



Research Article

EFFECT OF PLANTING TIME AND PINCHING ON YIELD OF ANNUAL CHRYSANTHEMUM

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Abstract: The performance of *annual chrysanthemum* transplanted on different time and pinching at different interval were studied and found that among different planting time maximum number of flowers per plant was recorded in 15th October planting (95.28 and 89.90). Whereas, under different pinching interval maximum number of flowers per plant was noticed in single pinching at 30 days after transplanting (97.52 and 91.21). Regarding yield of flower per plant maximum flower yield was noticed in 15th October planting (208.87 and 195.73) and in single pinching at 30 days after transplanting (227.62 and 210.69 g). Maximum flower yield per plot was recorded in 15th October planting (7.51 and 7.04 kg) and with respect to pinching, single pinching at 30 days after transplanting (8.18 and 7.56 kg) found superior. Maximum flower yield per hectare was recorded in 15th October planting (15.45 and 14.49 t) and in single pinching at 30 days after transplanting (16.84 and 15.56 t). Interaction effect due to the planting time and pinching on the number of flower per plant, yield of flower per plant, per plot and per hectare was found non-significant during both the years of investigation.

Keywords: *Annual chrysanthemum*, pinching, transplanting, yield

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Introduction

Improvement Chrysanthemum is a member of family *Asteraceae*. There are 160 species of chrysanthemum. Annual chrysanthemum is propagated through seeds. *Annual chrysanthemum* comprise of three species viz. *Chrysanthemum segtum* (Corn marigold), *Chrysanthemum carinatum* (tricoloured chrysanthemum) and *Chrysanthemum coronarium* (Crown daisy or garland chrysanthemum). The crown daisy or garland chrysanthemum is a native to southern Europe, is a branching, annual with a finely cut foliage reaching a height up to a meter, size of flower varies from 2.2 to 4 cm and colour is usually is shades yellow and white with cream zone at the centre [1]. Among loose flowers group annual chrysanthemum has its own importance. The growers are attracted towards annual chrysanthemum flowers as it's of short duration, to produce marketable attractive good keeping quality flowers. Annual chrysanthemum is generally tall growing, with a view of get a dwarf bushy plant and for getting continuous and maximum number of flowers in annual chrysanthemum, present investigation entitled "Response of pinching to the planting time in annual chrysanthemum" was carried out with objectives to find out suitable planting time and pinching time for better production of annual chrysanthemum.

Materials and Methods

The field experiment was conducted by us at horticulture section, Rural Institute, Pipri-Wardha during the years 2010-11 and 2011-12. The experiment was laid out in factorial randomized block design with 20 treatment combination and three replications. The treatment comprised two factors, factor A comprised with five planting times viz. 15th September (T₀), 1st October (T₁), 15th October (T₂) 1st November (T₃) and 15th November (T₄) and factor B comprised four pinching treatments viz. No pinching (P₀), pinching at 30 DAT (P₁), pinching at 45 DAT (P₂) and pinching at 30 and 45 DAT (P₃). Local seeds of annual chrysanthemum were sown on raised nursery beds. Thirty five days healthy and uniform seedlings were transplanted in prepared flat beds on five different dates at a spacing of 30X45cm. All recommended cultural operations were done as per treatments. Yield

parameters were recorded at harvesting time (Number of flowers per plant, yield of flowers per plant, per plot and per hectare). Collected data was statistically analyzed [2].

Result and Discussion

The data in respect of number of flowers per plant as influenced by planting time and pinching are presented in following tables chronologically.

Table-1 Number of flowers per plant as influenced by planting time and pinching

Treatment	Number of flowers per plant		Pooled
	2010-11	2011-12	
Planting time (T)			
T ₀ – 15 th September	90.82	85.50	88.16
T ₁ – 1 st October	94.65	89.20	91.93
T ₂ – 15 th October	95.28	89.90	92.59
T ₃ – 1 st November	93.78	87.53	90.66
T ₄ – 15 th November	90.62	85.12	87.87
F test	Sig.	Sig.	Sig.
SE (m) ±	1.19	1.18	0.84
C.D. at 5 %	3.40	3.37	2.36
Pinching (P)			
P ₀ – No pinching	84.59	80.60	82.59
P ₁ – 30 DAT	97.52	91.21	94.37
P ₂ – 45 DAT	95.32	89.27	92.29
P ₃ – 30 & 45 DAT	94.69	88.72	91.71
F test	Sig.	Sig.	Sig.
SE (m) ±	1.06	1.05	0.75
C.D. at 5 %	3.04	3.01	2.11
Interaction (TxP)			
F test	NS	NS	NS
SE (m) ±	2.38	2.35	--
C.D. at 5 %	--	--	--

Table -2 Flower yield per plant as influenced planting time and pinching

Treatment	Flower yield per plant (g)		Pooled
	2010-11	2011-12	
Planting time (T)			
T ₀ – 15 th September	190.67	178.14	184.41
T ₁ – 1 st October	204.90	191.15	198.02
T ₂ – 15 th October	208.87	195.73	202.30
T ₃ – 1 st November	199.67	184.89	192.28
T ₄ – 15 th November	187.92	175.09	181.50
F test	Sig.	Sig.	Sig.
SE (m) ±	2.67	3.97	3.04
C.D. at 5 %	7.65	11.36	8.55
Pinching (P)			
P ₀ – No pinching	163.92	155.26	159.59
P ₁ – 30 DAT	227.62	210.69	219.16
P ₂ – 45 DAT	203.52	189.18	196.35
P ₃ – 30 & 45 DAT	198.57	184.87	191.72
F test	Sig.	Sig.	Sig.
SE (m) ±	2.39	3.55	2.72
C.D. at 5 %	6.84	10.16	7.65
Interaction (TxP)			
F test	NS	NS	NS
SE (m) ±	5.35	7.94	--
C.D. at 5 %	--	--	--

Table-3 Flower yield per plot as influenced by planting time and pinching

Treatment	Flower yield per plot (kg)		Pooled
	2010-11	2011-12	
Planting time (T)			
T ₀ – 15 th September	6.86	6.42	6.64
T ₁ – 1 st October	7.37	6.88	7.12
T ₂ – 15 th October	7.51	7.04	7.27
T ₃ – 1 st November	7.17	6.64	6.91
T ₄ – 15 th November	6.75	6.29	6.52
F test	Sig.	Sig.	Sig.
SE (m) ±	0.11	0.14	0.10
C.D. at 5 %	0.30	0.41	0.28
Pinching (P)			
P ₀ – No pinching	5.89	5.60	5.75
P ₁ – 30 DAT	8.18	7.56	7.87
P ₂ – 45 DAT	7.32	6.80	7.06
P ₃ – 30 & 45 DAT	7.14	6.64	6.89
F test	Sig.	Sig.	Sig.
SE (m) ±	0.09	0.13	0.09
C.D. at 5 %	0.27	0.37	0.25
Interaction (TxP)			
F test	NS	NS	NS
SE (m) ±	0.21	0.29	--
C.D. at 5 %	--	--	--

Table-4 Flower yield per hectare as influenced by planting time and pinching

Treatment	Flower yield per hectare (t)		Pooled
	2010-11	2011-12	
Planting time (T)			
T ₀ – 15 th September	14.11	13.2	13.65
T ₁ – 1 st October	15.16	14.15	14.65
T ₂ – 15 th October	15.45	14.49	14.97
T ₃ – 1 st November	14.76	13.66	14.21
T ₄ – 15 th November	13.89	12.93	13.41
F test	Sig.	Sig.	Sig.
SE (m) ±	0.22	0.29	0.21
C.D. at 5 %	0.63	0.84	0.59
Pinching (P)			
P ₀ – No pinching	12.12	11.53	11.83
P ₁ – 30 DAT	16.84	15.56	16.2
P ₂ – 45 DAT	15.06	13.99	14.52
P ₃ – 30 & 45 DAT	14.68	13.67	14.17
F test	Sig.	Sig.	Sig.
SE (m) ±	0.2	0.26	0.18
C.D. at 5 %	0.56	0.75	0.51
Interaction (TxP)			
F test	NS	NS	NS
SE (m) ±	0.44	0.59	--
C.D. at 5 %	--	--	--

Effect of planting time and pinching on number of flowers per plant

Effect of planting time: The data presented in table 1 showed that during both the years of study, significantly minimum number of flowers per plant was noticed in 15th November planting (90.62 and 85.12). Whereas, maximum number of flower per plant was recorded in 15th October planting (95.28 and 89.90). This might be due to the qualitative and quantitative temperature prevails during the life cycle of this flowering plant [3, 4].

Effect of pinching

The experimental findings indicated that during both the years of study, significantly maximum number of flowers per plant was noticed in single pinching at 30 days after transplanting (97.52 and 91.27) whereas, significantly minimum numbers of flowers per plant was recorded in no pinching (84.59 and 80.60). From above results it was noticed that, pinching increased the number of flowers per plant. Single pinching at earlier stage induces vigorous branching, favoured to develop more flowers [5, 6, 7].

Effect of planting time and pinching on flower yield per plant**Effect of planting time**

Data from table 2 revealed that during both the years of investigation, significantly maximum flower yield per plant was noticed in 15th October planting (208.87 and 195.73 g) whereas, minimum flower yield per plant was noticed in 15th November planting (187.92 and 175.09 g). Maximum flower yield per plant in 15th October planting might be due to environment component, shorter day length on month prior and one month after 21st December, coincides favourably with 15th October planting produced more flowers per plant than other treatment [4,8,9].

Effect of pinching

During both the years of investigation, maximum flower yield per plant was recorded in single pinching at 30 days after transplanting (227.62 and 210.69 g). Whereas, significantly minimum flower yield per plant was recorded in no pinching (163.92 and 155.26 g). An early pinching produced more number of branches and more vegetative growth resulted in the production of maximum number and weight of flowers per plant [6,10,11].

Effect of Planting time pinching on flower yield per plot**Effect of planting**

Data from table 3 revealed that during both the years of experimentation, significantly maximum yield per plot was recorded in 15th October planting (7.51 and 7.04 kg) whereas, minimum flower yield per plot was noticed in 15th November planting (6.75 and 6.29 kg). The congenial climate coincides favourably with 15th October planting produced more yield per plant which reflects on enhancement of yield per plot [3, 4].

Effect of pinching

During both the years of experimentation there were significant differences with respect to flower yield per plot. Single pinching at 30 days after transplanting (8.18 and 7.56 kg) recorded higher flower yield per plot. Whereas, lowest flower yield per plot was recorded in no pinching (5.89 and 5.60 kg). As discussed earlier above results indicated that, the number and weight of flowers per plant was more due to pinching, reflects in more yield per plot [5,6].

Effect of planting time and pinching on flower yield per hectare**Effect of planting time**

It is indicated from the data presented in table 4 that, during both the years of investigation, significantly maximum flower yield per hectare was recorded in 15th October planting (15.45 and 14.49 t). Whereas, minimum flower yield per hectare was noticed in 15th November planting (13.89 and 12.93 t). Since low temperature low humidity and short day conditions might have influenced more during the period of 15th October planting there by increased the yield per hectare [3, 4, 9,12].

Effect of pinching

95-99.

During both the years of investigation, maximum flower yield per hectare was recorded in single pinching at 30 days after transplanting (16.84 and 15.56 t). Whereas, minimum flower yield per hectare was recorded in no pinching (12.12 and 11.53 t). Early pinching produced a greater number of branches per plant, a greater number of flowers per plant and more flower yield per plot which increased yield per hectare in single pinching at 30 days after transplanting [6,11,13].

Conclusion

The productivity of flower yield per unit area of annual chrysanthemum transplanted on 15th October was outstanding and it was closely followed by 1st October and 1st November. However, under single pinching at 30 days after transplanting, huge quantity of flowers per hectare was harvested. The result of 1st October and 1st November were also encouraging therefore the month of October is advocated for planting.

Application of research: Growers face lack in improved agro techniques of annual chrysanthemum. Among the various agro techniques pinching has important role in influencing the growth, yield and quality of flowers. Hence for the standardization of agro techniques and to find out suitable time of pinching and planting, the present investigation was undertaken.

Research Category: Horticulture

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