



QUESTION WORKBOOK

Hardy–Weinberg: what alleles do in a population when nothing acts on them

Inheritance and population genetics · Unit B16

AQA 3.7.2 · OCR A 6.1.2 · Edexcel A not listed · CAIE 17.2

6 questions · 22 marks

NAVY SCREEN EDITION

SECTION A · Short, 1 to 2 marks

- A1** State what is meant by the gene pool of a population, and state what is meant by the frequency of an allele. [2]

SECTION B · Standard, 3 to 5 marks

- B1** In a population of 5000 people, 450 show a condition caused by a recessive allele. Assuming the population is in Hardy-Weinberg equilibrium, calculate the frequency of each allele and the number of people expected to be heterozygous. [4]

- B2** A sample of 200 snails contains 98 of genotype CC, 84 of genotype Cc and 18 of genotype cc. Calculate the frequency of each allele in the sample, and calculate the number of heterozygotes expected under Hardy-Weinberg equilibrium in order to say whether the sample is at equilibrium. [4]

B3 Explain why a dominant allele does not become more common in a population simply because it is dominant. [4]

B4 A biologist finds that the observed genotype frequencies in a population of beetles differ significantly from those predicted by its allele frequencies. Explain what this tells the biologist, and explain how the pattern of the difference helps to identify the cause. [4]

B5 In parts of sub-Saharan Africa the sickle-cell allele occurs at a far higher frequency than selection against affected homozygotes should allow. Suggest an explanation for this, and suggest why the same allele is rare among populations in northern Europe. [4]
