

A New Black Waxy Corn Hybrid Cultivar, "Miheugchal" with Good Eating Quality and High Yield

Ki-Jin Park^{1*}, Si-Hwan Ryu¹, Hwang-Kee Min¹, Jeong-Sik Seo¹, Jong-Yeol Park¹,
Byeong-Dae Goh¹, Jin-Sun Jang², Nam-Soo Kim³

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

²Crop & Agricultural Management Research Section, Gangwon-do Agricultural Research and Extension Services, Chuncheon 200-150, Korea

³Division of Biotechnology, Kangwon National University, Chuncheon 200-701, 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, "Miheugchal" with black kernel was developed by the Maize Experiment Station (MES), Gangwon-do Agricultural Research and Extension Services (GARES) in 2004. This hybrid, which has good eating quality and high yield of fresh ear weight, was produced by the cross between two inbred lines, HW7 and HW8. Inbred HW7 was derived from Yanggu Bangsan local variety and inbred HW8 was derived from Hwacheon local variety, were collected by MES in 1996. Two inbred lines were advanced to seven generations by ear-to-row method. The silking date of this hybrid is about thirteen days later than that of check hybrid "Chalok 1". Ear length (17.7 cm) is longer than that (16.0 cm) of check hybrid. It is moderately resistance to lodging and highly resistance to *E. turcicum*, but moderately resistance to *B. maydis*. This hybrid has better eating quality check hybrid "Chalok 1". The yield of "Miheugchal" in fresh ear number and fresh ear weight were 2% and 34% higher than those of a check hybrid "Chalok 1" during three years of regional yield trials.

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

Year	'96	'96~'01	'00~'01	'01	'02	'03	'04
Generation	Local variety	S ₀ ~S ₇	Line	Maintenance & Cross			
Female(♀)	Yanggu Bangsan	96BS08-1-T13 [†] -1-2-M1 [‡] -1-3	00BS6066 01BS7060 (HW7)	13048	Miheugchal (Hongcheon10)		
Male(♂)	Hwacheon	96BS11-1-T15-3-1-M1-1-2	00BS6074 01BS7069 (HW8)				
Procedure	Collection	Segregation, Selection	Cross	PYT [¶]	RYT	RYT	RYT

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

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

[¶]PYT: preliminary yield trial, RYT: regional yield trial

Fig. 1. Pedigree diagram of "Miheugchal".

Table 1. Color of tassel, silk, seed coat and grain type of "Miheugchal".

Hybrid	Color			Grain type
	Tassel	Silk	Seed coat	
Miheugchal	Light green	Light green	Black	Flint, wx
Chalok 1	Light green	Purple	White	Flint, wx

Table 2. Agronomic characteristics of "Miheugchal" in regional yield trial from 2002 to 2004.

Hybrid	Days to silking (days)	Plant height (cm)	Ear height (cm)	Ear		Diameter (cm)	Ear no. per 100 plants
				Length (cm)	Setting rate [†] (%)		
Miheugchal	79	222	137	17.7	91	4.5	96
Chalok 1	66	166	67	16.0	90	4.1	95

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

Table 3. Resistance to lodging, disease and insect of "Miheugchal" in regional yield trial from 2002 to 2004.

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

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

Table 4. Kernel quality and panel test response of "Miheugchal" in regional yield trial from 2002 to 2004.

Hybrid	Pericarp thickness (μm)	Amylopectin content [†] (%)	Fresh hardness (φ2mm/g)	Panel test(1: very bad ~ 9: very good)			
				Appearance	Sweetness	Tenderness	Integrated
Miheugchal	46.9	91.3	287.2	5.6	6.0	6.9	6.1
Chalok 1	58.3	92.2	499.1	5.7	5.1	5.3	5.6

[†] Whole kernel, Juliano's method

Table 5. Number of fresh ears of "Miheugchal" in regional yield trial from 2002 to 2004.

Location	Miheugchal (thousand ear/ha)				Chalok 1 (thousand ear/ha)				Index (a/b×100)
	'02	'03	'04	Mean(a)	'02	'03	'04	Mean(b)	
Suwon	58.34	65.28	61.12	61.58	62.51	59.03	66.67	62.74	98
Hongcheon	68.88	83.33	63.33	71.85	65.55	65.55	68.88	66.66	108
Cheongwon	60.45	66.67	59.40	62.17	60.89	66.67	55.00	60.85	102
Taegu	53.63	66.00	56.76	58.80	59.13	66.00	53.02	59.38	99
Mean	60.32	70.32	60.15	63.44	62.02	64.31	60.89	62.47	102

Table 6. Fresh ear weight of "Miheugchal" in regional yield trial from 2002 to 2004.

Location	Miheugchal (ton/ha)				Chalok 1 (ton/10a)				Index (a/b×100)
	'02	'03	'04	Mean(a)	'02	'03	'04	Mean(b)	
Suwon	11.90	12.68	9.66	11.41	10.26	8.69	6.88	8.61	133
Hongcheon	11.58	14.02	11.24	12.28	9.07	8.15	6.19	7.81	157
Cheongwon	10.84	13.78	8.29	10.97	8.92	8.90	7.39	8.40	131
Taegu	11.07	6.33	9.26	8.89	8.01	7.35	7.54	7.63	117
Mean	11.35	11.70	9.61	10.93	9.06	8.27	7.00	8.15	134

Table 7. F₁ seed production trial of "Miheugchal" in Hongcheon in 2004.

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	HW7(♀)	May 8	July 24	-	12.1	18.8	1.1
inter-planting	HW8(♂)	May 8	July 26	July 23 to 31	-	-	-

[†] Spacing planting distance of female : 70×30 cm