



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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BIOCHEMICAL AND MOLECULAR STUDIES ON SOME SPECIES OF MULLET FISH

By

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ABSTRACT

Fish is one of the most important foods of the human because of its high nutritional content especially polyunsaturated fatty acids (PUFAs omega-3 and omega-6) which are available in mullet species. The aims of this study was to show how the traditional, biochemical and molecular methods can be used to assess the genetic diversity among the four mullet species, namely *Mugil cephalus*, *Liza ramada*, *Valamugil sihilil* and *Liza garana*, in addition to bioinformatics tools. The fish were collected from four different governorates in Egypt (Alexandria, Ismailia, Port Said and Damietta). The four species were morphologically characterized using seventeen morphometric characters. The ANOVA test showed that out of seventeen characters four morphometric characters (i.e., head length, distance of first dorsal fin, distance of second dorsal fin and body weight) showed significant differences ($p < 0.05$) among the four species. While, the remaining morphometric characters revealed no significant differences ($p > 0.05$) among the species. The morphology-based dendrogram divided the four species into two main clusters. The first cluster was divided into two subclusters and comprised the ten genotypes. The second cluster contained the six remaining genotypes and was divided into two subclusters. Protein banding patterns using SDS-PAGE (protein electrophoresis) revealed the total number as 59 bands in the profiles of the four species. *Liza garana* (Port Said) showed the highest number of bands (18). While, the lowest number of protein bands showed in *Valamugil sehili* (Ismailia) was 10 bands. The dendrogram constructed using protein data was successful in clustering the species together. Moreover, eleven SCoT primers and ten ISSR primers were used to estimate the genetic diversity among the four mullet species. The two markers SCoT and ISSR successfully amplified amplicons with a total number of 176 and 132 of which 153 and 111 were polymorphic, representing a percentage of polymorphism of 86.9% and 84.1% polymorphic amplicons/ primer, respectively. The similarity indices ranged from 0.47 to 0.84, 0.54 to 0.92 and 0.52 to 0.86 for SCoT, ISSR and combined, respectively. Cluster analysis based on similarity matrices of SCoT, ISSR and combined dendrograms revealed some similarities; i.e. the *Mugile cephalus* (Alexandria, Ismailia and Port Said) clustered together and the *Valamugil sehili* (Ismailia and Damietta) clustered together based on the three dendrograms. Also, *Liza ramada*, *Liza garana* (Damietta) and *Mugile cephalus* (Damietta) were clustered together based on the three dendrograms. Concerning the PCR product, one SCoT fragment was sequenced, blasted and aligned with the NCBI data based. This fragment revealed a high similarity to a sequence located on Chr1 near a gene called "Type II keratin E3 for fish species *Dicentrarchus labrax* (the European bass).

Key words: Mullet fish, morphological characterization, protein electrophoresis, molecular markers (SCoT and ISSR)

DEDICATION

I dedicate this work to whom my heartfelt thanks: to my father, my mother may God have mercy on her, my children are the metal of my liver and the soul of my heart (Ammar and Abdelrahman), my brothers and my sisters and, for their endless support along the period of postgraduation.

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CONTENTS

INTRODUCTION.....	1
REVIEW OF LITERATURE.....	7
1-Morphological characterization of the fish species.....	7
2-Biochemical characterization of the fish species.....	19
3-Molecular characterization of the genetic diversity among fish species	28
4-DNA Sequencing	43
analysis.....	
MATERIALS AND METHODS.....	48
1-Materials.....	48
2-Methods.....	48
a- Morphological	49
characterization.....	
b - Biochemical characterization (SDS –PAGE analysis of protein)	50
c- Molecular characterization.....	54
1-Start Codon Targeted Sequence (SCoT) analysis.....	56
2. Inter Simple Sequence Repeats (ISSR)-PCR analysis.....	57
3-Data analysis.....	59
d- Sequencing analysis.....	60
RESULTS AND DISCUSSION.....	62
The genetic diversity among the four mullet species.....	62
a-Morphological characterization.....	62
b. Biochemical Characterization.....	73
c. Molecular characterization among the four mullet species.....	82

1- Start Codon Targeted (SCoT) analysis of the mullet species	82
2-Inter simple sequence repeated (ISSR) analysis of the four mullet species....	89
3- Combined genetic relationships and cluster analysis as revealed by the combined of SCoT and ISSR markers	95
4- Sequence analysis using Bioinformatics tools	98
CONCLUSION.....	101
SUMMARY.....	102
REFERENCES.....	106
ARABIC SUMMARY.....	121

LIST OF TABLES

No	Title	Page
1-	The common and scientific names of the four mullet species investigated in the present study.....	48
2-	Components of resolving gel and of stacking gels used for Protein electrophoreses.....	53
3-	The primer code and nucleotide sequence of the eleven primers Assayed In the SCoT PCR.....	57
4-	The primer code and nucleotide sequence of the ten primers assayed in the ISSR – PCR.....	58
5-	Illustrated the univariate by one way ANOVA analysis for four species from Mugilidae	76
6-	Data matrix illustrating the presence or absence of total protein bands in th sixteen mullet fish species.....	81
7 -	Genetic similarity coefficients computed from total protein SDS - PAGE.....	82
8-	Total number of amplicons, monomorphic amplicons, polymorphic amplicons and percentage of polymorphic as revealed by SCoT markers among the four mullet species.....	86
9-	Genotypes characterized by unique positive and / or negative SCoT markers, size and total number of bands identifying by each genotype.....	86
10-	Genetic similarity matrix computed from SCoT for the four mullet species.....	89
11-	Primer code, total number of amplicons, monomorphic amplicons, polymorphic amplicons and percentage of polymorphic as revealed by ISSR marker among th mullet species.....	92

12- Genotypes characterized by unique positive and / or negative ISSR markers, marker size and total number of bands identifying by each genotype.....	92
13- Genetic similarity matrix computed from ISSR data for the four mullet species	94

LIST OF FIGURES

No	Title	Page
1-	Illustration of morphometric assessments of four mullet species ...	50
2-	Illustration the four mullet species which used in this investigation.....	63
3-	Histogram showing the significant differences morphometric characters among the four mullet species. (DL) and (HL).....	65
4-	Histogram showing the significant differences morphometric charac among the four mullet species, (BW) and FL...	65
5-	Histogram showing the no significant differences morphometric characters among the four mullet species.TL And SL..	66
6-	Histogram showing the non-significant differences morphometric characters among the four mullet species. D2 and DV.....	67
7-	Histogram showing the no significant differences morphometric characters among the four mullet species, (DCA) and DA.....	68
8-	Histogram showing the non-significant differences morphometric characters among the four mullet species ED and MBH).....	68
9-	Histogram showing the non significant differences morphometric characters among the four mullet species. CPD and DFL.....	69
10-	Histogram showing the non significant differences Morphometric characters among the four mullet species HD and NL.....	70
11-	Histogram showing the non significant differences morphometric characters among the four mullet species. W.....	70

12- Dendrogram for the four fish species genotypes constructed from morphological characters measurements data using UPGMA and similarity matrices according to Nei & Lis coefficient ...	77
13- SDS PAGE of total proteins extracted from the fish muscles	78
14- Dendrogram for the four fish species genotypes constructed from to protein SDS- PAGE data using UPGMA and similarity coefficients.....	82
15 - SCoT profiles of the four mullet species as revealed by SCoT prime	84
16- Dendrogram revealing the genetic relationships among the four mu species based on the genetic similarity computed from SCoT data using the UPGMA algorithm.....	89
17- ISSR profiles of the four mullet species as revealed by ISSR.....	90
18- Dendrogram revealing the genetic relationships among the four mu species based on the genetic similarity computed from ISSR data using UPGMAalgorithm.....	94
19- Dendrogram revealing the genetic relationships among the four mul species based on the genetic similarity computed from SCoT and IS marker data using the UPGMA algorithm.....	98
20- The gene blast results on the NCBI genome.....	99
21 - The alignment of the amplified of the full nucleotides sequence of tl fragment the corresponding sequence in the database using BLAST (a).....	100
21 -The alignment of the amplified of the full nucleotides sequence of tl fragment at the corresponding sequences in the database using BLAST (b)	101