

## Effect of Pinching and Nitrogen on Yield and Yield Attributing Characters of African Marigolds (*Tagetes erecta*) in Deukhuri, Dang

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### Abstract

Kolkata local variety of marigold (*Tagetes erecta*) was evaluated at Gadawa-4 Gangaparaspur, Dang district of Nepal from (July-November) to estimate the effect of pinching and different doses of nitrogen (0kg/ha, 50kg/ha, 100kg/ha, 150kg/ha.) on various parameters of marigold.

Among pinching and non-pinching, maximum plant height (89.7cm) was observed in non-pinching, maximum number of primary branches (17.1 cm) and least days to 50 percent flowering (61.58 days) with pinching, the significant diameter of flower (4.29), fresh weight of flower (4.32) was observed with non-pinching and best number of flower (60.66), best yield per plant (237.49gm) and best yield per hectare (9.89tones) was observed with pinching practices. The best plant height (92.2cm) was observed at 150kg/ha of nitrogen dose. Remaining all other parameters showed non-significant relationship with different doses of nitrogen except yield per plant and yield per hectare. The significant yield per plant (238.12 gm) and significant yield per hectare (9.91 tones) was observed at nitrogen dose of 50kg/ha. Interaction among pinching and different doses of nitrogen showed non-significant relationship for all parameters.

**Keywords:** Marigold; Pinching; Nitrogen Level; Yield; Quality

### Introduction

Floriculture is the discipline of horticulture, which refers to the cultivation of ornamental plants, flowering plants, foliage plants, cut flowers, bulbs, seeds and seedlings. Floriculture is one of the fast growing industry in the global context but it is relatively in a premature phase in Nepal (Pokhrel, 2008; Lama, 2009). The floriculture sector of Nepal is expanding day by day in Nepal. The growth in contribution of floriculture sector and subsequently to the economy was favored by the positive responses of some of the stakeholders, private sector institutions and business associations such as FAN with the support of AEC of FNCCI [1]. Flowers are the integral part of human life since human uses flowers and their products in many functions. Flowers are the part of happiness or sorrow. In both conditions man uses flowers. Nepalese have traditionally been using flowers or bunch of flowers to offer god and goddess or as a garland to the deities or fellow human being or as floral decoration during festivals [2]. Marigold belongs to the genus *Tagetes* and family *compositae*. Generally, there are two main *Tagetes erecta* L. and *Tagetes patula* Species of marigold which are popularly grown over the world. *Tagetes erecta* L. is Mexican origin and *Tagetes patula* L. is African origin. *Tagetes erecta* L. is commonly known as "African Marigold". Generally, in Nepal we grow African marigold. The cultivation of marigold is easier than cultivation of other flower since marigold has wider acceptance of edaphic and climatic variations. Because of wider adaptation capacity it has capacity to produce larger flower size and more in number. Color of flower varies from yellow or orange. Apart from ornamental purpose, different product of marigold is being used in

different filed e.g. Oil extracted from marigold are used in perfumes preparation and insect repellent, marigolds are also being used as trap crop in agriculture for nematode control. Recent advancement in research have revealed that carotenoids extracted from dried flower is used as poultry feed to improve egg yolk color and broiler' skin. Dang is a potential area of marigold flower production. It has got suitable climate, soil and environment required for marigold production. Despite of favorable edaphic and climatic requirement production of flower is lacking due to lack of technical knowhow regarding crop management practices in relation to growth and flowering and yield increment. Demand of marigold during festivals and socio-religious ceremonies is more but the demand is not being fulfilled due to lower production of marigold in farmer level. so production of marigold should be increased to meet the growing demand. In Nepal generally farmer do not practice pinching and apply fertilizer (nitrogen). So, there is necessary to conduct various research to find the appropriate pinching practices and suitable dose of nitrogen fertilizer to accelerate the yield and production of high quality flower. Due to the easy mode of cultivation the number of farmers growing marigold is being increasing. It is gaining popularity among dealers due to its wide spectrum of attractive color, shape, size and good keeping quality [3]. Generally pinching is the practice of removing apical portion of flower to increase lateral branches. The increased number of lateral branch leads to increase in number of flower and uniform flower size with higher keeping quality. While nitrogen is being supposed to increase the flower quality and maintains uniformity in flower size and number. Nitrogen also promote plant growth and increase in number of pri-

mary branches. The main objective of the research is to identify the suitable dose of nitrogen for marigold production; to evaluate the effect of pinching in marigold production; to access the interaction among pinching and nitrogen level on yield and yield attributing characteristics of marigold in Gadawa, Dang.

## Material and Methods

### Location of experimental site

The experiment was conducted at farmer's field in Gadawa rural municipality ward no 4, Gangapraspur, Dang, Nepal from July 2018 to November 2018. The experimental site is situated at 12 km south east from Lamahi. Purposive selection of site was done because it is one of the pocket areas of cut flower production. The location of the site is 27.80 N latitude and 82.530E longitudes with an elevation of 567masl. This location falls in inner terai region province number 5, of Nepal.

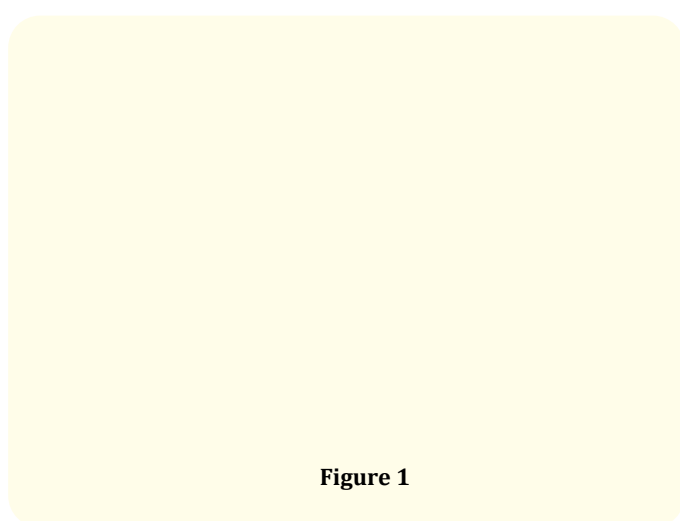


Figure 1

### Experimental design

- Design: Two factor RCBD
- Three replications
- Factor A: Pinching and non- pinching
- Factor B: Nitrogen doses at 0,50,100,150 kg/ha
- Treatments: Eight combinations
- Total experimental area: 256.5m<sup>2</sup>(28.5m\*9m)
- Spacing between replication: 1m
- Spacing between each plot: 0.5m
- Size of individual plot: 3m\*2m=6m<sup>2</sup>
- Border spacing: 0.5m

### Transplanting

Seedlings were transplanted on 10<sup>th</sup> July 2018. One month old healthy seedlings were transplanted at the spacing of 60 cm x 40 cm. Irrigation was done with watering can after transplanting.

### Manure and fertilization

Well decomposed farm yard manure (FYM) = 6t/ha.

Urea was applied at two splits (i.e. 1/2 as basal dose, 1/2 after 30 days). Full dose of single super phosphate and mutate of potash were applied as basal dose. Half dose of nitrogen and full dose of phosphorus and potash @ 100: 50: 50 kg NPK/ha were applied as basal dose. The remaining half dose of nitrogen was top dressed one month after the transplanting of seedlings.

### Observation recorded

Five representative plants from the inner rows of each plot were labelled and tagged in each replication and were used for recording of following parameters.

### Growth parameters

#### Plant height

The height of five randomly selected and tagged plants were measured from base of the plant to the tip of the main stem using long scale. Height measured at 15 days' interval.

Number of primary branches per plant: The number of primary branches arising on the main stem in five randomly selected and tagged plants were recorded at 15 days' interval and at harvest.

### Phonological parameters

- **Days to 50 percent flowering:** The number of days taken for 50 percent of the plants to produce first flower in each plot was recorded by counting the days from date of transplanting and expressed as days to 50 percent flowering.
- Yield and yield parameters
- **Number of flowers per plant:** The number of flowers harvested from the five tagged plants was averaged and recorded as the number of flowers per plant.
- **Diameter of flower:** Ten fully opened flowers were selected randomly from the tagged plants and diameter of flower was measured using Vernier caliper and expressed in centimeters.
- **Yield per plant:** Flower yield of sampled plants was recorded and average was calculated as yield per plant and expressed in gram.
- **Yield per hectare:** Flower yield of net plot area was calculated in and based on total net plot yield, yield per hectare was calculated and expressed in tones.
- **Fresh weight of flower:** After recording number of glowers harvested treatment wise, ten flowers were randomly selected and their total weight was calculated in gram and average fresh weight of single flower was obtained.

### Statistical analysis

Collected data tabulated in Microsoft excel and Recorded data is analyzed using R software. DMRT is done for mean separation at 5% level of significance and ANOVA is calculated with reference to Gomez and Gomez, 1984.

### Result and Discussions

The interaction effect of pinching and levels of nitrogen was non-significant for yield per plant and yield per hectare Table 1. But, higher yield per plant was observed in combination of pinching with nitrogen 50kg/ha treatment (249.2gm) Table 2. Lower yield per plant was observed in non- pinching along with nitrogen 150kg/ha treatment (184.53gm) Table 2. Similarly, higher yield per hectare was observed in combination of pinching with nitrogen 50kg/ha treatment (10.36 t/ha) Table 2 whereas significantly lower yield per hectare was observed in non-pinching along with nitrogen 150kg/ha treatment (7.66 t/ha). Pinching at 40 days after transplanting recorded maximum flower yield (16.44 t/ha) as compared to non pinched plants in marigold observed by Naik., et al. [4].

Treatment	Yield per plant (gm)	Yield per hectare(t/ha)
Pinching	237.49a	9.89a
Non-Pinching	213.35b	8.88b
LSD (0.05)	18.63*	0.77*
0 kg/ha	232.35a	9.68a
50kg/ha	238.18a	9.91a
100 kg/ha	230.13a	9.58a
150kg/ha	201.03b	8.36b
LSD (0.05)	26.35*	1.10*
CV%	9.44	9.48
Grand mean	225.42	9.38

**Table 1:** Effect of pinching and levels of nitrogen on yield per plant and yield per hectare of marigold flower in Gadawa-, Deukhuri, Dang, Nepal (2018).

Treatments means followed by the common letter (s) within column are non-significantly different among each other based on DMRT at 5% level of significance. LSD: Least significant difference and CV: Coefficient of variation.

Srivastava, *et al.* (2002) also found that pinching at 40 days after transplanting resulted in maximum number of flowers per plant (58.18) and flower yield (30.99 ton/ha) compared to no pinching (42.80 and 22.40 ton/ha, respectively) in African marigold cv. Pusa Narangi Gaiinda.

Jacques, *et al.* [5] found that *Tagetes patula* cv. Honeycomb grown in plastic containers in soilless media irrigated with 0, 100, 200, 300 or 400 mg N per liter in every irrigation resulted in maximum plant height at 55 days after transplanting grown at maximum level of N i.e. 400 mg N per liter.

Sehrawat, *et al.* [6] carried out a field experiment on *Tagetes erecta* cv. African Giant Double Orange with different level of N (0, 10, 20, 30 and 40 gm) and observed significant increase in plant height with nitrogen application from 0 to 40gm N/m<sup>2</sup>, the maximum plant height (82.10 cm) with N 30 gm/m<sup>2</sup>, while the numbers of branches (17.10) were maximum with N 40 gm/m<sup>2</sup>.

## Conclusion

Significantly higher yield per plant was recorded in 50kg/ha dose of nitrogen treatment (238.18gm) and lowest in 150kg/ha dose of nitrogen treatment (201.03gm). Significantly higher yield per hectare was observed in pinching treatment (9.89t) as compared to non-pinching treatment (8.88t). Similarly, significantly higher yield per hectare was observed in 50kg/ha dose of nitrogen treatment (9.91t) and lowest in 150kg/ha dose of nitrogen treatment (8.36 t). Different dose of nitrogen had no significant effect in case of number of flowers per plant, fresh weight of flower and diameter of flower. Similarly, the interaction between pinching and different dose of nitrogen gave no significant result in case of any parameters observed.

Based on the result obtained from the experiment, pinching showed significant result in case of all the observed parameters and nitrogen dose also showed significant result in case of plant height, yield per plant and yield per hectare. Pinching along with the application of 50 kg/ha of nitrogen showed highest yield of marigold, thus this treatment can be suggested regarding greater yield of marigold in case of Deukhuri, Dang, Nepal.

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