

Evolution

Question Paper 2

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Selection and evolution
Sub Topic	Evolution
Booklet	Theory
Paper Type	Question Paper 2

Time Allowed : 54 minutes

Score : / 45

Percentage : /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

- 1 (a) A recent study of the house mouse, *Mus musculus*, on the island of Madeira resulted in the following observations.
- There are six distinct populations.
 - The mice are associated with human settlements.
 - The populations are located in different valleys separated by steep mountains.
 - Each population has a different diploid number of chromosomes.

As a result of these observations it has been suggested that speciation is taking place.

Fig. 2.1 is a map of Madeira showing the distribution of the six populations.

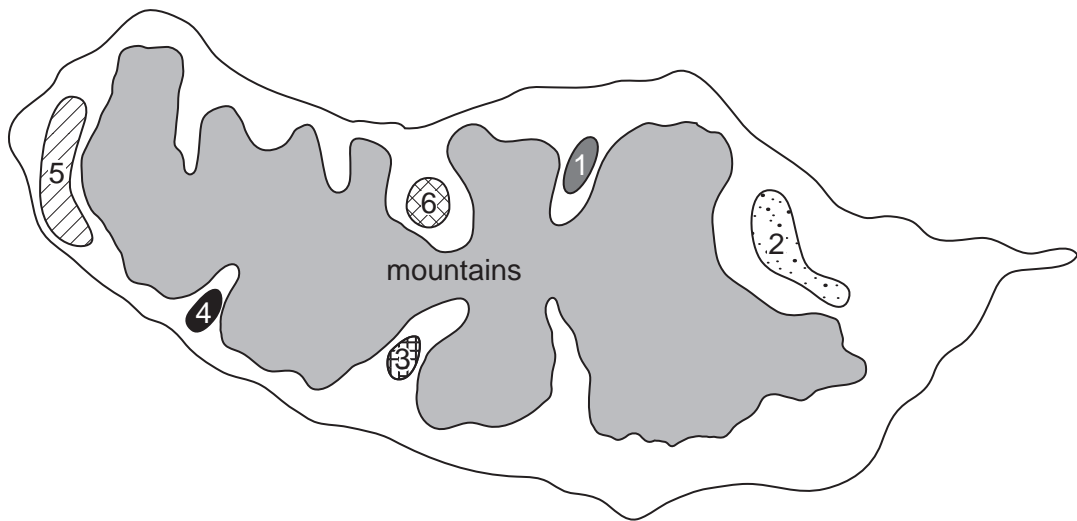


Fig. 2.1

Using the information in Fig. 2.1, state the likely isolating mechanism and the type of speciation taking place.

isolating mechanism

type of speciation [2]

(b) Explain how speciation is occurring in the house mouse populations of Madeira.

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[Total: 7]

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- 4 Both sorghum and maize are important food crops in dry regions of the world, but sorghum is able to produce higher yields than maize in very dry conditions.

This is partly because sorghum plants have a smaller leaf area than maize, and also because sorghum leaves have rows of motor cells along the midrib of the upper surface of the leaf, allowing the leaves to roll up.

- (a) Explain how **these two** features adapt sorghum plants for growth in very dry conditions.

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- (b) Sorghum is a staple food in Africa, but the major storage protein that it contains, kaffirin, is not easily digested by protease enzymes. The main cause of this is cross-linking between kaffirin molecules.

The digestibility of the protein in five varieties of sorghum was measured when raw, and after cooking. Digestibility was measured as the percentage of the protein that would be broken down to amino acids during digestion.

The results are shown in Fig. 5.1.

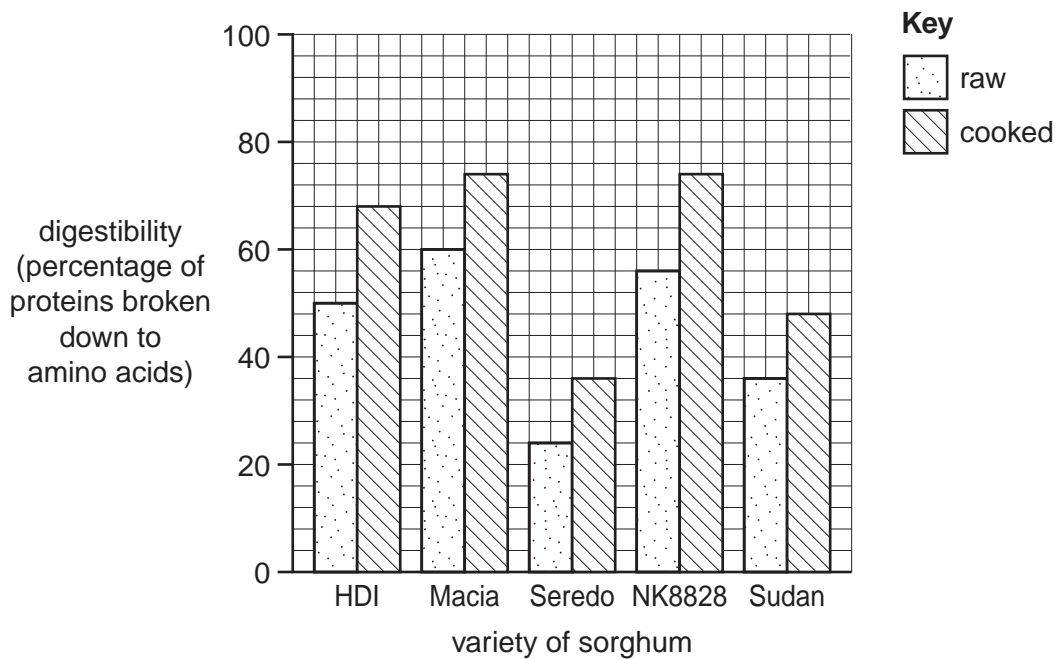


Fig. 5.1

With reference to Fig. 5.1

- (i)** compare the digestibility of raw and cooked sorghum protein

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- (ii)** using your knowledge of protein structure and enzyme activity, suggest reasons for the differences you have described in **(i)**.

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..... [3]

[Total: 8]