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NZQA

Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 2 Agricultural and Horticultural Science 2023

91294 Demonstrate understanding of how NZ commercial management practices influence livestock growth and development

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of how management practices influence livestock growth and development in commercial production in New Zealand.	Demonstrate in-depth understanding of how management practices influence livestock growth and development in commercial production in New Zealand.	Demonstrate comprehensive understanding of how management practices influence livestock growth and development in commercial production in New Zealand.

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 attempt ALL the questions in this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (DO NOT WRITE IN THIS AREA DO NOT WRITE). This area will be cut off when the booklet is marked.

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

Excellence

TOTAL 21

INSTRUCTIONS

You are required to discuss THREE livestock species of **your choice**.

BEFORE choosing livestock, carefully read ALL the questions to ensure your selections will allow you to meet all the requirements.

QUESTION ONE: Livestock development and feeding

Throughout their life stages, livestock require different types of feed as they grow and develop.

Select your livestock for this question. The livestock you select for this question must be different to those you select for questions Two and Three.

Livestock for Question One: Sheep

(a) How do the growth and development of your chosen livestock change from birth through to the harvest of products? Provide details of the main factors that drive these changes.

Young lambs can only drink milk after they are born ~~until~~ because their rumen isn't fully developed so they can't digest ~~pastures~~ crops or grass. This usually takes around 12 weeks to develop. While lambs are drinking milk, it passes the rumen through the oesophagal groove and straight into the abomasum where the nutrients are absorbed and used for growth and development, including the rumen. A fully developed rumen allows the growing lambs to properly digest grass and other crops and retain maximum nutrients, protein and carbs out of the feed. This will increase the rate of growth and development of lambs into sheep as ~~they~~ protein is needed for muscle and bone growth and carbs are ~~added~~ needed for energy. Nutrients help with the normal functioning of body cells, ~~and no~~

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spring, summer = heaps of grass
winter, ~~spr~~ autum = require other feed types.

4 (b) Evaluate how growers adapt their practices to match seasonal changes in feed supply to ensure growth and development are not compromised.

In your answer consider the impact on the economics of production and timing.

During Spring and Summer when grass growth is at its high, farmers don't need to supply any other feed types unless there is a drought or floods that could destroy grass and other crops. Grass requires high amounts of rain and sunshine for photosynthesis which is why spring and summer produces the highest grass growth. During these ~~ma~~ seasons, sheep will reach optimum growth of 100-400g per day until they reach around 38kg which usually takes around 3-6 months. During Spring / Summer, lambing usually occurs which is when ewes require ~~the most~~ 2.5x maintenance feed to produce enough good quality milk to feed their lambs so they can grow and develop faster. If ewes don't recieve enough feed and nutrients throughout this time, it can cause nutrient deficiencies and other health problems such as milk fever meaning their ~~lam~~ offspring won't be feed a enough ~~qual~~ quality milk to reach maturity in the desired time frame. ~~During~~ This means lambs will take longer to reach maturity meaning more feed is required which can become costly for a farmer. During winter and Autumn when grass growth is low, farmers can feed stock crops such as lucerne which is still high in protein and won't cause any compromise to growth and development. If sheep still aren't putting on enough weight, farmers

can use supplement feeds to boost ~~grow~~ weight gain and growth and development. This can be costly for a farmer but will ensure growth and development is not compromised. If growth is stunted from lack of protein, nutrients and carbs, the lamb will ~~not~~ reach maturity but at a lot smaller size and will take longer to reach maturity. This will decrease a farmers profits as they would've spent all this money on feed that wouldn't be necessary if growth wasn't stunted. During colder months, lambs can spend more energy on keeping warm rather than putting on weight and the growth and development of muscle and bones. This puts a hold on growth and development and the lamb will take longer to reach maturity. The farmer will also have to ~~pay~~ spend more on supplement feeds to increase weight gain ~~as~~ so the lamb will reach maturity at the deired time.

QUESTION TWO: Livestock health

To ensure that livestock are able to reach their potential for growth and development, producers must carry out animal health practices throughout the life of the livestock.

Select your livestock for this question. The livestock you select for this question must be different to those you select for questions One and Three.

Livestock for Question Two: Pigs

Select your health practice for your chosen livestock.

Health practice: Vaccinating

(a) How does this animal health practice have a positive impact on the growth and development of your chosen livestock?

Vaccinating prevents diseases in pigs ~~and~~ and is administered in the neck ~~where~~ and under the skin where the less valuable meat is. Vaccinating has a positive impact on the growth and development of pigs as it prevents the pigs from catching a disease that could reduce growth and development. If vaccinating wasn't done, it would be a lot easier for the pigs to catch diseases and spread them around most. Diseases cause ~~pigs~~ a loss of appetite in pigs. They cause pigs to spend more energy from their food on fighting the disease, rather than growth and development. Vaccinating prevents this from occuring so pigs won't catch as many diseases and their growth and development won't be stunted and is less likely to be impacted negatively.

(b) Evaluate the effectiveness of this health practice by explaining how the improvements in growth and development impact the quality of the products and the economics of production.

Vaccinating

Vaccinating is costly for a farmer but will increase profits long term. 5 in 1 vaccines can be used which reduces the overall cost and protects pigs from multiple diseases. Vaccinating prevents diseases in pigs and is administered in the neck and under the skin where the less valuable meat is so the quality of meat is not affected as much. Vaccinating gives the pigs antibodies so they can easily fight a disease if they do catch it. Diseases can cause stunted growth because the pigs are ~~spending more~~ useing more energy on fighting the disease, rather than growth and development. This means they will take longer to reach maturity and a farmer will have to spend more on feed and won't make as ~~more~~ much profits from a smaller ~~carcass~~ carcass size as an effect of stunted growth. When an animal has a disease, it can cause stress which an increase in lactic acid in the meat. An increase in lactic acid causes an increase in pH of meat which decreases the quality as the pork ~~will~~ will be tougher. If the pork is at a lower quality, the farmer won't make as much profits from their pigs. Vaccinating all pigs will reduce the risk of diseases spreading and impacting the growth and development ~~of~~ negatively. Vaccinating will allow pigs to stay healthy and spend their energy on growth and development. This ~~w~~ increases the quality

of pork because the pigs aren't stressed, and they will reach maximum growth and development and reach maturity quicker. This will increase the profits a farmer will make because all of their pigs will be healthy and have the best quality meat and making the most money. Although vaccinating all pigs for the most common diseases is costly for a farmer, it will increase the risk of stunted growth and degradation of meat quality, therefore increasing profits in the long term.

QUESTION THREE: Breeding practices

The breeding practices chosen by livestock producers can have an important impact on the growth and development of the resulting offspring.

Select your livestock for this question. The livestock you select for this question must be different to those you select for questions One and Two.

Livestock for Question Three: Cattle / Beef

Select a breeding practice for your chosen livestock.

Breeding practice: Cross Breeding

(a) How does this breeding practice impact the growth and development of the offspring that result from this practice?

Cross Breeding is when you cross two genetically different animals to produce an offspring that is superior to ~~the~~ each parent. This effect is called hybrid vigour and is commonly used in cattle breeds Angus and Hereford. This cross produces offspring that is early maturing meaning it will reach maturity quicker, but at lighter weights. In early maturing breeds, the fat tissue develops earlier creating more intramuscular fat and marbling. Hybrid vigour allows a farmer to combine desirable genetics to produce offspring that will grow faster and at a higher quality.

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(b) Evaluate the use of this breeding practice in terms of growth and development by comparing it with an alternative breeding practice.

In your answer discuss the impacts on the quality and quantity of livestock produced from these practices.

Crossbreeding produces offspring that will inherit desirable traits and it will be superior to the genetics of each parent. This results in hybrid vigour. ~~The~~ Angus and Hereford are commonly crossed and produce offspring that are early maturing and produce high amounts of intramuscular fat/marbling. Another breeding practice is artificial insemination which is where the farmer can chose which genetics they want the offspring to inherit. This can be costly for a farmer but can introduce new genetics into the herd such as marbling and large eye muscle area which are desirable traits in meat. Crossbreeding Angus and Hereford will produce an offspring that is early maturing which means that it will reach maturity quicker, but at lighter weights. There will be more animals sent to the works per year because the animals are reaching maturity quicker and spending less time on the farm. The quantity of animals sent to slaughter is increased but the amount/carcass size of each animal is smaller. With A.I, you can select genetics for either late or early maturing qualities as well as eye muscle area, marbling and carcass size which will increase the quantity of meat that each animal will

produce. Early maturing breeds, ~~produce~~ fat tissue ~~earlier~~ develops earlier meaning there will be more intramuscular fat which gives meat its flavour. Marbling is a desired ~~trait~~ quality in meat. With A.I, you can select for more desirable qualities such as ~~rib~~ eye area and carcass size which will increase the quantity and quality of meat and increase overall profits a farmer will make.

Excellence

Subject: Agricultural and Horticultural Science

Standard: 91294

Total score: 21

Q	Grade score	Marker commentary
One	E7	The candidate covered timing in significant detail and provided the scientific reasoning for the impact of the management practice. Economics of production and cost to the farmer has been written in some detail.
Two	E7	The candidate covered the seasonal variation of feed changes and its impact on their chosen livestock. They articulately covered timing in relation to the economics of production.
Three	E7	The candidate covered quality well with great links to amount of product at export and slaughter quality.