IXORA COCCINEA AND DATURA STRAMONIUM CELLS UNDER FOLDSCOPE

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Abstract **–** Foldscope is the ultra-affordable and to give optical quality similar to conventional research microscopes. In this study, how foldscope can be used as an efficient tool to detect in cell of *Ixoracoccinea* and *Datura stramonium.* Foldscope images revealed viable stained areas in the respective antherand stem section, indicating live activities. So based on data the use of foldscope was recommended.

Keywords:Foldscope, *Ixoracoccinea, Datura stramonium*, 40Xmagnification, Portable microscope, Mobile microscope

INTRODUCTION

Foldscope is an origami paper microscope designed and developed by Professor Manu Prakash from Stanford University.[1] It has multiple micro-lens kit capable of 140X - 2000X magnification and 1.9 micron resolution. It can be attached with smartphone allowing the user to take pictures with the magnification. The magnification power of this pocket size microscope is enough to enable spotting of plant, animal cells and micro-organisms.[2-6]

In addition, *Ixoracoccinea* is commonly known as Flame of the woods. It is a popular flowering shrub belongs to the Rubiaceae family. The flower colour is red-orange, but ornamental varieties are white, yellow, pink flowers.[7,8] The root, stem, leaves and flowers are used to treat various ailments in Indian traditional system of medicine. The use of flower in medicine is less known although it is mentioned in Ayurveda. The flowers of raktaka are used in dysentery, hypertension and anaemia.[9] It used as a remedy for skin diseases and antiseptic.[10] Moreover,*Daturastramonium*is a medicinal plant with a broad range of biological applications

such as anti-asthmatic, antibacterial, antifungal, anti-inflammatory, larvacidal, antispasmodic, anti-oxidant, antinociceptive, anti-rheumatoid and anti-ulcer activities.[11-13]Itshowed that it contained alkaloids, saponins, tannins, steroids, flavonoids, phenols and glycosides.A dried leaves are used to cure asthma. It grows to a height of 2-4 feet and diameter of 4-6 feet. The flowers are large 6 cm long. The fruit is a very thorny and contains numerous black to dark brown seeds. The stems are simple, stout and mostly erect. Root is long, thick and tapering.[14-16]The present study is focused on the plant cells under foldscope by *Ixoracoccinea* and *Datura stramonium*.

2. EXPERIMENTAL SECTION

2.1. MATERIALS AND METHODS

Foldscope purchased from Department of Biotechnology (DBT), Government of India. Methylene blue and Microscopic slide purchased from MERCK Scientific India Pvt Limited. Mobile tab (Samsung Tab A-SM- T285) purchased from Amazon.in.

2.2. COLLECTION OF PLANT MATERIAL

Ixoracoccinea and *Datura stramonium*were collected from Sathyabama Institute of Science and Technology (Deemed to be University), Chennai, Tamil Nadu, India. The plants were collected in the month of October early morning. Plants were washed with distilled water for further analysis

2.3. IMAGE DETECTION

The thin section of tissues were taken on glass slides and covered with transparent cover slip. The slide was inserted into the foldscope in such a way that sample side was close to lens of foldscope. A LED light supplied with foldscope instruments was used a light source. The clear images under foldscope for each sample were photographed using cell phone camera by adjusting zoom and focusing of camera and foldscope.

3. RESULTS AND DISCUSSION

Ixoracoccinea stem was oval to wavy in outline. The outer epidermis was covered with thick cuticle. Moreover, epidermis covered with thick cuticle. It is 2-3 layered compactly arranged

collenchymas cells. Some of the hypodermal cells filled with red coloring matters followed by cortical cells made up of 6-9 layers of simple parenchyma cells without any intercellular spaces, mostly filled with chlorophyll pigments. Cortex is followed by single layer of endodermis. 2-3 layers of compactly, circulary arranged, pericyclic fibers which are lignified. Vascular bundles are open and collateral, radially arranged. Metaxylem is facing towards cortical region and protoxylem to words central pith region with xylem parenchyma and fibres. Xylem is separated by unserrate medullary rays. Phloem is situated above the xylem with sieve elements and fibres. Larger region of the section is occupied by pith made up of parenchymatous cells. In the pith region 3-5 isolated groups of pitted stone cells are shown in Figure 1c. Moreover, transverse sections of the Datura stramonium anther of thorn-apple connective, with a small stele embedded in parenchyma are shown in figure 1f. The four spore cases arranged in pairs showing pollen grains. When the spore cases break, the walls rupture at the groove between a Magnified about 25 diameters.

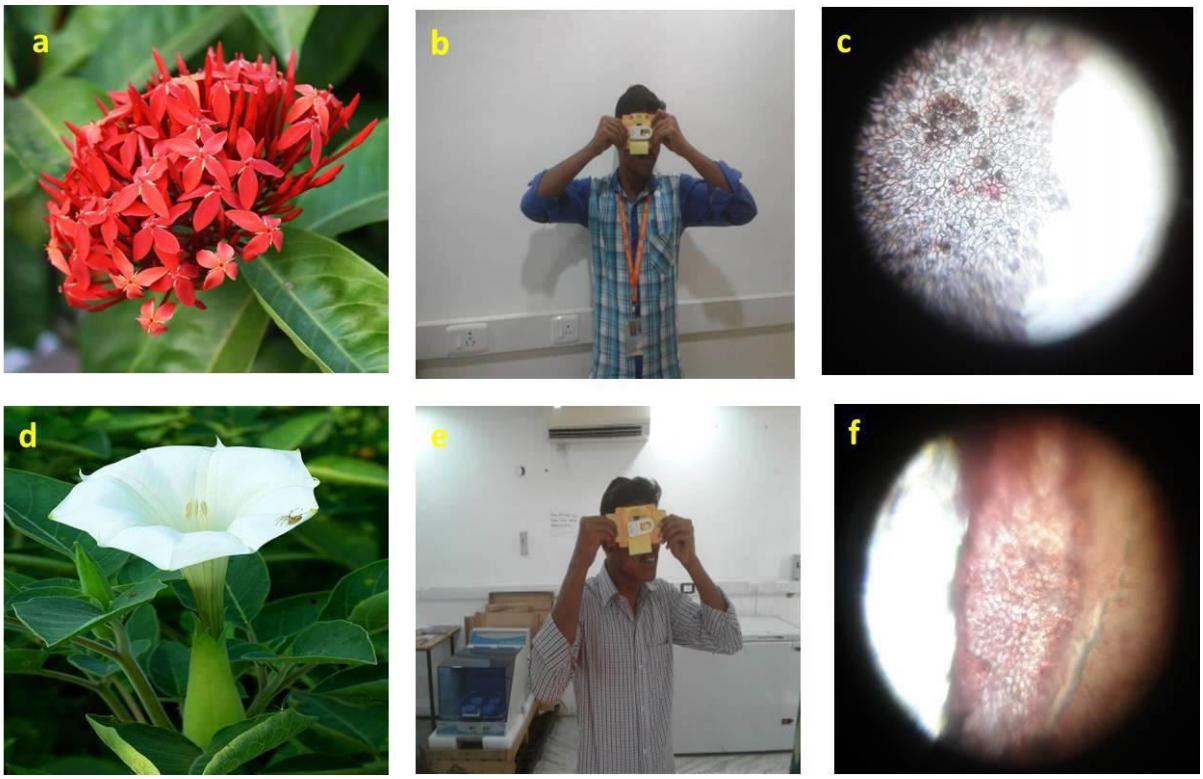

Figure 1: a). *Ixoracoccinea*plant, b).Student observing *Ixoracoccinea*stem section by foldscope, c).*Ixoracoccinea*stem cell, d).*Datura stramonium*Plant, e).Student observing *Datura stramonium*anthersection by foldscope, f) *Datura stramonium*anther *cell.*

4. CONCLUSION

Foldscope is very excellent apparatus due to its flexible application. It helped in observing and studying*Ixoracoccinea*stem cell and *Datura stramonium*anther, which can be done in any location devoid of normal microscopes which are normally heavy. So we can observe plant species by this foldscope. It is more affordable compared with other microscope and limited sensitivity, but excellent specificity can be achieved in this foldscope.

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