Measuring the length of leaf cell health essay

Health & Medicine

Introduction-

Different types of plants were collected in order to find cell size of each plant. This would show me how cell size varied within plants. A microscope is an instrument to see objects that are too small to see with the naked eye. The science of investigating small objects using a microscope is called microscopy. There are various types of microscopes, few of them are – electron microscope, light microscope, binocular microscope, etc. Binocular microscope – the binocular microscope permits the use of both eyes. [1]Ocular micrometer – a glass disk that fits in a microscope eyepiece and that has a ruled scale; when calibrated with a stage micrometer, direct measurements of a microscopic object can be made.[2]Stage micrometer- a finely divided scale ruled on a microscope slide and used to calibrate the ocular micrometer.[3]

Research question –

To what extend the length of plant cell size varies in leaves? Hypothesis -The Tridax and Tradescantia pallida leaves are herbs. Duranta is a shrub and Loranthus is a parasitic plant. I expect the leaves of Loranthus to be large, after which Duranta, Tradescantia pallida leaf and then Tridax leaf. I have assumed this based on the size of leaves (appearance)

Variables:

Dependent variable –

Cell size measured using Microscope and micrometers

Independent variable –

Leaves

Controlled variable –

Same Sample size, Same microscope used and calibrated. The peel was taken from lower epidermis only.

Materials required -

Binocular Microscope - 14 different leaves – Tridax leaf, Tradescantia pallida leaf , Duranta leaf and Loranthus leafStage MicrometerOcular MicrometerNeedleGlass slide – 8Distill water – 20 mlCover Slip – 8

Diagram 1: Binocular Microscope

Macintosh HD: Users: abhijitrao: Desktop: bm. jpg

Procedure –[4]

I collected 4 different types of leaves; they were Tridax, Tradescantia pallida leaf, Duranta leaf and Loranthus leaf. I then set up the binocular microscope placing the ocular micrometer inside the microscope eyepiece and placed the stage micrometer on the stage of the microscope. I calibrated the micrometer. With the help of a needle, I made a cross section on the lower epidermis of the leaf and took a small epidermis of the leaf. I then placed the leaf on a slide and poured some distilled water on it, water was poured in order to keep the leaf moist. And then placed the cover slip upon the leaf without any air bubbles. Removed the excess of water. I then placed the slide under the binocular microscope and measured cell size with the help of the ocular micrometer. I took 25 readings for each kind of the leaves. The data is processed and presented below.

Collected and processed data –

Data Processing and Presentation:

Formulas Used:

Calibration factor (µm) = Stage micrometer division X 10Ocular micrometer divisionLength of cell (µm) = Total length covered by Ocular micrometerdivision of a single cell X Calibration factorI have used the Excel to process my raw data to calculate the Average , standard deviation, calibration factor and length of cell. The processed data is presented in the form of line graph using Excel sheet. The error bars in the graphs represents the standard deviation value calculated in excel.

Key:

In all the tables below, Raw data is in blue colorProcessed data is in purple colorTable 1 – Calibration factor of ocular micrometer using stage micrometer (100. 00 µm)Ocular micrometer divisionStage micrometer divisionCalibration factor (µm)5. 005. 0010. 0010. 0010. 0010. 0015. 0015. 0010. 0020. 0020. 0010. 00Average -10. 00Table 2 – Length of Tridax plant cellOcular Division occupied by a single plant cell.(+ 1. 00 division)Size of the cell (µm) = Ocular micrometer division * calibration factor (10)(+ 1. 00 µm)5. 0050. 008. 0080. 009. 0090. 007. 0070. 006. 0060. 005. 0050. 0010. 00100. 009. 0090. 005. 0050. 0010. 00100. 006. 0060. 007. 0070. 0010. 00100. 008. 0080. 006. 0060. 009. 0090. 008. 0080. 007. 0070. 0010. 00100. 005. 0050. 009. 0090. 007. 0070. 006. 0060. 009. 0090. 008. 0080. 00Table 3 – Length of Tradescantia pallida leaf Plant cellOcular Division occupied by a single plant cell.(+ 1. 00)Size of the cell (µm) = Ocular micrometer division * calibration factor (10)(+ 1. 00 µm)12. 00120. 0019.

00190. 0010. 00100. 005. 0050. 008. 0080. 0020. 00200. 007. 0070. 0012. 00120. 0016. 00160. 0018. 00180. 0013. 00130. 009. 0090. 0012. 00120. 0017. 00170. 0021. 00210. 0011. 00110. 0015. 00150. 0013. 00130. 0018. 00180. 0020. 00200. 0018. 00180. 0015. 00150. 007. 0070. 009. 0090. 0020. 00200. 00Table 4 – Length of Duranta Plant cellOcular Division occupied by a single plant cell.(+ 1. 00)Size of the cell (µm) = Ocular micrometer division * calibration factor (10)(+ 1. 00 µm)1. 0010. 001. 0010. 002. 0020. 004. 0040. 003. 0030. 002. 5025. 001. 0010. 004. 0040. 003. 5035. 003. 0030. 002. 0020. 000. 505. 003. 0030. 001. 0010. 002. 0020. 003. 0030. 002. 5025. 001. 0010. 002. 5025. 004. 0040. 001. 0010. 003. 0030. 002. 0020. 001. 0010. 002. 5025. 00Table 5 – Length of Loranthus plant cellOcular Division occupied by a single plant cell. (+ 1. 00)Size of the cell (µm) = Ocular micrometer division * calibration factor (10)(+ 1. 00 µm)2. 0020. 003. 0030. 001. 0010. 003. 0030. 002. 0020. 001. 5015. 003. 0030. 002. 5025. 001. 0010. 003. 0030. 002. 0020. 002. 5025. 001. 0010. 003. 0030. 002. 0020. 002. 0020. 005. 0050. 003. 0030. 002. 5025. 001. 0010. 003. 0030. 002. 0020. 002. 5025. 001. 0010. 003. 0030. 00

PROCESSED DATA:

Table 6 – Average, Standard deviation and Range of the length of the leaves

Leaves

Average

Standard deviation (+)

Range

Tridax leaf

75. 60

17. 34

50. 00 -100. 00

Tradescantia pallida leaf

138. 00

47. 78

70. 00 -210. 00

Duranta leaf

22. 40

10. 81

5. 00 - 40. 00

Loranthus leaf

23. 00

9. 35

10. 00-50. 00

Graph 1: Average length of the leaves of 4 different plants