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Short communication

Performance of heliconia under coconut garden and open field conditions

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ABSTRACT

A Field experiment was conducted at ICAR Research Complex, Old Goa during 2004-2006 to evaluate the performance of heliconia under partial shade of coconut garden and open field conditions. Overall performance of varieties was better in open conditions for most of the characters. Interaction between varieties and conditions was found significant for all the characters studied. Among the varieties, maximum plant height, leaf size, stalk girth, spike length, spike width, spike and rhizome yield were observed in Golden Torch. Flowering was early in Golden Torch whereas it was late in Choconiana and Lady Di. Comparatively, the longevity of spikes and leaves of the variety Choconiana was more. All the varieties produced more spike and rhizome yield in open conditions when compared to shade.

Keywords: Heliconia, coconut garden, inter crop, performance.

Heliconias are newly identified cut flowers in our country and becoming popular in all metropolitan cities. Among the species of genus *Heliconia*, *H. psittacorum*, L. is gaining importance due to its huge potential as a commercial cut flower. Its brilliant colour, exotic form, long straight peduncles and excellent post harvest characterstics make it an outstanding flower for the florist (Lalrinawmi and Talukdar, 2). It likes warm and humid conditions and can up well even under partial shade. Heliconia assures sizeable income to the farmer with minimum investment and care. Only 50% of the solar radiation being intercepted by coconut canopy projecting the scope for use of underutilized space and solar radiation (Nair, 4). At present, it is grown to a small extent in coconut gardens in Goa. In fact it is a good choice for intercropping in coconut and arecanut gardens, which are widespread in the state. Both the flowers and leaves of heliconia are used for various purposes in star hotels of the state. Hence, there is vast scope for expansion of the crop on a commercial scale to meet the local as well as outside demand. With this backdrop, the present experiment was conducted with an objective of evaluating the performance of heliconia under partial shady conditions of coconut garden and its relative performance in open field conditions.

A study on performance of heliconia under 20-year-old coconut garden having 45% shade and open field conditions was carried out at ICAR research Complex for Goa, Ela, Old Goa for three years. Experiment was laid out in factorial randomized block design with three treatments and four replications. Fresh and healthy rhizomes of *Heliconia psittacorum* varieties *viz.*, Golden Torch, Lady Di and Choconiana were planted at a spacing of 1 m × 1 m. Farm yard manure @ 5 kg/m^2 was applied at the time of land preparation. Recommended cultural operations were practiced uniformly during the study period as and when required. Plant height was measured from bottom of the plant to tip of the spike. Harvesting of spikes was done when the first bract opened and stalk length was taken from bottom of the plant to base of the spike. Spikes and leaves were kept in tap water under room conditions for studying the vase-life. Observations were recorded on various vegetative, flowering and vase-life parameters and data were analyzed statistically.

There were significant differences (Table 1) among the varieties for all the characters under both the conditions. Plants were taller in open conditions as compared to shade. Higher light intensity might have accelerated the plant height The results are in accordance with the findings of Saud *et al*. (6) in gladiolus. Among the varieties, Golden Torch showed the maximum plant height, while the minimum plant height was recorded in Choconiana. Varieties Golden Torch and Lady Di were found on par with each other. Maximum plant height was resulted in Golden Torch under both the conditions. Results were found non-significant between the conditions for number of leaves/shoot. However, differences among the varieties and inter action between condition and variety were found significant. Shoots of Lady Di had more number of leaves and produced the highest number of leaves/shoot both under shade and open field conditions. Under both the conditions, the lowest number of leaves/shoot was reported in Golden Torch. Relatively, longer and broader leaf were observed in shade. More leaf length in all gladiolus cultivars

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Table 1. Performance of heliconia varieties under partial shade of coconut garden and open field conditions.

Variety	Plant height (cm)			Leaves/shoot			Leaf length (cm)			Leaf width (cm)		
	Open	Shade	Mean	Open	Shade	Mean	Open	Shade	Mean	Open	Shade	Mean
Golden Torch	117.44	97.55	107.49	5.30	5.35	5.32	61.12	58.75	59.94	14.54	15.01	14.78
Lady Di	115.26	90.15	102.71	5.92	5.80	5.86	39.37	44.25	41.81	9.47	11.53	10.50
Choconiana	95.28	92.06	93.67	5.37	5.45	5.41	38.05	43.87	40.96	8.31	9.49	8.91
Mean	109.33	93.25		5.53	5.53		46.18	48.96		10.78	12.01	
CD (P = 0.05)												
Condition			6.12			NS			2.02			0.46
Variety			7.50			0.24			2.48			0.57
Inter action			10.61			0.34			3.51			0.80

grown under coconut garden as compared to open field conditions was reported by Ramachandrudu and Thangam (5). Maximum leaf length under open conditions and maximum leaf width under shade were noticed in Golden Torch and the same variety was markedly superior to other varieties with respect to leaf size. Relatively, number of shoots/clump was counted more under open conditions rather than shade. Similar observations were made by Maciel *et al*. (3) in heliconia. Golden Torch produced the highest number of shoots/clump, whereas the least was noticed in Lady Di. The variety Golden Torch grown in open conditions registered the highest number of shoots/clump, and the lowest was noted down in Lady Di in shade.

There was considerable earliness (Table 2) in days to emergence of spike and opening of spike under open conditions compared to shade under coconut garden and the variety Golden Torch was found early while Lady Di and Choconiana as late in approaching the stages of spike emergence and opening of spike. Differences between varieties Lady Di and Choconiana were found non significant. There was significant delay in flowering in all varieties under shade and the variety Ladi Di took maximum period of time for the same. Lengthy spikes are preferred by consumers as they give good appearance in vase and flower arrangement. Spike stalk length was happened to be the maximum under open field conditions when compared to shade. Maximum stalk length was recorded in Lady Di followed by Golden Torch and both were found at par with each other, whereas the minimum was noticed in Choconiana. Both the extremes of stalk length were recorded in Lady Di under open and shady conditions, respectively. Differences (Table 3) in respect of stalk girth were found non-significant between the conditions. Stalks were sturdy and very thick in Golden Torch, while they were thin in Choconiana. The variety Golden Torch produced stalks having the maximum girth whereas the minimum was reported in Choconiana. Under both the conditions, maximum stalk girth was recorded in Golden Torch while the minimum in Choconiana.

Table 2. Flowering in heliconia varieties under partial shade of coconut garden and open field conditions.

Variety	Shoots/plant			Days to emergence of spike			Days to opening of spike			Stalk length (cm)		
	Open	Shade	Mean	Open	Shade	Mean	Open	Shade	Mean	Open	Shade	Mean
Golden Torch	152.45	80.00	116.22	120.00	140.75	130.37	132.25	153.25	142.75	94.18	84.16	89.17
Lady Di	61.02	46.05	53.54	124.50	143.50	134.00	137.50	155.75	146.62	100.03	78.65	89.34
Choconiana	110.87	89.10	99.99	129.75	139.00	134.37	140.25	152.25	146.25	84.79	82.13	83.46
Mean	108.12	71.72		124.75	141.08		136.67	153.75		93.00	81.65	
CD (P = 0.05)												
Condition			5.28			0.55			0.82			3.98
Variety			6.47			0.67			1.00			4.88
Interaction			9.15			0.95			1.42			6.89

Among the varieties, Golden Torch produced the spikes, which had the better length and width under both the conditions. Spike length as well as spike width were found significantly lesser in Choconina under open and shady conditions. Spike length observed in all varieties was significantly more in open conditions as compared to shade. However, results for spike width were found non significant between the conditions. Bract is a main attractive part of spike. Compared to shade, spikes with more number of bracts were seen under open conditions in all varieties. The variety Golden Torch produced spikes with highest number of bracts whereas it was lowest in Choconiana. More number of bracts/spike was recorded in Golden Torch under shade as well as open conditions, whereas it was less in Choconiana grown under shade (Table 3).

Results (Table 4) with regard to vase-life of spikes and leaves were found non-significant between shade and open field conditions. Among the varieties, both spikes and leaves of the variety Choconiana lasted for more number of days and the same variety had longest vase-life under both the conditions. Longevity of spikes and leaves was shortest in Lady Di and Golden Torch, respectively. Significant differences at all levels were observed for spike and rhizome yield/clump. In all varieties, spike yield/clump was maximum under open conditions compared to shade. Golden Torch produced more spikes in open conditions while Lady Di grown under shade produced less number of spikes/clump. Spike yield/clump obtained in Lady Di under both the conditions was more or less the same. The variety Golden Torch emerged as the best spike yielder, whereas Lady Di yielded the lowest number of spikes/clump. Similar trend was noticed for rhizome yield/clump, wherein the varieties were at par.

It can be concluded from the results of study that all the varieties performed well in open field conditions as compared to shade. There is good scope to take up heliconia as inter-crop in coconut gardens. Crops like heliconia, anthurium and jasmine were reported to perform well under partial shade of coconut garden (Arunachalam and Reddy, 12). Based on the performance, Golden Torch and Choconiana for shade

Table 3. Flower characters of heliconia varieties under partial shade of coconut garden and open field conditions.

Variety	Stalk girth (cm)			Spike length (cm)			Spike width (cm)			Bracts/spike		
	Open	Shade	Mean	Open	Shade	Mean	Open	Shade	Mean	Open	Shade	Mean
Golden Torch	2.15	2.07	2.11	21.50	15.15	18.33	22.53	22.20	22.37	6.97	6.50	6.74
Lady Di	1.62	1.57	1.60	15.07	11.53	13.30	15.62	15.42	15.52	5.95	5.15	5.55
Choconiana	1.42	1.42	1.42	11.54	9.93	10.74	11.45	10.30	10.87	5.22	4.17	4.7
Mean	1.73	1.69		16.04	12.20		16.53	15.98		6.05	5.27	
CD (P = 0.05)												
Condition			NS			0.62			NS			0.14
Variety			0.11			0.76			0.75			0.18
Interaction			0.16			1.08			1.06			0.25

Table 4. Performance of heliconia varieties under partial shade of coconut garden and open field conditions.

Variety	Vase-life of spike (days)			Vase-life of leaves (days)			Spike yield/ clump (No.)			Rhizome yield/clump (kg)		
	Open	Shade	Mean	Open	Shade	Mean	Open	Shade	Mean	Open	Shade	Mean
Golden Torch	12.12	11.75	11.94	11.10	11.10	11.10	110.77	54.32	82.55	5.30	3.20	4.25
Lady Di	7.50	7.75	7.62	18.22	17.87	18.05	42.02	41.12	41.57	2.12	1.52	1.82
Choconiana	12.75	12.25	12.50	22.15	21.12	21.64	81.17	55.00	68.09	4.75	3.31	4.03
Mean	10.79	10.58		17.16	16.70		77.99	50.15		4.06	2.68	
CD (P = 0.05)												
Condition			NS			NS			3.20			0.27
Variety			0.82			1.34			3.92			0.34
Interaction			1.16			1.89			5.54			0.48

and Golden Torch for open areas were found promising and the same can be recommended for commercial production in Goa.

REFERENCES

1. Arunachalam, V. and Srinivasareddy, D.V. 2002. Enhancing system productivity in coconut garden by flowers, medicinal and aromatic plants. *Annual Report*, CPCRI, Kasargod, Kerala, 32 p.
2. Lalrinawmi and Talukdar, M.C. 2004. Heliconia: an unusual cut flower for tropics. *Indian Hort.*
3. Maciel, N., Rojas, E. and Campbell, R.J. 1994. Growth and development of *Heliconia bihai* and *H. latispatha* under different levels of shade. *Proc. InterAmerican Soc. Trop. Hort.* **38**: 257-63.
4. Nair, P.K.R. 1979. Intensive multiple cropping with coconut in India. *Adv. Agron. Crop Sci.* **6**: 147-49.
5. Ramachandrudu, K. and Thangam, M. 2006. Comparative performance of gladiolus cultivars under coconut garden and open conditions. *J. Orn. Hort.* **9**: 200-3.
6. Saud, B.K., Santosh Kumar and Ranjan Srivastava. 2005. Effect of growing conditions on vegetative growth, flowering and corm production in gladiolus. *J. Orn. Hort*. **8**: 264-67.
7. Sheela, V.L. and Rakhi, R., Jayachandran Nair, C.S. and Sabina George, T. 2005. Genetic variability in heliconia. *J. Orn. Hort.* **8**: 284-86.

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