

## Vegetative Growth Patterns of Some *Heliconia* Genotypes

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**ABSTRACT:** A study on the performance of twelve *Heliconia* genotypes was under taken under costal humid condition of Bhubaneswar for two years under natural shade condition during year 2021-2022. Suckers of 12 different genotypes of *Heliconia* were planted at 1 × 1m spacing so as to accommodate 48 plants in one plot. The experiment was laid out in RBD with four replication in the Department of Floriculture & Landscaping at BTC centre premises, OUAT, Bhubaneswar. Analysis of different vegetative growth parameters variance indicated that all the traits observed differed significantly. The maximum plant height was noticed in *Heliconia stricta* cv. Iris Red (315.50 cm) followed *H. wagnerianais* Cv. Peachy Pink (237.00 cm) and smallest plant height recorded in *H. stricta* cv. Jamaica dwarf (61.75 cm). Similarly maximum plant spreading observed in species of *H. rostrata* cv. Parrot beak (118.25 cm) followed by *H. stricta* cv. Iris red (105.00 cm) and *H. latispata* cv. Expanded Claw /Scarlet orange (102.50 cm) and minimum plant spreading observed in *H. chartacea* Cv. Sexy Pink (68.00cm) followed by *H. psittacorum* cv. Lady Di (74.74 cm) and *H. stricta* Cv. Jamaica Dwarf (75.75 cm). The maximum number of leaves per clump noticed in *H. psittacorum* × *H. marginata* cv. Tropics (256.00) and *H. stricta* cv. Iris red (178.25) and less numbers of leaves per clump observed *H. chartacea* cv. Sexy pink (55.50) and *H. latispata* cv. Red Yellow/Distan (56.60). The last vegetative characters observed on maximum length of leaf length on *H. stricta* cv. Iris Red (121.50cm) having highest long leaves like banana and smaller leaves found in *H. psittacorum* cv. Lady Di (44.50cm) where as other vegetative growth like maximum suckers produced in *H. psittacorum* × *H. marginata* cv. Tropics (95.50) followed in *H. psittacorum* cv. Vincent Red and lowest sucker produced in *H. chartacea* Cv. Sexy Pink (10.00) which was more attributing characters for flower production and spike length.

**Keywords:** Vegetative growth, spreading, sucker, *Heliconia*.

## INTRODUCTION

Heliconias are popular as ornamental plants and cut flowers because of their brilliant colours and exotic appearance. Their enhancing beauty had made them, a best landscape and as a potential cut flower (Janakiram and Pavan Kumar 2011). The Heliconias exhibit a wide array of colours led by red, pink, orange, yellow, and green combined with different sizes and shapes (Goel, 2004). Due to its exotic appearance and brilliant colours, it fetches premium price in the market. Leaves of some varieties of *Heliconia* are also sold as cut leaves for flower decoration. The genus *Heliconia* belongs to family Heliconiaceae includes a number of species showing potential as commercial cut flower crops. *H. psittacorum* and some of its hybrids (i.e. 'Golden Torch') are particularly promising because of their attractive flowers, long straight clean peduncles, prolific year round flower production, excellent post harvest characteristics, and few pest problems. The demand for ornamental Heliconias has increased, both

in national and international markets, and its cultivation had become a significant factor in the agricultural economy of many countries (Jerez, 2007; Nihad *et al.*, 2016). There is excellent potential for floriculture in plantation gardens, especially shade-loving. Heliconias flower cultivation on a commercial scale in coastal belts of India as there is ample scope for intercropping in coconut and other plantation gardens. Heliconias are grown for the florist's trade and as landscape plants. These plants do not grow well in cold and dry conditions. They are very drought-in tolerant but can endure some soil flooding. Heliconias need an abundance of water, sunlight, and soils that are rich in humus in order to grow well. These flowers are grown in tropical regions all over the world as ornamental plants. The flower of *H. psittacorum* (parrot heliconia) is especially distinctive; it has greenish-yellow flowers with black spots and red bracts reminiscent of the bright plumage of parrots. As a cut flower: Brilliant color, exotic form, long straight/drooping peduncles, and

outstanding postharvest durability eventually tagged them as “specialty cut flower.”

In the landscape *Heliconia psittacorum* cv. ‘Golden Torch,’ *H. psittacorum* var. ‘Lady Di,’ *H. stricta*, and *H. angusta* as potted plants and for interior landscape can be employed. Its exotic appearance and brilliant colors fetch premium price in the market. Leaves of some varieties of *Heliconia* are also sold as cut leaves for flower decoration.

In Odisha this crop newly introduced on research mode in coastal area of Bhubaneswar for successful evaluation of different *Heliconia* genotypes for vegetative growth and especially suckers production as suckers are prerequisite for high flower production.

## MATERIALS AND METHOD

The experiment was conducted for the years during 2021 and 2022 at Dept of Floriculture & landscaping premises, OUAT, Bhubaneswar, India at (20.2961° North latitude, 85.5249° East longitude and 45m above Mean Sea Level). The soil of the experimental site is red and laterite soil with good nutrient status and sufficient organic was added before planting.

The experiment was laid out in Randomized Block Design (RBD) with twelve varieties as treatment and four replications. Plots of size 4 × 12 m were taken in the natural shade area under timber trees and suckers are planted at 1m × 1m spacing. *Heliconia* suckers were planted during the first week of March, 2021 in beds at 1 × 1 m spacing with a plant density of 48 plants/plot per replication. *Heliconia* rhizomes of uniform sized good quality collected from ICAR-Central Island Agriculture Research Institute, Port Blair, and Andaman and other private nurseries were used for the study.

Biometric observations were recorded considering the requirement of cut flower production and its attributing characters. The growth parameters viz., plant height, plant spreading, total number of leaves per clump, leaf length and suckering habit were recorded during study period. The plant spread was recorded by measuring the distance of rhizomes in North-South and East-West directions.

Growth and yield parameters of *Heliconia* varieties were analyzed in Randomized Block Design (RBD). Differences in parameters were compared using replicated measures analysis of variance (ANOVA).

## RESULTS AND DISCUSSION

*Heliconia* genotypes under the study exhibited wide variation for vegetative characters (Table 1). Vegetative characters are significantly important as they play a vital role in deciding the good crop yield. Growth parameters such as plant height, plant spreading, total numbers of leaves per clump and leaf length and number of suckers are recorded during 2021-2022. The mean value shows significant differences in growth parameters in genotype *H. stricta* cv. Iris Red recorded

the maximum height (315.50 cm) followed by other varieties. *H. wagnerianais* cv. Peachy Pink is (237.00cm), *H. psittacorum* × *H. marginata* cv. Tropics (205.75cm). The genotypes *H. psittacorum* cv. Vincent Red, (94.50cm), *H. psittacorum* cv. lady Di (101.75cm) and *H. stricta* cv. Jamaican Dwarf (61.75cm) recorded less than one meter height, which can be best suited as potted plants. Where intermediate group the plant height 1m-2m are *H. bihai* cv. Island Yellow (104.25cm), *H. psittacorum* cv. Golden Torch (125.00) were intermediate with 1 to 2 meter plant height and could be used as border plants in landscaping. Whereas *H. chartacea* cv. Sexy Pink (194.75 cm) and *H. latispatha* cv. Expanded Claw /Scarlet Orange (168.50 cm) and *H. rostrata* cv. Parrot Beak (181.75cm) can be used for hedging or screening purpose in landscaping area. Such variations in plant height among the *Heliconia* genotypes could be attributed mainly due to genetic makeup of the genotype. This finding was supported by Kumar *et al.* (2011); Malakar *et al.* (2015).

Cut foliage of *Heliconia* used as backdrop material in flower arrangements, bouquet preparation as well as stage decorations. In the present study, wide variation was observed for various leaf traits. A leaf of lanceolate shape with medium width is highly preferred for floral decorations (Safeena *et al.*, 2018). Maximum number of leaves per clump was recorded maximum in *H. psittacorum* × *H. marginata* cv. Tropics (256.00) followed by *H. stricta* cv. Iris Red (178.26), *H. rostrata* cv. Parrot Beak and *H. psittacorum* cv. Lady Di (149.26) however, it was also that recorded number leaves per clump was increased in after 2<sup>nd</sup> year crop than 1<sup>st</sup> year. Number of leaves on stem during inflorescence emergence can serve as a useful indicator for *Heliconia* growers to quantify the plants expected to bloom for market planning. Such finding was supported by Sheela *et al.* (2007).

Maximum leaf length was observed in *H. stricta* cv. Iris red (121.50cm) followed by *H. wagnerianais* cv. Peachy Pink (84.75cm) and *H. latispatha* cv. Red yellow/Distan (82.25cm), it was recorded least in Jamaican dwarf (32.25 cm) followed by *H. psittacorum* cv. Lady Di (44.50cm) and *H. psittacorum* cv. Golden Torch (54.50 cm). This categorized *Heliconia* species on basis leaf length for use in flower arrangement with leaf attached with flower spike.

Plant spreading habit in *Heliconia* helps to selection of species for landscaping purposes to cover area under semi shade or shade condition and screening effect in particular landscaped area, this study resulted that maximum plant spreading nature found *H. rostrata* cv. Parrot Beak (118.25cm) followed by *H. stricta* cv. Iris red (105.25cm), *H. latispatha* cv. Expanded Claw/Scarlet Orange (102.32cm) and *H. psittacorum* × *H. marginata* cv. Tropics (95.75cm). Less spreading habit are suitable potted plants and cut flower production. The less spreading found in *H. chartacea*

cv. Sexy Pink (68.00cm) and *H. Pissitacorom* cv. Vincent Red (74.75cm) was recorded. Such observation was also similar with Souza *et al.* (2016).

Productivity of *Heliconia* is dependent on suckering habit and number of flowering suckers per clump in a year, while, suckering habit determines its commercial viability (Safeena *et al.*, 2018). Total number of suckers Produced is a critical factor in determining yield potential of a cultivar. Maximum sucker production was recorded in *H. psittacorum* × *H. marginata* cv. Tropics

(95.50) followed by *H. psittacorum* cv. Vincent Red (70.00) and *H. psittacorum* cv. Lady Di (58.75) Ramachandrudu & Thangam (2012) ; Thangam *et al.* (2014) also reported variability in number of suckers per plant in *Heliconia*. High variability for the number of suckers per clump may be due to ploidy levels, genomic constitution, more aeration and light due to suckering nature of genotypes (Dalawai *et al.*, 2017; Nihad *et al.*, 2019).

**Table 1: (vegetative growth pattern of *Heliconia* genotypes).**

Genotype Nos.	Name of Genotypes	Plant height (cm)	Plant spreading (cm)	Numbers of Leave per clump	Leave length (cm)	Numbers of suckers/ clump
1	<i>H. psitacorum</i> cv. Golden tourch	125.00	76.75	107.00	52.75	47.75
2	<i>H. psitacorum</i> cv. Vincent Red	94.50	89.25	146.75	54.50	70.00
3	<i>H. psittacorum</i> cv. Lady Di	103.75	74.75	149.26	44.50	58.75
4	<i>H. psittacorum</i> × <i>H. marginata</i> cv. Tropics	205.75	95.75	256.00	55.75	95.50
5	<i>H. stricta</i> cv. Iris Red	315.50	105.00	178.25	121.50	50.75
6	<i>H. Bihai</i> cv. Island Yellow	104.25	96.75	121.75	55.00	31.50
7	<i>H. chartacea</i> cv. Sexy Pink	194.75	68.00	55.50	65.75	10.00
8	<i>H. rostata</i> cv. Parrot Beak	181.75	118.25	170.50	70.00	27.75
9	<i>H. stricta</i> cv. Jamaica Dwarf	61.75	75.75	80.00	32.25	30.00
10	<i>H. latspatha</i> cv. Red Yellow/Distan	158.25	95.25	56.75	82.25	17.25
11	<i>H. wagnerianais</i> cv. Peachy Pink	237.00	94.74	93.75	84.75	21.50
12	<i>H. latspatha</i> cv. Expanded claw /Scarlet Orange	168.50	102.50	120.00	60.75	23.25
SE		4.46	2.64	4.99	1.87	1.24
CD (5%)		12.68	7.60	4.99	5.40	7.60

## CONCLUSIONS

In the present investigation, the *Heliconia* genotypes Iris Red, Sexy Pink, Tropics, *H. wagnerianais* cv. Peachy Pink are tall group of plants and it can use more cut flower purposes and specimen purposes in landscaping and smaller plant height group like Jamaican Dwarf, Vincent Red, Island Yellow, Lady Di are more suitable potted plants and plants for covering large area in landscape. The varieties like Parrot Beak. Lady Di and Vincent Red produced desirable quality leaves for cut foliage purpose, while, genotypes with more sucker producing capacity are Tropics, Vincent Red, Lady Di and Golden Torch are more responsible for more flower production .The long leaves of Iris red and *H. latspatha* cv. Red Yellow/Distan are more useful for leaf attached cut flower and flower arrangement with long leaf petiole .The groups of more spreading capacity like Parrot Beak, Tropics, Iris Red and *H. latspatha* cv. Expanded Claw/Scarlet Orange are more suitable for both landscaping and cut flower production purposes.

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