

Performance evaluation of pendent *Heliconia* genotypes for growth characteristics under Kanyakumari condition

Abstract

Heliconia's are one of the important emerging exotic specialty cut flowers which is gaining importance in the Indian markets which are used as cut flower, floral decoration and also for beautifying gardens. A field experiment was conducted at Horticultural Research Station, Pechiparai, Kanyakumari to evaluate the performance of pendent *Heliconia* genotypes based on the growth characters. The results revealed that among the eight genotypes evaluated, *Heliconia chartacea* 'Surinam Gold' recorded the highest plant height (168.12 cm and 228.32 cm) at 120 and 180 days after planting (DAP) followed by *Heliconia vellerigera* 'Red' and *Heliconia chartacea* 'Sexy Pink' which were on par with each other with maximum number of suckers (8.05 and 8.20 respectively). *Heliconia vellerigera* 'Red' has the highest stem girth than the rest of genotypes.

Keywords: Floriculture, *Heliconia* genotypes, specialty cut flower

Introduction:

Heliconia, a singular genus encompassing around 250-300 species, has earned considerable attention both in Indian and international markets. It is perennial in nature, characterized by a sturdy stem and propagation through rhizomes. The name "*Heliconia*" traces its origin back to Greek, paying homage to Mount Helicon, and is derived from the term 'helikonios' by Carl Linnaeus (Malakar and Biswas, 2022). Inflorescences, composed of variedly colored waxy bracts, constitute the hallmark of this flower. These inflorescences can either droop or stand upright, exposing these plants with a unique opportunity to flourish within the floricultural sector. Emerging as an exotic specialty, *Heliconias* have surged in popularity in Indian markets. Beyond their role in enhancing gardens, they command significant prices as cut flowers on the global stage. Referred to as lobster claw, false bird of

paradise, wild plantains, parrot flower, parrot plantain, or false plantain (Janakiram and Kumar 2011), *Heliconia*'s boast year-round inflorescence production across all seasons, rendering them indispensable for exotic floral arrangements. Their spectrum of colors spans red, pink, orange, yellow, and green, coupled with diverse sizes and shapes. Prominent growing regions for *Heliconia*'s in India include the West Godavari district of Andhra Pradesh, Kerala, southern Tamil Nadu, Karnataka, Assam and other northeastern states.

Beyond aesthetics, *Heliconia*'s find utility in landscaping due to their lush tropical foliage and an array of inflorescence styles and hues. Additionally, they serve as intercrops in coconut, arecanut and rubber-based cropping systems, enhancing farmers' profits (Nihad *et al.*, 2016). Notably, the sizable leaves of *Heliconia* species, particularly *Heliconia bihai*, are harnessed to craft eco-friendly bio food wrappers. This innovative packaging solution, including an outer paper covering, caters to busy consumers (Dodampe *et al.*, 2022). Moreover, the folk medicine realm has embraced *Heliconia rostrata* for addressing diabetes and diabetes-related leg swellings (Shahriar *et al.*, 2017). There is a good demand for the flowers and suckers of the pendent types. On an average in a hectare 88,000 to 1,15,000 flowers can be obtained from 10,000 to 30,000 suckers. Besides an additional revenue can be obtained by the sale of suckers besides flowers. In light of this, the principal objective of the study is to comprehensively evaluate various *Heliconia* genotypes, focusing on their vegetative and growth characteristics.

Methods and Materials

The current experiment was carried out at Horticultural Research Station, Pechiparai in Kanyakumari district of Tamil Nadu during the year 2022. The study includes eight genotypes of *Heliconia* which are all pendent types. The species includes *Heliconia rostrata* 'Regular', *Heliconia rostrata* 'Ten Days', *Heliconia excelsa*, *Heliconia chartacea* 'Temptress', *Heliconia chartacea* 'Sexy Pink', *Heliconia chartacea* 'Surinam Gold', *Heliconia vellerigera* 'Brown' and *Heliconia vellerigera* 'Red'. The experiment was laid out in Randomized Block Design (RBD) with three replications in open field condition. Six-month-old suckers were planted in uniform pits of size 30cm x 30cm x 30cm with a spacing of 1m x 1m and recommended package of practices were followed thereafter. Biometric observations on growth attributes were recorded on 60, 120 and 180 days after planting (DAP).

Results and Discussion

Plant height

The genotypes evaluated exhibited significant difference in the plant height at 60 days intervals (Table 1). Among the genotypes studied, *Heliconia rostrata* ‘Ten Days’ showed maximum plant height (105.21cm) which was on par with *Heliconia excelsa* (102.31 cm) and *Heliconia vellerigera* ‘Brown’ (102.85 cm) whereas minimum plant height was observed in *Heliconia vellerigera* ‘Red’ (79.10 cm) at 60 days after planting (DAP). While at 120 and 180 days DAP *Heliconia chartacea* ‘Surinam Gold’ recorded the maximum plant height with 168.12 cm and 228.32 cm respectively whereas *Heliconia chartacea* ‘Sexy Pink’ had a minimum plant height of 81.89 cm and 108.82 cm respectively.

According to Kress (1984), the genus *Heliconia* displays substantial variability, with approximately 422 distinct species identified. Plant height plays a pivotal role in a species' light competition capacity (Moles et al., 2009). In the case of *Heliconia psittacorum* cv. *Andromeda* and *Heliconia psittacorum* x *Heliconia spathocircinata* cv. Golden Torch, their plant height ranged from 1.0 to 1.8 m, as documented by Broschat *et al.* (1984). This current study similarly observed notable variations in plant height among the species.

Number of suckers

The number of suckers evaluated at 60 days intervals among *Heliconia* sp. revealed that *Heliconia chartacea* ‘Sexy Pink’ recorded the highest number of suckers (3.04) while *Heliconia vellerigera* ‘Brown’ had no suckers (Table 2). At 120 DAP, maximum number of suckers was observed in *Heliconia vellerigera* ‘Red’ (6.19) which was on par with *Heliconia chartacea* ‘Sexy Pink’ (6.01) while minimum number of suckers was observed in *Heliconia excelsa* (2.19) and *Heliconia vellerigera* ‘Brown’ (2.02) respectively. At 180 DAP *Heliconia chartacea* ‘Sexy Pink’ had the highest number of suckers (8.05) which was on par with *Heliconia vellerigera* ‘Red’ (8.20). The lowest number of suckers was observed in *Heliconia excelsa* (3.17) which was equivalent with *Heliconia chartacea* ‘Surinam Gold’ (3.07). Andersson (1985) and Thangam *et al.*, (2014) noted the presence of extensive variation within the genus *Heliconia*, attributing it to the diverse characteristics of the *Heliconia* family which was observed in the current study also, where substantial variations were also observed.

Stem girth

The stem girth of eight different *Heliconia* genotypes at 60 days intervals was observed (Table 3). The genotype *Heliconia vellerigera* ‘Red’ has the highest stem girth with

3.10cm, 4.01cm, 5.02cm at 60, 120 and 180 DAP respectively while *Heliconia rostrata* 'Ten Days' had the least value of stem girth (1.90cm, 2.00cm and 2.30 on 60, 120 and 180 DAP, respectively). Among the *Heliconia* genus, the distinction among interspecific cultivars and hybrids is naturally evident and discernible. This differentiation has been observed and understood through the process of morphological characterization, as elucidated by Berry and Kress (1991).

Conclusion

The present study revealed that *Heliconia chartacea* 'Surinam Gold' displayed the highest plant height at 120 and 180 days after planting (DAP), while *Heliconia chartacea* 'Sexy Pink' displayed the lowest plant height. In terms of the number of suckers, *Heliconia vellerigera* 'Red' and *Heliconia chartacea* 'Sexy Pink' demonstrated similar high counts, while *Heliconia excelsa* and *Heliconia chartacea* 'Surinam Gold' had the lowest counts. Furthermore, *Heliconia vellerigera* 'Red' emerged with the greatest stem girth, while *Heliconia rostrata* 'Ten Days' exhibited the smallest stem girth value. Collectively, these findings lead to the conclusion that among the evaluated genotypes, *Heliconia vellerigera* 'Red' revealed superior morphological characteristics in terms of growth and sucker production which could be beneficial to the flower growers for obtaining higher flower yield and revenue in terms of suckers.

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Table 1. Plant height (cm) of different Heliconia genotypes under open field condition

Genotypes	60DAP	120DAP	180DAP
H ₁ - <i>Heliconia rostrata</i> 'Regular'	83.05	123.88	178.71
H ₂ - <i>Heliconia rostrata</i> 'Ten Days'	105.21	123.07	136.29
H ₃ - <i>Heliconia excelsa</i>	102.31	125.69	169.82
H ₄ - <i>Heliconia chartacea</i> 'Tempress'	97.48	127.50	150.93
H ₅ - <i>Heliconia chartacea</i> 'Sexy Pink'	67.36	81.89	108.82
H ₆ - <i>Heliconia chartacea</i> 'Surinam Gold'	86.62	168.12	228.32
H ₇ - <i>Heliconia vellerigera</i> 'Brown'	102.85	154.55	180.32
H ₈ - <i>Heliconia vellerigera</i> 'Red'	79.10	144.94	184.87
SE.d	1.80	3.61	3.30
CD	3.87	7.75	7.07

Table 2. Number of suckers produced by different Heliconia genotypes under open field condition

Genotypes	60 DAP	120 DAP	180 DAP
H ₁ - <i>Heliconia rostrata</i> 'Regular'	1.12	3.85	6.06
H ₂ - <i>Heliconia rostrata</i> 'Ten Days'	1.21	3.95	5.22
H ₃ - <i>Heliconia excelsa</i>	1.07	2.19	3.17
H ₄ - <i>Heliconia chartacea</i> 'Tempress'	1.23	3.05	4.98
H ₅ - <i>Heliconia chartacea</i> 'Sexy Pink'	3.04	6.01	8.05

H ₆ - <i>Heliconia chartacea</i> 'Surinam Gold'	1.04	5.14	6.07
H ₇ - <i>Heliconia vellerigera</i> 'Brown'	0.00	2.02	3.07
H ₈ - <i>Heliconia vellerigera</i> 'Red'	1.06	6.19	8.20
SEd	0.11	0.23	0.19
CD	0.24	0.49	0.415

Table 3. Stem girth (cm) of different Heliconia genotypes under open field condition

Genotypes	60 DAP	120 DAP	180 DAP
H ₁ - <i>Heliconia rostrata</i> 'Regular'	2.20	2.60	2.90
H ₂ - <i>Heliconia rostrata</i> 'Ten Days'	1.90	2.00	2.30
H ₃ - <i>Heliconia excelsa</i>	2.20	3.30	4.50
H ₄ - <i>Heliconia chartacea</i> 'Tempress'	2.80	3.30	4.00
H ₅ - <i>Heliconia chartacea</i> 'Sexy Pink'	2.80	3.60	3.81
H ₆ - <i>Heliconia chartacea</i> 'Surinam Gold'	2.30	2.60	3.14
H ₇ - <i>Heliconia vellerigera</i> 'Brown'	3.10	4.01	5.02
H ₈ - <i>Heliconia vellerigera</i> 'Red'	2.70	3.02	3.60
SE.d	0.05	0.05	0.18
CD	0.11	0.11	0.38