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NEW ZEALAND QUALIFICATIONS AUTHORITY
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SUPERVISOR'S USE ONLY

Level 2 Agricultural and Horticultural Science, 2016

91290 Demonstrate understanding of techniques used to modify physical factors of the environment for NZ plant production

2.00 p.m. Monday 14 November 2016
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of techniques used to modify physical factors of the environment for commercial plant production in New Zealand.	Demonstrate in-depth understanding of techniques used to modify physical factors of the environment for commercial plant production in New Zealand.	Demonstrate comprehensive understanding of techniques used to modify physical factors of the environment for commercial plant 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 2–8 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.

Achievement

TOTAL

10

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QUESTION ONE: ORGANIC MATTER IN SOILS

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Adding organic matter to soil improves its physical factors. One technique to increase the organic matter in soils on a dairy farm is to spread effluent.



Source: <http://www.farmtrader.co.nz/features/1511/how-to-make-your-farm-effluent-compliant/>

- (a) Describe how spreading effluent, to increase organic matter, modifies physical factors of the soil.

By ~~adding~~ ^{spreading} effluent to increase organic matter, it modifies the acidity of the soil. This means that the soil becomes rich and nourishable for the grass to grow in. It adds nitrogen to help with growth. //

- (b) Explain how the addition of organic matter affects plant production and improves pasture yield.

Organic matter is a natural way of increasing growth on your farm. By adding organic matter you are putting extra nutrients for the plants to soak up. //

- (c) Justify a farmer's decision to spread effluent on dairy pasture, taking into account the environmental and economic impact of this technique.

By spreading effluent on a dairy pasture it is an easy way to get rid of the effluent with beneficial attributes to the growth on the farm. But you can only put effluent on not all at once, if too much is added the acidity can be too strong and can kill the pasture. Effluent spreading ^{gives} off nitrogen ~~that~~ ^{into} the air from the effluent, which is one of the green house gasses. This is one of the negatives with effluent spreading. If done correctly effluent can be added at the right amount for the pasture and ~~the~~ farmer will have great growth in his crops. If not it can cause the crop to have too much nitrogen and could cause the crop to wilt or die.

QUESTION TWO: HAIL

Hail is an undesirable climatic factor when growing fruit such as apples or cherries for an export market. Covers are often used to protect the fruit from hail.



Source: <http://www.teara.govt.nz/en/photograph/17244/hail-damage>

- (a) Describe an alternative technique which can be used to reduce the impact of hail on fruit for export.

Hail cannons can be used to reduce the impact of hail on fruit as it breaks the hail & so that the impact on the fruit is not as strong.

- (b) Explain how the technique you have described in (a) modifies physical factors of the environment to improve the crop yield and quality for export.

Hail cannons modify the physical factors of the environment very lightly, they only effect the hail. It ~~may~~ causes more pollution through the air and means that the fuels needed are being burned near the fruit which is not a good thing.

- (c) A grower will generally choose covers. Justify this choice by comparing and contrasting covers with the technique you have described in (a) and (b).

In your answer:

- describe how covers modify physical factors of the environment
- explain how covers improve the crop yield and quality for export
- compare the two techniques, taking into account the social and economic impact.

Covers reduce the amount of light let in, where as cannons are only in areas around the fruit. covers can also begin to rip or sag when too much pressure is added to it, which could cause hail to get onto the fruit. //

~~Covers also~~ Covers improve the crop yield and quality for export because you are able to have light shade from the sun, but also allows hail to completely be missed from hitting the fruit, so they do not get any bruises or marks. //

Covers are probably a cheaper option to put up. But may need more maintenance and more labour to do so. Where as hail cannons may cost more to put up but have less labour needs as the covers ~~need~~ need holes fixed and so on. Hail cannons may not do as good of a job as covers may at keeping the hail off and may cause some bruising. //

The more economic option to go for would probably be the covers because they are able to keep the hail completely off even though it may be more labour

QUESTION THREE: DROUGHT

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Source: <https://www.goift.com/news/20130531-pulse-feature-argentinas-historic-drought-higgins/>

Next year, 2017, is predicted by many to be a drought year. Evaluate the techniques a producer could use to reduce the impact of drought on plant production, in relation to timing, quality, and yield.

In your answer:

- describe the effect of drought on plant production
- explain two drought management techniques a producer could use to reduce the impact of drought
- explain how each technique affects plant processes and reduces the impact on the timing, quality, and yield of crops produced
- justify the use of each technique in terms of their environmental and economic impact.

Droughts cause the plants to dry out and die, this means that your plant production for the year is a loss and you will not make a profit. //

Two ways to reduce the impact of a drought is through irrigation, ~~but~~ putting in irrigators or moving sprinklers it means that you can have water going onto the plants to ensure they don't ~~dry~~ dry up. Another way is through using indoor greenhouses instead of growing the plants outside. //

By doing these it means that you are controlling the factors of the environment. By controlling these it means you are making sure that the plant. //

growth is to the best of its ability, and you are giving it a chance to have a good growth rate.

By using irrigation it means that you're able to give the ~~the~~ crop a better growth rate, as you are supplying it with what it needs to survive.

By using greenhouses, it means you are able to control all environmental factors to ensure that you get the best possible outcome. This means that you can control the humidity, water availability and light. By having control of this in a drought it means that you are able to keep the growth rate high. This does mean you need more labour to help control this but in a drought it is more important to keep the crop from dying //

Annotations

Achievement Exemplar 2016

Subject:		Agricultural and Horticultural Science	Standard:	91290	Total score:	10
Q	Grade score	Annotation				
1	3	<p>The candidate's response describes how effluent adds nitrogen to soil, which increases plant growth.</p> <p>The response could have been improved by explaining in detail how the addition of organic matter affects plants, specifically in regards to plant processes.</p>				
2	3	<p>The candidate describes how hail cannons can be used to reduce the impact of hail.</p> <p>The response could have been improved by explaining hail cannons in greater depth. It could have also included links to the use of hail cannons and plant processes.</p>				
3	4	<p>Irrigation is described as a drought-management technique. The candidate describes how irrigation encourages plant growth.</p> <p>The response could have been improved by fully explaining irrigation and how it could affect plant processes.</p>				