

A New Waxy Corn Hybrid Cultivar, "Mibaek 2" with Good Eating Quality and Lodging Resistance

Ki-Jin Park^{1*}, Jong-Yeol Park¹, Si-Hwan Ryu¹, Byeong-Dae Goh¹, Jeong-Sik Seo¹,
Hwang-Kee Min¹, Tae-Wook Jung², Chang-Suk Huh³, and In-Mo Ryu⁴

¹Maize Experiment Station, Gangwon-do Agricultural Research and Extension Services, Hongcheon 250-823, Korea

²National Institute of Crop Science, RDA, Suwon 441-857, Korea

³Gyeongbuk-do Agricultural Research and Extension Services, Daegu 702-010, Korea

⁴Chungbuk-do Agricultural Research and Extension Services, Cheongwon 363-883, Korea

*Corresponding author(E-mail : kjp@gwd.go.kr, Tel:+82-33-435-3757, Fax:+82-33-435-6876)

Abstract

A new single cross waxy corn (*Zea mays* L.) hybrid, "Mibaek 2" with white kernel was developed by the Maize Experiment Station (MES), Gangwon-do Agricultural Research and Extension Services (GARES) in 2005. This hybrid, which has good eating quality, high yield of fresh ear weight and lodging resistance, was produced by the cross between two inbred lines, HW9 and HW3. Inbred HW9 was derived from Jewon/Bosung//KW7 and inbred HW3 was derived from W9060/A632wx. Two inbred lines were advanced to eight generations by ear-to-row method. The silking date of this hybrid is about six days later than that of check hybrid "Chalok 1". Ear length (18.8 cm) is longer than that (15.8 cm) of check hybrid. It is highly resistance to *B. maydis*(southern leaf blight) and *E. turcicum*(northern leaf blight), and has high lodging tolerance. This hybrid has better eating quality than "Chalok 1". The yields of "Mibaek 2" in fresh ear number and fresh ear weight were 1% and 26% higher than those of a check hybrid "Chalok 1" during three years of regional yield trials, respectively.

Key words : Maize (*Zea mays* L.), waxy corn, inbred, single cross hybrid, seed production

Year	♀ '94	'95~'01	'01	'02	'03	'04	'05
	♂ '89	'90~'96					
Generation	Hybrid	S ₀ ~S ₈	Line	Maintenance & Cross			
Female(♀)	Jewon/ Bosung// KW7	9521-3-2-4-M2 [†] -3-M2-1-2	01S8111 (HW9)	} Honggyo68	Mibaek 2 (Hongcheon17)		
Male(♂)	W9060/ A632wx	9008-6-3-3-T2 [‡] -5-3-T23-4	96S8004 (HW3)				
Procedure	Crossing	Segregation, Selection	Combination	PYT [¶]	RYT	RYT	RYT

[†] The M means winter breeding nursery in Mexico.

[‡] The T means winter breeding nursery in Thailand.

[¶]PYT: preliminary yield trial (4 locations in Gangwon), RYT: regional yield trial

Fig. 1. Pedigree diagram of "Mibaek 2".

Table 1. Color of tassel, silk, seed coat and kernel type of "Mibaek 2".

Hybrid	anthocyanin coloration(1~9) [†]				Seed coat color	Kernel type
	Tassel : at base of glume	Tassel : glumes excluding base	Anther	Silk		
Mibaek 2	7	7	5	7	White	Flint, wx
Chalok 1	5	5	7	5	White	Flint, wx

[†] 1-very weak, 5-midium, 9-very strong

Table 2. Agronomic characteristics of "Mibaek 2" in regional yield trial from 2003 to 2005.

Hybrid	Days to silking (days)	Plant height (cm)	Ear height (cm)	Ear		Diameter (cm)	Ear no. per 100 plants
				Length (cm)	Setting rate [†] (%)		
Mibaek 2	70	197	94	18.8	86	4.2	93
Chalok 1	64	175	71	15.8	88	4.1	91

[†] Setting rate : ratio of kernel set length/ear length

Table 3. Resistance to lodging, disease and insect of "Mibaek 2" in regional yield trial from 2003 to 2005

Hybrid	Lodging	Disease		Insect	
		<i>E. turcicum</i>	<i>B. maydis</i>	Aphid	Corn borer
Mibaek 2	R [†]	R	R	M	MR
Chalok 1	MR	R	M	MR	MR

[†] MR : moderately resistance, R : resistance, M : moderate

Table 4. Kernel quality and panel test response of "Mibaek 2" in regional yield trial from 2003 to 2005.

Hybrid	Pericarp thickness (μm)	Amylopectin content (%) [†]	Fresh hardness ($\Phi 2\text{mm/g}$)	Panel test(1: very bad ~ 9: very good)				
				Appearance	Stickness	Sweetness	Tenderness	Integrated
Mibaek 2	53.0	92.9	345.1	6.6	7.2	6.7	6.8	6.8
Chalok 1	54.0	92.8	476.2	5.0	5.0	5.0	5.0	5.0

[†] : Whole kernel, Juliano's method

Table 5. Number of fresh ear of "Mibaek 2" in regional yield trial from 2003 to 2005.

Location	Mibaek 2 (thousand ear/ha)				Chalok 1 (thousand ear/ha)				Index (a/b \times 100)
	'03	'04	'05	Mean(a)	'03	'04	'05	Mean(b)	
Suwon	63.20	73.62	58.34	65.05	59.03	66.67	56.95	60.88	107
Hongcheon	66.66	54.44	61.11	60.74	65.55	68.88	64.44	66.29	92
Cheongwon	66.67	57.20	61.60	61.82	66.67	55.00	59.40	60.36	102
Taegu	66.00	62.26	63.36	63.87	66.00	53.02	60.72	59.91	107
Jinju	-	-	54.45	54.45	-	-	60.00	60.00	91
Mean	65.63	61.88	59.77	62.43	64.31	60.89	60.30	61.66	101

Table 6. Fresh ear weight of "Mibaek 2" in regional yield trial from 2003 to 2005.

Location	Mibaek 2 (ton/ha)				Chalok 1 (ton/10a)				Index (a/b \times 100)
	'03	'04	'05	Mean(a)	'03	'04	'05	Mean(b)	
Suwon	11.45	8.45	10.10	10.00	8.69	6.88	7.19	7.59	132
Hongcheon	11.49	6.81	10.56	9.62	8.15	6.19	8.96	7.77	124
Cheongwon	11.97	7.07	10.53	9.86	8.90	7.39	9.67	8.65	114
Taegu	7.40	10.51	10.28	9.40	7.35	7.54	5.96	6.95	135
Jinju	-	-	8.84	8.84	-	-	7.21	7.21	127
Mean	10.58	8.21	10.06	9.67	8.27	7.00	7.80	7.69	126

Table 7. F₁ seed production trial of "Mibaek 2" in Hongcheon in 2005.

Planting pattern (♀ : ♂) [†]	Inbred	Planting date	Silking date	Pollen dispersal period	Ear length (cm)	100 kernel weight(g)	F ₁ seed production (ton/ha)
2 : 1, male	HW9(♀)	April 29	July 20	-	12.6	21.8	1.56
inter-planting	HW3(♂)	May 7	-	July 22 to 29	-	-	-

[†] Spacing planting distance of female : 70 \times 25 cm