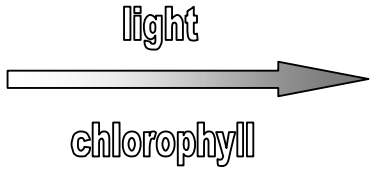
Investigating the comparison of stomata density on leaves from shaded areas of a plant to those from parts in bright light

Conclusion

The results obtained from the experiment show a higher stomata count in the leaves picked in areas of light than the leaves picked from shaded areas. The average stomata count in leaves from areas of light is 12.33 while the average stomata count in leaves picked from shaded areas is a lower 8.33.

This trend occurs because of the process of photosynthesis. Plants photosynthesise using a chemical called chlorophyll (found in chloroplast) to capture light energy and convert it into carbohydrates such as glucose, this makes light intensity to be a major factor in the process of photosynthesis.



From this equation the statement of an increase in light will increase the rate of photosynthesis can be derived.

The equation above also shows the need for CO gas to be present for photosynthesis to occur, and a bi-product of O gas to be released. The gasses enter and exit the leaves through small pores known as stomata's. The stomata's regulate the intake and output of gasses according to the leaves water potential; higher water potential equals increase in rate of photosynthesis; lower water potential has the opposite affect of a decrease in the rate of photosynthesis. The structure of the stomata causes the pore to close up when the water potential of the leaf is high, this reduces the amount of water vapour being lost, as if the leaf has a high water potential the water vapour will move out of the leaf, diffusion across a concentration gradient, the stomata's close up to prevent the loss of the water vapour.

In conditions of high light intensity there will be a higher rate of photosynthesis, this causes the need for more CO ; which in turn means the need for more stomata's. In conditions of low light intensity the need for CO decreases, photosynthesis will still occur but at a lower rate as there is a limiting factor of light. In areas of low light intensity the leaves have a lower rate of photosynthesis therefore the number of stomata's needed decreases, not only because of irrelevancy of CO needed, but to also decrease the amount of water vapour lost through the pores. This theory suggests that there will be a lower number of stomata's in leaves in areas of low light intensity.

Also there is a % confidence that the results are significant and a % probability that my results occurred through chance, this probability, scientific theories and the fact that the results obtained show no anomalous readings, provide me with sufficient information to state that the null hypothesis of that there will be a higher stomata

count in the leaves picked in areas of light compared to the stomata count in leaves picked in shaded areas is accepted.

Evaluation

The method used in the investigation was to pick leaves randomly from areas of significantly low light availability (bottom area of plant) and compare the stomata count with leaves picked from areas of significantly high light availability (top end of plant). This method did produce results which are reliable, no anomalous readings were obtained.

Limitations

Humidity is one of the factors that may have affected the experiment. If there is a constant condition of low humidity, it will cause water to diffuse out of the leaf more quickly, which will decrease the rate of photosynthesis, this then decreases the need for CO and decreases the stomata count.

If areas of the plant we sampled leaves from had regions of varying humidity; it would mean there is another limiting factor which in turn would disrupt the fairness of the experiment. In order to have a fair test the humidity level should have been measured to ensure the sample of leaves used had the same humidity conditions.

Another factor is temperature. Temperature will affect the rate in which chemicals involved in photosynthesis work. The rate of photosynthesis will increase as the temperature increases, but the increase on the rate of photosynthesis will come to a stop beyond the optimum temperature limit. To enable a fair test the sample of leaves used should all be from areas of the same temperature.

Method of using a high powered microscope to count the number of stomata's increases the margin of error. The high powered microscope is difficult to focus onto the stomata's this may cause miscounts due to the out of focus stomata's.

Sample sized used could have been increased. If more samples were used more sets of results will be obtained. Obtaining more readings will enable the results to produce more accurate averages.