

Clonal propagation and Seed plot technique

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- **Clonal Propagation** - Production of genetically identical copies of a plant without interference of sex organ
- The most widely used '*in vivo*' methods of cloning agricultural crops **include**
 - Cuttings of vegetative parts,
 - Layering,
 - Grafting and
 - Budding.
- The '*in vivo*' clonal propagation of plants is often difficult

Techniques of Clonal Propagation: (*In Vitro*)

Steps

- **Stage 0** -Selection and maintenance of stock plants culture initiation.
- **Stage I**- Initiation and establishment of aseptic culture (Main steps: explant isolation, surface sterilisation, washing, and establishment on appropriate culture medium).
- **Stage II**- Multiplication of shoots or rapid somatic embryo formation using a defined culture medium.
- **Stage III**- Germination of Somatic embryos and/or rooting of regenerated shoots 'in vitro'.
- **Stage IV**- Transfer of plantlets to sterilised soil for hardening under greenhouse environment (in a few cases this stage may also include the 'in vivo' rooting of regenerated shoots by skipping stage III).

Potato -seed plot technique

- **Principle and need**
- **Principle-** Selection of time having less incidence of aphid (Major vector)
- **Need-** Hills account 6 percent area for potato cultivation, not enough to meet seed requirement of plains
- Tubers harvested in Sep- Oct in hills cannot be used for commercial plantation in plain during Sep- Oct due to dormancy

SEED PLOT TECHNIQUE

- Use of healthy seed in vegetative propagated crop is very important
- Continuous use of same seed stocks year after year without periodic replacement allows infiltration of disease particularly widely prevalent viruses
- These viruses readily spread through contact of foliage and roots in the field or through aphid vectors from far off fields or within fields
- They have debilitating effect and are responsible for bringing down yield potential of infected tubers
- The high hills were the traditional sources of healthy seed as population of aphids remain low due to low temperature

- However, hills accounts for only 6% of the area under potato and this was not enough to meet the seed requirement of the plains.
- In 1962, Cockerham (Scotland) came to India to do some studies to increase the potato yield.
- On the basis of data on appearance and build up of aphids in different months, it was found that potato can successfully be grown for seed production in many parts of the plains under low or no aphid condition.
- This led to the development of “Seed Plot Technique” i.e. raising the healthy seed crop during low aphid population period available in northern plains

Steps followed in seed plot technique

- Planted before the commencement of 10th October
- Sowing at closer spacing of 45cm x15 cm for smaller size potato tubers
- Two inspections at least should be made to rogue out any diseased or off-type plants during growing season
- Application of granular systemic insecticides at planting or earthing up

- When the crop has tuberized well by the middle of December, restrict irrigation and later withhold it completely
- At the end of December or first week of January, haulm should be cut down before the aphid population builds up to 20 aphids per 100 leaves
- If the crop is still green destroy the haulms by spraying 2% solution of CuSO_4 or cut them
- The harvesting of tubers is done in Mid February to end February

- **Modifications made**

- Hot weather cultivation and green manuring.
- Crop rotation for 2-3 years.
- One or two sprays of systemic insecticides + spray of metalaxyl or mancozeb in December- January.
- Tubers dip treatment with 3% boric acid for 30 minutes after harvest and before storage of the produce.
- The use of this technique helps in meeting the large requirement of healthy seed in country