



Effect of fertigation levels on bird-of-paradise (*Strelitzia reginae*)

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Bird-of-paradise (*Strelitzia reginae* Ait.) is an evergreen perennial herbaceous indigenous to South Africa, grown in the regions having moderate subtropical climate. The brilliant colours and unusual appearance of the flowers have made it exceptionally popular as cut flower. Therefore, the crop is cultivated in many parts of the world in order to produce cut flowers for both domestic and international markets. The major producing countries of bird-of-paradise on commercial scale are USA, Israel and South Africa. Bird-of-paradise occupies a Place of pride in the garden and is an important choice for landscaping.

Strelitzia reginae is very popular flowering species growing up to a height of 90 cm, the leaf and the leaf blade is about 45 cm long. The flowers with orange sepals and purple petals are very brilliant, emerging from the purplish spathes on a stem about 90 cm long.

Fertigation permits application of various fertiliser formulations directly at the site of concentration of active roots and it is thus reported to improve the efficiency of nutrient uptake and reduce their requirements besides increasing plant growth and yield of horticulture crops.

The field experiment was laid out in a Randomized Complete Block Design with three replications during 2008-2009 at the Precision Farming Development Centre (PFDC), Division of Horticulture, Gandhi Krishi Vigyan Kendra, University of Agricultural Sciences, Bangalore. The experiment was conducted on one-year-old bird-of-paradise plants to study the effects of fertigation on growth and yield. The plants were planted at the spacing of 1.5 m × 1.5 m; 80, 100 and 120% recommended dose of fertilizers (16:11:6g NPK/plant/month) were provided through fertigation in splits at monthly intervals along with 8 and 12 liters of water/day/

plant for 12 months. Observations such as plant height, leaf length, leaf width, number of leaves/plant, number of days taken for initiation of inflorescence from first day of treatments, number of days taken for flowering from initiation of inflorescence, number of inflorescence/plant/month, number of florets/inflorescence, stalk length, stalk diameters, inflorescence weight, length of bracts, sepals and petals were recorded.

The data on effect of different levels of fertigation on plant height, leaf length, leaf width, number of leaves/plant, number of days taken for initiation of inflorescence, number of days taken for flowering from initiation of inflorescence, number of inflorescence/plant/month, number of florets/inflorescence, stalk length, stalk diameters, inflorescence weight, length of bracts, sepals and petals were recorded. Statistically analyzed data presented in Table 1 and 2.

Plant height (113.26 cm) recorded was maximum in fertigation treatment supplied with 120% recommended dose of fertilizer + 12 liters of water/plant/day (T₆) which was on par with T₅ and T₄ (108.22 cm and 101.72 cm respectively) while lowest plant height was recorded in control T₇ (77.94 cm). The leaf length increased significantly with increasing nutrient levels, the plants which received higher level (T₆) produced longer leaves (85.70 cm) which was on par with T₃, T₅, T₄ and T₂ (78.68 cm, 78.54 cm, 77.40 cm and 74.01 cm respectively) whereas, minimum leaf length (61.56 cm) was recorded in control (T₇). Number of leaves recorded was maximum (12.75) in T₆ level, which was on par with T₅, T₄ and T₃ (11.66, 11.38 and 11.12 respectively) while the lowest (8.24) number of leaves was recorded in control (T₇). In the present investigation the vegetative characters like plant height, leaf length and number of leaves/plant were statistically significant and increased with the increasing levels of fertigation and drip irrigation. Maximum plant height, leaf length and number of leaves/plant were observed at higher (T₆) levels of fertigation and drip irrigation, which might be due to availability of more nutrients, inducing the plants to grow taller and increase the length of leaves and number of leaves/plant. The present findings are in accordance

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Table 1 Effect of fertigation and drip irrigation on plant height, leaf length, leaf width, number of leaves/plant, flower initiation and floral characters of bird-of-paradise

Treatment	Plant height (cm)	Leaf Length (cm)	Leaf Width (cm)	Number of leaves/plant	Number of days taken for initiation of inflorescence	Number of days taken for flowering from initiation of inflorescence	Number of inflorescence/plant/month	Number of florets/inflorescence
T ₁ – 80% of recommended dose + 8 l of water/plant/day	87.32	67.68	8.33	8.42	51.00	30.00	1.04	3.00
T ₂ – 80% of recommended dose + 12 l of water/plant/day	93.32	74.01	8.93	8.71	51.00	30.66	1.04	3.00
T ₃ – 100% of recommended dose + 8 liter of water/plant/day	95.76	78.68	10.60	11.12	40.00	26.33	1.37	3.00
T ₄ – 100% of recommended dose + 12 l of water/plant/day	101.72	77.40	10.63	11.38	39.33	24.33	1.37	3.66
T ₅ – 120% of recommended dose + 8 l of water/plant/day	108.22	78.54	9.84	11.66	27.33	23.33	2.37	4.00
T ₆ – 120% of recommended dose + 12 l of water/plant/day	113.26	85.70	10.54	12.75	24.66	20.00	2.72	4.33
T ₇ – control	77.94	61.56	8.30	8.24	64.00	42.66	0.80	2.33
F-value	*	*	NS	*	*	*	*	*
SEm+	3.95	4.20	0.90	0.83	1.27	0.91	0.31	0.19
CD (P=0.05)	12.19	12.97	2.78	2.58	3.92	3.81	0.95	0.59

NS, Non-significant; *Significant (P=0.05)

with Siraj Ali (1998) in bird-of-paradise, Gopinath (2001) and Krishna (1998) in carnation, Sreenivas and Narayana Gowda (1999) and Jithendra Kumar *et al.* (2003) in China aster.

It was observed that initiation of inflorescence was earliest (24.66 days) at T₆ level followed by T₅ level (27.33 days) where as control (T₇) took more number of days (64 days) for inflorescence initiation. In case of T₆ level of fertigation at 120% + 12 liters of water/plant/day recorded early flowering from initiation of inflorescence (20.00 days) followed by T₅ (23.33 days) while late flowering from initiation of inflorescence was recorded in T₇ (42.66 days). Duration of inflorescence initiation and flowering was statistically significant and influenced by level of fertigation and drip irrigation. Early emergence of inflorescence and flowering were observed at higher (T₆) levels of fertigation and drip irrigation. This might be attributed to higher supply of nutrients, which results in the early onset of flowering. These results are in accordance with the findings of Sharma and Mohammad (2004), Archana and Aravind (2003) and Shashidhar (2004) in tuberose, Krishna (1998) in carnation, Sreenivas and Narayana Gowda (1999) in China aster.

Among the different treatments T₆ level recorded

significantly highest number of inflorescence/plant/month (2.72) followed by T₅ (2.37) while the lowest number of inflorescence/plant/month (0.80) was noticed in control (T₇). Number of inflorescence/plant/month showed statistically significant difference among different levels of fertigation and drip irrigation. Among different levels of fertigation, higher (T₆) level produced more number of inflorescence/plant/month. It might be due to more nutrient availability at higher level of fertigation resulting in accumulation of more photosynthates due to increase in leaf number and leaf area which has resulted in production of more number of inflorescence/plant. Similar effects of nutrition in increasing the above traits has been reported by Siraj Ali (1998) in bird-of-paradise, Shashidhar (2004) in tuberose and Jithendra Kumar *et al.* (2003) in China aster.

Increase in the level of fertigation significantly increased the number of florets/inflorescence. More number of florets/inflorescence (4.33) was noticed in T₆ level followed by T₅ (4.00) where as less number of florets/inflorescence (2.33) was recorded in control (T₇). Maximum number of florets/inflorescence was noticed at higher (T₆) level of fertigation with drip irrigation. This may be due to the higher supply of nutrients resulting in vigorous and bigger inflorescence

Table 2 Effect of fertigation and drip irrigation on stalk length, diameter of stalk, weight of inflorescence, length of bracts, sepals and petals of bird-of-paradise

Treatment	Stalk length (cm)	Diameter of stalk (mm)	Weight of inflorescence (g)	Length of bracts (cm)	Length of sepals (cm)	Length of petals (cm)
T ₁ – 80% of recommended dose + 8 l of water/plant/day	68.73	10.57	76.03	17.02	9.33	8.24
T ₂ – 80% of recommended dose + 12 l of water/plant/day	71.70	11.13	75.79	17.05	9.40	9.15
T ₃ – 100% of recommended dose + 8 l of water/plant/day	74.79	11.28	94.11	17.76	10.86	10.25
T ₄ – 100% of recommended dose + 12 l of water/plant/day	80.10	11.71	102.26	19.62	11.44	10.84
T ₅ – 120% of recommended dose + 8 l of water/plant/day	89.11	12.39	137.90	19.74	12.14	11.29
T ₆ – 120% of recommended dose + 12 l of water/plant/day	100.30	13.19	148.22	19.80	12.29	11.79
T ₇ – control	51.63	11.41	73.92	17.38	9.59	8.24
F-value	*	*	*	*	*	*
SEm+	1.55	0.20	1.91	0.27	0.19	0.12
CD (P = 0.05)	4.80	0.63	5.90	0.83	0.60	0.37

*Significant (P = 0.05)

causing production of more florets. These findings are in conformity with the report of Siraj Ali (1998) in bird-of-paradise and Biradar (2002) in tuberose.

The maximum stalk length (100.30 cm) was recorded in T₆ level where as minimum stalk length (51.63 cm) was recorded in control (T₇). T₆ level of treatment recorded maximum inflorescences diameter (13.19 mm) while minimum inflorescence diameter (10.57 mm) was recorded in T₁ level of treatment. Maximum weight of inflorescence (148.22 g) was recorded in T₆ level of treatment, whereas minimum weight of inflorescence (73.92 g) was recorded in control (T₇). T₆ level of treatment recorded highest length of bracts (19.80 cm) on par with T₅ level (19.74 cm) and T₄ level of treatment (19.62 cm) while the lowest length of bracts (17.02 cm) was noticed in T₁ level of treatment. The highest sepals length (12.29 cm) was recorded in T₆ level of treatment followed by T₅ (12.14 cm), whereas lowest length of sepals (9.22 cm) was recorded in T₁ level of treatment. In the treatment level T₆ highest length of petals (11.79 cm) was recorded while in the treatment level T₁ and control (T₇) lowest length of petals (8.24 cm) was recorded.

The quality characters like stalk length, diameter of stalk, weight of inflorescence, length of bracts, petals and sepals were statistically significant, influenced by higher level of fertigation and drip irrigation. Higher (T₆) level of fertigation and drip irrigation resulted in production of maximum stalk length, diameter of stalk and weight of inflorescence, length of bracts, petals and sepals than the other fertigation levels. This might be due to the higher nutrients availability at monthly interval and water to the

plants daily has resulted in production of stronger and taller flower stalk with higher number of florets. Build up of sufficient photosynthates enabling in increasing the quality parameters. These results are comparable with findings of Siraj Ali (1998) in bird-of-paradise, Sharma and Mohammad (2004) in tuberose.

The above traits showed statistically significant results with recommended dose of fertilizers through drip. It can be concluded that application of 120% recommended dose of fertilizer + 12 liters of water/day/plant recorded the maximum vegetative growth and flower yield with better flower quality.

SUMMARY

To raise healthy and attractive plants producing superior quality flowers, use of balanced nutrition and fertilizer management are important. Several research findings have shown that source and levels of major plant nutrients, their application methods are some of the important factors influencing growth, yield and quality of the crop. In the present investigation, water soluble fertilizer as source of nutrients at different levels were supplied by way of fertigation to study the Effect of fertigation on growth, yield and quality of bird-of-paradise (*Strelitzia reginae* Ait.). The vegetative characters, flower yield and quality character were statistically significant and increased with the increasing levels of fertigation and drip irrigation. Higher fertigation level (T₆-120% of recommended dose + 12 l of water/plant/day) recorded higher plant height (113.26 cm), leaf length (85.70 cm), number of leaves/plant (12.75), early emergence of inflorescence (24.66 days), early flower initiation (20 days),

maximum number of inflorescence/plant/month (2.72), number of florets/inflorescence (4.33), stalk length (100.30 cm), stalk diameters (13.19 mm), inflorescence weight (148.22 g), length of bracts (19.80 cm), length of sepals (12.29 cm), length of petals (11.79 cm), as compared to 77.94 cm plant height, 61.56 cm leaf length, 8.24 leaves/plant, 64 days for inflorescence emergence, 42.66 days for flower initiation, 0.80 inflorescence/plant/month, 2.33 florets/inflorescence, 51.63 cm stalk length, 11.41 mm stalk diameters, 73.92 g inflorescence weight, 17.38 cm bracts length, 9.59 cm sepals length and 8.24 cm petals length in control respectively.

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