

# A COMPENDIUM OF HYBRIDS AND COMPOSITES OF MAIZE

(1993-2012)



**Directorate of Maize Research**

मक्का अनुसंधान निदेशालय

**(Indian Council of Agricultural Research)**

(भारतीय कृषि अनुसंधान परिषद)

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## **DIRECTORATE OF MAIZE RESEARCH**

**(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)**

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# 1. Introduction

In the era of new IPR regime, protection of plant varieties around the world including India has assumed a great significance. In order to protect plant varieties, the Government of India has established its own *sui generis* legal system entitled "Protection of Plant Varieties and Farmers' Rights Act, 2001" (PPV & FR Act, 2001). The Protection of Plant Varieties and Farmers' Rights Authority was created under the aegis of this Act as the implementing Authority. Accordingly, Directorate of Maize Research (DMR) was entrusted with the task to file the applications of hybrids/composites; conduct and coordinate DUS testing at two locations (Delhi and Hyderabad); develop and update data-base and document maize varieties developed and released in India.

Since 1993, a total of 107 varieties including 64 hybrids and 43 composites have been developed and released for cultivation in different parts of the country. Of these hybrids, 54 are normal, eight Quality Protein Maize (QPM) and one each baby corn and sweet corn, respectively. The composite varieties comprise 38 normal, two sweet corn and one each baby corn and popcorn, respectively. Out of these, 103 applications have been filed by DMR at PPV & FR Authority, New Delhi since May, 2007. Of these, 32 hybrids/composites fall under new category while 71 under extant category, respectively. Based on DUS testing conducted during *Kharif* 2008 and 2009 at two locations (Delhi and Hyderabad) three public-bred hybrids namely HM-9, Malviya Hybrid Makka-2 and HQPM-5 have been registered under new category w.e.f. December 2011 for a period of 15 years. Six hybrids viz., HM-8, PAU-352, Vivek QPM 9, Vivek Maize Hybrid-33, HQPM-7 and HM-10 completed mandatory two years of DUS testing and have become eligible for protection under new category. One hybrid (HM-11) and three composites namely Bajaura Makka-1, Vivek Sankul Makka-35 and Vivek Sankul Makka-11 under Variety of Common Knowledge (VCK) completed one year of DUS testing at two locations. Thirty one hybrids comprising twenty five normal maize, five QPM and one baby corn have been registered under extant category. Among composites, twenty normal, two sweet corn and two baby corn have also been registered. Thirty three applications pertaining to new and extant hybrids/composites have been accepted for registration by the PPV&FR Authority. Two hybrids (DHM 107 and DHM 109) and four composites (Mahi Kanchan, Mahi Dhawal, C-8, Dewaki Composite Makka) completed 15 years and are thus outside the purview of registration. The relevant files stand closed and these varieties are now in public domain. Six applications viz., PMH-3, Bajaura Makka, Chandramani, Pant Sankul Makka 3, Pratap Kanchan 2 and Sharadmani are under the process of scrutiny at PPV&FR Authority.

In this bulletin, an attempt has been made to document maize hybrids/composites pertaining to the period 1993 till date giving relevant information on centres, pedigree details, notification number and date and characteristics as per DUS guidelines wherever applicable and status of applications at PPV&FR Authority has also been appended. Information on date of filing of applications with their acknowledgement numbers too, has been provided.

## 2. Hybrids registered under new category

Based on DUS testing conducted during *Kharif* 2008 and 2009 at two locations i.e. Delhi and Hyderabad, three hybrids namely HM-9, Malviya Hybrid Makka-2 and HQPM-5 (Quality Protein Maize) have been registered w.e.f. December, 2011 for a period of 15 years. In this section information on major characteristics, notification number and date, area of adoption, average yield and DUS traits has been compiled.



## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 2.1 Normal Maize

S. No.		
1.	Name of Hybrid	HM-9
2.	Pedigree/Parentage	HKI 1105 x HKI 1128
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, K.S. Dhanju, Dharam Pal, J.C. Mahla and D.P. Singh
5.	Year	2007
6.	Notification	
	1. Number	1703 (E)
	2. Date	05/10/2007
7.	Description of Hybrid	HM-9 is orange flint single corn hybrid with sparse spikelet and erects lateral tassel branches
8.	Description of the Parents of the Hybrids	HKI 1105 was derived from single cross hybrid, Kargil 633 through 7 generations of selfing and selection before involving in hybridization. On the other hand, HKI 1128 is a selections from exotic germplasm from Mexico, SIRNTUXW-13-3-1-2-B-B-B-B-B-B followed by three generations of inbreeding before hybridization
9.	Identifiable Distinguishing Morphological Characters	Orange flint single corn hybrid with sparse spikelet and erects lateral tassel branches
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Resistant to major diseases
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Bihar, Jharkhand and Orissa
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	60
17.	Remarks	Registered w.e.f. December 07, 2011

## A Compendium of Hybrids and Composites of Maize (1993-2012)

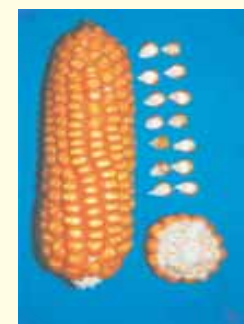
Characteristics	HM 9	HKI 1105	HKI 1128
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Wide (7)	Small (3)
Leaf: attitude of blade	Straight (1)	Straight (1)	Straight (1)
Stem: anthocyanin colouration of brace root	Present (9)	Present (9)	Present (9)
Tassel: time of anthesis	Medium (5)	Medium (5)	Late (7)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)	Present (9)	Absent (1)
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Narrow (3)	Wide (7)	Narrow (3)
Tassel: attitude of lateral branches	Straight (1)	Straight (1)	Straight (1)
Ear: time of silk emergence	Medium (5)	Medium (5)	Late (7)
Ear: anthocyanin colouration of silks	Absent (1)	Absent (1)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Long (7)	Short (3)
Plant length up to flag leaf	Long (7)	Medium (5)	Long (7)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Broad (7)	Medium (5)
Ear: length without husk	Medium (5)	Medium (5)	Medium (5)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Conical (1)	Cylindrical (3)	Conical (1)
Ear: number of rows of grains	Medium (5)	Medium (5)	Medium (5)
Ear: type of grain	Flint (1)	Flint (1)	Flint (1)
Ear: colour of top of grain	Orange (5)	Orange (5)	Orange (5)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Medium (5)	Small (3)



HM 9



HKI 1105



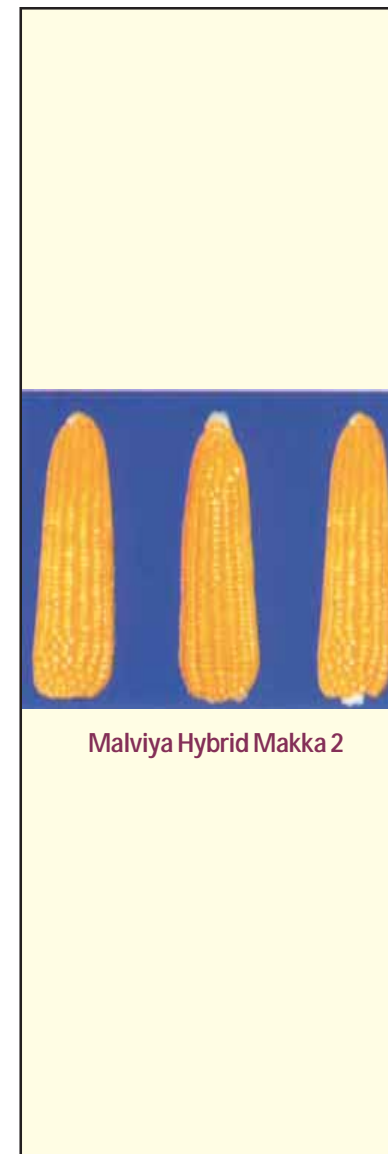
HKI 1128

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Malviya Hybrid Makka -2</b>
2.	Pedigree/Parentage	HUZM 185 x HKI 1105
3.	Developing Centre	BHU, Varanasi
4.	Contribution of Persons in Evolving this Variety	J.P.Shahi, Sain Dass and R.N.Singh
5.	Year	2007
6.	Notification	
	1. Number	1703 (E)
	2. Date	05/10/2007
7.	Description of Hybrid	Malviya Hybrid Makka -2 is a single cross hybrid with yellow grain type
8.	Description of the Parents of the Hybrids	Parental lines derived through selfing followed by selections from BC Pool
9.	Identifiable Distinguishing Morphological Characters	Yellow, semi-flint grain type
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Resistance to MLB
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	East UP, Bihar, Jharkhand, Chhattisgarh, West Bengal and Orissa
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	54
17.	Remarks	Registered w.e.f. December 27, 2011

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Malviya Hybrid Makka 2	HUZM 185	HKI 1105
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Wide (7)	Wide (7)
Leaf: attitude of blade	Straight (1)	Drooping (9)	Straight (1)
Stem: anthocyanin colouration of brace root	-	-	-
Tassel: time of anthesis	Medium (5)	Medium (5)	Medium (5)
Tassel: anthocyanin colouration at base of glume	-	-	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	-	-	Absent (1)
Tassel: anthocyanin colouration of anthers	-	-	-
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Narrow (3)	Narrow (3)	Wide (7)
Tassel: attitude of lateral branches	Straight (1)	Curved (5)	Straight (1)
Ear: time of silk emergence	Medium (5)	Medium (5)	Medium (5)
Ear: anthocyanin colouration of silks	Absent (1)	Absent (1)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Present (9)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Short (3)	Long (7)
Plant length up to flag leaf	Medium (5)	Long (7)	Medium (5)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Broad (7)	Narrow (3)	Broad (7)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Medium (5)	Small (3)	Medium (5)
Ear: shape	Conical (1)	Conico-cylindrical (2)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Medium (5)
Ear: type of grain	Semi flint (2)	Flint (1)	Flint (1)
Ear: colour of top of grain	Yellow (3)	Orange (5)	Orange (5)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	-	Round (2)	Round (2)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 2.2 Quality Protein Maize

S. No.		
1.	Name of Hybrid	<b>HQPM-5</b>
2.	Pedigree/Parentage	HKI 163 x HKI 161
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, K.S. Dhanju, Dharam Pal, J.C. Mahla and D.P. Singh
5.	Year	2007
6.	Notification	
	1. Number	1703 (E)
	2. Date	05/10/2007
7.	Description of Hybrid	Medium broad leaves, long conical cob, orange flint grains, white gully, purple silk, sparse tassel, high tryptophan (>0.6%)
8.	Description of the Parents of the Hybrids	HKI 163 and HKI 161 were derived through selections from CML 163 and CML 161, respectively (CML: CIMMYT Maize Line), followed by four generations of inbreeding.
9.	Identifiable Distinguishing Morphological Characters	Medium broad leaves, long conical cob, orange flint grains, white gully, purple silk and sparse tassel
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistance to MLB and SB
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	Responsive to higher doses of fertilizers
14.	Area of Adoption	Across the country
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	58
17.	Remarks	Registered w.e.f. December 07, 2011

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	HQPM 5	HKI 163	HKI 161
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Medium (5)
Leaf: attitude of blade	Straight (1)	Curved (5)	Straight (1)
Stem: anthocyanin colouration of brace root	Present (9)	Present (9)	Present (9)
Tassel: time of anthesis	Late (7)	Late (7)	Late (7)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (9)
Tassel: density of spikelets	Sparse (3)	Dense (7)	Sparse (3)
Tassel: angle between main axis and lateral branches	Narrow (3)	Medium (5)	Narrow (3)
Tassel: attitude of lateral branches	Medium (5)	Straight (1)	Straight (1)
Ear: time of silk emergence	Late (7)	Late (7)	Late (7)
Ear: anthocyanin colouration of silks	Present (9)	Absent (1)	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Medium (5)	Medium (5)
Plant length up to flag leaf	Medium (5)	Medium (5)	Medium (5)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Broad (7)	Medium (5)	Broad (7)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Conical (1)	Conico-cylindrical (3)	Cylindrical (2)
Ear: number of rows of grains	Medium (5)	Medium (5)	Medium (5)
Ear: type of grain	Flint (1)	Semi-flint (2)	Flint (1)
Ear: colour of top of grain	Yellow (3)	Orange (5)	Red (6)
Ear: colouration of glumes of cob	White (1)	White (1)	Dark purple (3)
Kernel row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Present (9)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



HQPM 5



HKI 163



HKI 161

### 3. Hybrids registered under extant category

In this section information on 31 hybrids for major characteristics, notification number and date, area of adoption, average yield and DUS traits has been tabulated. These hybrids have been registered w.e.f. their respective dates of notification for a period of 15 years. Of these registered hybrids 25 are normal maize, five QPM and one baby corn, respectively.

## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 3.1 Normal Maize

S. No.		
1.	Name of Hybrid	HM 5
2.	Pedigree/Parentage	HKI 1344 x HKI 1348-6-2
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, Mohinder Singh, Pawan Arora, K.S. Dhanju and Dharam Pal
5.	Year	2005
6.	Notification	
	1. Number	1177(E)
	2. Date	25/08/2005
7.	Description of Hybrid	HM-5 is white dent single corn hybrid
8.	Description of the Parents of the Hybrids	Parental lines derived through selections from exotic CIMMYT germplasm followed by selfing and selection before hybridization
9.	Identifiable Distinguishing Morphological Characters	Medium bold dent seed with white cap, cylindrical thick cobs, long and flat grain
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Resistant to MLB
12.	Quality of Produce	White, dent
13.	Reaction to Stress (Special Character)	Tolerant to frost/cold
14.	Area of Adoption	Haryana
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	72
17.	Remarks	Registered w.e.f. February 12, 2009



## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	HM 5	HKI 1344	HKI 1348-6-2
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Wide (7)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Straight (1)
Stem: anthocyanin colouration of brace root	Present (9)	Present (9)	Present (9)
Tassel: time of anthesis	Medium (5)	Medium (5)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (5)
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Dense (7)
Tassel: angle between main axis and lateral branches	Narrow (3)	Narrow (3)	Narrow (3)
Tassel: attitude of lateral branches	Straight (1)	Straight (1)	Straight (1)
Ear: time of silk emergence	Medium (5)	Medium (5)	Medium (5)
Ear: anthocyanin colouration of silks	Absent (1)	Absent (1)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Medium (5)
Plant length up to flag leaf	Medium (5)	Medium (5)	Short (3)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Broad (7)	Medium (5)	Broad (7)
Ear: length without husk	Medium (5)	Medium (5)	Medium (5)
Ear: diameter	Large (7)	Large (7)	Large (7)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Many (7)
Ear: type of grain	Dent (3)	Semi Flint (2)	Dent (3)
Ear: colour of top of grain	White with cap (2)	White with cap (2)	White with cap (2)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Irregular (3)	Straight (1)	Irregular (3)
Kernel: peppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Medium (5)	Large (7)



HM 5



HKI 1344



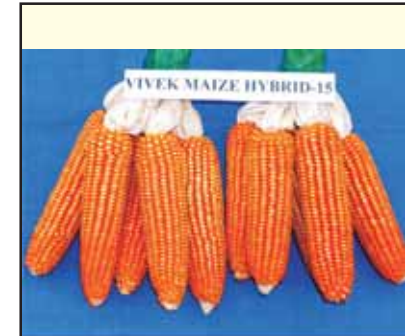
HKI 1348-6-2

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Vivek Maize Hybrid 15</b>
2.	Pedigree/Parentage	CM 152 x CM 212
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	V.P. Mani, Rajesh Singh, Dr. R. Babu , K.S. Koranga, G.S. Bisht, A.K.Pandey and S.K.Pant
5.	Year	2005
6.	Notification	
	1. Number	122(E)
	2. Date	02/02/2005
7.	Description of Hybrid	Medium wide leaf blade; Long ear length and large ear diameter; Anthocyanin pigment present in silk; Indented yellow semi-flint kernel with cap; Large kernel weight
8.	Description of the Parents of the Hybrids	Female – U 15-1 (Pop.31 C <sub>4</sub> HS bulk) and Male – CM 212 (USA/Acc. No. 2132)
9.	Identifiable Distinguishing Morphological Characters	Medium wide leaf blade; Long ear length and large ear diameter; Anthocyanin pigment present in silk; Indented yellow semi-flint kernel with cap; Large kernel weight
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Moderate degree of tolerance to TLB
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	J&K, UP, HP, AP, TN, Maharashtra and Karnataka
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Registered w.e.f. February 12, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Vivek Maize Hybrid 15	CM 152	CM 212
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)	Small (3)	Small (3)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Absent (1)	Absent (1)	Absent (1)
Tassel: time of anthesis	Early (3)	Early (3)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Present (9)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (9)
Tassel: density of spikelets	Dense (7)	Dense (7)	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)	Wide (7)	Wide (7)
Tassel: attitude of lateral branches	Curved (5)	Curved (5)	Curved (5)
Ear: time of silk emergence	Early (3)	Early (3)	Early (3)
Ear: anthocyanin colouration of silks	Present (9)	Present (9)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Present (9)	Present (9)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Medium (5)
Plant length up to flag leaf	Long (7)	Medium (5)	Long (7)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Large (7)	Medium (5)	Medium (5)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Many (7)
Ear: type of grain	Semi-flint (2)	Flint (1)	Semi-flint (2)
Ear: colour of top of grain	Yellow with cap (4)	Yellow (3)	Yellow with cap (4)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Round (2)	Indented (3)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



**Vivek Maize Hybrid 15**



**CM 152**



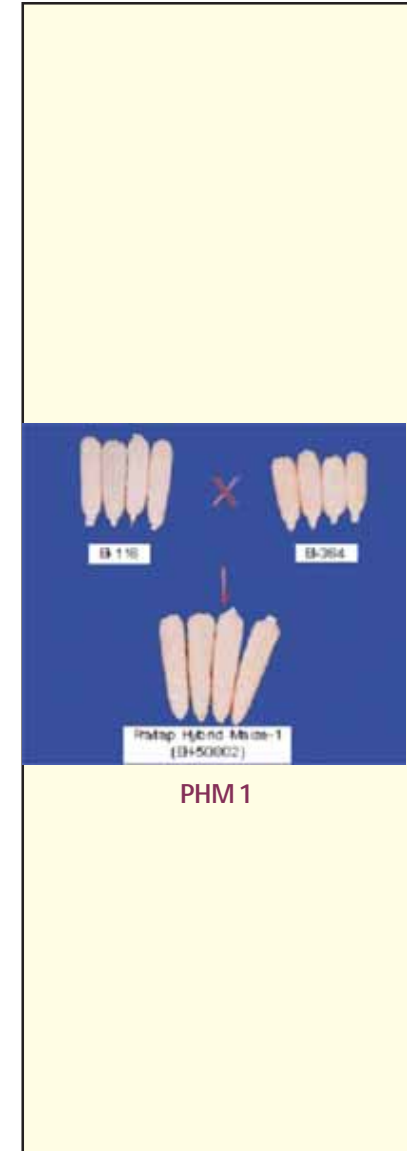
**CM 212**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Pratap Hybrid Maize 1</b>
2.	Pedigree/Parentage	EI-116 x EI-364
3.	Developing Centre	MPUAT, Udaipur
4.	Contribution of Persons in Evolving this Variety	S. C. Gupta, V. N. Joshi, S.L. Godawat, R.B. Dubey , N.K. Pandiya , A.K. Nagda, S. N. Jain , B.S. Upadhyaya, P. Kumar, B.R.S. Krishanawat and Amit Dadheech
5.	Year	2004
6.	Notification	
	1. Number	161(E)
	2. Date	04/02/2004
7.	Description of Hybrid	Medium stature plant, semi erect leaves, tassel densely branched, medium sized cobs with good husk cover
8.	Description of the Parents of the Hybrids	Parental lines derived from X <sub>2</sub> W pool by 5 generation of selfing
9.	Identifiable Distinguishing Morphological Characters	Medium stature plant, semi erect leaves, tassel densely branched, medium sized cobs with good husk cover
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Moderately resistance to SB
12.	Quality of Produce	White, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Rajasthan, Gujarat and MP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	38
17.	Remarks	Registered w.e.f. February 12, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	PHM 1	EI 116	EI 364
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Wide (7)	Wide (7)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)	Present (9)	Present (9)
Tassel: time of anthesis	Very early (1)	Early (3)	Early (3)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)	Absent (1)	Absent (1)
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Wide (7)	Wide (7)	Wide (7)
Tassel: attitude of lateral branches	Very early (1)	Medium (5)	Straight (1)
Ear: time of silk emergence	Absent (1)	Early (3)	Medium (5)
Ear: anthocyanin colouration of silks	Absent (1)	Absent (1)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Medium (5)
Plant length up to flag leaf	Long (7)	Long (7)	Long (7)
Plant: ear placement	Long (3)	Medium (5)	Low (3)
Leaf: width of blade	Medium (5)	Medium (5)	Broad (3)
Ear: length without husk	Long (7)	Long (7)	Long (7)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Conical (1)	Conical (1)	Conical (1)
Ear: number of rows of grains	Medium (5)	Many (7)	Many (7)
Ear: type of grain	Flint (1)	Flint (7)	Flint (1)
Ear: colour of top of grain	White (1)	White (1)	White (1)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Toothed (4)	Indented (3)	Indented (3)
Kernel: 1000 kernel weight	Large (7)	Large (7)	Medium (3)

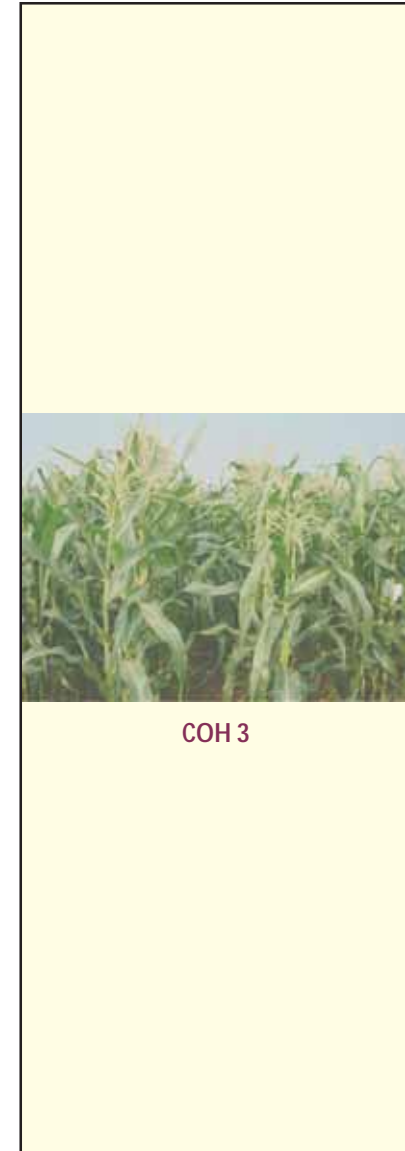


## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>COH 3</b>
2.	Pedigree/Parentage	(UMI 101 x UMI 130) x (UMI 90 x UMI 285)
3.	Developing Centre	TNAU, Coimbatore
4.	Contribution of Persons in Evolving this Variety	G.Nallathambi, N. Jayaraman, P. Veerabathiran and M. Rangasamy
5.	Year	1997
6.	Notification	
	1. Number	662(E)
	2. Date	17/09/1997
7.	Description of Hybrid	COH 3 is a double cross hybrid
8.	Description of the Parents of the Hybrids	UMI 101, UMI 130 and UMI 90, UMI 285 were derived through selections followed by four generations of inbreeding from EH 435673, PKT 3, Kissan and Suwan 1, respectively
9.	Identifiable Distinguishing Morphological Characters	Very long plant height with flint type of grain
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistance to downy mildew and moderate tolerance to stem borer
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	AP, TN, Maharashtra, Karnataka in irrigated and rainfed ecology
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Registered w.e.f. February 12, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	COH 3	UMI 101	UMI 90
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)	Wide (7)	Wide (7)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Absent (1)	Absent (1)	Absent (1)
Tassel: time of anthesis	Medium (5)	Medium (5)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of anthers	Absent (1)	Absent (1)	Absent (1)
Tassel: density of spikelets	Dense (7)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Narrow (3)	Wide (7)	Wide (7)
Tassel: attitude of lateral branches	Straight (1)	Curved (5)	Straight(1)
Ear: time of silk emergence	Medium (5)	Medium (5)	Late (7)
Ear: anthocyanin colouration of silks	Absent (1)	Present (9)	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Medium (5)
Plant length up to flag leaf	Very Long (9)	Long (7)	Long (7)
Plant: ear placement	High (7)	Medium (5)	Medium (5)
Leaf: width of blade	Broad (7)	Broad (7)	Medium (5)
Ear: length without husk	Long (7)	Long (7)	Medium (5)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Conico-cylindrical (2)	Conico-cylindrical (2)	Conico-cylindrical (2)
Ear: number of rows of grains	Many (7)	Medium (5)	Medium (5)
Ear: type of grain	Flint (1)	Flint (1)	Flint (1)
Ear: colour of top of grain	Yellow (3)	Yellow (3)	Yellow (3)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Pusa Early Hybrid Makka -1</b>
2.	Pedigree/Parentage	CM 135 x CM 136
3.	Developing Centre	IARI, Delhi
4.	Contribution of Persons in Evolving this Variety	B.K. Mukherjee and V.P. Ahuja
5.	Year	1997
6.	Notification	
	1. Number	662(E)
	2. Date	17/09/1997
7.	Description of Hybrid	Pusa Early Hybrid Makka-1 is a single cross hybrid with orange grain type
8.	Description of the Parents of the Hybrids	IPA-3 (female parent) was derived from base population A-64, which comprised germplasm from different countries such as Mexico, USA, Argentina, Carribean region and India. The female parent, IPA-34 was derived from base population MDR-1, comprising germplasm from Philippines, USA, Thailand, Guatemala and Carribean region
9.	Identifiable Distinguishing Morphological Characters	Extremely vigorous, sturdy stem, large tassel, dark green broad leaf, anther colour-yellow, silk emerging green turning purple, hus cover-tight, extending over tip, heart colour-white
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Moderate resistance to MLB, <i>Rhizoctonia solani</i> , resistance to SB and lodging and tolerance to waterlogging
12.	Quality of Produce	Yellow-orange, flint
13.	Reaction to Stress (Special Character)	Resistant to temporary water logging situations
14.	Area of Adoption	Peninsular India, AP, Maharashtra under irrigated and rainfed ecology
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	45
17.	Remarks	Registered w.e.f. Feburary 12, 2009



## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	PEHM 1	CM 135	CM 136
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Small (3)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)	Present (9)	Present (9)
Tassel: time of anthesis	Early (3)	Early (3)	Early (3)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)	Absent (1)	Absent (1)
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Dense (7)
Tassel: angle between main axis and lateral branches	Narrow (3)	Narrow (3)	Narrow (3)
Tassel: attitude of lateral branches	Straight (1)	Curved (9)	Straight (1)
Ear: time of silk emergence	Early (3)	Early (3)	Early (3)
Ear: anthocyanin colouration of silks	Present (9)	Present (9)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Medium (5)
Plant length up to flag leaf	Medium (5)	Medium (5)	Long (7)
Plant: ear placement	Low (3)	Low (3)	Low (3)
Leaf: width of blade	Narrow (3)	Broad (7)	Narrow (3)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Small (3)	Medium (5)	Small (3)
Ear: shape	Conico-cylindrical (2)	Conico-cylindrical (3)	Conico-cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Many (7)
Ear: type of grain	Flint (1)	Flint (1)	Flint (1)
Ear: colour of top of grain	Orange (5)	Orange (5)	Orange (5)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Small (3)	Small (3)	Small (3)

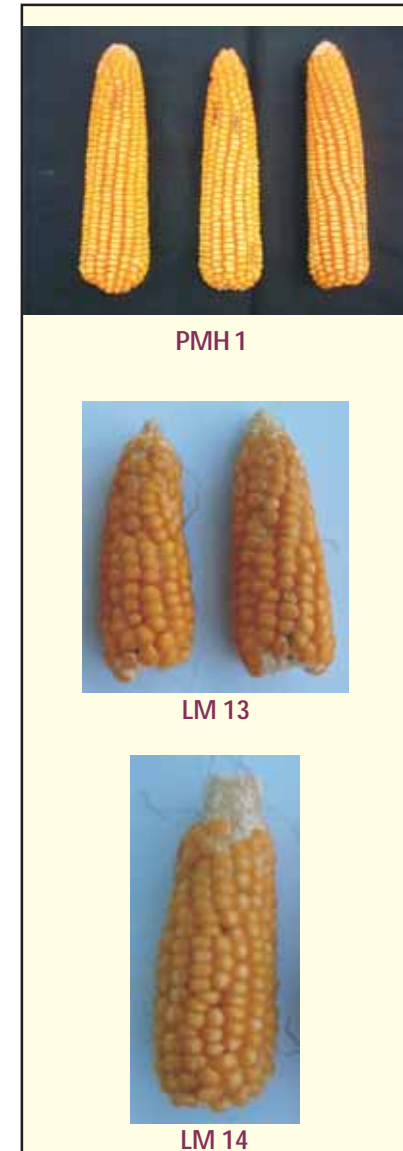


## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>PMH-1</b>
2.	Pedigree/Parentage	LM 13 x LM 14
3.	Developing Centre	PAU, Ludhiana
4.	Contribution of Persons in Evolving this Variety	N.S. Malhi, M.S.Grewal, Jasbir Singh and S.S. Pal
5.	Year	2007
6.	Notification	
	1. Number	122(E)
	2. Date	06/02/2007
7.	Description of Hybrid	PMH 1 is a single cross hybrid with yellow orange flint as well as dent grain type
8.	Description of the Parents of the Hybrids	LM 13 Inbred line was selected through pedigree method and LM 14 is a selection from an introduction
9.	Identifiable Distinguishing Morphological Characters	Yellow orange flint as well as dent grain type
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistance to MLB and stalk rots
12.	Quality of Produce	Yellow orange, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Irrigated areas of Punjab
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	52
17.	Remarks	Registered w.e.f. December 21, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	PMH 1	LM 13	LM 14
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Wide (7)
Leaf: attitude of blade	Drooping (9)	Straight (1)	Straight (1)
Stem: anthocyanin colouration of brace root	Present (9)	Present (9)	Absent (1)
Tassel: time of anthesis	Late (7)	Late (9)	Late (9)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (9)
Tassel: density of spikelets	Dense (7)	Dense (7)	Dense (7)
Tassel: angle between main axis and lateral branches	Narrow (3)	Narrow (3)	Wide (7)
Tassel: attitude of lateral branches	Straight (1)	Straight (1)	Straight (1)
Ear: time of silk emergence	Late (7)	Late (7)	Late (7)
Ear: anthocyanin colouration of silks	Present (9)	Present (9)	Absent (1)
Leaf: anthocyanin colouration of sheath	Present (9)	Present (9)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Short (3)	Long (7)
Plant length up to flag leaf	Long (7)	Long (7)	Long (7)
Plant: ear placement	High (7)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Narrow (3)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Conico-cylindrical (2)	Conico-cylindrical (2)	Conico-cylindrical (2)
Ear: number of rows of grains	Many (7)	Many (7)	Many (7)
Ear: type of grain	Flint (1)	Flint (1)	Flint (1)
Ear: colour of top of grain	Yellow with cap (4)	Orange (5)	Yellow (3)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Pusa Extra Early Hybrid Makka 5</b>
2.	Pedigree/Parentage	CM 150 x CM 151
3.	Developing Centre	IARI, Delhi
4.	Contribution of Persons in Evolving this Variety	R. D. Singh, R. D. Singh, R. N. Gadag, B. K. Mukherjee and V.P. Ahuja
5.	Year	2004
6.	Notification	
	1. Number	161(E)
	2. Date	04/02/2004
7.	Description of Hybrid	Green silk colour, yellow-orange, flint
8.	Description of the Parents of the Hybrids	The parental lines CM -150 and CM -151 of the hybrid Pusa Extra Early Hybrid Makka -5 are the recycled inbred lines. The female parent CM -150 was derived from a single cross hybrid SC-7 and the male parent CM -151 was derived from another hybrid 510, from which IPA 510 line was derived
9.	Identifiable Distinguishing Morphological Characters	Green silk colour, yellow-orange, flint
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance to TLB, MLB and ESR
12.	Quality of Produce	Yellow-orange, flint
13.	Reaction to Stress (Special Character)	Performs well under a wide range of temperature
14.	Area of Adoption	J&K, Uttarakhand, NEH, HP, Assam, Haryana, Punjab, AP, TN, Maharashtra and Karnataka
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Registered w.e.f. December 21, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	PEEHM 5	CM 150	CM 151
Leaf: angle between blade and stem (on leaf just above upper ear)	Large (7)	Large (7)	Large (7)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)	Present (9)	Present (9)
Tassel: time of anthesis	Early (3)	Early (3)	Early (3)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)	Absent (1)	Absent (1)
Tassel: density of spikelets	Dense (7)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Narrow (3)	Narrow (3)	Broad (7)
Tassel: attitude of lateral branches	Straight (1)	Curved (5)	Curved (5)
Ear: time of silk emergence	Early (3)	Medium (5)	Early (3)
Ear: anthocyanin colouration of silks	Absent (1)	Present (9)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Medium (5)
Plant length up to flag leaf	Medium (5)	Medium (5)	Medium (5)
Plant: ear placement	Low (3)	Low (3)	Low (3)
Leaf: width of blade	Normal (3)	Normal (3)	Normal (3)
Ear: length without husk	Medium (5)	Medium (5)	Medium (5)
Ear: diameter	Medium (5)	Short (3)	Short (3)
Ear: shape	cylindrical (3)	cylindrical (3)	cylindrical (3)
Ear: number of rows of grains	Many (7)	Medium (5)	Many (7)
Ear: type of grain	Flint (1)	Flint (1)	Flint (1)
Ear: colour of top of grain	Orange (5)	Orange (5)	Yellow (3)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Spiral (2)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5))	Small (3)	Medium (5)

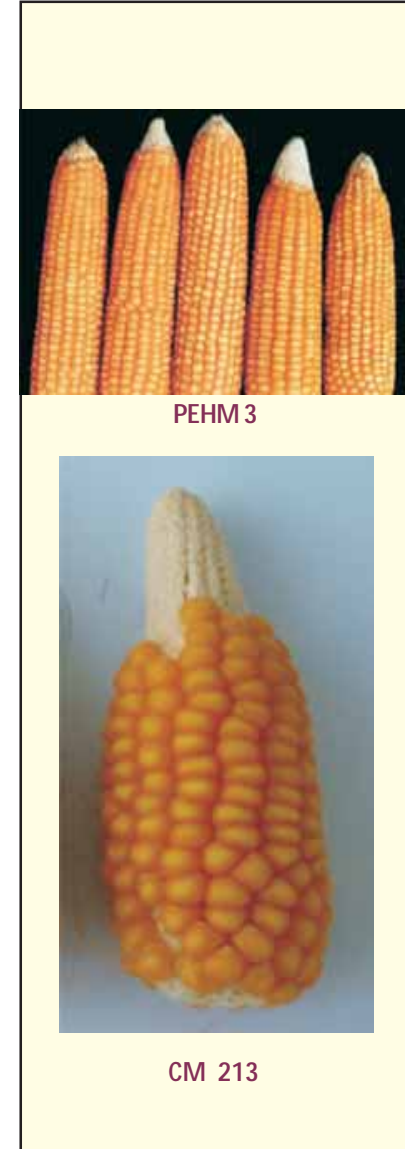


## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Pusa Early Hybrid Makka-3</b>
2.	Pedigree/Parentage	CM 213 x CM 142
3.	Developing Centre	IARI, Delhi
4.	Contribution of Persons in Evolving this Variety	B.K. Mukherjee, V.P. Ahuja, R.D.Singh, R.D. Singh and R. N. Gadag
5.	Year	2001
6.	Notification	
	1. Number	92(E)
	2. Date	02/02/2001
7.	Description of Hybrid	Silk colour-green, anther colour-yellow, heart colour-white and kernel colour-yellow flint
8.	Description of the Parents of the Hybrids	CM-213, the female parent was derived from population A 64, which comprised germplasm from different countries such as Mexico, USA, Argentina, Caribbean region and India. The male parent CM -142 was derived from population MDR-1, with germplasm from Philippines, USA, Thailand, Guatemala and Caribbean region
9.	Identifiable Distinguishing Morphological Characters	Silk colour-green, anther colour-yellow, heart colour-white and kernel colour-yellow flint
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Tolerance to high temperature
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	Tolerance to high temperature
14.	Area of Adoption	Punjab, Haryana and Delhi
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	55
17.	Remarks	Registered w.e.f. December 21, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	PEHM 3	CM 213	CM 142
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (7)	Large (7)	Small (3)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Absent (1)	Present (9)	Absent (1)
Tassel: time of anthesis	Early (3)	Early (3)	Early (3)
Tassel: anthocyanin colouration at base of glume	Present (9)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)	Absent (1)	Absent (1)
Tassel: density of spikelets	Dense (7)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Narrow (3)	Large (7)	Narrow (3)
Tassel: attitude of lateral branches	Straight (1)	Curved (9)	Curved (9)
Ear: time of silk emergence	Early (3)	Early (3)	Early (3)
Ear: anthocyanin colouration of silks	Present (9)	Absent (1)	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Medium (5)
Plant length up to flag leaf	Long (7)	Long (7)	Long (7)
Plant: ear placement	Medium (5)	Low (3)	Low (3)
Leaf: width of blade	Narrow (3)	Narrow (3)	Narrow (3)
Ear: length without husk	Long (7)	Long (7)	Medium (5)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Medium (5)
Ear: type of grain	Flint (1)	Flint (1)	Flint (1)
Ear: colour of top of grain	Orange (5)	Yellow (3)	Orange (5)
Ear: colouration of glumes of cob	Dark (3)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Medium (5)	Medium (5)



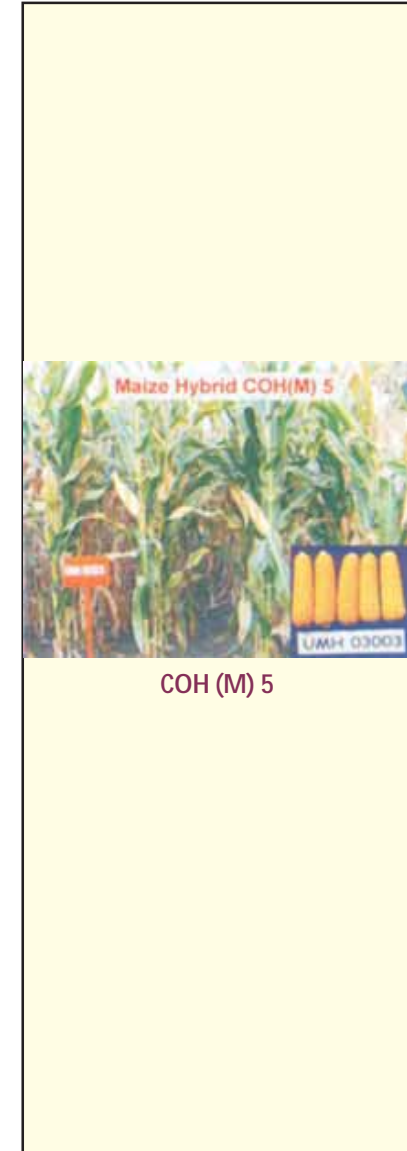
## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	COH (M) 5
2.	Pedigree/Parentage	UMI 285 x UMI 61
3.	Developing Centre	TNAU, Coimbatore
4.	Contribution of Persons in Evolving this Variety	S.Arumugachamy, B.Meenakumari, B.Selvi, T.S.Raveendran, G.Mohan, K. Ponnusamy, C. Gopalakrishnan and M.R. Srinivasan
5.	Year	2007
6.	Notification	
	1. Number	1178(E)
	2. Date	20/07/2007
7.	Description of Hybrid	COH (M) 5 is a single cross high yielding hybrid with tolerance to downy mildew
8.	Description of the Parents of the Hybrids	UMI 285 and UMI 61 were derived through selections followed by five generations of inbreeding from Suwan 1 and Taiwan DMR 13, respectively
9.	Identifiable Distinguishing Morphological Characters	Green colour stem, glume green colour, silk colour green at emergence turn to pink when exposed to sun light, yellow, semi-flint grains
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistance to DM & moderately resistance to SB
12.	Quality of Produce	Yellow, semi flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Tamil Nadu under irrigated and rainfed ecology
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Registered w.e.f. October 20, 2010



## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	COH (M) 5	UMI 285	UMI 61
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Wide (7)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)	Present (9)	Present (9)
Tassel: time of anthesis	Late (7)	Late (7)	Late (7)
Tassel: anthocyanin colouration at base of glume	Present (9)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (9)
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Dense (7)
Tassel: angle between main axis and lateral branches	Narrow (3)	Narrow (3)	Wide (7)
Tassel: attitude of lateral branches	Curved (5)	Curved (5)	Straight (1)
Ear: time of silk emergence	Late (7)	Late (7)	Late (7)
Ear: anthocyanin colouration of silks	Absent (1)	Absent (1)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Present (9)	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)	Long (7)	Medium (5)
Plant length up to flag leaf	Long (7)	Long (7)	Long (7)
Plant: ear placement	Medium (5)	High (7)	Medium (5)
Leaf: width of blade	Broad (7)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Conico-cylindrical (2)	Conico-cylindrical (2)	Cylindrical (2)
Ear: number of rows of grains	Many (7)	Medium (5)	Many (7)
Ear: type of grain	Semi-flint/semi-dent (2)	Flint (1)	Semi-flint (2)
Ear: colour of top of grain	Yellow with cap (4)	Orange (5)	Yellow with cap (4)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Vivek Maize Hybrid-25</b>
2.	Pedigree/Parentage	V 341 x V 346
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	Vinay Mahajan, R. Babu, V.P. Mani and H.S. Gupta
5.	Year	2007
6.	Notification	
	1. Number	1703(E)
	2. Date	05/10/2007
7.	Description of Hybrid	Plant height: Very long; Anthocyanin pigment present in brace root and absent in anthers and glumes excluding base; Strongly curved lateral branches; Large indented yellow semi-flint kernel with cap; Large grain size
8.	Description of the Parents of the Hybrids	Female – V341 (Mexico Acc. No. 3136 F⊗-3-2-3-8-1-⊗b-#-⊗b-#-⊗b##) and Male – V346 (BIO-45010 OP, F ⊗-2-1-8-5-6-#-⊗b-#-⊗b-##)
9.	Identifiable Distinguishing Morphological Characters	Plant height: Very long; Anthocyanin pigment present in brace root and absent in anthers and glumes excluding base; Strongly curved lateral branches; Large indented yellow semi-flint kernel with cap; Large grain size
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance to TLB
12.	Quality of Produce	Yellow, semi-dent
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Uttarakhand, HP, J&K and NEH
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	55
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Vivek Maize Hybrid 25	V 341	V 346
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)	Wide (7)	Wide (7)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)	Absent (1)	Absent (1)
Tassel: time of anthesis	Early (3)	Medium (5)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Present (9)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of anthers	Absent (1)	Absent (1)	Present (9)
Tassel: density of spikelets	Dense (7)	Dense (7)	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)	Wide (7)	Wide (7)
Tassel: attitude of lateral branches	Strongly Curved (9)	Curved (5)	Strongly curved (9)
Ear: time of silk emergence	Early (3)	Medium (5)	Medium (5)
Ear: anthocyanin colouration of silks	Present (9)	Absent (1)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Long (7)	Long (7)
Plant length up to flag leaf	Very Long (9)	Long (9)	Medium (5)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Medium (5)	Broad (7)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Large (7)	Medium (5)	Medium (5)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Medium (5)	Many (7)
Ear: type of grain	Semi-flint (1)	Flint (1)	Semi-flint (2)
Ear: colour of top of grain	Yellow with cap (4)	Yellow with cap (4)	Yellow with cap (4)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Indented (3)	Indented (3)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Vivek Maize Hybrid-27</b>
2.	Pedigree/Parentage	V 335 x V 345
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	Vinay Mahajan, R. Babu, V.P. Mani and H.S. Gupta
5.	Year	2007
6.	Notification	
	1. Number	1703(E)
	2. Date	05/10/2007
7.	Description of Hybrid	Plant medium with long, broad, semi-erect, dark green leaves and purplish leaf sheath, medium large semi open tassel; purple anther and silk, medium, yellow, semi-dent, grains
8.	Description of the Parents of the Hybrids	Female – V335 (TZI-25 F-##-b-4-1-b-b-14-###-b-#-b-##) and Male – V345 (BIO-45010 OP, F -2-1-8-5-5-B-#-B-##)
9.	Identifiable Distinguishing Morphological Characters	Plant medium with long, broad, semi-erect, dark green leaves and purplish leaf sheath, medium large semi open tassel; purple anther and silk, medium, yellow, semi-dent, grains
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	-
12.	Quality of Produce	Yellow, semi-dent
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Eastern UP, Bihar, Jharkhand, Orissa, Chattisgarh, WB, Maharashtra, AP, Karnataka and TN
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	55
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Vivek Maize Hybrid 27	V 335	V 345
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)	Wide (7)	Wide (7)
Leaf: attitude of blade	Drooping (9)	Straight (1)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)	Present (9)	Present (9)
Tassel: time of anthesis	Early (3)	Medium (5)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Present (9)	Present (9)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (9)
Tassel: density of spikelets	Dense (7)	Dense (7)	Sparse (3)
Tassel: angle between main axis and lateral branches	Wide (7)	Narrow (3)	Wide (7)
Tassel: attitude of lateral branches	Curved (5)	Straight (1)	Strongly curved (9)
Ear: time of silk emergence	Early (3)	Medium (5)	Medium (5)
Ear: anthocyanin colouration of silks	Present (9)	Present (9)	Absent (1)
Leaf: anthocyanin colouration of sheath	Present (9)	Present (9)	Present (9)
Tassel: length of main axis above lowest side branch	Medium (5)	Long (7)	Long (7)
Plant length up to flag leaf	Long (7)	Long (9)	Long (9)
Plant: ear placement	High (7)	High (7)	Medium (5)
Leaf: width of blade	Medium (5)	Broad (7)	Broad (7)
Ear: length without husk	Long (7)	Medium (5)	Long (7)
Ear: diameter	Medium (5)	Small (3)	Medium (5)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Many (7)
Ear: type of grain	Semi-flint (1)	Flint (1)	Dent (3)
Ear: colour of top of grain	Yellow with cap (4)	Yellow (3)	Yellow with cap (4)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Small (3)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Vivek Maize Hybrid 17</b>
2.	Pedigree/Parentage	CM 153 x CM 212
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	V.P. Mani, Rajesh Singh, R. Babu, K S Koranga, G S Bisht, A K Pandey and S K Pant
5.	Year	2005
6.	Notification	
	1. Number	122(E)
	2. Date	02/02/2005
7.	Description of Hybrid	Small leaf angle between blade and stem; Anthocyanin pigment present in silk; Indented yellow semi-flint kernel with cap; large kernel weight
8.	Description of the Parents of the Hybrids	Female - Syn I Inter crosses of three inbreds derived from Pop 31C4 HS and Male – CM 212 (USA/Acc. No. 2132)
9.	Identifiable Distinguishing Morphological Characters	Small leaf angle between blade and stem; Anthocyanin pigment present in silk; Indented yellow semi-flint kernel with cap; large kernel weight
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Moderate degree tolerance to TLB and MLB
12.	Quality of Produce	Yellow with cap, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Across the country except hilly states
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Vivek Maize Hybrid 17	CM 153	CM 212
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Small (3)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Absent (1)	Absent (1)	Absent (1)
Tassel: time of anthesis	Early (3)	Early (3)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Present (9)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (9)
Tassel: density of spikelets	Dense (7)	Dense (7)	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)	Wide (7)	Wide (7)
Tassel: attitude of lateral branches	Curved (5)	Curved (5)	Curved (5)
Ear: time of silk emergence	Early (3)	Early (3)	Early (3)
Ear: anthocyanin colouration of silks	Present (9)	Present (9)	Absent (1)
Leaf: anthocyanin colouration of sheath	Present (9)	Absent (1)	Present (9)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Medium (5)
Plant length up to flag leaf	Long (7)	Long (7)	Long (7)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Medium (5)	Many (7)
Ear: type of grain	Semi-flint (2)	Flint (1)	Semi-flint (2)
Ear: colour of top of grain	Yellow with cap (4)	Yellow (3)	Yellow with cap (4)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1*)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Round (2)	Indented (3)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



Vivek Maize Hybrid 17



CM 153



CM 212

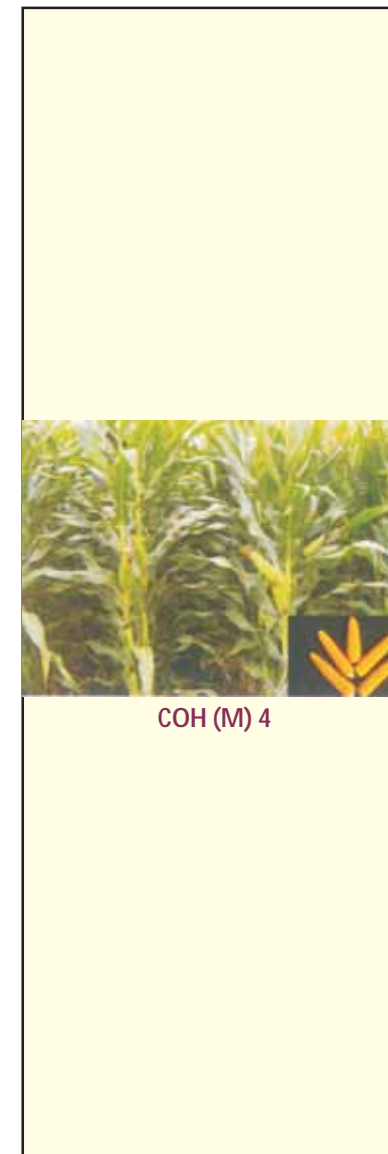
## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>COH (M) 4</b>
2.	Pedigree/Parentage	(UMI 90 x UMI 285) x UMI 112
3.	Developing Centre	TNAU, Coimbatore
4.	Contribution of Persons in Evolving this Variety	G.Nallathambi, A.K.Fazlullah Khan, Surendran , B.Meenakumari, A Kamalakannan and B. Rajasekaran
5.	Year	2005
6.	Notification	
	1. Number	1177(E)
	2. Date	25/08/2005
7.	Description of Hybrid	Green colour stem, leaf sheath having predominantly white hairs, glume has green and purple tinge, yellow flint grains
8.	Description of the Parents of the Hybrids	UMI 90,UMI 285 and UMI 112 were derived through selections followed by five generations of inbreeding from Kissan, Suwan 1 and YUZP –SC- 8, respectively
9.	Identifiable Distinguishing Morphological Characters	Green colour stem, leaf sheath having predominantly white hairs, glume has green and purple tinge, yellow flint grains
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Moderately resistance to downy mildew and stem borer
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Tamil Nadu
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Registered w.e.f. October 20, 2010



## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	COH (M) 4	UMI 90	UMI 285	UMI 90 x UMI 285	UMI 112
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Wide (7)	Small (3)	Wide (7)	Small (3)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)	Absent (1)	Present (9)	Present (9)	Present (9)
Tassel: time of anthesis	Medium (5)	Medium (5)	Late (7)	Medium (5)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)	Present (9)	Present (9)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)	Absent (1)	Present (9)	Absent (1)	Absent (1)
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Sparse (3)	Sparse (3)	Dense (7)
Tassel: angle between main axis and lateral branches	Narrow (3)	Wide (7)	Narrow (3)	Narrow (3)	Narrow (3)
Tassel: attitude of lateral branches	Straight (1)	Curved (5)	Curved (5)	Curved (5)	Straight (1)
Ear: time of silk emergence	Medium (5)	Late (7)	Late (7)	Curved (5)	Medium (5)
Ear: anthocyanin colouration of silks	Absent (1)	Present (9)	Absent (1)	Absent (1)	Present (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Present (9)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Long (7)	Medium (5)	Medium (5)
Plant length up to flag leaf	Very Long (9)	Long (7)	Long (7)	Very Long (9)	Long (7)
Plant: ear placement	Medium (5)	Medium (5)	High (7)	Medium (5)	Medium (5)
Leaf: width of blade	Broad (7)	Medium (5)	Medium (5)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)	Medium (5)	Medium (5)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Conico-cylindrical (2)	Conico-cylindrical (2)	Conico-cylindrical (2)	Conico-cylindrical (2)	Conico-cylindrical (2)
Ear: number of rows of grains	Many (7)	Medium (5)	Medium (5)	Medium (5)	Medium (5)
Ear: type of grain	Flint (1)	Flint (1)	Flint (1)	Flint (1)	Flint (1)
Ear: colour of top of grain	Yellow (3)	Yellow (3)	Orange (5)	Orange (5)	Yellow (3)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Medium (5)	Medium (5)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>DMH 2</b>
2.	Pedigree/Parentage	CI-4 x KDMI 10
3.	Developing Centre	UAS, Dharwad
4.	Contribution of Persons in Evolving this Variety	S.J.Patil, Mruthunjaya C.Wali, R.Gurumurthy, M. Prashanth, S.I.Harlapur, S.Muralikrishna, C.P.Chandrashekhar, G.K.Girejesh, N.G. Hanamaratti, B.T. Ninganur, Chandrashekhar, S.G. Yalamali, S.G Parameshwarappa and M.P.Patil
5.	Year	2002
6.	Notification	
	1. Number	937(E)
	2. Date	04/09/2002
7.	Description of Hybrid	Yellow, semi-flint
8.	Description of the Parents of the Hybrids	CI-4, direct introduction from CIMMYT and the KDMI-10 developed from X <sub>2</sub> (Y) national pool developed at Dharwad & Kolhapur centres of AICMIP by using the elite germplasm available in the country to develop new inbred lines
9.	Identifiable Distinguishing Morphological Characters	Yellow, semi-flint
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistance to SDM
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Karnataka
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	DMH 2	CI 4	KDMI 10
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Medium (5)
Leaf: attitude of blade	Straight (1)	Straight (1)	Straight (1)
Stem: anthocyanin colouration of brace root	Absent (1)	Absent (1)	Absent (1)
Tassel: time of anthesis	Late (7)	Late (7)	Late (7)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (9)
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Dense (7)
Tassel: angle between main axis and lateral branches	Narrow (3)	Narrow (3)	Narrow (3)
Tassel: attitude of lateral branches	Straight (1)	Straight (1)	Straight (1)
Ear: time of silk emergence	Late (7)	Late (7)	Late (7)
Ear: anthocyanin colouration of silks	Present (9)	Present (9)	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Long (7)	Long (7)
Plant length up to flag leaf	Very long (9)	Medium (5)	Medium (5)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Large (7)	Medium (5)	Medium (5)
Ear: shape	Cylindrical (3)	Conico-cylindrical-2	Conico-cylindrical (2)
Ear: number of rows of grains	Medium (3)	Medium (5)	Medium (5)
Ear: type of grain	Semi-flint (2)	Semi-flint (2)	Semi-flint (2)
Ear: colour of top of grain	Yellow (3)	Yellow (3)	Yellow with cap (4)
Ear: colouration of glumes of cob	White (1)	White (1)	Purple (6)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Vivek Hybrid 5</b>
2.	Pedigree/Parentage	CM 212 x V 25
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	V.P. Mani, Rajesh Singh, K. S .Koranga, G.S. Bisht , S. K. Pant and A. K. Pandey
5.	Year	2001
6.	Notification	
	1. Number	92(E)
	2. Date	02/02/2001
7.	Description of Hybrid	Vivek hybrid 5 has anthocyanin pigment present in brace root and medium width leaf blade; large ear diameter; indented yellow semi-flint kernel with cap; large kernel weight
8.	Description of the Parents of the Hybrids	Female – USA/ Acc. No. 2132(Alm.) and Male – Riveirao Preto 8233 (Alm)
9.	Identifiable Distinguishing Morphological Characters	Vivek hybrid 5 has anthocyanin pigment present in brace root and medium width leaf blade; large ear diameter; indented yellow semi-flint kernel with cap; large kernel weight
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance to leaf blight and SB
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	UP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Vivek Hybrid 5	CM 212	V 25
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)	Small (3)	Wide (7)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)	Absent (1)	Present (9)
Tassel: time of anthesis	Early (3)	Medium (5)	Early (3)
Tassel: anthocyanin colouration at base of glume	Present (9)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (9)
Tassel: density of spikelets	Dense (7)	Dense (7)	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)	Wide (7)	Wide (7)
Tassel: attitude of lateral branches	Curved (5)	Curved (5)	Curved (5)
Ear: time of silk emergence	Early (3)	Early (3)	Early (3)
Ear: anthocyanin colouration of silks	Present (9)	Absent (1)	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)	Present (9)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Medium (5)	Medium (5)
Plant length up to flag leaf	Very Long (9)	Long (7)	Long (7)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Long (7)
Ear: diameter	Large (7)	Medium (5)	Medium (5)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Many (7)
Ear: type of grain	Semi-flint (2)	Semi-flint (2)	Flint (1)
Ear: colour of top of grain	Yellow with cap (4)	Yellow with cap (4)	Orange (5)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Indented (3)	Round (2)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Vivek Maize Hybrid 9</b>
2.	Pedigree/Parentage	CM 214 x CM 145
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	V.P. Mani, K.S. Koranga, G.S.Bisht, Rajesh Singh, S.K. Pant and A.K. Pandey
5.	Year	2001
6.	Notification	
	1. Number	92(E)
	2. Date	02/02/2001
7.	Description of Hybrid	Small leaf angle between blade and stem; Anthocyanin pigment present in brace root and sheath; Indented yellow semi-flint kernel with cap; Large kernel weight
8.	Description of the Parents of the Hybrids	CM 212 (USA/Acc. No. 2132 (Alm.)-3-2-f-#-13-# -⊗b-#### ), Pop 31-C 4-HS bulk (Alm.) ⊗-70-2-7-7-### ⊗ bulk
9.	Identifiable Distinguishing Morphological Characters	Small leaf angle between blade and stem; Anthocyanin pigment present in brace root and sheath; Indented yellow semi-flint kernel with cap; Large kernel weight
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance to TLB and MLB
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	AP, Karnataka, Maharashtra and Tamil Nadu
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Vivek Maize Hybrid 9	CM 212	CM 145
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Small (3)
Leaf: attitude of blade	Straight (1)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)	Absent (1)	Absent (1)
Tassel: time of anthesis	Early (3)	Medium (5)	Early (3)
Tassel: anthocyanin colouration at base of glume	Present (9)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (9)
Tassel: density of spikelets	Dense (7)	Dense (7)	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)	Wide (7)	Narrow (3)
Tassel: attitude of lateral branches	Curved (5)	Curved (5)	Straight (1)
Ear: time of silk emergence	Early (3)	Early (3)	Early (3)
Ear: anthocyanin colouration of silks	Present (9)	Absent (1)	Present (9)
Leaf: anthocyanin colouration of sheath	Present (9)	Present (9)	Present (9)
Tassel: length of main axis above lowest side branch	Long (7)	Medium (5)	Short (3)
Plant length up to flag leaf	Very Long (9)	Long (7)	Medium (5)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Broad (7)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Large (7)	Medium (5)	Medium (5)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Many (7)
Ear: type of grain	Semi-flint (2)	Semi-flint (2)	Flint (1)
Ear: colour of top of grain	Yellow with cap (4)	Yellow with cap (4)	Orange (5)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Indented (3)	Round (2)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>HHM 2</b>
2.	Pedigree/Parentage	HKIW-1352 x HKIW-1344
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, Mohinder Singh, K.S. Dhanju and Dharam Pal
5.	Year	2000
6.	Notification	
	1. Number	340(E)
	2. Date	03/04/2000
7.	Description of Hybrid	Dark green, medium tall with medium long cob and flint to semi-dent white grains
8.	Description of the Parents of the Hybrids	HKI-1344 was derived from subheterotic group A, while HKI-1352 was derived from subheterotic group B. seven cycles of selfing, selection, and evaluation were conducted. At the end of seventh cycle, uniform Progenies were identified, their selfed seed bulked and multiplied in isolation. HKI-1344 was used as male and HKI-1352 as female and the single cross hybrid HHM-2 was developed.
9.	Identifiable Distinguishing Morphological Characters	Dark green, medium tall with medium long cob and flint to semi-dent white grains
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistance to MLB in <i>Kharif</i> and common rust in <i>Rabi</i>
12.	Quality of Produce	White, dent
13.	Reaction to Stress (Special Character)	Resistant to frost/cold
14.	Area of Adoption	Haryana state under irrigated conditions
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	60
17.	Remarks	Registered w.e.f. October 20, 2010



## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	HHM 2	HKI 1352	HKI 1344
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Small (3)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present-9	Absent (1)	Absent (1)
Tassel: time of anthesis	Medium (5)	Late (7)	Late (7)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)	Present-9	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)	Present (9)	Present (9)
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Wide (7)	Narrow (3)	Narrow (3)
Tassel: attitude of lateral branches	Straight (1)	Curved (5)	Straight (1)
Ear: time of silk emergence	Early (3)	Late (7)	Late (7)
Ear: anthocyanin colouration of silks	Absent (1)	Present (9)	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Long (7)	Long (7)
Plant length up to flag leaf	Medium (5)	Medium (5)	Medium (5)
Plant: ear placement	Medium (5)	High (7)	High (7)
Leaf: width of blade	Medium (5)	Broad (7)	Broad (7)
Ear: length without husk	Long (7)	Late (7)	Medium (5)
Ear: diameter	Medium (5)	Small (3)	Medium (5)
Ear: shape	Conical (1)	Conico-cylindrical (2)	Conical (1)
Ear: number of rows of grains	Medium (5)	Medium (5)	Many (7)
Ear: type of grain	Flint (1)	Flint (1)	Semi-flint (2)
Ear: colour of top of grain	White (1)	White (1)	White with cap (2)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Irregular (3)	Irregular (3)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Toothed (4)	Round (2)	Indented (3)
Kernel: 1000 kernel weight	Medium (5)	Small (3)	Small (3)



HHM 2



HKI 1352



HKI 1344

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Vivek Hybrid 4</b>
2.	Pedigree/Parentage	CM 212 x CM 141
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	V.P. Mani, K.S.Koranga, G.S. Bisht, J.B. Singh, S.K.Pant, A.K.Pandey and V.S. Chauhan
5.	Year	1999
6.	Notification	
	1. Number	425(E)
	2. Date	08/06/1999
7.	Description of Hybrid	Small angle between blade and stem with droopy leaves; Anthocyanin pigment present in brace root and glume; Very long plant height; Large ear diameter; Indented yellow semi-dent kernel with cap; Large kernel weight
8.	Description of the Parents of the Hybrids	CM 212 x CM 141 (USA/Acc. No. 2132 (Alm.)-3-2-f-#-13-# -⊗b, Pool 33- (Alm.) 198-2-2-2-2-### -15-#- ⊗-bulk
9.	Identifiable Distinguishing Morphological Characters	Small angle between blade and stem with droopy leaves; Anthocyanin pigment present in brace root and glume; Very long plant height; Large ear diameter; Indented yellow semi-dent kernel with cap; Large kernel weight
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance to TLB and MLB
12.	Quality of Produce	Yellow-orange, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Gujarat, Rajasthan and MP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Vivek Hybrid 4	CM 212	CM 141
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Small (3)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Straight (1)
Stem: anthocyanin colouration of brace root	Present (9)	Absent (1)	Absent (1)
Tassel: time of anthesis	Early (3)	Medium (5)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Present (9)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Absent (1)
Tassel: density of spikelets	Dense (7)	Dense (7)	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)	Wide (7)	Narrow (3)
Tassel: attitude of lateral branches	Curved (5)	Curved (5)	Curved (5)
Ear: time of silk emergence	Early (3)	Early (3)	Early (3)
Ear: anthocyanin colouration of silks	Absent (1)	Absent (1)	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)	Present (9)	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Long (7)
Plant length up to flag leaf	Very Long (9)	Long (9)	Long (7)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Large (7)	Medium (5)	Medium (5)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Many (7)
Ear: type of grain	Semi-dent (2)	Semi-flint (2)	Flint (1)
Ear: colour of top of grain	Yellow with cap (4)	Yellow with cap (3)	Yellow (3)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Indented (3)	Round (2)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



**Vivek Hybrid 4**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Pusa Early Hybrid Makka-2</b>
2.	Pedigree/Parentage	CM 137 x CM 138
3.	Developing Centre	IARI, Delhi
4.	Contribution of Persons in Evolving this Variety	B.K. Mukherjee and V.P. Ahuja
5.	Year	1997
6.	Notification	
	1. Number	662(E)
	2. Date	17/09/1997
7.	Description of Hybrid	Pusa Early Hybrid Makka -2 is a single cross hybrid with yellow grain type
8.	Description of the Parents of the Hybrids	IPA-9 (female parent) was derived from base population MDR-1, which comprised germplasm from Philippines, USA, Thailand, Guatemala and Caribbean region. The female parent, IPA-21 was derived from base population AD-609, comprising germplasm from Australia, Yugoslavia, India, Romania and Argentina
9.	Identifiable Distinguishing Morphological Characters	Anthocyanin colouration of brace root, medium length without husk, round kernel shape
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Tolerance to moisture stress
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	AP, TN, Maharashtra, Karnataka, Rajasthan, Gujarat and MP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	PEHM 2	CM 137	CM 138
Leaf: angle between blade and stem (on leaf just above upper ear)	Large (7)	Large (7)	Large (7)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)	Absent (1)	Present (9)
Tassel: time of anthesis	Early (3)	Early (3)	Early (3)
Tassel: anthocyanin colouration at base of glume	Present (9)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of anthers	Absent (1)	Absent (1)	Absent (1)
Tassel: density of spikelets	Dense (7)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Narrow (3)	Narrow (3)	Narrow (3)
Tassel: attitude of lateral branches	Straight (1)	Straight (1)	Straight (1)
Ear: time of silk emergence	Early (3)	Early (3)	Early (3)
Ear: anthocyanin colouration of silks	Present (9)	Present (9)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Medium (5)
Plant length up to flag leaf	Medium (5)	Long (7)	Medium (5)
Plant: ear placement	Low (3)	Medium (5)	Low (3)
Leaf: width of blade	Narrow (3)	Narrow (3)	Narrow (3)
Ear: length without husk	Medium (5)	Medium (5)	Medium (5)
Ear: diameter	Small (3)	Small (3)	Small (3)
Ear: shape	Conico-cylindrical (3)	Conico-cylindrical (3)	Conico-cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Many (7)
Ear: type of grain	Flint (1)	Flint (1)	Flint (1)
Ear: colour of top of grain	Yellow (5)	Yellow (5)	Yellow (5)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Small (3)	Small (3)	Small (3)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>HIM 129</b>
2.	Pedigree/Parentage	(CM 128 x CM 129) x CM 502
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	V.P. Mani, K.S.Koranga, S.K.Pant, A.K.Pandey, N.K.Singh and G.S. Bisht
5.	Year	1997
6.	Notification	
	1. Number	647(E)
	2. Date	09/09/1997
7.	Description of Hybrid	A hybrid with yellow, flint and round Kernel. Ear placement: medium; Anthocyanin coloration of brace root in stem and sheath in leaf is absent and present in anthers and silk
8.	Description of the Parents of the Hybrids	Female – (CM 128 x CM 129) and Male – CM 502 (Pop 31 C4 – HS bulk)
9.	Identifiable Distinguishing Morphological Characters	A hybrid with yellow, flint and round Kernel. Ear placement: medium; Anthocyanin coloration of brace root in stem and sheath in leaf is absent and present in anthers and silk
10.	No. of days to Maturity	Very-early
11.	Reaction to Major Pests and Diseases	Tolerance to MLB, TLB and ESR
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	Very early maturity duration enables the crop to escape from drought and produce fairly good yields under late sowing due to delayed onset of monsoon
14.	Area of Adoption	Eastern UP, Bihar, Assam, Orissa, Rajasthan, MP and Gujarat
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	HIM 129	(CM 128 xCM 129)	CM 502
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)	Small (3)	Wide (7)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Absent (1)	Absent (1)	Absent (1)
Tassel: time of anthesis	Early (3)	Early (3)	Early (3)
Tassel: anthocyanin colouration at base of glume	Present (9)	Present (9)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Absent (1)	Present (9)
Tassel: density of spikelets	Dense (7)	Dense (7)	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)	Wide (7)	Wide (7)
Tassel: attitude of lateral branches	Curved (5)	Curved (5)	Curved (5)
Ear: time of silk emergence	Early (3)	Early (3)	Early (3)
Ear: anthocyanin colouration of silks	Present (9)	Present (9)	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Medium (5)	Medium (5)
Plant length up to flag leaf	Long (7)	Long (7)	Long (7)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Wide (7)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Long (7)	Long (7)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Many (3)
Ear: type of grain	Flint (2)	Flint (1)	Flint (1)
Ear: colour of top of grain	Yellow (3)	Yellow (3)	Yellow (3)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Vivek Maize Hybrid-21</b>
2.	Pedigree/Parentage	CM 212 x V 341
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	R. Babu, V.P. Mani, Rajesh Singh, Vinay Mahajan and H.S. Gupta
5.	Year	2007
6.	Notification	
	1. Number	122(E)
	2. Date	06/02/2007
7.	Description of Hybrid	Broad blade leaves; Anthocyanin pigment absent in silk; Large indented yellow semi-flint kernel with cap; Large ear diameter
8.	Description of the Parents of the Hybrids	Female – CM 212 (USA/Acc. No. 2132 (Alm.) -3-2-f-#-13-#-b-####) and Male – V341 (Mexico Acc. No. 3136 F-3-2-3-8-1-b-#-b-#-b##)
9.	Identifiable Distinguishing Morphological Characters	Broad blade leaves; Anthocyanin pigment absent in silk; Large indented yellow semi-flint kernel with cap; Large ear diameter
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance to TLB
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Uttarakhand, HP, J&K, NEH regions, Delhi, Punjab, Haryana, Western UP, AP, TN, Maharashtra and Karnataka
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Registered w.e.f. March 07, 2011



## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Vivek Maize Hybrid 21	CM 212	V 341
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)	Small (3)	Wide (7)
Leaf: attitude of blade	Drooping (9)	Straight (1)	Drooping (9)
Stem: anthocyanin colouration of brace root	Absent (1)	Present (9)	Absent (1)
Tassel: time of anthesis	Early (3)	Early (3)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Present (9)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Absent (1)
Tassel: density of spikelets	Dense (7)	Dense (7)	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)	Wide (7)	Wide (7)
Tassel: attitude of lateral branches	Curved (5)	Curved (5)	Curved (5)
Ear: time of silk emergence	Early (3)	Early (3)	Medium (5)
Ear: anthocyanin colouration of silks	Absent (1)	Absent (1)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Long (7)	Long (7)
Plant length up to flag leaf	Long (7)	Long (7)	Long (7)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Broad (7)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Long (7)	Medium (5)
Ear: diameter	Large (7)	Large (7)	Medium (5)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Medium (5)
Ear: type of grain	Semi-flint (2)	Semi-flint (2)	Flint (1)
Ear: colour of top of grain	Yellow with cap (4)	Yellow with cap (4)	Yellow with cap (4)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Indented (3)	Indented (3)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



**Vivek Maize Hybrid 21**



**CM 212**



**V 341**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Vivek Maize Hybrid 23</b>
2.	Pedigree/Parentage	V 351 x V 341
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	V.P. Mani, Rajesh Singh, R. Babu, H.S. Gupta, Vinay Mahajan, K. S. Koranga, G. S. Bisht, S.Saha, Anil Kumar, S. K. Pant and K. A. Gopinath
5.	Year	2007
6.	Notification	
	1. Number	122(E)
	2. Date	06/02/2007
7.	Description of Hybrid	Wide angle between drooping blade and stem; anthocyanin pigments absent in glume base and silk; It has Long plant height with flint round grains
8.	Description of the Parents of the Hybrids	Female: V 351 (Shakti (S0) HE 25#CCB 50% F-#-⊗-1-F-⊗-4-#-B###) and Male: V 341 (Mexico Acc No. 3136⊗-3-2-3-8-1-B-#-B-#-B-#)
9.	Identifiable Distinguishing Morphological Characters	Plant sturdy, leaf medium and broad, tassel large-open, glume light green, anther light purple, silk dark pink
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Tolerance to TLB
12.	Quality of Produce	Orange-yellow, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Uttarakhand hills
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	45
17.	Remarks	Registered w.e.f. September 30, 2011

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Vivek Maize Hybrid 23	V351	V 341
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)	Small (3)	Wide (7)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)	Absent (1)	Absent (1)
Tassel: time of anthesis	Medium (5)	Medium (5)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of anthers	Present (9)	Absent (1)	Absent (1)
Tassel: density of spikelets	Dense (7)	Dense (7)	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)	Wide (7)	Wide (7)
Tassel: attitude of lateral branches	Curved (5)	Curved (5)	Curved (5)
Ear: time of silk emergence	Early (3)	Medium (5)	Medium (5)
Ear: anthocyanin colouration of silks	Absent (1)	Present (9)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Medium (5)	Long (7)
Plant length up to flag leaf	Long (7)	Medium (5)	Long (7)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Broad (7)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Large (7)	Medium (5)	Medium (5)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Medium (5)	Medium (5)
Ear: type of grain	Flint (1)	Flint (1)	Flint (1)
Ear: colour of top of grain	Yellow with cap (4)	Yellow with cap (4)	Yellow with cap (4)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



**Vivek Maize Hybrid 23**



**V 351**



**V 341**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>PMH-2</b>
2.	Pedigree/Parentage	LM 15 x LM 16
3.	Developing Centre	PAU, Ludhiana
4.	Contribution of Persons in Evolving this Variety	N.S. Malhi, M.S.Grewal, Jasbir Singh, V.B. Kulshreshtha , S.S. Pal , G.K. Gill, Geeta Chhuneja and Harjinder Singh
5.	Year	2006
6.	Notification	
	1. Number	599(E)
	2. Date	25/04/2006
7.	Description of Hybrid	PMH 2 is a single cross hybrid with orange grain type with yellow cap
8.	Description of the Parents of the Hybrids	LM 15 (I 102) and LM 16 (SE 539) were derived through inbreeding and Pedigree selection from Indigenous and Semi-Exotic heterotic pools respectively which are maintained at P.A.U., Ludhiana
9.	Identifiable Distinguishing Morphological Characters	Orange grain type with yellow cap, flint
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Resistance to MLB, BSDM and PFSR
12.	Quality of Produce	Yellow orange, flint
13.	Reaction to Stress (Special Character)	Moderately tolerant
14.	Area of Adoption	Delhi, Haryana, Central and Western UP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	60
17.	Remarks	Registered w.e.f. September 30, 2011

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	PMH 2	LM 15 (I 102)	LM 16 (SE 539)
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)	Small (3)	Wide (7)
Leaf: attitude of blade	Drooping (9)	Straight (1)	Drooping (9)
Stem: anthocyanin colouration of brace root	Absent (1)	Absent (1)	Absent (1)
Tassel: time of anthesis	Early (3)	Early (3)	Early (3)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)	Absent (1)	Absent (1)
Tassel: density of spikelets	Dense (7)	Dense (7)	Dense (7)
Tassel: angle between main axis and lateral branches	Narrow (3)	Narrow (3)	Medium (5)
Tassel: attitude of lateral branches	Straight (1)	Straight (1)	Straight (1)
Ear: time of silk emergence	Early (3)	Early (3)	Early (3)
Ear: anthocyanin colouration of silks	Absent (1)	Absent (1)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Medium (5)
Plant length up to flag leaf	Medium (5)	Short (3)	Medium (5)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Medium (5)	Medium (5)
Ear: length without husk	Medium (5)	Medium (5)	Medium (5)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Conico-cylindrical (2)	Conico-cylindrical (2)	Conical (1)
Ear: number of rows of grains	Many (7)	Many (7)	Many (7)
Ear: type of grain	Flint (1)	Flint (1)	Flint (1)
Ear: colour of top of grain	Orange (5)	Orange with cap (7)	Orange with cap (7)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Indented (3)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Medium (5)	Medium (5)



PMH 2



LM 15



LM 16

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S.No.		
1.	Name of Hybrid	<b>Parkash</b>
2.	Pedigree/Parentage	CM 139 x CM 140
3.	Developing Centre	PAU, Ludhiana
4.	Contribution of Persons in Evolving this Variety	B.S. Dhillon, V.K.Saxena , Maninder Singh, N.S. Malhi, V.B.Kulshreshtha, S.S. Pal and W.R.Kapoor
5.	Year	1997
6.	Notification	
	1. Number	647(E)
	2. Date	09/09/1997
7.	Description of Hybrid	Parkash is a single cross hybrid with orange grain type and light pink silks
8.	Description of the Parents of the Hybrids	Inbred lines were selected through pedigree method (CM 139) and standard method (CM 140)
9.	Identifiable Distinguishing Morphological Characters	Plants are medium tall with medium ear placement. Leaves are dark green, semi-erect. Tassel is of medium size, open. Grains are attractive orange flint
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Resistance to lodging, shattering, MLB and BSDM
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	Tolerance to abiotic stresses
14.	Area of Adoption	Across the country
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	60
17.	Remarks	Registered w.e.f. September 30, 2011

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Prakash	CM 139	CM 140
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Small (3)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Drooping (9)
Stem: anthocyanin colouration of brace root	Absent (1)	Absent (9)	Absent (9)
Tassel: time of anthesis	Early (3)	Medium (5)	Medium (5)
Tassel: anthocyanin colouration at base of glume	-	-	-
Tassel: anthocyanin colouration of glumes excluding base	-	-	-
Tassel: anthocyanin colouration of anthers	-	-	-
Tassel: density of spikelets	Dense (7)	Dense (7)	Dense (7)
Tassel: angle between main axis and lateral branches	Small (3)	Narrow (3)	Narrow (3)
Tassel: attitude of lateral branches	Curved (5)	Curved (5)	Curved (5)
Ear: time of silk emergence	Early (3)	Medium (5)	Medium (5)
Ear: anthocyanin colouration of silks	Present (1)	Absent (9)	Present (1)
Leaf: anthocyanin colouration of sheath	Absent (9)	Absent (9)	Absent (9)
Tassel: length of main axis above lowest side branch	Medium (5)	Medium (5)	Medium (5)
Plant length up to flag leaf	Long (7)	Medium (5)	Medium (5)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Conico-cylindrical (2)	Conico-cylindrical (2)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Many (7)
Ear: type of grain	Flint (1)	Flint (1)	Flint (1)
Ear: colour of top of grain	Orange (5)	Orange	Orange
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Small (3)	Small (3)



Prakash



CM 139



CM 140

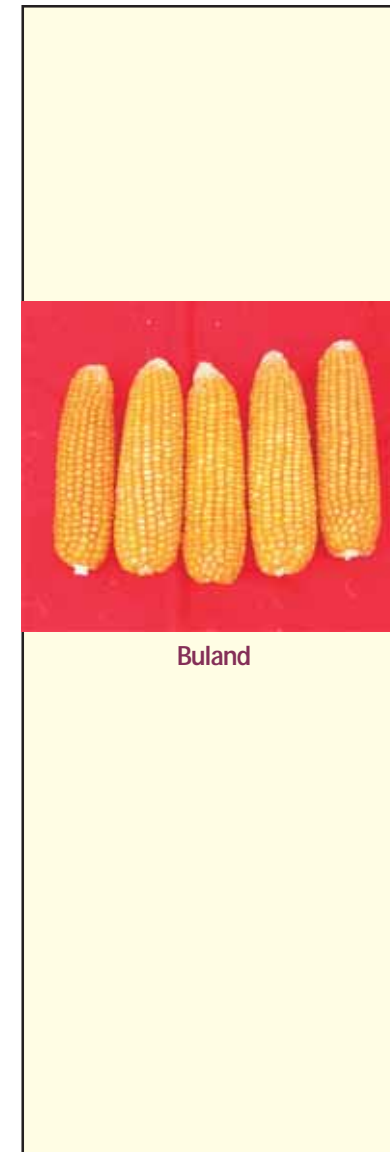
## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Buland</b>
2.	Pedigree/Parentage	LM 11 x LM 12
3.	Developing Centre	PAU, Ludhiana
4.	Contribution of Persons in Evolving this Variety	V. K. Saxena, N. S. Malhi, G. K. Gill, M. S. Grewal and D. P. Singh
5.	Year	2005
6.	Notification	
	1. Number	1177(E)
	2. Date	25/08/2005
7.	Description of Hybrid	Buland is a single cross cold tolerant hybrid with yellow orange grain type
8.	Description of the Parents of the Hybrids	Parental lines derived through selections from exotic germplasm followed by six generations of inbreeding, before hybridization
9.	Identifiable Distinguishing Morphological Characters	Stem colour green, leaf surface rough, curved attitude of blade, yellow orange grain type
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistance to TLB and common rust
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Punjab, UP, Haryana and Delhi
15.	Production conditions	<i>Kharif</i> and <i>Rabi</i>
16.	Average grain yield (q/ha)	85
17.	Remarks	Registered w.e.f. October 21, 2011



## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Buland	CM 146	CM 147
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Small (3)
Leaf: attitude of blade	Drooping (9)	Drooping (9)	Straight (1)
Stem: anthocyanin colouration of brace root	Present (9)	Absent (1)	Present (9)
Tassel: time of anthesis	Late (7)	Late (7)	Early (3)
Tassel: anthocyanin colouration at base of glume	Present (9)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (9)
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Wide (7)	Wide (7)	Narrow (3)
Tassel: attitude of lateral branches	Straight (1)	Strongly curved (9)	Straight (1)
Ear: time of silk emergence	Late (7)	Late (7)	Early (3)
Ear: anthocyanin colouration of silks	Present (9)	Present (9)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Medium (5)	Medium (5)
Plant length up to flag leaf	Long (7)	Medium (5)	Medium (5)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Medium (5)	Medium (5)
Ear: length without husk	Medium (5)	Medium (5)	Short (3)
Ear: diameter	Large (7)	Large (7)	Large (7)
Ear: shape	Conico-cylindrical (2)	Conico-cylindrical (2)	Conical (1)
Ear: number of rows of grains	Many (7)	Medium (5)	Medium (5)
Ear: type of grain	Semi-flint (2)	Flint (1)	Flint (1)
Ear: colour of top of grain	Yellow orange (3)	Yellow orange with cap (4)	Orange (5)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Round (2)	Pointed (5)
Kernel: 1000 kernel weight	Medium (5)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 3.2 Quality Protein Maize

S. No.		
1.	Name of Hybrid	<b>Shaktiman 3</b>
2.	Pedigree/Parentage	CML 161 x CML 163
3.	Developing Centre	RAU, Dholi
4.	Contribution of Persons in Evolving this Variety	P. B. Jha and R.B.P. Nirala
5.	Year	2006
6.	Notification	
	1. Number	1572(E)
	2. Date	20/09/2006
7.	Description of Hybrid	Shaktiman-3 is single cross QPM hybrid with orange yellow grain type
8.	Description of the Parents of the Hybrids	CML 161-13-3 $\otimes$ and CML 163-7-2 $\otimes$ parental lines were developed from second generation selfed lines of CML 161 and CML 169, respectively
9.	Identifiable Distinguishing Morphological Characters	Attitude of leaf blade is strongly curved, presence of zig-zag stem, kernels of bold orange yellow in colour
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Tolerance to MLB and BLSB
12.	Quality of Produce	Yellow-orange, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Bihar
15.	Production conditions	<i>Kharif</i> and <i>Rabi</i>
16.	Average grain yield (q/ha)	60
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Shaktiman 3	CML 161	CML 163
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Medium (5)	Medium (5)
Leaf: attitude of blade	Strongly curved (9)	Strongly curved (9)	Strongly curved (9)
Stem: anthocyanin colouration of brace root	Present (9)	Present (9)	Present (9)
Tassel: time of anthesis	Late (7)	Late (7)	Late (7)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Absent (1)
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Medium (5)	Medium (5)	Medium (5)
Tassel: attitude of lateral branches	Wide (7)	Straight (1)	Straight (1)
Ear: time of silk emergence	Late (7)	Late (7)	Late (7)
Ear: anthocyanin colouration of silks	Present (9)	Present (9)	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Long (7)	Long (7)
Plant length up to flag leaf	Long (7)	Medium (5)	Medium (5)
Plant: ear placement	Long (7)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Broad (7)	Broad (7)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Large (7)	Medium (5)	Medium (5)
Ear: shape	Conico-cylindrical (2)	Conico-cylindrical (2)	Conico-cylindrical (2)
Ear: number of rows of grains	Medium (5)	Many (7)	Medium (5)
Ear: type of grain	Semi-flint (2)	Flint (1)	Semi-flint (2)
Ear: colour of top of grain	Yellow (3)	Orange (1)	Yellow (3)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel row arrangement	Spiral (2)	Spiral (2)	Spiral (2)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Present (9)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Indented (3)	Indented (3)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Shaktiman 4</b>
2.	Pedigree/Parentage	CML 161 x CML 169
3.	Developing Centre	RAU, Dholi
4.	Contribution of Persons in Evolving this Variety	P. B. Jha and R.B.P. Nirala
5.	Year	2006
6.	Notification	
	1. Number	1572(E)
	2. Date	20/09/2006
7.	Description of Hybrid	Shaktiman-4 is single cross QPM hybrid with orange yellow grain type
8.	Description of the Parents of the Hybrids	Parental lines were developed from second generation selfed lines of CML 161 and CML 169, respectively
9.	Identifiable Distinguishing Morphological Characters	Attitude of leaf blade is strongly curved, presence of zig-zag stem, kernels semi-flint bold orange in colour, tassel having deep purple spikelets
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistance to MLB
12.	Quality of Produce	Yellow-orange, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Bihar
15.	Production conditions	<i>Kharif and Rabi</i>
16.	Grain yield (q/ha)	60
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Shaktiman 4	CML 161	CML 169
Leaf: angle between blade and stem (on leaf just above upper ear)	Medium (5)	Medium (5)	Medium (5)
Leaf: attitude of blade	Very strongly curved (9)	Very strongly curved (9)	Very strongly curved (9)
Stem: anthocyanin colouration of brace root	Present (9)	Present (9)	Present (9)
Tassel: time of anthesis	Late (7)	Late (7)	Late (7)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Present (9)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Absent (1)
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Medium (5)	Medium (5)	Medium (5)
Tassel: attitude of lateral branches	Very strong curved (9)	Straight (1)	Curved (5)
Ear: time of silk emergence	Late (7)	Late (7)	Late (7)
Ear: anthocyanin colouration of silks	Present (9)	Present (9)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Long (7)	Long (7)
Plant length up to flag leaf	Long (7)	Long (7)	Long (7)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Broad (7)	Broad (7)	Broad (7)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Long (7)	Medium (5)	Medium (5)
Ear: shape	Conico-cylindrical (2)	Conico-cylindrical (2)	Conico-cylindrical (2)
Ear: number of rows of grains	Medium (5)	Many (7)	Medium (5)
Ear: type of grain	Semi-flint (2)	Flint (1)	Flint (1)
Ear: colour of top of grain	Orange (5)	Orange (5)	Orange yellow (3)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Spiral (2)	Spiral (2)	Spiral (2)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Present (9)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Indented (3)	Indented (3)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>HQPM -1</b>
2.	Pedigree/Parentage	HKI-193-1 x HKI 163
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, Pawan Arora, K.S. Dhanju, Dharam Pal and J.C. Mahla
5.	Year	2005
6.	Notification	
	1. Number	1178(E)
	2. Date	20/07/2005
7.	Description of Hybrid	HQPM 1 is a single cross QPM hybrid with yellow grain type
8.	Description of the Parents of the Hybrids	HKI 193-1 and HKI163 were derived through selections followed by four generations of inbreeding from CML193 and CML163 (CML: CIMMYT Maize Line), respectively
9.	Identifiable Distinguishing Morphological Characters	QPM hybrid with yellow grain type
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Tolerance to frost/cold and resistance to MLB and common rust
12.	Quality of Produce	Yellow, dent
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Across the country
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	62
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	HQPM 1	HKI 193-1	HKI 163
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)	Small (3)	Small (3)
Leaf: attitude of blade	Straight (1)	Straight (1)	Straight (1)
Stem: anthocyanin colouration of brace root	Absent (1)	Present (9)	Present (9)
Tassel: time of anthesis	Late (7)	Late (7)	Late (7)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (9)
Tassel: density of spikelets	Sparse (3)	Sparse (3)	Dense (7)
Tassel: angle between main axis and lateral branches	Narrow (3)	Narrow (3)	Medium (5)
Tassel: attitude of lateral branches	Straight (1)	Straight (1)	Straight (1)
Ear: time of silk emergence	Late (7)	Late (7)	Late (7)
Ear: anthocyanin colouration of silks	Absent (1)	Absent (1)	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Medium (5)	Medium (5)
Plant length up to flag leaf	Medium (5)	Medium (5)	Medium (5)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Medium (5)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Conico-cylindrical (2)	Conico-cylindrical (2)	Conico-cylindrical (2)
Ear: number of rows of grains	Medium (5)	Medium (5)	Medium (5)
Ear: type of grain	Dent (3)	Semi dent (2)	Semi flint (2)
Ear: colour of top of grain	Yellow (3)	Yellow with cap (4)	Orange (5)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Present (9)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Medium (5)



HQPM 1



HKI 193-1



HKI 163

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Shaktiman 2</b>
2.	Pedigree/Parentage	CML 176 x CML 186
3.	Developing Centre	RAU, Dholi
4.	Contribution of Persons in Evolving this Variety	P. B. Jha
5.	Year	2004
6.	Notification	
	1. Number	161(E)
	2. Date	04/02/2004
7.	Description of Hybrid	Shaktiman-2 is single cross QPM hybrid with white grain type
8.	Description of the Parents of the Hybrids	Hybrid for initial testing alongwith parental lines were provided by CIMMYT, Mexico through Directorate of Maize Research, New Delhi
9.	Identifiable Distinguishing Morphological Characters	Hybrid uniform with white flint grains, moderate sized leaves
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistance to MLB
12.	Quality of Produce	White, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Bihar
15.	Production conditions	<i>Rabi</i>
16.	Average grain yield (q/ha)	60
17.	Remarks	Registered w.e.f. October 20, 2010



## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Shaktiman 2	CML 176	CML 186
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)	Small (3)	Small (3)
Leaf: attitude of blade	Drooping (9)	Curved (5)	Straight (1)
Stem: anthocyanin colouration of brace root	Present (9)	Present (9)	Present (9)
Tassel: time of anthesis	Early (3)	Medium (5)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Present (9)	Present (9)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Absent (1)
Tassel: density of spikelets	Dense (7)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Wide (7)	Medium (5)	Medium (5)
Tassel: attitude of lateral branches	Straight (1)	Curved (3)	Curved (3)
Ear: time of silk emergence	Medium (5)	Late (7)	Medium (5)
Ear: anthocyanin colouration of silks	Present (9)	Absent (1)	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)	Short (3)	Short (3)
Plant length up to flag leaf	Tall (7)	Medium (5)	Short (3)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Narrow (3)	Narrow (3)	Narrow (3)
Ear: length without husk	Short (3)	Medium (5)	Medium (5)
Ear: diameter	Medium (5)	Medium (5)	Medium (5)
Ear: shape	Conico-Cylindrical (2)	Conico-cylindrical (2)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Medium (5)
Ear: type of grain	Semi-flint (2)	Flint (1)	Semi-flint (2)
Ear: colour of top of grain	White (1)	White (1)	White (1)
Ear: colouration of glumes of cob	Light Purple (2)	Light purple (2)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Present (9)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Medium (5)	Medium (5)

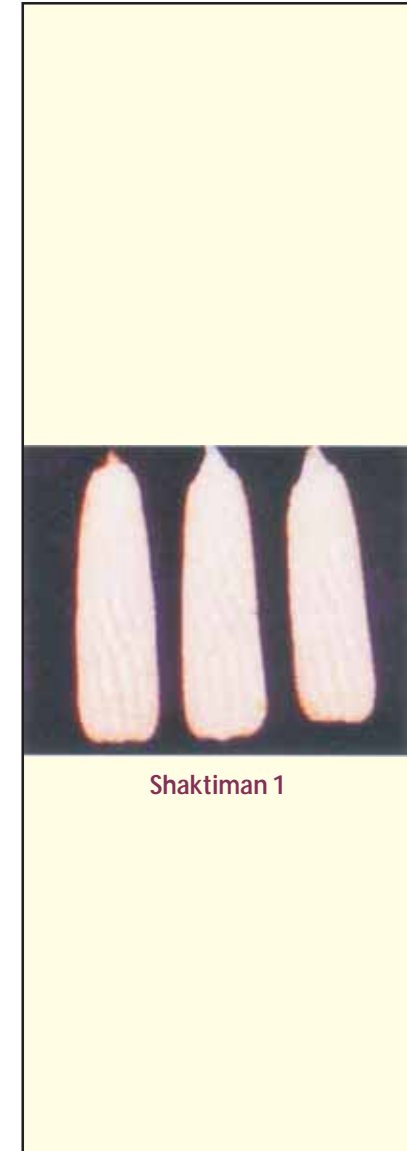


## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Shaktiman 1</b>
2.	Pedigree/Parentage	(CML 142 x CML 150) x CML 186
3.	Developing Centre	RAU, Dholi
4.	Contribution of Persons in Evolving this Variety	P. B. Jha
5.	Year	2001
6.	Notification	
	1. Number	1134(E)
	2. Date	15/11/2001
7.	Description of Hybrid	The hybrid is white flint grained of average height. Ear placement is below the mid height of plants
8.	Description of the Parents of the Hybrids	Hybrid for initial testing and parental lines CML 142, CML 150 and CML 186 were provided by CIMMYT, Mexico through Directorate of Maize Research, New Delhi and three way cross was developed through hybrid breeding
9.	Identifiable Distinguishing Morphological Characters	The hybrid is white flint grained of average height. Ear placement is below the mid height of plants
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Tolerance to MLB, TLB, BLSB and stem borer
12.	Quality of Produce	White, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Bihar
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Shaktiman 1	CML 142	CML 150	CML 186
Leaf: angle between blade and stem (on leaf just above upper ear)	Medium (5)	Small (3)	Small (3)	Small (3)
Leaf: attitude of blade	Medium (5)	Curved (5)	Small (3)	Small (3)
Stem: anthocyanin colouration of brace root	Present (9)	Absent (1)	Present (9)	Present (9)
Tassel: time of anthesis	Early (7)	Medium (5)	Late (7)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Absent (1)	Absent (1)	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)	Absent (1)	Present (1)	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Absent (1)	Absent (1)
Tassel: density of spikelets	Sparse (3)	Dense (7)	Medium (5)	Sparse (3)
Tassel: angle between main axis and lateral branches	Medium (5)	Narrow (3)	Narrow (3)	Medium (5)
Tassel: attitude of lateral branches	Medium (5)	Straight (1)	Straight (1)	Medium (5)
Ear: time of silk emergence	Medium (5)	Medium (5)	Late (7)	Medium (5)
Ear: anthocyanin colouration of silks	Present (9)	Absent (1)	Present (9)	Absent (1)
Leaf: anthocyanin colouration of sheath	Present (9)	Present (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Short (3)	Short (3)	Short (3)	Short (3)
Plant length up to flag leaf	Medium (5)	Long (7)	Medium (5)	Short (3)
Plant: ear placement	Medium (5)	Long (7)	Medium (5)	Short (3)
Leaf: width of blade	Narrow (3)	Narrow (3)	Medium (5)	Narrow (3)
Ear: length without husk	Medium (5)	Short (3)	Short (3)	Medium (5)
Ear: diameter	Medium (5)	Small (3)	Small (3)	Medium (5)
Ear: shape	Conico-cylindrical (2)	Conico-cylindrical (2)	Cylindrical (2)	Cylindrical (3)
Ear: number of rows of grains	Many (7)	Many (7)	Medium (5)	Medium (5)
Ear: type of grain	Flint (2)	Flint (1)	Semi-flint (2)	Semi-flint (2)
Ear: colour of top of grain	White (1)	White (1)	White (1)	White (1)
Ear: colouration of glumes of cob	Light purple (2)	Light purple (2)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Indented (3)	Indented (3)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Present (9)	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Indented (3)	Round (2)	Indented (3)	Round (2)
Kernel: 1000 kernel weight	Medium (5)	Small (3)	Medium (5)	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 3.3 Baby Corn

S. No.		
1.	Name of Hybrid	HM 4
2.	Pedigree/Parentage	HKI 1105 x HKI 323
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, Mohinder Singh, Pawan Arora, K.S. Dhanju and Dharam Pal
5.	Year	2005
6.	Notification	
	1. Number	1177(E)
	2. Date	25/08/2005
7.	Description of Hybrid	HM-4 is purple silk orange flint grain single cross hybrid
8.	Description of the Parents of the Hybrids	HKI1105 has been derived by 6 generations of selfing and selection of Cargil633, while HKI323 was derived by selection and selfing for 7generations in CIMMYT Pool28
9.	Identifiable Distinguishing Morphological Characters	Purple silk orange flint grain single cross hybrid
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Resistant to major pests
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Across the country
15.	Production conditions	<i>Kharif</i>
16.	Grain yield (q/ha)	68
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	HM 4	HKI 1105	HKI 323
Leaf: angle between blade and stem (on leaf just above upper ear)	Medium (5)	Medium (5)	Small (3)
Leaf: attitude of blade	Straight (1)	Straight (1)	Drooping (9)
Stem: anthocyanin colouration of brace root	Present-9	Present (9)	Present
Tassel: time of anthesis	Medium (5)	Medium (5)	Medium (5)
Tassel: anthocyanin colouration at base of glume	Absent (1)	Present (9)	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)	Absent (1)	Absent (1)
Tassel: anthocyanin colouration of anthers	Present (9)	Present (9)	Present (9)
Tassel: density of spikelets	Medium (5)	Sparse (3)	Sparse (3)
Tassel: angle between main axis and lateral branches	Medium (5)	Wide (7)	Medium (5)
Tassel: attitude of lateral branches	Curved (5)	Straight (1)	Curved (5)
Ear: time of silk emergence	Medium (5)	Medium (5)	Medium (5)
Ear: anthocyanin colouration of silks	Present (9)	Absent (1)	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)	Absent (1)	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)	Long (7)	Long (7)
Plant length up to flag leaf	Medium (5)	Short (3)	Short (3)
Plant: ear placement	Medium (5)	Medium (5)	Medium (5)
Leaf: width of blade	Medium (5)	Broad (7)	Medium (5)
Ear: length without husk	Long (7)	Medium (5)	Medium (5)
Ear: diameter	Large (7)	Medium (5)	Medium (5)
Ear: shape	Cylindrical (3)	Cylindrical (3)	Conical (1)
Ear: number of rows of grains	Medium (5)	Medium (5)	Medium (5)
Ear: type of grain	Flint (1)	Flint (1)	Flint (1)
Ear: colour of top of grain	Orange (5)	Orange (5)	Orange (5)
Ear: colouration of glumes of cob	White (1)	White (1)	White (1)
Kernel: row arrangement	Straight (1)	Straight (1)	Straight (1)
Kernel: poppiness	Absent (1)	Absent (1)	Absent (1)
Kernel: sweetness	Absent (1)	Absent (1)	Absent (1)
Kernel: waxiness	Absent (1)	Absent (1)	Absent (1)
Kernel: opaqueness	Absent (1)	Absent (1)	Absent (1)
Kernel: shape	Round (2)	Round (2)	Round (2)
Kernel: 1000 kernel weight	Large (7)	Medium (5)	Small (3)



HM 4



HKI 1105



HKI 323

## 4. Hybrids under DUS testing

The PPV&FR Authority devised guidelines for the conduct of DUS test for Distinctiveness, Uniformity and Stability (DUS) in maize based on which newly developed public-bred as well as proprietary hybrids and inbreds are being evaluated since 2008 (*Kharif*). Six public-bred hybrids completed two years of DUS testing and one hybrid completed one year of DUS testing at two locations (Delhi and Hyderabad). In this section information on major characteristics, notification number and date, area of adoption and average yield has been presented.

## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 4.1 Normal Maize

S. No.		
1.	Name of Cultivar	<b>HM-10</b>
2.	Pedigree/Parentage	HKI -193-2 x HKI 1128
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, Dharam Pal, J.C. Mahla, K.S. Dhanju, D.P. Singh and Rishi Pal
5.	Year	2008
6.	Notification	
	1. Number	2458 (E)
	2. Date	16/10/2008
7.	Description of Variety/Hybrid	HM-10 is a single cross normal maize hybrid with yellow and semi-flint grain
8.	Description of the Parents of the Hybrids	CML193 was obtained through germplasm exchange programme from CIMMYT, Mexico in 1998. Individual plants with desirable agronomic traits were selected and selfed and grown ear to row. Each row was evaluated and superior ones were selected and selfed. At each cycle of selfing selected plants were advanced through ear-to-row, which were subjected to visual selection for four generations of selfing. Eventually, uniform progenies were identified and their selfed seeds were bulked, and multiplied in isolation. In this way HKI -193-2 was developed. Concurrently, F2 seed from the hybrid grown on farmer's field were collected; evaluated and desirable plants were selfed. This process continued for 6-7 generations. At the end, an inbred line HKI-1128 was developed. The parental lines were multiplied in isolation, and crossed to obtain single cross hybrid, HM-10.
9.	Identifiable Distinguishing Morphological Characters	Medium broad leaves, long cob, white cob heart, sparse tassel, yellow and flint grains
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Resistance to MLB
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Delhi, Punjab, Haryana, Western UP, Rajasthan, MP, Gujarat, AP, TN, Maharashtra and Karnataka
15.	Production conditions	<i>Rabi</i>
16.	Average grain yield (q/ha)	72
17.	Remarks	Completed two year of DUS testing



**HM 10**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Vivek Maize Hybrid-33</b>
2.	Pedigree/Parentage	V 372 x CM 212
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	V. Mahajan, R. Babu, V.P. Mani, H.S. Gupta, K. S. Koranga, G. S. Bisht, M. C. Pant, S. K. Pant and K. A. Gopinath
5.	Year	2008
6.	Notification	
	1. Number	2458 (E)
	2. Date	16/10/2008
7.	Description of Hybrid	Small leaf angle between blade and stem on leaf just above upper ear; Anthocyanin coloration of brace root and silk absent; Long tassel length; Broad leaf blade; Yellow dent grain with cap; Indented kernel shape with medium kernel weight
8.	Description of the Parents of the Hybrids	Female – V 372 (PRO-337 OP⊗-6-4-1-3-4-1-#-⊗b-##-⊗b) and Male – CM 212 (USA/Acc. No.2132 (Alm.)-3-2-f-#-13-#-b-# # # #)
9.	Identifiable Distinguishing Morphological Characters	Small leaf angle between blade and stem on leaf just above upper ear; Anthocyanin coloration of brace root and silk absent; Long tassel length; Broad leaf blade; Yellow dent grain with cap; Indented kernel shape with medium kernel weight
10.	No. of days to Maturity	Extra- early
11.	Reaction to Major Pests and Diseases	Tolerance against TLB and MLB
12.	Quality of Produce	Yellow, dent
13.	Reaction to Stress (Special Character)	All trials in rainfed conditions
14.	Area of Adoption	J &K and Uttarakhand
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	60
17.	Remarks	Completed two year of DUS testing



**Vivek Maize Hybrid-33**



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>HM-8</b>
2.	Pedigree/Parentage	HKI 1105 x HKI 161
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, K.S. Dhanju, Dharam Pal, J.C. Mahla and D.P. Singh
5.	Year	2007
6.	Notification	
	1. Number	1703 (E)
	2. Date	05/10/2007
7.	Description of Hybrid	HM-8 is range flint single corn hybrid with pink silk and straight leaf
8.	Description of the Parents of the Hybrids	CML 161 was obtained through germplasm exchange programme from CIMMYT, Mexico in 1998. The lines showed residual variation. Individual plants with desirable agronomic traits were selected and selfed. Subsequently the same were grown ear-to-row. Each row was evaluated and superior ones were selected and selfed. At each cycle of selfing selected plants were advanced through ear-to-row, which were subjected to visual selection for four selfing. At the end of four selfing and evaluation, uniform progenies were identified and their selfed seeds were bulked, which were multiplied in isolation. This gave rise to HKI 161. A single cross hybrid, Kargil 633 was subjected to inbreeding and selection for 7 generations and named as HKI 1105. HKI 1105 and HKI 161 were crossed to give HM 8.
9.	Identifiable Distinguishing Morphological Characters	Medium broad leaves, long conical cob, white gully, flint, orange grain, green silk and sparse green tassel
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Resistant to MLB
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	AP, TN, Maharashtra and Karnataka
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	68
17.	Remarks	Completed two years of DUS testing



**HM 8**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>PAU-352</b>
2.	Pedigree/Parentage	LM 15 x CML 32
3.	Developing Centre	PAU, Ludhiana
4.	Contribution of Persons in Evolving this Variety	N.S. Malhi, M.S.Grewal, Jasbir Singh, G.K.Gill and Harjinder Singh
5.	Year	2007
6.	Notification	
	1. Number	1703 (E)
	2. Date	05/10/2007
7.	Description of Hybrid	Stem zig-zag, medium density of spikelets, early time of silk emergence, Orange, flint grain type
8.	Description of the Parents of the Hybrids	LM 15 (I 102) was derived through inbreeding and Pedigree selection from Indigenous heterotic pool and CML 32 is an introduction from CIMMYT, Mexico adapted to Punjab conditions which are maintained at P.A.U., Ludhiana
9.	Identifiable Distinguishing Morphological Characters	Stem zig-zag, medium density of spikelets, early time of silk emergence, Orange, flint grain type
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Resistance to MLB, BSDM and ESR
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Punjab, Haryana and Delhi
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	60
17.	Remarks	Completed two year of DUS testing



**PAU 352**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>HM-11</b>
2.	Pedigree/Parentage	HKI-1128 x HKI-163
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, Dharam Pal, J.C. Mahla, K.S. Dhanju, and Rishi Pal
5.	Year	2009
6.	Notification	
	1. Number	2187 (E)
	2. Date	27/08/2009
7.	Description of Hybrid	HM-11 is a single cross normal maize hybrid with medium and semi dent grain type
8.	Description of the Parents of the Hybrids	CML163 was obtained through germplasm exchange programme from CIMMYT, Mexico in 1998. Individual plants with desirable agronomic traits were selected and selfed and grown ear to row. Each ear was evaluated and superior ones were selected and selfed. At each cycle of selfing selected plants were advanced through ear-to-row, which were subjected to visual selection for four generations of selfing. Eventually, uniform progenies were identified and their selfed seeds were bulked, and multiplied in isolation. In this way HKI -163 was developed. Concurrently, F <sub>2</sub> seed from the hybrid grown on farmer's field were collected; evaluated and desirable plants were selfed. This process continued for 6-7 generations. At the end, an inbred line HKI-1128 was developed. The parental lines were multiplied in isolation, and crossed these lines i.e. HKI -1128 & HKI -163 to obtain single cross hybrid, HM-11.
9.	Identifiable Distinguishing Morphological Characters	Tall plant, medium broad leaves, long conical cob, white heart, flint, orange grain, green silk and sparse green tassel
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Responses to TLB, SDM, PFSR and Common rust
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Across the country except Himalayan belt
15.	Production conditions	<i>Rabi</i>
16.	Average Grain yield (q/ha)	55
17.	Remarks	Completed one year of DUS testing



**HM 11**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 4.2 Quality Protein Maize

S. No.		
1.	Name of Hybrid	<b>HQPM-7</b>
2.	Pedigree/Parentage	HKI-193-1 x HKI-161
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, Dharam Pal, J.C. Mahla, K.S. Dhanju, D.P. Singh and Rishi Pal
5.	Year	2008
6.	Notification	
	1. Number	2458 (E)
	2. Date	16/10/2008
7.	Description of Hybrid	HQPM -7 is a single cross QPM hybrid with orange grain type
8.	Description of the Parents of the Hybrids	HKI-193-1 and HKI-161 were derived through selections from CML193 and CML161, respectively (CML: CIMMYT Maize Line), followed by four generations of inbreeding.
9.	Identifiable Distinguishing Morphological Characters	Broad leaves, long conical cob, white cob heart, flint orange grains
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistance to MLB
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Karnataka, AP, TN and Maharashtra
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	72
17.	Remarks	Completed two year of DUS testing



**HQPM-7**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Vivek QPM 9</b>
2.	Pedigree/Parentage	VQL 1 x VQL 2
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	R. Babu, H.S. Gupta, Vinay Mahajan, V.P. Mani, Sudha Nair, P. K. Agarwal, K. S. Koranga, G. S. Bisht, K. A. Gopinath and S. K. Pant
5.	Year	2008
6.	Notification	
	1. Number	2458 (E)
	2. Date	16/10/2008
7.	Description of Hybrid	Small leaf angle between blade and stem; Anthocynin pigment present in brace root and sheath; Indented yellow semi-flint kernel with blue cap; Large kernel weight with high tryptophan content
8.	Description of the Parents of the Hybrids	Female – VQL 1 [(CM 212 x CML 180) BC <sub>3</sub> P <sub>1</sub> . ⊗b⊗b⊗b-#] and Male – VQL 2 [(CM 145 x CML 170) BC <sub>3</sub> P <sub>1</sub> ⊗b⊗b⊗b-##]
9.	Identifiable Distinguishing Morphological Characters	Plant sturdy, medium height, light purple anther and purple silk, extra-early maturity, grain yellow, semi-flint
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance against TLB
12.	Quality of Produce	Yellow, dent
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	J & K, Uttarakhand, Himachal Pradesh, AP, TN, Karnataka and Maharashtra
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	55
17.	Remarks	Completed two year of DUS testing



**VIVEK QPM 9**

### 5. Hybrids accepted for registration

Eleven hybrids under new category and two hybrids under extant category have been accepted for registration under PPV&FR Act, 2001. In this section information on major characteristics, notification number and date, area of adoption and average yield has been tabulated. Given below is the requirement of seed along with seed quality report.

#### A. Seed Quantity

Category	Seed quantity required (g)
New	3000
Extant	600

#### B. Seed Quality

##### Germination capacity

I. Inbred lines & single cross hybrids	80% (minimum)
II. Varieties and double cross hybrids	90% (minimum)

**Physical purity** 98% (minimum)

**Moisture content** 8-10% (maximum)

## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 5.1 New Category

S. No.		
1.	Name of Hybrid	<b>Vivek Maize Hybrid 39</b>
2.	Pedigree/Parentage	V-373 x CM 212
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	V. Mahajan, H. S. Gupta, V. P. Mani, G. S. Bisht, M. C. Pant, S. K. Pant and J. K. Bisht
5.	Year	2012
6.	Notification	
	1. Number	456 (E)
	2. Date	16/03/2012
7.	Description of Hybrid	Plant sturdy, 195-200 cm in mid hills, ear placement medium-low, leaves medium, broad, green; tassel large, open glume purple, silk light purple, ear cylindrical, along with white cob wood. Grain large, flat yellow, semi-dent, days to 50% silking in mid hills varies from 52-54 days.
8.	Description of the Parents of the Hybrids	Single cross hybrid having parentage: Female – V373 (JKMH-175-4 (O.P.) ⊗-16-7-12-1- ⊗b ## ⊗b#) and Male – CM 212 (USA/Acc No. 2132 (Alm)-3-2-f-#-13-#- ⊗b # # # # ⊗b)
9.	Identifiable Distinguishing Morphological Characters	Plant medium height with large open tassel, glume and silk purple; yellow semi-dent bold flat grains
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance against <i>turcicum</i> leaf blight
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Uttarakhand and Himachal Pradesh
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	71
17.	Remarks	Seed, seed quality report and DUS test fee submitted



**VIVEK MAIZE HYBRID 39**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Vivek Maize Hybrid 43</b>
2.	Pedigree/Parentage	V-373 x V-341
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	V. Mahajan, H. S. Gupta, V. P. Mani, G. S. Bisht, M. C. Pant and S. K. Pant
5.	Year	2012
6.	Notification	
	1. Number	456 (E)
	2. Date	16/03/2012
7.	Description of Hybrid	Wide leaf angle between blade and stem on leaf just above upper ear; Straight attitude of blade; Anthocyanin coloration of brace root and silk present; Broad leaf blade; sparsely dense spikelets; Straight attitude of lateral branches; Yellow semi-flint grain with cap; Medium kernel weight
8.	Description of the Parents of the Hybrids	Single cross hybrid having parentage Female – V373 (JKMH-175-4 (O.P.) ⊗-16-7-12-1- ⊗b ## ⊗b#) and Male – V341 (Mexico Acc.No. 3136⊗-3-2-3-8-1-⊗b-#-⊗b-#-⊗b-#-⊗b#)
9.	Identifiable Distinguishing Morphological Characters	Plant medium with large open tassel, glume, anther and silk light purple, semi flint, flat and bold grains
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance against <i>turcicum</i> leaf blight
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	East UP, Bihar, Jharkhand, Chhattisgarh, West Bengal, Orissa, Rajasthan, Gujarat and MP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	48
17.	Remarks	Seed, seed quality report and DUS test fee submitted



**Vivek Maize Hybrid 43**



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>DHM 119</b>
2.	Pedigree/Parentage	BML 2 x BML 15
3.	Developing Centre	ANGRAU, Hyderabad
4.	Contribution of Persons in Evolving this Variety	R. Sai Kumar, K. Jhansi Rani, M.R. Sudharshan, R. Ranga Reddy, A. Srinivas, D. Sreelatha, J.C. Shekar, M. Anuradha, Y. Sivalakshmi, G.Lakshmi Kantha Reddy, V. Narsimha Reddy and T. Nageshwar Rao,
5.	Year	2011
6.	Notification	
	1. Number	632 (E)
	2. Date	25/03/2011
7.	Description of Hybrid	DHM 119 has prolific ears, productive longitude nods, erect leaves with dense tassel, yellow and semi-flint grain and white shank.
8.	Description of the Parents of the Hybrids	Single cross hybrid technology is adopted and crossed the two parents (BML 2 and BML 15) to get this hybrid. The parental lines viz., BML 2 and BML 15 were developed by adopting pedigree selection from exotic recycled lines through several generations of inbreeding
9.	Identifiable Distinguishing Morphological Characters	Dense tassel, yellow and semi-flint grain and white shank
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Nutrient responsive and resistant to lodging
12.	Quality of Produce	Yellow and semi-flint grain
13.	Reaction to Stress (Special Character)	Moderate
14.	Area of Adoption	AP, Maharashtra, Karnataka and TN
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	70
17.	Remarks	-



**DHM 119**


## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>PMH 4</b>
2.	Pedigree/Parentage	LM 5 x LM 16
3.	Developing Centre	PAU, Ludhiana
4.	Contribution of Persons in Evolving this Variety	MS Grewal, Jasbir Singh, GK Gill, SPS Brar, Mahesh Kumar, Harleen Kaur, Jawala Jindal, Nirmal Singh Hari, Sunita Sharma, Devinder Pal Singh, NS Malhi, VK Saxena and Harjinder Singh
5.	Year	2011
6.	Notification	
	1. Number	632 (E)
	2. Date	25/03/2011
7.	Description of Hybrid	PMH 4 is a single cross hybrid with flint type of grain having yellow orange with cap colour of top of grain and drooping leaf: attitude of blade
8.	Description of the Parents of the Hybrids	LM 5 and LM 16 were derived through inbreeding and pedigree selection from Tuxpeno and Exotic Germplasm
9.	Identifiable Distinguishing Morphological Characters	Yellow orange flint grains, green silk
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Resistant against MLB, BLSB, BSDM and PFSR
12.	Quality of Produce	Yellow-orange, flint
13.	Reaction to Stress (Special Character)	Suitable for irrigated conditions
14.	Area of Adoption	Delhi, Punjab, Haryana, Western UP and tarai UA
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	83
17.	Remarks	Seed, seed quality report and DUS test fee submitted



**PMH 4**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	PMH 5
2.	Pedigree/Parentage	LM 16 x LM 18
3.	Developing Centre	PAU, Ludhiana
4.	Contribution of Persons in Evolving this Variety	MS Grewal, Jasbir Singh, GK Gill, SPS Brar, Nirmal Singh Hari, Jawala Jindal, Harleen Kaur, Mahesh Kumar, Sunita Sharma, Devinder Pal Singh, NS Malhi, VK Saxena and Harjinder Singh
		
PMH 5		
5.	Year	2011
6.	Notification	
	1. Number	632 (E)
	2. Date	25/03/2011
7.	Description of Hybrid	PMH 5 is a single cross hybrid with orange red flint grain type with cap
8.	Description of the Parents of the Hybrids	LM 16 was derived through inbreeding and pedigree selection from semi-exotic heterotic pool and LM 18 has been derived from Kaloyey local material well adapted to Punjab conditions which are maintained at PAU, Ludhiana
9.	Identifiable Distinguishing Morphological Characters	Orange red flint grains with cap, silk colour green
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Resistant against MLB, BLSB, BSDM and PFSR
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	Suitable for irrigated and rainfed conditions
14.	Area of Adoption	Rajasthan, Gujarat, MP and Chhattisgarh
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	60
17.	Remarks	-

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	HQPM-4
2.	Pedigree/Parentage	HKI-193-2 x HKI-161
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, Dharam Pal, J.C. Mahla, and K.S. Dhanju
5.	Year	2010
6.	Notification	
	1. Number	2137 (E)
	2. Date	31/08/2010
7.	Description of Hybrid	HQPM-4 is a hybrid with long plant length, straight tassel: attitude of lateral branches, long cob and yellow colour of top of grain
8.	Description of the Parents of the Hybrids	CML193 and CML 161 were obtained through germplasm exchange programme from CIMMYT, Mexico in 1998 and the material is in public domain
9.	Identifiable Distinguishing Morphological Characters	Purple silk, green tassel, orange and flint grain
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistant to major diseases viz., MLB, PFSR under artificial conditions
12.	Quality of Produce	Yellow, semi-dent
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Across the country except Himalayan belt
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	60
17.	Remarks	Seed, seed quality report and DUS test fee submitted



HQPM-4


## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>HSC-1</b>
2.	Pedigree/Parentage	HKI 1831 x HKI SCST-1
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, Dharam Pal, J.C. Mahla, Rishi Pal, J. C. Shekhar, K.S. Dhanju and M.C. Kamboj
5.	Year	2010
6.	Notification	
	1. Number	2137 (E)
	2. Date	31/08/2010
7.	Description of Hybrid	HSC-1 is a sweet corn hybrid with long ear length, purple tassel colour and presence of anthocyanin colouration at the base of glume and excluding glume.
8.	Description of the Parents of the Hybrids	Ear to row selection from the populations Pop A(S) co(sh2sh2) and Madhuri through evaluation and continuous inbreeding for eight generations. The uniform selfed ear with respect to all the morphological traits was bulked to from the HKI -1831 and HKI-SC ST, respectively. The selection criteria were high sugar, high yield and medium height plant type with heavy pollen shedder
9.	Identifiable Distinguishing Morphological Characters	Tassel curved, light yellow grain, long cob and thin heart
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Resistance to disease viz., MLB, common rust under artificial conditions
12.	Quality of Produce	Light, yellow, semi-dent
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Himachal Pradesh and Uttarakhand
15.	Production conditions	<i>Kharif</i>
16.	Average green ear yield (q/ha)	120
17.	Remarks	-




**HSC-1**


## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Cultivar	<b>DHM 111</b>
2.	Pedigree/Parentage	BML 6 x BML 15
3.	Developing Centre	ANGRAU, Hyderabad
4.	Contribution of Persons in Evolving this Variety	R. Sai Kumar, M.R. Sudharshan, E .Sathyanarayana , G. Lakshmi Kantha Reddy, V.Sudheer Reddy, K. Jhansi Rani, R. Ranga Reddy, A. Srinivas, S.Hemalatha and J.C. Shekar
		
5.	Year	2010
6.	Notification	
	1. Number	211 (E)
	2. Date	29/01/2010
7.	Description of Variety/Hybrid	DHM 111 is a single cross hybrid with yellow grain type.
8.	Description of the Parents of the Hybrids	Single cross hybrid technology is adopted and crossed the two parents (BML 6 and BML 15) to get this hybrid. The parental lines viz., BML 6 and BML 15 were developed by adopting pedigree selection from exotic recycled lines through several generations of inbreeding.
9.	Identifiable Distinguishing Morphological Characters	Sturdy tall and non-loading hybrid, stay green nature at brown husk stage and presence of anthocyanin pigmentation on basal leaf sheaths
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Tolerant to MLB, TLB, PFSR and stem borer.
12.	Quality of Produce	Yellow orange and semi flint kernels
13.	Reaction to Stress (Special Character)	Moderate
14.	Area of Adoption	Andhra Pradesh
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	65
17.	Remarks	-

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.			
1.	Name of Hybrid	<b>DHM 113</b>	
2.	Pedigree/Parentage	BML 2 x BML 7	
3.	Developing Centre	ANGRAU, Hyderabad	
4.	Contribution of Persons in Evolving this Variety	R.Sai Kumar, E Sathyanarayana, V.Sudheer Reddy , R.Ranga Reddy, S.Hemalatha, M.R.Sudarshan, G.Lakshmi Kantha Reddy, K. Jhansi Rani, A.Srinivas and J.C.Shekhar	
5.	Year	2010	<b>DHM 113</b>
6.	Notification		
	1. Number	211 (E)	
	2. Date	29/01/2010	
7.	Description of Hybrid	DHM-113 is a single cross hybrid, anthocynin colouration of silk, tall, anthocyanin pigmentation on leaf sheath, presence of dark red pigmentation at the base of the glumes and the grain colour is semi dent yellow with cap	
8.	Description of the Parents of the Hybrids	Single cross hybrid technology is adopted and crossed the two parents (BML 2 and BML 7) to get this hybrid. The parental lines viz., BML2 and BML 7 were developed by adopting pedigree selection from exotic recycled lines through several generations of inbreeding.	
9.	Identifiable Distinguishing Morphological Characters	Tall having thick stem, anthocyanin pigmentation on leaf sheath, presence of dark red pigmentation at the base of the glume and tendency to bear prolific ear under good agronomic management.	
10.	No. of days to Maturity	Late	
11.	Reaction to Major Pests and Diseases	Tolerant to MLB, TLB, BLSB and stem borer	
12.	Quality of Produce	Orange and semi-dent kernels	
13.	Reaction to Stress (Special Character)	Moderate	
14.	Area of Adoption	Andhra Pradesh	
15.	Production conditions	<i>Kharif</i>	
16.	Average grain yield (q/ha)	66	
17.	Remarks	-	

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.			
1.	Name of Cultivar	DHM 117	
2.	Pedigree/Parentage	BML 6 x BML 7	
3.	Developing Centre	ANGRAU, Hyderabad	
4.	Contribution of Persons in Evolving this Variety	R. Sai Kumar, K. Jhansi Rani, M.R. Sudharshan, G. Lakshmi Kantha Reddy, D. Srilatha, A. Srinivas, R. Ranga Reddy, M. Anuradha, J.C. Shekar, and Y. Sivalakshmi	
5.	Year	2010	DHM 117
6.	Notification		
	1. Number	211 (E)	
	2. Date	29/01/2010	
7.	Description of Variety/Hybrid	DHM 117 is a single cross hybrid with uniform plant height, non lodging, stay green at harvest stage with flint grain type	
8.	Description of the Parents of the Hybrids	DHM-117 is a single cross hybrid and developed by crossing BML-6 and the BML-7 maize inbred lines. The female parent BML 6 derived from stalk rot resistance hybrid SRRL 65 and through inbreeding for six generations followed by self bulk. The male parent BML 7 through recycling of X <sub>2</sub> Y pool and CML 287 which was obtained from CIMMYT, Mexico. The single cross was selfed for eight generations followed by self bulk	
9.	Identifiable Distinguishing Morphological Characters	Sturdy, tall, non-lodging hybrid, stay green nature at brown husk stage and presence of anthocyanin pigmentation on basal leaf sheaths	
10.	No. of days to Maturity	Medium	
11.	Reaction to Major Pests and Diseases	Moderately tolerant to major foliar diseases viz., MLB, TLB, BLSB and PSFR	
12.	Quality of Produce	Orange yellow, flint	
13.	Reaction to Stress (Special Character)	Moderate	
14.	Area of Adoption	Andhra Pradesh	
15.	Production conditions	<i>Kharif</i>	
16.	Average grain yield (q/ha)	75	
17.	Remarks	Seed, seed quality report and DUS test fee submitted	



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>Rajendra Hybrid Makka-3</b>
2.	Pedigree/Parentage	Dholi inbred 32 x Dholi inbred 40
3.	Developing Centre	RAU, Dholi
4.	Contribution of Persons in Evolving this Variety	Rajendra Prasad, Ajay Kumar, PB Jha, PK Singh, MM Jha and M Kumar
5.	Year	-
6.	Notification	
	1. Number	
	2. Date	-
7.	Description of Hybrid	Presence of Stem: anthocyanin colouration of brace root, wide Tassel: length of main axis above upper side branch and conico-cylindrical Ear: shape.
8.	Description of the Parents of the Hybrids	Dholi inbred 32 was derived through continuous selfing and selection for seven generations of Pop-65 maintained at Dholi. Dholi inbred-40 was derived from Pop-147 (Y) through continuous selfing and selection for 6 generations. Effective selection was practiced during inbreeding process in order to develop these two promising parental inbred lines.
9.	Identifiable Distinguishing Morphological Characters	Long Ear: length without husk and round Kernel: shape.
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	The hybrid is resistance against MLB and TLB
12.	Quality of Produce	Its grains are bold with orange yellow colour and sweet taste
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Bihar
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	-



**RHM-3**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 5.2 Extant Category

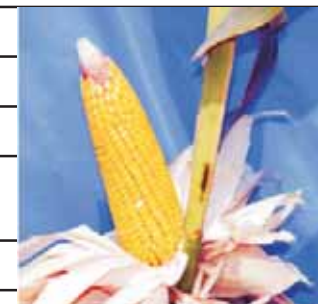
S. No.		
1.	Name of Hybrid	<b>NAH 2049</b>
2.	Pedigree/Parentage	SKV-50 x MA 1105
3.	Developing Centre	Naganahalli
4.	Contribution of Persons in Evolving this Variety	K.T. Pandurangegowda, Puttarama Naik, T.A. Sreerama Setty, B.Vidyachandra, N.Mallikarjuna, H.L.Vasantha kumar, M.R.Gururaja Rao, Manjunath, Narayana Prasad, Nagaraju, Doddahanumaiah, Rajendra Prasad, H.K.Veeranna, Anwarulla, Sunanda Saran, Rajanna and Rudraradya
5.	Year	2009
6.	Notification	
	1. Number	449 (E)
	2. Date	11/02/2009
7.	Description of Hybrid	Stem green, semi tall, brace root purple, tassel medium texture, secondary branches erect, anther glume, purple, ear bold and semi-dent
8.	Description of the Parents of the Hybrids	SKV-50 (population 147-F <sub>2</sub> # 89-3-2-B-1-B) X MAI – 105 (F-720 – X – 87 – X – 88 # 89 – F <sub>2</sub> # 8 – 3)
9.	Identifiable Distinguishing Morphological Characters	Stem green, semi tall, brace root purple, tassel medium texture, secondary branches erect, anther glume, purple, ear bold and semi-dent
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistant to TLB
12.	Quality of Produce	Orange, semi-dent
13.	Reaction to Stress (Special Character)	Resistance to loading
14.	Area of Adoption	Karnataka
15.	Production conditions	<i>Kharif and Rabi</i>
16.	Average grain yield (q/ha)	80
17.	Remarks	Seed, seed quality report and registration fee submitted



**NAH 2049**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Hybrid	<b>HHM 1</b>
2.	Pedigree/Parentage	HKI-536 x HKI-295
3.	Developing Centre	CCSHAU, Karnal
4.	Contribution of Persons in Evolving this Variety	Sain Dass, Mohinder Singh, K.S. Dhanju and Dharam Pal
5.	Year	2000
6.	Notification	
	1. Number	340(E)
	2. Date	03/04/2000
7.	Description of Hybrid	Dark green, Medium tall with Medium Long cob and Flint to Semi dent White grains
8.	Description of the Parents of the Hybrids	HKI 536 has been derived from Cargill Hybrid while HKI 295 was derived from composite Karnal 4
9.	Identifiable Distinguishing Morphological Characters	Dark green, Medium tall with Medium Long cob and Flint to Semi dent White grains
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Resistance to MLB, common rust in winter and tolerance to major insect-pests
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	Resistant to frost/cold
14.	Area of Adoption	Haryana
15.	Production conditions	<i>Kharif</i>
16.	Average grain syield (q/ha)	60
17.	Remarks	-



**HHM 1**

## 6. Composites registered under extant category

Among composites, twenty normal, two baby corn and two sweet corn have been registered under PPV&FR Act, 2001. The detailed information on major characteristics, notification number and date, area of adoption, average yield and DUS traits has been compiled in this section.

## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 6.1 Normal Maize

S. No.		
1.	Name of Composite	<b>Birsa Vikas Makka 2</b>
2.	Pedigree/Parentage	Crosses of six OPVs-Suwan, BMI, Chandan Makka 3, GM 6, Shweta, Rudrapur local
3.	Developing Centre	BHU, Ranchi
4.	Contribution of Persons in Evolving this Variety	M. Chakraborty, D .K. Ganguli, D. N. Singh, J Ghosh, Arun Kumar, P. K. Singh, S.K.Pal, S.C.Dubey, D.Prasad, D. S. Virk, J.R. Whitcombe, S .C. Prasad, J.S.Gangwar, S.C.Singh, I.B.singh, Virendra Singh and T.B.Rao
5.	Year	2005
6.	Notification	
	1. Number	1177(E)
	2. Date	25/08/2005
7.	Description of Varietys	Birsa Vikas Makka -2 is an extra early maturing composite with small leaf angle, narrow and sparse spikelet and yellow flint medium size kernel
8.	Description of the Parents of the Hybrids	Broad based population made by cossing six open pollinated varieties namely Suwan, BM –1, Chandan Makka 3, GM-6 (GDRM-187), Shweta and Rudrapur local of maize
9.	Identifiable Distinguishing Morphological Characters	Extra early maturing composite with small leaf angle, narrow and sparse spikelet and yellow flint medium size kernel
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Moderately resistant to leaf blight and highly resistant to sheath blight
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Bihar and Jharkhand
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	35
17.	Remarks	Registered w.e.f. July 20, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Birsa Vikas Makka 2
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)
Leaf: attitude of blade	Drooping (9)
Stem: anthocyanin colouration of brace root	Absent (1)
Tassel: time of anthesis	Extra early (1)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Sparse (3)
Tassel: angle between main axis and lateral branches	Narrow (3)
Tassel: attitude of lateral branches	Straight (1)
Ear: time of silk emergence	Extra early (1)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Large (7)
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	Long (7)
Ear: diameter	-
Ear: shape	Conico - cylindrical (2)
Ear: number of rows of grains	Many (7)
Ear: type of grain	Flint (1)
Ear: colour of top of grain	Yellow (3)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	-
Kernel: 1000 kernel weight	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Shalimar KG Maize 2</b>
2.	Pedigree/Parentage	Pool-42 x Gurez Local
3.	Developing Centre	SKUAS&T, Srinagar
4.	Contribution of Persons in Evolving this Variety	H.U.Ahanger, Late S.A.Wani , A.M.Wani , G.H.Zargar, M.A.Zargar, Shahid Ahmed, GulZaffar, S.D.Masoodi and Z.A.Baba
5.	Year	2005
6.	Notification	
	1. Number	1177(E)
	2. Date	25/08/2005
7.	Description of Variety	Shalimar KG Maize-2 is extra early maturing composite with high biomass and protein and Yellowish White flint grains
8.	Description of the Parents of the Hybrids	Pool 42 from CIMMYT was used as a seed parent for developing Shalimar KG-Maize 2
9.	Identifiable Distinguishing Morphological Characters	Ear shape slightly conical, silk anthocyanin present, yellowish, flint grains
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance to leaf blight, DM, resistance to stem rot and moderate tolerance to SB
12.	Quality of Produce	Yellowish, flint
13.	Reaction to Stress (Special Character)	Resistant to low temperature injury
14.	Area of Adoption	J&K
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Registered w.e.f. December 21, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Shalimar KG Maize 2
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)
Leaf: attitude of blade	Straight (1)
Stem: anthocyanin colouration of brace root	Absent (1)
Tassel: time of anthesis	Early (3)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Sparse (3)
Tassel: angle between main axis and lateral branches	Wide (7)
Tassel: attitude of lateral branches	Strongly Curved (9)
Ear: time of silk emergence	Early (3)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Short (3)
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	Medium (5)
Ear: diameter	Large (7)
Ear: shape	Conico-cylindrical (2)
Ear: number of rows of grains	Medium (5)
Ear: type of grain	Flint (1)
Ear: colour of top of grain	Yellow (3)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Round (2)
Kernel: 1000 kernel weight	-





## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Pusa Composite 3</b>
2.	Pedigree/Parentage	Yellow Pool-1
3.	Developing Centre	IARI, Delhi
4.	Contribution of Persons in Evolving this Variety	Ram Deo Singh, Rishab Dev Singh and R.N. Gadag
5.	Year	2005
6.	Notification	
	1. Number	1566(E)
	2. Date	05/11/2005
7.	Description of Variety	Pusa Composite-3 has long ears, yellow flint grains. It is a composite with medium maturity and stalks possess good forage quality because of stay-green character
8.	Description of the Parents of the Hybrids	Pusa Composite – 3 was derived from Yellow pool-1, which was constituted from the populations comprising adapted maize genotypes as part of the maize breeding work at Delhi centre
9.	Identifiable Distinguishing Morphological Characters	Long ears, yellow flint grains
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Tolerance to stalk borer, moisture and resistance to lodging
12.	Quality of Produce	Yellow-orange, flint
13.	Reaction to Stress (Special Character)	Performs well under low input and moisture stress conditions
14.	Area of Adoption	Punjab, Haryana, Central and Western UP under irrigated and rainfed ecology
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Registered w.e.f. December 21, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Pusa Composite 3
Leaf: angle between blade and stem (on leaf just above upper ear)	Large(7)
Leaf: attitude of blade	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)
Tassel: time of anthesis	Medium (5)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Sparse (3)
Tassel: angle between main axis and lateral branches	Narrow (3)
Tassel: attitude of lateral branches	Curved (5)
Ear: time of silk emergence	Medium (5)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)
Plant length up to flag leaf	Long (7)
Plant: ear placement	Low (3)
Leaf: width of blade	Narrow (3)
Ear: length without husk	Medium (5)
Ear: diameter	Medium (5)
Ear: shape	Conico-cylindrical (3)
Ear: number of rows of grains	Many (7)
Ear: type of grain	Flint (1)
Ear: colour of top of grain	Yellow (3)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Round (2)
Kernel: 1000 kernel weight	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Pusa Composite 4</b>
2.	Pedigree/Parentage	Yellow Pool-2
3.	Developing Centre	IARI, Delhi
4.	Contribution of Persons in Evolving this Variety	Ram Deo Singh and Rishab Dev Singh
5.	Year	2005
6.	Notification	
	1. Number	1566(E)
	2. Date	05/11/2005
7.	Description of Variety	Long ears, yellow flint grains
8.	Description of the Parents of the Hybrids	Pusa Composite – 4 was derived from Yellow pool-2, which was constituted from the populations comprising adapted maize genotypes as part of the maize breeding work at Delhi centre
9.	Identifiable Distinguishing Morphological Characters	Long ears, yellow flint grains
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Tolerance to stalk borer, lodging resistance and tolerance to water stress
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	Performs well under low input and moisture stress conditions
14.	Area of Adoption	Punjab, Haryana, Central and Western UP
15.	Production conditions	<i>Kharif</i>
16.	Average Grain yield (q/ha)	40
17.	Remarks	Registered w.e.f. December 21, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Pusa Composite 4
Leaf: angle between blade and stem (on leaf just above upper ear)	Large (7)
Leaf: attitude of blade	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)
Tassel: time of anthesis	Medium (5)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Sparse (3)
Tassel: angle between main axis and lateral branches	Narrow (3)
Tassel: attitude of lateral branches	Curved (5)
Ear: time of silk emergence	Medium (5)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Low (3)
Leaf: width of blade	Narrow (3)
Ear: length without husk	Medium (5)
Ear: diameter	Medium (5)
Ear: shape	Conico-cylindrical (3)
Ear: number of rows of grains	Many (7)
Ear: type of grain	Flint (1)
Ear: colour of top of grain	Orange (5)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Round (2)
Kernel: 1000 kernel weight	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>D 994</b>
2.	Pedigree/Parentage	Population 31 and one line from Suwan -1
3.	Developing Centre	GBPUA&T, Pantnagar
4.	Contribution of Persons in Evolving this Variety	I. S. Singh, M. Z. K. Warsi and S. S. Verma
5.	Year	2004
6.	Notification	
	1. Number	642(E)
	2. Date	31/05/2004
7.	Description of Variety	D-994 having kernel colour orange yellow semi flint
8.	Description of the Parents of the Hybrids	Source population namely, Pop 31 and Suwan 1 were obtained from CIMMYT, Mexico. Selection was made for earliness and vigour, and nine selected lines from Pop 31 and one from Suwan 1 was used for constitution of the variety
9.	Identifiable Distinguishing Morphological Characters	Sparse tassel, central spike of the tassel relatively long with 8-10 lateral branches
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Lodging and waterlogging tolerance
12.	Quality of Produce	Orange-yellow, semi-flint
13.	Reaction to Stress (Special Character)	Tolerant to biotic and abiotic stresses
14.	Area of Adoption	Bihar, Jharkhand and Orissa
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	35
17.	Remarks	Registered w.e.f. December 21, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	D 994
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)
Leaf: attitude of blade	Straight (1)
Stem: anthocyanin colouration of brace root	Present (9)
Tassel: time of anthesis	Early (3)
Tassel: anthocyanin colouration at base of glume	-
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Sparse (3)
Tassel: angle between main axis and lateral branches	-
Tassel: attitude of lateral branches	-
Ear: time of silk emergence	Early (3)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	-
Tassel: length of main axis above lowest side branch	-
Plant length up to flag leaf	Long (7)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	Medium (5)
Ear: diameter	Medium (5)
Ear: shape	Cylindrical (3)
Ear: number of rows of grains	Medium (5)
Ear: type of grain	Semi-flint (2)
Ear: colour of top of grain	Orange Yellow (7)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Irregular (3)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Toothed (4)
Kernel: 1000 kernel weight	Large (7)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Gujarat Makai-6</b>
2.	Pedigree/Parentage	Selection made from the crosses performed between white and yellow maize varieties
3.	Developing Centre	AAU, Godhara
4.	Contribution of Persons in Evolving this Variety	S.N.Goyal and S.M.Khanorkar
5.	Year	2003
6.	Notification	
	1. Number	283(E)
	2. Date	12/03/2003
7.	Description of Variety	Gujarat Makai-6 was suitable for <i>kharif</i> rainfed marginal cultivation and six to seven days early in 50 per cent silking
8.	Description of the Parents of the Hybrids	Selection made from the crosses performed between white and yellow maize varieties
9.	Identifiable Distinguishing Morphological Characters	Green to purple pigmentation, Cylindrical shape, White, flint grain type
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance to MLB and BSDM
12.	Quality of Produce	White, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Bihar, Jharkhand, Orissa and WB
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Registered w.e.f. December 21, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Gujarat Makkai 6
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)
Leaf: attitude of blade	Drooping (9)
Stem: anthocyanin colouration of brace root	Absent (1)
Tassel: time of anthesis	Very early (1)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)
Tassel: attitude of lateral branches	Curved (5)
Ear: time of silk emergence	Very early (1)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	Short (3)
Ear: diameter	Medium (5)
Ear: shape	Cylindrical (2)
Ear: number of rows of grains	Many (1)
Ear: type of grain	Semi-flint (2)
Ear: colour of top of grain	White with cap (2)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Round (2)
Kernel: 1000 kernel weight	Large (7)





## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Gujarat Makai 3</b>
2.	Pedigree/Parentage	Advancement of filial generations of cross Composite-1 x WRF-9(HS).
3.	Developing Centre	AAU, Godhara
4.	Contribution of Persons in Evolving this Variety	S.N.Goyal, M.D.Arha and S.M.Khanorkar
5.	Year	2002
6.	Notification	
	1. Number	937(E)
	2. Date	04/09/2002
7.	Description of Variety	Green colour stem, pale yellow in colour tassel, medium broad leaf
8.	Description of the Parents of the Hybrids	This variety was developed by advancement of filial generations of cross Composite-1 x WRF-9(HS). Composite-1 was derived from local populations at MMRS, AAU, Godhara during late 1980 whereas, WRF-9(HS) promising genotype collected from rabi-1988-89 breeding trial at Godhara
9.	Identifiable Distinguishing Morphological Characters	Green colour stem, pale yellow in colour tassel, medium broad leaf
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Tolerant to pests and diseases
12.	Quality of Produce	White, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Gujarat
15.	Production conditions	<i>Rabi</i>
16.	Average grain yield (q/ha)	55
17.	Remarks	Registered w.e.f. December 21, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Gujarat Makai 3
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)
Leaf: attitude of blade	Straight (1)
Stem: anthocyanin colouration of brace root	Absent (1)
Tassel: time of anthesis	Late (7)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)
Tassel: attitude of lateral branches	Curved (5)
Ear: time of silk emergence	Late (7)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	-
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	Broad (7)
Ear: length without husk	Long (7)
Ear: diameter	Medium (5)
Ear: shape	Cylindrical (3)
Ear: number of rows of grains	Many (7)
Ear: type of grain	Flint (1)
Ear: colour of top of grain	White (1)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Present (9)
Kernel: opaqueness	Absent (1)
Kernel: shape	Round (2)
Kernel: 1000 kernel weight	Small (3)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Gujarat Makai 4</b>
2.	Pedigree/Parentage	LGC-40 x WRF-15 (HS)
3.	Developing Centre	AAU, Godhara
4.	Contribution of Persons in Evolving this Variety	S.N.Goyal, S.M.Khanorkar and M.D.Arha
5.	Year	2001
6.	Notification	
	1. Number	92(E)
	2. Date	02/02/2001
7.	Description of Variety	Stem green in colour, medium thickness, white, flint, medium size
8.	Description of the Parents of the Hybrids	This variety was developed by advancement of filial generations of cross LGC-40 x WRF-15(HS). LGC-40 was derived from local germplasm collections at MMRS, AAU, Godhra during late 1980 whereas, WRF-15 (HS) was found promising genotype and collected from rabi-1988-89 breeding trials at Godhra
9.	Identifiable Distinguishing Morphological Characters	Stem green in colour, medium thickness, white, flint, medium size
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Tolerance to <i>R. herculea</i> , MLB and BSDM
12.	Quality of Produce	White, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Bihar, Jharkhand, Orissa and WB
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Registered w.e.f. December 21, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Gujarat Makai 4
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)
Leaf: attitude of blade	Drooping (9)
Stem: anthocyanin colouration of brace root	Absent (1)
Tassel: time of anthesis	Early (3)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Sparse (3)
Tassel: angle between main axis and lateral branches	Wide (7)
Tassel: attitude of lateral branches	Curved (5)
Ear: time of silk emergence	Early (3)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Long (5)
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	Medium (5)
Ear: diameter	Medium (5)
Ear: shape	Cylindrical (3)
Ear: number of rows of grains	Many (7)
Ear: type of grain	Flint (1)
Ear: colour of top of grain	White (1)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Present (9)
Kernel: opaqueness	Absent (1)
Kernel: shape	Round (2)
Kernel: 1000 kernel weight	Large (7)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Gaurav</b>
2.	Pedigree/Parentage	Open pollinated ears selected from various trials
3.	Developing Centre	GBPUA&T, Pantnagar
4.	Contribution of Persons in Evolving this Variety	S.N.Mishra, M. Z. K. Warsi, S. S. Verma and Ranjeet
5.	Year	1999
6.	Notification	
	1. Number	425(E)
	2. Date	08/09/1999
7.	Description of Variety	Gaurav having kernel colour orange yellow semi flint
8.	Description of the Parents of the Hybrids	Genetic base of the variety is selected open pollinated ears from a yield trial grown in 1992 kharif. Seeds from selected ears were bulked and population allowed to random cross pollination in subsequent generations
9.	Identifiable Distinguishing Morphological Characters	Medium plant height, subtropical plant type, yellow semi-flint kernel colour
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Resistance to major foliar and stem diseases and tolerance to SB
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Punjab, Haryana and Central and Western UP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	48
17.	Remarks	Registered w.e.f. December 21, 2009

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Gaurav
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)
Leaf: attitude of blade	-
Stem: anthocyanin colouration of brace root	-
Tassel: time of anthesis	Early (3)
Tassel: anthocyanin colouration at base of glume	-
Tassel: anthocyanin colouration of glumes excluding base	
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Sparse (3)
Tassel: angle between main axis and lateral branches	-
Tassel: attitude of lateral branches	-
Ear: time of silk emergence	Early (3)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	-
Tassel: length of main axis above lowest side branch	-
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	-
Ear: length without husk	Medium (5)
Ear: diameter	Medium (5)
Ear: shape	Cylindrical (3)
Ear: number of rows of grains	Medium (5)
Ear: type of grain	Semi Flint (2)
Ear: colour of top of grain	Yellow (3)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Toothed (4)
Kernel: 1000 kernel weight	Large (7)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Shalimar KG Maize 1</b>
2.	Pedigree/Parentage	Pool 39 x Gurez Local
3.	Developing Centre	SKUAS&T, Srinagar
4.	Contribution of Persons in Evolving this Variety	H.U.Ahanger, Late S.A.Wani , A.M.Wani , G.H.Zargar, M.A.Zargar, Shahid Ahmed, Gul Zaffar, S.D.Masoodi and Z.A.Baba
5.	Year	2005
6.	Notification	
	1. Number	1177(E)
	2. Date	25/08/2005
7.	Description of Variety	Shalimar KG Maize-1 is extra early maturing composite with high biomass and protein and yellowish -white flint grains
8.	Description of the Parents of the Hybrids	Pool 39 from CIMMYT was used as a seed parent for developing Shalimar KG-Maize I
9.	Identifiable Distinguishing Morphological Characters	Silk anthocyanin present, anthocyanin colouration of glume present, yellowish white flint grains
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance to leaf blight, DM, resistance to stem rot and moderate tolerance to SB
12.	Quality of Produce	Yellowish- white, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	J&K
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	35
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Shalimar KG Maize 1
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)
Leaf: attitude of blade	Straight (1)
Stem: anthocyanin colouration of brace root	Absent (1)
Tassel: time of anthesis	Very early (1)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Sparse (3)
Tassel: angle between main axis and lateral branches	Wide (7)
Tassel: attitude of lateral branches	Strongly curved (9)
Ear: time of silk emergence	Early (3)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	Medium (5)
Ear: diameter	Small (3)
Ear: shape	Conico- cylindrical (2)
Ear: number of rows of grains	Medium (5)
Ear: type of grain	Flint (1)
Ear: colour of top of grain	Yellow (3)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Round (2)
Kernel: 1000 kernel weight	-



**Shalimar KG Maize 1**



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Narmada Moti</b>
2.	Pedigree/Parentage	LGC-40 x EH-2922 (HS)
3.	Developing Centre	AAU, Godhara
4.	Contribution of Persons in Evolving this Variety	S.N.Goyal and S.M.Khanorkar
5.	Year	2002
6.	Notification	
	1. Number	937(E)
	2. Date	04/09/2002
7.	Description of Variety	Narmada moti is distinguished by white flint grain type and suited to low nitrogen marginal farming under rainfed situations specially tribal region where white maize is preferred
8.	Description of the Parents of the Hybrids	This variety was developed by advancement of filial generations of cross LGC-40 x EH-2922(HS). LGC-40 was extra-early and derived from local germplasm collections at MMRS, AAU, Godhra during late 1980 whereas, EH-2922(HS) was found high yielding and promising genotype and collected from rabi-1988-89 breeding trials at Godhra
9.	Identifiable Distinguishing Morphological Characters	White, flint grain type
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Moderate tolerance to SB and resistance to MLB and TLB
12.	Quality of Produce	White, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Across the country
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Narmada Moti
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)
Leaf: attitude of blade	Straight (1)
Stem: anthocyanin colouration of brace root	Absent (1)
Tassel: time of anthesis	Early (3)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)
Tassel: attitude of lateral branches	Curved (5)
Ear: time of silk emergence	Early (3)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Medium – Long (5 & 7)
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	Broad (7)
Ear: length without husk	Medium (5)
Ear: diameter	Medium (5)
Ear: shape	Conic- Cylindrical (2)
Ear: number of rows of grains	Many (7)
Ear: type of grain	Flint (1)
Ear: colour of top of grain	White (1)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Round (2)
Kernel: 1000 kernel weight	Medium (5)

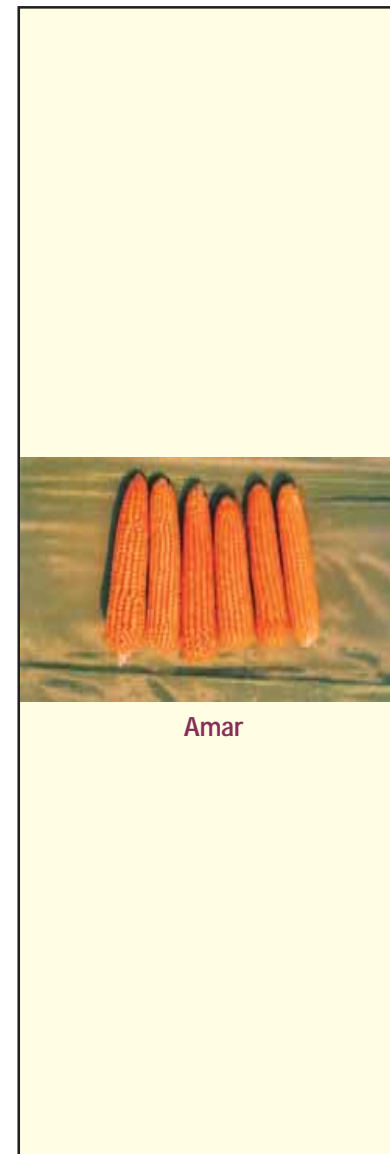


## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Amar</b>
2.	Pedigree/Parentage	Intercross of Tarun, D 765, Kanchan, Navin, Kiran, Suwan-1, Pool 18, Pop 26 and 31
3.	Developing Centre	GBPUA&T, Pantnagar
4.	Contribution of Persons in Evolving this Variety	S.N.Mishra, M. Z. K. Warsi, S. S. Verma and Ranjeet
5.	Year	2001
6.	Notification	
	1. Number	92(E)
	2. Date	02/02/2001
7.	Description of Variety	Medium plant height pale yellow semi-flint kernel colour
8.	Description of the Parents of the Hybrids	Four exotic populations namely Pop 31, Pop 26, Pool 18 and Suwan 1 were included in varietal crosses for development of variety Amar
9.	Identifiable Distinguishing Morphological Characters	Medium plant height pale yellow semi-flint kernel colour
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Moderately resistance to major foliar and stalk diseases, tolerance to SB and fertilizer responsive
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	AP, Maharashtra, Karnataka, TN, Rajasthan, Gujarat and MP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Amar
Leaf: angle between blade and stem (on leaf just above upper ear)	-
Leaf: attitude of blade	-
Stem: anthocyanin colouration of brace root	-
Tassel: time of anthesis	Early (3)
Tassel: anthocyanin colouration at base of glume	-
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Sparse (3)
Tassel: angle between main axis and lateral branches	-
Tassel: attitude of lateral branches	-
Ear: time of silk emergence	Early (3)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	-
Tassel: length of main axis above lowest side branch	-
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	-
Ear: diameter	Medium (5)
Ear: shape	Conical\cylindrical (2)
Ear: number of rows of grains	Medium (5)
Ear: type of grain	Semi Flint (2)
Ear: colour of top of grain	Yellow with cap (4)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Irregular (3)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Toothed (4)
Kernel: 1000 kernel weight	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Pratap Makka 4</b>
2.	Pedigree/Parentage	Bulk of material pool-2
3.	Developing Centre	MPUAT, Udaipur
4.	Contribution of Persons in Evolving this Variety	S.L. Godawat, V. N. Joshi, N.K. Pandiya, P. Kumar, B.R.S. Krishanawat and Amit Dadheech
5.	Year	2006
6.	Notification	
	1. Number	599(E)
	2. Date	25/04/2006
7.	Description of Variety	Strong tall plant with medium cob placement, Semi-dense tassel with purplish glumes colour
8.	Description of the Parents of the Hybrids	Bulk of National Pool-2 (selected progenies from C <sub>3</sub> cycle of NP-2)
9.	Identifiable Distinguishing Morphological Characters	Strong tall plant with medium cob placement, Semi-dense tassel with purplish glumes colour
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Moderately resistance to stem borer
12.	Quality of Produce	White, semi-flint
13.	Reaction to Stress (Special Character)	Escape terminal drought due to early maturity
14.	Area of Adoption	J&K, Uttarakhand, NE Hills, HP and Assam
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	45
17.	Remarks	Registered w.e.f. March 07, 2011

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Pratap Makka 4
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)
Leaf: attitude of blade	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)
Tassel: time of anthesis	Medium (5)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Narrow (7)
Tassel: angle between main axis and lateral branches	Narrow (7)
Tassel: attitude of lateral branches	Straight (1)
Ear: time of silk emergence	Medium (5)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)
Plant length up to flag leaf	Long (7)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	Long (7)
Ear: diameter	Medium (5)
Ear: shape	Conico-cylindrical (2)
Ear: number of rows of grains	Many (7)
Ear: type of grain	Flint (1)
Ear: colour of top of grain	White (1)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Toothed (4)
Kernel: 1000 kernel weight	Large (7)



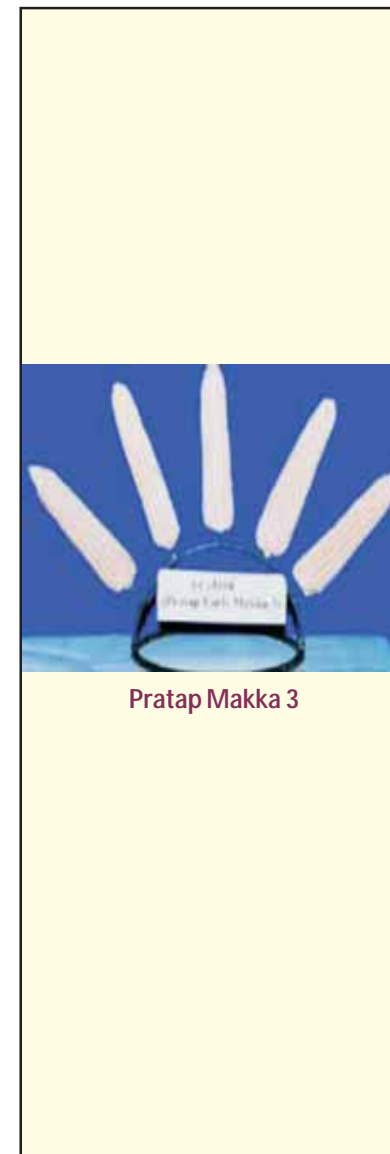
**Pratap Makka 4**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Pratap Makka 3</b>
2.	Pedigree/Parentage	Bulk of CEW-8 pool
3.	Developing Centre	MPUA&T, Udaipur
4.	Contribution of Persons in Evolving this Variety	V. N. Joshi, S.L. Godawat, R.B. Dubey, N.K. Pandiya , P. Kumar, B.R.S. Krishanawat and Amit Dadheech
5.	Year	2005
6.	Notification	
	1. Number	122(E)
	2. Date	02/02/2005
7.	Description of Variety	Semi erect, dark green, hairy leaves, medium sized, cylindrical cobs with good top filling
8.	Description of the Parents of the Hybrids	Bulk of CEW-8 Pool selected through random mating cycle-4
9.	Identifiable Distinguishing Morphological Characters	Semi erect, dark green, hairy leaves, medium sized, cylindrical cobs with good top filling
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Moderately resistant to ESR, PFSR, MLB, TLB, BLSB, BSDM and SB
12.	Quality of Produce	White, semi-flint
13.	Reaction to Stress (Special Character)	Escape terminal drought due to early maturity
14.	Area of Adoption	Rajasthan, Gujarat and MP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Registered w.e.f. March 07, 2011

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Pratap Makka 3
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)
Leaf: attitude of blade	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)
Tassel: time of anthesis	Very early (3)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Dense (7)
Tassel: angle between main axis and lateral branches	Narrow (7)
Tassel: attitude of lateral branches	Curved (5)
Ear: time of silk emergence	Early (3)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)
Plant length up to flag leaf	Long (7)
Plant: ear placement	Medium (5)
Leaf: width of blade	Broad (7)
Ear: length without husk	Long (7)
Ear: diameter	Medium (5)
Ear: shape	Conical (1)
Ear: number of rows of grains	Medium (5)
Ear: type of grain	Semi Flint (2)
Ear: colour of top of grain	White (1)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Toothed (4)
Kernel: 1000 kernel weight	Medium (5)





## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>NAC-6002</b>
2.	Pedigree/Parentage	NAI-103, 104, 109, 113, 114 & 117, 118, 125, 132, 133, 134, 135, 136, 108, 140
3.	Developing Centre	UAS, Nagenahalli
4.	Contribution of Persons in Evolving this Variety	K.T. Pandurange gowda, Puttaramanaik and T.A. Sreerama Setty
5.	Year 2002	
6.	Notification	
	1. Number	937(E)
	2. Date	04/09/2002
7.	Description of Variety	NAC-6002 is a composite variety with yellow semi-dent grain type
8.	Description of the Parents of the Hybrids	NAC-6002 was derived from 16 top Turcicum leaf blight and sorghum downy mildew disease resistant Full-sib families of early yellow "INDIMYT-145" population in Cycle-3. Later these best 16 Full-sibs were subjected to Half-sib and Full-sib method of recurrent selection and recombination
9.	Identifiable Distinguishing Morphological Characters	Medium, green & thick stem, tassel erect dense with purple anther glume, yellow, semi-dent
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Resistance to TLB, DM, SB, corn ear worm and flea beetles
12.	Quality of Produce	Yellow, semi-dent
13.	Reaction to Stress (Special Character)	Low to moderate
14.	Area of Adoption	AP, Maharashtra, TN and Karnataka
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Registered w.e.f. March 07, 2011

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	NAC 6002
Leaf: angle between blade and stem (on leaf just above upper ear)	Medium (5)
Leaf: attitude of blade	Straight (1)
Stem: anthocyanin colouration of brace root	Present (9)
Tassel: time of anthesis	Early (3)
Tassel: anthocyanin colouration at base of glume	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Present (9)
Tassel: density of spikelets	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)
Tassel: attitude of lateral branches	Straight (1)
Ear: time of silk emergence	Early (3)
Ear: anthocyanin colouration of silks	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	Medium (5)
Ear: diameter	Medium (5)
Ear: shape	Cylindrical (3)
Ear: number of rows of grains	Medium (5)
Ear: type of grain	Semi-Dent (2)
Ear: colour of top of grain	Yellow (3)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Round (2)
Kernel: 1000 kernel weight	Medium (5)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>NAC 6004</b>
2.	Pedigree/Parentage	Derived from INDIMYT-345 population
3.	Developing Centre	UAS, Nagenahalli
4.	Contribution of Persons in Evolving this Variety	K.T. Pandurange gowda, Puttaramanaik and T.A. Sreerama Setty
5.	Year	2001
6.	Notification	
	1. Number	92(E)
	2. Date	02/02/2001
7.	Description of Variety	NAC-6004 is a composite variety with yellow semi-dent grain type
8.	Description of the Parents of the Hybrids	NAC-6004 was derived from 15 top Turcicum leaf blight and sorghum downy mildew disease resistant Full-sib families of Late yellow "INDIMYT-345" population in Cycle-3. Later, these best 15 Full-sibs were subjected to Half-sib and Full-sib method of recurrent selection and recombination
9.	Identifiable Distinguishing Morphological Characters	Medium green stalk with light pink base, dark green leaves, silk colour green, tassel erect dense, semi-bold grains
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Resistance to TLB, downy mildew, stalk borer, corn and ear worm and Flea beetles
12.	Quality of Produce	Yellow, semi-dent
13.	Reaction to Stress (Special Character)	Low to moderate resistance to major stress
14.	Area of Adoption	Karnataka
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	66
17.	Remarks	Registered w.e.f. March 07, 2011

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	NAC 6004
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)
Leaf: attitude of blade	Straight (1)
Stem: anthocyanin colouration of brace root	Present (9)
Tassel: time of anthesis	Late (7)
Tassel: anthocyanin colouration at base of glume	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)
Tassel: density of spikelets	Medium (5)
Tassel: angle between main axis and lateral branches	Medium (5)
Tassel: attitude of lateral branches	Curved (5)
Ear: time of silk emergence	Late (7)
Ear: anthocyanin colouration of silks	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	Medium (5)
Ear: diameter	Medium (5)
Ear: shape	Cylindrical (3)
Ear: number of rows of grains	Medium (5)
Ear: type of grain	Semi-dent (2)
Ear: colour of top of grain	Orange yellow (5)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Round (2)
Kernel: 1000 kernel weight	Medium (5)



NAC 6004

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Azad Kamal</b>
2.	Pedigree/Parentage	(Azad Uttam x Navjot) x Surya
3.	Developing Centre	CSAUA&T, Kanpur
4.	Contribution of Persons in Evolving this Variety	N.S. Shukla, S.L. Katiyar, H.C.Singh, K.C. Arya, R.D. Dwivedi and K.K. Saxena
5.	Year	2005
6.	Notification	
	1. Number	122(E)
	2. Date	02/02/2005
7.	Description of Variety	Tassel pinkish white, semi lax, grain medium bold, yellowish orange
8.	Description of the Parents of the Hybrids	Three way cross between (Azad Uttam x Navjot) x Surya, improved through recurrent selection for three cycles
9.	Identifiable Distinguishing Morphological Characters	Tassel pinkish white, semi lax, grain medium bold, yellowish orange
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Tolerance to major diseases and insect-pests
12.	Quality of Produce	Yellow-orange
13.	Reaction to Stress (Special Character)	Suitable for rainfed/limited irrigated conditions
14.	Area of Adoption	Rajasthan, Gujarat and MP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	42
17.	Remarks	Registered w.e.f. September 30, 2011

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Azad Kamal
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)
Leaf: attitude of blade	Straight (1)
Stem: anthocyanin colouration of brace root	Absent (1)
Tassel: time of anthesis	Early (3)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	-
Tassel: density of spikelets	Sparse (3)
Tassel: angle between main axis and lateral branches	Narrow (3)
Tassel: attitude of lateral branches	Straight (1)
Ear: time of silk emergence	Early (3)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)
Plant length up to flag leaf	Medium (5)
Plant: ear placement	-
Leaf: width of blade	Medium (5)
Ear: length without husk	Long (7)
Ear: diameter	Medium (5)
Ear: shape	Conico cylindrical (2) (2)
Ear: number of rows of grains	Medium (5)
Ear: type of grain	Flint (1)
Ear: colour of top of grain	Yellowish orange (7)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Indented (3)
Kernel: 1000 kernel weight	Large (7)



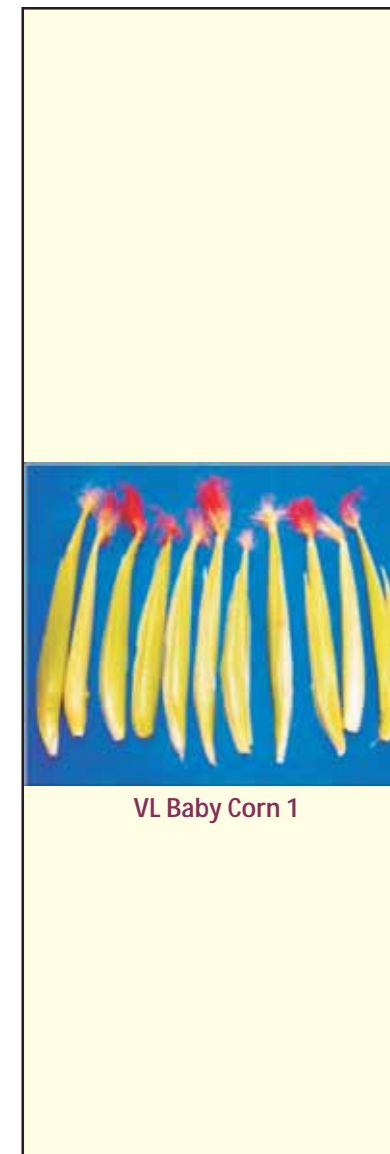
## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 6.2 Baby Corn

S. No.		
1.	Name of Composite	<b>VL Baby Corn 1</b>
2.	Pedigree/Parentage	[(VL 16 x Murulia) X VL 16] x VL 16]
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	P. Mani, Rajesh Singh, R. Babu, K. S. Koranga, G.S. Bisht and A. K. Pandey
5.	Year	2005
6.	Notification	
	1. Number	122(E)
	2. Date	02/02/2005
7.	Description of Variety	Long plant with high ear placement; Medium ear length without husk; Conico-cylindrical ear shape with medium number of rows
8.	Description of the Parents of the Hybrids	A composite from (VL 16 x Murulia) x VL 16) x VL 16)
9.	Identifiable Distinguishing Morphological Characters	Long plant with high ear placement; Medium ear length without husk; Conico-cylindrical ear shape with medium number of rows
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Moderate degree to tolerant
12.	Quality of Produce	Yellow
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Across the country
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	Prolific yield 38-40 q/ha with baby corn yield as 12-13 q/ha
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	VL Baby Corn 1
Leaf: angle between blade and stem (on leaf just above upper ear)	Wide (7)
Leaf: attitude of blade	Droopy (9)
Stem: anthocyanin colouration of brace root	Absent (1)
Tassel: time of anthesis	Early (3)
Tassel: anthocyanin colouration at base of glume	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)
Tassel: density of spikelets	Dense (7)
Tassel: angle between main axis and lateral branches	Wide (7)
Tassel: attitude of lateral branches	Curved (5)
Ear: time of silk emergence	Early (3)
Ear: anthocyanin colouration of silks	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)
Plant length up to flag leaf	Long (7)
Plant: ear placement	High (7)
Leaf: width of blade	Medium (5)
Ear: length without husk	Medium (5)
Ear: diameter	Medium (5)
Ear: shape	Cylindrical (3)
Ear: number of rows of grains	Medium (5)
Ear: type of grain	Flint (1)
Ear: colour of top of grain	Yellow (3)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Round (2)
Kernel: 1000 kernel weight	Medium (5)



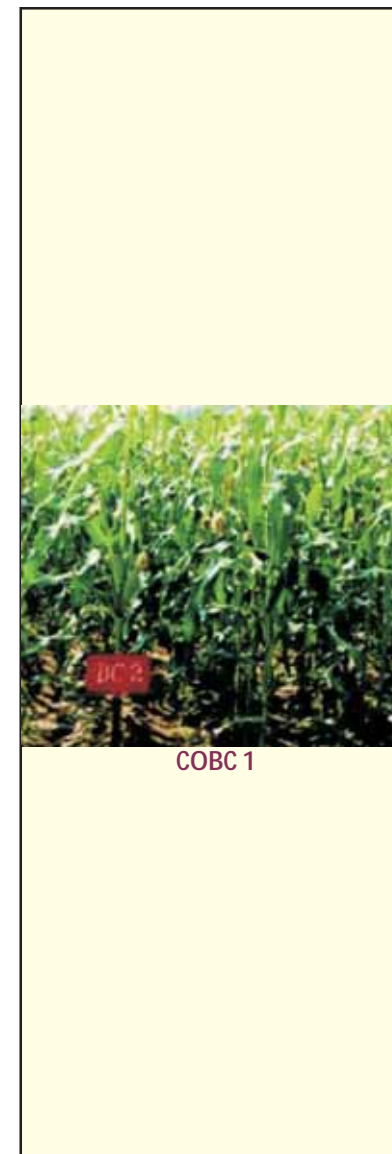


## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>COBC 1</b>
2.	Pedigree/Parentage	(UMI 90 x UMI 285) X UMI 112
3.	Developing Centre	TNAU, Coimbatore
4.	Contribution of Persons in Evolving this Variety	G.Nallathambi, N.Jayaraman and M.Rangasamy
5.	Year	1999
6.	Notification	
	1. Number	425(E)
	2. Date	08/06/1999
7.	Description of Variety	COBC 1 is a variety with prolificacy, shrunken and yellow dent grains
8.	Description of the Parents of the Hybrids	UMI 836 was derived through selections followed by composite development from Thai 416
9.	Identifiable Distinguishing Morphological Characters	Semi-dwarf, erect, greenish pink stem colour with dark green leaves
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Bold grain with moderate resistance to DM and stem borer
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Across the country under rainfed and irrigated ecology
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	32t/ha (green fodder yield)
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	COBC 1
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)
Leaf: attitude of blade	Drooping (9)
Stem: anthocyanin colouration of brace root	Present (9)
Tassel: time of anthesis	Early (3)
Tassel: anthocyanin colouration at base of glume	Present (9)
Tassel: anthocyanin colouration of glumes excluding base	Present (9)
Tassel: anthocyanin colouration of anthers	Present (9)
Tassel: density of spikelets	Dense (7)
Tassel: angle between main axis and lateral branches	Narrow (3)
Tassel: attitude of lateral branches	Curved (5)
Ear: time of silk emergence	Medium (5)
Ear: anthocyanin colouration of silks	Present (9)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	Medium (5)
Ear: diameter	Medium (5)
Ear: shape	Conico-cylindrical (2)
Ear: number of rows of grains	Medium (5)
Ear: type of grain	Dent (3)
Ear: colour of top of grain	Yellow (3)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Absent (1)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Shrunken (1)
Kernel: 1000 kernel weight	Small (3)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 6.3 Sweet Corn

S. No.		
1.	Name of Composite	<b>Win Orange Sweet Corn</b>
2.	Pedigree/Parentage	Elite family crosses of winter nursery sweet corn population
3.	Developing Centre	Winter Nursery, DMR
4.	Contribution of Persons in Evolving this Variety	S. Venkatesh, J.C.Sekhar, R.Sai Kumar, E.Satyanarayana and M.L.K.Reddy
5.	Year	2005
6.	Notification	
	1. Number	122(E)
	2. Date	02/02/2005
7.	Description of Variety	Win orange sweet corn is a sweet corn composite is medium maturing with large cob size and moderately dented seed
8.	Description of the Parents of the Hybrids	It involves Hungary sweet corn an introduction along with indigenous germplasm Harsha, Navjot, Prabhat with sweet corn varieties Madhuri, Priya in the development of sweet corn population. It is obtained from elite family crosses of winter nursery sweet corn population
9.	Identifiable Distinguishing Morphological Characters	Leaf light green, tassel heavy, husk complete and extends beyond tip, shriveled sugary dent, stay green colour
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Shriveled and sugary and tolerance to MLB, TLB and ESR
12.	Quality of Produce	Dent
13.	Reaction to Stress (Special Character)	Moderately tolerant to moisture stress
14.	Area of Adoption	J&K, Uttarakhand, NE and HP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	65
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Win Orange Sweet Corn
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)
Leaf: attitude of blade	Drooping (9)
Stem: anthocyanin colouration of brace root	Absent (1)
Tassel: time of anthesis	Medium (5)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (1)
Tassel: density of spikelets	Sparse (3)
Tassel: angle between main axis and lateral branches	Narrow (3)
Tassel: attitude of lateral branches	Curved (5)
Ear: time of silk emergence	Medium (5)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Medium (5)
Plant length up to flag leaf	Medium (5)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	Long (7)
Ear: diameter	Large (5)
Ear: shape	Conico-cylindrical (2)
Ear: number of rows of grains	Many (7)
Ear: type of grain	Dent (3)
Ear: colour of top of grain	Yellow (3)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Present (9)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Shrunken (1)
Kernel: 1000 kernel weight	Small (3)



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Priya Sweet Corn</b>
2.	Pedigree/Parentage	Malaysian Sweet Corn, Thai Sweet Corn, Madhuri and Madhu Makka
3.	Developing Centre	ANGRAU, Hyderabad
4.	Contribution of Persons in Evolving this Variety	E.Sathyanarayana, R.Sai Kumar, Rajesham, P.Mary Rekha, M.Lavakumar Reddy and S.Venkatesh
5.	Year	2002
6.	Notification	
	1. Number	937(E)
	2. Date	04/09/2002
7.	Description of Variety	Priya is a sweet corn composite is medium maturing with large cob size and moderately dented seed
8.	Description of the Parents of the Hybrids	The composite was developed by chain crossing among four sweet corn varieties viz. namely Malaysian sweet corn, Thai sweet corn, Madhuri and Madhu Makka. Selected half sib progenies were bulked and in the subsequent generations mass selection was practiced in the best families
9.	Identifiable Distinguishing Morphological Characters	Leaf light green, tassel heavy, glume green, white, dent
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Tolerance to diseases like TLB, charcoal rot, late wilt and other stalk rots
12.	Quality of Produce	Yellow, dent
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Andhra Pradesh, Tamil Nadu, Maharashtra and Karnataka
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	25
17.	Remarks	Registered w.e.f. October 20, 2010

## A Compendium of Hybrids and Composites of Maize (1993-2012)

Characteristics	Priya Sweet Corn
Leaf: angle between blade and stem (on leaf just above upper ear)	Small (3)
Leaf: attitude of blade	Drooping (1)
Stem: anthocyanin colouration of brace root	Absent (1)
Tassel: time of anthesis	Medium (5)
Tassel: anthocyanin colouration at base of glume	Absent (1)
Tassel: anthocyanin colouration of glumes excluding base	Absent (1)
Tassel: anthocyanin colouration of anthers	Absent (9)
Tassel: density of spikelets	Sparse (7)
Tassel: angle between main axis and lateral branches	Narrow (3)
Tassel: attitude of lateral branches	Straight (1)
Ear: time of silk emergence	Medium (5)
Ear: anthocyanin colouration of silks	Absent (1)
Leaf: anthocyanin colouration of sheath	Absent (1)
Tassel: length of main axis above lowest side branch	Long (7)
Plant length up to flag leaf	Long (7)
Plant: ear placement	Medium (5)
Leaf: width of blade	Medium (5)
Ear: length without husk	Medium (5)
Ear: diameter	Large (5)
Ear: shape	Conico-cylindrical (2)
Ear: number of rows of grains	Medium (5)
Ear: type of grain	Semii-dent (2)
Ear: colour of top of grain	Orange (5)
Ear: colouration of glumes of cob	White (1)
Kernel: row arrangement	Straight (1)
Kernel: poppiness	Absent (1)
Kernel: sweetness	Present (9)
Kernel: waxiness	Absent (1)
Kernel: opaqueness	Absent (1)
Kernel: shape	Shrunken (1)
Kernel: 1000 kernel weight	Small (3)



## 7. Composites under DUS testing

Under new category, two composites have completed one year of DUS testing at two locations (Delhi and Hyderabad) whereas one composite filed under VCK has completed one year of DUS testing. In this section information on major characteristics, notification number and date, area of adoption and average yield has been tabulated.

## A Compendium of Hybrids and Composites of Maize (1993-2012)


S. No.		
1.	Name of Composite	<b>Vivek Sankul Makka 35</b>
2.	Pedigree/Parentage	Heterotic pool -1
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	Vinay Mahajan, H. S. Gupta, V. P. Mani, G. S. Bisht, M. C. Pant , S. K. Pant and J. K. Bisht
5.	Year	2009
6.	Notification	
	1. Number	2187(E)
	2. Date	27/08/2009
7.	Description of Variety	Broad blade leaves; Early anthesis; Anthocyanin pigment absent at base of glume and silk; Medium ear placement
8.	Description of the Parents of the Hybrids	Synthetic developed through S <sub>1</sub> selection in Early Yellow Heterotic Pool-I developed at Almora
9.	Identifiable Distinguishing Morphological Characters	Broad blade leaves; Early anthesis; Anthocyanin pigment absent at base of glume and silk; Medium ear placement
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	-
12.	Quality of Produce	White, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	J&K, HP, UA and NE hills
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Completed one year of DUS testing



**Vivek Sankul Makka 35**



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.			
1.	Name of Composite	<b>Bajaura Makka 1</b>	
2.	Pedigree/Parentage	Modified mass selection from; CHH 71/ JH3748 /AH807/ L118 (Girija)/ Chamba local /Salooni local	
3.	Developing Centre	CSK HPKV, Bajaura	
4.	Contribution of Persons in Evolving this Variety	S.K Guleria, B.K.Sharma, DR Thakur, Swaran Lata, Rakesh Devlash , Anil Kumar and Akhilesh Singh	
5.	Year	-	<b>Bajaura Makka 1</b>
6.	Notification		
	1. Number		
	2. Date		
7.	Description of Variety	Medium maturing composite and its plants of medium height with medium cob placement, long ears with shining yellow orange semi flint grains	
8.	Description of the Parents of the Hybrids	Bajaura Makka 1 was developed by modified mass selection from; CHH 71/ JH3748 /AH807/ L118 (Girija)/ Chamba local /Salooni local followed by four cycles of random mating with selection in each cycle	
9.	Identifiable Distinguishing Morphological Characters	Medium maturing composite and its plants of medium height with medium cob placement, long ears with shining yellow orange flint grains	
10.	No. of days to Maturity	Medium	
11.	Reaction to Major Pests and Diseases	Tolerance to major diseases	
12.	Quality of Produce	Yellow- orange, semi-flint	
13.	Reaction to Stress (Special Character)	-	
14.	Area of Adoption	Uttarakhand and HP	
15.	Production conditions	<i>Kharif</i>	
16.	Average grain yield (q/ha)	63	
17.	Remarks	Completed one year of DUS testing	

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	Vivek Sankul Makka 11
2.	Pedigree/Parentage	Pop.31 C4 HS bulk (Alm) ###-⊗ bulk-###-⊗ bulk-f
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	V.P. Mani, Rajesh Singh, S.K. Pant, A. K. Pandey, K. S. Koranga and G.S. Bisht
5.	Year	-
6.	Notification	
	1. Number	
	2. Date	-
7.	Description of Variety	Wide angle between drooping blade and stem; Anthocyanin pigment present in anthers, glume base and silk; Anthocyanin colouration of glumes excluding base is purple; Long plant height with flint, flat, orange-yellow grains
8.	Description of the Parents of the Hybrids	The exotic germplasm Population 31 was used to develop the composite through selection, Pop.31 C4 HS bulk (Alm) ###-⊗ bulk-###-⊗ bulk-f
9.	Identifiable Distinguishing Morphological Characters	Wide angle between drooping blade and stem; Anthocyanin pigment present in anthers, glume base and silk; Anthocyanin colouration of glumes excluding base is purple; Long plant height with flint, flat, orange-yellow grains
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Tolerant to leaf blight
12.	Quality of Produce	Orange yellow, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Uttarakhand
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Completed one year DUS testing under VCK category



Vivek Sankul Makka  
11

## 8. Composites accepted for registration

Fifteen composites have been accepted for registration under PPV&FR Act, 2001. The details information on major characteristics, notification number and date, area of adoption and average yield has been compiled in this section.

## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 8.1 New Category

S. No.		
1.	Name of Composite	<b>Vivek Sankul Makka 37</b>
2.	Pedigree/Parentage	VL Makka 16, Pop 31, C 4 HS bulk (Alm), VL 87, VL 89, D 831 and D 941
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	Vinay Mahajan, H. S. Gupta, V. P. Mani, G. S. Bisht, M. C. Pant and S. K. Pant
5.	Year	2009
6.	Notification	
	1. Number	2187(E)
	2. Date	27/08/2009
7.	Description of Variety	Medium tassel length of main axis above lowest side branch
8.	Description of the Parents of the Hybrids	A synthetic of seven experimental and released varieties, viz., VL Makka 16, Pop 31 C <sub>4</sub> HS bulk (Alm), VL 87, VL 89, VL 90, D 831 and D 941
9.	Identifiable Distinguishing Morphological Characters	Medium tassel length of main axis above lowest side branch
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	-
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Karnataka, AP, TN and Maharashtra
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	Seed, seed quality report and DUS test fee submitted



**Vivek Sankul Makka 37**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Vivek Sankul Makka 31</b>
2.	Pedigree/Parentage	A composite of seven experimental and release varieties viz. VL Makka 19, Pop.31 C 4 HS bulk (Alm), VL 87, VL 89, VL 90, D 931 and D941.
3.	Developing Centre	VPKAS, Almora
4.	Contribution of Persons in Evolving this Variety	V. Mahajan, R. Bahu, V.P. Mani, H S Gupta, K. S. Koranga, G.S. Bisht, M C Pant, S. K. Pant and K. A. Gopinath
5.	Year	2008
6.	Notification	
	1. Number	1108(E)
	2. Date	08/05/2008
7.	Description of Variety	Wide angle between drooping blade and stem; Anthocynin pigment present in anthers, glume base and silk; Anthocyanin colouration of glumes excluding base is purple; Long plant height with flint, flat, orange-yellow grains, conico-cylindrical ears, large tassel and broad leaf blade
8.	Description of the Parents of the Hybrids	A composite of seven experimental and release varieties viz. VL Makka 19, Pop.31 C 4 HS bulk (Alm), VL 87, VL 89, VL 90, D 931 and D941.
9.	Identifiable Distinguishing Morphological Characters	Plant medium with large-open tassel, predominately purplish green glume and purple anther and silk
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Tolerance against <i>H. turcicum</i> leaf blight
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Uttarakhand hills
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Seed, seed quality report and DUS test fee submitted



**Vivek Sankul Makka 31**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Jawahar Pop Corn 11</b>
2.	Pedigree/Parentage	Amber Pop
3.	Developing Centre	JNKVV, Chhindwara
4.	Contribution of Persons in Evolving this Variety	S.K. Thakur, N.D. Raut, V.K. Paradkar and R. K. Sharma
5.	Year	2007
6.	Notification	
	1. Number	1178(E)
	2. Date	20/07/2007
7.	Description of Variety	Jawahar Pop Corn -11 is a composite with white grain type in early maturity group
8.	Description of the Parents of the Hybrids	Germplasm collected from the State M.P.
9.	Identifiable Distinguishing Morphological Characters	Medium maturity, medium plant height, cob placement is more over in middle of the plants
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Tolerant to TLB and MLB
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	MP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Seed, seed quality report and DUS test fee submitted



**Jawahar Pop Corn 11**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 8.2 Extant Category

S. No.		
1.	Name of Composite	<b>Pratap Makka 5</b>
2.	Pedigree/Parentage	Bulk of 11 HS progenies selected from C <sub>3</sub> cycle of material pool-2
3.	Developing Centre	MPUAT, Udaipur
4.	Contribution of Persons in Evolving this Variety	V. N. Joshi, S.L. Godawat, R.B. Dubey, N.K. Pandiya, P. Kumar, B.R.S. Krishanawat and Amit Dadheech
5.	Year	2006
6.	Notification	
	1. Number	599(E)
	2. Date	25/04/2006
7.	Description of Variety	Broad, semi erect green leaves, tall and vigorous plants with medium sized, conico -cylindrical cobs.
8.	Description of the Parents of the Hybrids	Composite (Bulk of 11 HS progenies selected from C <sub>3</sub> cycle of NP-2 pool)
9.	Identifiable Distinguishing Morphological Characters	Broad, semi erect green leaves, tall and vigorous plants with medium sized, conico -cylindrical cobs.
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Moderately resistance to ESR, PFSR, MLB, TLB, BLSB and BSDM and moderate tolerance to SB
12.	Quality of Produce	White, flint
13.	Reaction to Stress (Special Character)	Satisfactory yield performance even in low rainfall areas
14.	Area of Adoption	Rajasthan, Gujarat, AP, MP and Chattisgarh
15.	Production conditions	<i>Kharif</i>
16.	Grain yield (q/ha)	45
17.	Remarks	Seed, seed quality report and registration fee submitted



**Pratap Makka 5**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Jawahar Makka 216</b>
2.	Pedigree/Parentage	Local germplasm from Ambikapur
3.	Developing Centre	JNKVV, Chhindwara
4.	Contribution of Persons in Evolving this Variety	R.G. Satpute, S. K. Thakur, N.D. Raut, V.K. Rastogi, V.K Paradkar and R.K.Sharma
5.	Year	2004
6.	Notification	
	1. Number	161(E)
	2. Date	04/02/2004
7.	Description of Variety	Jawahar makka-216 is a Yellow-orange composite of medium maturity
8.	Description of the Parents of the Hybrids	It is a composite developed from local germplasm. The material was strengthened by sibbing and half sibbing than selection pressure was applied towards desirable characters
9.	Identifiable Distinguishing Morphological Characters	Sturdy plants with dark green leaves, stem stout purplish tinge often observed, ear placement is mostly in middle of the plant
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Resistance to MLB and TLB
12.	Quality of Produce	Yellow-orange
13.	Reaction to Stress (Special Character)	It is fairly tolerant to drought stress
14.	Area of Adoption	MP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Seed, seed quality report and registration fee submitted

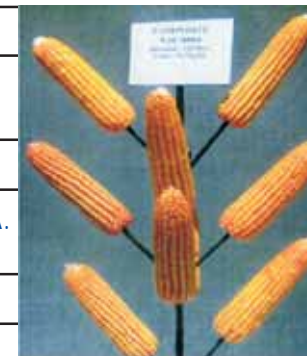


**Jawahar Makka 216**



## A Compendium of Hybrids and Composites of Maize (1993-2012)

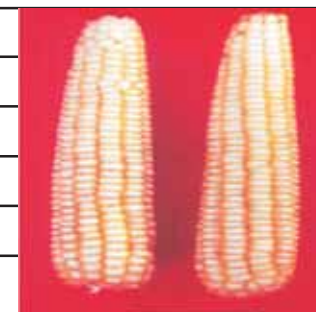
S. No.		
1.	Name of Cultivar	<b>Aravali Makka 1</b>
2.	Pedigree/Parentage	Bulk of early and stress tolerant HS families from X- 2 W pool
3.	Developing Centre	MPUA&T, Udaipur
4.	Contribution of Persons in Evolving this Variety	S.C. Gupta, V. N. Joshi, R.B. Dubey, N.K. Pandiya, A. K. Nagada and S. N. Jain
5.	Year	2001
6.	Notification	
	1. Number	92(E)
	2. Date	02/02/2001
7.	Description of Variety	Medium statured plant, Narrow semi erect, dark green leaves
8.	Description of the Parents of the Hybrids	Bulk of early and stress tolerant HS families from X <sub>2</sub> W Pool
9.	Identifiable Distinguishing Morphological Characters	Medium statured plant, Narrow semi erect, dark green leaves
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Moderate resistance to MLB, TLB, BSDM and downy mildew
12.	Quality of Produce	White, semi-flint
13.	Reaction to Stress (Special Character)	High yield performance in rainfed situations
14.	Area of Adoption	Rajasthan, Gujarat and parts of Maharashtra
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Seed, seed quality report and registration fee submitted



**Aravali Makka 1**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Jawahar Composite 12</b>
2.	Pedigree/Parentage	Early to very early national pool (CDW) material
3.	Developing Centre	JNKVV, Chhindwara
4.	Contribution of Persons in Evolving this Variety	V. K. Rastogi and V.K. Paradkar
5.	Year	1999
6.	Notification	
	1. Number	425(E)
	2. Date	08/06/1999
7.	Description of Variety	Jawahar Composite Makka-12 (J.M.-12) is a white grain composite of medium maturity having high yield
8.	Description of the Parents of the Hybrids	Early to very early national pool (CDW) material
9.	Identifiable Distinguishing Morphological Characters	White grain composite of medium maturity having high yield
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Tolerance to TLB and MLB
12.	Quality of Produce	White, semi-flint
13.	Reaction to Stress (Special Character)	Fairly good tolerant to drought stress
14.	Area of Adoption	All tribals areas of MP under low to moderate rainfall condition
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	45
17.	Remarks	Seed, seed quality report and registration fee submitted



Jawahar Composite 12

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Jawahar Makka 8</b>
2.	Pedigree/Parentage	Early to very early national pool (CDW) material
3.	Developing Centre	JNKVV, Chhindwara
4.	Contribution of Persons in Evolving this Variety	V. K. Rastogi, A. K. Sharma and V.K. Paradkar
5.	Year	1997
6.	Notification	
	1. Number	360(E)
	2. Date	01/05/1997
7.	Description of Variety	Jawahar makka-8 is a composite with white grain type in early maturity group
8.	Description of the Parents of the Hybrids	Early to very early national pool (CDW) material
9.	Identifiable Distinguishing Morphological Characters	White grain type in early maturity group
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Resistant to MLB
12.	Quality of Produce	White, flint
13.	Reaction to Stress (Special Character)	Fairly good tolerant to moisture stress
14.	Area of Adoption	Rajasthan, Gujarat and MP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Seed, seed quality report and registration fee submitted



Jawahar Makka 8

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Shakti 1</b>
2.	Pedigree/Parentage	Antigua, Ver 181 HE02, Amarillo crstallino HE02, Ant Rep Dom, HE02, temperate HE02
3.	Developing Centre	Delhi
4.	Contribution of Persons in Evolving this Variety	N.N. Singh, Raj Pal Singh, N.P. Gupta, S.B. Singh, Iqbal Singh, Om Prakash and H.O. Gupta
5.	Year	1997
6.	Notification	
	1. Number	662(E)
	2. Date	17/09/1997
7.	Description of Variety	Stem green, leaves narrow to medium, semi-erect, tassel green with light purple, silk green to light purple, grain orange yellow with hard endosperm
8.	Description of the Parents of the Hybrids	Composite Shakti 1 was developed by using Antigua x Ver 181, HE02, Amarillo Cristalino HE02 Anti Rep Dom. HE02 Temperate x tropical HE02 chain crossed, avanced and screened for hard endosperm semi-opaque kernel type through full sib family selection for seven cycles followed by random mating
9.	Identifiable Distinguishing Morphological Characters	Stem green, leaves narrow to medium, semi-erect, tassel green with light purple, silk green to light purple, grain orange yellow with hard endosperm
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Moderate resistance to TLB, tolerance to <i>sesamia inferens</i> and QPM composite variety with 0.63% tryptophan in protein
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Across the country
15.	Production conditions	<i>Rabi</i>
16.	Grain yield (q/ha)	45
17.	Remarks	-



**Shakti 1**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Matungha</b>
2.	Pedigree/Parentage	(KDMIG x KDMI 10) x CM 501
3.	Developing Centre	UAS, Dharwad
4.	Contribution of Persons in Evolving this Variety	S.J.Patil, R.Gurumurthy, S.Muralikrishna, M.T.Hegde, M.R.Gururaja Rao, M.R.Krishnappa, S.K.Nadaf, B.T. Ninganur, P.Y.Kamannavar, G.V.P. Reddy and Mohammed Ibrahim
5.	Year	1997
6.	Notification	
	1. Number	647(E)
	2. Date	09/09/1997
7.	Description of Variety	Long length without husk, glume light purple
8.	Description of the Parents of the Hybrids	Parental lines KDMI 4 & KDMI 10 are developed from X <sub>1</sub> (Y) and X <sub>2</sub> (Y) pools, respectively. X <sub>1</sub> (Y) and X <sub>2</sub> (Y) pools developed at Dharwad & Kolhapur Centres of AICMIP by using the elite germplasm available in the country to develop new inbred lines. These two national pools are based on two different heterotic patterns, namely CM-202 and CM-111.
9.	Identifiable Distinguishing Morphological Characters	Long length without husk, glume light purple
10.	No. of days to Maturity	Late
11.	Reaction to Major Pests and Diseases	Tolerance to SDM and MLB
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Karnataka
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	40
17.	Remarks	Seed, seed quality report and registration fee submitted




**Matungha**

## 9. Applications under the process of scrutiny

One hybrid and five composites are under the process of scrutiny at PPV&FR, Authority. In this section information on major characteristics, notification number and date, area of adoption and average yield has been presented.

## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 9.1 Hybrids

S. No.			
1.	Name of Hybrid	<b>PMH 3</b>	
2.	Pedigree/Parentage	LM 17 x LM 14	
3.	Developing Centre	PAU, Ludhiana	
4.	Contribution of Persons in Evolving this Variety	N.S. Malhi, Jasbir Singh, M.S.Grewal, SPS Brar, G.K. Gill, RK Sharma, Nirmal Singh, Harleen Kaur, Jawala Jindal, Mahesh Kumar and Sunita Sharma	
5.	Year	2008	<b>PMH 3</b>
6.	Notification		
	1. Number	2458 (E)	
	2. Date	16/10/2008	
7.	Description of Hybrid	Long plant length, orange, flint grain, wide angle between blade and stem	
8.	Description of the Parents of the Hybrids	LM 17 Inbred line was developed through pedigree method from MS heterotic pool whereas LM 14 is a selection from an Introduction from CIMMYT. Material is in public domain	
9.	Identifiable Distinguishing Morphological Characters	Long plant length, orange, flint grain, wide angle between blade and stem	
10.	No. of days to Maturity	Late	
11.	Reaction to Major Pests and Diseases	Resistance to maydis leaf blight, erwinia stalk rot and post flowering stalk rots	
12.	Quality of Produce	Orange, flint	
13.	Reaction to Stress (Special Character)	Suitable for irrigated conditions	
14.	Area of Adoption	Delhi, Punjab, Haryana and Western UP	
15.	Production conditions	<i>Kharif</i>	
16.	Average grain yield (q/ha)	75	
17.	Remarks	-	

## A Compendium of Hybrids and Composites of Maize (1993-2012)

### 9.2 Composites

S. No.		
1.	Name of Composite	<b>Pratap Kanchan 2</b>
2.	Pedigree/Parentage	Bulk of 11 HS progenies selected from C-3 cycle of NP-1
3.	Developing Centre	MPUA&T, Udaipur
4.	Contribution of Persons in Evolving this Variety	L. L. Panwar, Pramod Rokadia, D. P. Saini, G. S. Ameta and Hargilas
5.	Year	2009
6.	Notification	
	1. Number	454(E)
	2. Date	11/02/2009
7.	Description of Variety	Semi-errect, green leaves, extra-early maturing, medium statured plants, medium sized, sparsely branched tassels with greenish pink anthers, medium sized, cylindrical cobs with semi-flint, yellow coloured grains
8.	Description of the Parents of the Hybrids	Bulk composite of H S progenies selected from III cycle of broad based gene pool National Pool 1
9.	Identifiable Distinguishing Morphological Characters	Broad semi-erect leaves, tall and vigorous plants, medium sized, cylindrical cob with good tip filling
10.	No. of days to Maturity	Extra-early
11.	Reaction to Major Pests and Diseases	Moderate resistance to ESR, PFSR, MLB, TLB and BLSB
12.	Quality of Produce	Yellow, semi-flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	J&K and Uttarakhand
15.	Production conditions	<i>Kharif</i>
16.	Grain yield (q/ha)	56
17.	Remarks	-



Pratap Kanchan 2



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Sharadmani</b>
2.	Pedigree/Parentage	Chain crossing in Azad Uttam, Farrukhabad local, Agethi-76, Kanpur local, Kanchan, Jaunpur local
3.	Developing Centre	CSAUA&T, Kanpur
4.	Contribution of Persons in Evolving this Variety	N.S. Shukla, Attar Singh, K.N. Singh, A.K. Tripathi, M. O. Shamim and K.K. Saxena
5.	Year	2008
6.	Notification	
	1. Number	72(E)
	2. Date	10/01/2008
7.	Description of Variety	Sharadmani is one of the few composite for which information regarding most of the parents is available and possesses stay green trait
8.	Description of the Parents of the Hybrids	i. Agethi -76 x Farrukhabad Local ii. Azad Uttam x Farrukhabad Local iii. Azad Uttam x Kanpur Local iv. Kanchan x Jaunpur Local v. Agethi -76 x Jaunpur Local
9.	Identifiable Distinguishing Morphological Characters	Pinkish white, tassel medium lax
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Tolerant against <i>H. turcicum</i>
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	Suitable for limited irrigated conditions
14.	Area of Adoption	AP, TN
15.	Production conditions	<i>Rabi</i>
16.	Average grain yield (q/ha)	45
17.	Remarks	-



Sharadmani

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Bajaura Makka</b>
2.	Pedigree/Parentage	Early composite, yellow pool Kullu locals bulked together & advanced through controlled bulk pollination
3.	Developing Centre	CSKHPKV, Bajaura
4.	Contribution of Persons in Evolving this Variety	S. K. Guleria, B K Sharma, D.R. thakur, V.K. Rathee, Rakesh Devlash , Swaran Lata, Anil Kumar and Ashawani Kumar
5.	Year	2008
6.	Notification	
	1. Number	2458(E)
	2. Date	16/10/2008
7.	Description of Variety	Bajaura Makka is a early maturing composite and its plants of medium height with medium cob placement, long ears with shining orange flint grains.
8.	Description of the Parents of the Hybrids	Bajaura Makka was developed by modified selection from; PS 62, FH 3209, FH 3198, FH 3202, Early Composite, 10 half sibs progenies of Hill early yellow pool and Kullu local followed by four cycles of random mating with selection in each cycle.
9.	Identifiable Distinguishing Morphological Characters	Plants are medium height with medium cob placement, long ears with shining orange flint grains
10.	No. of days to Maturity	Medium
11.	Reaction to Major Pests and Diseases	Resistance to Turcicum and Maydis leaf blight diseases
12.	Quality of Produce	Orange, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	Uttarakhand and HP
15.	Production conditions	<i>Kharif</i>
16.	Average Grain yield (q/ha)	47
17.	Remarks	-



**Bajaura Makka**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Chandramani</b>
2.	Pedigree/Parentage	Chain crossing in Azad Uttam, Kiran, Kanchan and Navjot improved through simple recurrent selection
3.	Developing Centre	CSAUA&T, Kanpur
4.	Contribution of Persons in Evolving this Variety	N.S. Shukla , U.C.Pachauri, H.C.Singh, K.C. Arya , R.D. Dwivedi, K.K. Saxena, Mahajan Singh and R.P. Katiyar
5.	Year	2008
6.	Notification	
	1. Number	2458(E)
	2. Date	16/10/2008
7.	Description of Variety	Chandramani has long ears, yellowish orange flint grains. It is a composite with early maturity and stalks possess good forage quality because of stay –green character
8.	Description of the Parents of the Hybrids	Chandramani was developed by chain crossing between Azad Uttam, Kiran, Kanchan and Navjot and thereafter improved through simple recurrent selection using four cycle of random mating with mild selection in each cycle.
9.	Identifiable Distinguishing Morphological Characters	Tassel pinkish white, semi lax, grain medium bold, flint, yellowish orange
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Resistance to major diseases
12.	Quality of Produce	Yellow-orange, flint
13.	Reaction to Stress (Special Character)	Suitable for limited irrigated conditions
14.	Area of Adoption	AP, TN, Karnataka, Maharashtra, Gujarat and MP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	50
17.	Remarks	-



**Chandramani**

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S. No.		
1.	Name of Composite	<b>Pant Sankul Makka 3</b>
2.	Pedigree/Parentage	National early yellow pool (NEYP) developed from 29 early maturing population crossed with each other
3.	Developing Centre	GBPUA&T, Pantnagar
4.	Contribution of Persons in Evolving this Variety	M. Z. K. Warsi, S. S. Verma, N. K. Singh, D.C. Baskheti and I.S. Singh
5.	Year	2008
6.	Notification	
	1. Number	2458(E)
	2. Date	16/10/2008
7.	Description of Variety	Pant Sankul Makka-3 is having semi-flint orange yellow grain and sparse tassel with medium ear length
8.	Description of the Parents of the Hybrids	Pant Sankul Makka -3 was developed by population improvement approach. National early yellow pool was generated using controlled crossing among 29 population followed by half sib selection and four cycles of random mating
9.	Identifiable Distinguishing Morphological Characters	Sparse tassel, purple pigmentation on the base of stem
10.	No. of days to Maturity	Early
11.	Reaction to Major Pests and Diseases	Resistance to major pests
12.	Quality of Produce	Yellow, flint
13.	Reaction to Stress (Special Character)	-
14.	Area of Adoption	AP, TN, Karnataka, Maharashtra, Rajasthan, Gujarat and MP
15.	Production conditions	<i>Kharif</i>
16.	Average grain yield (q/ha)	55
17.	Remarks	-



**Pant Sankul Makka 3**

## 10. Hybrids and composites in public domain

Two hybrids and seven composites completed 15 years period and are thus outside the purview of registration. The relevant files stand closed and these varieties are now in public domain.

## A Compendium of Hybrids and Composites of Maize (1993-2012)

### Hybrids and composites completed 15 years period and now in public domain

Hybrids	Centre	Notification no.	Date
DHM 107	ANGRAU, Hyderabad	615 (E)	17/08/1993
DHM 109	ANGRAU, Hyderabad	636(E)	02/09/1994
Composites			
Mahi Kanchan	MPKV, Kolhapur	615 (E)	17/08/1993
Gujarat Makai-2*	AAU, Godhara	408(E)	04/05/1995
C-14*	SKUAS&T, Srinagar	1(E)	01/01/1996
Mahi Dhawal	MPUA&T, Bansawara	1(E)	01/01/1996
Birsa Makai-1*	BAU, Ranchi	1(E)	01/01/1996
Dewaki Composite Makka	RAU, Dholi	1(E)	01/01/1996
C-8	SKUAS&T, Srinagar	1(E)	01/01/1996

\* Registered under PPV&FR Act, 2001; now in public domain

## 11. Date of filing and acknowledgement number of applications

In this section information on date of filing and acknowledgement number of applications is complied.

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S.No.	Hybrids	Name of Centre	Date of Filing	Acknowledgement No.
1.	PMH 4 (JH 31153)	PAU Ludhiana	30.11.2010	REG/2010/340
2.	PMH 5 (JH 31110)	PAU Ludhiana	30.11.2010	REG/2010/341
3.	DHM 119 (BH 4062)	ANGRAU Hyderabad	15.11.2010	REG/2010/327
4.	Rajendra Hybrid Makka-3	RAU Dholi	27.09.2010	REG/2010/304
5.	HQPM-4	CCSHAU Karnal	08.09.2010	REG/2010/263
6.	HSC-1	CCSHAU Karnal	08.09.2010	REG/2010/264
7.	Vivek Maize Hybrid 39 (FH 3356)	VPKAS Almora	26.07.2010	REG/2010/217
8.	Vivek Maize Hybrid 43 (FH 3358)	VPKAS Almora	26.07.2010	REG/2010/216
9.	DHM 117	ANGRAU Hyderabad	08.03.2010	REG/2010/75
10.	DHM 111	ANGRAU Hyderabad	08.03.2010	REG/2010/76
11.	DHM 113	ANGRAU Hyderabad	08.03.2010	REG/2010/77
12.	NAH-2049	ZARS, VC, Mandya	16.09.2009	REG/2009/370
13.	HM-11	CCSHAU Karnal	07.09.2009	REG/2009/364
14.	Bajaura Makka 1	CSK HPKV Bajaura	24.08.2009	REG/2009/341
15.	Vivek Sankul Makka 35	VPKAS Almora	24.08.2009	REG/2009/342
16.	Vivek Sankul Makka 37	VPKAS Almora	24.08.2009	REG/2009/343
17.	PMH-3	PAU Ludhiana	29.01.2009	REG/2009/23
18.	Pant Sankul Makka-3	GBPAU&T Pantnagar	13.01.2009	REG/2009/10
19.	Pratap Kanchan-2	MPUA& Bansawara	13.01.2009	REG/2009/9
20.	Chandra Mani	CSUA&T Kanpur	15.12.2008	REG/2007/519
21.	Sharad Mani	CSUA&T Kanpur	15.12.2008	REG/2008/518
22.	HM -10	CCSHAU Karnal	14.08.2008	REG/2008/438
23.	HQPM- 7	CCSHAU Karnal	14.08.2008	REG/2008/437



## A Compendium of Hybrids and Composites of Maize (1993-2012)

S.No.	Hybrids	Name of Centre	Date of Filing	Acknowledgement No.
24.	Vivek Maize Hybrid-33	VPKAS Almora	14.08.2008	REG/2007/439
25.	Bajaura Makka	CSK HPKV Bajaura	14.08.2008	REG/2008/436
26.	Composite C 8	SKUAST Srinagar	27.06.2008	REG/2007/425
27.	Jawahar Pop Corn-11	JNKVV Chhindwara	12.03.2008	REG/2008/202
28.	Vivek QPM 9	VPKAS Almora	12.02.2008	REG/2008/198
29.	Vivek Sankul Makka 31	VPKAS Almora	12.02.2008	REG/2008/199
30.	Shakti-1	DMR	03.01.2008	REG/2008/87
31.	PAU-352	PAU Ludhiana	02.01.2008	REG/2008/44
32.	PMH 1	PAU Ludhiana	02.01.2008	REG/2008/43
33.	DHM-107	ANGRAU Hyderabad	02.01.2008	REG/2008/46
34.	Parakash	PAU Ludhiana	02.01.2008	REG/2008/50
35.	PMH 2	PAU Ludhiana	02.01.2008	REG/2008/42
36.	Shaktiman-3	RAU Dholi	02.01.2008	REG/2008/47
37.	Shaktiman-4	RAU Dholi	02.01.2008	REG/2008/48
38.	Dewaki	RAU Dholi	02.01.2008	REG/2008/45
39.	Shalimar KG Maize-2	SKUAST Srinagar	02.01.2008	REG/2008/49
40.	NAC-6004	UAS Nagenahalli	02.01.2008	REG/2008/40
41.	NAC-6002	UAS Nagenahalli	02.01.2008	REG/2008/41
42.	DHM 109	ANGRAU Hyderabad	27.12.2007	REG/2007/429
43.	Buland	PAU Ludhiana	27.12.2007	REG/2007/432
44.	Shaktiman-2	RAU Dholi	27.12.2007	REG/2007/420
45.	Shaktiman-1	RAU Dholi	27.12.2007	REG/2007/428
46.	Priya Sweet Corn	ANGRAU Hyderabad	27.12.2007	REG/2007/422

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S.No.	Hybrids	Name of Centre	Date of Filing	Acknowledgement No.
47.	Win Orange Sweet Corn	DMR	27.12.2007	REG/2007/421
48.	Jawahar Composite Makka-12	JNKVV Chhindwara	27.12.2007	REG/2007/427
49.	Jawahar Makka-216	JNKVV Chhindwara	27.12.2007	REG/2007/423
50.	Mahi Dhawal	MPUA&T Bansawara	27.12.2007	REG/2007/431
51.	Mahi Kanchan	MPUA&T Bansawara	27.12.2007	REG/2007/430
52.	Composite C-14	SKUAST Srinagar	27.12.2007	REG/2007/401
53.	Shalimar KG Maize-1	SKUAST Srinagar	27.12.2007	REG/2007/424
54.	COH (M) 5	TNAU Coimbatore	26.12.2007	REG/2007/411
55.	Vivek Maize Hybrid-23	VPKAS Almora	26.12.2007	REG/2007/410
56.	HHMS-2	CCSHAU Karnal	26.12.2007	REG/2007/402
57.	Pusa Early Hybrid Makka-2	IARI Delhi	26.12.2007	REG/2007/409
58.	COH 3	TNAU Coimbatore	26.12.2007	REG/2007/400
59.	COH (M) 4	TNAU Coimbatore	26.12.2007	REG/2007/405
60.	Matungha	UAS Dharwad	26.12.2007	REG/2007/417
61.	DMH-2	UAS Dharwad	26.12.2007	REG/2007/416
62.	HIM-129	VPKAS Almora	26.12.2007	REG/2007/408
63.	Vivek Maize Hybrid-9	VPKAS Almora	26.12.2007	REG/2007/403
64.	Vivek Hybrid-5	VPKAS Almora	26.12.2007	REG/2007/412
65.	Vivek Maize Hybrid-15	VPKAS Almora	26.12.2007	REG/2007/407
66.	Vivek Maize Hybrid-17	VPKAS Almora	26.12.2007	REG/2007/413
67.	Azad Kamal	CSUA&T Kanpur	26.12.2007	REG/2007/415
68.	Jawahar Composite Makka-8	JNKVV Chhindwara	26.12.2007	REG/2007/404
69.	COBC 1	TNAU Coimbatore	26.12.2007	REG/2007/418

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S.No.	Hybrids	Name of Centre	Date of Filing	Acknowledgement No.
70.	Vivek Sankul Makka-11	VPKAS Almora	26.12.2007	REG/2007/414
71.	VL Baby Corn 1	VPKAS Almora	26.12.2007	REG/2007/419
72.	Malviya Hybrid Makka-2	BHU Varanasi	15.12.2007	REG/2007/398
73.	HHM-1	CCSHAU Karnal	11.12.2007	REG/2007/399
74.	Pusa Early Hybrid Makka-1	IARI Delhi	06.12.2007	REG/2007/388
75.	Pusa Early Hybrid Makka-3	IARI Delhi	06.12.2007	REG/2007/385
76.	Pusa Extra Early Hybrid Makka-5	IARI Delhi	06.12.2007	REG/2007/386
77.	Pusa Composite-3	IARI Delhi	06.12.2007	REG/2007/384
78.	Pusa Composite-4	IARI Delhi	06.12.2007	REG/2007/387
79.	Vivek Maize Hybrid-27	VPKAS Almora	27.11.2007	REG/2007/344
80.	Vivek Maize Hybrid-25	VPKAS Almora	27.11.2007	REG/2007/345
81.	D-994	GBPAU&T Pantnagar	27.11.2007	REG/2007/343
82.	Amar	GBPAU&T Pantnagar	27.11.2007	REG/2007/347
83.	Aravali Makka-1	MPUA&T Udaipur	27.11.2007	REG/2007/346
84.	Vivek Hybrid-4	VPKAS Almora	26.11.2007	REG/2007/406
85.	Gujarat Makai-6	AAU Godhara	20.11.2007	REG/2007/338
86.	Gujarat Makai-2	AAU Godhara	20.11.2007	REG/2007/336
87.	Gujarat Makai-3	AAU Godhara	20.11.2007	REG/2007/337
88.	Gujarat Makai-4	AAU Godhara	20.11.2007	REG/2007/339
89.	Narmada Moti	AAU Godhara	20.11.2007	REG/2007/340
90.	Gaurav	GBPAU&T Pantnagar	20.11.2007	REG/2007/341
91.	Birsa Makai-1	BAU Ranchi	19.11.2007	REG/2007/332
92.	Birsa Vikas Makka-2	BAU Ranchi	19.11.2007	REG/2007/333

## A Compendium of Hybrids and Composites of Maize (1993-2012)

S.No.	Hybrids	Name of Centre	Date of Filing	Acknowledgement No.
93.	HQPM-5	CCSHAU Karnal	15.11.2007	REG/2007/310
94.	HM-8	CCSHAU Karnal	15.11.2007	REG/2007/317
95.	HM-9	CCSHAU Karnal	15.11.2007	REG/2007/312
96.	HM-4	CCSHAU Karnal	15.11.2007	REG/2007/316
97.	HM-5	CCSHAU Karnal	15.11.2007	REG/2007/311
98.	HQPM-1	CCSHAU Karnal	15.11.2007	REG/2007/319
99.	Pratap Hybrid Maize-1	MPUA&T Udaipur	15.11.2007	REG/2007/315
100.	Vivek Maize Hybrid-21	VPKAS Almora	15.11.2007	REG/2007/309
101.	Pratap Makka-3	MPUA&T Udaipur	15.11.2007	REG/2007/318
102.	Pratap Makka-4	MPUA&T Udaipur	15.11.2007	REG/2007/314
103.	Pratap Makka-5	MPUA&T Udaipur	15.11.2007	REG/2007/313

## 12. Subject index

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# Notes



# Notes



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