The Maximum Length Record of the Blackspot Seabream (*Pagellus bogaraveo* Brünnich, 1768) for the Entire Aegean Sea and Turkish Territorial Waters

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**ABSTRACT**

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The maximum length, weight, and age information of organisms in an ecosystem, moreover, the first records of migrated exotic species are essential in terms of the basis for the studies on population dynamics, stock assessment, and biological activities. Therefore, the recording of such data may be necessary for scientific databases and new related studies. The Blackspot seabream (Red seabream - *Pagellus bogaraveo*), which belongs to the Sparidae family, is an important seafood which is marketed fresh and frozen around the Mediterranean and the Aegean seas. Nowadays, this species has high prices depending on market demands in domestic markets as a result of overfishing and is also cultured in northern Spain. It is classified as “Near Threatened Species” in the red list due to its decreasing population trend by the IUCN. A single specimen of the Blackspot seabream with 30.7 cm in total length and 390.00 g in total weight, which was angled in the Saros Bay with a handline by a fisherman on February 08, 2019, was obtained from a fishmonger in Çanakkale. Even though there are bigger individuals in the North-east Atlantic probably depending on polar and/or deep-sea gigantism, the mentioned measurement is the proven maximum total length of this species for the Aegean Sea up to the time.

**Keywords:**

Sparidae
*Pagellus bogaraveo*
Blackspot Seabream
Maximum Length
Aegean Sea

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**Tüm Ege Denizi ve Türk Karasaları için Mandagöz Mercan’ın (*Pagellus bogaraveo* Brünnich, 1768) Maksimum Total Boy Kaydı**

**MAKALE BİLGİSİ**

**ÖZ**

**Araştırma Makalesi**

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Sparidae familyasının bir türü olan Mandagöz mercan (Pagellus bogaraveo), Akdeniz ve Ege çevresinde taze ve dondurulmuş olarak pazarlanan önemli bir deniz ürünüdür. Günümüzde, aşırı avlanma sonucu iç piyasaçılıkla bahsedilebilir. Bir ekosistemdeki canlılara ait maksimum boy, ağırlık ve yaş bilinmesi, ayrıca göç ile gelen yabancı türlerin ilk kayıtlarını oluşturabilir; popülasyon dinamigi, stok tahmini ve biyolojik aktiviteler üzerine yapılan çalışmaların temelini oluşturması açısından önemlidir. Bu nedenle, bu tür verilerin kaydedilmesi, bilimsel veri tabanı oluşturulabilmesi ve tür ile ilgili yeni çalışmalar için gereklidir. Bu türün popülasyonunun azalmaktadır ve çizgili olarak kırmızı listede bulunmaktadır. Aşırı avlanma sonucu iç piyasalardaki taleplerle bağlı olarak yüksek fiyatlara sahip ve kuzeý İspanya'da kültürü de yapılmaktadır. Bu türün popülasyonunun azalması üzerine, IUCN tarafından kırmızı listeleme konusunda bir çalışmanın oluşturulması gerekmektedir. Bu türün popülasyonunun azalması nedeniyle, mandagöz mercanın kırmızı listede yer alması gerekmektedir.

**Anahtar Kelimeler:**

Sparidae
*Pagellus bogaraveo*
Mandagöz Mercan
Maksimum Boy
Ege Denizi

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Introduction

The Sparidae, commonly called sea breams and porgies, is a family of the order Perciformes and contains 164 species in 38 genera (Eschmeyer’s Catalog of Fishes, 2020; Fishbase, 2020a). Recently, the sister family Centracanthidae (picarels) has also been merged with the Sparidae (Santini et al., 2014; Fishbase, 2020b) while they previously were listed as distinct and separate (Nelson 2006; Golani et al., 2006; Mater et al., 2011). As far as it is known, 24 Sparidae species within 13 genera (Boobs, Centracanthus, Dentex, Diplodus, Eyvynnis Lithogathus, Oblada, Pagellus, Pagrus, Sarpa, Sparus, Spicara and Spondylisosoma) from Turkish territorial waters were reported (Mater et al., 2011; Fishbase, 2020c) and there are two more species (Crenidens creniden and Rhadbosargus haffiar) in the Eastern Mediterranean (Golani et al., 2006) which are lessespsian. Members of the Sparidae family are mainly coastal marine fishes which have high economic value and are captured and cultured for human consumption, as well as for recreational intentions (Pavlidis and Mylonas, 2011). According to the FAO statistics, in terms of captured marine and brackish water fishes all over the world in 2018, the Sparidae production with 347,996 metric tonnes (mtn) represented %0.48 of the total amount. On the other hand, aquaculture production of the Sparidae in 2018 reached 388,534 mtn with a revenue of $1,843,265,000 which represented 12.92% of the amount and 14.24% of the value of the production of cultured and farmed (tuna fish, etc.) marine fishes worldwide (FAO, 2020).

The Blackspot seabream (Red seabream - Pagellus bogaraveo Brünnich, 1768), belongs to the family Sparidae, is a demersal and omnivorous (predominantly carnivores) teleost fish feeding mainly on crustaceans, mollusks, worms, small fish, and sometimes on plants (Wheeler, 1997; Froese and Pauly, 2019). They live near the coast as juveniles and on the continental slope down to 400 meters in the Mediterranean but down to 700-800 meters in the Atlantic as adults, above different types of substrates, like mud, sand, and rocks (Fischer et al. 1987; Froese and Pauly, 2019). This species prevalently shows the protandrous hermaphroditic feature in culture conditions while a high incidence of gonochorism occurred in the wild (Micale et al., 2011). It is relatively widespread species from the south of Norway to the west of Saharan Africa, including the Azores and Canary Islands in the continental slope of Atlantic, and is more common in the western Mediterranean Sea than in the eastern basin, besides it is absent in the Black Sea (Spedicato et al., 2002; IUCN, 2014) (Figure 1). In addition, it has been recorded that the total length of individuals, especially in northeastern of the Atlantic, is higher (Bauchot and Hureau, 1986; Froese and Pauly, 2019) compared to the Mediterranean basin records (Işmen et al., 2007; Karachle and Stergiou, 2008). This situation may be related to the abundance of nutrients and/or the polar gigantism biological incident.

Nowadays, the Blackspot seabream has high prices depending on market demands in domestic markets as a result of overfishing and is also cultured in northern Spain (IUCN, 2014; FAO, 2017). Nevertheless, probably due to problems such as high sensitivity to captivity conditions, slow growth rate and late maturation age, only one commercial enterprise produces this fish (Pavlidis and Mylonas, 2011). Also, the annual aquaculture production amount of this species decreased from 245 mtn to 108 mtn from 2011 to 2018 (FAO, 2020) (Table 1). Pagellus bogaraveo has also been included in the list of the Near Threatened Species by the IUCN since 2014 due to its decreasing population trend (IUCN, 2014).

Maximum length and weight are important parameters used in life history studies and fisheries science (Dulčić and Soldo, 2005). These measurements are applied directly or indirectly in most stock assessment models (Borges 2001; Cengiz 2014). Notably, the size-based analyses of
fishes are becoming increasingly popular methods for enhancing the understanding of community structure and function (Jennings and Dulvy, 2005) and could be used as a tool for rapid assessment of growth rates in the deficiency of primary data (Filiz and Sevinç, 2015). Therefore, it is important to regularly update the maximum size information of commercially or recreationally important species (Dušić and Soldo, 2006; Navarro et al., 2012; Cengiz et al., 2019a). Depending on polar or deep-sea gigantism (Geldiay and Kocataş, 2012), there are massive individuals, especially in the seas with lower average temperatures; but the previous maximum total length record for the Aegean Sea was 25.1 cm (İşmen et al., 2007). This study presents the maximum length and weight values of the Blackspot seabream for the Aegean Sea up to the time.

Material and Methods

Saros Bay, situated in the Northeastern Aegean Sea, is connected to the North Aegean with a depth of approximately 600 m to the west. The shelf extends at a water depth of 90–120 m. The length of the bay is about 61 km and the width at the opening to the Aegean Sea is about 36 km (Eronat and Sayın, 2014; Cengiz et al., 2019b). Since Saros Bay had been closed to bottom trawl fishing since 2000 (Cengiz et al., 2011) and no industrial activity was prevalent in the area (Sarı and Çağatay, 2001), the bay can be considered as a pristine environment (Cengiz et al., 2013; 2019c).

A single specimen of Pagellus bogaraveo was caught in Saros Bay (Figure 2) by a fisherman on 08 February 2019, from a depth of 25 m, using live bait (mud-shrimp; Upogebia pusilla or Gilvossius tyrrhenus) with a 0.50 mm monofilament fishing line, consisting of 3 pieces of number 3 Mustad 505 hooks and lead weights. Subsequently, we obtained it from a fishmonger in Çanakkale.

Total length is defined as the measurement taken from the anterior-most part of the fish to the end of the caudal fin rays when compressed dorso-ventrally (Anderson and Gutreuter 1983). Accordingly, the total length and weight of the specimen was measured accurately. Besides, some morphometric characters (according to Figure 3) were measured, and some meristic characters were counted.

Results and Discussion

The blackspot seabream specimen (Figure. 4) subjected to the article was 30.7 cm in total length and 390.00 g in total weight. Some morphometric and meristic characters for P. bogaraveo is presented in Table 2. The comparison of the maximum lengths and weights recorded for P. bogaraveo in the Aegean Sea is given in Table 3.

As well known, the individuals in populations exposed to high levels of fishing pressure will respond by reproducing at smaller average sizes and ages, and so reached maximum lengths would gradually decrease. Nevertheless, despite overfishing, sometimes such large individuals which could not be caught because of non-coincidence, are also encountered (Filiz 2011; Cengiz et al., 2019d). On the other hand, some factors such as nutrient availability and abundance, feeding appetite, water temperature, photoperiod, dissolved oxygen amount, salinity, turbidity, pollutants, the severity of water current, predator density, intra-specific social interactions, and genetics, might affect the growth (Helfman et al., 2009; Geldiay and Kocataş, 2012; Acarlı et al., 2009). Briefly, the maximum length and weight of organisms depend on the ecological conditions, regional differences, and overfishing pressure.
Figure 3. Morphometric measurements of the Blackspot seabream
Abbreviations: TL – total length, FL – fork length, SL – standard length, HL – head length, PrOD – preorbital distance, ED – eye diameter, POD – postorbital distance, DFBL – dorsal fin base length, PFBL – pectoral fin base length, AFBL – anal fin base length, CPL – caudal peduncle length, BDm – minimum body depth, BDx – maximum body depth.

Figure 4. The Blackspot seabream with 30.7 cm TL and 390.00 g TW

Table 3. The comparison of the maximum length and weight records of *P. bogaraveo* caught in the Aegean Sea

| Authors                  | Location                          | N  | L<sub>max</sub> (cm) | W<sub>max</sub> (g) |
|--------------------------|-----------------------------------|----|----------------------|--------------------|
| Papaconstantinou et al. (1994) | Northern Aegean Sea, Greece | 694 | 17.5 | - |
| Karakulak et al. (2006)   | Gökçeada Island, Turkey          | 1  | 18.6 | 66.80 |
| İşmen et al. (2007)       | Saros Bay, Turkey                | 2355 | 25.1 | 255.00 |
| Özaydın et al. (2007)     | İzmir Bay, Turkey                | 51  | 17.9 | - |
| Ilkyaz et al. (2008)      | İzmir Bay, Turkey                | 77  | 15.1 | - |
| Karachle and Stergiou (2008)| Northern Aegean Sea, Greece    | 72  | 23.1 | - |
| Cengiz (2013)             | Gallipoli Peninsula, Turkey      | 92  | 20.9 | 105.62 |
| Bilge et al. (2014)       | Southern Aegean Sea, Turkey      | 113 | 15.9 | - |
| Altın et al. (2015)       | Gökçeada Island, Turkey          | 471 | 5.7  | 1.68  |
| This study               | Saros Bay, Turkey                | 1  | 30.7 | 390.00 |

Ethical Approval

The confirmation document, numbered 16498365-050-E.6917, and indicates the Ethics Committee’s permission is not required for this study (scientific studies with dead fish provided from commercial fishers) was obtained from the Local Ethics Committee of Kastamonu University.

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