Table S7 Probabilities for the genotypes of the pair of individuals at a single X chromosome locus, at generation F_k in the formation of four-way RIL by sibling mating

Prototype	No. states	Probability of each
$AA \times A$	2	$\frac{1}{3}+\frac{1}{24}\left(-\frac{1}{2}\right)^k+\frac{1}{8}\left(\frac{1}{2}\right)^k-\left(\frac{5+2\sqrt{5}}{20}\right)\left(\frac{1+\sqrt{5}}{4}\right)^k-\left(\frac{5-2\sqrt{5}}{20}\right)\left(\frac{1-\sqrt{5}}{4}\right)^k$
$AA \times B$	2	$\frac{1}{3}\left(-\frac{1}{4}\right)^k-\frac{1}{12}\left(\frac{1}{2}\right)^k-\left(\frac{5-3\sqrt{5}}{40}\right)\left(\frac{1+\sqrt{5}}{4}\right)^k-\left(\frac{5+3\sqrt{5}}{40}\right)\left(\frac{1-\sqrt{5}}{4}\right)^k$
$AA \times C$	2	$\frac{1}{8}\left(-\frac{1}{2}\right)^k-\frac{1}{24}\left(\frac{1}{2}\right)^k-\frac{1}{3}\left(-\frac{1}{4}\right)^k+\left(\frac{5-\sqrt{5}}{40}\right)\left(\frac{1+\sqrt{5}}{4}\right)^k+\left(\frac{5+\sqrt{5}}{40}\right)\left(\frac{1-\sqrt{5}}{4}\right)^k$
$AB \times A$	2	$-\frac{1}{6}\left(\frac{1}{2}\right)^k-\frac{1}{3}\left(-\frac{1}{4}\right)^k+\left(\frac{5-\sqrt{5}}{20}\right)\left(\frac{1+\sqrt{5}}{4}\right)^k+\left(\frac{5+\sqrt{5}}{20}\right)\left(\frac{1-\sqrt{5}}{4}\right)^k$
$AB \times C$	1	$\frac{1}{3}\left(\frac{1}{2}\right)^k+\frac{2}{3}\left(-\frac{1}{4}\right)^k$
$AC \times A$	2	$-\frac{1}{4}\left(-\frac{1}{2}\right)^k-\frac{1}{12}\left(\frac{1}{2}\right)^k+\frac{1}{3}\left(-\frac{1}{4}\right)^k+\frac{\sqrt{5}}{10}\left[\left(\frac{1+\sqrt{5}}{4}\right)^k-\left(\frac{1-\sqrt{5}}{4}\right)^k\right]$
$AC \times B$	2	$\frac{1}{3}\left(\frac{1}{2}\right)^k-\frac{1}{3}\left(-\frac{1}{4}\right)^k$
$AC \times C$	2	$\frac{1}{4}\left(-\frac{1}{2}\right)^k-\frac{1}{4}\left(\frac{1}{2}\right)^k+\frac{\sqrt{5}}{10}\left[\left(\frac{1+\sqrt{5}}{4}\right)^k-\left(\frac{1-\sqrt{5}}{4}\right)^k\right]$
$CC \times A$	2	$-\frac{1}{8}\left(-\frac{1}{2}\right)^k-\frac{1}{8}\left(\frac{1}{2}\right)^k+\left(\frac{5-\sqrt{5}}{40}\right)\left(\frac{1+\sqrt{5}}{4}\right)^k+\left(\frac{5+\sqrt{5}}{40}\right)\left(\frac{1-\sqrt{5}}{4}\right)^k$
$CC \times C$	1	$\frac{1}{3}-\frac{1}{12}\left(-\frac{1}{2}\right)^k+\frac{1}{4}\left(\frac{1}{2}\right)^k-\left(\frac{5+3\sqrt{5}}{20}\right)\left(\frac{1+\sqrt{5}}{4}\right)^k-\left(\frac{5-3\sqrt{5}}{20}\right)\left(\frac{1-\sqrt{5}}{4}\right)^k$