



Tissue Culture Laboratory at the Asola Bhatti Wildlife Sanctuary

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Why in News?

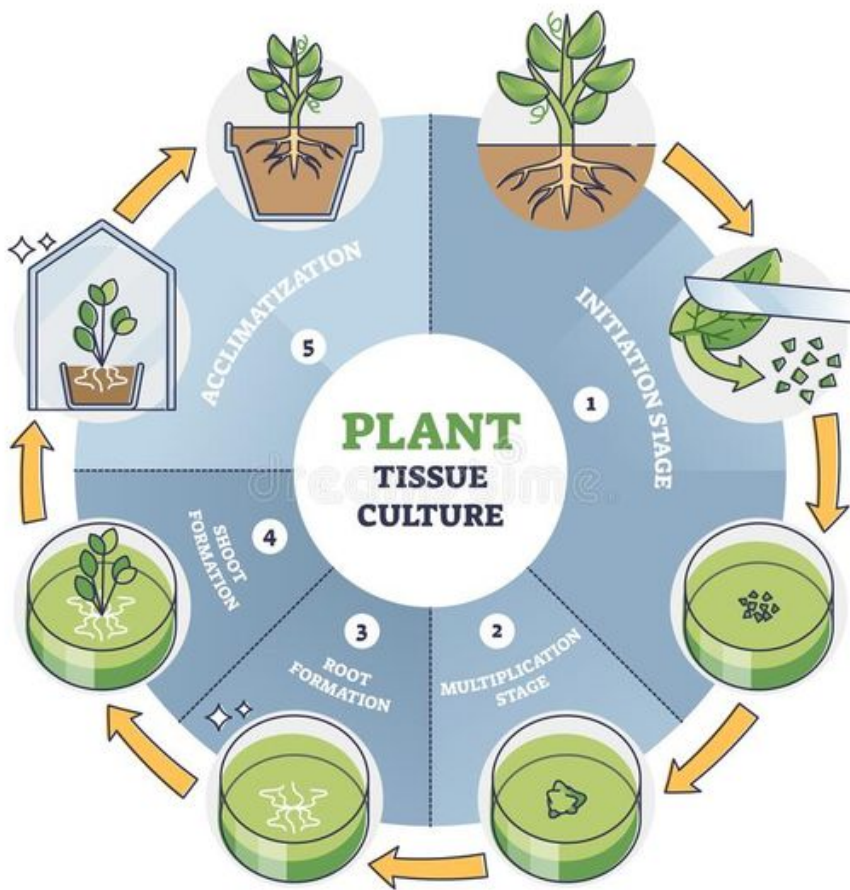
Recently, the Delhi forest department has initiated the establishment of a tissue culture laboratory at the Asola Bhatti Wildlife Sanctuary to conserve rare native trees.

- The primary goal of the laboratory is to grow **endangered native** Delhi trees in a controlled environment and regenerate saplings of species facing **regeneration challenges** due to [invasive species](#).

What are key Facts about the Tissue Culture Laboratory?

- **Tissue Culture Laboratory:**
 - The lab will be able to extract plant tissue from an in-vitro fully grown plant, generating **multiple trees** from the same tree.
 - The forest department will take assistance from botanists and scientists from the [Indian Council of Forestry Research and Education \(ICFRE\)](#) and the [Forest Research Institute \(FRI\)](#).
- **Other Similar Laboratories:**
 - The [National Facility for Plant Tissue Culture Repository \(NFPTCR\)](#) was established in Delhi at the [National Bureau of Plant Genetic Resources \(NBPGR\)](#) in 1986.
 - They carry out tissue culture experiments and research on **five plant types** -- tubers, bulbs, spices, plantation crops, horticultural crops, and medicinal and aromatic plants.
- **Application:**
 - **The Aravalli Plan:**
 - The regeneration of ridge species like Kulu (ghost tree), palash, doodhi, and dhau is hindered by invasive species, resulting in **poor survival rates**, with large-scale multiplication achievable only through tissue culture, **particularly shoot culture**.
 - The lab will also be useful in culturing endangered [medicinal plants](#).
 - **Success Stories:**
 - Tissue culture has proven **highly effective** in agriculture, particularly with crops such as **bananas, apples, pomegranates, and jatropha**, offering **higher yields** compared to traditional farming methods.
- **Issues:**
 - Biodiversity experts have contended that cloning should be limited to "**extremely rare trees**" to avoid **genetic homogeneity** and vulnerability to specific **diseases**.
 - Cloning can result in **restricted genetic diversity**, with the trees being clones of a single tree or plant.
 - To avoid this, one should not restrict oneself to a single seed variety; instead, **use different parent seeds** or seed varieties to prevent having multiple cloned trees.
 - Experts believe that commonly found species like khair, dhak and desi babool in the Aravallis could waste public funds, despite **potential benefits for endangered or**

nearly extinct species.



What is Tissue Culture?

- Tissue culture, also known as [micro-propagation](#), allows multiple plants to be produced from a parent plant using [in-vitro tissue](#), which is incubated under a controlled environment.
- **Types of Plant Tissue culture:**
 - **Callus Culture:** Involves **cultivating undifferentiated masses** of cells (callus) from explants.
 - **Cell Suspension Culture:** Cultures **individual cells** or small aggregates of cells in a liquid medium.
 - **Anther/Microspore Culture:** Used for **producing haploid plants** from pollen grains or anthers.
 - **Protoplast Culture:** Cultures **isolated plant cells** without cell walls.
- **Applications of Plant Tissue Culture:**
 - **Micropropagation:** Rapid **clonal propagation** of plants by culturing small pieces of plant tissue.
 - **Soma-clonal Variation:** Studying **genetic variation** among plant cells in culture.
 - **Transgenic Plants:** Introducing and expressing foreign genes (transgenes) in plant cells.
 - **Induction and Selection of Mutations:** Using mutagens to induce mutations for specific traits.

Animal Tissue Culture:

- Animal tissue culture is the **in vitro maintenance** and propagation of isolated cells, tissues, or organs **from animals in an appropriate artificial environment**.
- Cells used in animal tissue culture are usually obtained from **multicellular eukaryotes** and their established cell lines.
- This technique allows the study of **cell functions, mechanisms,** and applications.

- Animal cell culture has revolutionised research and **biotechnology**, providing insights into cell behaviour and applications across various fields.

Asola Wildlife Sanctuary

- [Asola-Bhatti Wildlife Sanctuary](#) is located at the end of an important wildlife corridor that starts from [Sariska National Park](#) in Alwar and passes through Mewat, Faridabad and Gurugram districts of Haryana.
- The region has a **semiarid climate** with notable diurnal temperature variations.
- The vegetation in the Wildlife Sanctuary is predominantly an **open canopied thorny scrub**. The native plants exhibit **xerophytic adaptations** such as thorny appendages, and wax-coated, succulent, and tomentose leaves.
- Major wildlife species include Peafowl, Common Woodshrike, Sirkeer Malkoha, Nilgai, Golden Jackals, Spotted deer, etc.

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UPSC Civil Services Examination, Previous Year Questions (PYQ)

Prelims

Q. With reference to the current trends in the cultivation of sugarcane in India, consider the following statements: (2020)

1. A substantial saving in seed material is made when 'bud chip settlings' are raised in a nurse, and transplanted in the main field.
2. When direct planting of setts is done, the germination percentage is better with single-budded setts as compared to setts with many buds.
3. If bad weather conditions prevail when setts are directly planted, single-budded setts have better survival as compared to large setts.
4. Sugarcane can be cultivated using settlings prepared from tissue culture.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 3 only
- (c) 1 and 4 only
- (d) 2, 3 and 4 only

Ans: (c)

Q. Consider the following statements: (2009)

1. Sweet orange plant is propagated by grafting technique.
2. Jasmine plant is propagated by layering technique.

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

Ans: (c)

PDF Reference URL: <https://www.drishtiias.com/printpdf/tissue-culture-laboratory-at-the-asola-bhatti-wildlife-sanctuary>

