

Table S1. Correlation analysis results of quantitative characters of F1 generati.

Traits	Plant height	Crown width	Crown height ratio	Number of main branches	Inflorescence diameter	Number of ray florets	Number of flowers per plant	Days from planting period to coloring period	Days of florescence
Plant height	1								
Crown width	0.56**	1							
Crown height ratio	-0.35**	0.51**	1						
Number of main branches	0.18**	0.30**	0.128**	1					
Inflorescence diameter	0.17**	-0.05	-0.200**	0.06	1				
Number of ray florets	0.08*	-0.12**	-0.201**	0.01	-0.01	1*			
Number of flowers per plant	0.45**	0.71**	0.271**	0.21**	-0.24**	-0.08**	1**		
Days from planting period to coloring period	-0.32**	-0.27**	0.035	-0.08*	0.4	-0.29**	-0.24**	1	
Days of florescence	0.18**	0.14**	-0.020	0.08*	0.08*	0.42**	0.09**	-0.71	1*

** and * indicate significant different at 0.01 and 0.05 probability level, respectively.

Table S2. Genetic statistical analysis of plant height of hybrids.

Combination	Height of parents/cm			Height of hybrids/cm			Comparison of hybrids and parents			
	Female parent	Male parent	Mid-parent value	$\bar{X} \pm \sigma$	CV	Extremum	\bar{X}/P	Less than low parent	Between parent	Greater than parent
CH	39	42	40.5	30.7±7.2	0.24	17-51	75.7	86.3	8.8	5.0
CY	39	38	38.5	31.7±8.2	0.26	18-69	82.4	80.0	5.0	15.0
CQ	39	45	42.0	32.4±8.1	0.25	11-51	77.2	76.3	6.3	17.5
YQ	38	45	41.5	34.8±8.6	0.25	17-55	83.8	61.3	13.8	25.0
YH	38	37	37.5	35.7±8.7	0.25	17-65	95.1	56.3	7.5	36.3
YF	38	41	39.5	27.4±7.9	0.29	13-49	69.4	86.3	1.3	12.5
QF	45	41	43.0	29.6±8.6	0.29	10-48	68.9	85.0	3.8	11.3
QY	45	38	41.5	30.3±11.0	0.37	9-50	73.1	66.7	21.2	12.1
QS	45	35	40.0	28.1±12.7	0.46	7-53	70.3	59.6	21.3	19.1
HY	37	38	37.5	38.3±9.5	0.25	15-61	102.2	42.5	12.5	45.0
HF	37	41	39.0	32.9±8.6	0.26	14-55	84.3	69.6	13.9	16.5
YY	42	38	40	32.2±8.6	0.27	15-52	80.6	72.0	12.2	15.9
Average							80.2	70.2	10.6	19.2

Table S3. Genetic statistical analysis of crown width of hybrids.

Combination	Crown width of parents/cm			Crown width of hybrids/cm			Comparison of hybrids and parents%			
	Female parent	Male parent	Mid-parent value	$\bar{X} \pm \sigma$	CV	Extremum	X/P	Less than low parent	Between parent	Greater than parent
CH	53	41	47	45.2±11.2	0.25	22-68	104.0	36.3	31.3	32.5
CY	53	49	51	48.3±10.2	0.21	24-74	105.6	45.7	27.2	27.2
CQ	53	36	44.5	52.9±13.6	0.26	15-90	84.2	12.5	37.5	50.0
YQ	49	36	42.5	56.8±16.1	0.28	20-97	74.8	13.8	20.0	66.3
YH	49	51	50	37.6±11.0	0.29	17-82	132.9	78.8	10.0	11.3
YF	49	47	48	35.1±11.8	0.34	10-76	136.8	75.0	11.3	13.8
QF	36	47	41.3	52.7±15.9	0.30	20-90	78.3	20.0	15.0	65.0
QY	36	49	42.5	62.1±19.3	0.32	26-116	68.5	17.6	8.8	73.5
QS	36	38	37	46.1±16.9	0.37	15-85	80.3	23.4	12.8	63.8
HY	51	49	50	56.0±21.4	0.39	17-100	89.3	37.5	12.5	50.0
HF	51	47	49	42.7±13.9	0.33	10-75	114.6	58.8	13.8	27.5
YY	41	53	47	49.4±10.9	0.22	23-75	95.2	24.4	40.2	35.4
Average							97.0	37.0	20.0	43.0

Table S4. Genetic statistical analysis of the main branches number of hybrids.

Combination	Number of main branches of parents			Number of main branches of hybrids			Comparison of hybrids and parents%			
	Female parent	Male parent	Mid-parent value	$\bar{X} \pm \sigma$	CV	Extremum	X/P	Less than low parent	Between parent	Greater than parent
CH	3	5	4	4.7±3.1	0.65	1-20	84.4	21.3	50.0	28.8
CY	3	3	3	4.1±2.0	0.49	1-10	73.0	21.0	40.7	38.3
CQ	3	4	3.5	5.7±3.1	0.55	1-17	61.5	12.5	26.3	61.3
YQ	5	4	4.5	5.0±3.0	0.61	1-16	90.5	30.0	23.8	46.3
YH	5	7	6	5.7±2.0	0.35	2-11	104.5	21.3	56.3	22.5
YF	5	6	5.5	4.3±1.8	0.42	2-10	128.6	58.8	32.5	8.8
QF	4	6	5	5.6±2.5	0.45	2-17	88.7	18.8	51.3	30.0
QY	4	5	4.5	5.7±1.8	0.31	2-9	79.4	14.7	35.3	50.0
QS	4	3	3.5	4.3±2.8	0.65	1-12	80.6	29.8	27.7	42.6
HY	7	5	6	5.2±2.8	0.54	1-15	114.6	48.8	25.0	26.3
HF	7	6	6.5	4.8±3.3	0.68	1-17	134.5	69.6	13.9	16.5
YY	3	5	4	5.5±3.0	0.55	2-16	73.1	9.8	52.4	37.8
Average							92.8	29.7	36.3	34.1

Table S5. Genetic statistical analysis of inflorescence diameter of hybrids.

Combination	Inflorescence diameter of parents/cm			Inflorescence diameter of hybrids/cm			Comparison of hybrids and parents%			
	Female parent	Male parent	Mid-parent value	$\bar{X} \pm \sigma$	CV	Extremum	X/P	Less than low parent	Between parent	Greater than parent
CH	3.34	3.39	3.37	3.8±0.5	0.12	2.65-5.21	88.0	12.5	10.0	77.5
CY	3.34	4.42	3.88	3.7±0.4	0.11	2.78-4.74	105.4	21.0	67.9	11.1
CQ	3.34	2.84	3.09	3.7±0.4	0.11	2.63-4.90	82.6	3.8	17.5	78.8
YQ	4.42	2.84	3.63	4.6±0.7	0.14	2.91-6.30	78.2	10.0	32.5	57.5
YH	4.42	4.57	4.49	5.2±0.7	0.13	3.73-6.84	86.5	11.3	12.5	76.3
YF	4.42	3.37	3.90	5.0±0.7	0.15	3.27-6.65	78.6	6.3	23.8	70.0
QF	2.84	3.37	3.11	4.8±0.6	0.12	3.18-6.10	65.3	11.3	10.0	78.8
QY	2.84	4.42	3.63	4.2±0.8	0.18	2.45-5.55	87.2	8.8	52.9	38.3
QS	2.84	5.21	4.03	4.8±1.3	0.27	2.55-7.46	83.4	8.5	61.7	29.8
HY	4.57	4.42	4.50	4.9±0.8	0.16	2.91-7.25	92.0	25.0	12.5	62.5
HF	4.57	3.37	3.97	5.3±0.6	0.12	3.72-6.77	74.7	13.0	9.5	77.5
YY	3.39	4.42	3.91	4.1±0.7	0.18	2.62-6.03	95.6	18.6	53.4	28.0
Average							84.8	12.5	30.3	57.2

Table S6. Genetic statistical analysis of the ray florets number of hybrids.

Combination	Number of ray florets of parents			Number of ray florets of hybrids			Comparison of hybrids and parents%			
	Female parent	Male parent	Mid-parent value	$\bar{X} \pm \sigma$	CV	Extremum	X/P	Less than low parent	Between parent	Greater than parent
CH	93	19	56	76.7±32.4	0.43	24-185	73.1	30.0	41.3	28.8
CY	93	75	84	78.9±40.4	0.52	23-222	106.5	55.0	16.3	28.8
CQ	93	24	58.5	88.9±37.8	0.43	24-189	65.8	18.8	45.0	36.3
YQ	75	24	51	73.6±37.0	0.51	20-198	69.3	30.0	25.0	45.0
YH	75	85	80	106±36.3	0.34	32-197	75.4	22.5	8.8	68.8
YF	75	29	52	76.5±34.2	0.45	20-199	67.9	10.0	45.0	45.0
QF	24	29	26.5	33.6±13.6	0.41	17-107	79.0	23.8	21.3	55.0
QY	24	75	49.5	48.2±29.2	0.62	20-144	102.7	20.6	61.8	17.6
QS	24	46	35	26.1±6.8	0.27	15-51	134.3	40.4	40.4	19.2
HY	85	75	80	71.0±56.0	0.79	20-210	112.7	60.0	7.5	32.5
HF	85	29	57	47.4±25.7	0.54	21-161	120.2	22.5	65.0	12.5
YY	19	75	47	60.3±26.8	0.45	19-153	78.0	36.6	37.8	25.6
Average							90.4	30.8	34.6	34.6

Table S7. Genetic statistical analysis of the number of flowers per plant of hybrids.

Combination	Number of flowers per plant of parents			Number of flowers per plant of hybrids			Comparison of hybrids and parents%			
	Female parent	Male parent	Mid-parent value	$\bar{X} \pm \sigma$	CV	Extremum	X/P	Less than low parent	Between parent	Greater than parent
CH	743	452	597.5	556.2±347.5	0.63	76-1596	107.4	46.3	27.5	26.3
CY	743	428	585.5	651.2±394.2	0.61	89-2954	89.9	29.6	40.7	29.6
CQ	743	315	527.5	526.4±381.6	0.73	76-1896	100.2	27.5	51.3	21.3
YQ	428	315	371.5	506.8±363.0	0.72	27-1960	73.3	30.0	20.0	50.0
YH	428	337	382.5	285.7±202.8	0.71	40-1346	133.9	66.3	13.8	20.0
YF	428	289	358.5	303.0±262.0	0.87	22-1240	118.3	56.3	12.5	31.3
QF	315	289	302	559.0±449.2	0.81	37-2620	54.0	22.5	8.8	68.8
QY	315	428	371.5	672.6±394.7	0.60	50-1592	55.2	20.6	8.8	70.6
QS	315	124	219.5	224.9±156.3	0.70	14-662	97.6	27.7	38.3	34.0
HY	337	428	382.5	501.9±489.0	0.98	47-2440	76.2	40.0	22.5	37.5
HF	337	289	313	335.5±224.1	0.67	12-952	93.3	47.5	11.3	41.3
YY	452	428	440	601.4±296.5	0.50	104-1752	73.2	26.8	3.7	69.5
Average							89.4	36.7	21.6	41.7

Table S8. Genetic statistics of plant form of hybrids.

Combination	Female parent	Male parent	Number of plants in F ₁ generation	Separation of plant form of hybrid hybrids%			
				I	II	III	IIII
CH	I	II	80	16.3	43.8	32.5	7.5
CY	I	II	80	15.0	42.5	37.5	5.0
CQ	I	IIII	78	18.8	38.8	32.5	10.0
YQ	II	IIII	76	17.5	25.0	43.8	13.8
YH	II	II	78	23.8	11.3	52.5	12.5
YF	II	III	76	15.0	5.0	57.5	22.5
QF	IIII	III	80	7.5	40.0	36.3	16.3
QY	IIII	II	33	8.8	29.4	55.9	5.9
QS	IIII	III	44	8.5	12.8	51.1	27.7
HY	II	II	76	8.8	30.0	52.5	8.8
HF	II	III	78	15.0	13.8	52.5	18.8
YY	II	II	81	15.9	35.4	37.8	11.0
Total				14.2	27.3	45.2	13.3

Table S9. Genetic statistical analysis of branching intensity of hybrids.

Combination	Female parent	Male parent	Number of plants in F ₁ generation	Separation of branching intensity of hybrid hybrids%		
				I	II	III
CH	I	II	80	56.3	31.3	12.5
CY	I	I	80	31.3	53.8	15.0
CQ	I	III	78	32.5	48.8	18.8
YQ	II	III	76	46.3	27.5	26.3
YH	II	I	78	52.5	33.8	13.8
YF	II	II	76	33.8	57.5	8.8
QF	III	II	80	20.0	55.0	25.0
QY	III	I	33	41.2	52.9	5.9
QS	III	II	44	19.1	44.7	36.2
HY	I	I	76	31.3	27.5	41.3
HF	I	II	78	47.5	27.5	25.0
YY	II	I	81	70.7	18.3	11.0
Total				42.6	39.1	18.3

Table S10. Genetic statistics of flower color of hybrids.

Combination	Female parent	Male parent	Number of plants in F ₁ generation	Separation of flower color of hybrid hybrids								
				Yellow	White	Pink	Red	Purple	Orange	Pink-purple	Orange-yellow	Orange-red
CH	Yellow	Purple	80	6	17	3	10	12	4	2	5	21
CY	Yellow	Red	80	6	13	4	6	21	7	4	8	11
CQ	Yellow	Orange-red	78	24	0	0	9	0	17	0	19	9
YQ	Red	Orange-red	76	6	0	0	28	0	2	0	11	29
YH	Red	Red	78	2	0	0	50	3	7	0	6	10
YF	Red	Pink-purple	76	1	3	12	19	17	6	1	3	14
QF	Orange-red	Pink-purple	80	5	4	16	13	14	0	4	4	20
QY	Orange-red	Red	33	6	1	2	2	3	6	1	3	9
QS	Orange-red	Orange	44	15	0	2	11	2	1	0	6	7
HY	Red	Red	76	16	0	6	22	1	7	2	7	15
HF	Red	Pink-purple	78	1	0	6	32	22	0	14	0	3
YY	Purple	Red	81	0	0	4	24	34	5	0	7	7
Ratio%				10.2	4.4	6.4	26.3	15.0	7.2	3.3	9.2	18.0