

A New Waxy Corn Hybrid Cultivar, "Jomichal" with Early Flowering 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, "Jomichal" 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 early flowering, short-culm and lodging resistance, was produced by cross between two inbred lines, HW5 and HW6. Inbred HW5 derived from KW1/KW2//KW9 and from WPE(waxy corn breeding population earliness). Two inbred lines were advanced to seven generations by ear-to-row method. The silking date of this hybrid is about two days later than that of check hybrid "Chalok 1". Short plant height(148 cm) and uniformity of "Jomichal" are suitable for vinyl house cultivation. It is highly resistance to lodging and *B. maydis* (southern leaf blight). This hybrid has better eating quality than "Chalok 1". The yields of "Jomichal" in fresh ear number and fresh ear weight were similar with check hybrid "Chalok 1" during four years of regional yield trials.

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

Year	'94	'95~'01	'00~'01	'01	'02	'03	'04	'05
Generation		S ₀ ~S ₇	Line	Maintenance & Cross				
Female(♀)	KW1/KW2 //KW9	9514-3-1-1-M2 [†]	-1-1-2	01S7082 (HW5)	} Honggyo35		Jomichal (Hongcheon9)	
Male(♂)	WPE	9501-1-1-2-M1-1-2-1	01S7072 (HW6)					
Procedure	Crossing	Segregation, Selection		Combination	PYT [‡]		RYT	

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

[‡] PYT: preliminary yield trial(3 locations in Gangwon-do), RYT: regional yield trial

Fig. 1. Pedigree diagram of "Jomichal".

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

Hybrid	anthocyanin coloration(1~9) [†]				Seed coat color	Kernel type
	Tassel : at base of glume	Tassel : glumes excluding base	Anther	Silk		
Jomichal	3	3	9	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 "Jomichal" in regional yield trial from 2002 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 [†] (%)		
Jomichal	68	148	58	16.2	87	4.1	92
Chalok 1	66	171	70	16.0	90	4.1	93

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

Table 3. Resistance to lodging, disease and insect of "Jomichal" in regional yield trial from 2002 to 2005.

Hybrid	Lodging	Disease		Insect	
		<i>E. turcicum</i>	<i>B. maydis</i>	Aphid	Corn borer
Jomichal	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 "Jomichal" in regional yield trial from 2002 to 2005

Hybrid	Pericarp thickness (μm)	Amylopectin content (%) [†]	Fresh hardness (Φ2mm/g)	Panel test(1: very bad ~ 9: very good)				
				Appearance	Stickness	Sweetness	Tenderness	Integrated
Jomichal	63.3	93.1	337.9	5.6	5.8	5.8	5.8	5.9
Chalok 1	55.3	92.5	441.3	5.5	5.3	5.1	5.2	5.5

[†] : Whole kernel, Juliano's method

Table 5. Number of fresh ear of "Jomichal" in regional yield trial from 2002 to 2005.

Location	Jomichal (thousand ear/ha)					Chalok 1 (thousand ear/ha)					Index (a/b×100)
	'02	'03	'04	'05	Mean(a)	'02	'03	'04	'05	Mean(b)	
Suwon	49.31	71.53	68.06	52.78	60.42	62.51	59.03	66.67	56.95	61.29	99
Hongcheon	67.77	66.66	61.11	67.77	65.83	65.55	65.55	68.88	64.44	66.11	100
Cheongwon	60.00	66.67	61.60	61.60	62.47	60.89	66.67	55.00	59.40	60.49	103
Taegu	61.88	66.00	56.76	61.38	61.51	59.13	66.00	53.02	60.72	59.72	103
Jinju	-	-	-	55.56	55.56	-	-	-	60.00	60.00	93
Mean	59.74	67.72	61.88	59.82	62.05	62.02	64.31	60.89	60.30	61.76	100

Table 6. Fresh ear weight of "Jomichal" in regional yield trial from 2002 to 2005.

Location	Jomichal (ton/ha)					Chalok 1 (ton/10a)					Index (a/b×100)
	'02	'03	'04	'05	Mean(a)	'02	'03	'04	'05	Mean(b)	
Suwon	8.35	9.52	6.83	8.268	8.24	12.26	8.69	6.88	7.19	8.26	100
Hongcheon	9.49	8.59	7.44	77	8.57	9.07	8.15	6.19	8.96	8.09	106
Cheongwon	7.55	8.90	7.64	8.10	8.05	8.92	8.90	7.39	9.67	8.72	92
Taegu	8.78	6.00	7.87	6.10	7.19	8.01	7.35	7.54	5.96	7.22	100
Jinju	-	-	-	6.75	6.75	-	-	-	7.21	7.21	94
Mean	8.54	8.25	7.45	7.60	7.95	9.06	8.27	7.00	7.80	8.03	99

Table 7. F₁ seed production trial of "Jomichal" 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	HW5(♀)	May 10	July 15	-	10.5	22.3	0.98
inter-planting	HW6(♂)	April 30	-	July 16 to 23	-	-	-

[†] Spacing planting distance of female : 60×25 cm