

## EVALUATION OF $F_4$ AND $F_5$ GENERATIONS OF A SET OF CLUSTERED BELL PEPPERS

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Most of the commercial varieties of chilli and capsicum are solitary fruited. Nearly 20 per cent of the total cost of cultivation is exclusively for harvesting fruits alone (Pious, 1985). The concept of clustered bell peppers assumes importance in the context. Attempts are made at the Kerala Agricultural University to develop clustered bell pepper lines, adapted to Kerala conditions. Peter *et al.* (1984) and Pious (1985) developed a set of clustered bell peppers. These lines needed continuous evaluation. The present investigation was mainly undertaken to study the variability present in the segregating generations of clustered bell peppers and to select elite plants.

### Materials and Methods

Segregating generations ( $F_4$  and  $F_5$ ) of Sweet Red Cherry Pickling x KAU Cluster (SRCP x KAU) and Hungarian Wax x KAU Cluster (HW x KAU) which were developed at the Kerala Agricultural University were made use of for this study. Selected clustered lines, two in  $F_4$  and 17 in  $F_5$  were grown in a compact homogeneous block without replications. The materials were evaluated for variability in plant height, days to first picking, clusters/plant, fruits/plant and fruit yield/plant. Observations were also made on reaction to bacterial wilt. The genotypes were scored according to Mew and Ho (1976). Elite plants in each family were progressed.

### Results and Discussion

The mean, range, cv, for five quantitative characters in  $F_4$  and  $F_5$  generations of Hungarian Wax x KAU Cluster and Sweet Red Cherry Pickling x KAU Cluster are given in Table 1.

#### $F_4$ generations

The range for plant height was 14.50 cm (HW x KAU) to 38.00 cm (SRCP x KAU); days to first green fruit harvest 76.00 (HW x KAU) to 105.00 (SRCP x KAU); clusters/plant 2.30 (SRCP x KAU) to 24.00 (HW x KAU); fruits/plant 13.00 (SRCP x KAU) to 59.00 (HW x KAU) and yield/plant 90.00 g (SRCP x KAU) to 283.00 g (HW x KAU). The highest estimate of coefficient of variation was observed for clusters/plant (58.76) followed by yield/plant (56.85).

Table 1

Mean, range and coefficient of variation (cv) of  $F_4$  generations of Hungarian Wax x KAU Cluster and Sweet Red Cherry Pickling x KAU Cluster crosses

		Plant height (cm)	Days to first green fruit harvest	Clusters/plant	Fruits/plant	Yield/plant
Mean	HW x KAU	23.42 ± 1.62	83.17 ± 2.42	8,14 ± 1.04	38.75 ± 8.02	146.25 ± 41.56
	SR x KAU	24,95 ± 2.37	97,42 ± 1.18	9.28 ± 1.72	20.57 ± 2.43	137,71 ± 21.85
Range	HW x KAU	14.50 -- 33.00	76.00 -- 90 00	7.00 -- 14.00	17.00 -- 59.00	95 .00— 283.00
	SR x KAU	15.50 -- 38.00	96.00 —105.00	2.00 - 24.00	13.00 — 32.00	90 .00— 270.00
cv	HW x KAU	24.95	7.13	33.75	41.39	56.85
	SR x KAU	30.04	3.19	58,76	31.28	S1.98

HW x KAU = Hungarian Wax x KAU Cluster

SR x KAU = Sweet Red Cherry Pickling x KAU Cluster

Table 2

Mean, range and coefficient of variation (cv) for yield and yield contributing characters in  $F_3$  generations of Hungarian Wax x KAU Cluster

Pedigree numbers		Plant height (cm)	Days to first green fruit harvest	Clusters/plant	Fruits/plant	Yield (g)
1—5	Mean	18.25 ± 1.08	84.33 ± 1.45	5.5 ± 1.09	14.75 ± 1.75	88.25 ± 19.12
	Range	15.00 — 21.00	80.00 — 80.00	3.00 — 9.00	9.00 — 18.00	40.00 — 143.00
	cv	11.86	4.15	39.62	23.67	43.22
2—2	Mean	21.42 ± 1.42	77.80 ± 1.49	3.95 ± 0.43	16.53 ± 3.33	93.38 ± 14.84
	Range	11.00 — 40.00	69.00 — 80.00	2.00 — 8.00	7.00 — 42.00	41.00 — 223.00
	cv	33.11	7.41	47.56	66.82	63.56
2—3	Mean	19.17 ± 1.06	82.75 ± 0.97	4.00 ± 0.79	9.2 ± 1.73	46.80 ± 9.67
	Range	16.00 — 24.00	80.00 — 86.00	1.00 — 60.00	4.00 — 14.00	25.00 — 85.00
	cv	13.53	2.62	0.45	42.04	46.27
2—5	Mean	14.10 ± 0.78	73.80 ± 3.18	2.60 ± 0.78	16.00 ± 6.83	65.00 ± 21.50
	Range	11.00 — 17.00	61.00 — 83.00	1.00 — 83.00	6.00 — 46.00	40.00 — 155.00
	cv	13.53	9.63	67.06	6.54	73.96
3—1	Mean	27.09 ± 1.23	87.40 ± 1.74	4.70 ± 0.86	22.00 ± 4.16	106.18 ± 13.54
	Range	18.00 — 30.00	83.00 — 110.00	1.00 — 10.00	6.00 — 50.00	41.00 — 111.00
	cv	16.92	6.29	57.91	62.68	42.31
4—6	Mean	24.31 ± 1.22	75.10 ± 0.79	4.63 ± 0.31	19.55 ± 1.43	106.74 ± 9.56
	Range	15.00 — 46.00	60.00 — 82.00	1.00 — 9.00	11.00 — 40.00	57.00 — 215.00
	cv	29.66	9.01	39.52	32.73	39.06
23	Mean	23.09 ± 1.11	80.64 ± 1.29	5.38 ± 0.29	21.68 ± 1.32	116.24 ± 7.88
	Range	12.00 — 34.00	64.00 — 88.00	2.00 — 11.00	8.00 — 42.00	55.00 — 235.00
	cv	33.38	9.18	37.71	40.46	45.99
26	Mean	17.38 ± 1.08	75.83 ± 4.33	2.63 ± 0.80	17.6 ± 4.02	113.33 — 131.20
	Range	18.00 — 30.00	75.00 — 88.00	2.00 — 12.30	6.00 — 28.00	30.00 — 195.00
	cv	17.95	13.98	32.65	50.89	61.38
39	Mean	24.26 ± 0.85	84.25 ± 1.55	4.88 ± 0.65	16.58 ± 2.68	85.25 ± 12.74
	Range	18.00 — 30.00	75.00 — 88.00	2.00 — 12.00	6.00 — 33.00	20.00 — 155.00
	cv	14.45	6.36	53.23	56.05	53.89

Table 3

Mean, range and coefficient of variation (cv) for yield and its components in  $F_5$  generations of Sweet Red Cherry Pickling x KAU Cluster

Pedigree number		Plant height (cm)	Days to first green fruits harvest	Clusters/plant	Fruits/plant	Yield/plant (g)
II-2	Mean	20.00 ± 1.18	<b>80.80 ± 0.86</b>	3.90 ± 0.92	14.09 ± 1.99	83.00 ± 10.89
	Range	16.00-30.00	75.00-83.00	1.00—12.00	6.00-28.00	45.00-163.00
	cv	19.54	3.40	<b>74.71</b>	47.02	47.30
II-8	Mean	18.68 ± 0.75	82.10 ± 0.41	3.50 ± 0.49	<b>11.72 ± 1.03</b>	69.64 ± 5.47
	Range	12.50—21.00	79.00-83.00	1.00- 8.00	6.00-15.00	45.00— 94.00
	cv	<b>15.03</b>	1.58	52.62	29.11	26.04
III-6	Mean	16.40 ± 5.95	92.40 ± 2.15	<b>5.40 ± 0.66</b>	<b>20.20 ± 1.87</b>	105.40 ± 9.42
	Range	25.00—35.00	84.00—99.00	4.00— 6.00	14.00-27.00	80.00—140.00
	cv	81.11	5.19	27.71	20.63	19.98
III-7	Mean	22.05 ± 1.30	80.30 ± 0.59	2.36 ± 0.39	<b>16.14 ± 2.21</b>	92.13 ± 15.44
	Range	18.00—28.00	78.00-83.00	1.00— 6.00	8.00-29.00	55.00—197.00
	cv	18.68	2.69	<b>54.93</b>	38.78	47.41
2	Mean	18.50 ± 1.33	79.00 ± 1.46	<b>3.80 ± 0.72</b>	<b>14.25 ± 1.75</b>	110.75 ± 15.01
	Range	15.00-24.00	77.00—84.00	2.00 - 6.00	10.00—19.00	85.00—160.00
	cv	16.03	3.69	42.11	<b>24.49</b>	27.11
2	Mean	32.64 ± 2.23	84.00 ± 0.47	<b>5.57 ± 0.58</b>	<b>13.00 ± 1.68</b>	69.58 ± 10.79
	Range	23.00—46.00	81.00—84.00	1.00- 9.00	7.00-25.00	40.00—145.00
	cv	25.54	3.03	38.82	40.70	53.74
27	Mean	26.91 ± 1.73	<b>87.45 ± 0.68</b>	4.94 ± 0.68	<b>29.62 ± 3.45</b>	179.16 ± 21.36
	Range	15.50—41.00	86.00—89.00	1.00—13.00	6.00-55.00	50.00—300.00
	cv	26.49	1.78	58.62	42.07	41.31
28	Mean	30.64 ± 2.57	83.92 ± 1.35	<b>8.08 ± 1.15</b>	<b>47.80 ± 4.88</b>	346.70 ± 28.31
	Range	26.00—53.00	77.00-88.00	3.00-15.00	18.00—70.00	103.00-472.00
	cv	31.41	5.57	51.50	32.26	25.81

F<sub>5</sub> generation

Nine selected lines of F<sub>5</sub> generation of the cross Hungarian Wax x KAU Cluster were evaluated (Table 2). Plant height ranged from 11.00 cm (2-2 and 2-5) to 46.00 cm (4-6). The highest coefficient of variation for plant height was observed in the line 23 (33.88). Days to green fruit harvest ranged from 80.00 (1-5) to 110.00 (3-1). The coefficient of variation was maximum in 26 (13.98). Considerable variation among the genotypes was observed for clusters/plant. It ranged from 1.00-12.00. The cv was the highest in 2-5 (67.06). Fruits/plant ranged from 4.00 to 50.00. The yield/plant ranged from 20.00 g (39) to 235.00 g (23). The highest estimate of cv was in 2-5 (73.96). The lowest estimate was observed in 3-1 (42-31).

Table 4

Bacterial wilt incidence in F<sub>4</sub> and F<sub>5</sub> generations of Hungarian Wax x KAU Cluster and Sweet Red Cherry Pickling x KAU Cluster

Pedigree	Wilt incidence	
	%	Score
F <sub>4</sub>		
Hungarian Wax x KAU Cluster	60.00	MS
Sweet Red Cherry Pickling x KAU Cluster	65.71	S
F <sub>5</sub>		
Sweet Red Cherry Pickling x KAU		
II-2	43.00	MS
II-8	48.00	MS
III-7	23.38	MR
III-6	26.60	MR
1	26.80	MR
2	53.33	MS
28	56.36	MS
27	55.71	MS
Hungarian Wax x KAU Cluster		
I-5	28.57	MR
II-1	21.43	MR
M-2	34.28	MR
II-5	35.71	MR
III-1	40.00	MS
IV-6	22.50	MS
23	38.33	MR
26	30.00	MR
39	45.45	SM

S = Susceptible; MS = Moderately susceptible; MR = Moderately resistant

The extent of variability for yield and its components was measured in terms of range, mean and coefficient of variation in the  $F_8$  generations of SRCP x KAU crosses. The results are presented in Table 3. Plant height ranged from 16 cm to 23 cm with a general mean of 20 cm (11-2), 18.68 cm (11-8), 16.40 cm (111-6), 22.05 cm (111-7), 18.5 cm (1), 32.54 cm (2), 26.91 cm (27) and 30.64 cm (28). Days to first green fruit harvest ranged from 76.00 (11-2) to 99.00 (111-6). The highest estimate of cv was in 28 (5.57). Cluster/plant ranged from 1.00-15.00. The estimate of cv was the highest in II-2 (74.71). Considerable variations among the genotypes were observed for fruits/plant. The range for fruits/plant was 6.00 to 70.00. The highest cv for this character was observed in II-2 (47.02). The yield of green fruits/plant ranged from 40.00 to 372.00. The highest cv was observed in 2 (53.74).

Considerable variation was observed in the population for all the characters studied. There is scope for further selection.

The selected clustered bell pepper lines were evaluated under field condition for resistance to bacterial wilt (Mew and Ho, 1976). The lowest percentage of wilt was observed in II-1 of  $F_8$  generation of Hungarian Wax  $\therefore$  KAU Cluster (21.43%) (Table 4). I-5, II-2, II-5, IV-6, 23 and 26 were also recorded as moderately resistant.  $F_4$  generations of Sweet Red Cherry Pickling x KAU Cluster were susceptible to wilt. Clustered bell peppers with desirable characters were identified and progressed.

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