Chi-squared test

Pg 443

(Calculation of chi-squared will be explained in the 1.15 lesson)

When we carry out a genetic cross between two parents, for several generations, there might be a difference between observed and expected ratios in the offspring

Chi-squared test is used to answer the following question:

Are the differences between observed and expected ratios significant, or due to chance?

Example: Flower colour in snapdragon

The following experimental hypothesis was proposed: *Flower colour is controlled by a single gene with two codominant alleles.*

Expected ratio: 1:2:1 (red:pink:white)

For 260 offspring, the expected ratio-

65:130:65 (red:pink:white)

Observed ratio: 62 : 131 : 67 (red:pink:white)

Are these differences significant, or due to chance?

- Null hypothesis: *Any difference between Observed and Expected results is due to chance (not significant)*
- Calculate chi-squared value
- Work out degrees of freedom - one less that total number of categories

- Work out critical value from the table for p = 0.05 (p=0.05 is used as a standard for most biological experiments) - Table of p values on pg 444

- If chi-squared value is greater than critical value, **REJECT** the null hypothesis
  - Less than 5% probability (p=0.05) that results are due to chance
  - Any differences between observed and expected results are SIGNIFICANT

- If chi-squared value is less than critical value, **ACCEPT** the null hypothesis
  - Greater than 5% probability that the results are due to chance
  - Any differences between observed and expected results are solely due to CHANCE - not significant