



Influence of Temperature on Breeding of Tilapia (*Oreochromis Niloticus*) in the station of Fish Farming of Deroua, Beni Mellal/ Morocco

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Abstract

To estimate the growth of Tilapia (*Oreochromis niloticus*, L, 1758) at the level of the station of D eroua (Blessed Mellal / Morocco) and the influence of the environmental factors, an experimental study was led in 2007 on alevins raised at the level of two ponds (C₁ and C₂) the average depth of which is of 1,5m and a surface of 1500 m². Ponds in question were empoisoned by alevins of 4g on average, with a density of 5individus / m². The obtained results(profits) show that the growth is positively influenced by the temperature, and has increase 1 %, every time we pass of a range of temperature to another superior among the following ranges (16 - 20°C), (21 - 24°C) and (25 - 28°C). The obtained average immediate growth was 1 %. Models of weight growth ($Y = 77, 97 e^{0,012t}$) and shelf space ($Y = 62, 49 t^{0,288}$) according to time and the relation size / weight ($P = 0,0392 L^{2,763}$) were determined from the data of the essays made in 2005 and 2006 in the station of Deroua.

Keywords: *Oreochromis niloticus*, deroua fish farming, temperature, weight growth, growth shelf space, Morocco.

Introduction

The fish farming is the production which progresses most at the world level. The production affected 148 million tons of fishes in 2010 and the preliminary data show that the production increased in 2011, affecting 154 million tons¹. The continental fish farming in Africa is the most late in the world, in spite of its favorable conditions for the development of this production. Of African origin, the Tilapia, can play an important role in the economy of many countries of this continent, so improving the especially protein food self-sufficiency. The Tilapia, the foundation of the African fish farming, train from now on, with some endemic species in Africa, the base of the fish farming of fresh water of the intertropical belt of the globe².

Morocco following the example of the other countries of Africa does not escape this rule as regards the development of the continental fish farming in spite of this speculation was introduced since 1924 by the creation of the fish station of Azrou³, then that of Deroua en1990. These two units are managed by the National Center of Hydrobiology and Fish farming of Azrou being of the High Commission in Waters and Forests and Fight Against the Desertification.

Morocco following the example of the other countries of Africa encourages the development of the continental fish farming. This continental fish farming was introduced since 1924 by the creation of the station of fish of Azrou³ then that of Deroua in

1990. These stations assured the stocking with fish of the majority of ornamental lakes with native and introduced species.

The fish station of Azrou takes care of the breeding of fishes of cold waters (fario Trout, Rainbow trout, Pike) whereas that of Deroua (Beni Mellal) of fishes of hot waters (Carp, Black-bass, Tilapia. the main objective of which is the stocking with fish of roadblocks and rivers to fight against the eutrophication of waters.

The present work handles the influence of the temperature on the growth of tilapia of the Nile (*Oreochromis niloticus*) and consequently the determination of the relations enters the growth size and the weight growth during a ' intensive semi breeding at the level of the station of fish farming of D eroua (B eni Mellal) in Morocco between 2005 and 2007. The knowledge of the variation of the parameters of breeding as the temperature and their optimization will allow a better production.

Material and Methods

Presentation of the site of study: The fish station of Deroua, geographical coordinates: Latitude: 32°20' the North, Longitude: 6°45' the West and of a Height of 428m is situated in 20 km in the Southwest of the city of Beni Mellal (Morocco). La refreshed station of ponds figure-1, in identical ground of 2000 m² of surface and of 1,5 m of depth and the food of which

is made from The groundwater and the roadblock Bine El ouidane⁴. From geologic point of view, ponds base on a brown ground subtropical isohumique developed on an argilo-calcareous deposit of the average Quaternary⁵.



Figure-1

Pond with hapas at the level of the station of Deroua to Beni Mellal

Biological Material: To estimate the growth of alevins at different intervals of temperature (16 - 20°C, 21 - 24°C and 25 - 28°C) an experience was organized at the level of two ponds named C₁ and C₂. These two ponds are empoisoned by 7000 alevins of a middleweight of 4 g is an initial biomass of 21 kg each. Every two weeks we make a fishing of control to follow the growth of alevins according to the temperature. Before poisoning the ponds of experiment, a meticulous sorting was made to obtain a homogeneous population not to bias the experience. More the dispersal is big more the individual difference plays an important role on the growth. Best is to

group together alevins stemming from the same laying or the moved closer laying. The figure-2 shows the structure by size at the beginning of the experience of growth in C₁ and C₂. To estimate the growth according to sex, measures were made on a population of tilapia constituted by 160 females and by 80 males raised at the level of ponds named A₂ and A₃. The determination of a model of weight and linear growth is obtained by the use of the data collected during the partners of breeding of the 2005 and 2006.

Besides the temperature, other parameters of were followed, it is about the concentration of dissolved oxygen and the potential Hydrogenates.

Results and Discussion

For the dissolved oxygen and the potential Hydrogenates, the table 1 summarizes the averages obtained during the period of experience. For the dissolved oxygen and the potential hydrogenates, the averages registered during the period of study are respectively of the order of 8 mg / L and a pH equals in 8,5. These averages are favorable to the development of Tilapia.

The measures made on a sample of 80 males and 160 females show that the Tilapias of the Nile product in the station of Deroua present different growths according to the sexes. Measures made on fishes of different sex and the same age revealed that males grow faster than females⁶. The sizes obtained for both sexes are respectively 32, 5 cm (±2) for males and 26 cm (± 2, 6) for females. The recorded middleweight is 580 g (± 115) for males against 330 g (± 93) only for females.

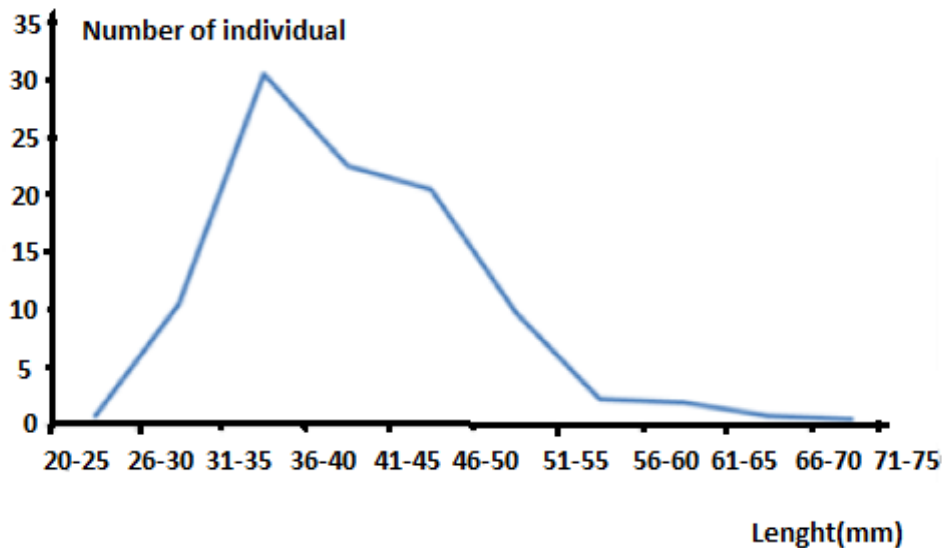


Figure-2

Structure by size at the beginning of the experience of growth of C₁ and C₂

The males of one year have an almost double size of the females of the same age. This difference of growth has for origin the genetic factors. The measures made at the level of the station between 2005 and 2006 allowed to follow the weight growth and the linear growth according to time and to determine the relation between variables (Weight and size). The obtained results show that the weight growth of *Oreochromis niloticus* takes an exponential speed (figure-3) whereas the linear growth figure-4 tends to decrease with the age. These experiences took place in ponds of 1500 m² (C₁, C₂) and of 2000m² (A₃ and A₄), in a low density. From 150h in the daytime the experience, the middleweight of the individuals (males) was upper to 500 g. As

comparison, a weight of 650 g is affected by some individuals in experimental⁷ to the 200h days in ponds rich in natural food and in low density.

For the relation weight length ($P = aL^b$), the figure-5 shows the results obtained on a sample of 241 variable-sized specimens between 6,5 cm and 36 cm. The analysis of the figure shows that the weight increases with the size of fish with a coefficient of correlation of the order of 0,98 ($p < 0,01$). The equation connecting the weight with the size is the shape $P=0,0392L^{2,763}$, the coefficient b is lower than 3 (2,763) this shows that the growth in size is important with regard to the mass growth⁸.

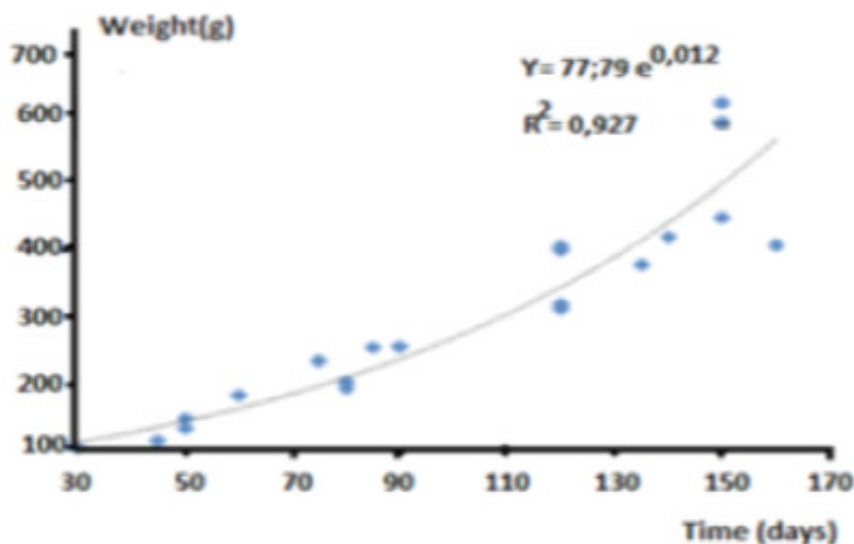


Figure-3
 Weight Growth of Tilapia of the Nile in the station of Deroua

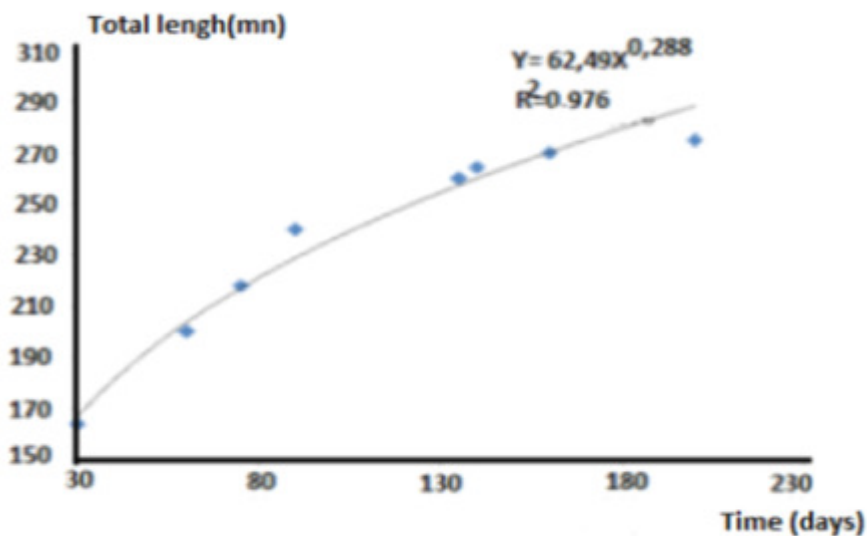


Figure-4
 Linear Growth of Tilapia of the Nile

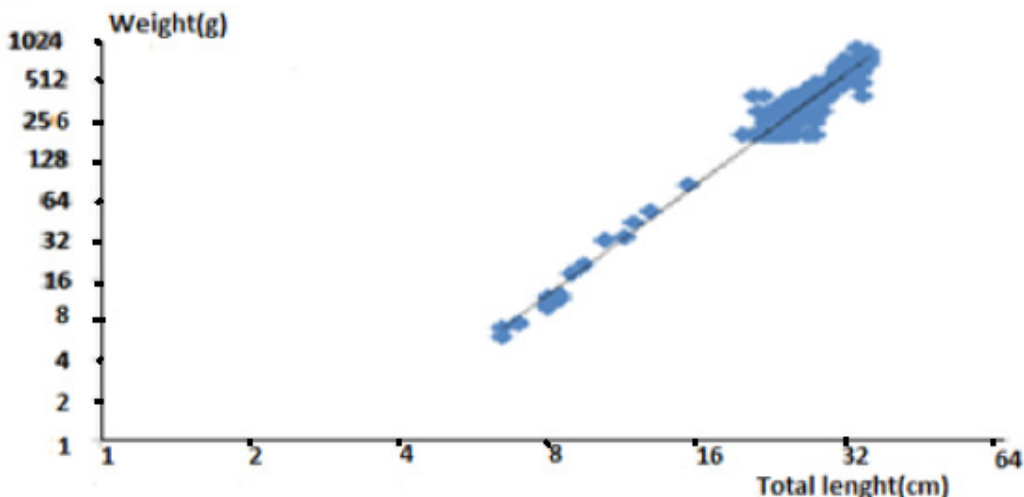


Figure-5
 Relation weight-size of tilapia of the station of Deroua (2005-2006)

The immediate growth (Gp) for three ranges of temperature followed at the level of ponds C₁ and C₂ are recorded in the table 1 and the figure 6.

Table-1

Immediate Growth (Gp) for various ranges of temperature

Water temperature (°C)	Estimation of Gp (% day) in various tepemperatures		
	[16-20]	[21-24]	[25-28]
Pond C1	3,04	3,7	4
Pond C2	4,53	4,7	5,1

Conclusion

The present study allowed determining the performances of growth of Tilapia in different conditions of temperature. The experience led at the level of the station Déroua showed a fast growth of tilapia at the level of the station with a good rate of conversion of 1. Old males of one year affect weights going from 800 to 900 g. The temperature and the conditions of the environment are factors influencing the growth of the Tilapia during its breeding.

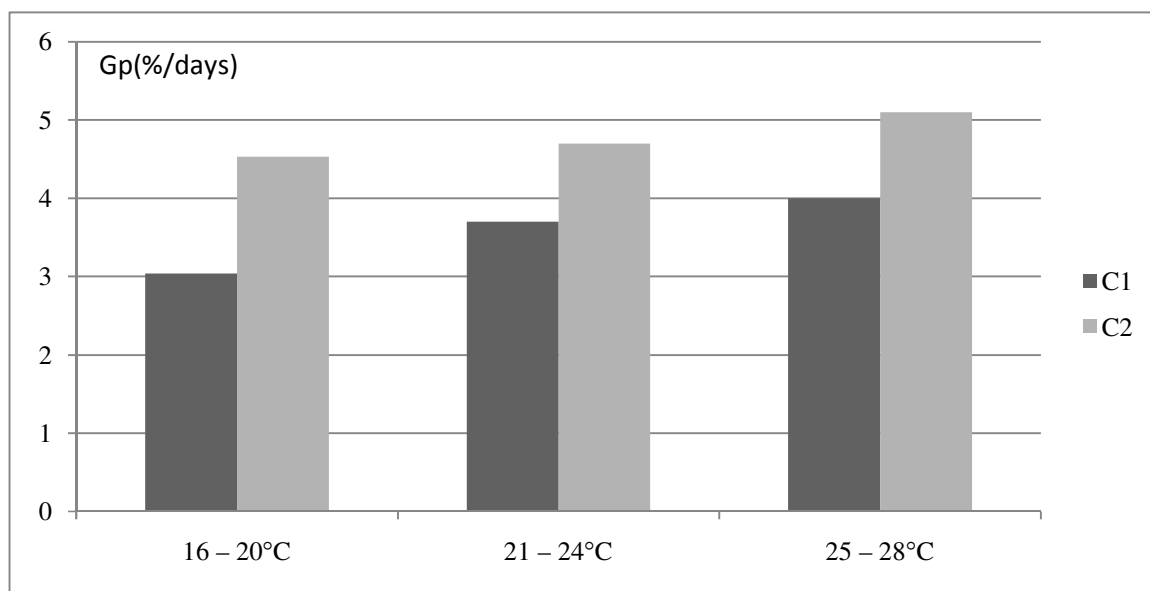


Figure-6
 Immediate Growth (Gp) according to ponds for various ranges of temperature

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