Abstract of their presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master of Agricultural Science

PHENOTYPIC AND GENOTYPIC VARIATION IN TENERA PROGENIES DERIVED FROM DIFFERENT SOURCES OF DURA CROSSED WITH AVROS PISIFERA

By

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May 2012

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This study was executed to search for new breeding strategies to be employed towards the improvement of elite Deli duras populations from Breeding Population of Restricted Origin (BPRO). The objectives for the study were (i) to estimate phenotypic and genetic variances and heritabilities (broad-sense and narrow sense) in various dura populations crossed to AVROS pisifera, (ii) to estimate phenotypic and genotypic coefficients of variation of the characteristics measured, (iii) to estimate phenotypic correlations among quantitative traits, and (iv) to identify for the characteristics that are unique to each of these dura sources crossed with AVROS pisifera.

Three experiments each consisted of 17, 45 and 15 duras crossed with AVROS pisifera progenies. The Deli duras originated from various sources of Deli
dura BPROs consisted of Ulu Remis dura, Johor Labis dura and their derivatives. Experiment 1 and Experiment 2 utilized North Carolina Mating Design I while Experiment 3 utilized the bi-parental crosses. All experiments were laid out in Randomised Completely Block Design (RCBD) with four replications and were planted at 8.8m triangular on coastal clay-loam soil in East Estate, Carey Island.

Due to high selection pressure in most of the dura populations during their early improvement programmes certain characters found to be more concentrated in different dura populations. It is possible to combined two different desirable characters from two different dura populations and combinations of more than two characters can be carried out by utilizing a three-way crosses. The proposed strategies were supported by the analysis that showed some of these characters can result in the improvement of desirable economic characters. The improvement of dura population was proposed based on results that showed low male effect in females parents in most of the economic characters indicated there was higher genetic control in female parents for most of the traits. The strategies can be more viable and the improvement can be made faster by combining characters based on the heritabilities and correlation results from the studies. Results obtained in all experiments showed that different selection and breeding objectives can accumulate different set of characters and intercrossing among these duras can be carried out towards further yield improvement in oil palm.
Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Sarjana Sains

VARIASI FENOTIP DAN GENOTIP DALAM PROGENI TENERA DIHASILKAN DARI SUMBER DURA YANG BERLAINAN DIKACUKKAN DENGAN PISIFERA AVROS

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Kajian ini dilaksanakan untuk mengenalpasti strategi biakbaka baru yang akan dijalankan ke arah peningkatan elit Deli dura berasal dari Pembiakbakaan Populasi Asal-usul yang Terhad (BPRO). Objektif bagi kajian ini (i) untuk menganggarkan varians fenotip dan genetik, dan keterwarisan (luas dan sempit) di dalam pelbagai populasi dura dikacukkan dengan AVROS pisifera, (ii) untuk menganggar pekali variasi fenotip dan genotip untuk semua ciri yang diukur, (iii) untuk menganggarkan korelasi fenotip di kalangan ciri kuantitatif, dan (iv) untuk menentukan ciri yang unik untuk setiap populasi dura yang dikacukkan dengan pisifera.

Tiga percubaan yang masing-masing mengandungi bilangan kacukan 17, 45 dan 15 progeni yang berasal dari kacukan elit Deli dura BPROs dengan
pisifera AVROS. Percubaan 1 dan Percubaan 2 menggunakan rekabentuk pengawanan Reka bentuk Carolina Utara I (NCM I) manakala Percubaan 3 menggunakan rekabentuk pengawanan dwi-induk. Semua percubaan ditanam menggunakan rekabentuk blok lengkap rawak (RCBD) dengan empat replikasi dan di tanam mengikut 8.8 meter tiga segi penjuru di tanah jenis tanah liat pantai di East Estate, Carey Island.

Oleh kerana tekanan pemilihan yang tinggi ke atas kebanyakan populasi dura semasa diperingkat awal program didapati lebih tertumpu ciri tertentu di dalam pelbagai populasi dura. Adalah mungkin untuk menggabungkan dua ciri yang berbeza dari dua populasi dura dan kombinasi lebih dari dua ciri yang baik melalui penggunaan kacukan tiga hala. Strategi yang dicadangkan disokong oleh analisis yang menunjukkan ciri-ciri tersebut dapat memajukan ciri ekonomi yang dikehendaki. Di dalam memajukan populasi dura, berdasarkan keputusan kajian ini, induk jantan mempunyai kesan yang sangat rendah dalam kebanyakan ciri ekonomik yang dikaji, ianya menunjukkan pengaruh induk betina tinggi dalam ciri tersebut. Strategi yang boleh berjaya dan kemajuan yang lebih cepat adalah dengan menggabungkan beberapa ciri berdasarkan keputusan keterwarisan dan kajian korelasi yang dijalankan. Keputusan yang didapati dalam kesemua percubaan menunjukkan pemilihan dan objektif pebiakbakaan yang berbeza boleh menyatukan ciri yang berbeza serta kacuksilang di antara dura ini boleh dilakukan untuk penambahbaikan ciri hasil di dalam kelapa sawit.
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I certify that a Thesis Examination Committee has met on 3 May 2012 to conduct the final examination of Mohaimi bin Mohamed on his thesis entitled “Phenotypic and Genotypic Variation in *Tenera* Progenies Derived from Different Sources of *Dura* Crossed with Avros *Pisifera*” in accordance with the Universities and University College Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently submitted for any other degree at Universiti Putra Malaysia or other institutions.

________________________________________
MOHAIMI BIN MOHAMED
Date : 3 May 2012
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td></td>
<td>i</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td></td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td></td>
<td>v</td>
</tr>
<tr>
<td>APPROVAL</td>
<td></td>
<td>vi</td>
</tr>
<tr>
<td>DECLARATION</td>
<td></td>
<td>viii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td></td>
<td>xiii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td></td>
<td>xviii</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td></td>
<td>xix</td>
</tr>
<tr>
<td>CHAPTER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>LITERATURE REVIEW</td>
<td>4</td>
</tr>
<tr>
<td>2.1</td>
<td>Introduction of oil palm and early selection</td>
<td>4</td>
</tr>
<tr>
<td>2.2</td>
<td>Deli dura in Malaysia</td>
<td>6</td>
</tr>
<tr>
<td>2.3</td>
<td>The early oil palm breeding and selection</td>
<td>7</td>
</tr>
<tr>
<td>2.4</td>
<td>Progress in breeding and selection</td>
<td>8</td>
</tr>
<tr>
<td>2.4.1</td>
<td>Breeding programmes at Chemara, Layang-Layang</td>
<td>11</td>
</tr>
<tr>
<td>2.4.2</td>
<td>Breeding programmes at OPRS, Banting</td>
<td>12</td>
</tr>
<tr>
<td>2.4.3</td>
<td>Deli dura breeding programmes in United Plantations Berhad (UPB)</td>
<td>13</td>
</tr>
<tr>
<td>2.4.4</td>
<td>Oil Palm Genetic Laboratory (OPGL) Deli dura breeding programmes</td>
<td>13</td>
</tr>
<tr>
<td>2.4.5</td>
<td>Highland Research Unit (HRU) Deli dura breeding programmes</td>
<td>14</td>
</tr>
<tr>
<td>2.4.6</td>
<td>Johor Labis (SOCFIN) Deli dura breeding programmes</td>
<td>14</td>
</tr>
<tr>
<td>2.5</td>
<td>Breeding and selection in AVROS pisifera population</td>
<td>15</td>
</tr>
<tr>
<td>2.5.1</td>
<td>Early Pisifera breeding in Malaysia</td>
<td>15</td>
</tr>
<tr>
<td>2.5.2</td>
<td>The AVROS pisifera breeding programmes</td>
<td>15</td>
</tr>
<tr>
<td>2.6</td>
<td>Genetic and heritability</td>
<td>18</td>
</tr>
<tr>
<td>2.7</td>
<td>Variation in the oil palm</td>
<td>19</td>
</tr>
<tr>
<td>2.8</td>
<td>Additive and dominance variances and heritability of traits in oil palm</td>
<td>21</td>
</tr>
<tr>
<td>2.9</td>
<td>Heritability estimates</td>
<td>22</td>
</tr>
<tr>
<td>2.9.1</td>
<td>Heritability estimates with different mating systems</td>
<td>23</td>
</tr>
<tr>
<td>2.10</td>
<td>Correlations</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>MATERIALS AND METHODS</td>
<td>25</td>
</tr>
<tr>
<td>3.1</td>
<td>Plant materials</td>
<td>25</td>
</tr>
<tr>
<td>3.1.1</td>
<td>Experiment 1: Comparison between Deli and interspecific duras in full-sib tenera progenies</td>
<td>26</td>
</tr>
<tr>
<td>3.1.2</td>
<td>Experiment 2: Performance of full-sib tenera progenies derived from various sources of Deli dura</td>
<td>26</td>
</tr>
<tr>
<td>3.1.3</td>
<td>Experiment 3: Performance of full-sib tenera progenies derived from various sources of Deli dura</td>
<td>26</td>
</tr>
</tbody>
</table>
3.2 Methodology
3.2.1 Field maintenance
3.2.2 Data collection
   3.2.2.1 Fresh Fruit Bunch (FFB) yield and yield components
   3.2.2.2 Bunch analysis
3.2.3 Measurements of vegetative and physiological traits
   3.2.3.1 Vegetative measurement
   3.2.3.2 Frond production (FP) (no/p/yr)
   3.2.3.3 Palm height (HT) (m) and height increment (HTI) (cm/yr)
   3.2.3.4 Rachis length (RL) (cm)
   3.2.3.5 Leaflet number (LN)
   3.2.3.6 Leaf area index (LAI)
3.2.4 Statistical analyses
   3.2.4.1 Analyses of variance (ANOVA)
3.2.5 Statistical and genetical analyses
   3.2.5.1 Analysis of variance
   3.2.5.1.1 Analysis on female sources
   3.2.5.1.2 Analysis on full-sib families
   3.2.5.1.3 North Carolina Model 1 (NCM1) analysis
3.2.6 Phenotypic correlation studies
3.2.7 Phenotypic (PCV) and genotypic (GCV) coefficients of variation

4 RESULTS
4.1 Experiment 1: Comparison between Deli and interspecific duras in full-sib tenera progenies
   4.1.1 Analysis of variance and progeny means of full-sib families.
      4.1.1.1 Yield and yield components
      4.1.1.2 Bunch components analysis
      4.1.1.3 Oil quality analysis
      4.1.1.4 Vegetative measurements
   4.1.2 Phenotypic and genetic coefficients of variation and heritability estimates for full-sib families in Experiment 1.
      4.1.2.1 Yield and yield components
      4.1.2.2 Bunch component analysis
      4.1.2.3 Oil quality analysis
      4.1.2.4 Vegetative measurements
   4.1.3 Performance of half-sib families
      4.1.3.1 Analysis of variance and progeny means of half-sib families.
         4.1.3.1.1 Yield and yield components
         4.1.3.1.2 Bunch component analysis
         4.1.3.1.3 Oil quality analysis
         4.1.3.1.4 Vegetative measurements
   4.1.4 Performance of DXP progenies based on female sources in Experiment 1.
4.1.4.1 Progeny means of female sources

4.1.4.1.1 Yield and yield components
4.1.4.1.2 Bunch components analysis
4.1.4.1.3 Oil quality analysis
4.1.4.1.4 Vegetative measurements

4.2 Experiment 2: Performance of full-sib tenera progenies derived from various sources of Deli dura

4.2.1 Analysis of variance

4.2.1.1 Yield and yield components
4.2.1.2 Bunch component analysis
4.2.1.3 Oil quality
4.2.1.4 Vegetative measurements

4.2.2 Phenotypic and genetic coefficients of variation and heritability estimates for full-sib families in Experiment 2

4.2.2.1 Yield and yield components
4.2.2.2 Bunch components analysis
4.2.2.3 Oil quality
4.2.2.4 Vegetative measurements

4.2.3 Analysis of variance and progeny means of half-sib families

4.2.3.1 Yield and yield components
4.2.3.2 Bunch components analysis

4.2.4 Phenotypic and genetic coefficients of variation and heritability estimates for half-sib families in Experiment 2

4.2.4.1 Yield and yield components
4.2.4.2 Bunch components analysis
4.2.4.3 Oil quality analysis
4.2.4.4 Vegetative measurements

4.2.5 Analysis of variance and progeny means of DXP progenies based on female sources in Experiment 2

4.2.5.1 Yield and yield components
4.2.5.2 Vegetative measurements

4.3 Experiment 3: Performance of full-sib tenera progenies derived from various sources of Deli dura

4.3.1 Full-sib families

4.3.1.1 Analysis of variance and progeny means of full-sib families
4.3.1.1.1 Yield and yield components
4.3.1.1.2 Bunch components analysis
4.3.1.1.3 Vegetative measurements

4.3.2 Phenotypic and genetic coefficients of variation and heritability estimates for full-sib families in Experiment 3

4.3.2.1 Yield and yield components
4.3.2.2 Bunch component analysis
4.3.2.3 Oil quality analysis
4.3.2.4 Vegetative measurements
4.3.3 Heritability
  4.3.3.1 Yield and yield components
  4.3.3.2 Bunch Component Analysis
  4.3.3.3 Oil quality analysis
  4.3.3.4 Vegetative measurements
4.3.4 Performance of DXP progenies based on female sources in Experiment 3
  4.3.4.1 Progeny means of female sources
    4.3.4.1.1 Yield and yield components
    4.3.4.1.2 Bunch component analysis
    4.3.4.1.3 Oil quality analysis
    4.3.4.1.4 Vegetative measurement
4.4 Correlation studies
  4.4.1 Phenotypic correlations between oil yield and its components for all the populations
5 DISCUSSION
  5.1 Variability and inheritance of characters in the DXP populations
    5.1.1 Yield and yield components
    5.1.2 Bunch components analysis
    5.1.3 Oil quality analysis
    5.1.4 Vegetative measurements
  5.2 Association and contribution of the economic component characters of oil yield
6 CONCLUSION
REFERENCES
BIODATA OF STUDENT