

## **Growth, Flowering and Yield of Marigold (*Tagetes erecta*) Cv. Pusa Arpita as influenced by foliar spray of urea and copper**

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### **Abstract**

*A field trial constituting four concentrations of urea (0, 0.5, 1.0 and 1.5%) and three concentrations of copper (0, 0.25 and 0.50%) giving thereby 12 treatment combinations which were replicated 4 times in a field laid-out in randomized block design at R.B.S. College, Bichpuri, Agra during 2015-16. Five weeks old seedlings of marigold Cv Pusa Arpita were used in transplanting. Its seed was procured from division of Floriculture & Landscaping, I.A.R.I., New Delhi. The results of this experiment indicated that the use of 1.5% urea and 0.5% copper through foliar spray gave better plant growth, flowering and yield of marigold.*

Key words: Marigold, Copper, Floriculture, foliar spray

### **Introduction**

Marigold is grown widely in all types of soil and climatic conditions throughout the country. Its cultivation is mainly done for using flower as loose as well as cut-flower. Its flowers are also used for making various floral decoration. It has ayurvedic medicinal properties as anti-bacterial and its extract from leaves is also used as antiseptic against wound and earache. It maintains high position in floriculture industry for spinning money. Unfortunately, nutritional aspect for marigold in specific is lacking and whatever searches have been done they remain confined to soil application which leads to a great loss of nutrients. Hence, foliar feeding was chosen for their application. Since nitrogen lacks in most-parts of the soil and for its requirement the main source which is applied, is urea and on the other side copper in the form of copper-sulphate was chosen as it contributes maximum in the metabolism of carbohydrates and then too in enzymatic activities. Keep in view the facts narrated above, the present experiment was conducted to ascertain the efficacy of foliar spray of urea and copper on growth, flowering and yield of marigold Cv. Pusa Arpita.

### **Materials and Methods**

An experiment comprising of four concentrations of urea (0, 0.5, 1.0 and 1.5%) and the concentrations of copper (0, 0.25 and 0.5%) giving thereby 12 treatment combinations which were

replicated four times in a field laid-out by randomized block design at R.B.S. College, Research Farm, Bichpuri, Agra during 2015-16. The seed of marigold Cv Pusa Arpita was procured from the Division of Floriculture and Landscaping, I.A.R.I., New Delhi and it was sown in nursery On September 16, 2015 after treating with mercurial fungicide. The seedlings in 5 weeks age were transplanted in prepared field. All the normal cultural operations were performed as per the need of the crop. The data on growth, flowering and yield were recorded timely during the course of experimentation.

### **Results and Discussion**

The data computed in Table 1 revealed clearly that foliar spray of urea and copper at their highest limits, i.e. 1.5% and 0.5% respectively was found to increase the plant growth in terms of height, spread, diameter and number of branches and leaves much more considerably over their lower rates of application. It appears that such an augmentation in plant growth might be due to more assimilation of carbohydrates as well as more activities of enzymes in plant during its growth period as reported by many researchers (Hansch and Mendel, 2009; Upadhyay and Panda, 2009).

An examination of the data summarized in Table 2 revealed that the foliar application of 1.5% urea and 0.5% copper produced appreciably more

Table 1: Effect of foliar spray of urea and copper on growth attributes

Treatments	Plant height (cm)	Plant spread (cm)	Diameter of stem (cm)	Branch/plant	Leaves/branch
Concentration of urea:					
0.0% (control)	70.08	31.18	2.31	15.71	29.31
0.5%	75.11	34.31	2.36	16.72	34.21
1.0%	76.81	36.91	2.41	17.93	35.73
1.5%	78.38	38.18	2.65	18.18	37.01
S.Em±	0.631	0.594	0.025	0.298	0.481
C.D. at 5%	1.275	1.200	0.050	0.602	0.972
Concentration of Copper :					
0.0% (control)	71.52	30.74	2.32	15.43	32.01
0.25%	74.65	36.55	2.43	17.55	33.73
0.50%	79.13	38.17	2.54	18.44	36.48
S.Em. ±	0.728	0.686	0.029	0.344	0.555
C.D. at 5%	1.472	1.386	0.058	0.695	1.122

Table 2: Effect of foliar spray of urea and copper on flowering and yield of marigold

Treatments	Days to flowering	Flower heads/plant	Periodicity of flowering	Yield of flowers (q/ha)
Concentration of urea:				
0.0% (control)	61.67	65.8	19.0	84.72
0.5%	60.06	76.08	24.0	98.64
1.0%	56.38	81.92	27.0	108.70
1.5%	54.11	86.24	32.0	118.44
S.Em±	0.423	0.484	0.656	2.561
C.D. at 5%	0.855	0.978	1.325	5.176
Concentration of Copper:				
0.0% (control)	61.50	68.36	19.0	88.48
0.25%	59.36	78.32	26.0	101.02
0.50%	0.488	0.559	0.757	2.057
S.Em. ±	0.488	0.559	0.757	2.957
C.D. at 5%	0.987	1.129	1.530	5.927

number of flower heads per plant, yield of flowers per unit area also extended the periodicity flowering much more over their respective lower concentrations. However, the initiation of flowering was delayed with each higher concentration of urea and upper in comparison to their respective lower rates of application through foliage. It is quite obvious that better plant growth might be held responsible for such an increase in the number of flowers/plant and ultimately yield per unit area. However, the start of flowering was delayed at their highest rate of application which might be due to the availability of nitrogen and copper in great quantity that is likely diverted to accelerate vegetative growth at the expense of flowering.

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### References

- Hansch, R. and R.R. Mendal (2009). Physiological functions of mineral micro-nutrients (C, Zn, Mg, Fe, Ni, Mo, B, Cl). *Curr. Opin. Biol.* 12: 259-66.
- Upadhyay, R.K. and S.K. Panda (2009). Copper induced growth inhibition, oxidative stress and ultra structural alterations in freshly growth water lettuce (*Pistisstratioles* L.). *C.R. Biologics*, 332: 623-32.