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# Growth, Dynamics and Stock Assessment of the Common Pandera *Pagellus erythrinus* (Linnaeus, 1785) from the Southwestern Mediterranean

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## ABSTRACT

On the Jijelian coast (eastern Algeria), the evolution *of Pagellus erythrinus* production was unstable and heterogeneous during the period of 2011-2016, with a fall of about 44.57% in 2015 compared to the year 2011. As a result, the present work aimed to study the population growth and the dynamics and to estimate the current state of the common pandora's stock. In this bioeconomic study, a total of 307 specimens of *P. erythrinus* were sampled on the Jijelian coast between March and May 2018 ($11.8 \leq TL \leq 28.2$ cm, $19.52 \leq TW \leq 264, 89$g). The growth parameters and exploitation indices were estimated using various methods. The retained values were utilized to evaluate the stock of this species ($L\infty = 29.55$, $K = 0.30$, $t0 = -0.77$, $a = 0.0143$, $b = 2.949$, $Z = 0,891$, $M = 0.32$ and $F = 0.571$). The analysis of **Jones' (1983)** cohort revealed that the individuals least targeted by sinners are those smaller than 17cm. In contrast, applying the **Thompson and Bell model (1934)** indicated that the fishing effort currently calculated (FC = 0.57) expresses that the *P. erythrinus* stock is overexploited. The recommended reduction in fishing effort to FMSY = 0.4 should be 29.8% for sustainable fishing and resource conservation.

## INTRODUCTION

The fishing activities in the wilaya of Jijel rooted in ancient traditions hold significant importance for the local population. This coastal region, which spans 120km (representing 10% of Algeria's coastline), features two fishing ports and is vital for both food supply and employment. However, there has been a concerning decline in overall fishery production, which dropped by approximately 60% during the period from 2010 to 2020 **(MPPH, 2023)**.

Marine fisheries resources are considered renewable, and their utilization plays a significant role in the economic development of our country. However, this exploitation can sometimes lead to fluctuations, ranging from underexploitation to overexploitation of these biological resources. This issue is central to the theory of rational fisheries management. These fluctuations arise from human activities that impact the sustainability of renewable resources **(Quensière & Charles-Dominique, 1997)**.

The Sparidae family is part of the order Perciformes, which includes notable round fish such as the *Pagellus erythrinus*, commonly known as the common pandera **(Rachedi *et al.*, 2024)**. This species is important for its nutritional value **(Koubaa *et al.*, 2013)** and is targeted by both professional fishermen and consumers. However, the production of common pandera has shown instability, particularly between 2011 and 2016, with a decrease of approximately 44.57% in 2015 compared to 2011. This fluctuation highlights the need for a stock assessment of this species.

In the Mediterranean basin, *P. erythrinus* has been the focus of various biological studies. **Rijavec and Zupanović (1965)** enhanced our understanding of its biology in the Adriatic Sea. **Ghorbel and Ktari (1982)** conducted a preliminary study on its reproduction, followed by an examination of its exploitation in Tunisian waters **(Ghorbel & Ktari, 1997)**. **Girardin (1981)** investigated its growth in the Gulf of Lion, while **Andaloro and Giarritta (1985)** focused on its growth in the Sicilian Channel. In Greece, **Mytilineou (1989)** studied its biology, and **Metin *et al.* (2011)** researched its biological characteristics in the Aegean Sea. Additionally, **Ghorbel *et al.* (1997)** contributed to the stock assessment of this species in the Gulf of Gabes (Tunisia).

However, the bioeconomic modeling of fish stocks in Jijel Bay has only been addressed by **Chakour (2005)** and **Mohdeb (2016)**. Notwithstanding, despite its biological and economic interest in the region, the common pandera has benefited, until now, only from the study of **Rachedi *et al.* (2024)**, who studied the age of this species by scalimetry in the El-Kala region. In the current study, we focused on the growth, and population dynamics of *P. erythrinus,* and estimated the current state of its stock in Jijel Bay. The aim of this study was to propose methods for managing this living resource through a lens that takes into account both the needs of present and future generations, as well as the functioning of the marine ecosystem.

## MATERIAL AND METHODS

### 1. Sampling

A total of 307 specimens of *Pagellus erythrinus*, caught mainly by bottom trawl (11.8 ≤TL ≤28.2cm; 19.52 ≤PT ≤264.89g), were collected between February and May of 2018 from Jijel Bay, on the South-western Mediterranean of Algeria (36°49'39.1"N

5°45'58.8"E ), via fishmongers and wholesalers (Fig. 1). The total length (TL) was measured to the nearest mm, and the total weight (TW) was recorded to the nearest g.


**Fig. 1.** Study area

### 2. Estimation of growth parameters

Growth parameters ($L_\infty$, K, and $t_0$) were estimated using the von Bertalanffy growth equation: $TL = L_\infty(1 - e^{-K(t-t_0)})$ **(von Bertallanffy, 1938)**, where TL is the length of the fish at time (t), $L_\infty$ is the asymptotic length, K is the growth coefficient, and $t_0$ is the hypothetical age at zero length.

To determine these parameters, size structure analysis and age structure analysis were relied upon. The first set of methods includes the techniques from **Powel (1979)** and **Wetherall (1986)**. Moreover, the program of Elefan I was used, as developed by **Pauly and David (1981)** and **Pauly (1985)**. The second set comprises the method from **Tomlinson-Abramson (1961)** through the method established by **Bhattacharya (1967)**. These methods were all applied using the FISAT II (1.9) program **(Gayanilo *et al.*, 2005)**.

The relationship between total weight and total length was estimated using **Froese (2006)**: $TW = aTL^b$, where TW is total weight (g), TL is total length (cm), a represents the intercept, and b denotes the slope. The value of (b) was then compared to 3 possible cases: a growth is isometric if b equals 3, minorant allometry if b is less than 3, and majorant allometry if b is greater than 3 **(Lleonart *et al.*, 2000)**.

### 3. Estimation of mortality parameters

Total mortality (Z) refers to the instantaneous mortality coefficient, which is important to evaluate before estimating fishing mortality (F) and natural mortality (M) separately **(Gulland, 1969)**. Total mortality was assessed using methods developed by **Beverton and Holt (1956)**, **Jones and Van Zalingue (1961)**, **Hoenig (1982)** and **Ault**

**and Ehrhardt (1991)**. The estimation of these two parameters was performed using the FISAT II program (1.9) **(Gayanilo *et al.*, 2005)**. Natural mortality was estimated based on the approaches of **Taylor (1960)**, **Pauly (1980)** and **Djabali *et al.* (1991)**. Fishing mortality was calculated directly using the following relationship:

$Z = M + F$ and therefore $F = Z - M$ **(Pauly, 1984)**.

### 4. Stock assessment of *Pagellus erythrinus*

#### *4.1. Analysis of* Jones (1983)

Virtual population analysis (VPA) or analysis of **Jones (1983)** is a method used to estimate the necessary size of fish populations at sea based on the number of individuals that were captured. This approach involves analyzing observable data to determine the population needed to sustain the catch observed **(Hemida, 2005)**. Additionally, it is a length-based method that requires specific parameters: $L_\infty$, K, $t_0$, and M, along with the parameters (a) and (b) for the weight-length relationship. The natural mortality factor (HL) was calculated using the parameters $L_\infty$, M and K. The calculation of the number of survivors per length (NL) values started with the last size class and proceeded backward to the first size class. This approach assumed that the exploitation rate (final F/Z) for the last length class is equal to 0.5. In addition, a series of equations was then calculated using Excel **(Sparre & Venema, 1996)**.

#### *4.2. The predictive model of Thompson and Bell (1934)*

In our work, we utilized one of the predictive models developed for assessing fish stocks based on the number of catches categorized by age or size class. Specifically, the model created by **Thompson and Bell (1934)** was employed. This model primarily focuses on length and incorporates the variable (X), known as the (F) factor. In this context, the index (i) denotes the length interval ($L_i$, $L_{i+1}$), where $L_i$ represents the lower limit of the length interval, and $L_{i+1}$ refers to the upper limit **(Sparre & Venema, 1996)**.

In Excel, calculations were performed for various values of X, which represents the factor of F. This allowed us to determine the corresponding values of total production (Y), total biomass (B), and total value (V). A graphical representation illustrated the maximum sustainable yield (MSY), the maximum sustainable economic yield (MSE), as well as the F factor and the associated biomass.

## RESULTS

### 1. Analysis of size frequency distributions

The frequency distribution of the sample size for *Pagellus erythrinus* indicated that the total length of the individuals ranged from 11.8 to 28.2cm (Table 1).

**Table 1.** Size frequency distribution of *P. erythrinus*

| **Size class center (Cm)** | **Number of individuals** |
|---|---|
| 11.5 | 2 |
| 12.5 | 0 |
| 13.5 | 3 |
| 14.5 | 1 |
| 15.5 | 8 |
| 16.5 | 41 |
| 17.5 | 105 |
| 18.5 | 82 |
| 19.5 | 37 |
| 20.5 | 10 |
| 21.5 | 10 |
| 22.5 | 2 |
| 23.5 | 2 |
| 24.5 | 1 |
| 25.5 | 0 |
| 26.5 | 0 |
| 27.5 | 2 |
| 28.5 | 1 |
| **Total** | **307** |
| **Mean value (cm)** | **18.04** |

The population is categorized into 18 size classes, each with a distribution interval of 1cm. Notably, individuals measuring between 16 and 20cm make up 86.32% of the total sampled population of this species.

### 2. Growth parameters

The values obtained for $L\infty$ and the Z/K ratio of our sample of *P. erythrinus*, using the method of **Powell (1979)** and **Wetherall (1986)**, were 29.55 and 1.06cm, respectively (Fig. 2). An analysis of the common pandera population, categorized by age groups using the method developed by **Bhattacharya (1967)** (Fig. 3), identified five distinct age groups. The age-length pairs collected were then used to estimate growth parameters.

This estimation was performed using the methods of **Tomlinson and Abramson (1961)** and ELEFAN I **(Pauly & David, 1981)**, applied through version 1.9 of the FISAT II software **(Gayanilo *et al.*, 2005)** (Fig. 4). The growth parameters obtained from the different methods are summarized in Table (2).

The length-weight relationship was described by the equation $TW = 0.0143\ TL^{b2.9496}$ , indicating a negative allometric growth (b < 3) (Fig. 5).

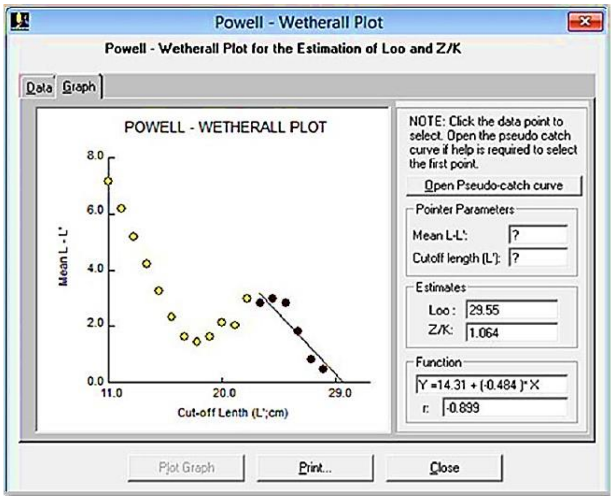


**Fig. 2.** Determining growth parameters using the **Powell (1979)** and **Wetherall (1986)** methods in *P. erythrinus*

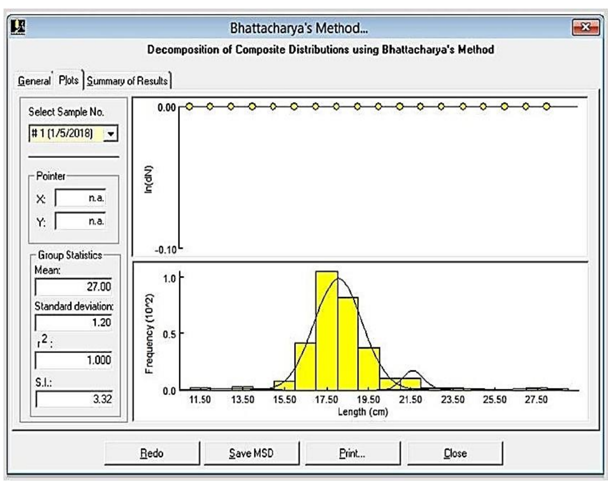


**Fig. 3.** Age group breakdown of the *P. erythrinus* population using the method of **Bhattacharya (1967)**

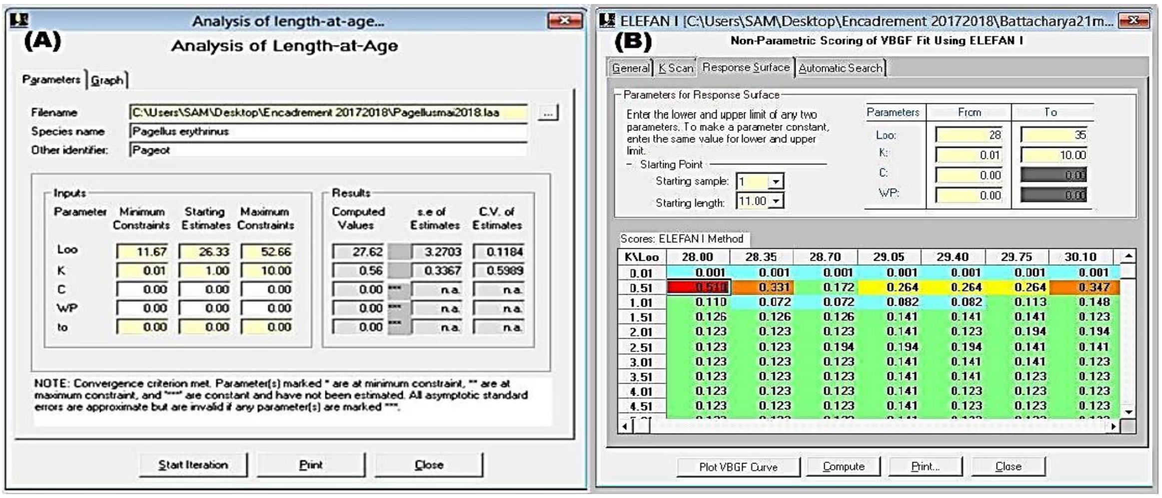


**Fig. 4.** Determination of growth parameters using the **(A) Tomlinson-Abramson (1961)** method and the **(B)** ELEFAN I method **(Pauly & David, 1981)** for *P. erythrinus*

**Table 2.** Growth parameters estimated in the *P. erythrinus* population using various methods. (*: retained value)

| Methods | $L_{\infty}$ (cm) | K (/year) | $t_0$ (year) |
|---|---|---|---|
| Pauly (1985) | 29.61 | 0.3 | -0.78 |
| Powell (1979)-Wetherall (1986) | 29.55* | 0.30* | -0.77* |
| Tomlinson-Abramson (1961) | 27.62 | 0.56 | -1.67 |
| Tomlinson-Abramson (1961) | 27.62 | 0.56 | -1.67 |
| ELEFAN 1 (Pauly and David. 1981) | 28 | 0.51 | -0.61 |

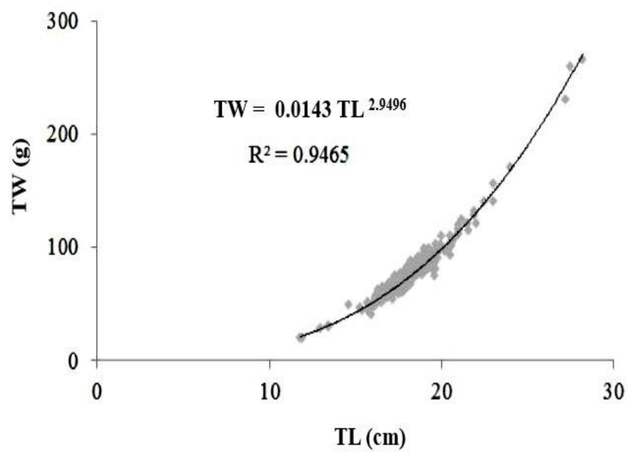


**Fig. 5.** Lenght – weight relationship in *P. erythrinus*

## 3. Mortality parameters

The estimation of total mortality values (Z) in the population of the common pandera was conducted using several methods: **Beverton and Holt (1956)**, **Ault and Ehrhardt (1991)** (Fig. 7), **Powell (1979)**, **Hoenig (1982)**, and **Wetherall (1986)** (Fig. 8), as well as **Jones and Van Zalingue (1981)** (Fig. 6). Each of these methods delivered different results, as shown in Table (3). For estimating natural mortality (M) in the common pandera population, we utilized the methods developed by **Taylor (1960)**, **Pauly (1980)** and **Djabali *et al.* (1993)**. Using the previously retained values of (Z) and (M), the fishing mortality (F) was estimated to be 0.57 per year (Table 3).

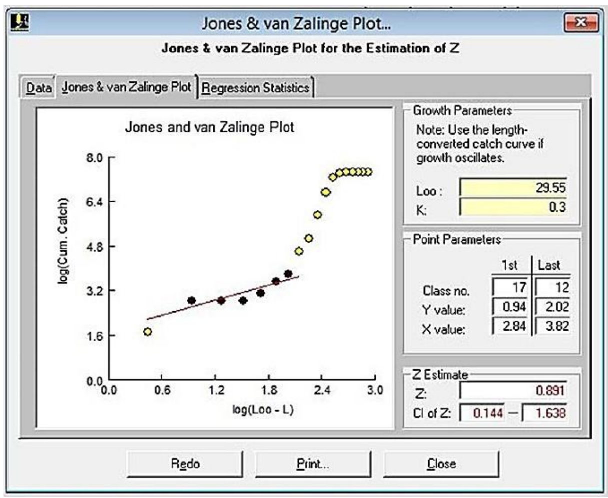


**Fig. 6.** Determination of (Z) by the method of **Jones and Van Zalingue (1981)** in the *P. erythrinus* population

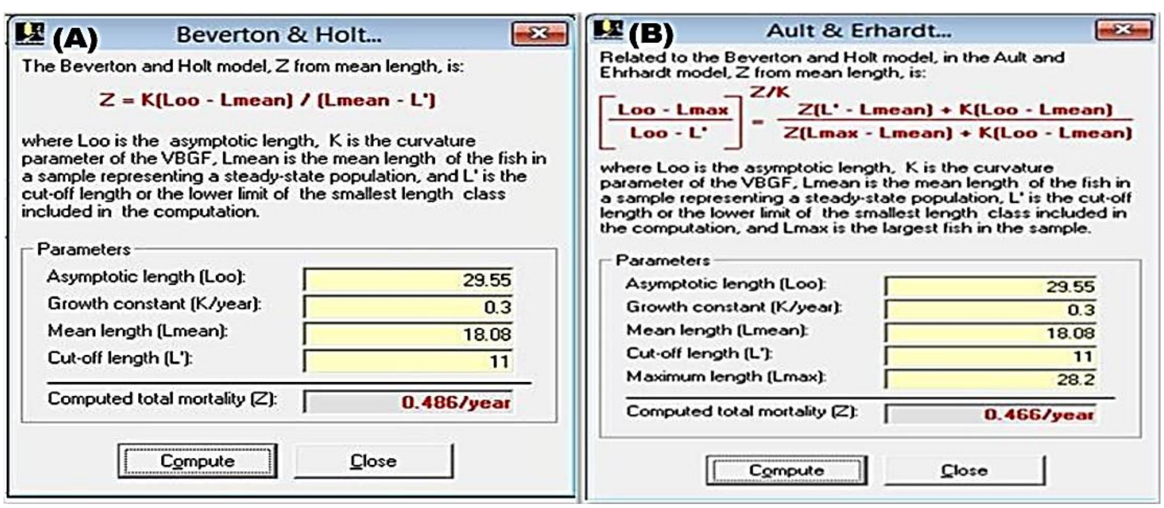


**Fig. 7.** Determination of (Z) by the methods of **(A) Beverton and Holt (1956)** and **(B) Ault and Ehrhardt (1991)** in the *P. erythrinus* population

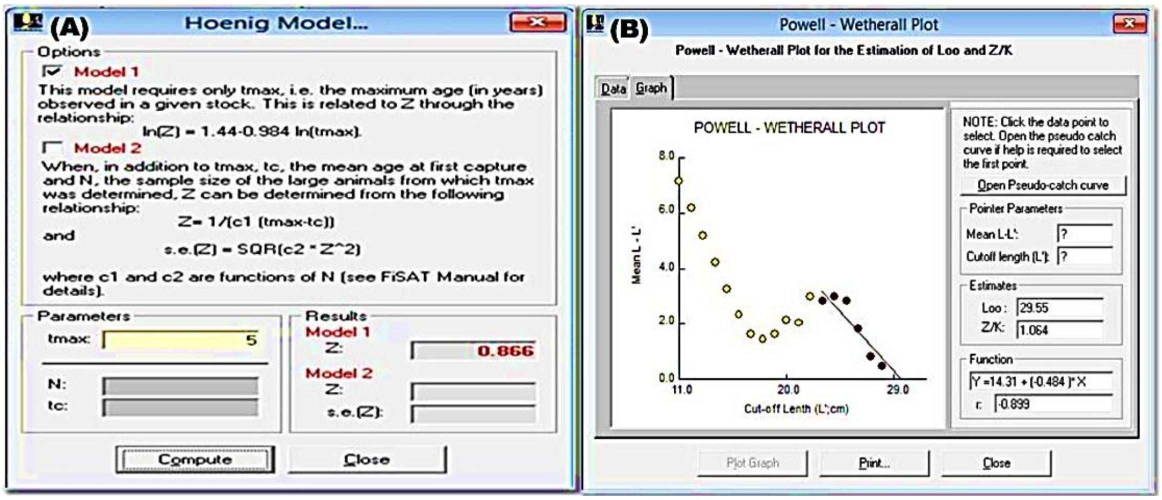


**Fig. 8.** Determination of (Z) by the methods of **(A) Hoenig (1982)** and **(B) Powell (1979)** and **Wetherall (1986)** in the *P. erythrinus* population

**Table 3.** Estimated total (Z), natural (M) and fishing (F) mortality in the *P. erythrinus* population. (Unit: /year; *: value retained)

| Mortality parameter | Method | Value |
|---|---|---|
| (Z) | Powell (79) -Wetherall (86) | 0.32 |
| | Jones et Van Zalingue (1981) | 0.89* |
| | Beverton et Holt (1956) | 0.47 |
| | Ault et Ehrhardt (1991) | 0.47 |
| | Hoenig (1982) | 0.87 |
| (M) | Taylor (1960) | 0.32* |
| | Pauly (1980) | 0.85 |
| | Djabali et al (1993) | 1.07 |
| | Moyenne | 0.74 |
| (F) | F = Z - M | 0.571* |

## 4. Stock assessment

### *4.1. Analysis of Jones (1983)*

The parameters for linear and weight growth, along with the previously selected exploitation indices, are presented in Table (4). These data were used as inputs for the analysis of virtual populations. The findings indicate that the most commonly caught fish have lengths ranging from 17 to 20cm, depending on the fishing mortality (F) values.

**Table 4.** Growth and exploitation parameters used for the VPA analysis of *P. erythrinus*

| **Parameters** | $L_\infty$ (cm) | K (/an) | $t_0$ (an) | M (/an) | Z (/an) | F (/an) | a | b |
|---|---|---|---|---|---|---|---|---|
| Values | 29.55 | 0.3 | -0.77 | 0.32 | 0.891 | 0.571 | 0.0143 | 2.949 |

The data shown in Tables (4, 5) provide the necessary inputs for the length-based model developed by **Thompson and Bell (1934)**. Moreover, the average unit price of fish at the port, along with the average body weight of each size class, are provided as additional input data alongside the results of the cohort analysis conducted by **Jones (1983)**.

**Table 5.** Virtual population analysis results as input to **Thompson and Bell's (1934)** length-based analysis in *P. erythrinus*

| **Size class center (cm)** | **(HL)** | **(NL)** | **(F)** |
|---|---|---|---|
| 11.5 | 1.002 | 323.705 | 0.373 |
| 12.5 | 1.002 | | 0 |
| 13.5 | 1.002 | | 0.508 |
| 14.5 | 1.003 | | 0.16 |
| 15.5 | 1.003 | | 1.226 |
| 16.5 | 1.003 | | 6.397 |
| 17.5 | 1.003 | | 20.686 |
| 18.5 | 1.004 | | 27.692 |
| 19.5 | 1.004 | | 25.363 |
| 20.5 | 1.005 | | 12.057 |
| 21.5 | 1.005 | | 18.141 |
| 22.5 | 1.006 | | 5.432 |
| 23.5 | 1.007 | | 6.167 |
| 24.5 | 1.009 | | 3.404 |
| 25.5 | 1.011 | | 0 |
| 26.5 | 1.016 | | 0 |
| 27.5 | 1.024 | | 4.375 |
| 28.5 | 1.05 | | 0.32 |

### *4.2 The predictive model of Thompson and Bell (1934)*

Using the output data from the **Jones (1983)** cohort analysis and the aforementioned additional data as input to the Thompson and Bell length-based production analysis for *P. erythrinus*, we obtained the values of total production, total biomass, and total market value, which we consider as output data of the predictive model used. The results obtained are grouped in Table (6), and illustrated by Fig. (9), similarly showing the maximum balanced production (MSY), the balanced economic production (MSE), and their corresponding (F) values.

**Table 6.** Variation of production (Y), market value (V) and biomass (B) as a function of F in *P. erythrinus*. (X: factor of F)

| X | Y (Kg) | B (Kg) | V (DA) |
|---|---|---|---|
| 0 | 0 | 255341.177 | 0 |
| 0.2 | 24170.9531 | 88836.923 | 12085476.6 |
| 0.3 | 27048.652 | 53572.3742 | 13524326 |
| 0.35 | 27559.4812 | 41860.4379 | 13779740.6 |
| 0.4 | 27703.079 | 32861.5591 | 13851539.5 |
| 0.41 | 27699.171 | 31327.6275 | 13849585.5 |
| 0.42 | 27686.353 | 29871.6471 | 13843176.5 |
| 0.44 | 27636.8661 | 27177.4408 | 13818433.1 |
| 0.5 | 27341.3535 | 20583.7946 | 13670676.8 |
| 0.57 | 26823.1607 | 15068.1421 | 13411580.4 |
| 0.6 | 26570.769 | 13244.0126 | 13285384.5 |
| 0.7 | 25688.0801 | 8821.52136 | 12844040 |
| 0.8 | 24830.1038 | 6135.73639 | 12415051.9 |
| 0.9 | 24052.5519 | 4490.74577 | 12026275.9 |
| 1 | 23371.2768 | 3473.22385 | 11685638.4 |
| 1.1 | 22783.6855 | 2836.09629 | 11391842.8 |
| 1.5 | 21149.2947 | 1871.88285 | 10574647.4 |
| 2 | 20002.3986 | 1596.87132 | 10001199.3 |

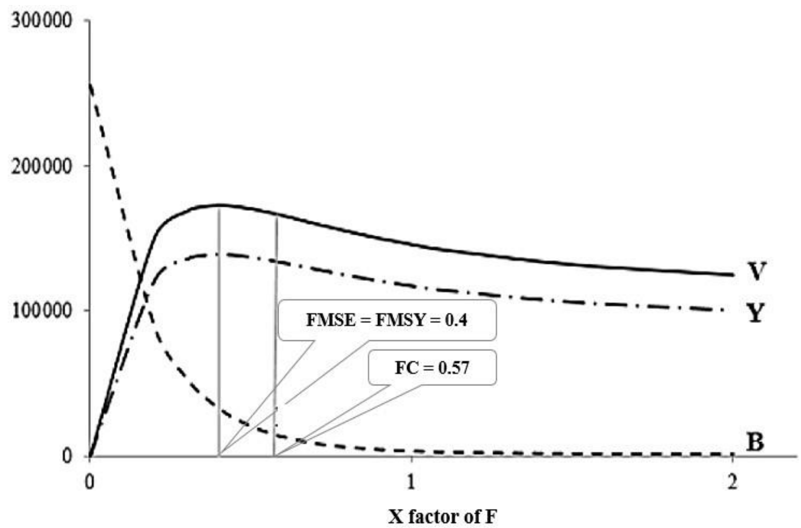


**Fig. 9.** Evolution of production, value and biomass for different (F) levels of *P. erythrinus*

The biomass of the virgin stock (B0) of the common pandera was estimated to be 255341.177kg. Total production (Y) and market value (V) increase up to the values known as FMSY and FMSE, after which they decline gradually as a function of fishing effort (F), with FMSY and FMSE both equal to 0.4. The current fishing effort (FC) is calculated to be 0.57, which places it in the descending portion of both the production curve and the market value curve. This indicates that the stock of *P. erythrinus* is currently overexploited.

## DISCUSSION

### 1. Growth parameters

The results presented in Table (7) indicate that the coefficient K for the population of *P. erythrinus* along the coasts of Jijel (North-East Algeria) is 0.3/year. This value is slightly higher than those estimated by **Girardin (1981)** in the Gulf of Lion (0.24/year), **Cherabi (1987)** on the coasts of Algiers (0.22/year), **Pajuelo and Lorenzo (1998)** in Spain (0.2/year), and **Rachedi *et al.* (2024)** on the coasts of Elkala (Algeria). These findings suggest that populations of this species in these regions share a proximate growth rate and tend to approach their asymptotic length ($L_\infty$) at a comparable pace throughout their lives. In contrast, the (K) values reported by **Ghorbel *et al.* (1997)** in the Gulf of Gabès (0.137/year) and by **Metin *et al.* (2011)** in the Aegean Sea (0.16/year) are lower than the results obtained in our study. This implies that the growth rate of the common pageot along the coasts of Jijel is superior compared to these other regions.

**Table 7.** Growth parameters obtained in different studies on *P. erythrinus*

| Autors | Location | $L_\infty$ | K | $t_0$ | a | b |
|---|---|---|---|---|---|---|
| Girardin (1981) | Gulf of Lyon (France) | 40.5 | 0.24 | -- | 0.0168 | 3.06 |
| Cherabi (1987) | Algeria (Algiers) | 36 | 0.22 | -- | 0.015 | 2.964 |
| Ghorbel (1997) | Tunisia (Gulf of Gabes) | 35.79 | 0.13 | -1.631 | 0.030 | 2.705 |
| Pajuelo et Lorenzo (1998) | Canary Island (Spain) | 41.7 | 0.2 | -- | 0.0127 | 3.013 |
| Metin *et al.* (2011) | Aegean Sea | 30.7 | 0.17 – | 0.86 | 0.0143 | 2.95 |
| Rachedi *et al.* (2024) | Algeria (Elkala) | 23.72 | 0.2 | -0.901 | 0.052 | 2.52 |
| Present study | Algeria (Jijel) | 29.55 | 0.3 | -0.77 | 0.0143 | 2.949 |

The value we obtained for $L_\infty$ (29.55cm) is slightly lower than the value reported by **Metin *et al.* (2011)** for the Turkish coasts (30.67cm) and higher than that found in the Elkala region by **Rachedi *et al.* (2024)** (23.72cm). Additionally, our result is lower than those recorded at the Gulf of Lion (40.5cm) by **Girardin (1981)**, along the coast of Algiers (36cm) by **Cherabi (1987)**, at the Gulf of Gabes by **Ghorbel *et al.* (1997)** (35.79 cm), and on the Spanish coasts (41.7cm) by **Pajuelo and Lorenzo (1998)**. These differences may be attributed to varying environmental conditions, fishing techniques, and gear used during sampling, as well as spatio-temporal variations among the studies.

The allometry coefficient for the length-weight relationship indicates a minorant growth, with a value of b = 2.95 (<3). This suggests that weight increases at a slower rate than length. This coefficient is higher than those reported by **Ghorbel *et al.* (1997)** (2.705), and **Rachedi *et al.* (2024)** (2.52). Moreover, it is close to the value obtained by **Cherabi (1987)** (2.964), which also indicates minorant allometry. In contrast, the coefficients from the studies by **Girardin (1981)** (3.060) and **Pajuelo and Lorenzo (1998)** (3.013) suggest major allometric growth. The parameters of the lenght-weight relationship can vary due to species-specific characteristics, such as size frequency distribution, sex, age, sexual maturity, and diet **(Ricker, 1975)**. Environmental factors, including salinity and temperature, also play a significant role, particularly in relation to the geographical location where the species resides **(Le Cren, 1951**).

## 2. Mortality rates

The total mortality rate (Z) in this study was estimated to be 0.89, using the method proposed by **Jones and Van Zalingue (1981)**. This value is comparable to that reported by **Pajuelo and Lorenzo (1998)** for Canary Islands, where (Z) was estimated at 1.06 year$^{-1}$. The slight difference observed may be attributed to variations in natural mortality and fishing mortality recorded over different years. Natural mortality (M) was estimated at 0.32 per year**.** This estimate closely aligns with **Pajuelo and Lorenzo's (1998)** findings, where (M) was determined to be 0.32 per year in Canary Islands. However, this value is higher than the estimate provided by **Ghorbel *et al.* (1997)**, which was 0.15 per year in the Gulf of Gabes, Tunisia. In addition, fishing mortality (F) was estimated at 0.57 per year, which is consistent with the result obtained by **Pajuelo and Lorenzo (1998)**, who estimated it at 0.76 per year. However, this value is nearly half that reported by **Ghorbel *et al.* (1997)**, which was 1 per year.

Mortality rates for the same species can differ in various areas due to factors such as the density of predators and competitors, which is further influenced by fishing activities. Additionally, the value of M can vary with the age of the cohort **(Sparre & Venema, 1996)**. While this complex process results in estimates that do not allow us to precisely define the level of uncertainty, we must accept these estimates as they are. An accurate value for M is essential for implementing most inventory management models **(Pauly & Moreau, 1997)**.

### 3. Stock assessment

The cohort analysis conducted by **Jones (1983)** revealed that individuals targeted least by fishermen are those measuring less than 17cm, which are classified as immature. This allows these immature individuals to grow and reproduce, thereby ensuring the regeneration of the species' population. The model developed by **Thompson and Bell (1934)** showed that total production (Y) and market value (V) increase up to specific thresholds (FMSE and FMSY) before decreasing in parallel as fishing effort (F) increases, with both FMSY and FMSE set at 0.4 (Fig. 9). These values represent the respective optimum fishing efforts.

Currently, the calculated fishing effort (FC) is at 0.57, which falls within the declining part of both the production and market value curves. This indicates that the stock of *P. erythrinus* in Jijel Bay is experiencing over-exploitation. This finding aligns with the trend of fishing efforts during that period, including the number of registered fishermen and the fishing fleet recorded at the study ports. Similarly, in Tunisia, an assessment of the same species in the Gulf of Gabes revealed a situation of over-exploitation **(Ghorbel *et al.*, 1997)**. According to the precautionary approach, the values of FMSY, FMSE, and FC identified in the study enable improved stock management. Therefore, we recommend reducing fishing effort until it approaches the FMSE of 0.4. This management measure allows us to operate at the maximum sustainable economic (MSE) level without exceeding the maximum sustainable yield (MSY).

## CONCLUSION

This study revealed that individuals less than 17cm in length are the least targeted by fishermen. By examining the complementarity between growth parameters and population dynamics, we applied the predictive model developed by **Thompson and Bell (1934)** to assess the stock status of *P. erythrinus*. Our findings indicate that the stock of this species in Southwestern Mediterranean is in a state of overexploitation along the Jijelian coast. Based on these results, to ensure sustainable exploitation of *Pagellus erythrinus*, we recommend reducing the fishing mortality rate from 0.57 to 0.4 per year. This adjustment would align fishing efforts with the maximum sustainable yield (MSY) and promote long-term stock recovery. This represents a decrease of 29.82% compared to the current effort. Adjusting fishing efforts to these recommended levels is crucial to preventing the common pandera from facing the risk of extinction in the Jijelian coast.

Additionally, extended studies are necessary across all components of the marine ecosystem. This includes examining the fishing activities in the region, assessing the education levels within the maritime population, evaluating the fishing fleet and gear used, and understanding the methods of fishery resource exploitation. Monitoring the changes in the stock by establishing a reliable statistical network will enhance data accuracy, ensuring better management of the fishery in the Jijel region.

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