

Classification

Question Paper 1

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Biodiversity, classification and conservation
Sub Topic	Classification
Booklet	Theory
Paper Type	Question Paper 1

Time Allowed : 64 minutes

Score : / 53

Percentage : /100

Grade Boundaries:

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

- 1 Mole rats, *Spalax ehrenbergi*, are mammals that live in groups in underground burrows. They are blind, and communicate with each other through sound and scent. Males make a purring call when they are attempting to persuade females to mate with them.

In Israel, the mole rats found in different parts of the country all look identical. However, there are actually four different populations with different chromosome numbers, which live in different climatic regions.

These are shown in Table 5.1.

This table also shows information about the purring calls used by the males in each population. The calls of the males were analysed by measuring the number of sound pulses per second, and also the frequencies of the sounds that they made.

Table 5.1

chromosome number of population		52	54	58	60
climatic region in which population lives		cool and humid	cool and dry	warm and humid	warm and dry
purring call made by males	mean number of pulses per second	21.0	25.3	23.9	23.2
	mean major frequency /kHz	595	555	583	562

- (a) Explain why the chromosome number of each of the four populations of mole rats is an even number.

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- (b) Researchers investigated how female mole rats from each of the four populations responded to purring calls made by males from the same population, and by males from different populations.

A female was placed midway between two loudspeakers, and recorded calls from two males were played to her simultaneously. The researchers noted which loudspeaker the female moved towards. This was repeated with many different females from each population. The results are shown in Table 5.2.

Table 5.2

population chromosome number	percentage of females preferring the purring call of males from their own population
52	79
54	77
58	77
60	44

With reference to Table 5.2, describe the extent to which female mole rats show a preference for the purring calls of males from their own population.

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- (c) With reference to the data in both Table 5.1 and Table 5.2, discuss whether these four populations of mole rats should be classified as different species.

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