

90454



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 2 Agricultural and Horticultural Science, 2010

90454 Describe manipulations to influence growth and development, and productivity, in livestock or plants

Credits: Four

2.00 pm Wednesday 1 December 2010

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

Answer ***EITHER***: ALL questions in Section A – Agricultural Science (pages 2–7) (Tick one box)
OR: ALL questions in Section B – Horticultural Science (pages 8–13).

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 2–15 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.

<i>For Assessor's use only</i>	Achievement Criteria		
Achievement	Achievement with Merit	Achievement with Excellence	
Describe the effect of factors on growth, development, and productivity of livestock or plants. <input type="checkbox"/>	Explain how factors influence the growth, development, and productivity of livestock or plants. <input type="checkbox"/>	Explain how factors influence the growth, development, and productivity of livestock or plants. <input type="checkbox"/>	
Describe manipulations of factors used to influence the growth and development, and productivity, of livestock or plants. <input type="checkbox"/>	Explain how manipulations of factors influence the growth and development, and productivity, of livestock or plants. <input type="checkbox"/>	Explain how manipulations of factors influence the growth and development, and productivity, of livestock or plants. <input type="checkbox"/>	
		Justify manipulation(s) used to influence growth and development, and the productivity of a livestock or plant production system. <input type="checkbox"/>	
Overall Level of Performance (all criteria within a column are met)			<input type="checkbox"/>

You are advised to spend 40 minutes answering the questions in this booklet.

EITHER:

SECTION A: AGRICULTURAL SCIENCE

QUESTION ONE: YOUNG STOCK AND CREEP GRAZING

Livestock farmers always give the best nutritional feed to young stock during times of feed shortage, such as droughts.

- (a) Explain why it is important that **young** animals receive the best nutritional feed available. In your explanation:
- describe how growth or development is influenced by the **age** of livestock
 - explain why feeding young animals the best nutritional feeds increases productivity.

(b) On-farm trials have shown that a feeding system called creep grazing is beneficial to the growth rates of lambs from about seven weeks of age. The gaps in a gate are wide enough for lambs to pass through, but not wide enough for the ewes.

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Creep grazing



Justify the use of the creep grazing system shown in the photograph rather than grazing ewes and lambs together in the one paddock during the **later** stages of lactation (milking).

In your justification:

- describe how creep grazing operates
- explain why creep grazing is more effective in the later stages of lactation
- compare the quantity and quality of feed available to lambs when using both feeding systems in the later stages of lactation.

QUESTION TWO: MEAT QUALITY AND CASTRATION

The sale of meat products is New Zealand's second-largest industry. Consumers show a strong preference for the meat from young animals.

(a) Explain why consumers prefer the meat of **young** animals, for example lamb or chicken.

In your explanation:

- describe the effect that **age** has on carcass characteristics
- explain how young animals provide the carcass quality preferred by most consumers.

(b) Some meat characteristics, especially the fat content, is affected by the sex of the animal.

Explain why the fat content differs between males and females of the **same age** and **breed**.

In your explanation:

- describe the difference in fat content
- explain why the difference in fat content exists.

- (c) Farmers have the choice of castrating or not castrating male lambs.

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A **steep hill country** farmer running Romney sheep on **low quality** pastures decides to castrate all ram lambs. All the castrated lambs will eventually be killed.

Justify the farmer's decision to castrate all ram lambs by explaining why this practice is better than leaving the lambs as ram lambs.

In your justification:

- describe the castration process
- explain how castration influences growth rates and carcass value
- explain why it is desirable that all ram lambs on **this** property are castrated.

QUESTION THREE: FACTORS AFFECTING CATTLE GROWTH

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Growth and development of **cattle** are affected by many factors.

- (a) At a Silver Fern processing factory, beef carcasses showing differences in size, fat content, fat colour, and meat colour were displayed to farmers.

Complete the table below by ticking the carcass characteristics **significantly** affected by the factors listed. Some factors will affect more than one carcass characteristic. One box has been ticked, showing that nutrition affects carcass size.

Factors	Carcass characteristics			
	Carcass size	Fat content	Fat colour	Meat colour
Breed				
Nutrition				
Pre-slaughter handling	✓			

- (b) Explain how ONE factor affects a carcass characteristic you have ticked.

Selected factor: _____

(c) The use of **feedlots** for cattle production has grown in recent years. Despite the fast growth rates achieved under feedlot conditions, most beef farmers use pasture as the main feed.

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Justify the use of a **pastoral grazing system**, including supplementary feeding in winter, rather than feedlots to raise cattle in New Zealand.

In your justification:

- describe the ease of use of pastoral grazing throughout the year
- explain the lower cost per unit of liveweight gain when using pastoral grazing systems
- explain why beef produced under a pastoral grazing system is in demand in overseas markets.



You are advised to spend 40 minutes answering the questions in this booklet.

OR:

SECTION B: HORTICULTURAL SCIENCE

QUESTION ONE: BIRD PROBLEM AND CONTROL

Birds can cause problems in fruit-growing areas, resulting in a loss of productivity.

- (a) When producing fruit crops such as grapes and cherries, describe TWO problems birds cause.

(1) _____

(2) _____

- (b) Explain why fruit becomes more attractive to birds in the final stages of its development.

(c) A young horticulturalist has purchased a small **vineyard** located close to a **tourist resort town**. The grower now faces a **bird problem** that threatens the **economics** of the vineyard.

The grower is considering the following bird control practices:

- use of netting
- use of gas guns as a bird-scarer
- shooting the birds.

Select the practice you would recommend **this** grower use to gain the **highest financial returns** in the **long term**.

Selected practice: _____

Justify the use of the selected practice by explaining why it is better than ONE other practice. In your justification, include:

- a description of the practice used to control birds
- an explanation of how the practice improves the quantity of high-quality grapes
- an explanation of why it is better than ONE other practice in the long term. In your explanation, include detail on the ability of the techniques to control birds, their impact on crop quality, and financial returns resulting from their use.



QUESTION TWO: FERTILISER APPLICATIONAssessor's
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Fertilisers are commonly applied to improve the yield and quality of vegetable and fruit crops. Fertilisers that provide the nutrients **nitrogen**, **phosphorus**, **potassium** and **magnesium** are in demand by growers.

- (a) (i) Describe the effect of any TWO of these nutrients on plant growth and development.

Nutrient (1): _____

Nutrient (2): _____

- (ii) Explain why it is important that a **balanced** supply of nutrients is provided to plants.

(b) A market gardener produces cabbages for a supermarket chain.

Nitrogen is applied during the growing period, and the grower is deciding whether to continue to use **inorganic** fertilisers or change to **organic** fertilisers in the future.

Consider the characteristics of fertiliser types shown below.

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 Source (adapted): Dr Kuan Goh, *An Introduction to Garden Soils, Fertilisers and Water* (Christchurch: Bascands, 1987), pp 36–47.

Select the type of fertiliser the grower should use when producing cabbages for the supermarket.

Selected type of fertiliser: _____

Justify your selected **type of fertiliser** by explaining why it is **better** than the other type of fertiliser for use on this property.

In your justification, include:

- a description of how the fertiliser would be applied
- an explanation of how this fertiliser will increase the rate of cabbage growth
- an explanation of why the selected fertiliser is better than the other fertiliser in terms of effectiveness, crop quality, and financial returns.

QUESTION THREE: TRAINING SYSTEMS

Many fruit crops require a **training system**.

A grower is planting a new variety of fruit crop called "Crimson Tang". The fruit is a berry, growing on a vine, which is produced on one-year-old canes. It can be trained, and needs to be hand-harvested. Sweetness, red colour, and clean appearance are requirements of the market for this fruit.

Training of a plant on wires

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Source: Christine Hammett, *Horticulture for NZ Students* (Auckland: Longman Paul Ltd, 1985), p 63.

(a) Explain how the factors required to produce this fruit are enhanced by the training system.

In your explanation:

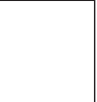
- describe the factors that are enhanced by the training system
- explain how enhancing these factors will increase fruit production.

(b) Justify the use of the training system by explaining how it **increases economic returns** when producing the fruit crop.

In your justification, include:

- a description of a **training system** that could be used for “Crimson Tang”
- an explanation of how the use of a training system helps the grower to meet **market requirements**
- an explanation of why a training system **increases economic returns**. In your explanation, include detail on the **management of the crop, crop yield, and fruit quality**.

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