

Review Article

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Influence of Pinching on Growth, Flowering and Yield of Different Flower Crops

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Flowers are regarded as a symbol of love, beauty and a gift of nature. Flowers are used by us to provoke the feelings of love and happiness because they have the power to make people happy and cheerful. A study was carried out to review on effect of pinching on flower crop. The number of experiments reviewed that pinching after 4 to 6 week after transplanting gives number of leaves, number of primary branches, plant spread, maximum number of flowers, number of seeds per flower, test weight and seed yield per ha with better seed quality parameters. From study plants pinched between 4 to 6 week after transplanting were found best for better growth, flowering and yield of chrysanthemum (annual), chrysanthemum (perennial), marigold, China aster, carnation etc.

Introduction

Flowers play an important role in making the life of a human being more cheerful and happy. People use flowers in several forms and on several occasions. The most important function that flowers have, however, is their power to convey profound human emotions and thoughts the way no other object can. Flowers are used as beautiful flower arrangements for decorating homes.

In flower crop there are certain operation that are to be followed judiciously for successful cultivation and ornamentals plants, major operation is pinching. The operation of pinching or stopping involves the removal of terminal growing portion of stem. Pinching can be helpful in regulating the flowering time and for quality flower production. Crop regulation (growth and flowering) is therefore desirable to have staggered production, enhanced quality, extended duration of flowering etc. these objective can be achieved

by pinching. The plants which need pinching include chrysanthemum (annual), chrysanthemum (perennial), marigold, China aster, carnation etc.

Chrysanthemum (Annual)

It is normally done with thumb and forefinger. First pinching is done when the plants reach a height of 15-20 cm with 3-4 pairs of leaves. A second pinching may be necessary if the plants make straggly and lean growth. Two types of pinching are performed in chrysanthemum. In soft pinching the soft tip of the shoot along with 2-3 open leaves is removed while in hard pinching a longer portion up to hard shoot is removed. In case of standard chrysanthemum only single bloom on a branch is usually allowed to produce. The pinching is not done if only one central bloom is desired on the main branch. Single pinching is done, if two flowers are desired, whereas double pinching is done for four flowers. In spray chrysanthemum numerous small to medium sized flowers are produced, therefore, two pinching are required to encourage lateral growth. As a general rule rooted cuttings are pinched 2 weeks after planting or approximately 100 days before full bloom.

Effect of pinching in Chrysanthemum (Annual)

Shivankar *et.al* (2010) conducted an experiment on annual chrysanthemum and reported that, minimum plant height was noticed in double pinching done 30 and 45 days after transplanting. Whereas, maximum plant height was recorded in control treatment i.e. no pinching. Regarding the number of primary branches per plant, stem diameter of plant, spread of plant at 50% flowering and fresh and dry weight of plant (biomass) were found maximum in early pinching at 30 days after transplanting under Nagpur conditions.

Dorajeerao *et al.*, (2011) conducted an experiment which reveals that the highest crop growth rate, plant height (106.97cm), leaf area (1050.3cm²) during all growth stages was recorded by pinching at 20 days after transplanting, which was significantly superior at initial stage and at par during later growth stages when compared top inch in treatment, plant height (99.42 cm), leaf area (895.1cm²) at 10 days after transplanting in garland chrysanthemum (*Chrysanthemum coronarium* L.).

Dorageerao and Mokashi (2012) observed that, number of flower per plant, yield of flower per plot, seed yield per plant, seed yield per plot, 1000 seed weight, germination percentage maximum when plant pinched at 20 DAS and 10 DAT in annual chrysanthemum.

Chrysanthemum (perennial)

Yassin and Pappiah (1990) conducted an experiment at Madurai and observed that, plant height was found to be significantly reduced by the pinching treatment. Pinching resulted in more number of branching and maximum spread of the plants. Pinching 30 days after transplanting was found to produce more laterals, compared to late pinching or no pinching in chrysanthemum cv. MDU-1.

Jhon and Poul (1995) studied on the effect of different spacing and pinching treatments on growth and flower production of chrysanthemum cv. Flirt and reported that, the highest number of flowers per plant was recorded when plants were pinched once, four weeks after planting. A field experiment conducted in chrysanthemum and reported that pinching after four weeks of planting substantially reduced plant height, flower stalk length and increased number of flower per plant Bholane *et al.*, (1998) (Fig. 1).

Pawar (2001) conducted the experiment on chrysanthemum which showed reduction in plant height, increased plant spread, number of primary branches, basal diameter of main stem and fresh and dry weight of plant when plant pinched at 4 weeks after planting in chrysanthemum cv. "PKV Shubhra.

Shinde *et al.*, (2010) carried out a field experiment on effect of pinching in chrysanthemum cv. IIHR-6 was conducted and the results revealed that pinching treatment significantly decreased the plant height.

Marigold

Marigold plants grow straight upward to their final height and develop into terminal flower buds. After production of terminal flower bud, side buds become free from correlative inhibition of apical dominance and these buds develop into branches to produce flowers. If the terminal portion of shoots is removed early, that is 40 days after transplanting, emergence of side branches starts earlier and more number of flowers of good quality and uniform size are produced.

Patil and Kale (1991) reported that, pinching greatly reduced the plant height in marigold. Pinching prior to flower bud initiation increased plant spread and pinching at flower bud emergence produced more number of shoots.

A field experiment conducted on the effect of spacing and pinching in marigold cv. 'Pusa Narangi Gainda' and revealed that, pinching reduced plant height done 20 days after planting and it also increased secondary branches when pinching done 30 and 40 days after transplanting (Shrivastava *et al.*, 2002)

Sehrawat *et al.*, (2003) revealed that, highest number of flowers per plant (30.17) and

flower yield (322.68 g/ plant) and pinching significantly reduced the plant height and increased number of branches when pinching is done 30 days after planting in marigold cv. 'African Gaint Double Orange'

Sharma *et al.*, (2012) noticed that, less number of days were required for 50% flowering in no pinching as compared to pinching done 20 DAT, 30 DAT and 40 DAT in African marigold and also observed that, the late pinching 40 DAT recorded maximum blooming period as compared to early pinching in African marigold. Badge *et al.*, (2012) reported that, maximum number of branches, leaf area per plant and diameter of main stem were found to be favoured under pinching done at 15 DAT in African marigold (Fig. 2).

China aster

In pinching, main shoot was pinched retaining six pairs of leaves from the base, 25–30days after planting.

Effect of pinching in china aster

Gyandev and Kurdikeri (2006) conducted an experiment on pinching, plant nutrients, growth retardant sprays on seed, yield, quality and storage studies in china aster. Pinching at 25 DAT increased number of flower bearing branches and number of flowers per plant, number of seeds per flower, test weight and seed yield per ha with better seed quality parameters in China aster.

Sailaja *et al.*, (2014) investigated that, number of primary branches (21.03), diameter (1.54 cm), were recorded maximum in China aster cv. Phule Ganesh White with single pinching at 30 day after transplanting. Where as, spread of plant was found maximum in Phule Ganesh Pink in single pinching at 30 day after transplanting.

Carnation

There are three ways of pinching in carnation. Single pinch is done once at 5 node stage by retaining 4-5 shoots for obtaining early crops. Second type of pinching is pinch and a half. In this type of pinch, the main stem is pinched and later when the resulting shoots are long enough, half of largest shoots on each plants is pinched. Double pinching is done in carnation, first by doing single pinch

followed by another pinching of all the shoots when they are 6-8 cm in length.

Singh *et al.*, (2005) reported that, maximum plant height (58.50 cm) was recorded in single pinching while maximum plant spread(25.0cm) and the number of branches plant-1 (8.5) were recorded in double pinching in carnation (*Dianthus caryophyllus* Linn.) cv. Tasman (Fig. 3).

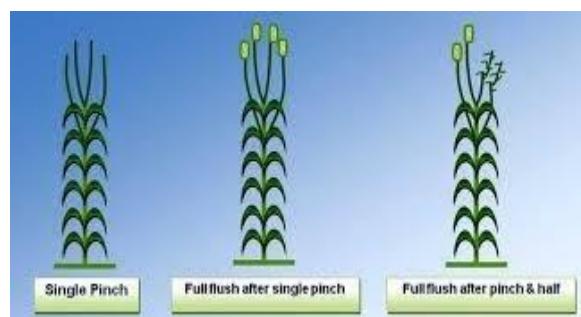
Fig.1 Effect of pinching in Chrysanthemum



Fig.2 Effect of pinching in marigold



Fig.3 Effect of pinching in Carnation



Dalal *et al.*, (2006) recorded maximum nodes per flower stalk, flower bud appearance, diameter of flower, cumulative uptake of water and vase life were observed in no pinching, while shoots per plant, flower yield per plant and flower yield/m² were observed maximum with double-pinching in carnation cv. Yellow Solar.

Ryagi *et al.*, (2007) reported that, the variety Domingo of carnation (*Dianthus caryophyllus* L.) was significantly early to produce flowers (85.83 days) compared to other varieties and Yellow Solar was late (143.66 days). Among pinching treatments single pinching produced flowers early (107.7 days) and double pinching was late in flowering (147.7 days). The maximum number of flowers m⁻² was recorded in variety Domingo (112.54 m⁻²). More number of flowers m⁻² was recorded in single pinching (74.82 m⁻²) and minimum was recorded in single and half pinching (63.14/m⁻²). The maximum flower stalk length was recorded in variety Yellow Solar (88.6 cm).

Dutta and Gupta (2010) conducted an experiment of rooted cuttings of eleven carnation cultivars with two pinching methods. Maximum plant height (84.17 cm) and stem length (64.09 cm) was recorded in cv. Impala planted in December employing single pinching while minimum plant height (48.77 cm) in cv. Dark Tempo and minimum stem length (44.57cm) in cv. Madras in January planted crop practicing pinch and a half method (in this method first single pinching is done and before emergence of new shoot second pinching is done).

In conclusion the above study, Pinching is one of the most important operation in this flowers, Pinching refers to the removal of the growing tips of the plant to induce the growth of vegetative laterals. It reduces the plant height, promote axillary branches, delay

flowering and helps in breaking resetting. It can be concluded that, pinching after 4 to 6 week after transplanting gives maximum number of flowers, number of leaves, plant height, number of primary branches, plant spread, number of flowers per plant in chrysanthemum (Annual), chrysanthemum (Perennial), marigold, china aster etc. and In Carnation a minimum plant height, maximum plant spread, more number of branches and more number of flower observed in single pinching.

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