



***THE EFFECTS OF DIFFERENT BAP CONCENTRATIONS ON AXILLARY
BUDDING AND BRANCHING OF *Orthosiphon stamineus* PLANT***

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BY

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**A project report submitted to Faculty of Agriculture, Universiti Putra Malaysia,
in fulfilment of the requirement of PRT 4999(Final Year Project) for the award
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CERTIFICATION

This project report entitled “The Effects of Different BAP Concentrations on Axillary Budding and Branching of *Orthosiphon stamineus* plant” is prepared by Siti Sarah binti Mohd Sinin and submitted to the Faculty of Agriculture in fulfilment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Horticultural Science.

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LIST OF SYMBOLS AND ABBREVIATIONS

%	=	Percentage
MeOH	=	Methanol
NKEA.	=	National Key Economic Area
GNI	=	Gross National Income
n.d.	=	No Date
et. al	=	Et Alia
BAP	=	6-Benzylaminopurine
mg/L	=	Milligram Per Liter
Cm	=	Centimeter
pH	=	Hydrogen Ion Concentration / -Log (H ⁺)
Mg	=	Milligram
M	=	Molar Concentration
L	=	Liter
NaOH	=	Sodium Hydroxide
ml	=	Milliliter
RCBD	=	Randomized Complete Block Design
SAS	=	Statistical Analysis System
ANOVA	=	Analysis of Variance
DMRT	=	Duncan's Multiple Range Test

ABSTRACT

Orthosiphon stamineus or commonly known as “misai kucing” in Malaysia is one of the medicinal herb from Lamiaceae family that originates from Southeast Asia. It has several important uses in terms of medicinal and economic value and as ornamental plant. *Orthosiphon stamineus* is currently propagated by stem cuttings for production of planting materials. However, propagation through stem cutting resulted in inadequate supply of planting materials for large market demand. In order to solve this problem, application of BAP (6-Benzylaminopurine) could trigger axillary branching and thus produce large quantity of stem cutting for production of planting materials. A study was conducted by using different concentration of BAP to trigger axillary branching of *Orthosiphon stamineus* plant. This experiment was carried out at the Tissue Culture Laboratory, Department of Agriculture Technology, Faculty of Agriculture, Universiti Putra Malaysia. There were five treatments of BAP at different concentrations which are 0, 25, 50, 75, and 100 mg/L with six replications for each treatment. The experiment was conducted using randomized complete block design (RCBD). Analysis of data is carried out using ANOVA and treatments mean was tested using DMRT test. The plants growth was monitored for 4 weeks. Number of days taken for bud proliferation, number of axillary shoots proliferation and the length of branching was recorded. A 50mg/L BAP concentration sprayed on nodes of *Orthosiphon stamineus* plant is better treatment since the plant produced high axillary proliferation (14.5). However, the application of BAP at different concentration on the nodes of the plant reduced its branching length.

ABSTRAK

Orthosiphon stamineus atau lebih dikenali sebagai " misai kucing " di Malaysia adalah salah satu tumbuhan perubatan herba dari keluarga Lamiaceae yang berasal dari Asia Tenggara. Ia mempunyai beberapa kegunaan penting dari segi nilai perubatan dan ekonomi dan juga sebagai tumbuhan hiasan. Pada masa ini, *Orthosiphon stamineus* dibiakkan melalui kaedah keratan batang sebagai sumber pengeluaran bahan penanaman. Walau bagaimanapun, pembiakan melalui keratan batang adalah tidak mencukupi bagi memenuhi permintaan pasaran yang besar. Untuk menyelesaikan masalah ini, aplikasi BAP (6-Benzylaminopurine) boleh menggalakkan penghasilan percabangan aksil dan dengan itu meningkatkan kuantiti keratan batang untuk pengeluaran bahan penanaman. Satu kajian telah dijalankan dengan menggunakan kepekatan BAP berbeza untuk merangsang pertumbuhan cabang aksil pokok *Orthosiphon stamineus* . Eksperimen ini telah dijalankan di Makmal Kultur Tisu , Jabatan Teknologi Pertanian, Fakulti Pertanian, Universiti Putra Malaysia. Terdapat lima rawatan kepekatan BAP yang berbeza iaitu 0, 25, 50, 75, dan 100 mg / L dengan enam replikasi untuk setiap rawatan. Eksperimen ini dijalankan menggunakan reka bentuk blok penuh berawak (RCBD). Analisis data dijalankan dengan menggunakan ANOVA dan rawatan bermakna telah diuji menggunakan ujian DMRT. Pertumbuhan tumbuhan ini telah dipantau selama 4 minggu. Bilangan hari diambil untuk percambahan tunas, bilangan percambahan tunas aksil dan panjang cabang telah direkodkan. BAP yang disemur pada kepekatan 50mg / L pada nod pokok *Orthosiphon stamineus* adalah kepekatan yang paling terbaik memandangkan pokok tersebut menghasilkan percambahan tunas aksil yang tinggi (14.5). Walau bagaimanapun, aplikasi kepekatan BAP yang berbeza pada nod pokok ini mengurangkan pemanjangan cabang tunas yang terbentuk.

Chapter 1

Introduction

1.1 *Orthosiphon stamineus*

Orthosiphon stamineus or locally known as “misai kucing” in Malay is one of the popular medicinal herbs belonging to the Lamiaceae family (Chan and Loo, 2006). This plant has other names such as Indischer Nierentee (German), Koemis koetjing (Dutch), Kumis kucing (Indonesian), Java tea (English) and feuilles de barbiflore (French) (Indubala and Ng, 2000). This herbaceous plant is native in Southeast Asia particularly Malaysia and Indonesia. It was introduced to Europe since early 1920, where it became a popular herbal tea (Indubala and Ng, 2000). The popularity of this plant as herbal tea began to attract researcher’s interest to carry out research on various aspect of this plant.

O. stamineus can be seen growing wild along the roadside, forest edges and wasteland. Apart from growing in the wild, it is also being planted in large-scale in fields for commercialization and in housing areas as an ornamental plant. This plant can be propagated easily and is suitable to be planted with different types of soil, including sandy soil and alluvium soil. This plant can grow successfully with monthly rainfall of 180 – 200 cm. Irrigation is important during the drought season. Lacking of water will caused the plant to produce small, hard and wilted leaves. *O. stamineus* requires moist area to reach a maximum vegetative growth (Jabatan Pertanian, n.d).

O. stamineus plant can be propagated through stem cutting. Rooting of stem cutting of this species is easy. Plants produced through this method are more uniform

and mature earlier (Hartmann *et al.*, 2002). However commercial production of planting materials through stem cutting is not adequate to supply the large market demand of this species. Hence, the application of 6-Benzylaminopurine (BAP) could trigger axillary budding and branching and thus produce large quantity of stem cutting as planting materials.

1.2 Objective

To determine the suitable BAP concentration for optimizing axillary budding and branching of *Orthosiphon stamineus* plant.

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