

EFFECT OF PLANT GROWTH REGULATORS AND STEM  
CUTTING SIZES ON PLANT HEIGHT, YIELD AND FRUIT  
QUALITY OF DRAGON FRUIT (*Hylocereus polyrhizus*)  
GROWN ON BRIS SOIL.

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MASTER OF SCIENCE  
UNIVERSITI MALAYSIA TERENGGANU  
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2007



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SIZES ON PLANT HEIGHT, YIELD AND FRUIT QUALITY OF DRAGON  
FRUIT (*Hylocereus polyrhizus*) GROWN ON BRIS SOIL.**

The work is dedicated to my family, my best friends and to whom supported me through everything I am doing. Thanks for helping me through everything and for always being enough about me to make things easier. Without them, I wouldn't have achieved what I want. I would have never gotten this far in life. Thank you.

**NOR SHARIAH BINTI SALLEH**

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## DEDICATION

The thesis is dedicated to my family, my best friends and to whom supported me became everything I am today. Thanks for helping me through everything and for always caring enough about me to make things easier. Without them, I wouldn't have achieved all of this and I would have never gotten this far in life. Thank you.

September 2017

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*Hemiphus polytrichus* (dragon fruit) originates from North, Central and South America and are common in nature. This plant is a desert plant and highly adaptable to a new environment. However, there were no scientific aspects on adaptation of this crop to local soil. Therefore, this study was carried out to establish the *H. polytrichus* on undeveloped local soil at the Department of Agriculture, Riba Lela, Terengganu. In Terengganu, there are about 10000 acres of undeveloped land and most of them are the local soil. The primary study on the effect of auxin's hormone auxin, IBA (Indole-3-butyric Acid) on the cuttings of *H. polytrichus* was carried out in the greenhouse of Universiti Malaysia Terengganu (UMT). The aim of the study was to determine the effect of IBA and stem cutting sizes on rooting of *H. polytrichus*. The cuttings of *H. polytrichus* 5 cm (2 inches), 10 cm (4 inches), 15 cm (6 inches) and 30 cm (12 inches) in length were soaked in IBA solutions at 0, 200, 300, 750 and 1000 ppm. The cuttings were planted in polybags sized 9 x 15 cm, containing a soil mix of

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**NOR SHARIAH BINTI SALLEH**

**September 2007**

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Associate Professor Sayed Mohd Zain S. Hasan, Ph.D  
**Faculty :** Agrotechnology and Food Science

*Hylocereus polyrhizus* (dragon fruits) originate from North, Central and South America and are cactus in nature. This plant is a desert plant and highly adaptable to a new environment. However, there were no scientific reports on adaptation of this crop to bris soil. Therefore, this study was carried out to establish the *H. polyrhizus* on undeveloped bris soil at the Department of Agriculture, Rhu Tapai, Terengganu. In Terengganu, there are about 15,000 acres of undeveloped land and most of them are the bris soil. The primary study on the effect of synthetic hormone auxin, IBA (Indole-3-butyric Acid) on the cuttings of *H. polyrhizus* was carried out in the greenhouse of Universiti Malaysia Terengganu (UMT). The aim of the study was to determine the effect of IBA and stem cutting sizes on rooting of *H. polyrhizus*. The cuttings of *H. polyrhizus*; 5 cm (2 inches), 10 cm (4 inches), 15 cm (6 inches) and 30 cm (12 inches) in length were soaked in IBA solutions at 0, 300, 500, 750 and 1000 ppm. The cuttings were planted in polybags sized 9 x 15 cm, containing a soil mix of

sand, soil and organic matter at the ratio of 2:1:1. The nursery study was undertaken for four weeks. The results of the study showed that IBA at 1000 ppm gave significant difference for percent rooting and number of roots for 5 cm cuttings of *H. polyrhizus* whereas 300 to 1000 ppm of IBA gave significant difference for root length on 30 cm cuttings of *H. polyrhizus*. The field study was carried out on bris soil at the Department of Agriculture, Rhu Tapai, Terengganu for 18 months. The objective of this study was to determine the effects of different concentrations of Gibberellic Acid A<sub>3</sub> (GA<sub>3</sub>) and different size of *H. polyrhizus* cuttings; 15 cm (6 inches) and 30 cm (12 inches) in length on plant height, yield and fruit quality. The cuttings of *H. polyrhizus* were soaked in 300 ppm of IBA in the nursery study and followed by spraying with GA<sub>3</sub> (0, 1, 10 and 50 ppm) solutions one week after being transplanted into the field. This study was arranged in Randomized Complete Block Design (RCBD) with each treatment consisting of six plants and three replications. The cuttings were planted with one, two and three cuttings per pole. From this experiment, the result showed there was no significant difference on plant height of *H. polyrhizus* cuttings treated with different concentrations of GA<sub>3</sub>. However the 30 cm cuttings were the most effective size to increase stem elongation of *H. polyrhizus* plants as compared to 15 cm cuttings. The 30 cm cuttings of *H. polyrhizus* sprayed with 1 ppm of GA<sub>3</sub> induced early flowering at 5 months old and also gave the highest number of flowers. However, GA<sub>3</sub> at 50 ppm plays a very important role in enhancing fruit setting and yield on 15 cm cuttings of *H. polyrhizus*. This study also attempted to evaluate some physical and nutritional properties of *H. polyrhizus* fruit for their response to GA<sub>3</sub> treatments. All physical properties such as weight, diameter, length and volume of fruits were determined using balancing, vernier calliper and liquid displacement method. The nutritional properties such as pH,

moisture, carbohydrate, protein, crude fibre, fat and ash content of the fruit were determined by using pH meter and Association of Official Analytical Chemist (AOAC) Method. There were three replicates for all parameter of fruit analysis. Nutritional properties were determined using different parts of the fruit such as flesh and peel. The result showed that 50 ppm of GA<sub>3</sub> gave a significant difference on weight, length, width and volume of *H. polyrhizus* fruit. GA<sub>3</sub> at 10 ppm gave significant difference on protein and fat content in the flesh of *H. polyrhizus* fruit and 50 ppm of GA<sub>3</sub> gave significant difference on crude fibre content on peel of *H. polyrhizus* fruit. More interestingly, results obtained from the nutritional analysis showed that protein and crude fibre in the peel is much higher than in the flesh. Based on the current findings of this research, dragon fruit (*H. polyrhizus*) are suitable and recommended to be planted on bris soil in Terengganu.