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EFFECTS OF ORGANIC AND INORGANIC FERTILIZERS ON THE GROWTH AND YIELD OF RODENT TUBER (*TYPHONIUM FLAGELLIFORME*)

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BY

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DEPARTMENT OF LAND MANAGEMENT

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CERTIFICATION

This project report entitle "EFFECTS OF ORGANIC AND INORGANIC FERTILIZERS ON THE GROWTH AND YIELD OF RODENT TUBER (*TYPHONIUM FLAGELLIFORME*)" is prepared by Mohamad Faiz Bin Mat Napi and submitted to the Faculty of Agriculture in fulfillment of the requirement PRT4999 (Final Year Project) for the award of degree of Bachelor of Agricultural Science.

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ABSTRACT

Typhonium flagelliforme, known also as Rodent Tuber (English) or Keladi Tikus (Malay), is an important herbal plant used by local communities as an alternative therapy in Malaysia and Indonesia to treat various types of cancer. Rodent tuber is a medicinal herb which belongs to the Araceae family with a maximum height of 25 to 30 cm. Recently, the planting of rodent tuber in Kelantan, especially in Kok Lanas, Kota Bharu faces a problem of low yield. The size of tuber becomes increasingly small and the flowering is late. A short-term field experiment was conducted on rodent tuber to assess the effects of inorganic fertilizer, organic fertilizer and integrated use of both fertilizers on plant growth and yields. Four treatments were used: cow manure + compost (T1), NPK Green + compost (T2), chemical fertilizer (NKP Green) (T3) and Compost (T4). The results showed that there were significant differences in growth and yield of *Typhonium flagelliforme* between the treatments ($P<0.05$). It was found that the application of organic fertilizers increased the yield and growth of the rodent tuber plant more than inorganic fertilizer. Compost application was the best management system for increasing rodent tuber yield both the tuber and leave parts.

ABSTRAK

Keladi tikus, juga dikenali sebagai Typhonium flagelliforme merupakan tumbuhan herba yang penting digunakan oleh masyarakat tempatan sebagai alternatif terapi di Malaysia dan Indonesia untuk merawat pelbagai jenis penyakit kanser. Keladi tikus adalah tumbuhan ubatan yang tergolong dalam keluarga Araceae dengan ketinggian maksimum antara 25 hingga 30 cm. Baru-baru ini penanaman keladi tikus di Kelantan, terutamanya di Kok Lanas, Kota Bharu berhadapan satu masaalah kekurangan hasil tuaian. Saiz ubi menjadi lebih kecil dan bunga tumbuhan itu lambat keluar. Satu kajian lapangan jangka masa pendek telah dijalankan terhadap tumbuhan herba keladi tikus untuk melihat kesan baja bukan organik, baja organik, dan penggunaan bersepadu kedua-dua baja keatas hasil dan pertumbuhan pokok. Empat rawatan telah digunakan: najis lembu + kompos (T1), NPK Hijau + Kompos (T2), baja kimia (NPK Hijau) (T3), and Kompos (T4). Hasil kajian menunjukkan bahawa terdapat perbezaan yang signifikan dalam pertumbuhan dan hasil keladi tikus antara rawatan ($P<0.05$). Kajian ini mendapati bahawa penggunaan baja organik telah meningkatkan hasil dan pertumbuhan pokok keladi tikus berbanding baja bukan organik. Penggunaan kompos adalah satu sistem pengurusan yang terbaik untuk meningkatkan hasil keladi tikus kedua-dua bahagian ubi dan daun.

CHAPTER 1

INTRODUCTION

Typhonium flagelliforme, known also as Rodent Tuber (English) or "Keladi Tikus" (Malay), is the important herbal plant, where it is highly appreciated by local communities for its uses as an alternative therapy in Malaysia and Indonesia to treat various types of cancer (Teo and Ch'ng, 1999; Lee and Wong, 2004). The plant is called as Rodent Tuber because the flower of the plant looks like the shape of the rodent's tail. Rodent tuber is a medicinal herb which belongs to the Araceae family with a maximum height of 25 cm to 30 cm.

Rodent tuber can be found from India to Australia and spreads northward to the sub-temperate area of the Eastern Asia up to Sri Lanka. The crop is usually grown in most wet habitat and does not expose to direct sunlight. It has round shiny leaves, and the root is white and forms the tubers in soil. The diameter of the tuber is around 3 cm (Chen, 1997).

In a report by the World Health Organization, claimed that a high percentage of the world's population is using herbal medicine and there is a growing interest in the use of traditional medicines (Tilburt and Kaptchuk, 2008). However, herbal medicines like

other natural resources have very limited sources. So, the production of herbal plants becomes important nowadays.

Among the uses of rodent tuber are to treat various types of cancer such as breast, lung, rectum, liver, prostate, cervical, and kidney cancer. Rodent tuber can kill the cells of these cancer and repair the cells that has been affected by chemotherapy treatment. This herb acts as antivirus and antibacterial. The juices from the plant can stunt the growth of cancer and helps in reducing the side effects of chemotherapy treatment.

Each part of the plant can be used for medicinal purpose: tuber, stem, leaves, and flower. There are many ways to obtain the extract of rodent tuber from the plant such as by boiling the plant in water, drying the whole plant, and grind it without cooking. Overall, rodent tuber has high medicinal value due to its functions in treating various types of cancer in human.

Planting of rodent tuber requires good soil preparation and specifically, soil drainage must be adequate. It needs a moist and sandy soil that contains a lot of organic matter. The medium must be very porous but also have high moisture retention characteristic. Usually the farmers planted rodent tuber in pots or polybags and no chemical fertilizers were used in commercial planting of rodent tuber, but for the

purpose of this study, the use of chemical fertilizer is applied to see the different actions of the different types of fertilizers on rodent tuber growth.

The sources of fertilizers are coming from chemical fertilizer such as NPK fertilizers and organic fertilizer such as cow dung and compost. Tubers are grown on a range of soils varying from sand to clay loams, all with different water holding capacities. The most suitable soils are peat soil and sandy soil with good drainage. Mineral soil and sandy loam are also suitable. An ideal soil is well structured, with good drainage to allow proper root aeration, and tuber development with minimal root disease infestation.

The organic soil is soil material that contains high amount of organic carbon. Organic matter serves as a reservoir of nutrients and water in the soil, aids in reducing compaction and surface crust and increase water infiltration into soil. Organic soil contains humus. Humus is organic material that has been converted by microorganisms to a resistant state of decomposition. Organic soils usually have very high water retention capacity and high cation exchange capacity (Schnitzer and Khan, 1979).

The problems related to rodent tuber are the plant is sensitive to specific growth condition in the natural environment such as moist and be in a shady area which provided the biggest need to produce the plant. Recently, the growing of rodent tuber in

Kelantan, especially in Kok Lanas, Kota Bharu is facing the problem of decreasing yield. The size of tuber becomes increasingly small and the flowering is late. This may be due to the medium of planting and fertilizers that are not too suitable to plant for obtaining a maximum growth. The fertilizer used is cow manures only and no chemical fertilizer was used.

The hypothesis can be made from the articles reviewed that is organic fertilizer used in planting of vegetables and herbs can greatly improve the soil from the soil physical, chemical and biological properties and also increased the yield of plants. Then, as *Typhonium flagelliforme* is to be used for medicinal purpose, it is better to use organic fertilizer. So, compost is the best option to be used as organic fertilizer as it is better than cow dung, chicken dung and other types of animal manures in supplying available nutrients for crop use.

The objectives of the experiment were to investigate the effects of inorganic, organic and integrated use of both fertilizer on the performance of rodent tuber. This experiment also was done to see the comparison between the use of inorganic fertilizer and organic fertilizer also the combination between both of them toward the rodent tuber growth and yield. From the growth performance, we expected that the higher growth rate of *Typhonium flagelliforme*, hence the biomass yield of *Typhonium flagelliforme* would be increased when we planted it in the soil that had been applied with the organic fertilizer.

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