



RESPONSE OF GRADED LEVELS OF NITROGEN APPLICATION ON GROWTH AND FLOWERING PARAMETERS IN DOUBLE PETALLED CULTIVARS OF TUBEROSE (*Polianthes Tuberosa* Linn.)

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ABSTRACT

Six levels of nitrogen namely, 100, 150, 200,250, 300 and 350 kg/ha were tried in tuberose (*Polianthes tuberosa* Linn.) cultivars Pearl Double and Suvasini for two consecutive years. It was observed that none of the growth and floral parameters were significantly influenced by graded levels of nitrogen application. However, 100-150 kg N/ha in cv. Pearl Double and 150-200 kg N/ha in cv. Suvasini marginally improved majority of the growth and floral parameters studied under Bengaluru condition.

Key Words : Cut flower, loose flower, nitrogen, tuberose.

Tuberose (*Polianthes tuberosa* Linn.) is popularly known as *Rajanigandha* in Hindi, occupies a prime position among commercial ornamental bulbous flower crops, because of its highly fragrant white flowers which can be used in various ways. It is commercially cultivated for use in cut flower and loose flower trades and also for extraction of highly valued essential oils. It belongs to the family Agavaceae and native to Mexico. The fragrant flowers of tuberose are added along with stimulants or sedatives to popular beverages prepared for chocolate and served either as cold or hot. The essential oils of tuberose is used in alcoholic beverages, ice creams, candy and backed products. The bulbs are considered as diuretic and emetic. They are rubbed with turmeric and thereafter butter and applied as paste to

remove red pimples of infants. The dried bulbs in the powdered form are used as remedy for gonorrhoea.

According to Singh *et al.* (2010) it is estimated that in India tuberose has been commercially cultivated over 30000 ha area. The major tuberose growing states are: Andhra Pradesh, Assam, Gujarat, Haryana, Karnataka, Maharashtra, Odisha, Tamil Nadu, Uttrakhand, Uttar Pradesh and West Bengal. Among about half a dozen cultivars of Double petalled tuberose are available in the country, cv. Pearl Double is most suited for cut flower trade and many other beautification purposes as intact cut spikes. The Indian Institute of Horticultural Research, Bengaluru had released a new cultivar of Double petalled tuberose and named it as Suvasini, recommended for use in cut flower and

beautification purposes (Anon. 1992-93). Cultivar Suvasini performed better over traditional Double petalled cultivar Pearl Double in most of the vegetative growth and floral parameters studied (Anon. 1993-94). As such little work has been done with respect to Double petalled tuberose cv. Suvasini, it is therefore essential to standardize the nutritional requirements and release the cultivar complete with its package of practices. Among various essential nutrients required by plant, nitrogen is the major one which plays an important role in improving the vegetative growth and development of plants. Nitrogen recognized as kingpin to the fertilization programme for higher yield. Nitrogen is the major constituent of chloroplast, protein and amino acids that accelerates synthesis of chlorophyll (Rathore and Singh, 2013). Nitrogen improves bulb production by promotion of cell proliferation and storage of starch in resulting cell. The main function of nitrogen is the initiation of meristematic activity which accelerates cell division and cell enlargement. Nitrogen influences emergence, production and quality of spikes (Singh, 1973). Keeping these aspects in view the present studies were initiated.

MATERIALS AND METHODS

The present studies were carried out at the Indian Institute of Horticultural Research, Hessaraghatta Farm, Bangaluru, is situated at 13° 58' N latitude, 78° E longitude and 890 meter altitude. The soil of the experimental plots was sandy loam, had a pH of 6.8, E.C. 0.22 d.S.m., low in nitrogen, medium in phosphorus and high in potash. Six graded levels of nitrogen namely, 100, 150, 200, 250, 300, and 350kg per hectare were tried in a randomized block design with four replications in both the cultivars of tuberose i.e. Pearl /Double and Suvasini.

Uniform quantities of phosphorus and potassium (200 kg per hectare, each) were supplied in both the cultivars and vis-a-vis in both the years. The graded levels of nitrogen were applied in three equal doses i.e., planting time, 60 and 90 days after planting

(Mukhopadhyay and Bankar, 1985), while phosphorus and potassium were applied at planting time only. Nitrogen, phosphorus and potassium were supplied through Urea, Single Super Phosphate and Muriate of Potash, respectively. Separate experiments were conducted for both the cultivars. Uniform size bulbs (2.0 to 2.5 cm diam.) of cvs. Pearl Double and Suvasini were planted at 25×25 cm apart, into 1.25 × 1.00 m size plots at 5 cm depth. Uniform cultural operations were carried out during the entire period of studies. Various observations on plant growth and floral parameters were recorded time to time from flowering stage upto one year of planting in both the years. Two years data were pooled and analysed statistically.

RESULTS AND DISCUSSION

The pooled data of two years experiments presented in Tables 1 and 2 revealed that different treatments namely, application of 100, 150, 200, 250, 300 and 350 kg nitrogen per hectare did not have significant influence of any of the plant growth and floral parameters studied in cultivars Pearl Double and Suvasini. However, treatments namely, 100 and 150 kg nitrogen per hectare in cv. Pearl Double and 150 and 200 kg nitrogen per hectare in cv. Suvasini had improving effect on majority of the growth and floral parameters studied when compared to other treatments. The increasing levels of nitrogen has shown adverse effect on some of the parameter studied in both the cultivars. Patil and Katwate (1993) also reported non significant effect due to application of nitrogen at 50, 75 and 100 kg/ha on flowers yield in tuberose cv. Single. Bankar (1988) obtained highest plant growth and yield of quality flowers when nitrogen was applied at 150 kg/ha in tuberose cv. Double, but he did not observe significant difference by application of nitrogen at 100, 150 and 200 kg/ha on most of the parameters studied. Gowda *et al.* (1991) recommended 200 kg nitrogen per hectare for obtaining higher yield and quality of flowers in tuberose cv. 'Double. Gangawar *et al.* (2003) reported higher vegetative growth with application of 150 kg nitrogen

Table : 1 Response of graded levels of nitrogen application on growth and flowering parameters in tuberose (*Polianthes tuberosa* Linn.) cv. Pearl Double (pooled data of two experiments)

Treatment (kg N/ha)	Plant height (cm)	No. of leaves / plant	No. of days taken for flowering	Floret diameter (cm)	Length of mature bud floret (cm)	Weight of florets spike (g)	Spike length (cm)	Rachis length (cm)	Flowering duration (day)	No. of florets / spike	No. of spikes / plot
100	34.46	25.33	140.82	4.31	4.58	52.96	69.17	22.47	20.80	36.29	20.25
150	38.60	28.12	130.95	4.19	4.33	45.29	69.03	20.99	23.38	35.07	22.25
200	33.56	26.80	129.71	4.21	4.59	56.78	65.08	18.99	20.28	35.99	24.25
250	34.33	27.55	137.24	4.44	4.62	51.65	69.36	21.24	21.09	36.36	23.00
300	33.39	27.25	139.41	4.32	5.21	51.69	64.41	22.26	20.89	35.43	24.75
350	35.31	27.35	118.97	4.29	4.33	56.78	68.64	21.14	22.02	37.28	24.00
S.Em±	1.25	1.55	5.56	0.10	0.21	7.04	2.68	1.22	2.01	1.61	1.52
C.D.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

(P=0.05)
N.S.: None significant**Table 2 : Response of graded levels of nitrogen application on growth and flowering parameters in tuberose (*Polianthes tuberosa* Linn.) cv. Suvasini (pooled data of two experiments).**

Treatment (kg N/ha)	Plant height (cm)	No. of leaves/ plant	No. of days taken for flowering	Floret diameter (cm)	Length of mature bud floret (cm)	Weight of florets spike (g)	Spike length (cm)	Rachis length (cm)	Flowering duration (day)	No. of florets/ spike	No. of spikes / plot
100	38.82	33.91	129.59	4.36	5.59	56.99	63.88	24.56	19.97	34.67	21.75
150	43.87	35.51	120.33	4.41	4.74	56.95	63.83	24.85	23.06	40.53	23.25
200	40.52	38.65	126.14	4.68	5.26	70.63	63.88	24.12	23.42	37.81	26.25
250	40.99	35.96	126.73	4.37	5.19	70.18	66.23	25.47	20.36	35.81	24.50
300	43.20	37.30	131.60	4.86	4.60	59.32	66.84	25.82	23.20	40.94	27.00
350	41.98	44.30	129.53	4.42	5.26	70.46	69.87	28.21	22.03	40.93	25.25
S.Em±	2.36	3.53	5.83	0.16	0.30	5.43	2.27	1.47	1.92	1.84	1.58
C.D.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

(P=0.05)
N.S.: None significant

per hectare in tuberose cv. Double under Kanpur (Uttar Pradesh) condition

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