

## SUPPLEMENTARY MATERIALS

**Table S1** Annotation of variants' effects by regions using SnpEff and the number of aa × bbbb and ab × aaaa/bbbb type markers in the DNA resequencing data

Chr	Total variants	Upstream	Downstream	Exon	Intron	Total SNPs	aa × bbbb	ab × aaaa/ bbbb
Chr1	495346	430248	389906	50062	147910	399104	718	10047
Chr2	528830	500885	474827	64620	171593	420694	1511	8324
Chr3	475590	419354	409640	56443	152293	381106	1106	9281
Chr4	309,430	325128	252061	31711	81054	252280	437	5944
Chr5	700237	562774	679310	74164	195079	576274	1804	15162
Chr6	401519	432441	361444	45795	118066	325401	3729	12019
Chr7	516867	493524	468693	64799	166513	408764	788	10243
Chr8	427366	348417	340392	42064	113351	348442	653	5263
Chr9	312257	274104	354827	63146	115160	257321	258	3796
Total	4167442	3786875	3731100	492804	1261019	3369386	11004	80079

**Table S2** SNP markers used in this study

SNP marker	Forward primer (5'-3')	Reverse primer (5'-3')	Usage
Chr2-24850985	Allele-X: CGTATGAAGTTGTTGGCGCA	GCCACTTAAACCAAGCCCAAG	To identify the genetic origin
	Allele-Y: CGTATGAAGTTGTTGGCGCC		
Chr2-25841537	Allele-X: GGGAGTTCCATTATCCAAGC	TTGAAGCCTTGGGTTGTAGG	
	Allele-Y: GGGAGTTCCATTATCCAAGG		
Chr3-18395328	Allele-X: CCGTGGAGGCCATCAATACC	TGCCTCCTATGAAAGCACCG	
	Allele-Y: CCGTGGAGGCCATCAATACA		
Chr3-24832283	Allele-X: AACACAACACGCCACCTCCT	CTGTGTTAGGGCCGGAAACT	
	Allele-Y: AACACAACACGCCACCTCCC		
Chr4-8664085	Allele-X: GGTCACACTGCGTCGGTCAC	GAGGGGTTTCAATGATTGGGCT	
	Allele-Y: GGTCACACTGCGTCGGTCAG		
Chr4-8689111	Allele-X: CTGCCGTGTACTGTCCTTGT	CAGTGACATGGACAAACAGGAG	
	Allele-Y: CTGCCGTGTACTGTCCTTGG		
Chr5-12876197	Allele-X: AAAGTGCTTCGAAAGGCGCT	CTGTCAGTAAGAAGGGAGCC	
	Allele-Y: AAAGTGCTTCGAAAGGCGCC		
Chr6-1932038	Allele-X: TTGATGCTGGGACCACATAGC	TCGACTCACCCACAAACTGTC	
	Allele-Y: TTGATGCTGGGACCACATAGT		
Chr9-815315	Allele-X: AGCTACGGTGGTGGGAAATG	CCAGCCAATCAAATGGTTCCC	
	Allele-Y: AGCTACGGTGGTGGGAAATA		
Chr1-12169985	Allele-X: AGACCGGAAGATCAAAGGGG	GTGATCACTGATCAAGGCCTCA	To determine the formation underlying 2n megagametophyte formation
	Allele-Y: AGACCGGAAGATCAAAGGGA		
Chr3-7913461	Allele-X: AATGAGAGCAAGCTCTCACG	GGTATTCAGACAGGACCATC	
	Allele-Y: AATGAGAGCAAGCTCTCAC A		
Chr5-17395118	Allele-X: TGA CTTCGCTCAGGACACTG	GAGGAGTCAGCGTGCAACCT	

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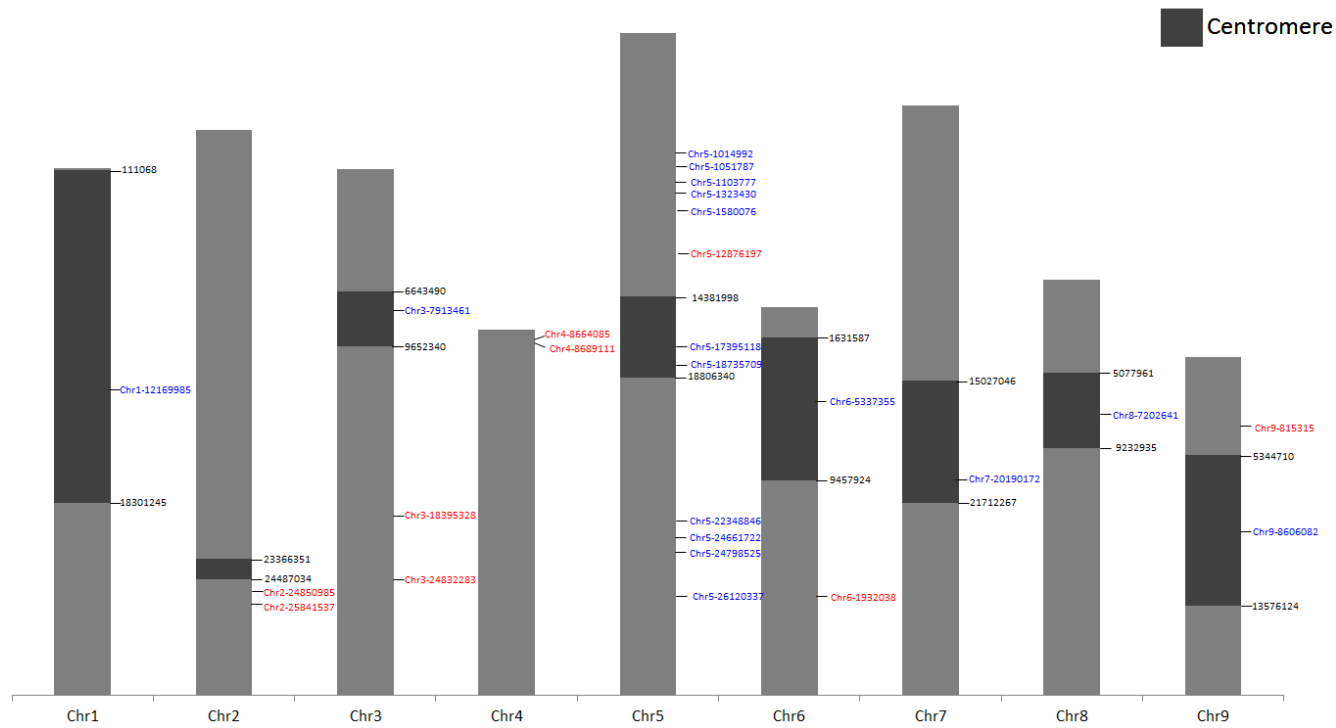
	Allele-Y: TGA	
Chr5-18735709	Allele-X: TGCCCAACAAGGCAATCCAT	TTGCTGACCATTAGGACCGG
	Allele-Y: TGCCCAACAAGGCAATCCAA	
Chr6-5337355	Allele-X: AGACTGTTAGGGCGCTTCCT	GCGAATCACACAACAGTCTAAG
	Allele-Y: AGACTGTTAGGGCGCTTCCG	
Chr7-20190172	Allele-X: GACACGTGGTTGTTGTCCTC	GCATCTGGTGGCAGAACTCA
	Allele-Y: GACACGTGGTTGTTGTCCTA	
Chr8-7202641	Allele-X: GACATATGAAGACATGCCGA	GCCACCTCAGGGTCAATTC
	Allele-Y: GACATATGAAGACATGCCGG	
Chr9-8606082	Allele-X: GTTCACCTACA	GAGGTAATTGAAGGTGTGGC
	Allele-Y: GTTCACCTACA	
Chr5-1014992	Allele-X: CCACGTGATGGTTCTTACGC	AAGCACGTGCCTTTCAGTGC
	Allele-Y: CCACGTGATGGTTCTTACGA	
Chr5-1051787	Allele-X: ATCAAGGATGTCTGGGGAA	CAAGCCTTGAATTAACCCG
	Allele-Y: ATCAAGGATGTCTGGGGAT	
Chr5-1103777	Allele-X: CCATTGCTTCAGCTGCCTTT	GAGTAATGAACAGGAACTTGGAG
	Allele-Y: CCATTGCTTCAGCTGCCTTC	
Chr5-1323430	Allele-X: CGTGAATCTCCGATAATACC	GATGAATGGCAAAGCAAGCA
	Allele-Y: CGTGAATCTCCGATAATACT	
Chr5-1580076	Allele-X: AGTGAAAGATCCACCGCCT	ACAATACGTTTGGGAGTCGC
	Allele-Y: AGTGAAAGATCCACCGGCC	
Chr5-22348846	Allele-X: CAGCCTCTGGTTTTGTTACAG	CAACCTCAAGCAACTATTTGG
	Allele-Y: CAGCCTCTGGTTTTGTTAC	
Chr5-24661722	Allele-X: GGACACGGAATTTGCATCCA	CGTAGGACACAGATTGTTGAC
	Allele-Y: GGACACGGAATTTGCATCCG	
Chr5-24798525	Allele-X: GTGCACCTTGCCCATGGAAT	GTTGCACAGAGGATTCTGATG

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Chr5-26120337	Allele-Y: GTGCACCTTGCCCATGGAAC	GCTGTCCATGTTTGCTGACT
	Allele-X: TCTCAAGGCATGGGCAAATC	
	Allele-Y: TCTCAAGGCATGGGCAAATT	

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**Fig. S1** The distribution on chromosomes of SNP markers used in this study. SNPs of aa x bbbb type are indicated in red; SNPs of ab x aaaa/bbbb type are indicated in blue.