

VARIABILITY AND CORRELATION ANALYSIS OF SOME  
FRUIT CHARACTERS OF SUGAR PALM (*Arenca  
pinnata*) IN UPLAND CAVITE

THESIS

ANGELIQUE M. NOBLE  
DELAIZA S. RABANES

College of Agriculture, Forestry, Environment  
and Natural Resources

CAVITE STATE UNIVERSITY

Indang, Cavite

Cavite State University (Main Library)



T5723

THESIS/SP 633.68 N66 2015

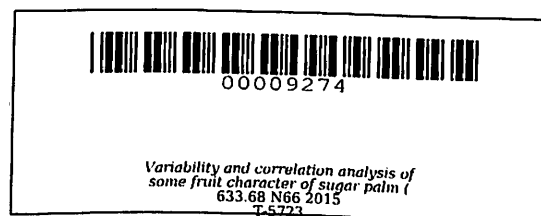
April 2015



**VARIABILITY AND CORRELATION ANALYSIS OF SOME  
FRUIT CHARACTERS OF SUGAR PALM  
(*Arenga pinnata*) IN UPLAND CAVITE**

Undergraduate Thesis  
Submitted to the Faculty of the  
College of Agriculture, Forestry, Environment, and Natural Resources  
Cavite State University  
Indang, Cavite

In partial fulfillment  
of the requirements for the degree  
Bachelor of Science in Agriculture  
(Major in Crop Science)



**ANGELIQUE M. NOBLE  
DELAIZA S. RABANES**  
April 2015

## ABSTRACT

**ANGELIQUE M. NOBLE and DELAIZA S. RABANES, Variability and Correlation Analysis of Some Fruit Characters of Sugar Palm (*Arenga pinnata*) in Upland Cavite.** Undergraduate Thesis. Bachelor of Science in Agriculture Major in Crop Science, Cavite State University, Indang, Cavite. April 2015. Adviser: Analita dM. Magsino, PhD

This study generally aimed to evaluate the fruit variability of sugar palm or *kaong* (*Arenga pinnata*) in upland Cavite, Philippines. Specifically, it aimed to determine the fruit characters of sugar palm; evaluate the correlation among the various fruit characters of sugar palm and select fruit characters which are relevant in the future selection and improvement works in sugar palm.

Eleven fruit characters of 25 sugar palm accessions from Indang, Bailen, Magallanes, Amadeo and Mendez were measured and counted. The variability in all characters was determined using Shannon-Weaver Diversity Index. Correlation coefficients of selected character combination were computed following PROC CORR (SAS System, 1985).

Wide variability was found in fruit weight, fruit length, fruit width, number of fruits per cluster, length of the cluster, aborted fruit per cluster, nut/meat yield and edible portion. Conversely, narrow variability was found in number of nuts per fruit and fruit shape.

Correlations of majority of fruit character combinations were highly significant. Fruit weight and fruit length, fruit weight and fruit width, fruit length and fruit width, and nut/meat yield and edible portion were highly correlated. Number of fruits per cluster and percent aborted fruit per cluster were also highly but negatively correlated. Moderately

positive correlations were found in number of fruits per cluster and length of the cluster and fruit shape and number of nuts per fruit. Weak positive correlations were found in fruit weight and number of nuts per fruit, fruit length and number of nuts per fruit, fruit width and number of nuts per fruit, fruit shape and fruit weight, fruit shape and fruit length, and fruit shape and fruit width. Length of the cluster and percent aborted fruit per cluster had no significant correlation.

The wide variability in fruit characters existing in the natural population of sugar palm in upland Cavite can be exploited in selection and breeding programs. In particular, length of the cluster, fruit weight, and nut yield are the important characters for handling and evaluation of as many sugar palm genotypes as possible.

## TABLE OF CONTENTS

	<b>Page</b>
BIOGRAPHICAL DATA . . . . .	iii
ACKNOWLEDGMENT . . . . .	v
ABSTRACT . . . . .	x
LIST OF TABLES. . . . .	xiv
LIST OF APPENDIX TABLES . . . . .	xv
LIST OF APPENDIX FIGURES. . . . .	xvi
INTRODUCTION . . . . .	1
Statement of the Problem. . . . .	2
Objectives of the Study. . . . .	2
Significance of the Study. . . . .	4
Scope and Limitation of the Study . . . . .	4
Time and Place of the Study . . . . .	5
Definition of Terms. . . . .	6
REVIEW OF RELATED LITERATURE . . . . .	7
Sugar Palm Plant . . . . .	7
Sugar Palm Fruit . . . . .	8
Floral Biology of Sugar Palm . . . . .	9
Mode of Pollination. . . . .	10
Mode of Propagation. . . . .	10
Uses of Sugar Palm. . . . .	11

Sugar Palm Production in the Philippines . . . . .	13
Scientific Studies on Fruit Variability . . . . .	13
METHODOLOGY . . . . .	19
Materials . . . . .	19
Methods. . . . .	19
Selection of Palm . . . . .	19
Collection of Fruit Samples. . . . .	19
Collection of Data. . . . .	19
Research Design. . . . .	21
Analysis of Data. . . . .	21
RESULTS AND DISCUSSION . . . . .	23
Variability of Fruit Characters . . . . .	24
Correlation of Fruit Characters . . . . .	26
Characters Relevant to the Selection and Improvement . . . . .	30
SUMMARY, CONCLUSIONS, RECOMMENDATIONS . . . . .	32
Summary . . . . .	32
Conclusions . . . . .	33
Recommendations. . . . .	34
REFERENCES . . . . .	35
APPENDICES . . . . .	38

## LIST OF TABLES

Table		Page
1	Mean, range, standard deviation and Shannon-Weaver Diversity Index of some fruit characters of sugar palm in upland Cavite . . . . .	25
2	Correlations of characters evaluated in fruit cluster . . . . .	27
3	Correlations of fruit weight, fruit length, fruit width and number of nuts per fruit . . . . .	28
4	Correlation of fruit shape with fruit weight, fruit length, fruit width and number of nuts per fruit . . . . .	29
5	Correlation of nut/meat yield with percent edible portion . . . . .	30

## LIST OF APPENDIX TABLES

Appendix Table		Page
1	Fruit characters of sugar palm in upland Cavite . . . . .	40
2	Simple statistics of number of fruits per cluster length of the cluster and percent aborted fruit per cluster . . . . .	41
3	Simple statistics of fruit weight, fruit length, fruit width and number of nuts per fruit . . . . .	42
4	Simple statistics of nut/meat yield and percent edible portion. . . . .	43



## LIST OF APPENDIX FIGURES

Appendix Figure		Page
1	Selection of source palms . . . . .	44
2	Gathering of fruit bunch and clusters . . . . .	45
3	Detaching and counting of fruits from the clusters . . . . .	46
4	Measurement of the length of the clusters . . . . .	47
5	Selection of 100 fruit samples per accession . . . . .	48
6	Measurement of the fruit weight . . . . .	49
7	Measurement of the fruit length and fruit width . . . . .	50
8	Cooking of nuts for 3 hours . . . . .	51
9	Number of nuts per fruit . . . . .	52
10	Nut yield from 100 fruit samples . . . . .	53
11	Farmer from BancodIndang, Cavite . . . . .	54
12	Farmer from Bailen, Cavite . . . . .	55
13	Farmer from PangilAmadeo, Cavite . . . . .	56
14	Farmer from Bgy. Maysili Mendez, Cavite . . . . .	57

**VARIABILITY AND CORRELATION ANALYSIS OF SOME FRUIT  
CHARACTERS OF SUGAR PALM (*Arenga pinnata*)  
IN UPLAND CAVITE**

**Angelique M. Noble  
Delaiza S. Rabanes**

---

Undergraduate thesis submitted to the faculty of the Department of Crop Science, College of Agriculture, Forestry, Environment and Natural Resources, Cavite State University, Indang, Cavite in partial fulfillment of the requirements for the degree of Bachelor of Science in Agriculture, Contribution No. BSA - 2014 - 2015 - 12.  
Prepared under supervision of Dr. Analita dM. Magsino.

---

**INTRODUCTION**

Sugar palm or *kaong* is found growing abundantly throughout the country in natural stands. It is a shade loving species which thrives well along the side of streams, riverbanks and ravines (Florido & De Mesa, 2003). It also can be found in virgin forests as its fruits are occasionally scattered by fruit bats and wild animals like the Southern Luzon slender-tailed cloud rat (*Phloemys cumingi*), palm civet (*Paradoxuru hermaphroditus*) and oriental civet (*Viverra zibetha*).

In the province of Cavite, *kaong* is abundantly found although its population is steadily declining through the years. Its natural regeneration has been hindered by several environmental factors. Indang has the most number of plants growing in natural stands.

Large variability in phenotypic characters exists in sugar palm brought about by seed propagation and open pollination. Evaluation of such wide differences among palms