

Aim:

To dissect the flower of *Phaseolus vulgaris* (bean) and display its parts. Study the type of root, stem and leaf.

1. Classification

Division	→ Angiospermata
Class	→ Eucotyledonata
Family	→ Papilionaceae (= Fabaceae)
Genus	→ <i>Phaseolus</i>
Species	→ <i>vulgaris</i>

2. Description of flower

Flower: Papilionaceous, Corolla, Standard, Keel, Petal, Stamen, Hypocotyl, Gynoecium, Pericarpium, Placenta, Endosperm.

Inflorescence: Raceme

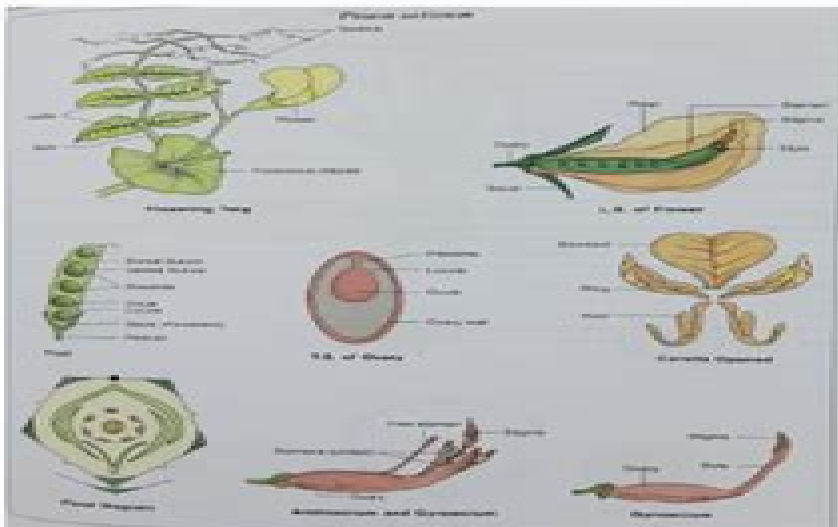
Calyx: Sepals 5, Corolla: Petals 5, Standard, Keel, Petal, Stamen, Hypocotyl, Gynoecium, Pericarpium, Placenta, Endosperm.

Corolla: Papilionaceous, Corolla, Standard, Keel, Petal, Stamen, Hypocotyl, Gynoecium, Pericarpium, Placenta, Endosperm. The two lateral petals are called wings or alae, while the anterior petal is broad and called keel or carina. Each corolla is called papilionaceous, corolla (butterfly-like) corolla.

Androecium: Stamens 10, 9 stamens united to form a tube around the ovary while the tenth stamen is free (9+1). The 9 stamens are called monadelphous. The 10 stamens are called diadelphous.

Gynoecium: Monocarpellary, Superior ovary, Unilocular, Ovary, Style, Placenta, Endosperm, Embryo in fruit.

Floral Formula: $\frac{(K_5)C_1(C_2)_1(C_4)_1}{(9+1)A_1G_1}$



Aim:

Experiment - 2

To compare the rate of transpiration through the upper and lower surfaces of a leaf by using cobalt chloride paper.

Materials required:

A potted plant, cobalt chloride solution, filter paper, clip, desiccator, glass slides, microscope etc.

Principle:

Transpiration is loss of water in the form of vapour from the leaves and other aerial parts of the stem. About 90% of transpiration takes place through the stomata. Some amount of water is also lost through cuticular transpiration. Rate of transpiration depends upon several factors like light, temperature, wind, humidity etc. Also on the size, type, number and distribution of stomata on the leaves. It is known that the distribution and number of stomata on the two surfaces of leaf varies in majority of plants, especially in dicotyledonous leaves, the number of stomata is more on the lower epidermis than the upper epidermis.

Rate of transpiration is determined with the help of cobalt chloride paper. This paper is blue in colour. Moisture released during transpiration can change the blue colour of cobalt chloride paper to pink. The time taken for this change of colour is proportional to rate of transpiration.

Procedure:

1. Dry filter papers in cobalt chloride solution and dry them. Keep them in a desiccator so that they are free from any moisture. In a dried state, they are blue in colour.
2. Fix two dried cobalt chloride papers one on either side of the leaf of a potted plant with the help of clip. Make them wriggle and note the time.
3. Observe the time taken for these papers to turn pink from blue.

Observation:

1. Time taken to change colour from blue to pink when cobalt chloride paper is on the upper surface of the leaf = ... minutes.
2. Time taken to change from blue to pink when cobalt chloride paper is on the lower surface of the leaf = ... minutes.

Result and Discussion:

The upper surface of leaf has less number of stomata so more time will be taken for the cobalt chloride paper to change from blue to pink, while the lower surface of leaf has more number of stomata so less time will be taken for the cobalt chloride paper to change from blue to pink. This is because of the fact that the rate of transpiration is higher when the stomata are more in number and vice versa.

In this way, rate of transpiration in different plants can also be compared. Further effect of various factors such as light, temperature, wind etc. on transpiration, can also be studied.

Biology Practical Manual For Secondary Schools

Judd E. Hollander



Biology Practical Manual For Secondary Schools:

Fundamentals of Practical Biology Margaret Ndukwe, 2016-04-30 This book has been designed to meet the requirements of the new Practical Biology curriculum for Senior Secondary Schools and Colleges It is comprehensive simplified and easy to use The concepts are well developed and illustrated by clearly labelled diagrams charts tables and relevant tests to give the student hands on exercise It is hoped that this book will assist candidates to get the idea of what is required of them in Practical Biology and Alternative to Practical Biology examinations

Practical/Laboratory Manual Biology Class XII based on NCERT guidelines by Dr. Sunita Bhagia & Megha Bansal Dr. Sunita Bhagia ,Megha Bansal, 2020-06-22

A List of Experiments

- 1 Study pollen germination on a slide
- 2 Collect and study soil from at least two different sites and study them for texture moisture content pH and water holding capacity Correlate with the kinds of plants found in them
- 3 Collect water from two different water bodies around you and study them for pH clarity and presence of any living organism
- 4 Study the presence of suspended particulate matter in air at two widely different sites
- 5 Study the plant population density by quadrat method
- 6 Study the plant population frequency by quadrat method
- 7 Prepare a temporary mount of onion root tip to study mitosis
- 8 Study the effect of different temperatures and three different pH on the activity of salivary amylase on starch
- 9 Isolate DNA from available plant material such as spinach green pea seeds papaya etc

B Study observation of the following

Spotting

- 1 Flowers adapted to pollination by different agencies wind insects birds
- 2 Pollen germination on stigma through a permanent slide
- 3 Identification of stages of gamete development i e T S of testis and T S of ovary through permanent slides from grasshopper mice
- 4 Meiosis in onion bud cell or grasshopper testis through permanent slides
- 5 T S of blastula through permanent slides
- 6 Mammalian
- 7 Mendelian inheritance using seeds of different colour sizes of any plant
- 8 Prepare pedigree charts of any one of the genetic traits such as rolling of tongue blood groups ear lobes widow s peak and colour blindness
- 9 Controlled pollination emasculation tagging and bagging
- 10 Common disease causing organisms like Ascaris Entamoeba Plasmodium any fungus causing ringworm through permanent slides or specimens
- 11 Comment on symptoms of diseases that they cause
- 12 Two plants and two animals model virtual images found in xeric conditions
- 13 Comment upon their morphological adaptations
- 14 Two plants and two animals models virtual images found in aquatic conditions
- 15 Comment Content

EXPERIMENTS

- 1 To study pollen germination on slide
- 2 To study the texture moisture content pH and waterHolding Capacity of soils collected from different sites
- 3 To collect water from different water bodies and study them for pH Clarity and presence of living organisms
- 4 To study the presence of suspended particulate matter in air at different sites
- 5 To study plant population density by quadrat method
- 6 To study plant population frequency by quadrat method
- 7 To study various stages of mitosis in root tip of onion by preparing slide in acetocarmine
- 8 To study effect of different temperature and three different pH onthe activity of salivary amylase
- 9 To study the isolation of DNA from available plant material such as spinach green pea seeds papaya etc

SPOTTING

- 1 Pollination in flowers
- 2 Pollen germination
- 3 Slides of mammal tissues
- 4 Meiosis

cell division 5 T S of Blastula 6 Mendel s inheritance laws 7 Pedigree chart 8 Controlled pollination 9 Common disease causing organisms 10 Xerophytic adaptation 11 Aquatic adaptation **A Manual for High School Administrators** Charles C. Brown,1925 **The United States Catalog** Mary Burnham,Carol Hurd,1928 *High School Manual for Administrators and Teachers* ,1927 **American School & University** ,1929 **High School Manual for Administrators and Teachers** South Carolina. State Department of Education,1927 **The Publishers Weekly** ,1924 **The Texas Outlook** ,1926 *A Brief Course in Qualitative Chemical Analysis for Schools and Colleges* John Brewer Garvin,1902

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