

Asexual propagation Methods

Asexual Propagation (Vegetative or Clonal Propagation)

“The multiplication of plants without using seeds”.

- **Asexual Propagation**
 - **Uses mitosis to create a complete plant**
 - **Requires the presence of 3 key factors:**
 - 1. Totipotency** – capacity of a cell to produce a complete plant.
 - 2. Competence** – the potential for a cell to develop in a particular direction.
 - 3. Environmental conditions** –

Advantages

1. Cloning

2. Overcomes limited seed quantity, inviable or dormant seeds.

3. Economical (cheaper) and rapid.

4. Propagate non-seed producing plants

5. control size & form.

6. Bypasses juvenile characteristics

- **Disadvantages**

1. **Difficult to prevent transmission of pathogens**

2. **Not useful for all types of plants.**

- **Asexual Propagation Methods**

- **Cuttings**

- **Layering**

- **Divisions**

- **Apomixis**

- **Grafting**

- **Budding**

- **Tissue Culture**

- **Cuttings –**
- “detached vegetative parts of the plant which can regenerate an entire plant if given the right conditions.”

4 basic types of cuttings

- 1. stem cuttings**
- 2. leaf cuttings**
- 3. leaf-bud cuttings**
- 4. root cuttings**

1. **Stem Cuttings** (piece of stem including a terminal or lateral bud)
 - **form - “adventitious roots”**
 - **Softwood** – late spring, new growth
 - **Semi-hardwood** ever green: olives,..
 - **Hardwood** –deciduous: fig, grapes, pomegranate,..



- **2. Leaf Cuttings**

- • generates a new plant from a single leaf of the parent plant.

- **Form adv. Shoot & adv. root**



- **3. Leaf-bud Cuttings**
- **Examples: blackberry, lemon**
- **Form adv. root**

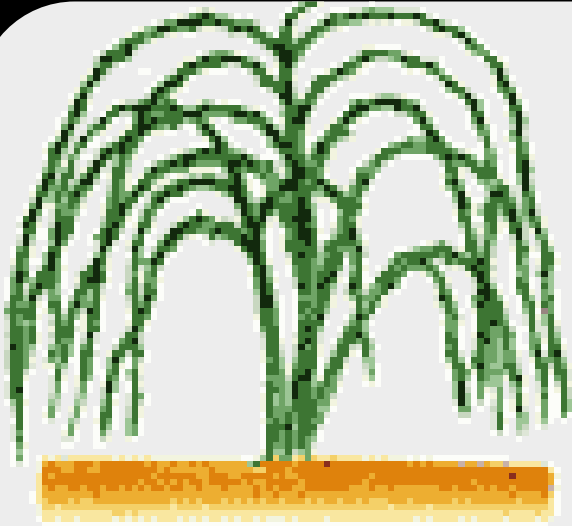


- **4. Root Cuttings (old method)**
- **Roots can generate adventitious shoots.**
- **Raspberry, blackberry, olives, apple, pear, pomegranate, guava**



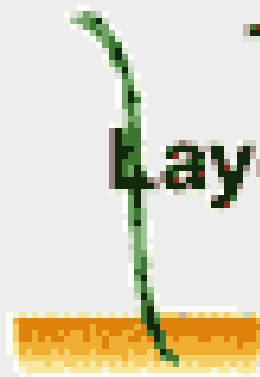
- **5. Layering**
- **Adventitious roots are formed on a stem while it is still attached to the parent plant**
- **Not often used in nursery industry.**
- **More expensive/labor intensive than cuttings.**

Methods of Layering



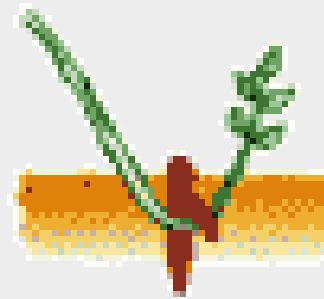
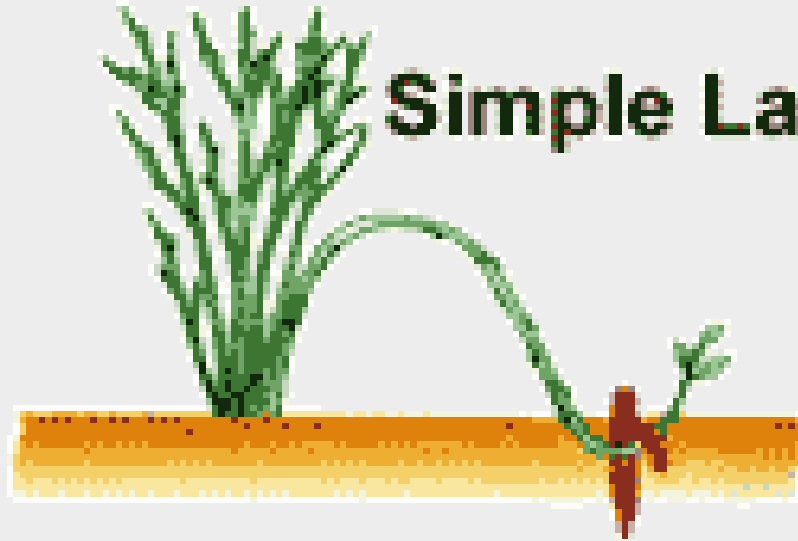
Tip Layering

blackberry



Simple Layer

Grapes & lemon



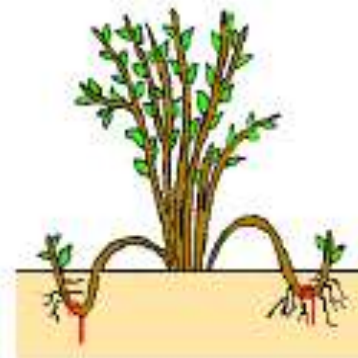
Tip layering

- Limited to brambles



Simple layering

- Layer in Spring with 1 yr. old wood –rooted by fall–remove



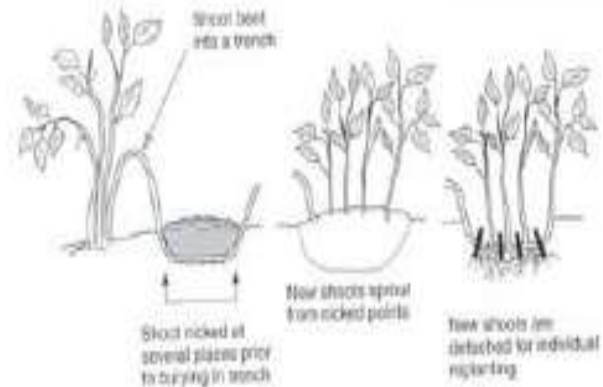
Mound layering

- Used for rootstock production in nursery trees



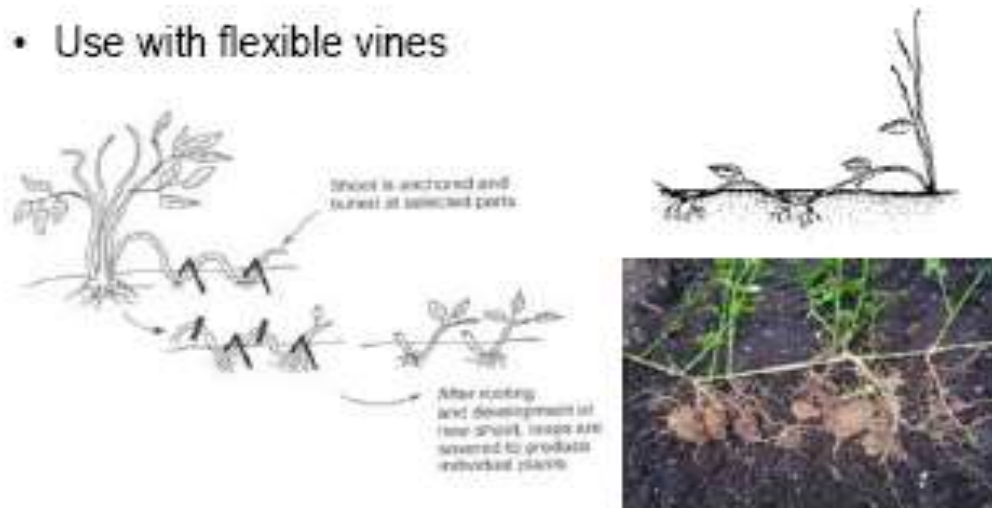
Mother plant cut back almost to the ground → Stool is covered with soil → New shoots develop from top of stool → Shoots are detached for replanting

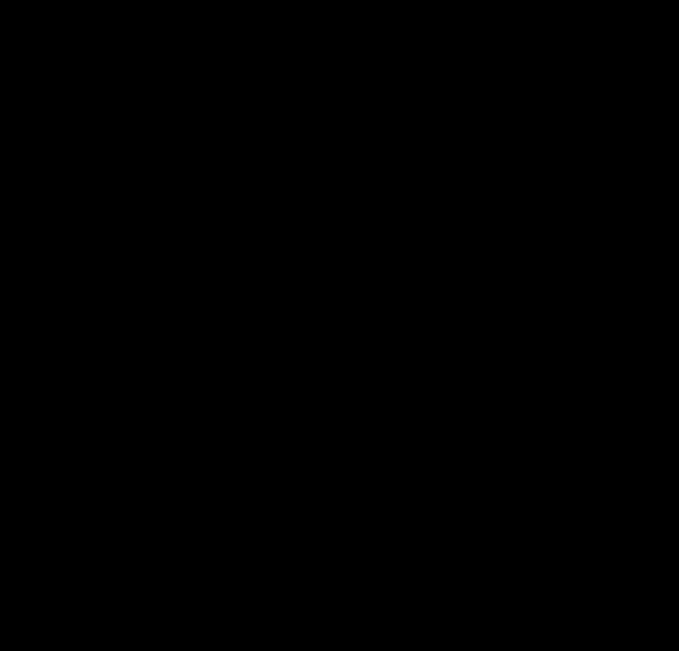
Trench layering



Compound (serpentine) layering

- Use with flexible vines





Air Layering



Mango, lemon

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- **6. Divisions**

- The crown is dug up and cut into sections.
- Used extensively for herbaceous perennials.

Offshoots/Offsets: pineapple, banana, date palm

Adventitious shoot that develops laterally at the base of a plant, often rooting to form a new plant.

• **Suckers** :adv. bud on stem/above soil/ no roots formed/need rooting after seperation: fig, olives, apple, quince, plums, kaki



- **7. Apomixis**
- The formation of seed without fertilization (1 parent).
- Apomictic seeds produce offspring identical to the parent plant.
- Examples of plants that reproduce via apomixis :
 - Hawthorns
 - Blackberries

