



ORGAN CULTURE

1. WHAT IS ORGAN CULTURE?

- **In vitro culture and maintenance of an excised organ primordia or whole or part of an organ in a way that allow differentiation and preservation of the architecture and/ or function.**
- **In organ culture, organs are not induced to form callus tissue.**

2. DIFFERENT ORGANS

- **Root**
- **Shoot**
- **Apical meristems**
- **Leaf Primordia**
- **Floral Buds**
- **Ovules**

3. IMPORTANCE OF ORGAN CULTURE

- **Excellent experimental system to define the nutrient and growth factors**
- **Valuable in the studies of interdependence of organs for growth hormones and other growth factors.**
- **Cultured organs ideal for study of specific problems in morphogenesis**
- **Helps to investigate sites of biosynthesis of specific metabolites and growth compounds**
- **Opens up a new avenue for the developments in agriculture and horticulture.**

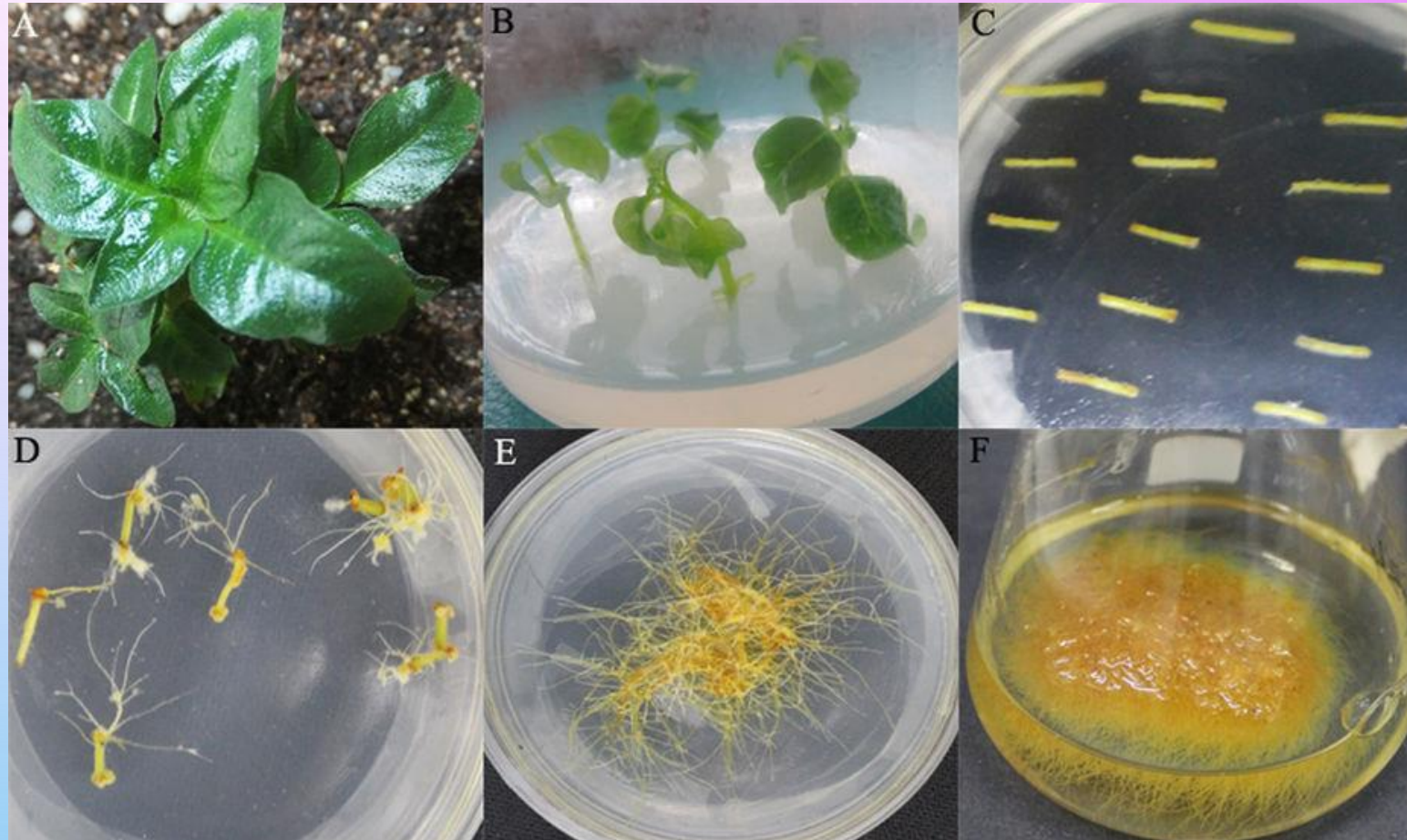
4. DIFFERENT TYPES OF ORGAN CULTURE

On the basis of explant, organ culture can be:

- **Root Culture**
- **Leaf Culture**
- **Shoot Tip Culture/ Meristem Culture**
- **Flower Culture**
- **Ovary Culture**
- **Ovule Culture**

A. ROOT CULTURE/ HAIRY ROOT CULTURE

Excised radicle tips of aseptically germinated seeds in a liquid medium where they are induced to grow independently under controlled conditions.



A. ROOT CULTURE/ HAIRY ROOT CULTURE

Principle :

- ✓ **Surface sterilization of root tips (very sensitive to chemicals) can be avoided.**
- ✓ **Root tips are cultured in moving liquid medium.**
- ✓ **Root tips are induced to grow like the root system of an intact plant.**

B. LEAF CULTURE

Culture of excised young leaf primordia or immature young leaf of the shoot apex in a chemically defined medium where they grow and follow the developmental sequences under controlled conditions.



B. LEAF CULTURE

- **Leaf primordia or very young leaf have growth potential than nearly mature leaves.**
- ***Osmunda* (lower plants), tobacco, sunflower.**
- **Size of leaf primordia – smaller size = shoot formation; larger = leaves**

C. SHOOT TIP/ MERISTEM CULTURE

- **Culture of terminal (0.1-1.0mm) portion of a shoot comprising the meristem (0.05-0.1 mm) together with primordial and developing leaves and adjacent stem tissue.**
- **Meristem culture is the in vitro culture of a generally shiny special dome-like structure measuring less than 0.1mm in length and only one two pairs of the youngest leaf primordia, most often excised from the shoot apex.**

C. SHOOT TIP/ MERISTEM CULTURE

- **Mericlone** – a popular term. It is in vitro vegetative propagation of orchids from excised shoot tips, axillary buds or floral organs.
- **Meristem** – a popular term. Used to describe the in vitro clonal propagation of plants from various explant sources including shoot tips, leaf sections and calli.

C. SHOOT TIP/ MERISTEM CULTURE

- **Importance**
 - **Virus Eradication**
 - **Micropropagation**
 - **Storage of genetic resources**
 - **Plant breeding programme**
 - **Propagation of haploid plants**
 - **Quarantine**



D. FLOWER BUD/ FLOWER CULTURE

- **Aseptic culture of flower primordia or flower bud to study flower morphogenesis.**
- **A full bloom is developed in a culture vessel.**

E. OVARY CULTURE

- It is a technique of culture of ovaries isolated either from pollinated or unpollinated flowers.



E. OVARY CULTURE - IMPORTANCE

- **Study of early development of embryo development, fruit development, different aspects of fruit physiology.**
- **Study of effect of phytohormones on parthenocarpic fruit development.**
- **Study of role of floral organs in fruit development.**
- **In hybridization programme - in vitro fertilization and seed formation.**
- **Inducing polyembryony.**
- **To study the nature of stimulus provided by pollination in the growth of the ovary and seed.**

F. OVULE CULTURE

- Ovules are aseptically isolated from the ovary and are grown aseptically on chemically defined nutrient medium under controlled conditions.

Helps to obtain seedlings
From crosses which are normally
Unsuccessful because of
Abortive embryos.

