Topic 5: Population genetics

23 November 2022 19:17

5.1

1. $p+q=1$

p = frequency of dominant allele

q = frequency of recessive allele

3. AA = 6000 , Aa = 2000 , aa = 2000

- Total alleles = $2(6000)+2(2000)+2(2000) = 20000$
- Total 'A' alleles = $2(6000)+2000 = 14000$

  Total 'a' alleles = $2000+2(2000) = 6000$
- frequency of dominant allele = $\frac{14000}{20000} = 0.7$
- frequency of recessive allele = $\frac{6000}{20000} = 0.3$

5.2

1. Hardy-Weinburg Law : population in genetic equilibrium.
   - The frequencies of alleles and genotypes in a population's gene pool remain constant over the generations.

   p, q $p^2, q^2, 2pq$
2. 5 assumptions
   - random mating.
   - large population size.
   - no mutation.
   - no migration.
   - no natural selection.
3. $p^2+2pq+q^2=1$

   p^2 = frequency of homozygous dominant genotype.

   $2pq$ = frequency of heterozygous genotype.

   q^2 = frequency of homozygous recessive genotype.
4. ⩓↑0 = ⩓↑ dcp.

   ⩾10000 : 4 dcp.

   1000 : 3 dcp.

   100 : 2 dcp.

   dcp must be consistent!

Fixed dcp on calc.

SHIFT → SETUP → 3 → 1 → 0-9 (dcp)

Popular quest.

AA = 16

Aa = 128

No. of xx left = 400 − 256 = 144

$P = \frac{2(16)+128}{2(144)}$

$= 0.56$

$q = 1-0.56$

$= 0.44.$