Western Indian Ocean J. Mar. Sci. Vol. 12, No. 1, pp. 79-83, 2013

Short Communication

Length-Weight Relationship and Condition Factor (K constant) of *Dentex maroccanus*, Valenciennes 1830 (Family Sparidae) at Malindi, Kenya

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Keywords: *Dentex maroccanus*, Sparidae, length-weight relationship, condition factor, Kenya

Abstract—Length-weight relationships and condition factors of Sparidae along the Kenyan coast are unknown. This study investigated the length-weight relationship and condition factor of *Dentex maroccanus* Valenciennes, 1830, a sparid, found in Malindi, Kenya, from June to August 2008. The length-weight coefficients were a = 2.04 and b = 2.87 to 2.96. The condition factor ranged from 0.91 to 2.84. Regression coefficients obtained were indicative of positive allometric growth.

INTRODUCTION

Dentex maroccanus (Valenciennes, 1830) is a member of the family Sparidae, Order Perciformes, commonly known as fin-rayed sea breams. Sparids are chiefly marine, being rare in fresh and brackish water (De Innocentiis *et al*., 2005; Omogoriola *et al*., 2011). They are widely distributed in the tropical and temperate Atlantic, Indian and Pacific Oceans. Many species have been found to be hermaphroditic, having male and female gonads simultaneously, while others change their sex as they grow. The family is of importance to fisheries based on their food value rather than the abundance of any species in particular (Omogoriola *et al*., 2011).

Length–weight relationships provide useful information on fish species within a given geographic region (Morato *et al*., 2001; Aura *et al*., 2011). In fish, size is generally more biologically relevant than age, mainly because several ecological and physiological factors are more size-dependent than they are age-dependent. Therefore, variability in size has important implications in fisheries science and population dynamics (Erzini, 1994), and is one of the most common measurements in fisheries data (Mendes *et al*., 2004). While aspects of the biology of *D. maroccanus* have been investigated by several authors (e.g. Bauchot & Hureau 1986, 1990; Bauchot, 1987), this is the first study of the length-weight relationship of this important fish species which is landed in quantities in Kenya, particularly between May and August during its spawning period.

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MATERIALS and METHODS

Study areas

Malindi is a coastal town near the south of Malindi-Ungwana Bay which lies between 3°30”S - 2° 30”S and 40° 00”N - 41° 00”N (Fig. 1). The bay falls within the Malindi and Tana River Districts in the central part of the Coast Province. Fishing and tourism are the main income sources of people in this area (Aura *et al*., 2011).

Malindi-Ungwana Bay is under the influence of the dominant offshore current regimes. During the South East Monsoon (SEM), which occurs between April and October, the current circulation is dominated by the northward flow of the East African Coastal Current. During this season, the bay also receives the heaviest inflow of the Tana and Sabaki Rivers. During the North East Monsoon (NEM), between November and March, the northward flowing East African Coastal Current joins the southward flowing Somali current to form the Equatorial Counter Current. In addition, the bay is shallow with a wide continental shelf ranging between 15 and 60 km. The mean depth at high spring tide is 12 m at 1.5 NM offshore and 18 m at 6.0 NM. The depth increases rapidly to 100 m beyond this. Terrigenous sediments from the rivers dominate the substratum in the bay (Aura *et al*., 2011).

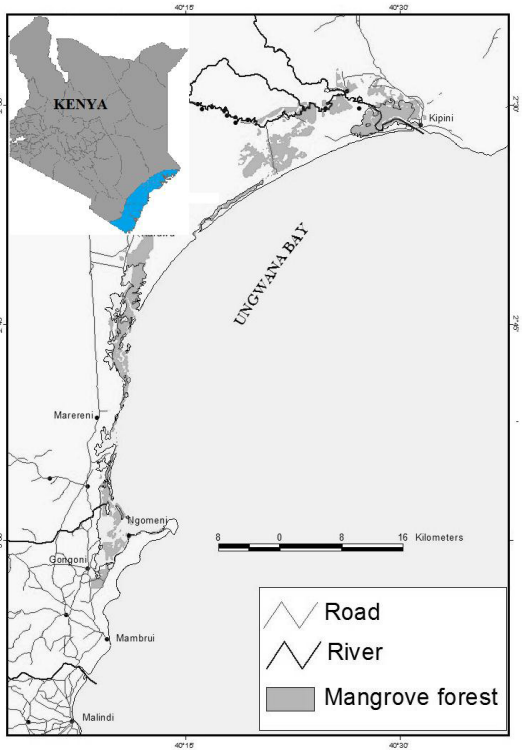

Figure 1. Location of Malindi-Ugwana Bay on the coast of Kenya.

Length-weight data of 688 specimens of *Dentex maroccanus* were obtained from artisanal fishing catches at Malindi landing sites, harvested with fishing gear such as gill nets, seine nets, hand lines and traps. The data were collected daily in June, July and August 2008 for an equal number of males and females. The fish were sexed by macroscopic examination of the gonads according to Grandcourt *et al*. (2004). Standard length (SL) and total length (TL) were measured using a measuring board to the nearest mm. The body weight of the fish was measured to the nearest 0.1 g with a digital balance after removing excess water and adherent matter such as sand. The length-weight data were recorded in a Microsoft Excel spreadsheet for analysis.

The length-weight relationship and condition factor were respectively derived using the equations $\log W = \log a + b.\log L$ and $K = 100W/L^b$ (Ricker, 1973) where: W = weight (g), L = total length (cm), a = regression intercept, b = growth regression slope and K = condition factor. The slopes of the length-weight regressions were compared for individual and combined sexes to determine the allometric growth of *D. marocannus* according to Huxley (1924).

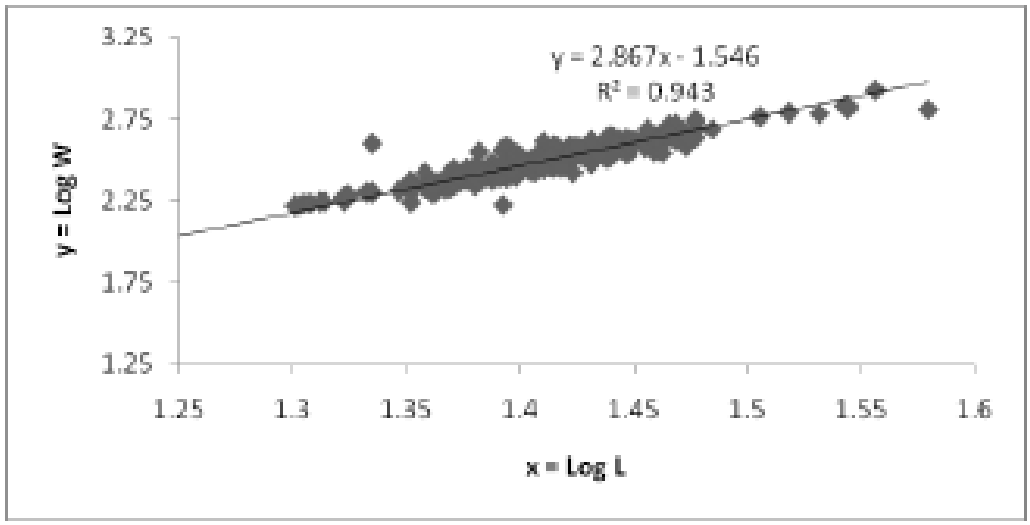

Figure 2. Length-weight relationship of *Dentex maroccanus* males (n = 344).

RESULTS

Table 1 lists parameters of the length-weight relationships of Dentex macrocannus (Figs 2-4) measured during the study period. The mean value and range of the condition factor of males was higher than for females and a t-test showed that these differences (p = 0.04) were significant (Table 2).

Most specimens fell within the size classes of 24.1 – 30.0 cm (n = 305) and 18.0 - 24.0 cm (n = 195). Only 30 specimens fell into the largest size class (35.1 - 41.0 cm). Most specimens fell within the 151 - 300 g (n = 250) and 301 - 450 g (n = 198) weight classes but nine fell in the heaviest weight class of 751 - 848 g.

The allometric growth coefficients for each sex and the sexes combined fell within the expected range of values (b = 2.5 - 3.5) in the literature (Omogoriola *et al*, 2011; http://www.fishbase.org/summary/Dentex-maroccanus.html) and compared favourably with other sparids (Table 3). As they were >1, they are indicative of positive allometric growth (Huxley, 1924).

Acknowledgments–Kenya Marine and Fisheries Research Institute in Mombasa, Kenya provided the funds and logistics of this study.

Table 1. Parameters for length-weight relationships of *Dentex maroccanus*.

Sex	TL (cm)	Weight (g)	Mean SL (cm)	a	b
Male	15.7-40.3	39-820	23.1	2.04	2.87
Female	12.6-32.0	41-780	20.3	2.03	2.96
Combined sexes	12.6-40.3	39-820	20.7	2.04	2.91

Table 2. Condition factor of *Dentex maroccanus* in June and July 2008 and of both sexes at Malindi.

Month/Sex	Range of K	Mean K
June	0.73-1.07	0.99
July	0.83-2.70	1.02
Male	1.45-2.87	2.49
Female	0.79-2.01	1.17
Combined sexes	0.91-2.84	2.55

Table 3. Length-weight relationships of some Sparidae.

Species name (Linnaeus, 1758)	n	Mean TL ± SE	log(a)	b	r^2	Author
Sparus aurata	395	19.2 ± 0.05	0.03	2.67	0.91	Cherif *et al*. (2008)
Spicara maena	330	15.4 ± 0.09	0.014	2.87	0.96	Cherif *et al*. (2008)
Boops boops	243	18.5 ± 0.14	0.007	3.06	0.98	Cherif *et al*. (2008)
Dentex congoensis	308	14.7 ± 2.57	-1.61	2.79	0.91	Omogoriola *et al*. (2011)
Dentex angolensis	277	16.47 ± 3.76	-1.56	2.77	0.98	Omogoriola *et al*. (2011)

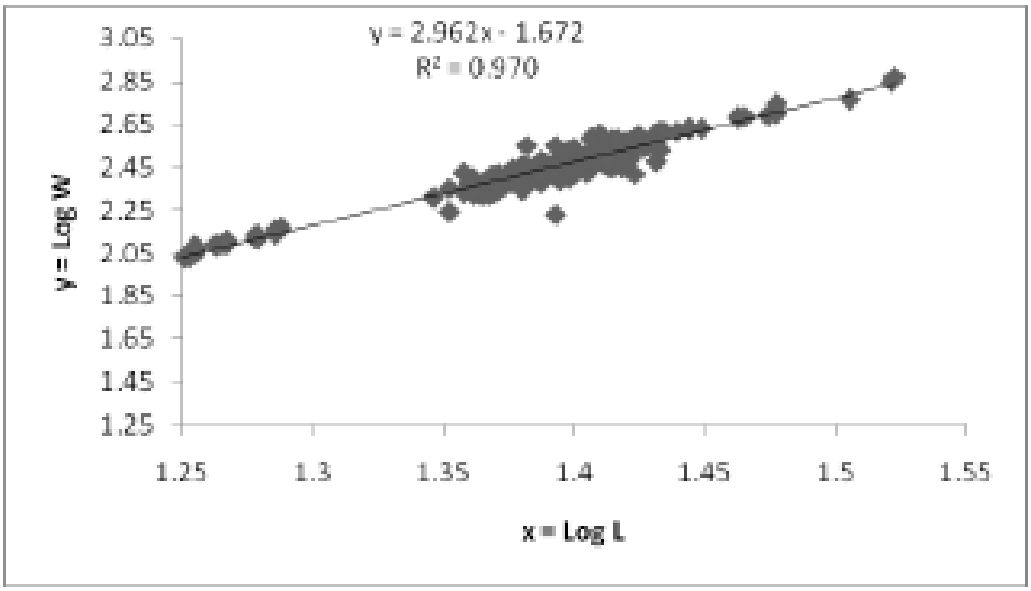

Figure 3. Length-weight relationship of *Dentex maroccanus* females (n = 344).

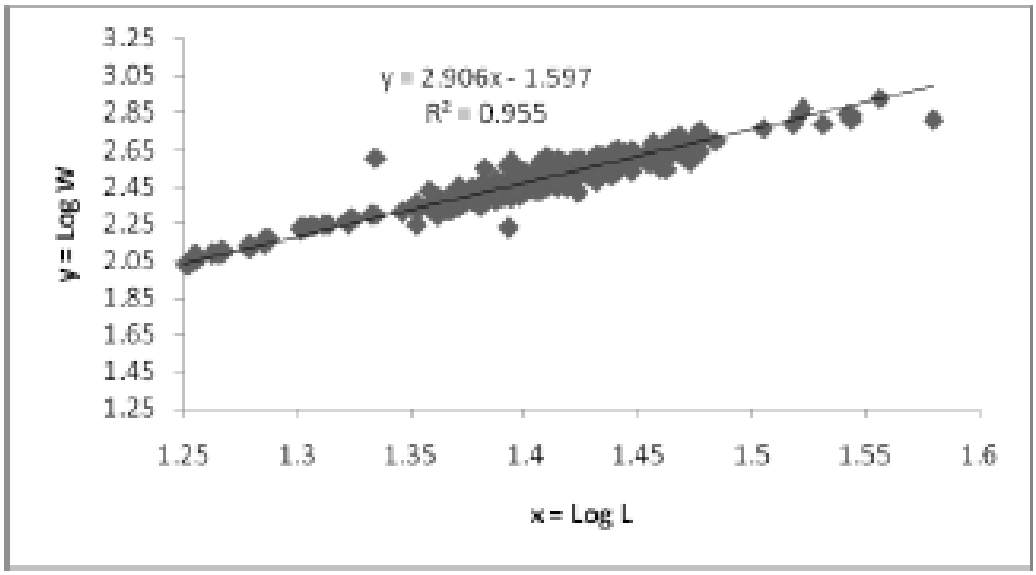

Figure 4. Length-weight relationship of *Dentex maroccanus*: combined sexes (n = 668).

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