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Aquaculture production in the black sea Turkey

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Abstract

In this study, production data of aquaculture production in the Black Sea Region was examined and the production volumes of the provinces were evaluated.

Freshwater and marine aquaculture in Turkey production, which was 3075 tons in 1986, reached 253395 tons in 2016.

There are a total of 377 aquaculture farms in the Black Sea, of which 354 are in the freshwaters. The production of aquatic products, which was 8984 tons in 2002 and 20441 tons in 2011, became 22424 tons in 2016. A total of 17425 tons of rainbow trout (*Oncorhynchus mykiss*), 2806 tons of sea bass (*Dicentrarchus labrax*), 2188 tons of other trout species (*Salmo sp.*) and 5 tons of sturgeon (*Acipenser sp.*) were obtained from the production in this region. In addition, 143,049,666 rainbow trout fries were produced in 102 aquaculture farms. Examining the production volumes, Samsun (5585 tons), Trabzon (5497 tons) and Tokat (4528 tons) are in the first place.

Keywords: Black sea Turkey, aquaculture production, number of farms, capacity in hatcheries

1. Introduction

According to the FAO [1], aquaculture is the fastest growing food sector, which meets most of the nutritional requirements of the world. In 1970, world fisheries production was 67.4 million tons and reached 199.7 million tons in 2015 (FAO, 2016) [1]. In 1970, aquaculture only made up 5% of the world's total production (3.5 million tons), whereas in 2015, it reached 106 million tons and made up 53% of the total water product production. Today, many fish species can be grown thanks to modern technologies (FAO, 2016) [1].

Fisheries production in Turkey fluctuates depending on the amount of hunting production. However, in recent years, aquaculture production achieved an important share of total water product production. In addition to its high potential for sea and freshwater production, using the power of qualified personnel and technology further increases the expectations for improving the aquaculture sector in Turkey. Revealing the current status of aquaculture production in the Black Sea Region of Turkey is important due to its high potential for aquaculture.

In Turkey, the total fisheries production in 1986 was 582,920 tons, and it reached 588,715 tons in 2016; the total aquaculture production was 3,075 tons in 1986 but accelerated in the mid-1990s to reach 253,395 tons by 2016. This production amount makes up 43% of the total water product production (TUIK, 2017) [2] (Figure 1).

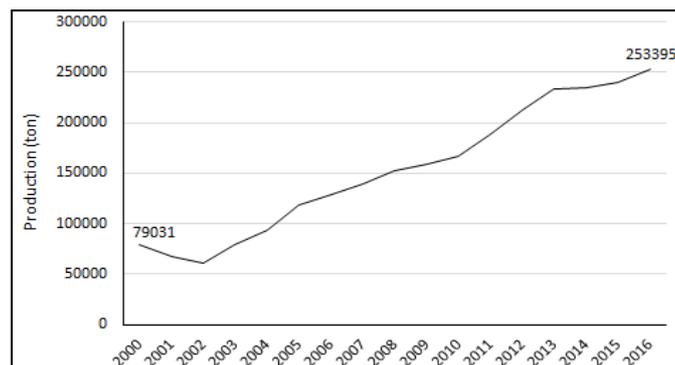


Fig 1: Aquaculture production in Turkey

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The number of aquaculture farms in Turkey has increased and reached 2074 as of 2017. Of these farms, 343 were marine aquaculture farms whereas 1526 were freshwater aquaculture farms (Table 1) (Anonymous, 2017) [3].

Table 1: The Number of Aquaculture Farms (Anonymous, 2017) [3].

	Total		Freshwaters		Marine Farms	
	Count	Percentage	Count	Percentage	Count	Percentage
Turkey	2074		1526		343	
The Black Sea	377	18.2%	354	23.2%	23	6.7%

2. Aquaculture in black sea (Turkey)

The Black Sea region is one of the most important regions of Turkey, both in terms of its terrestrial area and its coastal length (approximately 1500 km). Thanks to its inland water resources and coastal area, it has an important aquaculture potential. However, as a result of natural factors such as the lack of protected areas for aquaculture systems due to the coastal profile, the highly abrasive effects of the waves, the narrow continental shelves in marine areas, the mountainous geographical structure of the lands and the high number of rainy days, the use of this potential is limited (Baki and Dalgic, 2009) [4].

In the Black Sea region, 23 of a total of 377 farms were facilitated in the seas whereas 354 were freshwater aquaculture farms. Marine aquaculture farms comprised 6.7% of the total number of farms while freshwater aquaculture farms comprised 23.2% of the total number of farms.

Examining the number of aquaculture farms in the Black Sea Region, the number of farms was in Trabzon (70), followed by Giresun (40), Tokat (38), Artvin (34) and Gümüşhane (34). It was determined that Amasya (5), Bartın (3), Bayburt (7), Çorum (1), Karabük (3), Kastamonu (7), Sinop (3), Zonguldak (6) had low number of farms (Figure 2) (Anonymous, 2017) [3].

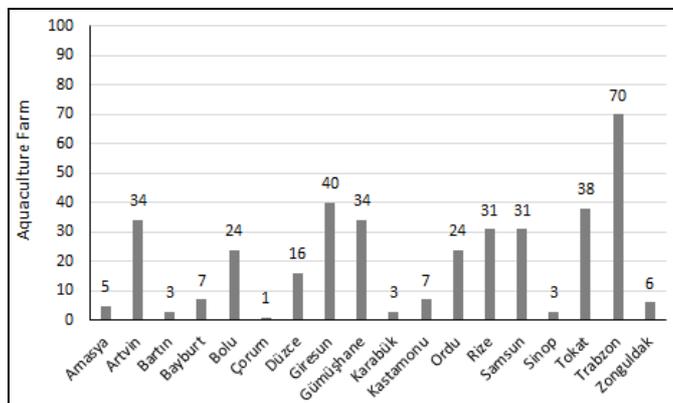


Fig 2: The Number of Aquaculture Farms in the Black Sea

Examining the provinces that where aquaculture is carried out in the Black Sea Region, it was detected that Samsun (5585 tons), Trabzon (5497 tons), Tokat (4528 tons), Ordu (2441 tons), Gümüşhane (1778 tons) had higher production levels compared to those of others in the region. In terms of the average production per farms, Samsun is ranked first with 180.2 tons/unit, while Tokat is ranked second with 119.2 tons / unit and Ordu is ranked third with 101.7 tons/unit (Figure 3).

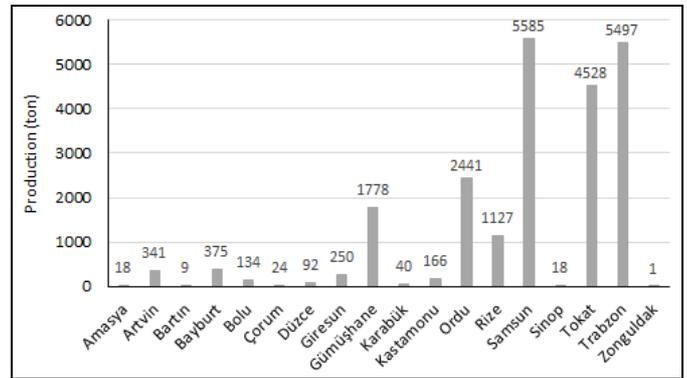


Fig 3: Aquaculture production levels in the Black Sea

In the Black Sea Region, rainbow trout, sea bass, *Salmo sp.* and sturgeon are produced to the extent that environmental and geographical conditions allow. In the region, 17425 tons of rainbow trout, 2806 tons of sea bass, 2188 tons of salmon sp., and experimentally, 5 tons of sturgeon fish were produced (Anonymous, 2017) [3] (Figure 4).

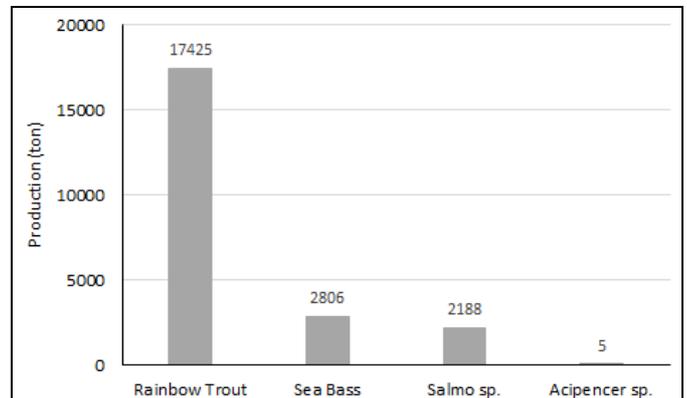


Fig 4: The Species Produced in the Black Sea

The provinces with the highest rainbow trout production are Samsun with 4698 tons, Tokat with 4528 tons and Trabzon with 4334 tons. It was determined that Amasya (18 tons), Bartın (9 tons), Çorum (24 tons), Karabük (35 tons), Sinop (18 tons), Zonguldak (1 tons) had very low levels of production (Figure 5).

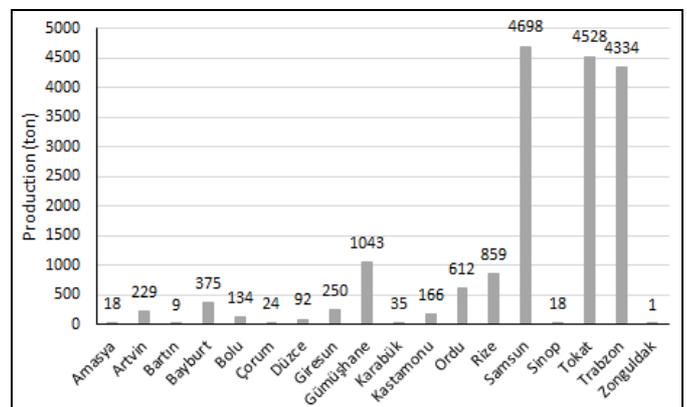


Fig 5: Rainbow Trout Production in the Black Sea

Sea bass was produced in three provinces in the Black Sea Region. Accordingly, 1829 tons of sea bass was produced in Ordu, 887 tons in Samsun and 90 tons in Trabzon (Figure 6).

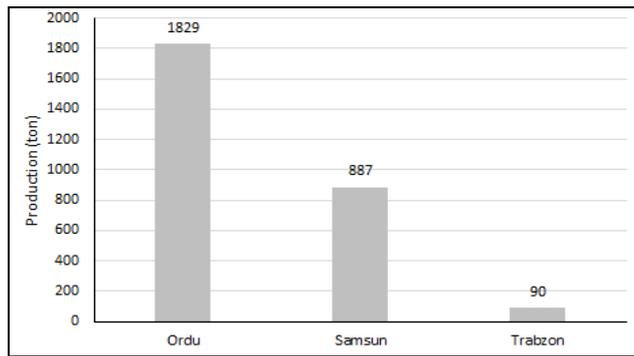


Fig 6: Sea Bass Production in the Black Sea

Salmo sp. Are produced in four provinces in the Black Sea Region. Accordingly, 1073 tons are produced in in Trabzon, 735 tons in Gümüşhane, 268 tons in Rize and 112 tons in Artvin (Figure 7).

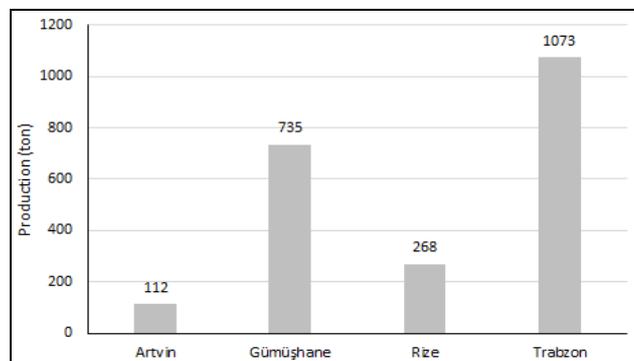


Fig 7: Salmo sp. Production in the Black Sea

In the Black Sea Region, the total number of hatchery farms was 102, while the total hatchery capacity was determined to be 187.5 million. While Rize (22), Trabzon (18) and Artvin (16) stand out in terms of the number of farms, it was determined that the maximum production of fry trout is 71.761 million in Trabzon (38.3%).

In hatcheries in the Black Sea Region, it was determined that, in addition to rainbow trout, egg supply and fry production of *salmo trutta sp.* species were carried out including *salmo trutta labrax*, *salmo trutta macrostigma*. In the region, fry rainbow trout were produced in hatcheries in 15 provinces (150 million). Also, *salmo trutta labrax* (24 million) is produced in Rize and *salmo trutta macrostigma* (14 million) is produced in Trabzon (Figure 8).

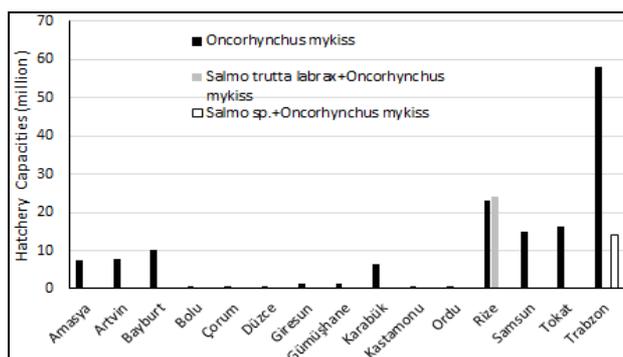


Fig 8: Hatchery Capacities in the Black Sea

Examining the production level and hatchery capacities in the Black Sea Region, it was seen that Trabzon, Samsun, Tokat, Ordu, Gümüşhane and Rize provinces stand out. It is also determined that Trabzon, Rize, Tokat and Samsun are the highest fry producer provinces. In the Eastern Black Sea Region, especially where the freshwaters are relatively less polluted, the fry trout demand of the Black Sea Provinces are met (Figure 9).

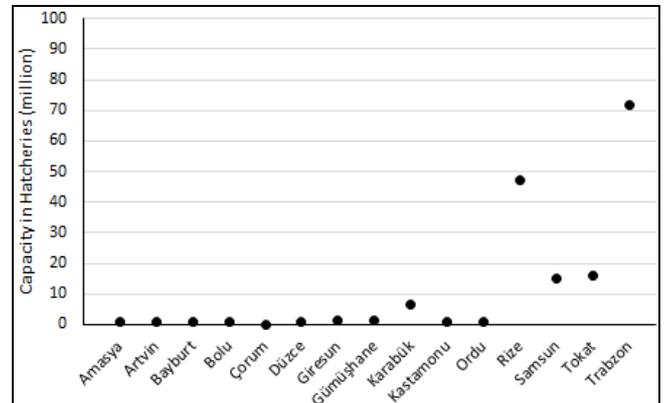


Fig 9: Capacity in Hatcheries the Black Sea Region

In the Black Sea region, although the number of suitable areas for sea cage systems is not as high as those in the Aegean and Mediterranean regions, the aquaculture of rainbow trout and sea bass in open-sea cage systems is nevertheless carried out in Samsun (Yakakent), Ordu (Perşembe), Trabzon and Rize. The rainbow trout used in cage systems in its aquaculture is obtained from the facilities in the region, while the sea bass requirement (2 to 15g) for its aquaculture is met by hatcheries in the Aegean region, since there is no hatchery for saltwater fish in the Black Sea region (Baki and Kalma, 2010)^[5].

There are only a certain number of areas suitable for high-capacity aquaculture in the region. In these areas, partial increases related to the production methods can be achieved with respect to the capacity of the areas. In addition to these increases, dam reservoirs closed to production could be utilized within this scope; however, the geographical structure of the region, and the fact that the majority of the lands in the region are not suitable for production, limit production in inland waters (Ayvaz and Baki, 2013) ^[6]. Accordingly, the General Directorate of Agricultural Research of the Ministry of Food, Agriculture and Livestock carries out studies in the Black Sea region to determine potential areas for aquaculture in sea cage systems in certain sea areas.

3. Conclusion

In the Black Sea region, 23 of a total of 377 farms were facilitated in the seas whereas 354 were freshwater aquaculture farms. Marine aquaculture farms comprised 6.7% of the total number of farms while freshwater aquaculture farms comprised 23.2% of the total number of farms.

Examining the provinces that where aquaculture is carried out in the Black Sea Region, it was detected that Samsun (5585 tons), Trabzon (5497 tons), Tokat (4528 tons), Ordu (2441 tons), Gümüşhane (1778 tons) had higher production levels compared to those of others in the region.

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In the Black Sea region, determining alternative sea aquaculture areas and species, encouraging the facilities carrying out aquaculture activities, increasing the capacity of sea production areas and establishing high-capacity hatcheries that can meet the requirement of the region can all contribute to meeting the aquaculture potential of the region and increase the production amounts.

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