

RSAU – Russian State Agrarian University
MTAA named after K.A. Timiryazev.

MICROPROPAGATION OF ORNAMENTAL POT PLANT VIA THIN CELL LAYER

by Golubev A.V.

A third – year student

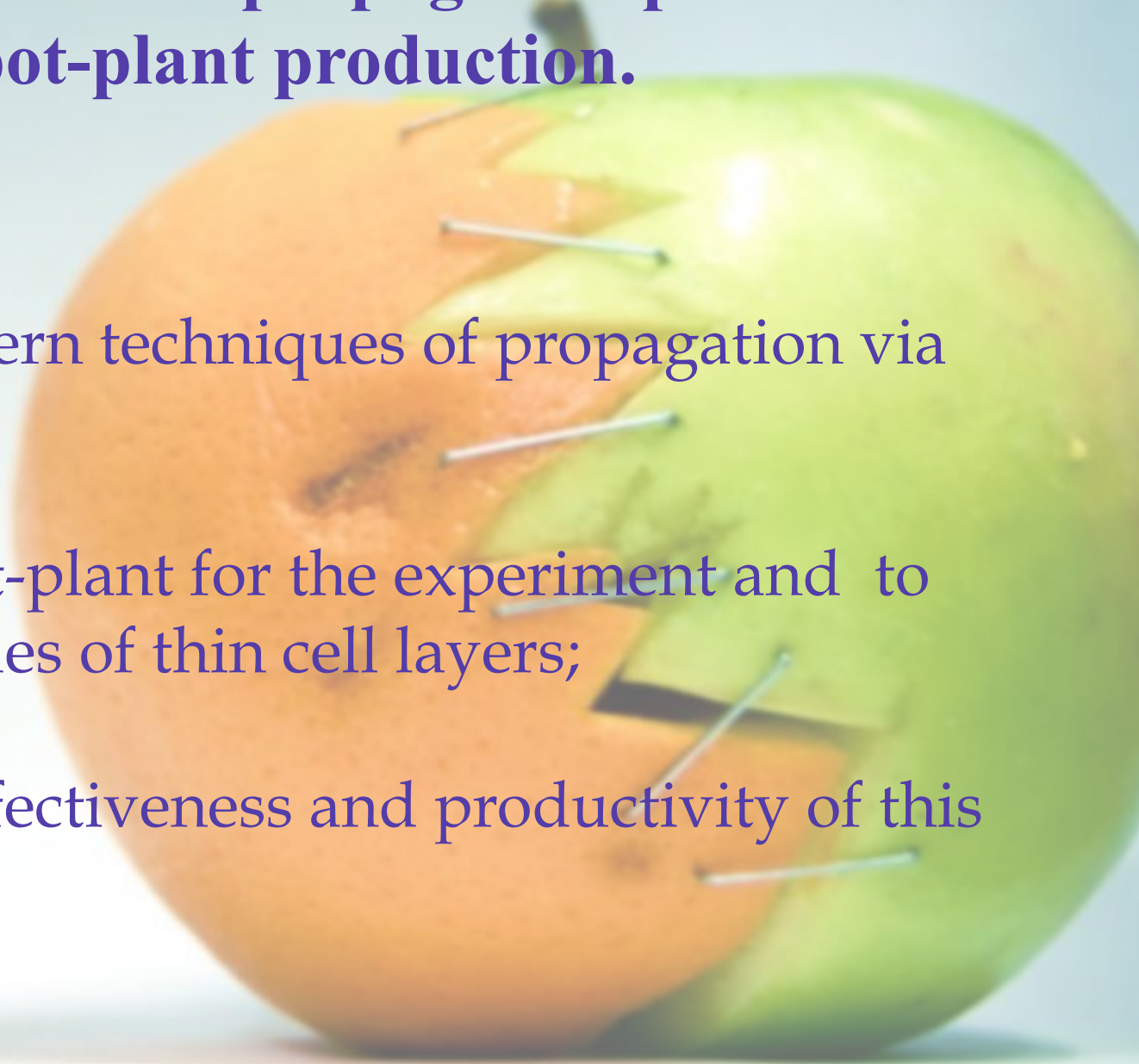
Department of Genetics and Biotechnology

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Aim: To assess micropropagation potential for ornamental pot-plant production.

Problems:

- To study modern techniques of propagation via thin cell layer;
- To collect pot-plant for the experiment and to prepare samples of thin cell layers;
- To analyze effectiveness and productivity of this technique.

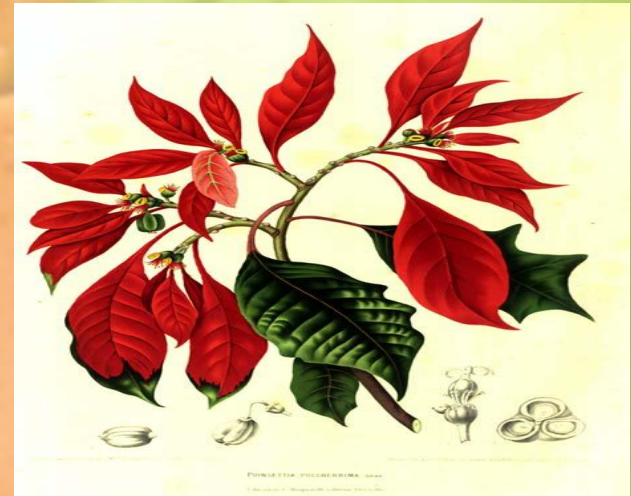


The object.



Orchids

Thin cell layers of



E. pulcherrima

Micropropagation

- History.
- Main types.
- Main achievement.
- From Lab to Commercial Micropropagation.



Historical Perspective

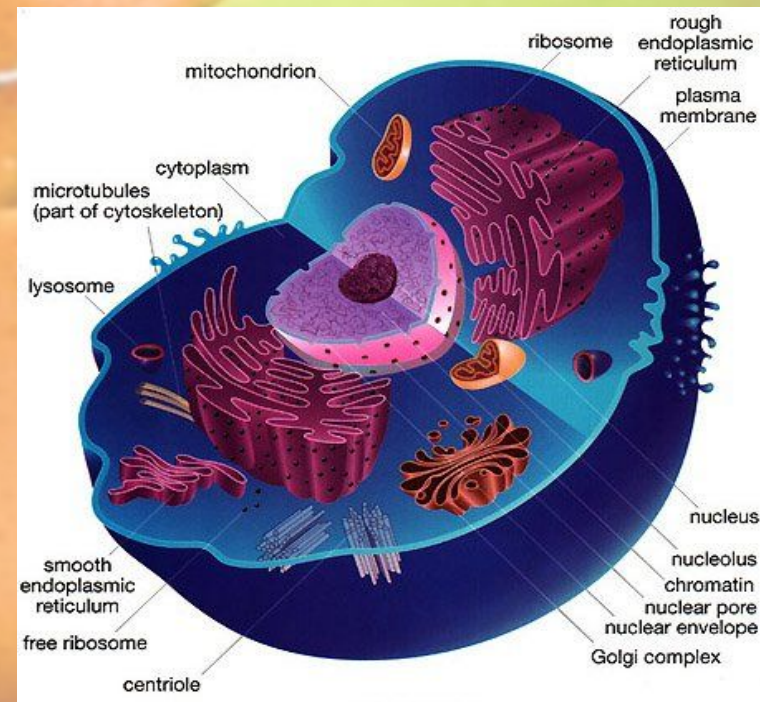
□ Schleiden 1838

Schwann 1839



□ Cell Theory

- *Cell is the basic unit of life*
- *Each living cell of a Multicellular organism should be capable of independent development if provided with the proper external conditions*



Main types

MACROPROPAGATION

MICROPROPAGATION

- Small propagule
- Aseptic conditions
- Controlled environment
- Heterotrophic growth
- Rapid multiplication
- Greater initial costs

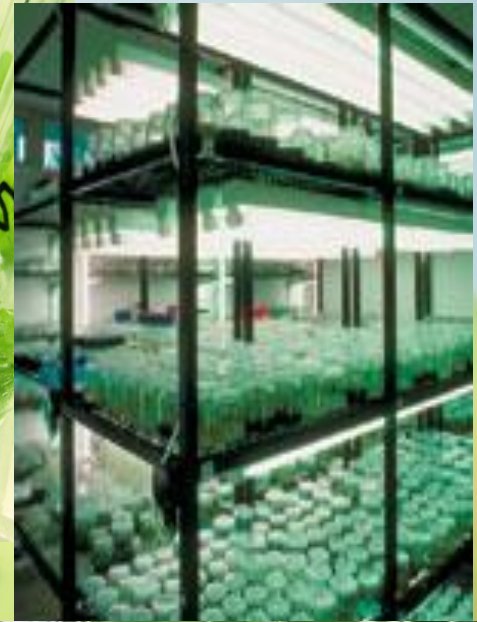
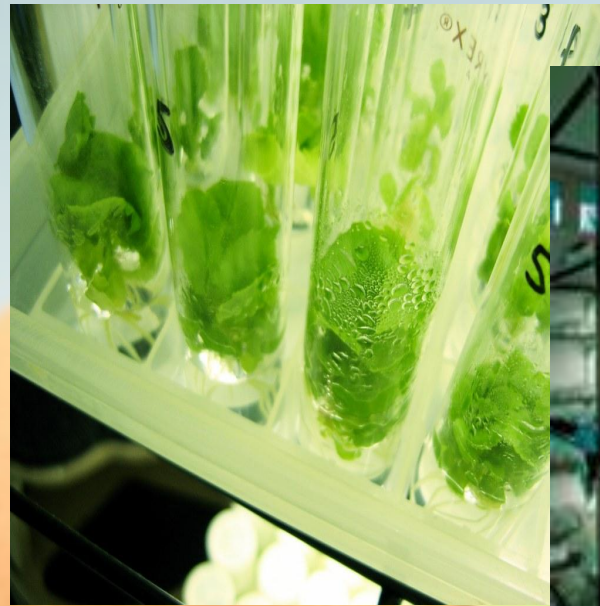


- Larger propagule
- Non-aseptic conditions
- Less environmental control
- Photoautotrophic growth
- Slower multiplication
- Nominal costs



Main achievements

- Rapid & efficient propagation
- Year-round production
- Precise crop production scheduling
- Reduce stock plant space
- Long-term germplasm storage
- Production of difficult-to-propagate species



Commercial Micropropagation: A Global Industry

- Israel
- Japan
- India
- Malaysia
- Mexico
- Central America
- South America



Stages:

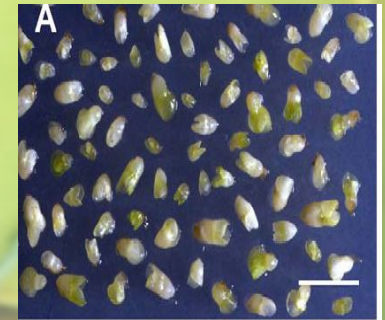
1. To select mother block-set as source of explants.



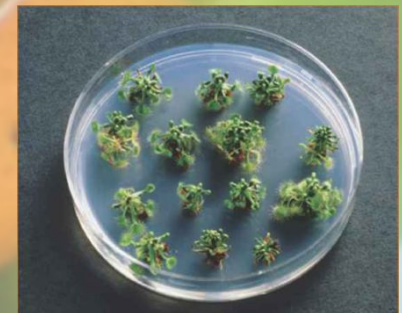
2. To establish Sterile Culture.



3. To carry out the stage of microcutting.

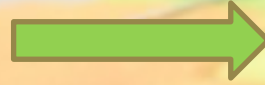


4. To prepare clusters in vitro.

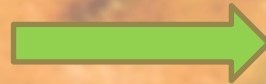


Stages:

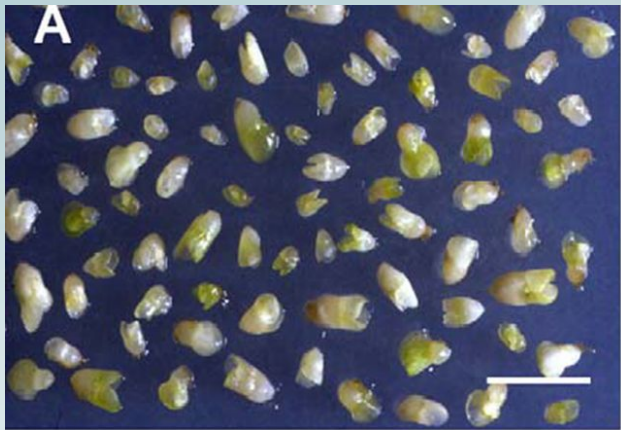
5. To study pre transplant.



6. To transfer plants to
Natural Environment.



7. To analyze the effectiveness
results of the experiment.



(A) Isolated somatic embryos of *E. pulcherrima* (bar=0.1 cm).



(B) Germination of somatic embryos (bar=0.25 cm).



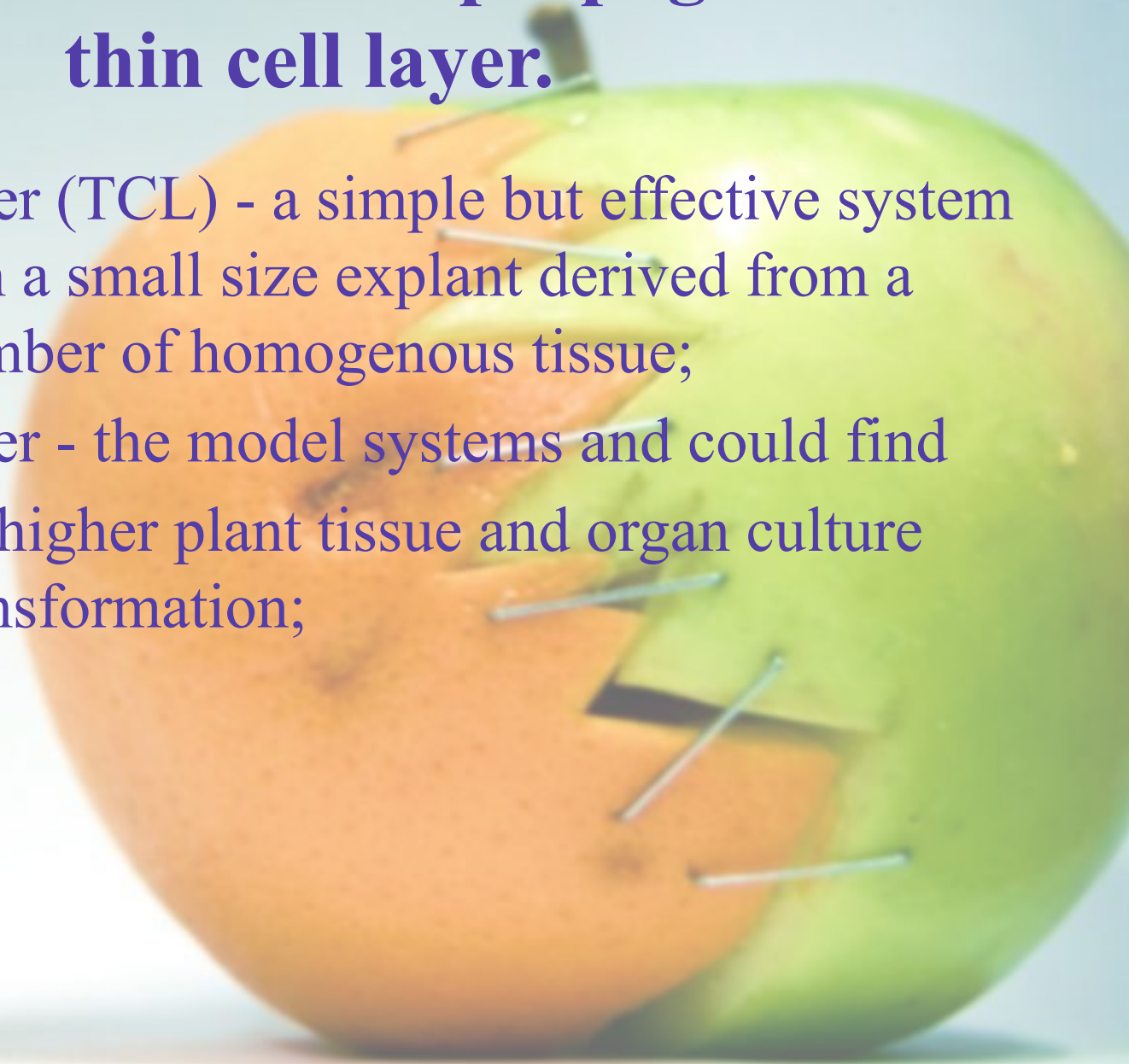
(C) Somatic embryos derived plantlets acclimatized in the greenhouse (bar=0.5 cm).



(D) Flowering of somatic embryo-derived plants (bar=25 cm).

Scientific value of Micropropagation via thin cell layer.

1. Thin cell layer (TCL) - a simple but effective system that relaying on a small size explant derived from a limited cell number of homogenous tissue;
2. Thin cell layer - the model systems and could find applications in higher plant tissue and organ culture and genetic transformation;



95 % - effectiveness and productivity

Thin cell layer technology - a solution to many of the issues currently hindering the efficient progress of ornamental and floricultural crop improvement



Thank you for attention

