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Effect of nutrient management on flowering parameters of spider lily (*Hymenocallis littoralis* L.) grown as intercrop in coconut garden under coastal littoral sandy soil

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Abstract

The present investigation entitled “Effect of nutrient management on flowering parameters of spider lily (*Hymenocallis littoralis* L.) grown as intercrop in coconut garden under coastal littoral sandy soil.” was carried out in 30 years old coconut plantation of AICRP on palms at Regional Coconut Research Station, Bhatye, Ratnagiri under Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (M.S.) during the year 2023 to 2025. The experiment was laid out in randomized block design, comprising seven treatments, each replicated thrice, resulting in a total of 21 plots. The first season of the field trial was conducted from May, 2023 to March, 2024 and the second season was carried out from May, 2024 to March, 2025. Seven treatments were tried T₁-15 t FYM + NPK dose @ 300:100:50 kg /ha), T₂- 25 t FYM + NPK dose @ 300:100:50 kg /ha), T₃- 25 t FYM + NPK dose @ 300:100:100 kg /ha), T₄- 12.5 t Vermicompost + NPK dose @ 300:100:50 kg /ha), T₅- 12.5 t Vermicompost + NPK dose @ 300:100:100 kg /ha), T₆-12.5 t Neem cake+ NPK dose @ 300:100:50 kg /ha) and T₇- 12.5 t Neem cake + NPK dose @ 300:100:100 kg /ha). Significantly least number of days (60.50 days after planting) taken to first spike emergence, minimum number of days to first flower emergence (64.85 days after planting) and minimum number of days (74.94 days after planting) required to reach 50% flowering was recorded in treatment T₅ (12.5 t vermicompost + NPK @ 300:100:100 kg ha⁻¹), while the delayed spike emergence (74.65 days after planting), maximum days taken to first flower emergence (82.84 days after planting) and maximum duration to 50% flowering (92.74 days after planting) was observed in treatment T₁ (15 t FYM + NPK @ 300:100:50 kg ha⁻¹).

Keywords: Spider lily, flowering and nutrient management

Introduction

Spider lily (*Hymenocallis littoralis* L.), is a bulbous ornamental plant belongs to the Amaryllidaceae family which is cultivated for its white mild sweet fragrant and spidery shaped flowers utilized in different ornamental preparation like *venies*, *gajras*, garlands etc. The flowers are in great demand during marriages and social ceremonies. Therefore, it has year-round market and has gained common importance. The name ‘spider lily’ comes from the shape of the petals, which resemble legs of spider. The plant is hardy, free of serious pests, diseases and other physiological disorders and it has earned a place among the traditional flowers in everyday life. Nutrient management is one of the most important components for proper growth of the plant, and its yield. All the crops require a proper nutrition for their proper growth and development for completing their life cycle. But this nutrition is needed by the plants in a balanced proportion. With the inception of commercial farming, the emphasis is given to production without taking care of soil health and eventually soil health deteriorates and production falls. One of the very important components of soil health remained neglected and now reached to the threatening level. Management of balanced nutrients has been of vital importance, especially for ornamentals. Organic and inorganic fertilizers are the prime sources for supplying nutrients to the plant. Cultivation of flower crops as intercrops enables efficient utilization of these resources without adversely affecting coconut yield. Flower crops such as jasmine, tuberose, marigold,

chrysanthemum, heliconia and spider lily are well suited to the microclimatic conditions of coconut orchards. These crops contribute to diversification, risk reduction, and enhanced system productivity. Intercropping also improves soil cover, reduces weed pressure and promotes better soil moisture conservation, thereby enhancing the overall sustainability of coconut gardens (Maheswarappa, 2011) ^[10]. With this view the present investigation was carried out to assess the effect of nutrient management on flowering in spider lily grown as intercrop in coconut garden under coastal littoral sandy soil.

Materials and Methods

The present investigation entitled “Effect of nutrient management on flowering parameters of spider lily (*Hymenocallis littoralis* L.) grown as intercrop in coconut garden under coastal littoral sandy soil.” was carried out in 30 years old coconut plantation of AICRP on palms at Regional Coconut Research Station, Bhatye, Ratnagiri under Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (M.S.) during the year 2023 to 2025. The experiment was laid out in Randomized Block Design (RBD) with 7 treatments and 3 replications. Seven treatments were tried T₁-15 t FYM + NPK dose @ 300:100:50 kg /ha), T₂- 25 t FYM + NPK dose @ 300:100:50 kg /ha), T₃- 25 t FYM + NPK dose @ 300:100:100 kg /ha), T₄- 12.5 t Vermicompost + NPK dose @ 300:100:50 kg /ha), T₅- 12.5 t Vermicompost + NPK dose @ 300:100:100 kg /ha), T₆-12.5 t Neem cake+ NPK dose @ 300:100:50 kg /ha) and T₇- 12.5 t Neem cake + NPK dose @ 300:100:100 kg /ha). Spider lily bulbs (5–10 cm size) were planted at 60 × 60 cm spacing in well-grown coconut garden (var. Banawali) with a spacing of 7.5 m × 7.5 m. The intercrop, spider lily (*Hymenocallis littoralis* L.) was grown between the coconut palms. Interspace among the coconut garden was prepared with operation like ploughing and harrowing. Strip of 4.2 m breadth and 3.6 m length was prepared between two successive palms. Intercrop (spider lily) were planted at distance of 2 m from base of the palm tree. Organic manures (FYM, vermicompost and neem cake) were applied as basal dose as per treatments. The recommended NPK fertilizers were applied in three splits, with full P and 1/3rd N and K in June, and remaining N and K in October and February. Nitrogen, phosphorus and potassium were supplied through urea, single super phosphate and muriate of potash, respectively. The observations on the flowering parameters viz; days required for first spike emergence (days after planting), days required for first flower emergence (days after planting) and days required for 50% flowering (days after planting) were recorded. Observations on flowering parameters were recorded from five randomly selected plants per treatment. The pooled data over the two years were subjected to statistical analysis using standard procedures to assess the comparative performance of the nutrient management on flowering parameters of spider lily grown as intercrop in coconut garden under coastal littoral sandy soil. The data were statistically analyzed by the method suggested by Panse and Sukhatme (1995) ^[13].

Results and Discussion

The data on flowering parameters viz., days taken to first spike emergence, days taken to first flower emergence and days taken to 50% flowering was influenced by different organic and inorganic fertilizers treatments are presented in Table1 and depicted in Figure 1.

Days required for first spike emergence (days after planting)

Pooled results across both years revealed that minimum number of days taken to first spike emergence (60.50 days after planting) was observed in treatment T₅ (12.5 t vermicompost + NPK @ 300:100:100 kg ha⁻¹). Followed by, T₄ (62.67 days after planting), T₂ (68.83 days after planting). In contrast, Treatment T₁ (15 t FYM + NPK @ 300:100:50 kg ha⁻¹) showed maximum days taken to first spike emergence (74.65 days after planting). The better performance in case of all vegetative parameters by supplement of vermicompost along with NPK fertilizers contributing to early growth might be the reason for the earliness of spike emergence in spider lily. Minimum number of days taken to first spike emergence was noted under (T₅) 12.5 t Vermicompost + NPK dose @ 300: 100: 100 kg /ha application. The presence of plant growth influencing microorganism in vermicompost may have helped to elevate the phytohormone activity in the vermicompost rich soil (Tomati and Galli, 1995 and Edwards, 1998) ^[16, 3] and caused early bulb sprouting. Vermicompost provided balanced uptake of nitrogen and proper availability of micronutrients (Vasanthi and Kumaraswamy, 1999) ^[17] as well as better stimulation in bulb metabolism to complete the growth phase early (Yadav *et al.*, 2023) ^[18], which may be the reason for early spike emergence. The shaded environment under coconut canopy likely minimized stress on young plants, enhanced water use efficiency, and promoted assimilate accumulation, thereby accelerating floral initiation. These findings are consistent with reports that tree-based intercropping can enhance vegetative vigour and reproductive development in understory ornamentals through improved microclimatic and soil conditions (Nair, 1993; Jose *et al.*, 2004) ^[11, 6]. The results on days taken to first spike emergence are coinciding with the previous researches on Gharat *et al.*, (2008) ^[4] in gladiolus, prasad *et al.* (2018) ^[12] in Dahlia and Kumar *et al.* (2022) ^[7] in gladiolus.

Days taken to first flower emergence (days after planting)

Data on the number of days taken to first flower emergence varied significantly among the treatments involving different organic manures and inorganic fertilizers, as presented in Table 1 and depicted Figure1. Pooled analysis confirmed that treatment T₅ resulted in the earliest flowering (64.85 days after planting), whereas T₁ showed the maximum duration required (82.84 days after planting) for first flower emergence. Treatment T₅ (12.5 t Vermicompost + NPK dose @ 300:100:100 kg /ha) was superior for reduction in opening of first flower emergence, due to absorption of nutrient by bulbs or primary roots leading to more stimulation of bulb metabolism and hence directed the plant towards the reproductive phase earlier (Singh *et al.*, 2013) ^[15] in Gladiolus. Studies have demonstrated that tree-based systems lower light intensity and create a moderated microenvironment that enhances photosynthetic efficiency and assimilate accumulation, leading to accelerated reproductive development (Pangemanan *et al.*, 2025; Machado., 2005) ^[14, 9]. Moderate shading under plantation crops has also been linked with improved chlorophyll content and better physiological performance, enabling plants to transition to the flowering phase sooner than in open environments. Similar findings were reported on flower crops, where integrated use of vermicompost with inorganic fertilizers significantly reduced days to flower initiation due to enhanced nutrient uptake and metabolic activity by Gharat *et al.* (2008) ^[4] in Aster, Kumar and Kumar (2016) ^[8] in African marigold, Prasad *et al.* (2018) ^[12] in dahlia (*Dahlia*

variabilis L.) cv. Kenya Orange and Kumar *et al.* (2022) ^[7] in gladiolus.

Days taken to 50% flowering (days after planting)

The data on the number of days to 50% flowering observed in each treatment block under all replications in spider lily, clearly indicate that treatments involving different organic manures and inorganic fertilizers exhibited significant variation, as presented in Table 1. Pooled data indicated that treatment T₅ resulted in the earliest 50% flowering (74.94 days after planting), while T₁ recorded the maximum duration (92.74 days after planting). Treatment T₅ (12.5 t/ha vermicompost + NPK @ 300:100:100 kg/ha) resulted in the earliest 50% flowering in spider lily compared to other treatments. This may be due to better nutrient availability and balanced nutrition from vermicompost, which supplies readily available N, P, and K and supports faster vegetative growth and earlier transition to the reproductive phase (Atiyeh *et al.*, 2002) ^[1]. Additionally, moderate shade under coconut canopy likely improved the microclimate by reducing stress and enhancing photosynthetic efficiency, thereby promoting earlier floral initiation (Hopkins and Huner, 2009) ^[5]. Similar trends have been observed in flower crops such as gladiolus and marigold, where vermicompost combined with

balanced fertilizers hastened flowering and reduced the time to reach 50% bloom (Gharat *et al.*, 2008) ^[4] in Aster flower Var. California Giant) and Kumar and Kumar, 2016 ^[8] in African marigold (*Tagetes erecta* L. cv. Pusa Basanti Gaiinda).

Table 1: Effect of nutrient management on days taken to first spike emergence (days after planting), days taken to first flower emergence (days after planting) and days taken to 50% flowering (days after planting) of spider lily (*Hymenocallis littoralis* L.) grown as intercrop in coconut garden under coastal littoral sandy soil

Treatments	Days taken to first spike emergence*	Days taken to first flower emergence*	Days taken to 50% flowering*
T ₁	74.65	82.84	92.74
T ₂	68.83	77.48	87.49
T ₃	69.07	72.00	82.64
T ₄	62.67	68.50	78.87
T ₅	60.50	64.85	74.94
T ₆	70.41	73.50	84.04
T ₇	69.44	73.00	83.83
Mean	67.94	73.17	83.51
F – Test	Sig	Sig	Sig
SE (m)±	0.40	0.45	0.58
CD at 5%	1.16	1.30	1.71

* -Days after planting

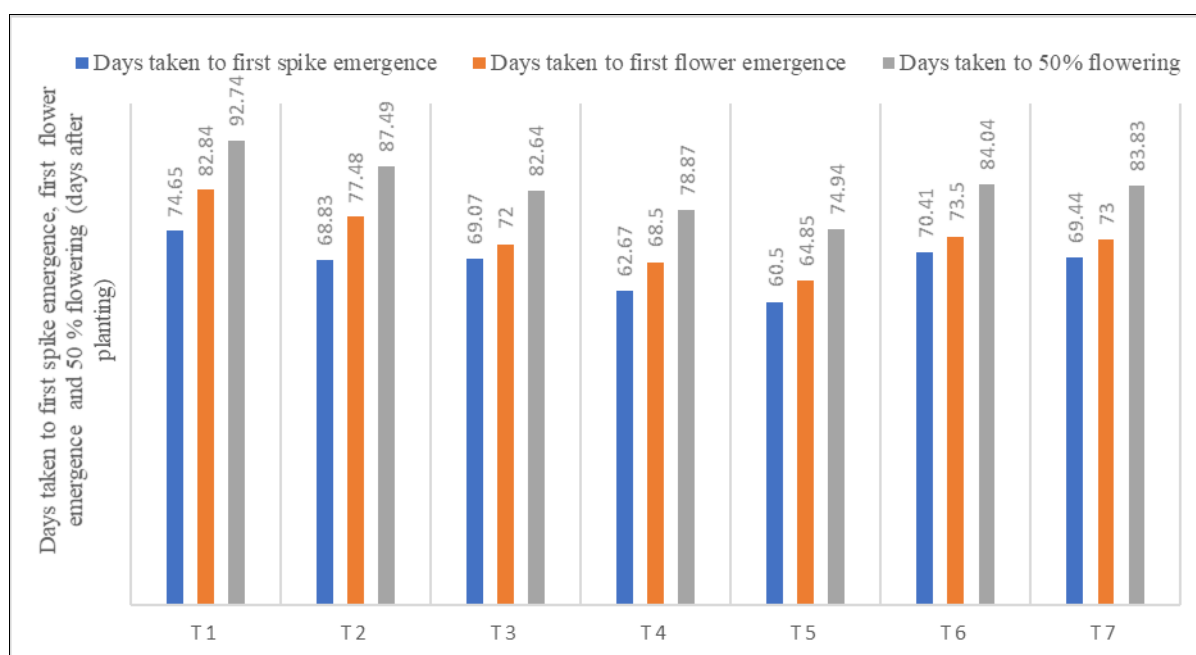


Fig 1: Effect of nutrient management on days taken to first spike emergence (days after planting), days taken to first flower emergence (days after planting) and days taken to 50% flowering (days after planting) of spider lily (*Hymenocallis littoralis* L.) grown as intercrop in coconut garden under coastal littoral sandy soil

Treatment Details

T₁ -15 t FYM + NPK dose @ 300: 100:50 NPK kg/ha

T₂ -25 t FYM + NPK dose @ 300: 100: 50 kg /ha

T₃ - 25 t FYM + NPK dose @ 300: 100: 100 kg /ha

T₄ -12.5 t Vermicompost + NPK dose @ 300: 100: 50 kg /ha

T₅ -12.5 t Vermicompost + NPK dose @ 300: 100: 100 kg /ha

T₆ -12.5 t Neem cake + NPK dose @ 300: 100: 50 kg /ha

T₇ - 12.5 t Neem cake + NPK dose @ 300: 100: 100 kg /ha

Conclusion

The results of the present investigation clearly indicated that application of 12.5 t vermicompost ha⁻¹ in combination with NPK @ 300:100:100 kg ha⁻¹ recorded the minimum number of days to first spike emergence, first flower emergence and 50%

flowering in spider lily, as compared to treatments receiving FYM and neemcake along with similar or lower NPK levels. Early spike emergence was noticed in T₅ treatment to early first flower.

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