Faculty of Agriculture

SOME PHENOTYPIC AND GENOTYPIC DIFFERENCES AMONG FOUR SPECIES OF TILAPIA FISH

By
Kamal Abdel-Azeem Abdel-Gowad Osman Eldeeb

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BY
Kamal Abdel-Azeem Abdel-Gowad Osman Eldeeb

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Zagazig University, 2001

Supervised by

1- Prof. Dr. Mohammed Mohammed El-Said Hassouna

Professor of Fish Nutrition, Faculty of Agriculture, Fayoum University.
Signature……...

2- Dr. Ramadan Mohamed Abou Zied

Associate Professor of Fish Production, Faculty of Agriculture, Fayoum University.

Signature……

3- Dr. Mahmoud Ali Rezk

Program Manager, Genetics World Fish Center Regional Center for Africa and West Asia Abbassa, Abu Hammad, Egypt

. Signature……

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This Thesis for M. Sc. Degree (Animal Breeding) has been

Approval by:

1- Prof. Dr. Mohamed Abdel-Hamid El Danasoury

Professor of Fish Production, Faculty of Agriculture, Suez Canal University.

Signature……...

2- Prof. Dr. Ali Rabia Abdel-Rahman

Professor of Animal Husbandry, The Chairman of Animal Production Department, Faculty of Agriculture, Fayoum University.

Signature**……...**

3- Prof. Dr. Mohammed Mohammed El-Said Hassouna

Professor of Fish Nutrition, Faculty of Agriculture, Fayoum University.

Signature**……...**

4- Dr. Ramadan Mohamed Abou Zied

Associate Professor of Fish Production, Faculty of Agriculture, Fayoum University.

Signature.....

5. SUMMARY AND CONCLUSION

The aim of the present study is to determine some of the differences in phenotypic and genotypic parameters among four species of tilapia. The four species tested were *Sarotherodon galilaeus, Oreochromis niloticus, Oreochromis aureus, Tilapia zillii.*

Fish samples were collected from some commercial farms at Shakshok, Fayoum Governorate, Egypt. The phenotypic measurements and chemical analysis were carried out at Department of Animal Production, Faculty of Agriculture, El-Fayoum University, El-Fayoum Governorate, Egypt. Thirty fish from each species were randomly collected at two periods after nursing period (it was 2 months and other 3 months), In two stages of growth (after nursing period, (period one) and at harvesting, (period two)), fish/each species were taken. Fish samples were put in plastic bags and frozen at -85ºC until the period of body measurements, chemical analysis and Muscle protein electrophoretic.

The phenotypic parameters per each fish were body weight/fish (BW); fish volume (Vol); fish area; fish length; fish depth; fish width ; empty body weight (EBW); gastro intestinal tract (GIT) with and without feed; condition factor (CF); and specific growth rate (SGR). Body chemical composition were dry matter (DM), organic matter (OM), crud protein (CP), ether extract (EE), Ash and gross energy (GE). Also, correlations, regressions, and the power equations to obtain body weight were obtained. Muscle protein electrophoretic pattern was studied to obtain the genetic variation between tested tilapia species. Results revealed the following,

5.1. body measurements.

All body measurements of the tastes tilapia phenotypes were highly significant ($p \leq 0.01$). Phenotypes tested showed that the highest (BW, Vol, area, length, depth and width) were with O, niloticus and the lowest were with T. zillii. However, the condition factor was highest with S. galilaeus and the lowest with T. zillii. At period two (at harvesting) fish showed higher values than period one (before grow-out period).

5.2. Body chemical composition

All body chemical composition data of the tested species were highly significant ($p \leq 0.01$). Nile tilapia DM, OM, EE, and Gross energy (GE) were significantly higher than the other species tested. Blue tilapia (O. aureus) was highest in CP content. Tilapia zillii was the lowest in OM, EE, Ash and GE. The period two (at harvesting) juveniles contained higher DM, EE, ash and GE than period one (before grow-out period). GIT fill had non significant effect on most body chemical components.

5.3. Correlation coefficients

All correlations coefficients between body measurements, body chemical composition and their interactions were highly significant.

5.4. Regression equations

They were obtained where $Y_2 = b_0 + b_1 Y_1$. b_0 is Y axes intercept and b_1 is the slope of the regression equation such equations were made for each species where the needed parameters could be obtained through each other.

5.5. Body protein through exponential equations

The equation was represented as,

Body protein, g = body weight ^{b} ,g

$$\text{Then} \quad b = \frac{\log \text{body protein}}{\log \text{body weight}}$$

5.6. Fish specific growth rate

Differences between the tested species were obtained characterizing Nile tilapia which followed by blue tilapia and other species tested.

Differences between the tested powers to obtain body protein between species at the two tested periods showed that they ranged between 0.82 to 085 for tilapia fish at harvesting (marketable fish, about 4-6 fish/kg). such power ranged between 0.65 to 0.73 for small fish after nursing period.

5.7. Fish muscle protein

The Genotypes differences are expressed through fish muscle protein. Differences between species were detected. Similarity index indicated differences in fingerlings than juvenile fish, Also differences between species were found. After nursing period T. *zillii* was near by *tilapia niloticus* (0.75 similarity index).

At harvesting the similarity index of *O. aureus* (0.83) and *S. galilaeus* (0.75) were near by *tilapia niloticus* respectively.

Protein molecular weight differences in the tested genotypes of tilapia were detected and affected by fish period. The tested bands and their percentages showed the possibility to differentiate between species.

Conclusion

It could be concluded that tilapia species differ than each other, phenotypic traits and body chemical composition. Also, genetic variations could be detected through muscle proteins. Regarding SGR and CF, Nile tilapia is preferable for its higher growth rate and *S. galilaeus* is preferable though its condition factor. Also, predicted equation could be used satisfactory to obtain different needed knowledge. Based on phenotypic variations, different body chemical composition, genetic expression of muscle proteins and predicted equations we can perform genetic improvement by crossing and selecting in cultured tilapia fish.