

**Table S16** Transpose of the recursion matrix for calculating probabilities of the two-locus X chromosome female diplotype of the form  $AA|AA$ , in the generation of four-way RIL by sibling mating

State at $k + 1$		State at $k$						
1		2: $(1 - r)$	3: $r$					
2		1: $\frac{r^2 + (1-r)^2}{4}$	2: $\frac{1-r}{2}$	3: $\frac{r}{2}$	4: $\frac{(1-r)^2}{4}$	5: $r(1 - r)$	9: $\frac{r^2}{4}$	
3		6: $\frac{1-r}{2}$	7: $\frac{r}{2}$	11: $\frac{1}{2}$				
4		4: $\frac{1-r}{2}$	9: $\frac{r}{2}$	10: $\frac{1}{2}$				
5		6: $\frac{1-r}{2}$	7: $\frac{r}{2}$	12: $\frac{1}{2}$				
6		4: $\frac{1-r}{4}$	5: $\frac{1}{4}$	9: $\frac{r}{4}$	12: $\frac{1}{2}$			
7		6: $\frac{1}{4}$	7: $\frac{1}{4}$	8: $\frac{1}{4}$	13: $\frac{1}{4}$			
8		4: $\frac{1}{4}$	8: $\frac{1}{2}$	9: $\frac{1}{4}$				
9		8: 1						
10		4: $(1 - r)$	9: $r$					
11		2: $\frac{1}{4}$	3: $\frac{1}{4}$	6: $\frac{1-r}{4}$	7: $\frac{r}{4}$	11: $\frac{1}{4}$		
12		4: $\frac{1-r}{4}$	5: $\frac{1}{4}$	6: $\frac{1-r}{2}$	7: $\frac{r}{2}$	9: $\frac{r}{4}$		
13		6: $\frac{1}{2}$	7: $\frac{1}{2}$					