

Assessment Schedule – 2017

Agricultural and Horticultural Science: Demonstrate understanding of how NZ commercial management practices influence livestock growth and development (91294)

Assessment Criteria

Question ONE: Feeding pigs

Achievement	Achievement with Merit	Achievement with Excellence
Describes how pig feed such as pig nuts improves pig growth and development after 17 weeks of age until slaughter.	Explains how pig feed such as pig nuts improves pig growth and development after 17 weeks of age until slaughter.	Justifies the use of pig nuts by evaluating how they improve the timing and economics of pork production.

N1	Some writing, but does not describe how pig feed such as pig nuts improves pig growth and development after 17 weeks of age until slaughter.
N2	Partial or insufficient description of how pig feed such as pig nuts improves pig growth and development after 17 weeks of age until slaughter.
A3	Describes how pig feed such as pig nuts improves pig growth and development after 17 weeks of age until slaughter.
A4	Fully describes how pig feed such as pig nuts improves pig growth and development after 17 weeks of age until slaughter (linking protein with muscle development and growth rates).
M5	Explains how pig feed such as pig nuts improves pig growth and development after 17 weeks of age until slaughter, linking food utilisation OR energy intake to growth rates.
M6	Fully explains how pig feed such as pig nuts improves pig growth and development after 17 weeks of age until slaughter, linking food utilisation AND energy intake to growth rates.
E7	Justifies the use of pig nuts by evaluating how they improve the timing and economics of pork production. Comprehensive evidence for superiority in ONE aspect, with the other aspect well supported.
E8	Justifies the use of pig nuts by evaluating how they improve the timing and economics of pork production. Comprehensive supporting evidence for superiority in BOTH aspects.

N0 = No response; no relevant evidence.

Q1	Sample Evidence
(a)	<p>Question: Explain how pig feed such as pig nuts improves pig growth and development after 17 weeks of age until slaughter.</p> <p><u>Describes</u> how pig feed such as pig nuts improves pig growth and development after 17 weeks of age until slaughter.</p> <p>Pigs require water, energy, protein, fats, vitamins, and minerals in order to grow and develop in a healthy state. Pig feed can be formulated to meet the pig's needs depending on the age and stage of the pig.</p> <p>Pig nuts contain quality grains and protein meal, which ensure a lower protein level (14%) and energy feed to maintain body weight without pigs becoming too fat. Protein is required for muscle development, and while minerals and vitamins are consumed in smaller quantities, they are essential for body processes.</p> <p>Any deficiency in one of these requirements will adversely affect growth and development. This means that the pig nuts on their own will meet the nutritional needs of the pigs. Additional feed such as scraps or other grains / feed can be provided, but pig nuts should make up the majority of the diet to get the best results.</p> <p>Pigs are usually fed an unlimited amount; however, they need to consume about 2–3 kilograms per pig per day, depending on age, body weight and environmental temperature.</p> <p><u>Explains</u> how pig feed such as pig nuts improves pig growth and development after 17 weeks of age until slaughter.</p> <p>Pig feed such as pig nuts meets the changing growth and development requirements of growing pigs, resulting in fast growth rates due to a high feed conversion ratio with minimal body fat. Minerals supplied in the pig nuts contain calcium and phosphorus required for bone development.</p> <p>The desired growth rate is mainly muscular with some fat, but it takes amino acids from protein to form the muscle, and this involves feeding a high-protein and high-energy diet, to maintain body function. Very young animals are developing muscle rather than fat, therefore a high-protein (20%) diet is essential. As the animal ages, the muscles have mainly developed, so there is less need for protein, so it is reduced to 14%.</p> <p>By having an unlimited amount of high-quality feed, instead of fighting over feed, the pigs are able to maximise their growth rates, because they can spend more time foraging for food. This ensures a higher intake and better utilisation of the feed, leading to greater growth, and faster liveweight gain. Higher feed intake increases digestion and the absorption of nutrients, therefore maximising the intake of digestible energy and protein required for growth, muscle, and tissue development.</p>
(b)	<p>Question: Justify the use of pig nuts by evaluating how they improve the timing and economics of pork production.</p> <p>Pork production takes advantage of the fact that young pigs have the capacity for growth, and if not fed correctly, stunted growth results. The faster the pigs achieve a desired carcass weight, the quicker the turnover of pigs in the production system. By having an unlimited amount of high-quality feed, instead of fighting over feed, the pigs are able to maximise their growth rates, as they can spend more time foraging for food, ensuring that they have a higher intake and better</p>

utilisation of the feed, which results in greater growth, and faster liveweight gain. Higher feed intake increases digestion and absorption of food nutrients, maximising the intake of digestible energy and protein required for growth, muscle and tissue development. This, therefore, improves the timing of the pork production.

Using pig nuts means that all the important ingredients are contained in the feed, which encourages consumption and ensures that no unpalatable alternatives are eaten. As the pig nuts are in pellet form, this reduces wastage and minimises respiratory problems due to reducing the dust / powder. Protein in any form is expensive to purchase but by using pig nuts, the protein is in the required amount for optimum pig growth and development, and does not contain excess protein, which would be converted into fat, reducing quality (and economic gains).

A specially formulated pig feed is a necessity whatever the cost, and is a justifiable outlay to the producer. Utilising pig nuts eliminates poor quality feed and ensures that the producer has a high number of quality pigs at optimum liveweight in the shortest timeframe, providing good financial gains.

Assessment Criteria

Question TWO: Facial eczema

Achievement	Achievement with Merit	Achievement with Excellence
Describes how one technique of zinc dosing to prevent facial eczema of livestock is carried out.	Explains how zinc dosing to prevent facial eczema improves livestock growth and development.	Evaluates how the effectiveness of treating animals with zinc is dependent on timing, and how this affects the economics of production.

N1	Some writing, but does not describe how one technique of zinc dosing to prevent facial eczema is carried out.
N2	Partial or insufficient description of how one technique of zinc dosing to prevent facial eczema is carried out.
A3	Describes how one technique of zinc dosing to prevent facial eczema is carried out.
A4	Fully describes how one technique of zinc dosing to prevent facial eczema is carried out, with reference to growth rates.
M5	Explains how zinc dosing to prevent facial eczema improves livestock growth and development, linking food utilisation OR energy intake to growth rates.
M6	Fully explains how zinc dosing to prevent facial eczema improves livestock growth and development, linking food utilisation AND energy intake to growth rates.
E7	Evaluates how the effectiveness of treating animals with zinc is dependent on timing, and how this affects the economics of production. Comprehensive evidence for superiority in ONE aspect, with the other aspect well supported.
E8	Fully evaluates how the effectiveness of treating animals with zinc is dependent on timing, and how this affects the economics of production. Comprehensive supporting evidence for superiority in BOTH aspects.

N0 = No response; no relevant evidence.

Q2	Sample Evidence
(a)	<p>Question: Describe how one technique of zinc dosing to prevent facial eczema is carried out.</p> <p>Zinc dosing can occur in a number of ways. Livestock can be drenched with zinc oxide, or zinc sulphate can be added to water supplies, added to feed or as an intraruminal slow release bolus.</p> <p>Drenching involves giving liquid zinc oxide to animals. The zinc oxide is given to the animal using a drench gun, which administers a predetermined dose to each animal. This involves weighing the animals to establish the range in liveweight, then reading the label of the zinc container to establish a dose for the average weight of the animals. The animal's head needs to be lifted, and the gun inserted in the corner of the mouth and over the tongue to ensure no "spitting out" of the zinc drench.</p> <p>Zinc sulphate can be added to an in-line zinc supplementing system, which delivers zinc to each trough, which the animals then drink.</p> <p>A slow-release intraruminal bolus can be put down the animal's throat into the rumen. Depending on the livestock, it lasts between 28 and 42 days.</p> <p>With zinc dosing, the animals have protection from facial eczema and therefore liver damage, meaning that the feed they consume contributes to their own growth and development.</p>
(b)	<p>Question: Explain how zinc dosing to prevent facial eczema improves livestock growth and development.</p> <p>Through zinc dosing, the animals are protected from facial eczema, so the feed that they consume is directly used in their own growth and development. This leads to better utilisation of feed, due to better digestion and absorption of food nutrients, maximising the intake of digestible energy and protein required for growth, muscle and tissue development. This results in greater growth rates, and higher liveweight gain.</p> <p>Each animal must receive the correct dose for effective treatment. If an animal is missed or is under-dosed, then it will not be protected from facial eczema.</p> <p>If facial eczema occurs, the animal experiences liver damage which presents as weight loss or decreased weight gain, lower milk production, and restlessness. It will seek shade, and any exposed unpigmented or thin skin reddens, thickens, and peels. In serious cases, chronic wasting may occur at the time of liver damage, or months later when the animal is under stress (e.g. calving), and the animal may die. Facial eczema has a negative impact on livestock growth and development.</p>
(c)	<p>Question: Evaluate how the effectiveness of treating animals with zinc is dependent on timing, and how this affects the economics of production.</p> <p>There is a wide range of zinc products available for use to prevent facial eczema (and liver damage) in livestock. Timing of the zinc treatments is critical, as it takes at least three weeks after the start of treatment for enough zinc reserves to be built up in the liver to be effective. This is the major reason for failure of livestock to be prevented from getting facial eczema, as some people expect instant results after they see the first cases.</p> <p>The fungus produces spores when grass minimum temperatures are above 12°C for two or three nights and humidity is high (usually January to May). Farmers should monitor regional spore counts and as soon as they are moving upwards of 20 000 spores / gram of pasture, zinc dosing needs to start. Pasture spore</p>

count monitoring is essential to get the best return from the zinc dosing treatments and the financial investment.

The more control a farmer has over the amount of zinc an animal receives, the more likely the animal is receiving the correct daily dose. Zinc drenching and intraruminal bolus will, for this reason, provide more reliable protection than adding zinc sulphate to drinking water. However, drenching has a lower cost, both in terms of drench and labour required.

Facial eczema has a major impact on farm business performance, as infected animals do not reach performance targets in milk or meat production. If animals have minor liver damage, it will still take them longer to reach their optimum liveweight, pushing their timing to meet the market out, reducing economic returns. Cows will have lower milk production, therefore a reduced economic return.

Animals can take up to 12 months to fully recover, and animals with a previous history of facial eczema have a lower chance of recovery than previously unaffected animals.

In serious cases, chronic wasting and / or death may occur due to poor body condition score and the severity of the condition. Animals with chronic wasting or with severe skin damage cannot be sent for meat processing, further reducing economic returns.

Having facial eczema-free livestock that are able to grow at their optimum rate, using their feed to maximise their development, ensures a higher number of quality animals producing products that reach the market on time, and fetching good economic returns for the farmer.

Assessment Criteria

Question THREE: Shelter belts

Achievement	Achievement with Merit	Achievement with Excellence
Describes how shelter belts improve the growth and development of livestock.	Explains how shelter belts improve the growth and development of livestock.	Justifies the use of shelter belts to improve the quality and quantity of livestock in New Zealand with reference to the economics of production.

N1	Some writing, but does not describe how shelter belts improve the growth and development of livestock.
N2	Partial or insufficient description of how shelter belts improve the growth and development of livestock.
A3	Describes how shelter belts improve the growth and development of livestock.
A4	Fully describes how shelter belts improve the growth and development of livestock, with reference to growth rates.
M5	Explains how shelter belts improve the growth and development of livestock, linking to growth rates.
M6	Fully explains how shelter belts improve the growth and development of livestock, linking food utilisation AND energy intake to growth rates.
E7	Justifies the use of shelter belts to improve the quality and quantity of livestock in New Zealand with reference to the economics of production. Comprehensive evidence for superiority in TWO aspects, with the other aspect well supported.
E8	Justifies the use of shelter belts to improve the quality and quantity of livestock in New Zealand with reference to the economics of production. Comprehensive supporting evidence for superiority in ALL THREE aspects.

N0 = No response; no relevant evidence.

Q3	Sample Evidence
(a)	<p>Question: Explain how shelter belts improve the growth and development of livestock.</p> <p><u>Describes</u> how shelter belts improve the growth and development of livestock. Shelter belts can be natural, using single or double rows of evergreen permeable trees and shrubs, or artificial, using permeable materials such as plastic or nylon weave strung between posts. Shelter belts need to be permeable, and of a continuous length, with no gaps. They act as a wind filter rather than a wind block, reducing wind turbulence and wind speed. Shelter belts reduce the chill factor, the mean wind speed and the penetration of gale-force winds. Shelter belts provide protection for livestock from all kinds of weather, in particular the wind, sun, rain, storms, frost, snow, and the cold. Basically they minimise the effects of adverse weather conditions.</p> <p>Livestock are particularly vulnerable to windy, cold, and wet conditions, and their growth and development is impeded or death can occur in these conditions. Livestock using shelter belts have lower feed requirements during cold and wet conditions, as less energy is required to keep them warm, than livestock that are left without shelter belts. More of the livestock’s feed intake can be utilised directly for growth and development, rather than going into heating or cooling themselves, resulting in a greater growth rate, and higher liveweight gain.</p> <p><u>Explains</u> how using shelter belts improves the growth and development of livestock. Giving livestock access to shelter belts means that they are able to shelter from adverse weather conditions, ensuring that they use their food intake and energy for growth rather than keeping warm or cool. Livestock will have a better food conversion efficiency, and increased growth rates, because they are able to either continue feeding during this period or their fat reserves will be used for growth rather than keeping warm or cool, which improves digestion and the absorption of nutrients. This maximises the intake of digestible energy and protein required for growth, muscle and tissue development, contributing to faster growth rates. Shelter belts also produce better pasture growth and utilisation as warmer temperatures encourage plant growth, and livestock will graze more evenly over widely sheltered areas.</p>
(b)	<p>Question: Justify the use of shelter belts to improve the quality and quantity of livestock in New Zealand, with reference to the economics of production.</p> <p>Shelter improves animal welfare and productivity, increasing the quality and quantity of the livestock. Shelter belts reduce energy demands on vulnerable animals, such as heavily pregnant ewes and cows, or any sheep post-shearing, increasing their survival rates. There is also a better chance of survival for young lambs and calves in cold, wet, or snowy conditions. Rams and bulls, especially lowland breeds, have better reproductive rates, as they perform better in more sheltered environments. All livestock are at risk of heat exhaustion and sunburn, so providing shelter improves the quality and quantity of livestock. Having livestock that are able to grow at their optimum rate, using their feed to maximise their development, ensures a higher number of quality animals that will fetch good economic returns for the farmer.</p>

Cut Scores

Not Achieved	Achieved	Achievement with Merit	Achievement with Excellence
0–6	7–12	13–18	19–24