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90459

NZQA
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 2 Biology, 2007

90459 Describe genetic variation and change

Credits: Three
2.00 pm Tuesday 27 November 2007

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–7 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

For Assessor's use only	**Achievement Criteria**		
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Describe biological concepts and processes that relate to genetic variation and change.	Explain biological concepts and processes that relate to genetic variation and change.	Discuss biological concepts and processes that relate to genetic variation and change.
Overall Level of Performance		

You are advised to spend 35 minutes answering the questions in this booklet.

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QUESTION ONE

(a) Define the term **mutation**.

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Drosophila melanogaster, the common fruit fly, is used in genetic experiments. A normal population of *Drosophila* consists of flies with long wings and grey bodies. Many mutant forms are found naturally in a population, and one such example is a fly with short wings and a black body.

Normal
(long wings, grey body)

Mutant
(short wings, black body)

A homozygous normal male with the genotype **WWGG**, is crossed with a homozygous mutant female with the genotype **wwgg**. The offspring of this cross all have the same genotype as each other. **Two of these F_1 offspring are then bred together to produce the F_2 generation.**

(b) Use the Punnett square to show the gametes and the **genotypes** of all the possible F_2 offspring from these two F_1 flies.

F_1 Gametes

F_1 Gametes					

(c) Give the **phenotypic** ratio for the F_2 offspring in part (b) above.

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(d) **Discuss** how the **processes** involved in meiosis can contribute to genetic variation.

QUESTION TWO

Assessor's use only

(a) Define the term **gene pool**.

(b) Explain how new alleles can enter and become established in a population.

QUESTION THREE

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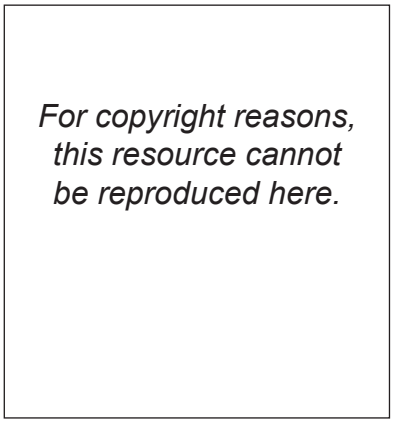
The Australian sheep blowfly, *Lucilia cuprina*, was first identified in New Zealand in 1988, and is now found to have spread throughout many sheep-farming regions. In 1995, a study was carried out to determine the genetic effects of the colonisation. The populations of Australian and New Zealand flies were found to have a number of genetic differences.
Ultimately, the New Zealand population may give rise to a new species.



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(a) Two processes that could be responsible for the genetic change in the New Zealand population of blowflies are **genetic drift** and **natural selection.**

Explain how **each** of these two processes works to change the allele frequencies of the populations.

(b) **Discuss** why the arrival of the blowfly in New Zealand is considered to be an example of the **Founder Effect** rather than a **Population Bottleneck**.

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Extra paper for continuation of answers if required.
Clearly number the question.

Assessor's use only

Question number	

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