Mysore J. Agric. Sci., 58 (3) : 45-53 (2024)

Evaluation of Variability Parameters for Yield and its Contributing Traits in Bird's Eye Chilli (*Capsicum frutescens* L.) Germplasm

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Received : March 2024

Accepted : March 2024

Abstract

Chilli is an important vegetable crop used to add spiciness to food. *Capsicum frutescens* L. is one of the cultivated species of chilli grown wild in high rainfall regions. The experimental material consisting of thirty-three genotypes involving thirty-two bird's eye chilli germplasm lines collected from various regions of Karnataka and Kerala and one check variety were evaluated for yield and its contributing traits. The replicated experiment was conducted in open field condition during the January-June, 2023 at Department of Biotechnology, GKVK, Bengaluru. For traits including plant height, the number of secondary branches per plant and the number of days to first fruit harvest, significant treatment differences were noted. The traits *viz.,* plant height, individual fruit dry weight and fruit yield per plant recorded high estimates of genotypic coefficient of variation (27.43, 25.49 and 27.10%, respectively), phenotypic coefficient of variation (29.92, 27.19 and 28.99%, respectively), heritability (84.00, 68.70 and 78.21%, respectively) and genetic advance over mean (51.81, 43.35 and 49.71, respectively). Promising genotypes identified for better yield were UASBCF-29, UASBCF-30, UASBCF-27, UASBCF-31 and UASBCF-9. The traits with high estimates of variance and heritability may be altered through selection. The better performing genotypes for yield can be effectively utilized in crop improvement programme.

Keywords : Bird's eye chill, Genetic variability, *Capsicum frutescens*, Yield

Chilli (*Capsicum annuum* L. 2n=24) is a unique and popular vegetable crop cultivated for its pungency. It is invariably used to add hotness and unique flavour to food. The crop is very diverse with a genome size of ~3.5Gb (Kim *et al.,* 2014) and is one of the largest in the family *Solanaceae*. Chilli has diverse uses as vegetable, spices, culinary supplement, condiment, medicine and aesthetic as well. India is the world's leader in chilli production with 4.69 million metric tonnes from an area of 0.42 m ha and productivity of 11 MT ha^{-1} and contributes to 43 *per cent* of world chilli production followed by China, Thailand, Ethiopia and Indonesia (Indiastat, 2022). In Karnataka, chilli is grown in an area of 0.059 mha with a production of 8.156 lakh tonnes and productivity of 13.71 MT ha^{-1}. Besides its culinary use, it possesses many medicinal and nutritional values. India is the world's largest producer, consumer and exporter of chilli. Despite being a native of North America, India is recognized as a secondary centre of variation for its abundant variety in the crop, particularly in *Capsicum annum* (Thakur *et al.,* 2019). With greater diversity, types of chillies cultivated around the world comprise of *Capsicum annuum, Capsicum baccatum, Capsicum pubescens, Capsicum chinense* and *Capsicum*

frutescens of which *C. annuum* and *C. frutescens* are mostly found in India.

Bird's eye chilli (*Capsicum frutescens* L.) is wild chilli that is genetically related to *Capsicum chinense*, a cultivated chilli. Bird's eye chilli is characterized by high pungency where fruits are small, upright with characteristic red, green or yellowish white in colour. Bird's eye chilli plants grow up to two meters with spreading architecture with hard stem and slender branches. It is an often-cross pollinated crop with a diploid chromosome number 2n = 24. *Capsicum frutescens* plants have smooth, medium-sized, elliptical leaves and a greater number of primary and secondary branches compared to *C. annum* species. Fruits are erect (Anilkumar and Rao, 2018) and exhibit less variation in colour, shape and size than *Capsicum annuum, C. chinense* and *C. baccatum.* Numerous local land races of *C. frutescens* are cultivated in tropics and subtropics of the world for culinary usage as fresh, dried and processed products. In India, bird's eye chilli is naturally grown in Western ghats including Kerala, Karnataka, Tamilnadu and North Eastern regions where the climate is humid with high rainfall. Among the north-eastern states of India, Mizoram, Meghalaya and Assam are known for the presence of incredible diversity of bird's eye chilli with respect to fruit shape, size, colour, pungency, plant type, physiological characteristics, reactions to diseases and pests, adaptability and distribution (Ozgur *et al.,* 2011). Huge diversity of the crop with respect to fruit quality *viz.,* phenols, flavonoids, antioxidant activity is found in Mizoram region and holds a great scope and potential for selection of best genotypes in these areas (Dutta *et al.,* 2015). Bhoomika *et al.* (2021) reported higher level of GCV, PCV (>20%), very high heritability (>90%) coupled with high GAM (>40%) for number of primary branches per plant, weight of seeds per fruit, fruit yield per plant, fresh and dry weight of ten fruits, fruit width, number of seeds per fruit, width and length of the fruit stalk and fruit length in bird's eye chilli collected from Western ghats of Karnataka. Carvalho *et al.* (2017) noted a high degree of polymorphism for stem length, stem diameter, days to flowering, days to fruiting, fruit weight, fruit length and fruit wall thickness.

Bird's eye chilli is believed to possess resistance to many diseases (Jayaram and Rao, 2015). However, the use of these chillies is limited due to difficulty in crop establishment, low adaptability in hot and dry climates, poor yield and seed dormancy problems (Barchenger and Bosland, 2016). Undoubtedly, the crop has the potential to yield foreign exchange earnings for the nation if proper steps are taken to develop it and make it available to farmers. But there is need of desirable cultivars which has become essential to evaluate the available collections in bird's eye chilli and to recommend the best cultivar (s) to the farmers.

High yielding cultivars that are more tolerant for varying soil types and climates, yield more fruit with superior quality, requiring less maintenance need to be developed. To initiate any breeding work, it is also necessary to assess the genetic variability present in the indigenous genotypes for yield and its components. Parameters of genotypic and phenotypic coefficient of variations are useful in detecting the amount of variability present in the germplasm. Heritability and genetic advance help in determining the influence of environment in expression of the characters and the extent to which improvement is possible after selection (Robinson *et al.,* 1949). As a result of huge genetic variability present among different bird's eye chilli genotypes, the quantity and quality of certain fruit components can be significantly altered by selection. Therefore, in the present study, it was aimed at evaluation of bird's eye chilli germplasm collection for yield and its contributing traits.

Material and Methods

The experimental material consisting of thirty-three bird's eye chilli germplasm collected from various regions of Karnataka and Kerala (Western ghats which is their natural habitat) were used to study their performance for yield and its contributing traits. The

details regarding the experimental material and their place of collection are presented in Table 1. Field evaluation was taken up at 'K' Block, Department of Plant Biotechnology, GKVK, Bengaluru, Karnataka, India situated at an altitude of 930 meters above mean sea level (MSL), 12º58' North latitude and 77º35' East longitude. The experiment was carried out in a Randomised Block Design (RBD) with two replications.

The experimental plot was ploughed and brought to fine tilth to make ridges. Weeds, stubbles, stones were removed and well decomposed farm yard manure was applied and mixed well. Plots were drenched with Bavistin @ 2 g/ml before sowing to avoid soil borne diseases. Healthy and uniform seedlings were raised for six weeks and transplanted in the experimental plots in each replication during the month of January, 2023. Each entry was planted at a distance of 1x1 m. After transplanting, one light irrigation was given for quick establishment of seedlings. Recommended dose of fertilizers N, P and K @ 150: 75: 75 NPK kg / ha were applied as per the recommended package of practice in the form of urea, diammonium phosphate and muriate of potash, respectively. Fifty per cent of nitrogen and full dose of phosphorus and potash were applied as basal dose and the remaining fifty per cent of nitrogen was applied 45 days after transplanting. The field was kept free from weeds by hand weeding at 15 days interval. The plots were irrigated at an interval of one day in initial growth period. Later the irrigation interval increased to once in 2-3 days depending on the soil moisture conditions. The general view of experimental plot is shown in Plate 1.

Observations were recorded on plant height (cm), number of primary branches per plant, number of secondary branches per plant (at the time of harvest) days to flower, days to fruitset, days to first fruit harvest, individual fruit dry weight (g), fruit yield per plant (g), seeds per fruit and test weight (g). The mean of quantitative characters recorded on germplasm collection was subjected to various standard statistical

Table 1

List of bird's eye chilli genotypes with their location of collection from southern parts of India

Genotype	Place of collection
UASBCF-1	Ponnampet, Kodagu
UASBCF-2	Alur, Hassan
UASBCF-3	Alur, Hassan
UASBCF-4	Alur, Hassan
UASBCF-5	Malappuram, Kerala
UASBCF-6	Alur, Hassan
UASBCF-7	Belur, Hassan
UASBCF-8	Ponnampet, Kodagu
UASBCF-9	Hassan
UASBCF-10	Mudigere, Chikkamagaluru
UASBCF-11	Mudigere, Chikkamagaluru
UASBCF-12	Mudigere, Chikkamagaluru
UASBCF-13	Mudigere, Chikkamagaluru
UASBCF-14	Mudigere, Chikkamagaluru
UASBCF-15	Ponnampet, Kodagu
UASBCF-16	Ponnampet, Kodagu
UASBCF-17	Ponnampet, Kodagu
UASBCF-18	Ponnampet, Kodagu
UASBCF-19	Ponnampet, Kodagu
UASBCF-20	Ponnampet, Kodagu
UASBCF-21	Maddur, Mandya
UASBCF-22	Virajpet, Kodagu
UASBCF-23	Virajpet, Kodagu
UASBCF-24	Sirsi, Uttara Kannada
UASBCF-25	Kollam, Kerala
UASBCF-26	Tiruvanathapuram, Kerala
UASBCF-27	Tiruvanathapuram, Kerala
UASBCF-28	Tiruvanathapuram, Kerala
UASBCF-29	Malappuram, Kerala
UASBCF-30	Kollam, Kerala
UASBCF-31	Wayanad, Kerala
UASBCF-32	Koppa, Chikkamagaluru
Vellayani University, Samruddhi (C)	Kerala Agricultural Kerala

Plate 1 : Field view of the experimental plot

procedures to estimate mean, range, ANOVA and variability parameters.

Results and Discussion

Analysis of Variance

The result on various yield and its contributing traits is shown in Table 2. The analysis of variance for various characters studied is presented in Table 3. The mean sum of squares was significant for plant height (746.51), number of secondary branches per plant (98.55) and days for first fruit harvest (1110.62) indicating that genotypic differences existed for these traits among the germplasm collection. The variability estimated (mean, range, genotypic and phenotypic coefficient of variations, heritability (broad sense) and genetic advance) are presented in Table 4.

The mean plant height recorded was 67.30 cm with a range of 48.32 to 126.76 cm. The analysis of variance revealed highly significant differences among the genotypes with respect to plant height. The maximum height of 126.76 cm was recorded in genotype UASBCF-27 and the lowest plant height was recorded

Table 2

Mean values for yield and its contributing traits in bird's eye chilli genotypes

Genotype	PH	PBPP	SBPP	DF	DFS	DFFH	FDW (g)	FYPP (g)	SPF	TW (g)
UASBCF - 1	50.56	9	20	79.5	116.5	131	0.2	111.05	15.5	3
UASBCF - 2	50.18	9.5	20	95.5	130.5	153	0.12	100	14.5	3.9
UASBCF - 3	48.32	10.5	24	81	129	152.5	0.11	108	13	3.1
UASBCF - 4	69.23	9	30	103	126.5	144.5	0.23	102.92	18.25	3.7
UASBCF - 5	68.95	10	28.5	87	121.5	136	0.12	100.5	18.5	3.4
UASBCF - 6	64.5	9.5	29.5	99.5	129.5	160	0.17	99	20.1	3.1
UASBCF - 7	60.69	8.5	34.5	98	120	142.5	0.12	91	16.4	3.7
UASBCF - 8	49.59	10	30.5	72	110	127.5	0.15	105	16.5	3.4
UASBCF - 9	90.39	12	32.5	90.5	119	142	0.15	155.75	14.99	2.9
UASBCF - 10	70.13	8.5	26.5	97	121.5	147.5	0.18	97.06	14.2	3.1
UASBCF - 11	49.1	14	37	85.5	116	134.5	0.15	100.19	12.89	3.1
UASBCF - 12	50.47	10.5	29	106	121	134	0.15	110	14.02	3.4

Continued....

Table 2 Continued....

Genotype	PH	PBPP	SBPP	DF	DFS	DFFH	FDW (g)	FYPP (g)	SPF	TW (g)
UASBCF - 13	57.77	9.5	31.5	93.5	120	135.5	0.14	103.5	12.7	3.3
UASBCF - 14	60.67	11.5	28	76	120.5	136	0.11	109	16.35	3.2
UASBCF - 15	58.36	11.5	34	109.5	125.5	145	0.13	100.2	12.85	3.3
UASBCF - 16	57.5	12	33	90	126.5	148.5	0.13	110.7	17.5	3.4
UASBCF - 17	60.02	8.5	23	82	123.5	140	0.12	110.5	13.15	3.1
UASBCF - 18	50.65	11.5	30	100.5	121.5	146	0.11	111.27	15.83	3.9
UASBCF - 19	62.37	9.5	29	79.5	118	134	0.13	106	17.24	3.6
Genotype	PH	PBPP	SBPP	DF	DFS	DFFH	FDW (g)	FYPP (g)	SPF	TW (g)
UASBCF - 20	58.25	11	32	78.5	118.5	134.5	0.15	107.8	14.4	3.3
UASBCF - 21	56.04	10.5	32	99	128	147.5	0.14	107.55	13.62	4
UASBCF - 22	71.17	12	39	86.5	118.5	138.5	0.12	108.66	15.08	3.7
UASBCF - 23	80.87	11.5	31.5	88.5	125	170	0.13	107.35	16.63	3.8
UASBCF - 24	54.8	9.5	36	86.5	123	144.5	0.13	113.65	19.2	3.3
UASBCF - 25	48.8	12.5	23.5	75	115	131	0.13	108.35	12.86	3
UASBCF - 26	100.13	11.5	39	88.5	119.5	141.5	0.15	103.83	17.63	3.8
UASBCF - 27	126.76	10	43	98	127	145	0.28	181.59	19.33	3.8
UASBCF - 28	91.81	10.5	20.5	92	122.5	134	0.14	108.68	19.09	3.8
UASBCF - 29	114.2	9	46.5	101.5	132.5	149.5	0.27	352	15.4	3.7
UASBCF - 30	71.25	13.5	46.5	97	123.5	145	0.17	213.05	19.04	3.4
UASBCF - 31	58.6	12	43.5	98.5	122.5	139.5	0.16	157.8	20.6	3.2
UASBCF - 32	71.84	13.5	36.5	99.5	120.5	137	0.13	153.65	18.6	3.5
Vellayani Samruddhi(C)	86.94	12	30.5	83.5	123.5	139.5	0.16	102.28	16.5	3.1
Mean	67.30	10.73	31.83	90.85	122.30	142.03	0.15	122.97	16.13	3.42
C.V.	11.95	14.5	15.81	8.89	4.2	4.48	9.8	5.39	12.7	12.03
C.D. 5%	16.39	3.17	10.25	16.44	-	13.24	0.03	13.49	4.17	-

Note : PH- Plant height, PBPP- Primary branches per plant, SBPP- Secondary branches per plant, DF- Days to flower, DFS- Days to fruitset, DFFH- Days for first fruit harvest, FDW- Fruit dry weight, FYPP- Fruit yield per plant, SPF- Seeds per fruit and TW- Test weight

Table 3

Mean sum of squares for yield and its contributing traits in thirty-three bird's eye chilli germplasms

Traits	Replication	Treatment	Error
Plant height (cm)	799.08	746.51 **	64.72
Primary branches per plant	0.55	4.60	2.42
Secondary branches per plant	402.56	98.55 **	25.34
Days to flower	427.64	185.86	65.17
Days to fruitset	163.88	46.56	26.44
Days for first fruit harvest	512.97	1110.62 **	42.22
Individual fruit dry weight (g)	0.00055	0.00351	0.00021
Fruit yield per plant (g)	70.29	4772.10	43.86
Seeds per fruit	9.96	11.30	4.20
Test weight (g)	0.00018	0.00195	0.00167

Note : ** Significance at 1 (%) probability level; * Significance at 5 (%) probability level

TABLE 4

Estimates of genetic variability parameters for yield and it's contributing traits

Traits	Mean	Range		GCV (%)	PCV (%)	h^2 (%)	GAM (5 %)
		Max.	Min.				
Plant height (cm)	67.30	48.32	126.76	27.43	29.92	84.00	51.81
Primary branches per plant	10.73	9.00	14.00	9.72	11.46	31.00	11.15
Secondary branches per plant	31.83	20.00	47.00	19.00	21.72	59.00	30.09
Days to flower	90.85	72.00	109.50	8.55	11.33	48.00	12.21
Days to fruitset	122.30	110.00	132.50	2.59	4.94	27.60	2.80
Days for first fruit harvest	142.03	127.50	170.00	15.93	16.55	62.70	31.59
Individual fruit dry weight (g)	0.15	0.11	0.28	25.49	27.19	68.70	43.35
Fruit yield per plant (g)	122.97	91.00	352.00	27.10	28.99	78.21	49.71
Seeds per fruit	16.00	13.00	21.00	11.68	14.25	45.93	16.30
Test weight (g)	3.40	2.90	3.95	3.52	4.53	29.20	2.04

in genotype UASBCF-2 (48.32 cm). The values of genotypic and phenotypic coefficient of variability were 27.43 (%) and 29.92 (%), respectively. The estimate of heritability was 84 (%) with an expected genetic advance over mean of 51.81 per cent. In a study conducted by Lakshmidevamma *et al.* (2021), the PCV and GCV values were high for plant height (29.99 and 28.51%).

Primary branches per plant showed a mean value of 11 branches with a range of 9 to 14 branches and had heritability (31%), PCV (11.46%), GCV (9.72%) coupled with moderate GAM (11.15). The genotypes UASBCF-7, UASBCF-10 and UASBCF-17 showed the lowest number of primary branches per plant (9) and genotype UASBCF-11 showed the highest number of primary branches per plant (14).

Reports of the investigation carried out by Bharadwaj *et al.* (2007) suggested that moderate GCV (18.46%) and PCV (20.15%) were recorded for number of primary branches per plant with high heritability (84.00%). In a study conducted by Thakur *et al.,* (2019), moderate estimates for GCV (12.74%) and PCV (14.65%) was observed for primary branches with a high heritability of (75.63%).

The lines differed significantly for secondary branches per plant. It varied significantly among the genotypes with a mean of 32 and range of 20 to 47. The genotypes UASBCF-29 and UASBCF-30 showed the highest number of secondary branches whereas the lowest number of secondary branches was recorded by the genotype UASBCF-1 and UASBCF-2. The genotypic and phenotypic co-efficient of variability were 19.00 (%) and 21.72 (%), respectively. The heritability estimates of 59 (%) and expected genetic advance of 30.09 per cent was noticed for secondary branches per plant. The high estimates of GCV and PCV were obtained for number of secondary branches per plant (33.00 & 33.84%) in a study conducted by Patel *et al.* (2015).

The mean number of days to flower was 90.85 days with a range of 72.00 to 109.50 days after transplanting. The genotype UASBCF-8 was earliest to flower at 72.00 days, while the genotype UASBCF-15 flowered late at 109.50 days. The genotypic and phenotypic coefficients of variability were 8.55 and 11.33, respectively. The heritability estimates of 48 (%) with genetic advance of 12.21 per cent were observed for this trait. Also, high heritability was observed for days to 50 per cent flowering (85.25%) (Janaki *et al.,* 2017).

Average number of days to fruitset observed was 122.30. The maximum number of days recorded was 132.50. It had moderate heritability (27%), low PCV (4.94%), GCV (2.59%) coupled with low GAM (2.80%). The genotype UASBCF-29 showed highest number of days to fruitset (132.50), while the genotypes UASBCF-8 showed the lowest number of days to fruitset (110.00).

Overall mean of genotypes for the trait days for first fruit harvest was 142.03 days with the least number of 127.50 days after transplanting. Highest number of days to first fruit harvest observed was 170 days. The genotypic and phenotypic coefficients of variability for this trait were 15.93 and 16.55, respectively. Heritability of 62.70 (%) with a GAM of 31.59 per cent were recorded for this character. Highest number of days to fruitset was recorded in the genotype UASBCF-23 and lowest by the line UASBCF-8. Similar results were observed by Thakur *et al.* (2019) for days to first fruit harvest (14.39%).

Individual fruit dry weight varied significantly from 0.11 g (UASBCF-3, UASBCF-14 and UASBCF-18) to 0.28 g (UASBCF-27) with a mean of 0.15 g. The genotypic and phenotypic coefficients of variability observed for this trait were 25.49 (%) and 27.19 (%), respectively. High heritability (68.70 %) and GAM of (43.35 %) were recorded for this trait. Genetic variability assessment by Patel *et al.* (2015) in chilli revealed high GCV (33.35 %) and PCV (34.23 %) estimates for fruit weight (g).

Average fruit yield per plant observed was 122.97g. The maximum recorded was 352.00g. It had heritability (78.21%), PCV (28.99%), GCV (27.10%) coupled with moderate GAM (49.71%). The genotype UASBCF-29 showed the highest fruit yield per plant while the genotype UASBCF-7 showed the lowest fruit yield per plant of 91.00g. The high phenotypic coefficient of variation (PCV) and genotypic coefficient of variation (GCV) was observed for dry fruit yield per plant (20.74% & 22.64%) (Rekha *et al.,* 2016).

For the trait seeds per fruit, the range was found to be from 13.00 to 21.00 showing a GCV of 11.68 (%) and a high PCV of 14.25 (%). Moderate heritability was observed (45.93 %). GAM was found to be 16.30 and the mean observed was 16.00. The findings of Hameedi *et al.* (2023) suggested that genotypic and phenotypic coefficients of variability (26.61% and 28.68%) for seeds per fruit was observed.

The values for test weight ranged between 2.90 g to 3.95 g with a mean of 3.40 g. The lowest value for 1000 seed weight was recorded by UASBCF-9 (2.90 g) whereas highest weight was exhibited by genotype UASBCF-21 (3.95 g). For test weight, it was found that the genotypic and phenotypic coefficients of variability were 3.52 (%) and 4.53 (%), respectively. High heritability estimates (29.20 %) and genetic advance over mean (2.04 %) was observed. In an investigation carried out by Madhu *et al.* (2009), sufficient variability (GCV) was observed for 1000 seed weight.

Performance of Bird's Eye Chilli Germplasm for Yield and its Contributing Traits

The genotypes were evaluated for phenotypic performance for productivity traits and lab analysis for fruit quality traits to identify promising entries. Top five entries for various traits recorded are depicted in Table 5.

Plant height was observed to be in the range of 48.32 cm to 126.76 cm. Top five *C. frutescens* genotypes identified for plant height were UASBCF-27, UASBCF-29, UASBCF-26, UASBCF-28 and UASBCF-9. Promising genotypes identified for various productivity traits were: primary branches per plant (UASBCF-11, UASBCF-30, UASBCF-32, UASBCF-25 and UASBCF-22), secondary branches per plant (UASBCF-29, UASBCF-30, UASBCF-31, UASBCF-27 and UASBCF-22).

Promising genotypes for earliness were: days to flower (UASBCF-8, UASBCF-25, UASBCF-14, UASBCF-20 and UASBCF-1), days to fruit set (UASBCF-8, UASBCF-25, UASBCF-11, UASBCF-1 and UASBCF-19) and days to first fruit harvest (UASBCF-8, UASBCF-25, UASBCF-1, UASBCF-28 and UASBCF-19).

TABLE 5

Performance of bird's eye chilli germplasms evaluated for yield and its contributing traits

Traits	Top five entries
PH	UASBCF-27, UASBCF-29, UASBCF-26, UASBCF-28 and UASBCF-9
PBPP	UASBCF-11, UASBCF-30, UASBCF-32, UASBCF-25 and UASBCF-22
SBPP	UASBCF-29, UASBCF-30, UASBCF-31, UASBCF-27 and UASBCF-22
DF	UASBCF-8, UASBCF-25, UASBCF-14, UASBCF-20 and UASBCF-1
DFS	UASBCF-8, UASBCF-25, UASBCF-11, UASBCF-1 and UASBCF-19
DFFH	UASBCF-8, UASBCF-25, UASBCF-1, UASBCF-28 and UASBCF-19
FDW	UASBCF-27, UASBCF-29, UASBCF-4, UASBCF-1 and UASBCF-10
FYPP	UASBCF-29, UASBCF-30, UASBCF-27, UASBCF-31 and UASBCF-9
SPF	UASBCF-31, UASBCF-6, UASBCF-27, UASBCF-24 and UASBCF-28
TW	UASBCF-21, UASBCF-18, UASBCF-2, UASBCF-26 and UASBCF-27

Note : PH- Plant height, PBPP- Primary branches per plant, SBPP- Secondary branches per plant, DF- Days to flower, DFS- Days to fruitset, DFFH- Days for first fruit harvest, FDW- Fruit dry weight, FYPP- Fruit yield per plant, SPF- Seeds per fruit and TW- Test weight

Promising genotypes for yield: individual fruit fry weight (UASBCF-27, UASBCF-29, UASBCF-4, UASBCF-1 and UASBCF-10), fruit yield per plant (UASBCF-29, UASBCF-30, UASBCF-27, UASBCF-31 and UASBCF-9), seeds per fruit (UASBCF-31, UASBCF-6, UASBCF-27, UASBCF-24 and UASBCF-28) and test weight (UASBCF-21, UASBCF-18, UASBCF-2, UASBCF-26 and UASBCF-27).

From the above results, the top performing genotypes for overall productivity traits were UASBCF-29, UASBCF-30, UASBCF-27, UASBCF-31 and UASBCF-32.

Bird's eye chilli is the one of the most unique among cultivated chilli due to their size and pungency. It is necessary to develop high-yielding cultivars with less maintenance, more fruit yield with quality and suitability to grow in soil types and climates. The present investigation was conducted to assess the variability parameters for productivity traits in bird's eye chilli germplasm collection.

The traits such as plant height, individual fruit dry weight and fruit yield per plant recorded high estimates of genotypic coefficient of variation (27.43, 25.49 and 27.10% respectively), phenotypic coefficient of variation (29.92, 27.19 and 28.99% respectively), heritability (84.00, 68.70 and 78.21% respectively) and genetic advance over mean (51.81, 43.35 and 49.71% respectively).

Performance of the bird's eye chilli genotype 'UASBCF-30' was observed to be better for most of the productivity traits as it recorded higher plant height, individual fruit dry weight, number of secondary branches per plant, yield per plant, seeds per fruit and test weight. Yield of UASBCF-29 was observed to be the highest (352.00 g). These genotypes may be subjected for further detailed analysis for its use in development of mapping population. UASBCF-30 and UASBCF-29 may be crossed as they outstand for most of the yield and its contributing traits. Also, genotype with lower performance for productivity traits (UASBCF-7) may be crossed with UASBCF-30 to develop mapping population for mapping QTLs and also for genetic analysis of yield and its contributing traits in bird's eye chilli.

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