TABLE S2: Probability $p_g(j)$ of observed dinucleotide read *j* at the two sites of interest with two-locus genotype *g* as a function of the error rate ε.

	Dinucleotide read								
Genotype	1 (*AB*)	2 (*Ab*)	3 (*Ae*)	4 (*aB*)	5 (*ab*)	6 (*ae*)	7 (*eB*)	8 (*eb*)	9 (*ee*)
1 (*AB/AB*)	$(1-\epsilon)^2$	$(1-\epsilon)\cdot\frac{\epsilon}{3}$	$(1-\epsilon)\cdot\frac{2\epsilon}{3}$	$\frac{\epsilon}{3}\cdot(1-\epsilon)$	$\left(\frac{\epsilon}{3}\right)^2$	$\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}$	$\frac{2\epsilon}{3}\cdot(1-\epsilon)$	$\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}$	$\left(\frac{2\epsilon}{3}\right)^2$
2 (*Ab/Ab*)	$(1-\epsilon)\cdot\frac{\epsilon}{3}$	$(1-\epsilon)^2$	$(1-\epsilon)\cdot\frac{2\epsilon}{3}$	$\left(\frac{\epsilon}{3}\right)^2$	$\frac{\epsilon}{3}\cdot(1-\epsilon)$	$\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}$	$\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}$	$\frac{2\epsilon}{3}\cdot(1-\epsilon)$	$\left(\frac{2\epsilon}{3}\right)^2$
3 (*aB/aB*)	$\frac{\epsilon}{3}\cdot(1-\epsilon)$	$\left(\frac{\epsilon}{3}\right)^2$	$\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}$	$(1-\epsilon)^2$	$(1-\epsilon)\cdot\frac{\epsilon}{3}$	$(1-\epsilon)\cdot\frac{2\epsilon}{3}$	$\frac{2\epsilon}{3}\cdot(1-\epsilon)$	$\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}$	$\left(\frac{2\epsilon}{3}\right)^2$
4 (*ab/ab*)	$\left(\frac{\epsilon}{3}\right)^2$	$\frac{\epsilon}{3}\cdot(1-\epsilon)$	$\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}$	$(1-\epsilon)\cdot\frac{\epsilon}{3}$	$(1-\epsilon)^2$	$(1-\epsilon)\cdot\frac{2\epsilon}{3}$	$\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}$	$\frac{2\epsilon}{3}\cdot(1-\epsilon)$	$\left(\frac{2\epsilon}{3}\right)^2$
5 (*AB/Ab*)	$\frac{1}{2}(1-\epsilon)^2+\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{\epsilon}{3}$	$\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{\epsilon}{3}+\frac{1}{2}(1-\epsilon)^2$	$(1-\epsilon)\cdot\frac{2\epsilon}{3}$	$\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot(1-\epsilon)+\frac{1}{2}\cdot\left(\frac{\epsilon}{3}\right)^2$	$\frac{1}{2}\cdot\left(\frac{\epsilon}{3}\right)^2+\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot(1-\epsilon)$	$\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}$	$\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot(1-\epsilon)+\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}$	$\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}+\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot(1-\epsilon)$	$\left(\frac{2\epsilon}{3}\right)^2$
6 (*aB/ab*)	$\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot(1-\epsilon)+\frac{1}{2}\cdot\left(\frac{\epsilon}{3}\right)^2$	$\frac{1}{2}\cdot\left(\frac{\epsilon}{3}\right)^2+\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot(1-\epsilon)$	$\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}$	$\frac{1}{2}(1-\epsilon)^2+\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{\epsilon}{3}$	$\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{\epsilon}{3}+\frac{1}{2}(1-\epsilon)^2$	$(1-\epsilon)\cdot\frac{2\epsilon}{3}$	$\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot(1-\epsilon)+\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}$	$\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}+\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot(1-\epsilon)$	$\left(\frac{2\epsilon}{3}\right)^2$

7 (*AB/aB*)	$\frac{1}{2}(1-\epsilon)^2+\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot(1-\epsilon)$	$\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{\epsilon}{3}+\frac{1}{2}\cdot\left(\frac{\epsilon}{3}\right)^2$	$\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{2\epsilon}{3}+\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}$	$\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot(1-\epsilon)+\frac{1}{2}(1-\epsilon)^2$	$\frac{1}{2}\cdot\left(\frac{\epsilon}{3}\right)^2+\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{\epsilon}{3}$	$\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}+\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{2\epsilon}{3}$	$\frac{2\epsilon}{3}\cdot(1-\epsilon)$	$\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}$	$\left(\frac{2\epsilon}{3}\right)^2$
8 (*Ab/ab*)	$\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{\epsilon}{3}+\frac{1}{2}\cdot\left(\frac{\epsilon}{3}\right)^2$	$\frac{1}{2}(1-\epsilon)^2+\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot(1-\epsilon)$	$\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{2\epsilon}{3}+\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}$	$\frac{1}{2}\cdot\left(\frac{\epsilon}{3}\right)^2+\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{\epsilon}{3}$	$\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot(1-\epsilon)+\frac{1}{2}(1-\epsilon)^2$	$\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}+\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{2\epsilon}{3}$	$\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}$	$\frac{2\epsilon}{3}\cdot(1-\epsilon)$	$\left(\frac{2\epsilon}{3}\right)^2$
9 (*AB/ab*)	$\frac{1}{2}(1-\epsilon)^2+\frac{1}{2}\cdot\left(\frac{\epsilon}{3}\right)^2$	$(1-\epsilon)\cdot\frac{\epsilon}{3}$	$\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{2\epsilon}{3}+\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}$	$\frac{\epsilon}{3}\cdot(1-\epsilon)$	$\frac{1}{2}\cdot\left(\frac{\epsilon}{3}\right)^2+\frac{1}{2}(1-\epsilon)^2$	$\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}+\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{2\epsilon}{3}$	$\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot(1-\epsilon)+\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}$	$\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}+\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot(1-\epsilon)$	$\left(\frac{2\epsilon}{3}\right)^2$
10 (*Ab/aB*)	$(1-\epsilon)\cdot\frac{\epsilon}{3}$	$\frac{1}{2}(1-\epsilon)^2+\frac{1}{2}\cdot\left(\frac{\epsilon}{3}\right)^2$	$\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{2\epsilon}{3}+\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}$	$\frac{1}{2}\cdot\left(\frac{\epsilon}{3}\right)^2+\frac{1}{2}(1-\epsilon)^2$	$\frac{\epsilon}{3}\cdot(1-\epsilon)$	$\frac{1}{2}\cdot\frac{\epsilon}{3}\cdot\frac{2\epsilon}{3}+\frac{1}{2}\cdot(1-\epsilon)\cdot\frac{2\epsilon}{3}$	$\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}+\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot(1-\epsilon)$	$\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot(1-\epsilon)+\frac{1}{2}\cdot\frac{2\epsilon}{3}\cdot\frac{\epsilon}{3}$	$\left(\frac{2\epsilon}{3}\right)^2$

A and *a* denote candidate alleles (the two most abundant nucleotide reads in the population, e.g., C and T) and *e* denotes other nucleotide reads (e.g., in this case A and G) at site α. *B* and *b* denote candidate alleles at site β. In the two-locus genotype notation, the slash separates haplotypes.