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Studies on Bali Salak Cultivars
(*Salacca zalacca* var. *amboinensis*)
(Areceaceae)



Thesis submitted by
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in December 2005

for the degree of Master of Science
in Tropical Plant Sciences
within the School of Tropical Biology
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ABSTRACT

Bali salak cultivars (*Salacca zalacca* var. *amboinensis*) (Arecaceae) commonly grow in Bali and other areas of the Indonesian archipelago and are of considerable value as a trade commodity because of their edible fruits. The thirteen cultivars that are currently recognised in Bali are distinguished from each other on the basis of fruit colour and taste. The research reported in this thesis documents the variability in Bali salak cultivars and provides a method for their reliable identification prior to fruiting. This involved analysis of vegetative anatomical and morphological characters as well as reproductive characters of all 13 cultivars.

Analysis of variance (ANOVA) was used to analyse the quantitative features to determine which characters differed significantly between cultivars. Multivariate techniques of cluster analysis and multidimensional scaling (MDS) were used to delimit and test groups of cultivars. Means for 17 of the 42 quantitative characters differed significantly ($p \leq 0.05$) and nine of the qualitative characters showed distinct variation between the cultivars. Cluster analysis of quantitative and qualitative characters established that the 13 cultivars grouped into four distinct clusters. MDS indicated that plant height, leaf length, middle leaflet length, female flower length, adaxial cell length, periclinal cell wall pattern, flesh taste, presence of fruits and seeds, which had square correlation values of more than 0.7, are reliable discriminators of cultivars. This study showed that anatomical and morphological characters and reproductive characters can be used as diagnostic tools to identify the 13 Bali salak cultivars. However, based on the multivariate analysis, it is proposed that this 13 be reduced to eight. The eight cultivars recognised in this study are Muani, Bingin, Putih, Nyuh, Maong, Boni, Gula and Biasa. Keys and descriptions of each cultivar are provided and recommendations are made for future research in *Salacca zalacca* var. *amboinensis*.

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TABLE OF CONTENTS

Title.....	i
Statement of Access.....	ii
Declaration.....	iii
Abstract.....	iv
Acknowledgements.....	v
Table of contents.....	vi
List of Figures.....	i x
List of Tables.....	x i
Glossary of Terms.....	xiii

CHAPTER 1 General Introduction

1.1	Background.....	1
1.2	Salacca.....	7
	1.2.1 Distribution.....	7
	1.2.2 Ecology.....	8
	1.2.3 Generic description of <i>Salacca</i>	8
	1.2.4 Classification.....	10
1.3	Research aims.....	12
1.4	Significance of the research.....	12
1.5	Scope of the research.....	12

CHAPTER 2 Analysis of Leaf Anatomical Characters of 13 Bali Salak Cultivars

2.1	Introduction.....	14
2.2	Epidermal cells.....	16
	2.2.1 Cell size.....	16
	2.2.2 Cell shape.....	16
2.3	Stomata.....	18
	2.3.1 Stomatal distribution.....	18
	2.3.2 Stomatal structure.....	19
	2.3.3 Guard cells.....	19
2.4	Epidermal studies on some Palms.....	22
2.5	Results of preliminary studies.....	23
2.6	Specific aims.....	24
2.7	Methods.....	24
	2.7.1 Plant materials and sampling sites.....	24

2.7.2	Sampling leaves for microscopy.....	25
2.7.3	Scanning electron microscopy (SEM).....	27
2.7.4	Light microscopy (LM).....	28
	2.7.4.1 Preparation of leaf epidermal peels.....	28
	2.7.4.2 Observation of leaf epidermal characters.....	32
	2.7.4.3 Paraffin embedding sections.....	34
2.8	Data analyses.....	34
2.9	Results.....	35
2.9.1	Scanning electron microscopy.....	35
2.9.2	Light microscopy.....	40
	2.9.2.1 Cell shapes, anticlinal cell walls, thickening on anticlinal walls, stomatal shape, stomatal occurrence, and stomatal orientation.....	40
	2.9.2.2 Analysis of variance (ANOVA).....	43
	2.9.2.3 Cell length, cell width, ratio of cell length to width.....	43
	2.9.2.4 Guard cells.....	47
	2.9.2.5 Stomatal density.....	47
	2.9.2.6 Stomatal index.....	47
	2.9.2.7 Stomatal apparatus in transverse section.....	48
2.10	Discussion.....	50

CHAPTER 3

Evaluation of Vegetative and Reproductive Characters of 13 Bali Salak Cultivars

3.1	Introduction.....	56
3.2	Specific aims.....	58
3.3	Methods.....	58
	3.3.1 Vegetative characters.....	58
	3.3.2 Reproductive features.....	59
	3.3.3 Data analyses.....	61
3.4	Results.....	61
	3.4.1 Vegetative morphology.....	61
	3.4.2 Reproductive morphology.....	67
	3.4.2.1 Flowers.....	67
	3.4.2.2 Pollen analysis under SEM and LM.....	67
	3.4.2.3 Fruits.....	74
3.5	Discussion.....	77

CHAPTER 4

Discrimination Among 13 Bali Salak Cultivars Using Phenetic Analysis of Anatomical and Morphological Characters

4.1	Introduction.....	80
4.2	Specific aims.....	81
4.3	Methods.....	81
	4.3.1 Character selection.....	81
	4.3.2 Multivariate analyses.....	81

4.4	Results.....	84
	4.4.1 Cluster analysis (CA).....	84
	4.4.2 Multidimensional scaling (MDS).....	86
4.5	Discussion.....	91

CHAPTER 5

The Taxonomy of Bali Salak Cultivars

5.1	Introduction.....	93
5.2	Description of the genus <i>Salacca</i>	94
5.3	Discussion of the selected characters with diagnostic value.....	97
5.4	A key to species of <i>Salacca</i>	100
5.5	Description of <i>Salacca</i> species.....	101
5.6	A Key to the currently recognised cultivars of Bali salak.....	114
5.7	A Key to the eight cultivars proposed for Bali salak based on the results of this study.....	115
5.8	Description of currently recognised Bali salak cultivars.....	115
5.9	Discussion.....	122
	5.9.1 <i>Salacca</i> species.....	122
	5.9.2 Bali salak cultivars.....	122

CHAPTER 6

General Conclusion

6.1	Leaf epidermal study conclusion.....	124
6.2	Vegetative morphological and reproductive characters.....	124
6.3	Phenetic Analysis.....	125
6.4	Taxonomy.....	125
6.5	Future Research in the Bali Salak Cultivars.....	126

REFERENCES	127
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APPENDICES	133
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The numeric prefix for each Appendix refers to the relevant chapter.

Appendix 2.1.....	134
-------------------	-----

Appendix 2.2.....	135
-------------------	-----

Appendix 2.3.....	136
-------------------	-----

Appendix 3.1.....	139
-------------------	-----

Appendix 3.2.....	142
-------------------	-----

LIST OF FIGURES

Figure 1.1	Map of Bali Island in the Indonesian archipelago showing the area from which samples of Bali salak were taken	2
Figure 1.2	The fruit of Bali salak, with variation of brown scales and yellowish flesh of Nanas cultivar	3
Figure 1.3	The fruit of Bali salak, with variation of a red flesh of Boni cultivar and golden yellow scales of Putih cultivar	3
Figure 1.4	The Bali salak plant (<i>Salacca zalacca</i> var. <i>amboinensis</i>).....	7
Figure 1.5	The Bali salak plant (<i>Salacca zalacca</i> var. <i>amboinensis</i>) showing a petiole with a channel, a pinnate leaf shape, a bifid terminal leaflet and a fruit bunch.....	9
Figure 2.1	The eight basic patterns of anticlinal cell walls as seen in surface view of leaf epidermis.....	17
Figure 2.2	Diagram of stomatal apparatus in surface view (Wilkinson, 1979)	20
Figure 2.3	Diagrammatic representation of the stomatal apparatus in transverse section (Wilkinson, 1979).....	20
Figure 2.4	Sampling procedure used for analysing leaf epidermal characters of 13 Bali salak cultivars.....	25
Figure 2.5	The position of leaf sampled for leaf epidermal observation.....	26
Figure 2.6	The position of the leaflets sampled from the fronds for leaf epidermal analysis.....	26
Figure 2.7	Epidermal peels of Bali salak cultivars using light microscopy produced from three different methods: Artschwager (1930), Ram and Nayer (1974) and Hilu and Randall (1984).....	30
Figure 2.8	The sampling data used for analysing the leaf epidermal cells of Bali salak cultivars.....	32
Figure 2.9	Scanning electron micrographs of adaxial leaf surfaces of Bali salak cultivars.....	37
Figure 2.10	The scanning electron micrographs of abaxial leaf surfaces of Bali salak cultivars.....	38
Figure 2.11	Scanning electron micrographs of abaxial leaf surfaces of Bali salak cultivars showing variation in guard cell position.....	39

Figure 2.12	The light microscope images of leaf epidermal surfaces of Bali salak cultivars showing leaf epidermal cells and stomata on adaxial and abaxial surfaces	41
Figure 2.13	Light microscope images of leaf epidermal surfaces of Bali salak cultivars showing that stomata were rare on the adaxial surface (A,C,E) and much more frequent on the abaxial surface (B,D,F).	42
Figure 2.14	Transverse sections of Bali salak lamina showing the positions of the guard cells in relation to the surrounding epidermal cells.....	49
Figure 3.1	The variation in spine density of Nanas and Nyuh cultivars (<i>Salacca zalacca</i> var. <i>amboinensis</i>).....	65
Figure 3.2	Leaves of Bali salak cultivars (<i>Salacca zalacca</i> var. <i>amboinensis</i>)	66
Figure 3.3	Flowers of Bali salak cultivars.....	70
Figure 3.4	Anthers of Bali salak cultivar (<i>Salacca zalacca</i> var. <i>amboinensis</i>) showing numerous of pollen grains.....	71
Figure 3.5	Pollen observed of Bali salak cultivar (<i>Salacca zalacca</i> var. <i>amboinensis</i>) using scanning electron microscopy	72
Figure 3.6	Pollen features of Bali salak cultivar (<i>Salacca zalacca</i> var. <i>amboinensis</i>) observed using light microscope showing the low number of nonaborted pollen grains	73
Figure 3.7	The variations in fruit size of Bali salak cultivars	75
Figure 3.8	Variation in the scale and flesh colour of Bali salak cultivars	76
Figure 4.1	The dendrogram of 13 Bali salak cultivars which resulted from the UPGMA fusion strategy based on Gower's similarity.....	85
Figure 4.2	Scatter plots from the ordination analyses of Multidimensional scaling (MDS) in 3 dimensions of 26 characters of Bali salak cultivars	86

LIST OF TABLES

Table 1.1	The number of Bali salak plants grown in eight Bali districts from 1989 to 1993 (Oka 1995)	4
Table 1.2	The annual production of Bali salak fruits (tonnes) from 1989 to 1993, in eight Bali districts (Oka 1995)	4
Table 1.3	Fruit characteristics of the Bali salak cultivars grown in Sibetan village, Karangasem, Bali based on Wijana (1997)	5
Table 1.4	The species names and the areas of distribution of <i>Salacca</i> species throughout South East Asia, adapted from Moge 1981b and Govaerts and Dransfield (2005)	11
Table 2.1	The types and characteristics of stomata found in various plants. Adapted from Dilcher (1974) and Wilkinson (1979).....	21
Table 2.2	The characters used for analysing leaf epidermal features of Bali salak cultivars using electron microscopy.....	27
Table 2.3	The results of boiling leaves of Bali salak cultivars in various concentrations of nitric acid	31
Table 2.4	The characters and measurements used for analysing leaf epidermal features of Bali salak cultivars under the light microscope	33
Table 2.5	The leaf epidermal features of 13 Bali salak cultivars (<i>Salacca zalacca</i> var. <i>amboinensis</i>) under SEM observations (surface view)	36
Table 2.6	The summary of statistical results from ANOVA ($p \leq 0.05$) of 10 quantitative measurements of leaf epidermal features of 13 Bali salak cultivars	44
Table 2.7	The leaf epidermal features of 13 Bali salak cultivars (<i>Salacca zalacca</i> var. <i>amboinensis</i>) based on quantitative measurements	45
Table 2.8	The stomatal features of 13 Bali salak cultivars (<i>Salacca zalacca</i> var. <i>amboinensis</i>) based on quantitative measurements	46
Table 3.1	The characters used in analysing vegetative features of Bali salak cultivars	59
Table 3.2	The 15 characters used for analysing flower features of Bali salak cultivars.....	60
Table 3.3	The 12 vegetative features of 13 Bali salak cultivars (<i>Salacca zalacca</i> var. <i>amboinensis</i>) based on field measurements	63

Table 3.4	The reproductive features of 13 Bali salak cultivars (<i>Salacca zalacca</i> var. <i>amboinensis</i>) based on length (L) and width (W) of flower measurements	68
Table 3.5	The percentage of nonaborted (dark pink) pollen grains of Bali salak cultivars (<i>Salacca zalacca</i> var. <i>amboinensis</i>) observed using light microscopy.....	74
Table 3.6	The fruit features of 13 Bali salak cultivars (<i>Salacca zalacca</i> var. <i>amboinensis</i>) based on fruit weight and presence or absence of fruits and seeds	75
Table 4.1	The characters and their states used in scoring the specimens for multivariate analysis	82
Table 4.2	The 26 characters and their ordination space in three dimensions and their correlation values resulting from PCC analysis	88
Table 4.3	Data matrix used in the multivariate analysis of the 13 Bali salak cultivars (<i>Salacca zalacca</i> var. <i>amboinensis</i>).....	89
Table 5.1	Mean values and ranges of characters used for describing the 13 Bali salak cultivars (<i>Salacca zalacca</i> var. <i>amboinensis</i>)	116

GLOSSARY OF TERMS

abaxial – the side of an organ that faces away from the axis that bears it, for example, the under surface of the leaf.

adaxial – the side of an organ that faces toward the axis that bears it, for example, the upper side of the leaf.

amphistomatic – stomata on both upper and lower epidermis.

anisocytic – stomata surrounded by three unequally sized cells.

anomocytic – the cells surrounding each stomata are not recognizably different from the remaining epidermal cells.

aperture – a specialized region of a pollen grain wall, that is thinner than the remainder of the wall and generally differs in ornamentation and/or in structure.

cyclocytic – stomata have a ring of subsidiary cells of more or less equal size.

diacytic – stomata surrounded by two subsidiary cells.

disulcate – referring to pollen structure with two furrow like apertura.

echinate – referring to exine structure which bears spinelike sculpturing elements.

helicocytic – stomata are surrounded by a helix of four or more cells.

hypostomatic – stomata only on the lower epidermis.

inaperturate – referring to pollen structure without aperture.

meridionosulcate – a pollen grain with an encircling sulcus.

monosulcate – referring to pollen structure with one furrow like aperture.

paracytic – one or two subsidiary cells enclosing the guard cell length at right angles to the longitudinal axis of the guard cells.

plicate leaves – a situation in which the leaflets remain fused, as seen in seedling leaves.

polyembryony – referring to the development of more than one embryo from a single egg or ovule.

reticulate – referring to exine structure which consists of a network enclosing small, often in irregular spaces.

scabrate/granulate – a general term for sculpturing elements of exine which is less than 1 μm diameter and varying in shape.

sporoderm – the entire wall of a pollen grain or spore.

staurocytic – stomata surrounded by three subsidiary cells.

subsidiary cell – epidermal cells surrounding the guard cells.

tetracytic – stomata surrounded by four subsidiary cells.

vivipary – a situation that occurs when the embryo breaks through the seed coat (and defies natural growth inhibitors) to begin growing, sometimes while the fruit is still attached to the parent plant.