MICROPROPAGATION

Micropropagation is the practice of rapidly multiplying stock plant material to produce a large number of new generation plants.

Micropropagation aims to increase plants production. You can find applications of this method in genetically modified plants or plants conventionally grown. It is also used to produce a sufficient number of plantlets to plant from a stock plant which is still the fertile part of the bud, or does not respond well to vegetative reproduction.

Benefits:

- Plants in large numbers can be produced in a short period. Any particular variety may be produced in large quantity with a time reduction of 50%.
- The micropropagation method produces plants without diseases.
- Proliferation of *in vitro* stocks can be done in every season of the year.
- Fast international exchange of plant material without the risk of disease introduction is provided. The time required for quarantine is lessened by this method.
- The micropropagation technique is also used for seed production.

This method includes 4 steps:

Establishment =Micropropagation begins with the selection of the part of the plant to be propagated. The plant tissues are extracted from an intact plant in a sterile condition. Cleaning stock materials that are free from viruses and fungi is important in the production of healthiest plants. This small portion of plant tissue, sometimes only a single cell, is placed on a growth medium (a solid,a liquid or a semi-solid designed to sustain the growth of microorganisms or cells, or small plants), typically containing resources as an energy source and one or more plant growth regulators (plant hormones). The medium is usually with agar that is a gel which supports the explant during growth.

Multiplication= Multiplication consists in taking tissue samples produced during the first stage and increasing their number. A single explant sample may be increased from one to hundreds and thousands of plants. Multiplication can involve different methods. If the plant material grown is callus tissue, it can be cut into smaller pieces and refarmed on the same type of culture medium to grow more callus tissue. If the tissue is grown as small plants, hormones are often added that cause the plants to produce many small offshoots.

Pretransplan=This stage involves treating the shoots produced to increase root growth and "hardening."(preparation of the plants for a natural growth environment.) It is achieved *in vitro*, or in a sterile "test tube" environment. So the plants will be grown in "ideal" conditions. This prevents them from diseases and reduces the use of water and energy. Hardening typically involves the slow weaning of the plantlets (the new plants) from a high-humidity, low light, warm environment to what would be considered a normal growth environment for the species in question.

Transfer from culture= In the final stage of plant micropropagation, the plantlets are removed from the plant media and transferred to soil .

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https://en.wikipedia.org/wiki/Micropropagation

https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/micropropagation