

Part II- Sex linkage

Exercise 5

The frequency of one form of recessive X-linked colour-blindness is 5% among European males. What is the expected frequency of this form of colour blindness among females? What fraction of females would be heterozygous carriers? Note, consider the locus X with the 2 alleles X1 and X2, X2 making colour-blindness.

Exercise 6

Searle (1949) gives the frequencies of a number of genes in a sample of cats in London. The animals examined were sent to clinics for destruction, they were therefore not necessarily a random sample. Among the genes studied was the sex-linked gene called "Orange" (O). All three genotypes in females are recognizable, the heterozygote being "tortoiseshell" or "calico".

The data were tested against the Hardy-Weinberg expectations, to see particularly if there was any evidence of non-random mating. The first test was to see whether the gene frequency is the same in the two sexes. Then the genotypes in females were tested against the Hardy Weinberg law in the same way.

a- Test for the HWE.

	Number of individuals						
	Females				Males		
	++	+O	OO	Total	+	O	Total
Observed	277	54	4	335	311	42	353
Expected							

b- Calculate the number of each allele for every sex and in the population.

	Number of alleles			Frequency of O-allele
	+	O	Total	q
in Females				
in Males				
Total				

c- Does the alleles frequency is different in males and in females?

	Number of alleles expected		
	+	O	Total
in Females			
in Males			
Total			