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Growth, Flowering and Yield of Tuberose Influenced by Different Planting Time: A Review

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ABSTRACT

Major flowers grown in the state are roses, gladiolus, marigold, jasmine and tuberose. Among these, tuberose is valued by the aesthetic world for its beauty, elegance and pleasant fragrance. Long flower spikes are excellent cut flowers for table and vase decoration. Individual florets are much in demand for preparation of artistic garlands, gajra, veni, floral ornaments, bouquets and for button holes. The 'concrete' and 'absolute' prepared from tuberose florets are valuable perfumery products. In fact, India is the second largest producer and exporter of tuberose concrete to the world market. It is well established that flower and bulb production in tuberose is strongly influenced by planting time besides other factors. In the past, little attention has been paid by the scientists towards tuberose. Even with its magnificent spikes and abundant fragrance, somehow it has failed to draw the attention of the scientists. Hence, the literature available on this crop is very meager and scanty and reviewed below, especially about the effect of planting time on growth and flowering of tuberose (Polianthes tuberosa L.)

Keywords: *flowers, Yield, Tuberose, Garlands, Gajra*

INTRODUCTION

Effect of planting time on growth and flowering of flower crops

Vegetative growth: Effect of seven planting dates was observed on growth, flowering and corm characteristics of tuberose (*Polianthes tuberosa*) cv. Single. It was noted that significantly more number of days were taken by the corms in early planting dates for 10% sprouting but number of days gradually decreased in late plantings. Plantation on 1st May took the minimum days (11.67), which is statistically at par with number of days taken by 31st March and 15th April plantations. Number of leaves per plant ranged from 25.33 to 30 in all the treatments. Planting on 31st March gave the best results for days required to sprouting of corms, number of leaves and plant height (Asif *et al.*, 2001). Days taken for initiation and completion of sprouting of bulbs were less in May planted tuberose (Kumar *et al.*, 2010).

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Earliest sprouting of bulbs was observed in January planted bulbs and was on par with December planting in tuberose. Maximum plant height was recorded in March planting, which was on par with the February, January and December treatments. Minimum plant height was obtained in September planted bulbs (Nair *et al.,* 2004). Tuberose bulbs planted from March to August sprouted early. Low temperature during winter months might have resulted in delayed sprouting. The bulbs which sprouted early also produced plants with increased height, more number of leaves and shoots, and maximum leaf area (Padaganur *et al.,* 2005). Yang *et al.* (2002) observed that tubers treated with low temperature and planted in October had high sprouting rates in tuberose. Dubey and shukla (2002) observed that planting of 25th July gave the greatest number of leaves (134.36) and plant height (64.04 cm) in tuberose at Etawah conditions. Trivedi *et al.* (2004) reported that the tallest plant were obtained in the 15th May planting (93.15 cm) followed by 15th April (92.10 cm) and lowest number of days to complete bulb sprouting was observed in the 15th June planting of tuberose in Uttar Pradesh. Gurav *et al.* (2005a) found that the April planting of tuberose cv. Shringar at Ganeshkhind (Pune) produced the maximum plant height (78.8 cm) followed by the February planting (75.5 cm) and the least pant height (59.0 cm) were observed in December planting. Padaganur *et al.* (2005b) found that growth of tuberose was significantly higher in April (plant height 51.18 cm and number of leaves per plant 33.65) followed by May (plant height 50.61cm and number of leaves per plant 32.83) planting. Krijer (1985) conducted a trial on chrysanthemum and revealed that the planting that was done on mid November produced plants with the maximum vegetative growth in terms of number of branches per plant and plant spread. Reimherr and Gradner (1987) revealed that the sowing of *Chrysanthemum parthenium* from 29th January to 3rd April recorded maximum number of branches per plant. Hong and Jeong (1988) conducted a trial on *Chrysanthemum morifolium* in which sowing was done at monthly intervals from February to July and the maximum vegetative growth was recorded by the later planting dates. An experiment was conducted on *Chrysanthemum coronarium* in which planting was done on four dates from 10th September to 15th October and reported that maximum plant height (115.8 cm) and spread (76.8 cm) was observed in October plantings (Yang *et al.,* 1989). Meher *et al.* (1999) reported that plant height, spread, internode length, stem circumference and number of branches assessed at 30, 50, 70 and 90 days after planting in Chrysanthemum, May planting produced the tallest and most spreading plants. Dhankhar *et al.* (1999) found that plant height was greatest in gladiolus cv. Chipper under November planting at Pantnagar and the total leaf area was highest with October planting in all cultivars, with American Beauty producing the greatest leaf area. Jane *et al.* (2001) conducted a field experiment on annual Chrysanthemum and reported that maximum plant height (110.20 cm) and spread (76.19 cm) was observed in the plants transplanted between 5th and 15th October. The cutting planted in the first week of July gave the maximum plant height (49.09 cm) and number of branches per plant (6.10) in Chrysanthemum cv. Flirt (Singh *et al.,* 2004).

Selection of good planting time is not only necessary for obtaining higher vegetative growth and flower production but appropriate time of planting is also important for better returns in tuberose. Planting time of tuberose depends on the climatic conditions of the place. Subjecting the crop to proper climatic conditions is one of the important factors which generally contribute to the productivity of the plants. Vegetative growth in tuberose and other

bulbous plant is generally affected by the time of planting as is evident from the findings of many workers. According to Sadhu and Bose (1973), the tuberose in India is generally planted in February-March in plains and April-May in hills and February planting in plains increased the vegetative growth of tuberose.

Vegetative growth and quality of gladiolus is improved by proper planting times which also satisfies the consumers demands (Zubair *et al.* 2006).

Planting time of tuberose is very much affected by climatic conditions of the place. Likewise, according to Sharga (1977) tuberose grows well in Lucknow between April (average temperature 30^{o}C) to December (average temperature 18^{o}C). Mukhopadhyay and Bankar (1981) indicated that tuberose could be planted round the year in Bangalore conditions, but it was observed that the height of plants and number of leaves per plant increased during May-June planting. Cirrito *et al.* (1982) found 15th June as the best time for planting tuberose under Italian conditions. Nambisan and Krishnan (1983) reported that under Tamil Nadu condition, tuberose is generally planted during July and August, whereas, in west Bengal, the first week of April appeared to be the best time for planting of tuberose to obtain maximum vegetative growth (Yadav and Bose, 1988). In Georgia (USA), Armitage and Laushman (1990a) suggested to plant the bulb of tuberose in the month of March. Reddy (1993) observed that the plants raised from April to July were early to sprout and produced more number of shoot and longer leaves under Hisar conditions. Bhattacharjee (1995) mentioned that in plains of West Bengal, tuberose bulbs at early date (10th April) significantly improved vegetative growth. Sharga (1999) reported that tuberose bulbs are planted in March-April for better growth under sub-tropical conditions.

Singh and Kumar (1999) conducted trial on tuberose cv. 'Double' with three planting dates (2nd week of October, March and June) and observed that the number of leaves was highest for June planting at Meerut. Mishra (1999) investigated the effect of planting date (February-May) on growth and flowering of *Polianthes tuberosa* and revealed that planting of bulbs on 7th March and 22nd March produced higher number of long leaves per clump. Srinivas and Rao (2000) indicated that the February to April period is the suitable time for planting the bulbs of tuberose cv. 'Double' under Hyderabad conditions.

Flowering parameters: Gurav *et al.* (2005a) studied the effect of planting time on yield and quality of tuberose cv. Shringar at Ganeshkhind (Pune) and found that the April planting produced significantly superior over other treatment times as regards number of flower stalks per plant (10.0), length of flower stalk (72.6 cm) and number of florets per stalks (44.5) followed by February planting. Padaganur *et al.* (2005) conducted a field experiment on effect of planting time of tuberose in Dharwad and observed that flowering of tuberose was significantly higher in April {length of spike (108 cm), rachis length (23.54 cm) and number of spikes per plant (2.20)} followed by May planting. Grewal *et al.* (2004) reported that non-significant differences in the number of flowers per plant were observed in cuttings planted on the first week of July than those planted on the second week of August in Chrysanthemum. In a field experiment on Chrysanthemum it was reported that the plants that had longest duration of flowering were those planted between February and September (Bres and Jerzy, 2004). Dhankhar *et al.* (1999) studied that effect of planting time on growth and flowering of some cultivars of gladiolus in Pantnagar and found that the emergence of spikes and the opening of basal florets were earliest in Her Majesty under September

planting; spike length and floret size were greatest under November planting in Chipper, producing spikes of 93.10 and 97.23 cm in length and the longest rachis (66.0 and 71.08 cm) and greatest number of florets per spike (17.58 and 18.33) were observed under October planting in Chipper and American Beauty. Bala *et al*. (2007) reported that corms planted on 1st November were earliest to flowering in gladiolus at Hyderabad. According to Ghosh and Pal (2008) that the crop planted on 10th February showed early flower buds (35.51days) compared to other planting dates and the flowering duration was maximum with the 12th October planting; whereas minimum with the 10th February and 12th April planting. Under AICRP on floriculture trials on planting time of tuberose at different centers were also conducted. At Pune, Yadav (2000) reported that the bulbs planted in the month of February and April took minimum days for flowering (90.5 and 98.8 days) and number of florets per stalk (40 and 44) respectively, as compared to the other treatments in tuberose cv. 'Shringar'. Datta (2000) reported that April planting was found to be better than other planting time in respect of earliness of flowering maximum length of spike (118.26 cm) number of spike per plant (1.33), number of florets per spike (34.26) and yield of spike (9.26/ m^2) in tuberose cv. 'Single' at Lucknow. In an experiment on tuberose, it was reported that April planting was found to be better than other planting time in respect of number of spike per bulb (1.33), number of florets per spike (34.26) and yield of spike (9.26/m^2) (Datta, 2000)**.** Biswas (2000) at Kalyani revealed that March planting was found to be better than other planting time which recorded longest duration of flowering (17days) and highest yield (66.52 / m^2) of spikes. Chaphale *et al.* (2000) revealed that significant results in respect of length of spike (94.11 cm), length of rachis (26.18 cm) and number of florets per spike (31.4) were recorded by 25th July planting of tuberose at Nagpur conditions. Padaganur (2005) observed that the flower production of tuberose in April followed by May and march months was best for planting at Dharwad conditions and it can be planted February to August for better growth and flowering (32.51 days) was maximum in March planted bulbs which was at par with April planting; September planting recorded minimum flowering duration of 13.0 days; August planted bulbs recorded the minimum number of days from spike initiation to opening of 1st floret; the maximum number of days was taken by June planted bulbs; July planting produced longer spikes, which was at par with April planting and January planting.

Bulb parameters: June planting gave the highest bulb yield in tuberose (Nagaraja *et al.,* 1999). Yadav and Bose (1988) stated that the first week of April appeared to be the best planting time for planting of tuberose to obtain maximum yield of bulbs in West Bangal. Khobragade *et al.* (1997) conducted trial on planting time of tuberose at Akola, and observed that planting bulbs at early date (10th April) significantly increased bulb production. Sagar *et al.* (2005) concluded that weight of bubs per plant (139.93 g) was maximums in bulb soaking treatment of GA_3 of 200 ppm. Gurav *et al.* (2005) studied the effect of planting time on yield and quality of tuberose cv. Shringar at Ganeshkhind (Pune) and observed that the April planting produced the maximum weight of bulb per plant (195.0 g) and number of bulbs per plant (33.0). Kalasareddi *et al.* (1998) conducted an experiment in Dharwad, and found that planting time significantly influenced the corm and cormel production of gladiolus in cultivar Melody and American Beauty. Laskar and Jana (1994) found that corm production was best with planting of gladiolus on 19th March (1.86 - 1.95 corm/plant). The findings of Suh and Kwack (1990) showed that the formation of good

quality corms was promoted with early planting dates.

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