



QUESTION WORKBOOK

Natural selection: variation, selection and allele frequency

Evolution and speciation · Unit B19

AQA 3.4.3, 3.4.4 · OCR A 4.2.2, 6.1.2 · Edexcel A Topic 4 · CAIE 17.1, 17.2

6 questions · 19 marks

NAVY SCREEN EDITION

SECTION A · Short, 1 to 2 marks

- A1** Name the only source of alleles that did not exist in a population before, and name two processes that produce new combinations of alleles that already exist. [2]

- A2** State what is meant by the fitness of an individual, and state why survival on its own does not raise it. [2]

SECTION B · Standard, 3 to 5 marks

- B1** A field of crops is sprayed with a new insecticide every year, and after ten years most of the insects in that field survive the spray. Explain how this change came about. [4]

B2 Compare stabilising selection with disruptive selection, referring to which phenotypes are favoured and to what happens to the mean and to the variation. [4]

B3 A recessive allele causes a metabolic condition, and 1 person in every 2500 is born with it. Assuming the Hardy-Weinberg conditions hold, calculate the frequency of the recessive allele and calculate the percentage of the population who are heterozygous carriers. [4]

B4 An allele giving resistance to a pesticide reaches a frequency of 0.6 in a field where the pesticide is used every season. Spraying then stops, and over the following years the frequency of the allele falls. Suggest why. [3]
