

**Table S4** Transition matrix for one autosomal locus in the generation of four-way RIL by sibling mating

$g_k$		$g_{k+1}$												
		1	2	3	4	5	6	7	8	9	10	11	12	13
1:	$AA \times AA$	1	0	0	0	0	0	0	0	0	0	0	0	0
2:	$AA \times AB$	1/4	1/2	0	0	0	0	0	1/4	0	0	0	0	0
3:	$AA \times AC$	1/4	0	1/2	0	0	0	0	0	0	0	1/4	0	0
4:	$AA \times BB$	0	0	0	0	0	0	0	1	0	0	0	0	0
5:	$AA \times BC$	0	0	0	0	0	0	0	1/4	1/2	0	1/4	0	0
6:	$AA \times CC$	0	0	0	0	0	0	0	0	0	0	1	0	0
7:	$AA \times CD$	0	0	0	0	0	0	0	0	0	0	1/2	1/2	0
8:	$AB \times AB$	1/8	1/2	0	1/8	0	0	0	1/4	0	0	0	0	0
9:	$AB \times AC$	1/16	1/8	1/8	0	1/8	0	0	1/16	1/4	0	1/8	1/8	0
10:	$AB \times CD$	0	0	0	0	0	0	0	0	0	0	1/4	1/2	1/4
11:	$AC \times AC$	1/8	0	1/2	0	0	1/8	0	0	0	0	1/4	0	0
12:	$AC \times AD$	1/16	0	1/4	0	0	0	1/8	1/16	1/4	0	1/8	1/8	0
13:	$AC \times BD$	0	0	0	0	0	0	0	1/8	1/2	1/8	1/8	0	1/8