONYMIDAE	*Callionymus maculatus Rafinesque,1810*
	Callionymus risso LeSueur, 1814
	Callionymus lyra Linnaeus, 1758
GOBIIDAE	*Gobius niger Linnaeus, 1758*
TRICHIURIDAE	*Lepidopus caudatus (Euphrasen, 1788)*
SCOMBRIDAE	*Scomber japonicus Houttuyn, 1782*
	Scomber scombrus Linnaeus, 1758
PLEURONECTIFORMES	
CITHARIDAE	*Citharus linguatula (Linnaeus, 1758)*
BOTHIDAE	*Arnoglossus laterna (Walbaum, 1792)*
	Arnoglossus thori Kyle, 1913
SCOPHTHALMIDA	*Scophthalmus rhombus (Linnaeus, 1758)*
SOLEIDIAE	*Solea nasuta (Pallas, 1811)*
	Microchirus variegatus (Donovan, 1808)

3. Discussion and result

In this study (research) the types of fish in Dikili Bay have been observed in the basis of bio variability. In our country in 2003 463.074 tons of fish from the seas and 44.698 tons fish from inland water were caught. In same year 79.943 tons of fish were bred. Breeding fish in seas and inland waters has shown an increasing tendency until 2000 whereas has shown a decreasing tendency in following years. The amount of fish bred by hunting has shown fluctuation according to the years. Turkey imports noncultivated fish and exports cultivated fish, mollusuc and shelled. The %70-80 of export ıs to EU countries like France, Germany and Belgium and Japan is the second. In recent years the export to China has been increasing. But first we should take caution to prevent environmental pollution and lessening the fish stocks to take the potential of sea and inland water into consideration. Besides these, it is necessary to introduce and encourage the methods (ways) of fish breeding in inlands and reservoirs, developing economical fish types, to adapt the non-existing economic types in a way which they won't harm fauna. (Karakas & Turkoglu, 2005)

In the study in Bay the place of existing types has been appointed (signified) in systematic, they have been observed biologically and the key of significance. In the study mostly the types of fish which hunted by using deep trawl (deep troll) has been given place and totally 70 types of fish which belong to 47 class (breed) in 38 families have been assigned. 9 types of those belong to the type of fish which are chondrinus and other 61 are bony.

According to the data of Dikili fishing association, the target types of fish which are assigned as economical by the fishermen in Dikili are; sardine (Sardina pilchardus), atlantic bonito (or skipjack tuna) (sarda sarda), red mullet (mullus barbatus), striped red mullet (mullus surmuletus), pickerel (spicara smaris), bogue (boops boops), horse mackerel (trachurus brachurus) and bluefish (pomatomus saltatrix) (Tokac, et al., 2010). Only atlantic bonito (or skipjack tuna) (sarda sarda) hasn't been seen in this study.

Hunted types are demersal ones which pelagic and economical commonly hunted ones are mainly sardine (Sardina pilchardus) and others are; Gilt-head bream (sparus aurata), red sea bream (pagellus erythrinus), red mullet (mullus barbatus), striped red mullet (mullus surmuletus), chub (mugil spp.), pickerel (spicara smaris), bogue (boops boops), horse mackerel (trachurus brachurus) (Hossucu, et al., 2001)

With the suitable ones which will be chosen in Dikili Bay natural stock can be enriched.

It has been observed that the methods that applied up to now for restocking programmes are mostly for the types which immigrate locally for short terms especially commercial types related to benthic and demersal and half benthic environments successfully. It has been said that for assigning the hunting strategies immigration in the enriching stock programmes is one of the essential factors (Salvanes, 2001).

In fishing projects immigration is important for the chance of hunting again by the fishermen. The Turbot (Psetta maxima) have been chosen for stock enriching programmes and experimental studies in North Atlantic coastal region, Spain and Denmark and also in Turkey Black Sea region (Bergstad and Folkvord, 1997), (Zengin vd, 2005).

Other important thing in the study of fishing is the chosen material and local place. The result of taking the exotic and unfamiliar types to the natural environment afterwards and their interaction and possible problems which may arise, can give harm to the balance of ecosystem. For Turkey the most common example is the negative effect of population of zander (pike-perch) (Stizostedion luciopreca) which was stocked in Egridir Lake, on other

fish fauna and this has caused the lessening of local fish fauna in lake ecosystem for long years (Anonim, 1991)

That's why for hunting in those areas should be banned during the season or should be limited until it reaches to its minimum level. In addition to that minimum hunting level should be processed in accordance with bio-economic value in hunting period. If necessary in this area artificial reef should be built. On the other hand in fishing, the fishermen who help (contribute) this project, can be given the right to fish and for the control of this a legal and administrational regulation should be planned. In this area the most improved (developed) model is Japan's (Blankenship and Leber, 1995; Sato, 2001).

Since there is no study on the subject in Dikili, in which our studies take place, the morphometric and meristic characters of the types haven't been compared.

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