

Tetrad Analysis

non-recombinant		AB AB ab ab	Parental Ditype
single recombination		AB Ab aB ab	Tetratype
2-strand double recombination		AB AB ab ab	Parental Ditype
3-strand double recombination		Ab AB aB ab	Tetratype
3-strand double recombination		AB Ab ab aB	Tetratype
4-strand double recombination		Ab Ab aB aB	Nonparental Ditype

map distance = centiMorgans (cM) = percent recombination = $\frac{\text{number of recombinant tetrads}}{\text{total tetrads}} \times 100$

number of recombinants = single rec tetrads + double rec tetrads

single rec tetrads = $\frac{1}{2}[\text{TT} - 2\text{NPD}]$ single recombinants = $\text{TT} - 2\text{NPD}$
 since only half of the ascospores in a TT are recombinant, we divide the single recombinants by half

double rec tetrads = 4NPD there are four types of double recombinants, but only one, NPD, is identifiable; therefore we estimate by multiplying by 4

$$\text{cM} = \frac{\frac{1}{2}[\text{TT} - 2\text{NPD}] + 4\text{NPD}}{\text{Total Tetrads}} \times 100 = \frac{\frac{1}{2}[\text{TT}] + 3\text{NPD}}{\text{Total Tetrads}} \times 100$$