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Conserving Honey Bees with Forage Plant Mexican Creeper - *Antigonon leptopus*

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JOURNAL OF HORTICULTURAL SCIENCES

Volume 15 **Number 2** **December 2020**

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Short Communications

In this issue…

Hearty New Year Greetings from our Editorial Team to all the readers of JHS!

As the world is slowly coming out of glitches of pandemic, there is no other better way than celebrating 2021 as Year of Fruits and Vegetables as announced by United Nations Assembly to welcome the new year and recognize the importance of nutrition for better health. Fruits and Vegetables ensure the Nutritional Security to humankind. They play key role in addressing the malnutrition that is a major concern. We are proud that JHS creatins awareness of importance of fruits and vegetables by publishing the recent developments in research with respect to these crops.

Diversity of fruit crops and genetic resources available with respect to fruit crops are important for developing better fruit crop varieties. ***Sankaran and Dinesh*** *have reviewed the "Biodiveristy of Fruit Crops in India" in a very comprehensive way. There is diversity in Jasmine species.* ***Ganga et al.*** *carried out the palynological investigations and recorded the variability in pollen morphology in different species of Jasmine by documentating images using scanning electron microscope. Biodiversity can be linked to livelihood also. One such success story with tamarind selection 'Lakhamna' is being reported by* ***Kanupriya et al.*** *This tamarind selection has been identified from participatory breeding programme. It has a better pod characters and more preferred by consumers.*

Protected cultivation has seen greater momentum in last two decades. ***Adeniji et al.*** *identified the best varieties of tomato for polyhouse cultivation in Nigeria.* ***Rao et al.*** *selected two gladiolus hybrid selections IIHRG-7 and IIHRG-11 with red purple and red coloured flowers respectively. These hybrids have resistance to Fusarium wilt and suitable for cut flower and flower arrangement purposes.* ***Sankaran et al.*** *analysed the variance for 6 quantitative and 30 qualitative traits in mango in 400 genotypes and identified 18 clusters. Selected genotypes from specific clusters can be used in hybridization programme.*

The production aspects are important in perennial crops. It is crop management that needs to be prioritized for enhanced yield. ***Adiga et al.*** *have reviewed the research work carried in "Canopy Management in Cashew", providing the wholistic view of cultural operations to have a better crop. Use of soilless medium in nursery industry is gaining importance. Best suited potting mixture for mango stone graft of cv. Alphonso has been identified by* ***Lad et al.*** *They found that cocopeat + leaf manure + compost (1:1:2) as pot mixture provided better plant growth.*

Growing Chrysanthemum in pots is practiced in home and terrace gardens. The cultivar Kikiobiory is well suited for this purpose. ***Thakur*** *has studied the nitrogen requirement for this cultivar and has come out with the recommendation of 300 mg of N per pot applied*

twice in September and October in Punjab for best results. In another study, ***Singh and Bala*** *confirmed that use of benzyl adenine at 200 ppm helped in extended vase life of Chrysanthemum morifolium flowers.* ***Nair et al.*** *recorded that foliar spray of 30:20:20 NPK at weekly interval recorded more number of flowers of Dendrobium cv. Singapore White with significantly longer spikes.*

Crop production is directly influenced by pollinators. Decline in honey bee population is a serious concern and to conserve the pollinators community approach through ecosystem services is required. ***Rami Reddy*** *reports the benefits of having ornamental plant Mexican Creeper (Antigonon leptopus) as forage plant. This creeper attracted all the four species of honey bees studied. This creeper can be used as bioindicator of honey bee population.*

Aravindaraj et al. *have reported the honey dew secretion by Thrips palmi and analysed the composition of it. They had identified different sugars present in the honey dew secretion of Thrips. Thrips not only cause direct damage but act as vectors of many plant viruses. Management of diseases in perennial crops is a challenge. Phytophthora incited root infection in citrus needs concerted efforts.* ***Ingle et al.*** *have demonstrated that use of potassium salt of phosphonic acid could help in management of Phytophthora root rot in Nagpur Mandarin.*

Mushrooms can fill the gaps in nutritional security as they are rich in nutritive value. Iron deficiency is important issue to be addressed. Iron fortified oyster mushroom products have been developed by ***Pandey et al.*** *The bioavailability of iron from Arka Mushroom Fe-Fortified Rasam Powder has been confirmed. In another study, the amino acid profile of 18 isolates of oyster mushroom species belonging to 4 species have been documented by* ***Azeez et al.*** *Quantification of essential and non-essential amino acids has been reported. Nutritionally superior isolates can be selected from these isolates.*

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S. Sriram
Editor in Chief

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Original Research Paper

Standardization of Nitrogen Application for Potted *Chrysanthemum morifolium cv. Kikiobiory*

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ABSTRACT

The present investigation was carried out to standardize nitrogen application for standard potted *Chrysanthemum morifolium* cv. Kikiobiory at Department of Floriculture and Landscaping, PAU, Ludhiana during the year 2015-16. Six treatments of nitrogen *viz.* 0, 100, 200, 300, 400 and 500 mg/pot were applied twice in the last week of September and October. The results of the study revealed that nitrogen application had significant effect on all the vegetative and floral parameters. The largest flower size (17.69 cm) was obtained with the nitrogen application of 400 mg/pot which was at par with 500 mg/pot (17.67 cm). Application of nitrogen at 500 mg/pot recorded the highest plant height (75.47 cm), number of leaves per plant 75 days after planting (30.92), number of root suckers per plant (11.47) and delayed flower bud appearance (93.78 days), color break stage (122.59 days) and also shown flower quality deterioration by reducing the flowering duration (5.84 days) as compared to the other treatments. Therefore, it was concluded that 300 mg of nitrogen per pot applied twice was the standard dose for quality flower pot production in *Chrysanthemum morifolium* cv. Kikiobiory.

Key words: Chrysanthemum, Kikiobiory, Nitrogen, Standardize and Potted plants

INTRODUCTION

Chrysanthemum (*Chrysanthemum morifolium* Ramat), belongs to the family Asteraceae, commonly known as Queen of East or Autumn Queen, is a popular cut flower of commercial importance and native of Europe and Asia (Koley and Sarkar, 2013). Nitrogen applied as fertilizer is the main sources used to meet the N requirements of plant growth (Konnerup and Brix, 2010). Nutrient status of the plants can be indicator to the response of plant to the fertilization and internal content of the nutrient determine the fertilizer requirements (Polara *et al*., 2014). Chrysanthemum is a heavy feeder of nitrogen and phosphorus with high requirement for N during first seven weeks of their growth period. William *et al*. (2013) reported that chrysanthemum accumulates applied N in the form of NO^{3-} during its active growth period which is later remobilized from vegetative tissues and directed to the developing bud during the bud emergence stage. Excessive nutrient concentrations caused an imbalance in other essential nutrients and reduced flower yield (Chawla *et al*., 2007). The plant height, number of branches, flower per plant and flower size increased with increase in nitrogen dose in annual chrysanthemum (Baboo and Sharma, 1997). Though, there is lot of literature available pertaining to amount of nutrient requirement in field grown chrysanthemum and however, there is a need to work in particular for potted plants used as cultivars. Keeping this in view, the study was undertaken to standardize the nitrogen dose for standard potted *C. morifolium* cv. Kikiobiory.

MATERIAL AND METHODS

The present study was conducted at Department of Floriculture and Landscaping, Punjab Agricultural University, Ludhiana during 2015-16. The terminal cuttings were taken from the mother stock plants pinched in end of May to encourage more number of axillary shoots of pot standard *C. morifolium* cultivar Kikiobiory. The terminal cuttings (5-7 cm) were

treated with IBA 400mg/L and rooted in burnt rice husk in June-July. The rooted cuttings were then transplanted during August in the earthen pots (8'') containing mixture of soil and FYM (2:1) along with diammonium phosphate DAP incorporated as a basal dose @ 1 kg/100 cubic feet. The application of nitrogen in the form of urea (N 46%) was done twice in the last week of September and October as per the treatments *viz*. control, 100 mg/pot, 200 mg/pot, 300 mg/pot, 400 mg/pot and 500 mg/pot. The liquid fertigation of potassium @ 200 ppm (muriate of potash) was given after transplanting the cuttings at 15 days interval till mid-October through watering can. The effect of different doses of nitrogen on vegetative growth (at 15 days interval) and floral parameters were recorded and statistically analyzed by SAS software using Duncan multiple range test (DMRT) at 5 per cent level of significance (Duncan, 1955).

RESULT AND DISCUSSION

The results indicated that vegetative parameters like plant height, number of leaves and root suckers per plant increased significantly ($p<0.05$) with increase in nitrogen application from 100 mg/pot to 500 mg/pot (Table 1). The plant height at 45 days after planting (DAP) varied significantly in all the treatments and was highest (25.80 cm) with the nitrogen application of 500 mg/pot whereas, it was shorter (22.29 cm) in the control. The plant height at 60 and 75 DAP were significantly high in the treatment of nitrogen 500 mg/pot (55.67 and 75.47 cm) and 400 mg/pot (54.30 and 72.85 cm). However, all the other treatments were at par among themselves. The shorter plant height at 60 and 75 DAP was observed in the control (46.44 and 60.30 cm) which was at par with 100 mg/pot (46.66 and 60.59 cm) and 200 mg/pot (47.60 and 63.31 cm). The numbers of leaves per plant 45, 60 and 75 DAP, were significantly more in 500 mg/pot (18.14, 25.92 and 30.92, respectively) followed by 400 mg/pot (17.41, 24.32 and 29.92, respectively), whereas minimum were observed in the control (14.62, 20.17 and 23.50, respectively). The maximum number of root suckers per plant was obtained in 500 mg/pot (11.47) which is significantly better than the other doses, whereas minimum was recorded in 100 mg/pot (8.78) which was at par with the control (8.61).

Table 1. Effect of nitrogen application on plant growth of chrysanthemum cv. Kikiobiory

Treatments (mg urea/ pot)	Plant height (cm)				No. of leaves per plant				No. of root suckers per plant
	30 DAP	45 DAP	60 DAP	75 DAP	30 DAP	45 DAP	60 DAP	75 DAP	
0	13.90 a	22.29 d	46.44 c	60.30 c	10.18 a	14.62 c	20.17 c	23.50 e	8.61 c
100	13.75 a	22.56 cd	46.66 c	60.59 c	11.17 a	15.57 bc	20.86 c	25.40 de	8.78 c
200	13.40 a	23.63 bcd	47.60 c	63.31 c	10.07 a	15.63 bc	21.85 c	27.16 cd	9.41 bc
300	13.62 a	24.17 abc	50.31 b	66.46 b	9.95 a	15.62 bc	22.22 bc	28.19 bc	10.82 ab
400	13.05 a	25.02 ab	54.30 a	72.85 a	9.86 a	17.41 ab	24.32 ab	29.92 ab	11.21 ab
500	13.68 a	25.80 a	55.67 a	75.47 a	10.95 a	18.14 a	25.92 a	30.92 a	11.47 a
F- test	ns	*	*	*	ns	*	*	*	*

Values followed by common alphabets do not differ significantly

The increased plant height, number of leaves and root suckers per plant obtained were due to the effect of nitrogen which increased the number of cells, cell size and an overall leaf production (Joshi *et al.,* 2013). The plants in control produced less vegetative growth due to non-availability of nitrogen and its involvement in photosynthesis. The increase in plant height in chrysanthemum at the higher dose of nitrogen might be due to the increase in transportation of metabolites and rate of photosynthesis in the plant which enabled the plant to have quick and better upward vegetative growth (Lodhi and Tiwari, 1993; Belgaonkar *et al.,* 1996). These results are in accordance with Joshi *et al*. (2013) and Dorajeerao *et al*. (2012) reported on chrysanthemum.

The flowering parameters *viz.,* days to flower bud appearance, colour break stage, full bloom, duration of flowering, flower diameter and nitrogen content in

plants were significantly ($p<0.05$) affected with increase in nitrogen application from 100 mg/pot to 500 mg/pot. The flower bud appearance, colour break stage and full bloom were delayed with the application of nitrogen at the rate of 500 mg/pot. The flower diameter, nitrogen content in plant are increased and duration of flowering decreased with increased nitrogen dose from 100 mg/pot to 500 mg/pot with increase in nitrogen application. The earliest flower bud appearance (84.50 days) was obtained in the control which is at par with 100 mg/pot (84.89 days) and the maximum days were observed in 500 mg/pot (93.78 days). The earliest color break stage was recorded in the control (111.84 days) and the maximum days were obtained with the application of nitrogen 500 mg/pot (122.59 days). The earliest full bloom was obtained in the control (138.31 days) and the maximum days were observed with the nitrogen dose of 500 mg/pot (144.87 days). The flower duration was significantly better in control (11.00 days) followed by nitrogen 100 mg/pot (10.20 days) whereas, shortest flower duration was recorded in the nitrogen dose 500 mg/pot (5.84 days) followed by 400 mg/pot (6.08 days). The largest size of flower (17.69 cm) was obtained in 400 mg/pot of nitrogen, it was at par with 500 mg/pot (17.67 cm) whereas, smallest flower size in control (15.18 cm). The nitrogen content increased significantly with increased nitrogen dose, maximum at 500 mg/pot (1.24 %) followed by 400, 300 and 200 mg/pot (1.12, 1.02 and 0.95, respectively) and minimum at control (0.81%).

The delayed flowering with higher dose of nitrogen in chrysanthemum has been reported earlier by Ingle *et al*. (1993) and Sharma *et al.* (2006). This delay in blooming is better as flowering of chrysanthemum is confined only to limited period from October to December thus, the monitoring of nitrogen dose application provides growers with an efficient crop schedule according to demand of flowers in the market. Joshi *et al*. (2013) also reported decreased vase life in chrysanthemum with increased nitrogen application of 300kgha^{-1}. These results are in conformity with the findings of De and Barman (1997) and John and Paul (1999) in chrysanthemum.

Table 2. Effect of nitrogen application on flowering of chrysanthemum cv. Kikiobiory

Treatments (mg urea/ pot)	Days to bud appearance	Days to color break stage	Days to full bloom	Duration of flowering (days)	Flower diameter (cm)	N content in plants (%)
0	83.79 c	112.02 d	138.31 c	11.00 a	14.56 b	0.81 f
100	84.89 c	116.08 c	140.39 bc	10.20 a	16.29 ab	0.86 e
200	88.53 b	117.89 c	141.64 ab	8.15 b	16.03 ab	0.95 d
300	89.38 b	118.83 bc	142.48 ab	7.29 bc	17.01 ab	1.02 c
400	90.40 b	120.82 ab	142.91 ab	6.08 c	17.69 a	1.12 b
500	93.78 a	122.59 a	144.87 a	5.84 c	17.67 a	1.24 a
F- test	*	*	*	*	*	*

Values followed by common alphabets do not differ significantly

The increased flower size with higher nitrogen application was due to the accelerated photosynthetic activities due to increase in number of leaves for providing facility to develop more flowers and increased flower size (Kumar *et al.,* 2002). The increased number of flowers per plant with increased nitrogen application is in conformity with the earlier findings reported in chrysanthemum (De and Barman, 1997; John and Paul, 1999). The increased nitrogen dose increases photosynthesis and enhances food accumulation and diversion of photosynthates towards sink resulting in better growth and subsequently higher number of flowers per plant and higher flower yield per hectare (Verma *et al.,* 2011).

The higher dose of nitrogen application of 500 mg urea/pot produced maximum vegetative growth with increased flower size and delayed flowering, but deteriorated the flower quality by shortening the duration of flowering. Therefore, it was concluded

that 300 mg urea/ pot applied twice was standardized nitrogen dose for quality flower pot production with better plant growth in *C. morifolium* cv. Kikiobiory.

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