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To studies effect of organic sources in vegetative growth of mint (*Mentha arvensis* L.) cv. Kosi

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Abstract
The present investigation was carried out at Main Experimental Station, College of Horticulture, Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Faizabad (U.P.) during the Year 2017. The experiment was laid out in randomised complete block design replicated thrice with Eleven different treatment. Study revealed that the maximum vegetative growth *viz*., plant height, plant spread, Number of branches, diameter of stem and Days to taken 50% Flowering were obtained with the application of Press mud (30 t/ha). The present finding gained significance particularly in the present context i.e., Increasing awareness of farmers about commercial cultivation and its positive out-put.

Keywords: Organic, mint, vegetative growth

Introduction
Japanese mint (*Mentha arvensis* L.) cv. Kosi belongs to the family Lamiaceae (Labiate). Brazil is the native place of Japanese mint. Commercially, Japan started producing mint around 1870 during that time, it was called Japanese mint and Japan was the leading mint producing country in the world. In India, the major mint producing states are U.P. Uttarakhand, Punjab, Haryana and Bihar. India contributes about (80%) of total mint oil production of the world and rest by China (09%) and Brazil (07%) and US (04%).
Mint is shallow rooted, high water demanding crop, and potential shortage of water can severely reduce its productivity. Irrigation and fertilization are the key inputs for securing optimum productivity and quality of the crop. The crop is commercially raised through underground stems called stolon, through suckers given out in rainy season also easily give out roots on planting, producing new plants. Some important varieties- MAS-1, Hybrid-77, Kalika, Konsi, Saryu are mostly grown. It was introduced as a Rabi crop and sown as winter season. Japanese mint is a long lasting, quick growing, it is well known fact that water management is one of the major factors responsible for achieving better harvest in crop production. Many secondary metabolites such as cyanogenic glycosides, glycosylates, terpenes, saponins, anthraquinones and polyacetylenes also act as allele chemicals, influencing the growth and development of neighbouring plants. For Example, monoterpene limonene has soon deterrent and insecticide properties and carvone is used as sprouting inhibitors.

Method and Material
The experimental was carried out was carried out at Main Experimental Station, College of Horticulture, Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumar Ganj), Faizabad (U.P.) during the year 2017. Before ploughing of the field, necessary irrigation of the experimental field was done and as the field comes into field capacity a deep ploughing with the help disc plough was done and again ploughing twice with cultivator followed by planking in order to break the clods as well as to make the soil pulverize. Besides, weed stubbles and other grasses were also removed manually to make the soil free from such problem. Different treatment was used in randomized block design with three replications with an optimum plot size 4.02x3.15 m^2 and spacing of 60cm row to row and 45cm plant to plant. Observation on Vegetative growth i.e., Plant height (cm), Plant spread (cm^2), Number of branches/plant and Diameter of stem (mm) were recorded from five tagged randomly selected plant in each replication at 90 days after transplanting

Result and Discussion
Effect of different organic sources in plant growth characters
Plant Height
Data pertaining to plant height as influenced by the use of different organics treatments clearly

indicated that Press mud (30 t/ha) has been found significantly superior (66.93 cm) to the rest lowest was and in control (44.53 cm). Although these organic sources increase plant height significantly higher plant height measured with the use of Press mud might be due to containing higher organic matter as well as NPK. It is fact that Press mud gives strength in the rooting media i.e., soil. It indicates that these Press mud doses influenced the plant height in a test way and all the Press mud doses, individually has been found significantly superior over control. Similar result was observed Lower dose of N treatment decreased the plant height and herb product of mint Chand *et al.* (2001) [1], Shormin *et al.* (2009) [5], Prabu *et al.* (2012) [3].

Plant spread

Plant spread (cm^2) indicated that non-significant variation observed due to application of various organics treatments. The maximum plant spread (30.87 cm^2) was measured due to the application of Press mud (30 ton/ha) than other organics treatments. Moreover, all the FYM doses except control which may be because of their role influence plant spread of mint. Similar results were observed by Chand *et al.* (2001) [1], Prabu *et al.* (2012) [3].

Number of branches per plant

Number of branches per plant indicated that significant variation observed due to application of various organics treatments. The maximum number of branches per plant (21.13) was found due to application of Press mud (30 ton/ha) as compared to other organics treatments and all the FYM doses were significantly superior over to control, which might be due to the role of FYM increasing number of branches per plant. Similar results were observed by Chand *et al.* (2001) [1], Prabu *et al.* (2012) [3].

Days taken 50% flowering

Data on days taken to 50% flowering clearly indicated that significant variations were observed on flowering. 50% flowering was noted in control treatment after 95.27 days of planting while late flowering was noted with the application of Press mud 30 ton/ha which may be due to application of different organics treatments containing NPK. It is fact that nitrogen (N) delayed the maturation. It might be that FYM also delayed the flowering up to some extent. Similar results were also observed by Singh *et al.* (2004) [4].

Diameter of stem

Data pertaining to diameter of stem indicated that significant variation observed due to application of different organics treatments. The maximum diameter of stem (11.37 mm) was found due to application of Press mud (30 ton/ha) as compared to other organics treatments and all the FYM doses were non-significantly superior over to control, which might be due to the role of FYM in increasing of diameter of stem. Similar results also observed by Kothari *et al.* (2000) [2] and Prabu *et al.* (2012) [3].

Table 1: Effect of organic sources in plant height, plant spread and no. of branches/plant of mint

Treatments	Plant height (cm)	Plant spread ($cm^{2)}$	No. of branches/plant
T_1 Control	44.53	19.13	11.13
T_2 FYM 25 t/ha	53.53	22.00	13.93
T_3 FYM 30 t/ha	60.80	24.33	16.87
T_4 Vermicompost 6 t/ha	52.40	21.07	13.00
T_5 Vermicompost 8 t/ha	62.67	26.93	18.33
T_6 Press mud 25 t/ha	64.93	27.93	19.20
T_7 Press mud 30 t/ha	66.93	30.87	21.13
T_8 Biofertilizers (PSB) 12 kg/ha	49.27	20.60	12.07
T_9 FYM 25 ton/ha + PSB 12 kg/ha	58.67	23.60	16.13
T_{10} Vermicompost 6 t/ha + PSB 12 kg/ha	56.93	22.33	15.20
T_{11} Press mud 25 t/ha + PSB 12 kg/ha	66.67	29.93	20.67
SEm±	0.30	0.15	0.13
CD at 5%	0.89	1.00	0.38

Table 2: Effect of organic sources in stem diameter and days taken 50% flowering of mint

Treatments	Stem diameter (mm)	Days taken to 50% flowering
T_1 Control	8.53	95.27
T_2 FYM 25 t/ha	7.86	102.73
T_3 FYM 30 t/ha	8.23	106.67
T_4 Vermicompost 6 t/ha	8.51	101.20
T_5 Vermicompost 8 t/ha	7.71	102.80
T_6 Press mud 25 t/ha	9.28	107.47
T_7 Press mud 30 t/ha	11.37	109.87
T_8 Biofertilizers (PSB) 12 kg/ha	7.11	104.27
T_9 FYM 25 ton/ha + PSB 12 kg/ha	8.93	99.20
T_{10} Vermicompost 6 t/ha + PSB 12 kg/ha	7.64	98.13
T_{11} Press mud 25 t/ha + PSB 12 kg/ha	9.96	108.40
SEm±	1.06	0.36
CD at 5%	NS	1.08

Conclusion

In this way experiment was revealed that the maximum vegetative growth *viz*., plant height, plant spread, Number of branches diameter of stem and were obtained with the application of Press mud (30 t/ha).

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