Unit 3 – Monitoring living organisms Salinisation

Risk assessment:

For this experiment, there are no real dangers or hazards that have to be identified, as I am only monitoring the growth of seeds. This experiment involves no harmful substances that I would have been aware of. Provided that I take care of how I conduct and monitor this experiment, there should be no problems.

Method:

To start the experiment, I had to get an egg box that had six holes, so that I could plant the seeds in each 1. In each egg hole, I had planted 10 seeds to make to a fair test. For each egg hole, I had numbered them one to six, so them I would know which one is which when it came to the monitoring. In all of the egg-holes, I had put cotton wool. When those were placed into the egg holes, then I put the ten cress seeds on top of them.

When I had done that, I measured out 1 litre of tap water and poured it into a measuring jug. Then, I had added 50 grams of salt to the tap water and stirred it thoroughly until all of the salt had dissolved. This was then ready for me to put the desired amount of salt concentration, measured by the teaspoon of the mixture into each egg-hole.

For egg-holes one and five, I had put 4 measures of the 50grams per litre salt solution to 1 measure of the tap water. For egg-holes two and six, I had put 3 measures of the 50grams per litre salt solution to 2 measures of tap water. For egg-hole three, I had put 2 measures of the 50grams per litre salt solution to 3 measures of tap water. For the egg-hole four, I had put 1 measure of the 50grams per litre salt solution to 4 measures of tap water.

When I have done that, I would place my experiment next to the window, especially where the sun shines most of the time. This is then allowing the plant to stay at usually the same temperature.

After 12 hours would go past everyday, I monitored to see if there would be any progress of the growth of the seeds. Then, I would put 2 teaspoons of water into each egg-hole, so then the growth of each egg-hole would still continue. I would keep on doing this for 2 weeks, so I would know what is happening for the duration of the seeds growth. Monitoring would take place 11.00am and 23.00pm.

Every time that I would note down the results, I would write down whether there has been any growth from any of the seeds and how much it has grown by (measured by using a ruler). I would describe how the weather was like on that day, and if there was any growth.
Also, I would inspect whether the leaves had necrosis or chlorosis occurring. Also, I would check whether all the plants were moist or not.

"The term 'necrosis' is the type of cell death (whether the seeds swell and burst, or whether the plant goes black)" that the plant goes through.

"The term 'chlorosis' is the yellowing of the leaves which is due to the lack of chlorophyll, which this is also due to the lack of the correct nutrients that the plant requires to grow".

Results:

When I was checking on how the seeds were doing at certain intervals, I had to do a monitoring sheet which records the germination of the experiment. This is how the completed monitoring sheet looked like:

Monitoring sheet: From the 10th of April to the 22nd of April. Monitoring of the seeds at two intervals: 1. 11.00am and 2. 23.00pm.

Day 1: Sunny all day. No growth.

Day 2: Rain in the morning, then dry with sunny intervals in the late afternoon, no growth.

Day 3: Sunny in the morning, then cloudy in the afternoon with light drizzle in the evening, no growth.

Day 4: Damp in the morning, cloudy and dry throughout the day. No growth.

Day 5: Sunny all day. No growth.

Day 6: Sunny during the day, then light rain during late evening. No growth.

Day 7: Wet in the morning, sunny in late morning and remaining dry throughout the day. Growth occurring. Egg-hole 4 with the most growth of 1 cm, egg-hole 3 with 0.7cm of growth, egg-hole 5 with 0.6cm of growth, and egg-hole 2 with 0.2cm of growth. Egg-holes: 6 and 1 with no growth.

Day 8: Cloudy in the morning, sunshine in the afternoon, then cloudy in the evening. Growth occurring. Egg-hole 1 = No growth, egg-hole 2 now 0.4cm, egg-hole 3 now 1.4cm, egg-hole 4 now 2cm, egg-hole 5 now 1.1cm and egg-hole 6 = No growth.

Day 9: Rain in the morning, then sunshine throughout the day. Growth occurring. Egg-hole 1 = No growth, egg-hole 2 now 0.6cm, egg-hole 3 now 1.8cm, egg-hole 4 now 3.5 cm, egg-hole 5 now 1.5cm and egg-hole 6 = No growth.

Day 10: Damp and cloudy in the morning, but clearing up with sunshine for the rest of the day. More growth occurring. Egg-hole 1 = No growth, egg-hole 2 now 0.8cm, egg-hole 3 now 2.4cm, egg-hole 4 now 4.2cm, egg-hole 5 now 1.8cm and egg-hole 6 now 0.2cm.

Day 11: Cloudy and dry throughout the day. More growth occurring. Egg-hole 1 now 0.1cm, egg-hole 2 now 1cm, egg-hole 3 now 3.2cm, egg-hole 4 now 5cm, egg-hole 5 now 2cm and egg-hole 6 now 0.4cm.

Day 12: Wet in the morning, clearing up with sunshine throughout the day. More growth occurring. Egg-hole 1 now 0.2cm, egg-hole 2 now 1.2cm, egg-hole 3 now 3.6cm, egg-hole 4 now 5.3cm, egg-hole 5 now 2.1cm and egg-hole 6 now 0.5cm.

Day 13: Sunny and dry throughout the day. No growth. The stems and leaves starting to yellow (chlorosis).

Day 14: Sunny and dry throughout the day. No growth. The plants started to die (necrosis). End result after 14 days (2 weeks) =

Egg-hole 1 = 0.2cm   egg-hole 2 = 1.2cm   egg-hole 3 = 3.6cm   egg-hole 4 = 5.3cm   egg-hole 5 = 2.3cm   egg-hole 6 = 0.5cm

End of monitoring sheet.

By looking at the results, it shows that after 7 days the first sign of germination started, as egg-hole 4 grew the most, and egg-holes 6 and 1 had no growth. From then, egg-holes 4, 3, 5 and 2 grew bit by bit, whereas it took egg-hole 6 10 days for some growth to start, and egg-hole 1 took 11 for it to start growing. For the next 2 days all of the egg-holes were growing bit by bit. When it came to the 13th day, the stems and leaves started to yellow, as from the weather report, it shows that day 13, 14 and half a day of 13 it was sunny. This could have meant that the plants didn't have the required nutrients needed for the seeds not to have started to go yellow. On day 14, the stems were then not straight and shown signs of death for the seeds, as they started to swell up.

The results clearly show that as the more concentration of salt there is, the less growth of the seeds will happen, but if there is less concentration of salt, then the seeds will grow quicker.

Since day 7 where the seeds started to grow, they all grew/not grew to a certain extent. From there, egg-holes 3, 4, 5 and 2 grew at the same rate and in the same order (in terms of germination). This clearly shows that they grew and started faster than egg-holes 6 and 1, as they had more concentration of salt, resulting to a shunt of their growth.

When it came to day 10 and 11 where egg-holes 6 and 1 started to germinate, they also grew at the same rate, which then all of the seeds grew at the same rate, without one of the egg-holes growing faster than the other.

Conclusion:

In conclusion, I can say that if there is more concentration of salt, then it will stunt the germination and take longer to grow. However, if the concentration of salt is low, then the germination will be quicker allowing the growth of the seeds to grow as they should.

Chlorosis happens for every plant, as at one time of a plants life cycle, the plant doesn't receive the required nutrients at the time, and therefore chlorosis occurs. This is the same for necrosis, as the seeds would start to swell up and burst, or go black.

Evaluation:

Although the experiment has finished, there could have been a few alteration to have made the experiment more reliable.
Firstly, I could have used tissue paper, or soil to then show what effects would happen if it was in a different type of 'environment'. By doing this, this would show the different type of germination of which type of material that would have been used. If 4 was used for soil, 4 used for tissue paper, and 4 used for cotton wool, then, I would have definitely got a more reliable and clearer result of the effects of different concentration of salt would do to different materials.

Monitoring is important to measure the rate of germination of plants because; this then allows people and me to have accurate results, by it showing the progress of the seeds at certain times when the monitoring is taken place. If the monitoring is taken after every 48 hours, this is then unreliable results, as this wouldn't give a clear reading of how much it had growth at a certain time. Whereas if the monitoring takes place after every 12 hours, this then allows us to have more reliable results, as it would show us the germination after a certain period of time, and allows us to compare the seed germination to the other seeds.