



UNIVERSITI PUTRA MALAYSIA

**GROWTH AND QUALITY OF MUTANT *Axonopus compressus*
CULTIVARS UNDER DIFFERENT GROWING MEDIA**

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BY

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**A project report submitted to the Faculty of Agriculture, Universiti Putra
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of the degree of Bachelor of Horticultural Science**

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CERTIFICATION

This project report '**Growth and Quality of Mutant *Axonopus compressus* Cultivars Under Different Growing Media**' was prepared by Munifah Siti Amira Binti Yusuf and submitted to the Faculty of Agriculture in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of Bachelor in Horticultural Science.

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ABSTRACT

Growing media is any organic or inorganic materials used for plants to grow. Different cultivars of turf grass species showed different responses towards different growing media. An experiment was conducted at the Unit Turf, UPM to evaluate the growth and quality of mutant *Axonopus Compressus* cultivars under different growing media. This study consist of one original cultivar of *Axonopus compressus* and four mutant cultivars of *Axonopus compressus* that were collected at Unit Turf Faculty of Agriculture UPM. The grasses were grown in plastic trays with the size of 37cm length X 27 cm width X 10 cm depth, containing four different growing media which were 100% sand (1 sand), 100% top soil (1 top soil), ratio of 3 top soil : 2 peat grow : 1 sand, and ratio of 8 sand : 2 peat grow. There were 80 trays (37cm x 27 cm x 10 cm) were used in this experiment and were arranged in factorial (5 cultivars x 4 media) experiment using Randomized Complete Block Design (RCBD) with four replications.

Turf grass growth and quality were determined through several parameters that include growth rate cover, shoot and root dry and fresh weight, leaf length and width, internodes length, shoot density, turf grass color, root volume and root length. Starting from week 9 until week 12 of planting, the data of growth rate cover, leaf width, leaf length and shoot density were recorded weekly. The data of leaf colour, shoot fresh weight, shoot dry weight, root fresh weight, root dry weight, internodes length, root volume and root length were taken and recorded at the end of the 12 weeks experiment.

The result showed that there were significant difference between media and cultivars. Different cultivars produced different growth and quality under different media. All the growing media produced and influenced good growth and quality for

the cultivars. Treatment 2 (100% top soil) produced the best effect on growth and quality compared to other growing media for *Axonopus compressus* original (control), Mutant 4-A48, and Mutant A-13. Meanwhile, the best cultivars that adapt best on most of growing media are *Axonopus compressus* original (control) and Mutant 4-A48. This result suggests that different cultivars may show difference effect on different growing media of growth and quality of mutant *Axonopus compressus* cultivars.



ABSTRAK

Media tanaman ialah apa-apa bahan tak organik atau organik yang digunakan untuk tumbuhan membesar. Kultivar spesies rumput turf yang berbeza menunjukkan respon berbeza ke atas media tanaman. Satu eksperimen dijalankan di Unit Turf, UPM untuk menilai kadar pertumbuhan dan kualiti kultivar mutan *Axonopus compressus* dalam media tanaman yang berbeza. Bahan penanaman yang digunakan dalam kajian ini terdiri daripada satu kultivar asal *Axonopus compressus* dan empat kultivar mutan *Axonopus compressus* yang didapati di plot Unit Turf Fakulti Pertanian UPM. Rumput ditanam di dalam 80 bekas plastik yang berukuran (37cm panjang x 27 cm lebar x 10 cm dalam) yang mengandungi empat media tanaman yang berbeza. Empat media tanaman tersebut terdiri daripada 100% tanah pasir (1 tanah pasir), 100% tanah atas (1 tanah atas), ratio 3 tanah atas : 2 tanah gambut : 1 tanah pasir, dan ratio 8 tanah pasir : 2 tanah gambut. 80 bekas plastik yang digunakan telah disusun mengikut reka bentuk blok rawak lengkap dengan dua faktor dan empat replikasi (5 kultivar x 4 media).

Pertumbuhan dan kualiti rumput turf telah ditentukan melalui beberapa parameter iaitu kadar pertumbuhan, berat basah dan kering bagi pucuk dan akar, panjang dan lebar daun, panjang internode, kepadatan rumput, warna rumput, isipadu akar dan panjang akar. Bermula dari minggu 9 sehingga minggu 12 penanaman, data kadar pertumbuhan, lebar daun, panjang daun dan kepadatan rumput telah direkodkan pada setiap minggu. Manakala, data warna daun, berat basah pucuk, berat kering pucuk, berat basah dan kering akar, panjang internode, isipadu akar and panjang akar telah diambil dan direkod pada akhir eksperimen.

Hasil kajian, menunjukkan terdapat perbezaan antara media dan kultivar. Kultivar yang berbeza menunjukkan kadar pertumbuhan dan kualiti yang berlainan dalam setiap media tanaman yang berbeza. Semua media tanaman memberikan kesan baik dan mempengaruhi pertumbuhan setiap rumput. Rawatan 2 (100% tanah atas) telah memberi kesan kadar pertumbuhan dan kualiti yang terbaik berbanding rawatan media lain kepada *Axonopus compressus* (kawalan), Mutant 4-A48 , dan Mutant-A13. Manakala, kultivar terbaik yang dapat tumbuh dengan kadar yang baik dalam kebanyakan media adalah *Axonopus compressus* (kawalan) and Mutant 4-A48. Hasil kajian ini menunjukkan perbezaan spesis akan memberi kesan yang berlainan dalam media yang berbeza bagi menentukan kadar pertumbuhan dan kualiti rumput kultivar mutan *Axonopus compressus*.

CHAPTER 1

INTRODUCTION

Turfgrass plant is a grass with low growing monocot that is most differs from typical dicotyledonous species in structure, pattern, and tolerant to frequent defoliation by mowing and traffic (Turgeon, 2008). Turfgrass is the name given to grasses that are used as vegetative ground cover with a close cut, thickly growing, uniform in characters and most widely used as ornamental crop especially in landscape (Beard 1973). Turfgrasses can be divided into two major types of grass species; cool-season and warm-season grass according to the temperature. Cool season grasses are suitable to grow in some areas of country that have cold winters with temperatures that fall below freezing and warm summers, without extended hot periods. In the northern United States and Europe, only a few species of cool-season grasses are useful for recreational areas. Meanwhile, warm-season grasses are from tropical origin and thrive during the scorching summer heat. Warm-season turfgrasses have been introduced into Malaysia to be grown in lawns, golf courses as well as on football field (Saad and Juraimi, 2013).

Turfgrass serve for a variety of purposes such as for environmental benefits, lining sport field, preventing soil erosion and others. The process of transpiration done by the turfgrass helps for air cooling and absorbing toxic roadside emissions. Apart from that, sport turfgrass provide a pleasure scene for the audiences and participants. Turfgrasses provide cushioning effects and reduce the risk of injury to the player on the field when the soil base becomes very hard in a dry condition. Besides, turfgrass root system can capture and retain large quantities of rainfall, thereby reducing the rate

and volume of surface run off and prevents erosion from wind and water (Turgeon, 2008).

Football field and golf course management are one of the crucial part in turfgrass industry. Golfers expect and demand a high level of turf quality. Meanwhile, football field turfgrass is vital to establish International Federation of Association Football (FIFA) football field standard as the player judge the quality of a football field by the condition of its wear-resistant grass abilities.

Turfgrass improvement is crucial in order to get new variation or tolerance, product and maintenance. However, in Malaysia there is still lacking of research on turfgrass. Thus, research is greatly required to enhance turfgrass improvement in the future. In Malaysia, Cow grass (*Axonopus compressus*) is very popular and commonly used for many purposes. *Axonopus compressus* is a course-textured grass which adapts best to moist soil conditions. It grows on a wide range of soils, from sandy to heavy clay loams. It has good shade tolerant, low nutrient requirement and less pest and disease problem compared to other turfgrass species. However, it cannot withstand waterlogged conditions for long periods but grows on a wide range of soils, from sandy to heavy clay loams.

Axonopus compressus is considered as a low quality grass due to its course texture. It is only used for low standard soccer field, fairway and rough of golf course, ground cover, soil stabilization and by roadside (Saad and Juraimi, 2013). In addition, the course texture of this grass is considered as a low quality and not a choice of high standard stadium.

Recently, a new mutant of *Axonopus compressus* was found and developed by University Putra Malaysia. The new mutants of *Axonopus compressus* have been shown to have smaller texture than the original species.

In turfing football field and golf course establishment process (new or replanting), the use of proper and suitable media is vital for fast establishment and performance of growth and quality of turfgrasses. New mutant of *Axonopus compressus* with smaller texture than original species has been found. However, their optimum performance and other potential are still in research and the information regarding the growth rate as well as the suitable growing media to be used are yet to be determined.

Hence the objectives of this research were (1) to determine the growth coverage of mutant *Axonopus compressus* cultivars under different growing media, (2) to determine the most suitable growing media of mutant *Axonopus compressus* cultivars.

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