Seaweed Distribution along a Rocky Shore.

Prediction:-
Seaweed species living higher up on the shore should not decrease in mass as much as seaweeds living lower down the shore.

Aim:- Different species from different zones of the rocky shore were dried over the same period of time, weight loss was recorded and % weight loss compared.

Method: -

- Firstly two ranging poles were placed on the shore (one at the upper end one at the lower end.) The distance was then measured between them, this formed our basis for a belt transact.
- The area marked was then divided into 5 meter sections.
- A quadrant was then used to measure plant cover, the quadrant was firstly placed beside the ranging pole and the % plant cover measured, it was then moved gradually moved down the beach in 5 metre sections.
- The information obtained informed us which plant species lived in various parts of the beach. We then chose 4 different types of seaweed 2 from the upper shore and 2 from the lower shore.
- This seaweed was then collected and weighed, the weights were recorded and reweighed after 1 hour, this continued for three hours.
- After this time enough data had been obtained to calculate the % mass lost, the results were then recorded.

Evaluation and Conclusion.

After analyzing the results obtained I can see that all four of the seaweed samples tested lost water. From the bar graph drawn I can see that enteromorpha Intestinalis and pelvetia had the least % weight loss while Fucus Ceramoides and chondrus crispus had a larger % weight loss. Chondrus Crispus had the largest % weight loss while Enteromorpha Intestinalis had the smallest % weight loss. From my line graph I can see that Chondrus Crispis and Fucus Ceranades had a higher rate of weight loss as the lines they produced on the graph had a steeper gradient.

The results which I obtained agreed with my prediction as the seaweeds which had the largest % weight loss- Fucus Ceramoides and Chondrus Crispus where found on the lower half of the shore. The seaweeds, which had the smallest %, weight loss- Enteromorpha Intestinalis and Pelvetia where found on the upper half of the shore. This occurred because the seaweeds, which live on the upper shore are, adapt to surviving without water for larger periods of time in comparison to those living further down the shore.

Seaweeds and animals which live on the upper shore have to be adapt to surviving without water for both long and shorter periods of time, this timescale varies in accordance with the seasons and the gravitational pull of the sun and moon. This causes a

tide cycle in which the tide comes in and goes out again this takes 12 hours. This means some plants are underwater all day and some are without water for the majority if not all day. The diagram below approximately shows the tidal cycle and tidal range.

As we move further up the beach there is greater exposure in summer this results in desiccation. Seaweeds further up the beach have to adapt to this condition to survive and this has a number of consequences. It makes plants on the upper shore better competitors and they are able to out compete other plants. Some off the upper shore plants develop a thick cuticle so water cannot b lost through transpiration, others have a small surface area e.g.: - Pelvetia, others have small channels to trap and preserve water in e.g.: - Enteromorpha intestinalis. So as you can see the two seaweeds which were studied were specially adapt to preserve water because of their position on the upper shore and so had and advantage over the lower shore samples.

I feel that our method of measuring masses was suitable as the same balance was used throughout the experiment and it was accurate to 3 decimal places. We were careful that no pieces off seaweed fell off the petri dishes. The masses were all then rounded off to two decimal places so the figures would be easier to perform calculations with.

We prevented variation between samples in a number of different ways some off these are listed below: -

- The samples were all taken from the same section of beach on the same day, and so the weather conditions were the same.
- We used the same method to carry out the experiment
- The seaweeds were all kept in the same room between weighing and so they were kept and the same humidity and temperature.
- The amount of time between weightings was kept constant at 1 hour for all groups

Yes we have found a large variation between our results we can see this as some results have more than doubled and example of this is the results after 1 hour we had % weight loses of 0.6 and 9.6 for Enteromorpha intestinalis. Also for Pelvitia after 3 hours there were 5 weight loses of both 6.2 and 11.8. This variation may have been caused by pieces off seaweed falling off the petri dishes, inaccuracy of reading the balance values other handling errors could also have been the cause. Another problem was small sample sizes this meat that any errors which occurred affected our results enormously. The samples may also have been exposed to different amounts of water before being sampled e.g.:- some may have been in a rock pool while others could have been on the edge of a rock pool and so exposed to very little water. We could have rectified this problem by soaking all the samples for 1 hour before weighing them. By doing this we could have made our results more reliable we could have also made them more reliable by doing more replicates.

As a follow up to this experiment we could study all the seaweeds which or red in colour or those brown and green in colour to reveal if colour effects their weight loss.