OCR
Oxford Cambridge and RSA

A Level Biology A

H420/02 Biological Diversity

Question Set 18

1 Plant cloning is often used by farmers to produce new plants.

A plant that is often cloned by taking cuttings is lavender, *Lavandula angustifolia*.

(a) A farmer had two fertiliser solutions, solution **A** and solution **B**, and wanted to investigate which one to use on lavender plants. In order to ensure the investigation would be valid, two cuttings were needed from the same parent plant.

(i) Describe how to clone a plant by taking a cutting. **[4]**

A branch from the parent plant is cut off and the stem is planted in damp compost. Plant hormones can be added to encourage new root development. Cover the cutting in a clear plastic bag to keep it moist and warm. Over time, new roots develop via mitosis forming new plant identical to the parent plant genetically.

(ii)* The farmer grew one of the cuttings in soil fertilised with solution **A** and the other cutting in soil fertilised with solution **B**.

The farmer took several other precautions to increase the validity of the investigation,including:

- growing the plants in the same type of soil
- exposing the plants to the same light intensity.

After a set period of time the farmer measured the increase in height of the lavender plants. The farmer's results are shown in the table below.

Fertiliser solution	Increase in height (cm)
A	20.3
B	15.4

The farmer concluded that solution **A** increased the height of lavender more. A student said that, even though the investigation was **valid**, the results did not give strong support to the farmer's conclusion.

Describe **and** explain how the investigation could be improved in order to have more confidence in any conclusions drawn from the results. **[6]**

Other factors than types of soil and light intensity could affect the plants growth. The size of cutting (height) should be the same at the start. Same concentration of fertiliser should be used. The plants should be grown in the greenhouse for easier control of environmental factors such as level of CO_2, humidity, soil pH, water availability, wind speed and light intensity + duration. The experiment should be repeated few more times to increase reliability and reduce the effect of anomalies. The mean value for both cases can be calculated as well. To determine whether the difference in height is significant, carry out a statistical test e.g. t-test.

(b) Cloning plants is also known as vegetative propagation.

Identify **three** advantages of vegetative propagation in agriculture. **[3]**

- Produce identical quality (genetically) as the parent
- It is easier and faster method of reproduction
- Can get many clones per plant and choose desirable characteristics

Total Marks for Question Set 18: 13