Table S1. Geographical information of agricultural meteorological experimental stations in the Beijing–Tianjin–Hebei region and climatic conditions during the maize growing season.

Site	Latitude	Longitude	Altitude	Tavg	EP	SRD
	(°)	(°)	(m)	(°C)	(mm)	(MJ·m^{-2})
Weichang	41.78	117.71	892.7	18.54±0.77	353.85±76.55	2593.44±171.16
Fengning	41.41	116.67	735.1	19.96±0.70	364.08±80.76	2673.63±163.19
Yuxian	39.83	114.64	909.5	20.63±0.81	300.57±63.69	2704.82±152.13
Huailai	40.33	115.62	570.9	22.40±0.65	295.96±82.18	2777.82±108.97
Qinglong	40.43	118.92	254.3	22.53±0.65	520.36±171.76	2292.21±202.18
Zunhua	40.01	118.00	54.9	24.26±0.97	492.15±183.82	1998.58±157.98
Zhuozhou	39.47	115.98	29.3	24.31±0.78	366.51±151.35	1806.61±145.45
Rongcheng	39.07	115.86	12.8	24.64±0.72	341.29±134.39	1771.10±156.96
Dingzhou	38.31	115.00	54.8	25.06±0.76	332.66±147.72	1700.18±125.90
Luancheng	37.87	114.64	52.9	25.52±0.80	346.70±129.11	1765.74±147.84
Huanghua	38.22	117.21	6.6	25.43±0.73	351.27±131.40	1675.66±179.00
Neiqiu	37.27	114.46	73.9	24.73±0.77	362.11±106.91	1761.36±185.60
Feixiang	36.59	114.82	50.2	25.08±0.68	328.30±63.75	1821.35±146.75

Note: mean ± standard deviation.

Table S2. Dataset of phenological stages for maize across agricultural meteorological stations in the Beijing–Tianjin–Hebei region.

Site	Day of year (d)					
	SW	VE	V8	R1	R3	R6
Weichang	112±3	134±5	187±5	210±5	242±6	263±8
Fengning	111±4	130±5	181±5	206±6	233±6	262±6
Yuxian	121±4	134±4	187±6	211±9	243±9	262±7
Huailai	116±4	129±4	175±5	203±4	227±3	258±3
Qinglong	123±10	133±9	179±8	204±6	234±7	250±7
Zunhua	145±17	153±16	183±13	211±12	238±12	259±14
Zhuozhou	170±4	177±3	205±4	227±3	247±5	269±5
Rongcheng	165±4	171±4	203±4	224±3	249±4	270±5
Dingzhou	164±4	170±4	199±3	222±4	244±5	261±5
Luancheng	159±5	166±5	196±3	218±4	236±4	263±6
Huanghua	169±7	175±7	207±6	227±6	247±6	263±8
Neiqiu	161±9	169±8	201±5	222±5	244±7	267±6
Feixiang	160±5	169±6	206±5	224±5	242±6	264±5

Note: mean ± standard deviation.

Table S3. Management practices and maize growth and development at each agricultural meteorological experimental station in the Beijing–Tianjin–Hebei region.

Site	Number of cultivar shifts	Number of varieties	Irrigation (mm)	Dry matter accumulation traits			Yield traits		
				TDW (10^3kg·hm^{-2})	GY (10^3kg·hm^{-2})	VOW (10^3kg·hm^{-2})	EN (10^4·hm^{-2})	GN (Kernels/Ear)	GW (g/1000-Kernels)
Weichang	15	15	150~180	14.77±5.95	6.68±3.15	8.08±3.06	5.04±1.27	475.64±106.84	267.01±46.77
Fengning	21	17	160~180	18.21±4.77	8.59±2.38	9.63±2.64	5.36±0.62	541.35±91.10	294.18±46.76
Yuxian	19	17	140~180	14.80±6.50	6.94±3.61	7.86±3.17	5.99±1.25	420.67±184.59	280.69±55.15
Huailai	17	15	80~135	18.88±4.42	9.25±2.20	9.63±2.29	5.22±0.96	518.32±78.50	345.88±54.31
Qinglong	24	24	90~120	15.74±5.72	7.31±3.00	8.43±2.87	5.05±2.11	506.91±155.54	308.92±33.64
Zunhua	23	20	Rain-fed	17.37±2.49	8.18±1.27	9.19±1.45	5.06±0.67	504.44±79.25	323.82±22.89
Zhuozhou	23	22	60~90	15.65±4.50	7.02±2.31	8.63±2.54	5.51±1.20	452.72±72.36	279.07±36.40
Rongcheng	21	20	Rain-fed	15.05±3.55	7.36±2.33	7.70±1.97	5.29±1.00	445.45±85.95	310.43±34.34
Dingzhou	25	22	30~40	16.98±3.86	7.40±1.83	9.58±2.60	5.19±1.21	505.90±74.34	285.09±29.68
Luancheng	23	21	40~45	17.01±4.34	7.75±2.13	9.26±2.40	5.88±1.24	440.16±66.45	302.41±49.63
Huanghua	24	22	Rain-fed	9.81±6.33	4.26±2.95	5.55±3.43	3.64±1.80	450.41±60.11	248.72±58.74
Neiqiu	23	21	Rain-fed	15.43±4.02	7.13±2.41	8.29±2.69	5.30±1.20	409.93±89.94	327.85±44.68
Feixiang	23	20	25~45	11.94±2.40	5.62±1.40	6.32±1.04	4.90±0.62	411.30±68.23	278.10±46.15

Note: mean ± standard deviation.