

Crop: Strawberries (berry growing, outside- not hydroponics)

Life process: Photosynthesis

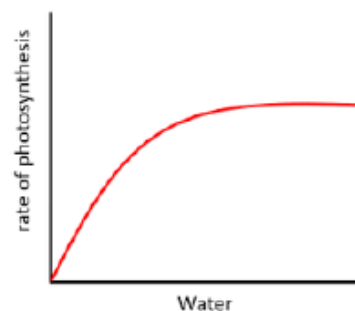
Management process: Irrigation

Photosynthesis is the process by which plants make their own food. Water is sucked up through the roots, carbon dioxide enters the leaves through the stomata and sunlight is absorbed through chlorophyll in the leaf which provides energy to the chloroplast. The chloroplast acts like a factory to break down molecules to then reconstruct them to produce glucose and oxygen. These outputs are used in respiration to make energy and excess sugars are stored as starch. Photosynthesis occurs in the day or at night if artificial light is used because that is when light levels are most sufficient. Factors that can affect photosynthesis in crops are the amount of carbon dioxide in the air, volume of water in the soil, amount of light available, environment's temperature and the amount of chlorophyll that is used to absorb light. In this report I will be investigating how irrigation affects photosynthesis in (field) strawberry plants.



Water is vital for a plant's survival because it is required for plant processes such as photosynthesis. The word equation pictured on the left demonstrates that water can become a limiting factor in photosynthesis so

without it, the plant would be unable to produce sufficient amounts of glucose and oxygen which would result in either the plant producing bad fruit, a very sick plant or the plant dying because the plant is left with suboptimal levels of sugar stores therefore the ability to make energy but this is a part of the respiration process. Too much water is also bad because it doesn't let



enough oxygen into the soil to get to the roots. This graph showing the rate of photosynthesis shows that photosynthesis will slow down if there is not enough water and at a certain point, water will stop increasing photosynthesis. Fortunately, plants can be monitored by growers so that the crop receives the right amount of water. Sometimes rain does not provide an adequate amount of water to the plant which is why many growers use a system called irrigation. Irrigation is needed for good plant growth so the grower does not have to rely on rainfall. There are two main systems of irrigation which are drip irrigation and sprinkler

irrigation. Drip irrigation has tubes along the ground that slowly drips water into the soil for the plant. Less water is wasted in this system which means more money is saved and it gives weeds less opportunity to steal water from the plants. Disadvantages of this system are that it can be easily damaged by mowers, animals and the sun because of it being on the ground, and the holes can get blocked up by sediments in the water. Sprinkler irrigation has tubes under the ground with sprinkler heads above the ground that pumps water to the plants. This system can cover a large surface which is good for large crops and since the tubes are underground, they

are less likely to be damaged by animals, mowers and the sun. Sprinkler systems are less efficient at getting water to the plant's roots because water is lost to runoff and evaporation.



Irrigation is crucial when growing strawberries because they are very sensitive to both too much or too little amount of water. Over irrigation can cause their shallow roots to become more susceptible to root diseases. Drip irrigation (shown on the left) is the most efficient when growing strawberries because the water can enter the soil and get to the roots faster with less wastage of water that would occur with the sprinkler system. Sprinkler systems can also cause the flowers, fruit and leaves to rot because of the overhead watering which is also a reason why drip irrigation is more ideal. Without this extra water needed for photosynthesis, the crop will not be able to produce the best fruit and improve production because of water being a limiting factor.

Photosynthesis is affected by irrigation because plants need water, and rainfall usually doesn't provide enough of it so growers use irrigation to supply the plants with the right amount of water. Drip irrigation drips water into the soil which is sucked up by the roots and used along with carbon dioxide and sunlight to make glucose and oxygen. Photosynthesis is influenced by irrigation because it provides one of the main factors to help the plant produce its food. Irrigation doesn't just keep the plant alive but it also helps the plant produce better fruit which will end up being more beneficial to the grower. It is also important to consider that growers also have to manage the amount of carbon dioxide and sunlight that the plant is absorbing. If there is enough water and not enough carbon dioxide or sunlight then the plant will be unable to photosynthesise as efficiently as possible.

Irrigation in strawberry plants shows manaakitanga because it shows how the grower cares for the whenua and nurtures the plant to make sure it can produce an abundant amount of healthy fruit. The grower provides this fruit for people to enjoy which also shows manaakitanga by providing for others.

References

Crop Guide: Growing strawberry (Provided by teachers)

<https://www.rivulis.com/crop/strawberries/> -information about types of irrigation

<https://www.parkland.co.nz/growing-outstanding-strawberries-with-aquatraxx-drip-tape/> - drip tape photo used from this site