Evaluation and Identification of Suitable Maize Cultivars for Baby Corn Productivity Traits

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Twenty cultivars of maize were assessed for their suitability for baby corn cultivation on the basis of different characteristics relevant for baby corn production relating to productivity traits, viz. flowering, as well as ear and plant characteristics (days to first cob picking, fodder etc.), during *kharif* 2007 and *rabi* 2007-08 seasons. HM 4 and HQPM 1 were found superior for most of the important productivity traits for cultivation, viz. husked cob yield per plant, HM 4(174.8g), HQPM 1 (169.9g); de-husked cob yield per plant, HM 4 (30.4g), HQPM 1 (26.0g); number of cobs picked per plant, HM 4 (3.3), HQPM 1 (2.7) and fodder yield per plant, HM 4 (522.3g), HQPM 1 (650.6g). Vivek Hybrid 17 and Vivek Hybrid 9 were found 10-14 days early for number of days to first cob picking and number of days to last cob picking compared to other cultivars. On the basis of overall characteristics, two elite hybrids HM 4 and HQPM 1 were identified for baby corn purpose. Many genotypes with specific characteristics can serve as potential genetic resources for effecting further development of new genotypes useful for baby corn improvement.

Key Words: Maize cultivars, Baby corn, Productivity, Ear characteristics, Hybrids

Introduction

Maize is unique among the cereals for its amenability to diverse uses and specialty corns attract utmost attention especially under Indian context. Specifically, baby corn is very relevant on account of a wide range of factors including enormous potentiality, multiple benefits to many stake holders etc. Baby corn is a young finger like unfertilized cob of maize harvested early within 1-3 days of silk emergence depending upon the growing season (Yodpetch, 1979; Yodpetch, and Bautista 1983). The ears are hand picked after the cob emerges from the ear tips, or a few days later. Being tender, it is eaten as whole cob in various forms (raw and cooked), and cooking does not change its culinary and physical properties significantly. Growing maize cultivars for baby corn has several advantages over other options like green ears or grain purpose, compared to other vegetable crops. Baby corn is a good option for crop diversification (Dass *et al.,* 2008) and it suits to peri-urban agriculture. Being a short duration crop (60-70 days during *kharif,* 120-140 days in winter- *rabi* and 75-90 days in spring), 3-4 crops of baby corn can be taken in a year, fitting well into the need to diversify the cropping system which is more remunerative to farmers (Kumar *et al.* 2001).

There is a great potential to earn foreign exchange through export of fresh/canned baby corn and its processed products, apart from increasing demand to meet local requirement within the country (Paroda, 2001). The major importing countries are USA, Japan, Hong Kong, Singapore, Australia, Malaysia, Canada, Saudi Arabia, New Zeeland, European countries and India. Thailand is major baby corn producing and exporting country in the world (Chutkaew, 1989), but India is emerging as one of the potential baby corn producing countries due to low cost of production and high demand within the country. Further, it is a dairy promoting crop as tassels (male part, consisting of pollens which are rich in protein and sugar contents), green sheathes, stalks and the other crop residues which are obtained as byproducts after picking of baby corn could be used both as fodder and silage for livestock production. Even from value-addition point of view, baby corn finds its way in to an array of preparations of several recipes like soup, raita, pakoras, chutney, pickles sour and sweet, cutlets, chat, mixed vegetable, kofta curry, baby corn masala, manchurian, baby corn chilli, jam, murabba, halwa, laddoo, burfi, kheer, candy, south Indian dishes etc. It is used as an ingredient in Chop-Suey (chinese dish), deep fried baby corn with meat and rice and mixed with other vegetables (Thakur and Jamwal, 2001). Baby corn is also very remunerative if it is cultivated with intercrop especially during winter. Since the winter season is long, farmers can utilize this lean period and get additional

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income through intercropping in baby corn. Intercropping of baby corn with pulse crops improves the soil fertility (Dass *et al.,* 2008). Thus, baby corn is a potential crop to generate income and employment for the rural poor, youth, women throughout the year, facilitating human welfare, sustainable development and best use of available resources in rural areas.

Despite such enormous prospects and potentialities, research initiatives are very much lacking in India. Very few studies are undertaken systematically to evaluate, identify or develop maize cultivars specifically suitable for baby corn usage across the seasons in Indian context. Usually early maturing maize cultivars primarily developed for grain yield are also cultivated for baby corn purpose. Specific features indicate desirability or otherwise of a maize cultivar for use at tender ear stage (Kumar and Kalloo, 2000). However, detailed information regarding productivity and ear aspects of most of the popular maize cultivars at the stage amenable for consumption as baby corn is scarce, necessitating systematic evaluation. Hence the present investigation was undertaken to assess the productivity traits and critically evaluated 20 diverse genotypes of maize aiming to identify potential cultivar(s) more suitable for utility as baby corn.

Material and Methods

The material for the present study consisted of a set of 20 maize cultivars comprising six single cross hybrids, four double cross hybrids, one three-way cross hybrids as well as nine composites (Table 1). These genotypes were obtained from the Directorate of Maize Research, Pusa Campus, New Delhi, and evaluated in two diverse seasons, viz. *kharif 2007* and *rabi 2007-08*. The experiment was laid in a Randomized Block Design with three replications in both the years at the experimental farm of Janta Vedic College, Baraut, Baghpat (Uttar Pradesh). The plot size for each genotype was 3 m X 1.2 m, with two rows of 3 m length, at a spacing of 60 cm between rows and 15 cm between plants. Recommended agronomic practices and plant-protection measures were adopted to raise a healthy crop. Observations were recorded on 10 randomly selected plants of each genotype in each replication on 20 characteristics pertaining to maturity, economic yield, biological yield etc. (Table 2). The analysis of variance was carried out according to the method suggested by Panse and Sukhatme (1985).

Table 1. Maize genotypes studied, their source, and main features

Genotype	Source/Centre	Main features (Maturity; type of cultivar)
Kiran	PAU, Ludhina	Early; composite
Parkash	PAU, Ludhina	Early; single cross hybrid
X 3342	Pioneer Seeds (Pvt. Seed comp.)	Early; double cross hybrid
HIM 129	VPKAS, Almora	Early; three way cross hybrid
Vivek hybrid17	VPKAS, Almora	Early; single cross hybrid
FQH 4567 (Vivek QPM 9)	VPKAS, Almora	Early; single cross hybrid
Vivek hybrid 9	VPKAS, Almora	Early; single cross hybrid
Pargati	GBPUT, Pantnagar	Early; composite
HQPM 1	CCS HAU, Karnal	Late; single cross hybrid
HM 4	CCS HAU, Karnal	Medium; single cross hybrid
BIO-9637	Bio-Seeds (Pvt. Seed comp.)	Late; double cross hybrid
Comp R-2005-2 (Chandramani)	CSAUAT, Kanpur	Early; composite
D 131 (Pant Sankul Makka 3)	GBPUT, Pantnagar	Early; composite
L 201	R.S., Bajaura, CSK HPKVV, Palampur	Early; composite
PRO 311	Bio-Seeds (Pvt. Seed comp.)	Late; double cross hybrid
Seed Tech 2324	Bisco Seed Tech. (Pvt. Seed comp.)	Late; double cross hybrid
Navjot	PAU, Ludhina	Early; composite
Surya	GBPUT, Pantnagar	Early; composite
L 166	R.S., Bajaura, CSK HPKVV, Palampur	Medium; composite
MS Pool C 7	PAU, Ludhina	Late; composite

Results and Discussion

The analysis of variance for both the seasons, viz. *kharif* (2007) and *rabi* (2007-08) revealed significant differences among genotypes for all the 20 productivity traits in 20 baby corn genotypes, indicating genetic diversity of material chosen for the present studies. For identifying suitable genotypes of maize to be used as baby corn comparative assessment was done on the basis of a total twenty characteristics related to productivity, maturity, cob and plant during *kharif*, *rabi* and both seasons (Table 2 and Table 3). On the basis of mean and other characteristics, overall performance of all the 20 genotypes were ascertained. While six traits were considered in detail for broad grouping to identify elite cultivars, the remaining 16 characteristics could be used for determining additional specific attributes. As for instance, the cultivar HM 4 exhibited highest values for trait number 14 referring to tassel weight/plant (26.4 and 27.12 g during *kharif* and *rabi* seasons respectively) implying that stout tassel was characteristic of this genotype.

Table 2. Performance of maize cultivars for different productivity traits during *kharif* season (2007)

	Characteristics																			
Genotypes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Kiran	48.23	52.44	56.70	53.59	57.80	4.21	2.43	45.66	9.22	111.16	22.45	20.18	116.67	17.03	36.44	88.71	348.62	454.36	476.81	4.70
Parkash	47.39	50.79	53.47	52.02	54.60	2.58	2.33	35.21	8.41	82.12	19.62	23.90	144.40	17.07	26.37	62.50	375.69	455.25	474.87	4.12
X 3342	48.15	52.29	59.07	53.71	60.09	6.38	2.00	38.72	9.29	77.45	18.60	24.01	126.73	13.47	29.42	58.85	365.34	437.66	456.26	4.08
HIM 129	45.53	48.98	56.79	50.80	58.13	7.33	2.83	44.62	9.52	126.18	26.97	21.37	107.20	14.30	35.10	99.41	229.97	343.68	370.65	7.27
Vivek Hybrid 17	41.43	45.34	52.96	47.26	54.19	6.92	2.10	34.97	9.55	73.34	20.04	27.32	116.27	15.27	25.41	52.05	260.99	328.30	349.33	5.73
FQH 4567	42.51	46.66	53.38	48.58	54.65	6.07	2.07	35.29	10.32	72.86	21.32	29.25	128.20	17.20	22.36	53.08	349.92	420.20	439.99	4.84
Vivek Hybrid 9	43.90	48.18	54.84	50.00	55.34	5.35	1.97	39.33	11.19	77.15	22.00	28.54	136.80	16.07	27.84	50.05	301.59	367.74	395.04	5.57
Pargati	44.23	48.10	55.79	49.76	56.66	6.89	2.50	38.08	8.42	95.12	21.05	22.12	113.80	18.17	29.65	74.07	246.27	338.51	359.56	5.85
HQPM 1	53.24	57.46	60.41	58.66	61.50	2.84	2.72	49.06	9.56	133.19	25.98	19.50	117.03	16.57	33.51	91.15	399.41	523.19	549.17	4.72
HM 4	50.08	53.85	58.79	55.40	60.28	4.88	3.10	46.47	9.53	143.79	29.53	20.58	103.20	26.40	35.94	113.96	348.60	488.96	518.79	5.69
BIO 9637	52.75	57.15	60.75	58.25	61.82	3.57	1.83	48.96	9.71	89.75	17.82	19.86	119.47	18.17	37.57	71.93	389.83	479.93	497.75	3.58
Comp R-2005-2	48.29	51.90	58.59	53.46	59.73	6.27	2.37	48.69	9.04	115.22	21.40	18.58	139.80	20.47	38.98	93.82	437.73	552.01	573.41	3.73
D 131	45.10	49.11	56.24	50.63	57.38	6.74	2.10	36.19	9.57	75.96	20.08	26.44	121.40	18.47	26.29	55.88	287.33	361.68	381.76	5.25
L 201	45.49	48.94	55.10	50.37	56.21	5.84	2.13	41.04	9.57	87.55	20.41	23.32	124.70	16.80	31.14	67.14	326.58	410.52	430.93	4.73
PRO 311	56.47	60.00	63.26	63.25	64.37	1.12	1.90	39.86	9.55	75.75	18.18	24.06	142.53	13.33	26.64	57.58	373.96	444.87	463.05	3.92
Seed Tech 2324	59.45	64.31	66.49	65.73	67.51	1.78	1.93	34.65	9.28	67.02	17.95	26.80	128.87	17.13	25.37	49.07	359.07	425.28	443.22	4.04
Navjot	47.43	51.69	56.17	53.60	57.17	3.57	2.00	46.33	8.68	92.60	17.36	18.77	142.53	19.23	36.65	75.24	374.28	468.75	486.12	3.57
Surya	43.74	47.37	52.91	48.75	54.07	5.32	2.40	39.29	8.62	94.30	20.68	21.96	126.77	22.13	26.34	73.62	274.90	370.65	391.33	5.28
L 166	45.61	49.97	55.55	51.12	56.64	5.52	2.33	40.81	9.88	95.18	23.05	24.22	142.20	20.50	30.10	72.13	330.90	423.54	446.58	5.16
MS Pool C 7	57.62	57.62	60.74	58.99	61.90	2.90	2.23	49.17	9.69	109.86	21.63	19.70	114.10	20.37	27.66	88.23	359.56	468.15	489.78	4.41
Mean	**48.33**	**52.11**	**57.40**	**53.70**	**58.50**	**4.80**	**2.26**	**41.62**	**9.43**	**94.78**	**21.31**	**23.02**	**125.63**	**17.91**	**30.44**	**73.24**	**337.03**	**428.18**	**449.72**	**4.81**
SEm±	1.02	0.93	0.79	0.82	0.78	0.99	0.078	0.96	0.23	3.07	0.83	0.69	1.28	0.23	1.04	3.25	3.42	4.21	3.98	0.17
Range	**41.43-**	**45.34-**	**52.91-**	**47.26-**	**54.07-**	**1.12-**	**1.83-**	**34.65-**	**8.41-**	**67.02-**	**17.36-**	**18.58-**	**103.20-**	**13.33-**	**22.36-**	**49.07-**	**229.97-**	**328.30-**	**349.33-**	**3.57-**
	59.45	64.31	66.49	65.73	67.51	7.33	3.10	49.17	11.19	143.79	29.53	29.25	144.40	26.40	38.98	113.96	437.73	552.01	573.41	7.27
CD at 5%	2.04	1.86	1.58	1.64	1.56	1.98	0.16	1.92	0.46	6.14	1.66	1.38	2.56	0.46	2.08	6.50	6.84	8.42	7.96	0.34

1. Number of days to tasseling, 2. Number of days to first cob silking, 3. Number of days to last cob silking, 4. Number of days to first cob picking, 5. Number of days to last cob picking, 6. Number of days interval to first and last cob picking, 7. Number of cobs picked/plant, 8. Single husked cob weight (g), 9. Single de-husked cob weight (g), 10. Husked cob yield/plant (g), 11. De-husked cob yield/plant (g), 12. De-husked to husked cob yield ratio 13. Plant height (cm), 14. Tassel weight/plant (g), 15. Husk (green sheath) weight/cob (g), 16. Husk (green sheath) yield/plant (g), 17. Stalk (picked plant) weight/plant (g), 18. Fodder yield/plant (g), 19. Biological yield/plant (g), 20. Harvest Index

Table 3. Performance of maize cultivars for different productivity traits during rabi season(2007-08)

Genotypes	Characteristics																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Kiran	123.82	128.22	132.10	130.52	134.18	3.67	1.97	48.53	8.67	95.49	17.35	18.17	106.33	20.38	39.87	78.14	316.50	415.02	432.37	4.01
Parkash	121.91	126.83	129.33	128.83	130.73	1.90	2.13	50.29	9.08	107.31	19.36	18.05	133.87	24.85	41.21	87.90	347.94	460.74	480.09	4.03
X 3342	119.00	124.43	128.28	126.43	130.27	3.83	2.35	53.49	9.33	125.63	21.90	17.44	108.70	13.57	44.36	104.25	312.78	430.61	451.99	4.84
HIM 129	114.50	120.09	128.27	121.53	128.93	7.40	2.10	47.07	9.36	98.83	19.63	19.89	92.33	22.33	37.71	79.07	197.78	299.19	318.95	6.15
Vivek Hybrid 17	113.50	118.44	125.82	120.18	127.49	7.32	1.93	47.21	9.05	91.33	17.48	19.17	99.73	18.25	38.16	73.85	222.42	314.51	331.99	5.26
FQH 4567	120.80	125.95	128.24	128.51	130.88	2.37	1.90	44.75	10.15	85.00	18.31	21.61	112.47	18.56	34.60	66.68	306.74	391.98	410.30	4.46
Vivek Hybrid 9	120.16	125.92	128.61	125.02	130.80	5.79	1.83	47.01	9.98	86.13	18.29	21.28	133.93	14.10	37.03	67.84	295.70	377.65	395.93	4.62
Pargati	127.70	129.95	132.55	131.58	134.29	2.71	2.20	47.68	8.90	105.04	19.59	18.66	110.30	22.45	38.78	85.46	233.36	341.27	360.85	5.42
HQPM 1	129.18	134.20	138.20	135.47	139.87	4.40	2.69	59.31	9.08	169.97	26.02	15.31	142.20	21.90	50.24	135.14	484.77	650.62	676.64	3.84
HM 4	126.93	132.25	137.60	134.03	139.47	5.43	3.30	52.94	9.21	174.80	30.40	17.42	103.80	27.12	43.72	144.40	350.79	522.31	552.71	5.50
BIO 9637	128.63	134.27	138.13	135.67	139.73	4.07	2.60	55.72	8.61	144.74	22.29	15.41	125.20	20.57	47.11	122.45	408.40	551.42	573.71	3.89
Comp R-2005-2	123.69	128.27	133.63	129.85	135.32	5.47	2.27	53.29	8.93	120.75	20.24	16.75	136.27	23.49	44.07	100.51	425.93	549.93	570.17	3.54
D 131	124.33	129.53	133.22	131.20	135.07	3.87	2.40	51.39	9.07	126.66	21.76	17.24	118.67	25.37	42.32	104.90	280.23	410.50	432.26	5.03
L 201	120.21	125.82	129.19	127.39	131.30	3.91	1.60	50.79	9.54	81.17	15.27	18.78	124.93	19.35	41.25	65.90	327.04	412.29	427.56	3.56
PRO 311	124.63	130.03	133.60	132.24	135.32	3.08	2.60	57.76	9.96	150.21	25.83	17.18	144.13	22.15	47.80	124.38	377.91	524.45	550.27	4.69
Seed Tech 2324	125.50	130.60	136.40	132.48	138.15	5.67	2.33	50.24	10.02	117.25	23.38	19.94	131.13	21.90	40.22	93.87	365.07	480.84	504.22	4.63
Navjot	123.22	128.13	132.07	130.00	133.68	3.68	1.80	49.50	9.28	89.07	16.67	18.75	141.20	20.23	40.22	72.40	365.21	457.85	474.52	3.51
Surya	118.39	123.43	130.47	126.09	132.22	6.13	1.87	49.15	8.68	91.79	16.20	17.67	123.40	22.28	40.48	75.59	270.73	368.60	384.80	4.21
L 166	125.95	131.40	133.73	132.98	135.48	2.50	2.67	58.54	8.70	156.08	23.17	14.86	141.07	21.46	49.84	132.92	328.17	482.55	505.71	4.58
MS Pool C 7	127.77	133.25	136.53	134.98	138.22	3.23	2.50	52.72	9.50	131.80	23.78	18.03	113.60	22.36	43.22	108.02	357.75	488.13	511.91	4.64
Mean	122.99	128.05	132.30	129.75	134.07	4.32	2.25	51.37	9.26	117.45	20.85	18.08	122.16	21.13	42.11	96.62	328.76	446.52	467.35	4.52
SEm±	1.27	1.67	1.97	1.72	1.79	1.27	0.130	1.05	0.27	6.01	1.11	0.86	1.17	0.51	1.09	5.38	2.05	6.38	7.02	0.20
Range	113.50-	118.44-	125.82-	120.18-	127.49-	1.90-	1.60-	44.75-	8.61-	81.17-	15.27-	14.86-	92.33-	13.57-	34.60-	65.90-	197.78-	299.19-	318.95-	3.51-
	129.18	134.27	138.20	135.67	139.87	7.40	3.30	59.31	10.15	174.80	30.40	21.61	144.13	27.12	50.24	144.40	484.77	650.62	676.64	6.15
CD at 5%	2.54	3.34	3.94	3.44	3.58	2.54	0.26	2.10	0.54	12.02	2.22	1.72	2.34	1.02	2.18	10.76	4.10	12.76	14.04	0.40

1. Number of days to tasseling, 2. Number of days to first cob silking, 3. Number of days to last cob silking, 4. Number of days to first cob picking, 5. Number of days to last cob picking, 6. Number of days interval to first and last cob picking, 7. Number of cobs picked/plant, 8. Single husked cob weight (g), 9. Single de-husked cob weight (g), 10. Husked cob yield/plant (g), 11. De-husked cob yield/plant (g), 12. De-husked to husked cob yield ratio 13. Plant height (cm), 14. Tassel weight/plant (g), 15. Husk (green sheath) weight/cob (g), 16. Husk (green sheath) yield/plant (g), 17. Stalk (picked plant) weight/plant (g), 18. Fodder yield/plant (g), 19. Biological yield/plant (g), 20. Harvest Index

The six important yield traits directly contributing to baby corn production comprised husked cob yield per plant, de-husked cob yield per plant, number of cobs picked per plant, fodder yield per plant, number of days to first cob picking and number of days to last cob picking during *kharif / rabi /* both the seasons. Five top performing genotypes for husked cob yield (g) included HM 4 (143.8), HQPM 1 (133.2), HIM 129 (126.2), Comp R 2005-2 (115.2) and Kiran (111.2) during *kharif* and HM 4 (174.8), HQPM 1 (169.9), L-166(156.1), PRO-311(150.2) and BIO 9637(144.7) during *rabi* season (Table 4). For de-husked cob yield (g) five superior genotypes included HM 4 (29.5), HIM 129 (26.9), HQPM 1 (25.9), L166(23.0) and Kiran(22.4) during *kharif* and HM4(30.4), HQPM1 (26.0),PRO 311(25.8),M.S. Pool C 7(23.7) and L-166 (23.2) during *rabi* season (Fig. 3 and 4). The cultivars HM4 (3.1), HIM 129(2.8), HQPM 1(2.7), Pargati (2.5) and Kiran (2.4) during *kharif* and HM 4 (3.3), HQPM 1(2.7), L 166(2.7), PRO 311(2.6) and BIO 9637 (2.6) were found superior during *rabi* for the number of cobs picked per plant (Fig. 5 and 6). Comp R 2005-2 (552.0), HQPM 1 (523.2), HM 4 (488.9), BIO 9637 (479.9) and Navjot (468.7) during *kharif* and HQPM 1 (650.6), BIO 9637 (551.4), Comp R 2005-2(549.9), PRO 311 (524.4) and HM 4 (522.3) during *rabi* were found superior for the fodder yield (g) per plant. Five promising genotypes for number of days to first cob picking, Vivek Hybrid 17 (47.3), FQH-4567 (48.6), Surya(48.7), Pargati (49.7) and Vivek Hybrid 9 (50.0) during *kharif* and Vivek Hybrid 17 (120.2), HIM 129 (121.5), Vivek Hybrid 9(125.0), Surya (126.1) and X-3342 (126.4) during *rabi* were found superior. For the number of days to last cob picking, Surya (54.1), Vivek Hybrid 17 (54.2), Parkash (54.6), FQH 4567 (54.6) and Vivek Hybrid 9 (55.3) during *kharif* and Vivek Hybrid 17 (127.5), HIM 129 (128.9), X-3342 (130.3), Parkash (130.7) and Vivek Hybrid 9 (130.8) were found superior during *rabi* (Table 4).

Comparison among elite cultivars across the traits indicated that HM 4 and HQPM 1 gave superior performance for four important productive traits, viz. husked cob yield/plant, de-husked cob yield/plant, number of cobs picked/plant and fodder yield/plant during both the seasons, viz. *kharif* (2007) and *rabi* (2007-08) (Table 4). These two single cross hybrids were released in Haryana for grain cultivation and are having high protein content**.** Prasanna *et al* (1995) emphasized that genotypes for baby corn should have cylindrical and long ears, uniform ear size and properly developed ovule rows. The present study indicates that HM 4 possessed majority of the desirable traits for high yield in baby corn.

The HQPM 1 was found to be the next best hybrid for baby corn cultivation. This single cross maize hybrid belongs to high quality protein maize (QPM) (Dass *et al.* 2004) and has also shown good performance for majority of the important productivity traits for baby corn cultivation. For characteristic relating to maturity, Vivek Hybrid 17, Vivek Hybrid 9 and composite Surya were identified for early baby corn pickings during both the seasons. Similarly, Vivek Hybrid 17 and Vivek Hybrid 9 and Parkash were identified for days to last cob picking during both the seasons which could facilitate early vacating of field. Minimum number of days required for last cob picking was observed in Vivek hybrid 17, Vivek hybrid 9 and Parkash. Though HM 4 and HQPM 1 took about a week more extra for last cob picking as compared to other early maturing single cross hybrids, viz. (Vivek hybrid 17, Vivek hybrid 9 and Parkash), but both of them gave 30% higher yield in both the seasons, viz. *kharif* (2007) and *rabi* (2007-08). Therefore, for cultivation of maize genotypes for baby corn it is necessary to take in to account all aspects, so that they are economical to the farmers.

Among elite cultivars identified on the basis of important traits, hybrids were predominantly represented in the elite group for each trait in general, implying superiority and desirability of maize hybrids for baby corn usage, compared to composites. This feature is especially evident when performance of the genotypes in both the seasons is taken in to account (Table 4 and Fig. 1).These hybrids were also good for fodder yield, which is obtained as a byproduct after picking baby corn and could be used as fodder or silage purpose. As the emphasis on single cross hybrids as a strategy in the field corn since last few years in India has been instrumental in realizing higher production and productivity, similar approach in baby corn could be relevant and fruitful.

It is pertinent to note that critical assessment of various characteristics in the maize cultivars would be fruitful in selecting most desirable genotypes as indicated by studies in different countries (Bar Zur *et al*. 1990; Zhao, 1991; Fongmance and Soonsuwan, 1998; Almeida *et al.* 2005, Itala Paula de *et al.* 2005; Rodrigues *et al*. 2003 and Silva Le *et al.* 2006). Most appropriate baby corn genotypes identified by the farmers out of the available cultivars played significant role in popularization and spread of baby corn cultivars in some countries like Thailand, Brazil etc. This benefited various stake holders and strong drive for

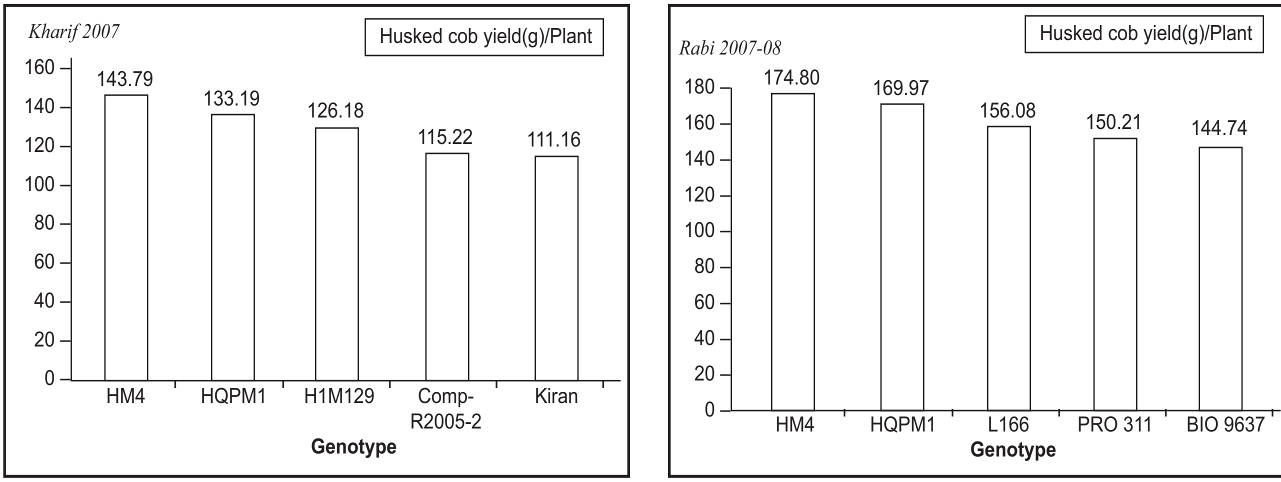

Fig. 1 and 2: Husked cob yield

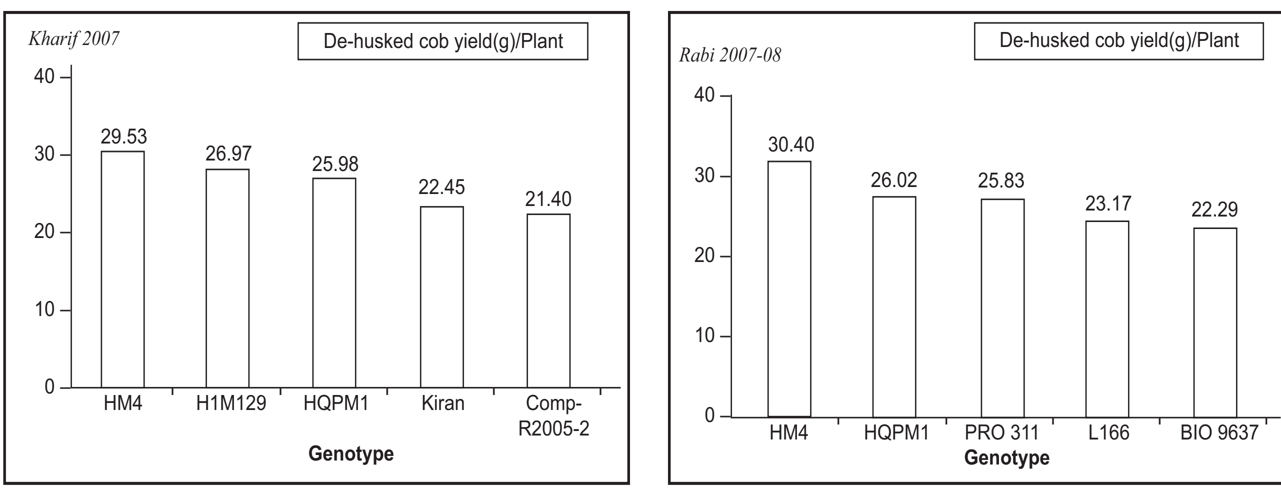

Fig. 3 and 4: De-husked cob yield (g)/Plant

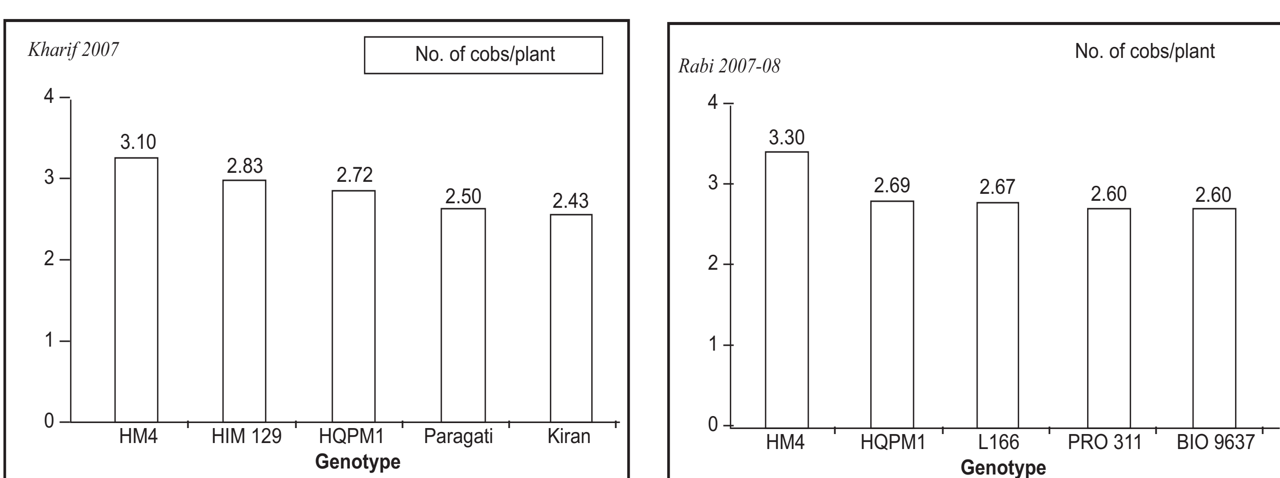

Fig. 5 and 6: Husked cob yield

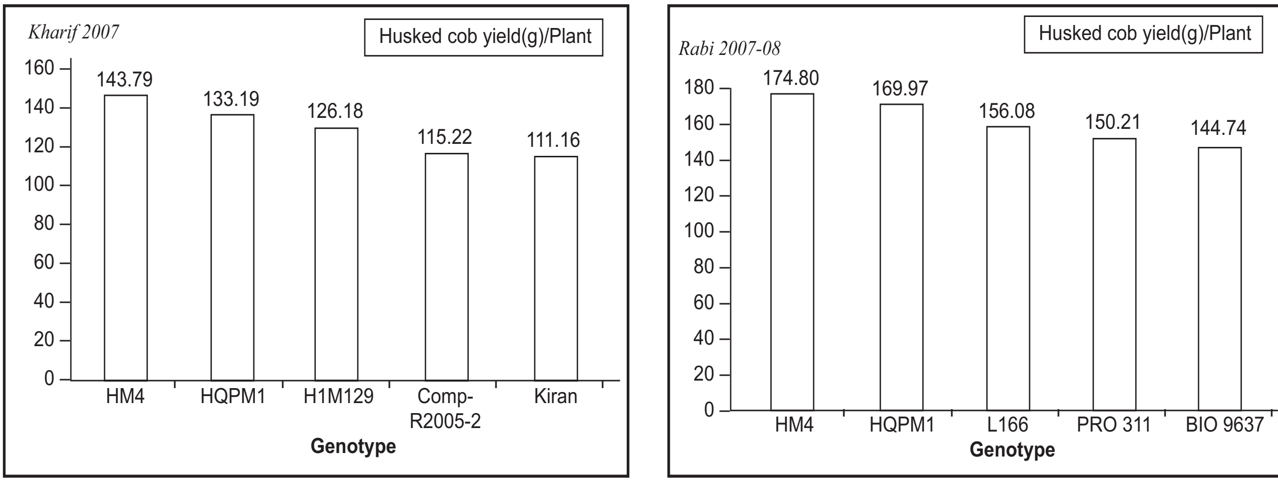

Fig. 1 and 2: Husked cob yield

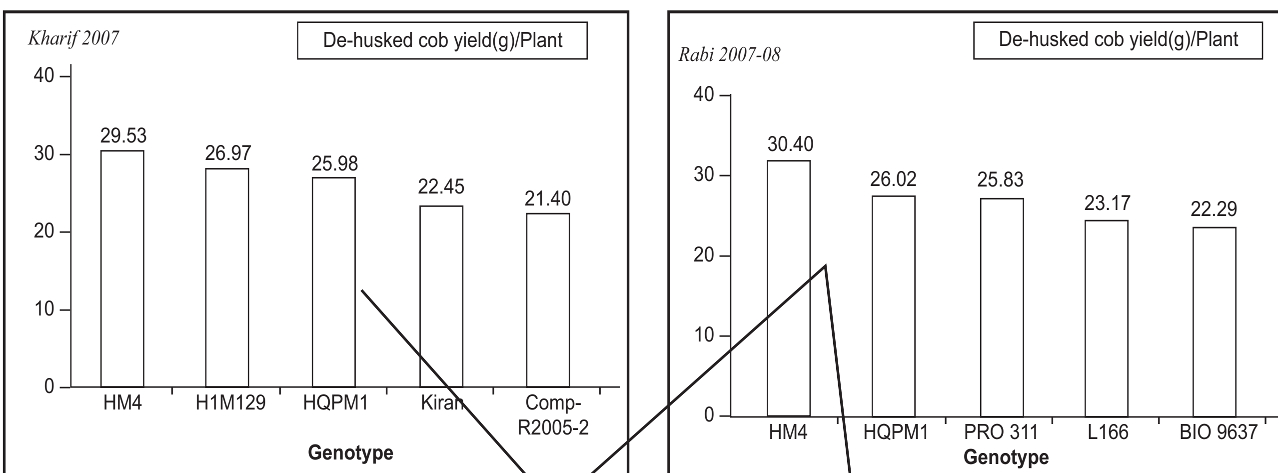

Fig. 3 and 4: De-husked cob yield (g)/Plant

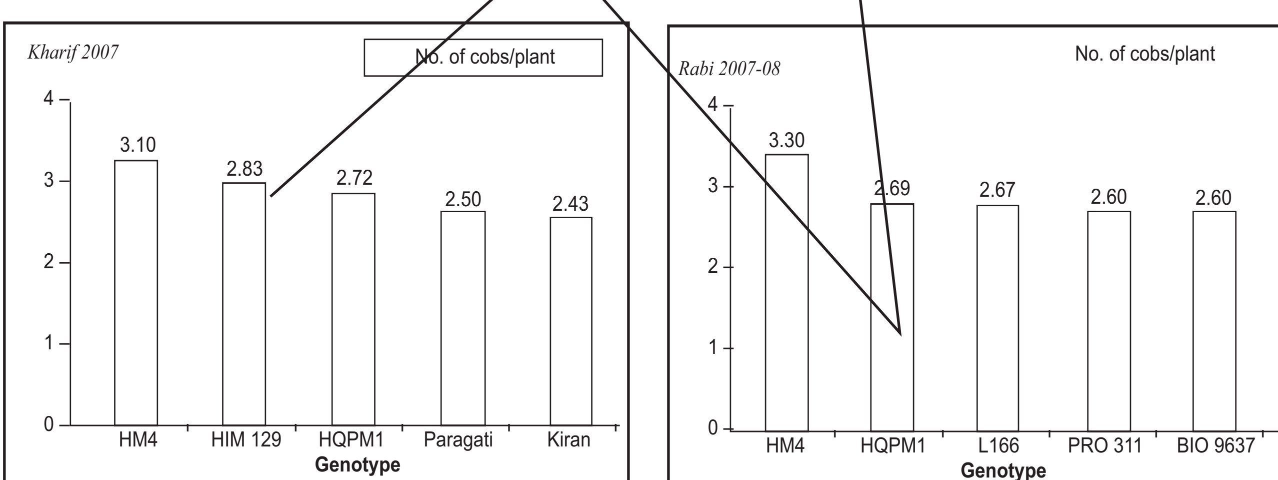

Fig. 5 and 6: Husked cob yield

Plate I: Field view

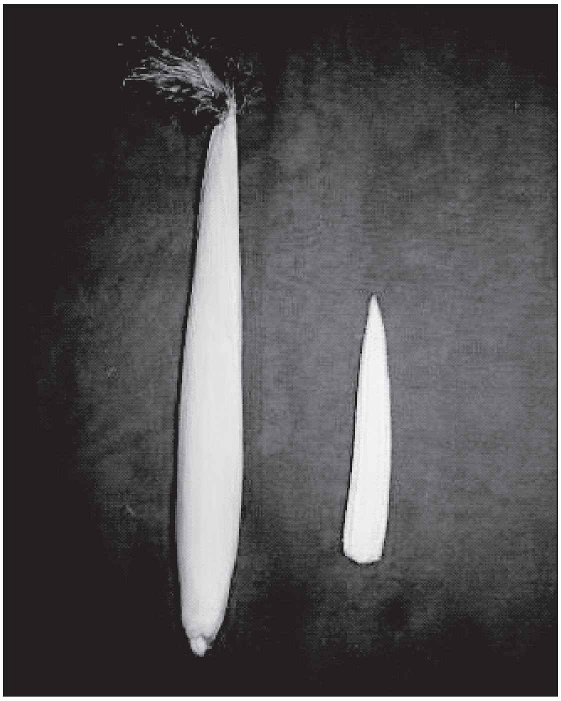

Plate II: Husked and de-husked cobs

HM 4

Plate III: Field view

Plate IV: Husked and de-husked cobs

HQPM 1

Table 4. Superior genotypes of baby corn identified for important productivity traits

Productivity traits	Superior genotypes under different seasons				Elite genotypes in both seasons
	Kharif (2007)		*Rabi* (2007-08)		
Husked cob yield/plant (g)	HM 4	(143.8)	HM 4	(174.8)	HM 4
	HQPM 1	(133.2)	HQPM 1	(169.9)	HQPM 1
	HIM 129	(126.2)	L-166	(156.1)	
	Comp R 2005-2	(115.2)	PRO-311	(150.2)	
	Kiran	(111.2)	BIO 9637	(144.7)	
De-husked cob yield/plant (g)	HM 4	(29.5)	HM 4	(30.4)	HM 4
	HIM 129	(26.9)	HQPM 1	(26.0)	HQPM 1
	HQPM 1	(25.9)	PRO 311	(25.8)	L 166
	L 166	(23.0)	M.S.Pool C 7	(23.7)	
	Kiran	(22.4)	L-166	(23.2)	
Number of cobs picked/ plant	HM 4	(3.1)	HM 4	(3.3)	HM 4
	HIM 129	(2.8)	HQPM 1	(2.7)	HQPM 1
	HQPM 1	(2.7)	L 166	(2.7)	
	Pargati	(2.5)	PRO 311	(2.6)	
	Kiran	(2.4)	BIO 9637	(2.6)	
Fodder yield/plant (g)	Comp R 2005-2	(552.0)	HQPM 1	(650.6)	HM 4
	HQPM 1	(523.2)	BIO 9637	(551.4)	HQPM 1
	HM 4	(488.9)	Comp R 2005-2	(549.9)	BIO 9637
	BIO 9637	(479.9)	PRO 311	(524.4)	
	Navjot	(468.7)	HM 4	(522.3)	
Number of days to first cob picking	Vivek Hybrid 17	(47.3)	Vivek Hybrid 17	(120.2)	Vivek Hybrid 17
	FQH-4567	(48.6)	HIM 129	(121.5)	Vivek Hybrid 9
	Surya	(48.7)	Vivek Hybrid 9	(125.0)	Surya
	Pargati	(49.7)	Surya	(126.1)	
	Vivek Hybrid 9	(50.0)	X-3342	(126.4)	
Number of days to last cob picking	Surya	(54.1)	Vivek Hybrid 17	(127.5)	Vivek Hybrid 17
	Vivek Hybrid 17	(54.2)	HIM 129	(128.9)	Vivek Hybrid 9
	Parkash	(54.6)	X-3342	(130.3)	Parkash
	FQH 4567	(54.6)	Parkash	(130.7)	
	Vivek Hybrid 9	(55.3)	Vivek Hybrid 9	(130.8)	

export was manifested. This further triggered intensive research towards improvement and development of new cultivars specifically for baby corn cultivation, meeting both high productivity and quality standards.

In India, a few researchers (Verma *et al.*, 1998; Verma 2001; Prodhan *et al.* 2007a and Sharma *et al.*, 2002) have attempted to evaluate the available genotypes for their suitability for baby corn. In addition to productivity, need for emphasis on economic returns highlighted by Prodhan *et al.* (2007b). There are also parallel and complementary efforts towards highlighting finer cultivation and technological aspects to facilitate better general awareness and popularization of baby corn cultivation (Kalloo and Kumar, 1999; Nirmal De *et al.* 2005 and Thakur and Jamwal, 2001). In present study, two single cross hybrids viz. HM 4 and HQPM 1 (Plates: I-IV) were found to be superior for majority of important productivity traits and hence can be recommended for commercial cultivation of baby corn in Western Uttar Pradesh and adjoining areas. On the basis of further extensive multi-location trials their cultivation could be readily extended to larger areas and zones.

Further, in view of large amount variability for various productivity, ear and plant as well as flowering characteristics exhibited in these cultivars could serve as useful genetic resources and be effectively utilized as base material in deriving better and useful genotypes by hybridization and directional selection. This would be instrumental in developing new cultivars including single cross hybrids for specific use as baby corn, fulfilling the needs and requirements of different stake holders.

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