

ABSTRACT

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Title of Thesis: Study of Some Molecular Genetic Loci Affecting Somatic Cell Score and Milk Yield Traits to Improve Resistance to Mastitis in Friesian Cows and Crosses under Egyptian Conditions

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This study was conducted at International Livestock Management Training Center of the Animal Production Research Institute and Department of Animal Production, Faculty of Agriculture, Kafrelsheikh University. The objective of this study was mainly share in to detect quantitative traits loci (QTL) affecting somatic cell score (SCS) in milk to improve resistance to mastitis in Friesian cows under in Egypt. Blood samples were collected from all cattle and DNA was extracted from blood and semen samples. The selected markers were specific to detect QTL for trait SCS in cattle. Markers were amplification in PCR machine.

The results obtained could be summarized as follow: -

The present results have identified the most likely QTL to be near marker BMS885 on BTA4 and TGLA429-BMS882 on BTA26, which reveals alleles that appears to be associated with reduced (SCS). The chromosome under study is more specific to for SCS and resistance to mastitis. Microsatellite markers under study showed a relationship between MY, SCS and resistance to mastitis. Its may be possible in the future to use microsatellites in marker-assisted selection in a criterion for selection for resistance to mastitis in Friesian cows under Egyptian condition and the cows will be more profitability.

Key words: DNA, Microsatellite Markers, Somatic Cell Score, Mastitis resistance, Quantitative Traits Loci Mapping, *Bos taurus* autosome 4 and 26, Daughter Design.

المستخلص

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لتحسين المقاومة لإلتهاب الضرع في أبقار الفريزيان و الخليط تحت الظروف المصرية
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أجريت هذه الدراسة في المركز الدولي للتدريب علي رعاية الحيوان بسخا التابع لمعهد بحوث الإنتاج الحيواني مركز البحوث الزراعية و قسم الإنتاج الحيواني- كلية الزراعة جامعة كفر الشيخ. هدفت الدراسة إلى المساهمة في الكشف عن مواقع الصفات الكمية (QTL) التي تؤثر على أعداد الخلايا الجسدية لتحسين المقاومة لإلتهاب الضرع في ابقار الفريزيان تحت الظروف المصرية و كيفية عمل الانتخاب بواسطة الواسمات الوراثية و مدى ارتباطها جينيا بصفة أعداد الخلايا الجسدية. تم أخذ عينات الدم من الأبقار و تم استخلاص المادة الوراثية (DNA) منها و من السائل المنوى المجمد . تم عمل إكثار للواسمات في جهاز إكثار المادة الوراثية. و تم حقن ناتج إكثار المادة الوراثية في البولي اكريلاميد جل في جهاز التفريد الكهربائي الرأسي الأوتوماتيكي.

و كانت النتائج المتحصل عليها كالآتي:

تم اكتشاف الـ QTL، حيث كانت تقع على مسافة ٤٦ سنتي-مورجان على الكروموسوم ٤ و أقرب واسمة لهذا الموضع BMS885 بينما كان موضع الـ QTL على مسافة ٢٧ سنتي-مورجان على الكروموسوم ٢٦ و كانت أقرب واسمتين لهذا الموضع هما TGLA429 و BMS882. . وجد أن موضع الـ QTL يكون أكثر احتمالا على الكروموسوم ٤ بالقرب من الواسمة BMS885 و كذا الـ QTL على الكروموسوم ٢٦ بالقرب من الواسمتين TGLA429 و BMS882 حيث أن هذه الواسمات تحتوى على الأليلات التي لها علاقة بتقليل أعداد الخلايا الجسدية فى اللبن. و بالتالى زيادة المقاومة لإلتهاب الضرع ويمكن إستخدام هذه الواسمات المرتبطة بمواقع الصفات الكمية لصفة الـ SCS فى المستقبل للانتخاب للمقاومة للإصابة بالتهاب الضرع

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ABBREVIATIONS

ABS(t)	Absolute t-value
AI	Artificial insemination
bp	Base Pair
BTA	<i>Bos taurus</i> autosome
CI	Confidence Interval
cM	centi Morgan
CM	Clinical Mastitis
DCCI	Dairy Capacity Composite Index
DD	Daughter Design
DHI	Dairy Herd Improvement
DNA	Deoxy ribonucleic acid
dNTP's	Deoxynucleotide triphosphate
DTT	Dithiothreitol
E.Z.N.A.	Eazy Nucleic Acid Isolation
EBV	Estimated Breeding Value
EY	Energy Yield
FC	Fat Content
FP	Fat Percentage
FY	Fat Yield
GDD	Granddaughter Design
h²	Heritability
IBD	Identity By Descent
INTERBULL	International Bull
LDLA	Linkage Disequilibrium and Linkage Analysis
LR	Likelihood Ratio
MARC	Meat Animal Research Center
MAS	Marker Assisted Selection
MAST	Mastitis
MHC	Major Histocompatibility Complex
μl	Micro Liter
μM	Micro Molar
MS	Microsatellite
MSPD	Milking Speed
MTDFREML	Multi Traits Derivative Free Restricted Maximum Likelihood
MY	Milk Yield
ng	Nano gram
PC	Protein Content
PCR	Polymerase Chain Reaction
PIC	Polymorphism Information Content

PP	Percentage Protein
PY	Protein Yield
QTL	Quantitative Trait Loci
RFLP	Restriction Fragment Length Polymorphism
r_g	Genetic correlation
RNA	Ribonucleic acid
r_p	Phenotypic correlation
SCC	Somatic Cell Count
SCS	Somatic Cell Score
SNP's	Single Nucleotide Polymorphisms
SSLP	Simple Sequence Length Polymorphisms
SSR's	Simple Sequence Repeats
SSTR	Simple Sequence Tandem Repeats
STM's	Sequence Tagged Microsatellites
STR's	Short Tandem Repeats
VNTR	Variable Number Tandem Repeats