



UNIVERSITI PUTRA MALAYSIA

**PRODUCTION OF PLANTING STOCK FROM KACIP FATIMAH
[*LABISIA PUMILA* (Bl.) F.VIII & Neves] THROUGH CUTTINGS**

ROZIHAWATI HJ. ZAHARI

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BY

ROZIHAWATI HJ. ZAHARI

**Thesis Submitted to the School of Graduate Studies, Universiti Putra
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Science**

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in
fulfilment of the requirement for the degree of Master of Science

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Labisia pumila (Bl.) F.Vill & Naves (Myrsinaceae) has been traditionally used by Malay women in parturition. Three different varieties of this species were identified and found in Malaysia: viz *pumila*, *alata* and *lanceolata*. However, two of its varieties i.e *pumila* and *alata* have been commonly used in traditional medicine and researched as they are more readily available than *lanceolata*.

The increase in logging activities and encroachment in forests caused a decline in the production of *L. pumila* from its natural stands. This problem is further aggravated by its slow growth in natural forests. Moreover, it is difficult to obtain planting material from the wild. In order to address the



demand of *L. pumila*, it is necessary to find alternative methods of production, specifically vegetative propagation by cuttings, to ensure regular supply of its planting stock. This study aims to explore the possibility of mass producing *L. pumila* using different propagation systems (misting and non misting), plant parts (stem, petiole and leaf) of two varieties (*alata* and *pumila*) and rooting media (river sand, sawdust and 1:1 v/v mixture of river sand and sawdust). This study utilized a Strip-Split Plot (SSPD) in a Randomised Complete Block Design (RCBD). This experiment was conducted in FRIM, Kepong's, nursery.

Results after three months propagation indicated that there were significant differences in all treatments with regards to root and shoot growth. Cuttings of var. *alata* produced better than var. *pumila* in terms of root and shoot growth. Propagation in misting systems produced cuttings with higher rooting ability (84%) compared to the ones in non-misting system (72%). However, cuttings in the non-misting system showed higher shooting ability (28%). Cuttings grown in 100% river sand produced higher root and shoot abilities (87% and 26%) than those raised on mixture of 1:1 river sand and sawdust (76% and 24%) and sawdust alone (72% and 23%). Propagation using stem cuttings were found to be the best compared to leaf and petiole cuttings. Based on the elongation of root cells, stem cuttings of variety *alata* was found to be better than *pumila*. The elongation of root cell cuttings in those



three media, showed a young root primordium elongated through the cortex from parenchyma phloem cell. These root cells were bigger size grown on sawdust and mixture of river sand and sawdust compared to river sand alone. Again, stem cuttings showed the best growth performance than the other plant parts based on height and diameter. In addition, upon chemical analysis of these cuttings, the flavonoids and resorcinol-derivatives content increased in mother plant of var. *alata*. However, stem rooted cuttings of var. *alata* had decreased in resorcinol-derivatives, which means it will give less adverse effects to humans compared to var. *pumila* cuttings.

The results of this research demonstrated that *L. pumila* var. *alata* stem cuttings could be possibly propagated vegetatively through rooting of cuttings with favorable treatments such those raised on river sand medium under the misting propagation system.



Abstrack tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Master Sains

**STOK PENGELUARAN TANAMAN BAGI KACIP FATIMAH [*LABISIA*
PUMILA (Bl.) F.Vill & Neves] MENGGUNAKAN KERATAN**

Oleh

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Labisia pumila (Bl.) F.Vill & Naves (Myrsinaceae) adalah sejenis tumbuhan ubatan yang popular digunakan untuk rawatan tradisional khususnya untuk wanita Melayu ketika selepas bersalin. Terdapat tiga jenis varieti yang telah ditemui dan dikenalpasti di Malaysia iaitu, *pumila*, *alata* and *lanceolata*. Namun, hanya dua varieti sahaja bagi spesis ini yang selalu digunakan dalam rawatan tradisional dan penyelidikan, ianya adalah varieti *pumila* dan *alata*. Aktiviti-aktiviti pembalakan dan pencerobohan sumber hutan yang tidak terkawal telah mengakibatkan kemerosotan sumber herba khususnya Kacip Fatimah (*L. pumila*). Tambahan pula pertumbuhan Kacip Fatimah adalah lambat dan semakin sukar didapati di kawasan hutan asli. Memandangkan permintaan ke atas spesis ini adalah sangat tinggi, kaedah pembiakan tampang merupakan salah satu kaedah yang dapat menghasilkan stok tanaman ini yang mencukupi.



Kajian ini bertujuan untuk mencari kaedah penghasilan stok melalui keratan menggunakan keratan batang, petiol dan daun. Kajian ini juga melibatkan penggunaan dua varieti iaitu *alata* dan *pumila* yang ditanam dalam media pengakaran yang berbeza iaitu 100% pasir sungai, 100% habuk kayu dan campuran (1:1 v/v) pasir sungai dan habuk kayu dengan teknik sistem renjisan dan tanpa renjisan. Rekabentuk eksperimen yang digunakan ialah “Strip-Split Plot” (SSPD) dalam RCBD (“Randomised Complete Block Design”). Ujikaji ini telah dijalankan di Tapak Semaian, FRIM, Kepong, Selangor.

Keratan menggunakan var. *alata* menghasilkan pertumbuhan akar serta pucuk yang lebih baik daripada var. *pumila*. Keratan yang ditanam menggunakan sistem renjisan menunjukkan keupayaan pengakaran yang paling tinggi (84%) berbanding dengan sistem tanpa renjisan (72%). Bagaimanapun, sistem tanpa renjisan menunjukkan keupayaan pertumbuhan pucuk yang lebih baik daripada keratan yang ditanam secara sistem renjisan. Keratan yang ditanam di dalam media 100% pasir sungai pula mencatatkan pengakaran dan pertumbuhan pucuk yang terbaik (87% dan 26%) berbanding dengan media campuran pasir sungai dan habuk kayu (76% dan 24%) dan media 100% habuk kayu (72% dan 23%). Keratan batang memberikan pertumbuhan yang terbaik dari segi pertumbuhan akar dan pucuk berbanding dengan keratan daun dan petiol. Hasil kajian keratan

rentas bagi setiap jenis keratan yang berakar telah menunjukkan bahawa keratan batang adalah mudah berakar berbanding dengan keratan petiol dan daun. Keputusan varieti *alata* masih juga menunjukkan tumbesaran yang lebih baik daripada varieti *pumila* dan bahagian keratan batang menghasilkan keputusan tahap tumbesaran dari segi ketinggian dan diameter yang paling tinggi jika dibandingkan dengan keratan daun dan petiol. Keputusan analisis kimia menunjukkan bahawa kandungan kimia seperti flavonoid dan resorcinol-derivatif terdapat banyak pada pokok ibu var. *alata*. Sebaliknya, anak keratan batang bagi var. *alata* mengandungi sedikit sahaja kandungan resorcinol-derivatif, yang mana ianya akan memberi kesan yang kurang negatif terhadap manusia jika dibandingkan dengan penggunaan anak keratan bagi var. *pumila*.

Keputusan kajian ini telah mempamerkan bahawa varieti *alata* dan keratan bahagian batang yang ditanam pada media pengakaran 100% pasir sungai merupakan keperluan optimum bagi menghasilkan stok pengeluaran yang banyak dan lebih praktikal secara keratan untuk *L. pumila*.



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I certify that an Examination Committee has met on 14th April 2008 to conduct the final examination of Rozihawati Zahari on her Master science thesis entitled “Production of planting stock from *Labisia pumila* (Bl.) F. Vill & Neves (kacip fatimah) through cuttings” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the student be awarded the degree of Master science.

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DECLARATION

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

ROZIHAWATI HJ. ZAHARI

Date: 05 May 2008



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LIST OF ABBEVIATIONS

ANOVA	Analysis of variance
cm	Centimeter
HPLC-DAD	High Performance Liquid Chromatography / Diode Array Detector
LSD	Least Significant Difference
mm	Millimeter
nm	Nanometer
PAR	Photosynthetic Active Radiation
RCBD	Randomised Complete Block Design
RH	Relative Humidity
SAS	Statistical Analysis System
SSPD	Strip-split plot Design
VPD	Vapour pressure deficit
v/v/v	Volume/volume/volume



CHAPTER 1

INTRODUCTION

1.1 General

Malaysia is one of the tropical countries blessed with great valuable resources including medicinal and aromatic plants. There are about 12,500 species of seed plants and 5000 species of cryptogams being estimated in the tropical natural forest. However, only 2000 species have been reported to have medicinal potentials (Latiff, 1994). Today, medicinal plants constitute an important group among all of mankind's natural resources (Kanta *et al.*, 1998). In addition, the conservation, cultivation, collection and processing of raw material of medicinal plants have been assumed as a large formal market nowadays (Kanta *et al.*, 1998).

The production of herbal medicine and aromatic plants began to gain attention and becoming popular. The import of herbal medicine into Malaysia exceeded the export values (Lattif, 1997; Norini and Mohd Azmi, 2004). According to the Department of Statistics of Malaysia, the total import value of medicinal and aromatic plants increased from RM 140 million to more than RM 600 million between 1986 and 2002, while the export values also increased from RM 17 million to RM 45 million in 1990 and 2002 respectively (Norini and Mohd Azmi, 2004).



This country which geared its efforts towards drug discovery has given high priority to screening phytochemicals to combat diseases such as AIDS, cancer, diabetes, heart diseases, inflammation and malaria. Many aromatic plant species in local rain forests can be potentially used for the production of essential oils, turpentine, flavours and fragrances (Azizol and Rasadah, 1999).

One of the herbs that has a tremendous potential in the herbal industry production is *Labisia pumila* (Mohd Setafarzi, 2000). This species can be found in tropical and subtropical regions including Indo China and Malaysia (Burkill, 1966). In Malaysia it is locally known by various names such as “Selusuh Fatimah” (literally Fatimah’s childbirth medicine), “Rumput Siti Fatimah” (grass of our lady Fatimah), “Kunci Fatimah” (Fatimah’s key), “Pokok pinggang” (waist tree), “Rumput palis” (modesty grass), “Tadah matahari” (intercepting the sun), “Mata pelanduk rimba” (forest mousedeer’s eye) and “Bunga Belangkas Hutan” (woodland Kingcrab’s flower) (Burkill, 1935). However, the most common name preferred or used by the Malays is “Kacip Fatimah” which means Fatimah’s betel scissors. According to Jamia Azdina (2004), *L. pumila* has three varieties viz; *pumila*, *alata* and *lanceolata*. Generally, only two varieties i.e *pumila* and *alata* have been commonly used in the traditional medicine and researched as they are readily available than the *lanceolata* based on their resources distributions.