ADVANCING MALAYSIAN MUM CULTIVATION WITH INTEGRATED NUTRIENT MANAGEMENT PRACTICES

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KEYWORDS: INM; Plantmate; vermin, carbonize ; rice hull: slow release.

ABSTRACT

The study aimed to develop sustainable production protocol on the standardized Integrated Nutrient Management (INM) practices affecting growth of potted Malaysian mums. Specifically, toassess the effect of two types of soil and conjoint use of different integrated nutrient management and its interaction effects on the growth of potted Malaysian mums.

Growth were significantly influenced by the type of soil and different integrated nutrient management (INM) practices. Mums grown in sandy loam soil excelled in all parameters evaluated except in leaf area index. Malaysian mums given with slow release fertilizer nutrient management (B5) was the tallest with greatest plant growth rate but statistically at par to mums with carbonized rice hull (B4) that attained the widest area index and higher dry matter yield.

However, a significant interaction between types of soil and integrated nutrient management (INM) practices in all parameters was observed except for daily plant growth rate at 45 days after rooting (DAR). Malaysian mums planted in sandy loam soil with carbonized rice hull integrated nutrient management yielded the tallest with higher plant growth rate, heavier bio mass dry weight, greater dry matter yield but statistically comparable to vermi compost integrated nutrient and both slow and fast release fertilizer. On the other hand, mums in clay soil amended with chicken dung obtained the highest shoot: root ratio, and greatest leaf area index positively correlated to widest leaf surface area. Mums grown in clay soil given with 100% inorganic fertilizer exhibited the shortest, light total biomass dry weight and low dry matter yield. The smallest leaf area index that corresponds to the narrow leaf area was noted in sandy loam soil with vermin cast.

INTRODUCTION

The development of mum industry as a major ornamental cut flower and potted plant enterprises supports the major thrusts of the government to develop the non-traditional export products that will boost the floriculture industry to substitute the imported flowers with locally produced ones. Malaysian mum is one of the leading cut flowers in both international and domestic market. In 2015 increase demand of mums estimated to 1.8 million dozen brought about by increasing population and the rising number of institutional buyers like hotels, restaurants, banks, park establishments and various land development for an increasing demand triggered more production (Jeratso, 2008). The demand for the domestic market is so huge that the domestic production cannot cope with the demand and still short to fill in the supply. However, no local growers of mums in the province were able to fill this demand due to some factors like poor access to improved production technologies and insufficient information as to proper cultural management practices and its adaptability. Hence, there is a need to standardize the utilization of organic, inorganic, and biological nutrient resources to meet crop needs for increased production and productivity of Malaysian mums leading to the development of sustainable production technologies. It was in these context that the study was conducted to develop sustainable production protocol focused on the standardized Integrated Nutrient Management (INM) affecting growth, Specifically, it aimed to assess the effect of two types of soil and conjoint use of different integrated nutrient management and its interaction effects on the growth of Malaysian mums.

MATERIALS AND METHODS

A total of 540 healthy and disease-free planting material of Malaysian mum were randomly distributed to two types of soil as Factor A and seven different INM as Factor B. The experiment was laid out in 2 x 7 factorial experimental field layout in randomized complete block design (RCBD) with three replications per treatment with 10 plants per replicate.

Rooted cuttings of Malaysian mums were set individually to the designated perforated polyethylene bags to ensure proper drainage. A soft pinching on the growing tip of the plant was employed a day after transplanting to attain a uniform height of 10 cm. and induced branching. Three stems per plant were maintained. Artificial lighting was installed at a distance of 1.5m from the tip of the plants and spaced to 2 m between bulbs. Hundred watts LED bulb lightings were provided from 6 - 9 pm for forty -five days after rooting.Watering was employed early in the morning twice a day in the first month and once daily onward up to harvesting. Disbudding was also practiced by removing the extra flower buds or central buds to ensure uniformed flower head opening, size and quality of the flower.Both vertical and horizontal netting was provided with bamboo stakes and nylon straw as

netting materials to support the plants.Harvesting was done late in the afternoon at 75 percent flower-opening stage as marketable flower (Singh, 2010).

RESULTS AND DISCUSSION

Growth of Malaysian mums was significantly influenced by the type of soil and different integrated nutrient management (INM).Mums grown in sandy loam soil excelled in all parameters evaluated., Malaysian mums given with slow release fertilizer nutrient management was the tallest with greatest plant growth rate but statistically at par to mums with carbonized rice hull that attained the widest area index, higher dry matter yield while those mums with inorganic fertilizer was the shortest, low shoot-root ratio, lightest biomass correspond to low dry matter yield. Mums with plantmate integrated nutrient management got the least plant growth rate, the results indicated that all organic amendment integrated nutrient management except plant mate was statistically comparable to commercial fertilizer.

However, a significant interaction between types of soil and integrated nutrient management (INM) in all parameters was observed except for daily plant growth rate at 45 days after rooting. Malaysian mums planted in sandy soil with carbonized rice hull integrated nutrient management yielded the tallest with higher plant growth rate, heavier bio mass dry weight, greater dry matter yield, but statistically comparable to vermin compost integrated nutrient and both slow release and fast release fertilizer. On the other hand, mums in clay soil amended with chicken dung obtained the highest shoot: root ratio, and greatest leaf area index positively correlated to widest leaf surface area. Mums grown in clay soil given with 100% inorganic fertilizer exhibited the shortest light total biomass dry weight and low dry matter yield. The smallest leaf area index that corresponds to the narrow leaf area was noted in sandyloam soil with vermi composting

CONCLUSIONS

Based on the above findings the following conclusions were drawn;
The overall multifaceted effects of different integrated nutrient management treatments facilitate beneficial soil conditions that lead to significant increase on the growth of Malaysian mums in both types of soil over the ad-hoc recommended inorganic treatment. Sandy loam soil significantly favors the growth of Malaysian mums.

There is a significant main effect of soil types and different integrated nutrient management (INM) on the growth of Malaysian mums with carbonized rice hull integrated nutrient management (B4) recorded the tallest with higher plant growth rate, heavier bio mass dry weight, greater dry matter yield and higher return of investment (ROI)which is statistically comparable to commercial fertilizer.

There is a significant main interaction effect of the soil type and different integrated nutrient management on the growth of Malaysian mums except for the plant height, initiation of the floral bolt/buds and plant growth rate at 45 days after rooting. Malaysian mums in sandy loam soil with carbonized rice hull excelled in all parameters but statistically at par to vermi cast integrtaed nutrient management and in inorganic nutrient management respectively.

RECOMMENDATIONS

Based on the findings, the following are recommended

- Malaysian mums grown in sandy loam soil with carbonized rice hull integrated nutrient management area feasible venture under protected condition during the month of November to February.
- Further study should be conducted using the same growing medium to test the efficiency of the different integrated nutrient management as second cropping to be conducted during long-day period (March-June)
- Plant tissue analysis must be included to know the uptake of nutrient by the host plant.
- A biolog analysis of the different soil organic amended growing media as assessment on the overall soil health and quality.
- The developed integrated nutrient management production protocol for potted Malaysian mums during short-day period cropping from November to February are the following

Treatment	Rooting (wks.)	Height (wks.)	Response (wks.)	Total Crop Period (wks.)
Clay soil with vermin compost nutrient management	2	4	7	13

Clay soil with chicken dung nutrient management	2	2	8	14
Clay soil with compost nutrient management	2	5	6	13
Clay soil with carbonized ricehull nutrient management	2	4	6	12
Clay soil with slow release fertilizer nutrient management	2	4	7	13
Clay soil within organic fertilizer nutrient management	2	4	7	13
Clay soil with plantmate nutrient management	2	5	8	15
Sandy loam soil with vermin compost nutrient management	2	4	7	13
Sandy loam soil with chicken dung nutrient management	2	5	7	14
Sandy loam soil with compost nutrient management	2	4	7	13
Sandy loam soil with carbonized Ricehull nutrient management	2	4	6	12
Sandy loam soil with slow release fertilizer nutrient management	2	3	7	12
Sandy loam soil with in organic fertilizer nutrient management	2	5	7	14
Sandy loam soil with plant mate nutrient management	2	4	8	14

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