




Plant Propagation

Plants reproduce in two ways:

1. Sexually: from seeds
2. Vegetatively: from stem, roots or tissue



Seed Propagation

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- Seeds can be sown in two ways:
 1. On site (Native species are best (unpredictable))
 2. In nurseries (cared-for cultivars (predictable))

Site Seeding

- Used for native plants, grasses and wild flowers
- Plant before winter rain and during mild weather
- Water 2-3 times a day (5-6) times during summer
- With time increase water and decrease frequency to wet deeper soil and make roots grow deep

Site seeding process

1. Prepare the Soil
2. Mark boundaries
3. Drills
4. Sow evenly (Mix with sand if small seeds 1:3 ratio)
5. Label sections
6. Water lightly

Hardy annuals are undemanding plants that can be sown directly into the ground. Thin them out and water well in dry weather and you will produce masses of flowers with little effort.

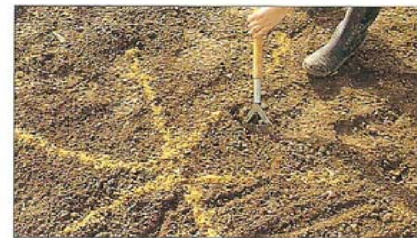
SOWING IN ROWS



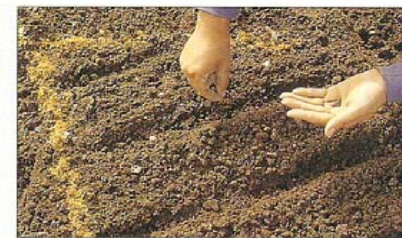
1 Make sure that the area is free of weeds and large lumps of earth, then rake level. Fine soil is needed to germinate seeds.



2 Mark out with sand or grit the areas in which each annual is to grow.



3 Make shallow drills in the soil according to the instructions, and plant in alternate directions to soften the effect.



4 Sow seeds as evenly as possible along the drill. Large seeds can be sown individually.

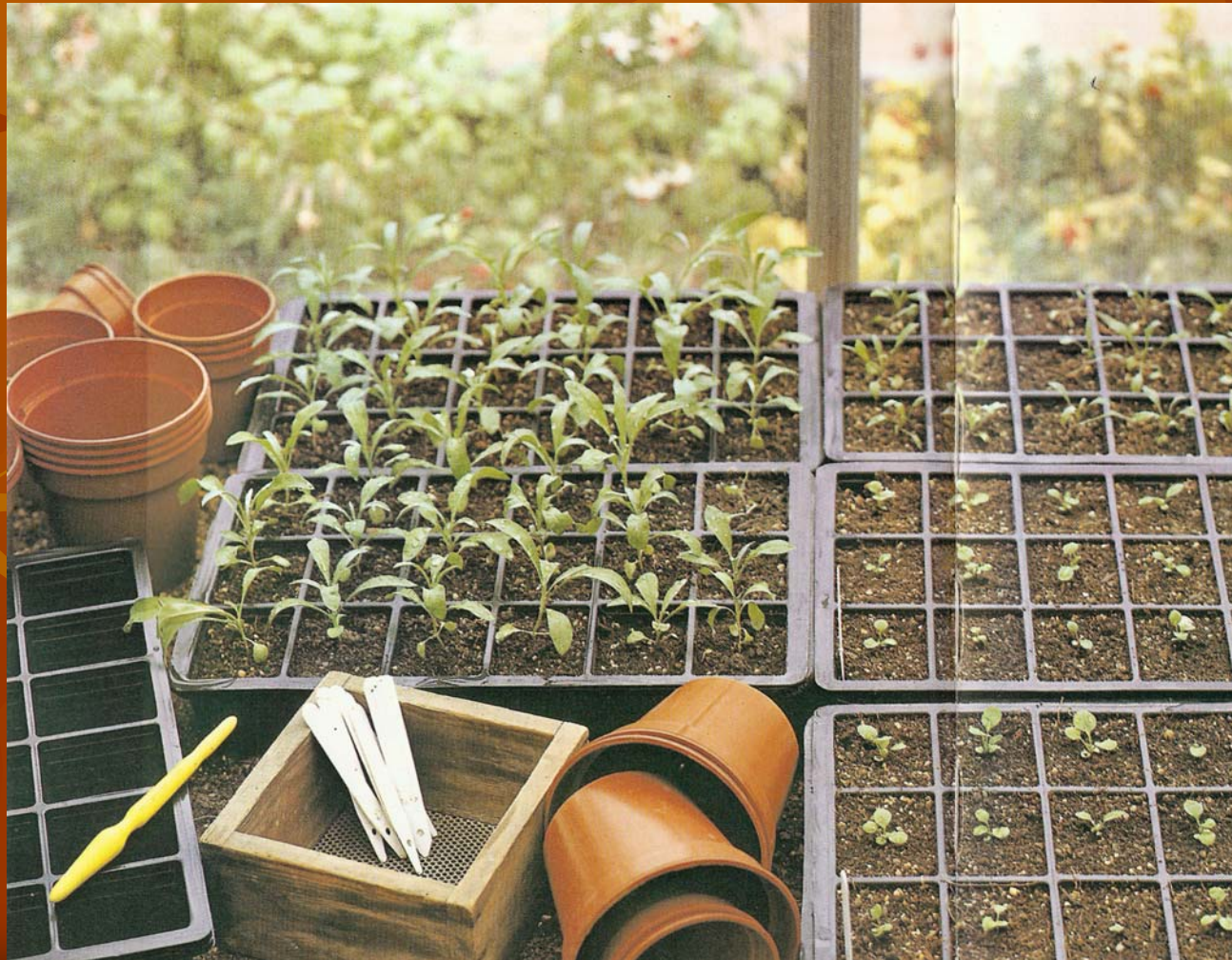


5 Label each section, rake the soil to cover the seeds.



6 Water well until seeds germinate and are established.

Nursery Seeding



- Needs a warm moist shaded area that is protected from sun, wind and animals.
- Use shade netting giving 30% light
- Soil must be well draining but still have moisture
- Soil mix:

1. 65-75% sterilized sand
2. 25% Sieved moist peatmos

For light mix

1. 5% Perlite or polystyrene
2. 5% Soil Conditioners

For individual containers add slow release fertalizers

Germination

- Hard seeds need Scarifying (warm water, acid, scraping, high or low temperature or a dormant period)
- Seeds are planted at surface level if small or at 2X seed diameter if large.
- Place tray or pot in water until surface is damp once seeded and keep wet using spraying
- Use plastic cover to keep moisture
- First leaf is the seed leaf the second are the true leaves



1 Fill the tray loosely with sterilized seed compost. Level with the rim, then press down with a piece of wood. Leave a gap of 12mm (0.5in) below the rim. Water the tray before sowing or the seeds will be washed away.



2 Sprinkle seeds thinly over the surface. Large seeds can be spaced individually. Medium-sized seeds can be put in a folded piece of paper, then tap it with a finger to disperse seeds.



3 Sift more compost over the top, if instructions say you should do so.



4 To keep the compost moist either place in a sealed plastic bag or cover with glass.



5 Each day, turn the glass over, or the bag inside out, to reduce condensation drips.



6 Once the seeds germinate, remove the glass or bag. Covering the seeds for too long could encourage disease through high humidity.



Potting up and transfer to shade house

- Thinning process
- Remove seedlings using the leaves after breaking the soil
- Plant in moist soil in a dibble
- Press soil around seedling
- Plant in a larger pots when half hardened and label
- Grow for 3-4 weeks or 6 weeks for good roots
- Move to open shaded area

PRICKING OUT

As soon as seedlings are large enough to handle, prick them out into pots or trays of potting compost to give the seedlings enough space to grow healthily.

PRICKING OUT INTO TRAYS

1 Fill tray with sterilized compost. Level and firm the compost to 12mm (0.5in) below the rim.



2 Use a dibber to loosen the compost and lift out each seedling with as much compost as possible attached.



3 Use a dibber to make a hole deep enough to take the roots. Hold the seedling by a seed leaf. Firm compost gently around roots. Space seedlings 2-5cm (1-2in) apart.

4 Water thoroughly after transplanting and shade from direct sunlight for a couple of days.



PRICKING OUT INTO MODULES

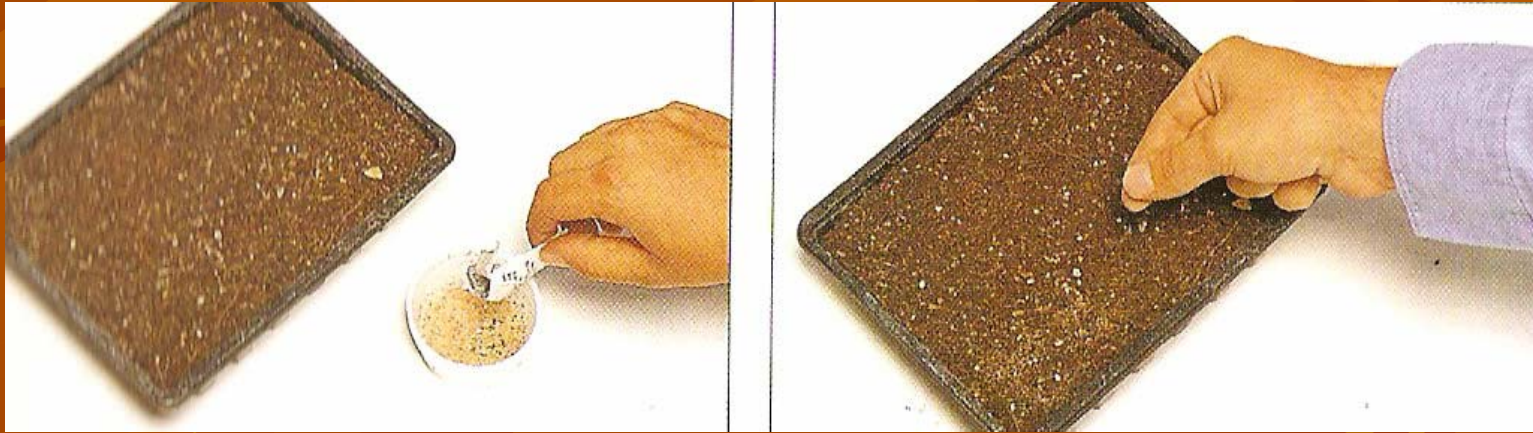
Using pre-formed trays or modules will ensure even spacing of seedlings.



Nursery Final Transplanting

- Prepare 30cm of soil mix
- Plant in North-South rows
- Space plants as needed
 - Trees 1m
 - Shrubs 70cm
 - Ground Covers 30cm
- Dig a hole twice as wide as the root ball
- Fill with water/ drain
- Pull root ball off container
- Loosen crowded roots
- Do NOT break root ball
- Backfill and keep stem at ground level
- Water at once

Using sand to better distribute seeds





The background of the slide is a solid orange color with a pattern of stylized, overlapping leaves in various shades of orange and brown, creating a textured, autumnal effect.

Vegetative Propagation

There are Five main ways for vegetative propagation

1. Cuttings
2. Divisions
3. Layering
4. Grafting
5. Tissue-Culture

Cuttings (1)

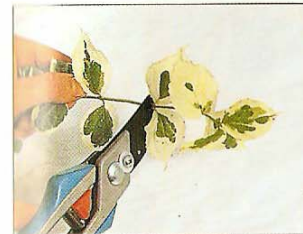
- Softwood
 - Quick rooting and rotting
 - Taken from green new growth
 - Cutting is 10-12 cm with a terminal bud
 - Remove lower leaves
 - Dip in growth hormones (Eg. *Coleus*, *Lantana*...)

TAKING GREENWOOD CUTTINGS

1 Take cuttings once the new growth has slowed down in early summer. For most shrubs, a 10cm (4in) long cutting from the shoot is adequate.



2 Place cuttings in a polythene bag or bowl of water to prevent wilting.



3 Shorten the length of each cutting to 8cm (3in), cutting straight across the stem.



4 Trim leaves from the bottom half of the cutting, using a sharp knife.



5 Dip the cut ends into a rooting hormone to speed up the rooting process.



6 Insert cuttings around the edge of a pot, water with fungicide and allow to drain.

7 Place pot in a warm, humid propagator in light but out of direct sunlight. A polythene bag could be used as an alternative.



Cuttings (2)

- Semi-Hardwood
 - Fairly quick growing
 - From half woody growth with terminal buds, side shoots
 - Same process as softwood propagation.
- (*Eg. Bougainvillea, Hibiscus...*)

Cuttings (3)

- Hardwood
 - Slow rooting
 - Pick firm shoots 1 cm diameter, but not old
 - Clean off dying leaves
 - Cut into 15-23cm sections
 - Cut the top angled, bottom straight
 - make a V-shape dig in a sheltered ground
 - Fill with coarse sand
 - Plant cuttings 10cm apart with no more than 2-5cm above ground

HARDWOOD CUTTINGS

Take hardwood cuttings in late autumn or when shrubs are dormant. Most are easy to root and need less looking after, than other cuttings, as they are left in the ground.

TAKING SEMI-RIPE CUTTINGS



1 Choose shoots grown in the summer, which are firm. Avoid weak and old shoots. Cut off shoots with secateurs, these can be divided up into shorter lengths later.

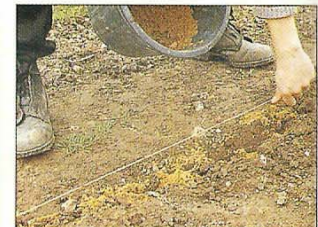
2 Pull off any dying leaves that remain on the shoot, then cut into sections about 15-23cm (6-9in) long.



3 So that you remember which end is the top, make a sloping cut above the top bud and a horizontal one underneath.



4 Choose a sheltered but not dry part of the garden and make a V-shaped slit trench.



5 To stop water from rotting the base of the cuttings, sprinkle grit or coarse sand along the base of the trench.

SINGLE STEM CUTTINGS

If you are taking cuttings of trees or fruit bushes that you want to grow with a single stem, insert the cutting so the tip is just covered.



6 Insert cuttings vertically 10cm (4in) apart, with only 2-5cm (1-2in) above ground.

Cuttings (4)

■ Root Cuttings

ROOT CUTTINGS

Root cuttings are usually taken in winter when there is not much outdoor propagation to be done. Border plants and alpines root readily with this method.

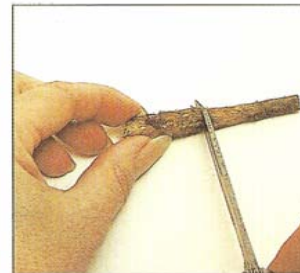
DIVIDING HERBACEOUS PLANTS



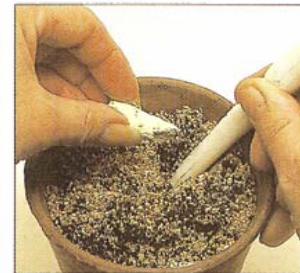
1 Lift the parent plant with a fork to expose the roots.



2 If the plant has fleshy, thick roots cut some off close to the main stem or root.



3 Cut each root, into 5cm (2in) pieces, cutting horizontally across the top and with a sloping cut at the bottom.



4 Insert the cuttings into pots of gritty compost. The top of the cuttings should be flush with the top of the compost.



5 Sprinkle a thin layer of grit over the surface, label and keep in a cold frame or cool greenhouse.



6 Plants with finer roots should be cut into 5-8cm (2-3in) lengths.



7 Lay the cuttings flat on the compost in a tray, cover with compost and store as above.

Cuttings (5)

■ Leaf Cuttings

LEAF CUTTINGS

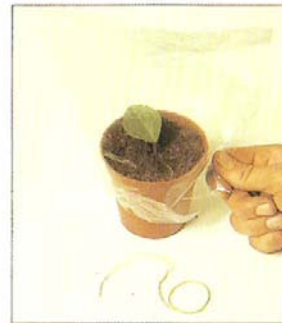
Leaf cuttings can be fun to root, and are ideal for propagating house-plants such as African voilets (*Saintpaulia*) and Cape primroses (*Streptocarpus*).

LEAF PETIOLE CUTTINGS



1 African voilets can be propagated from leaf cuttings taken with the stalk (petiole) attached. Choose young healthy leaves.

2 Trim the stalk, insert into a pot of cuttings compost, vermiculite or perlite, so the leaf blade just touches the compost.

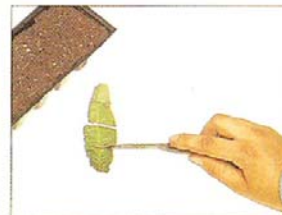


3 Cover with the top half of a plastic drinks bottle or an inflated plastic bag. Label and keep in a warm light place.

4 Keep the compost damp but not wet. Remove condensation. Pot up the plantlet as soon as it is growing well.



LEAF SECTION CUTTINGS



1 Cape primrose leaves can be cut into sections 5–8cm (2–3in) wide, with a sharp knife.



2 Push cut section vertically into a tray of compost. Keep the side nearest the leaf stalk downwards, bury one-third of cutting.



3 Keep compost moist and warm, out of direct sunlight. Pot up plantlets individually



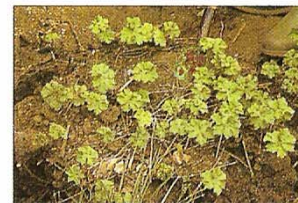
Divisions

DIVISION

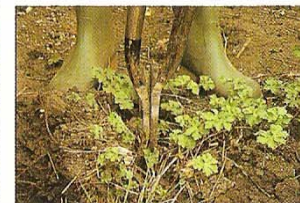
Division is one of the easiest and quickest methods of propagation. Herbaceous plants benefit from division once they have formed a mature clump of growth.



DIVIDING HERBACEOUS PLANTS



1 Divide large clumps as the shoots emerge in spring using a fork to lift the clump.



2 Use two forks back to back to divide the clump into smaller pieces.



3 Replant without further division unless you wish to have smaller plants. To make smaller plants pull or cut the clump apart. Remove any dead plant material.



4 Rake in a garden fertilizer before replanting the smaller pieces into prepared ground.

DIVIDING FLAG IRISES



1 Divide rhizomatous flag irises after flowering, by lifting with a fork and shaking off the soil.



2 Replant the current season's growth, discard the old part of the rhizome.



3 Trim the leaves to 5–8cm (2–3in) to reduce the water loss whilst new roots grow.

Layering (1)

■ Ground Layering

LAYERING

Layering is an ideal way to propagate shrubs and some house plants. You will usually have a larger plant than from cuttings. Air layering is a good technique if you have a leggy plant bare at the base. Simple layering is best for shrubs in the garden, serpentine layering is good for clematis or honeysuckle.

AFTERCARE

- Water thoroughly and prevent soil drying before the plant has rooted.
- Sever the stem from its parent in autumn or spring.
- After severing, pinch out the growing tip to get a bushy plant.
- Lift and replant if well-rooted; if not leave for a year.

PLANTS TO TRY

Most shrubs and some trees can be layered if there are suitable low-growing shoots, these include:

Corylus avellana 'Contorta'
Hamamelis (witch hazel)
Magnolia x soulangeana
Magnolia stellata
Rhododendron (opposite)
Syringa vulgaris (lilac)
Viburnum

SIMPLE LAYERING



1 Choose a young, low-growing branch which be bent down easily. Trim leaves and sideshoots off the branch where it meets the soil.



2 Make a hole 10–15cm (4–6in) deep sloping towards the parent plant.



3 Hold the stem in contact with the soil using a peg of bent wire. Ensure that the end of the stem lies vertically against the back of the hole.



4 Return the excavated soil to bury the stem and firm well.



Layering (2)

■ Air Layering

AIR LAYERING



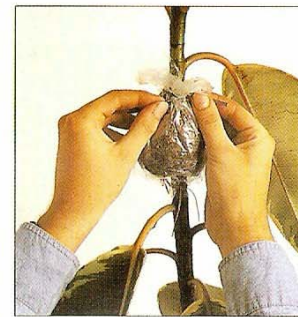
1 Trim off any leaves growing where you want to make a layer. Make a polythene sleeve to go around the stem. Secure the bottom of the sleeve using tape or plastic covered wire.



2 Holding out the sleeve out of the way, use a sharp knife to make a slanting upward cut, half-way through, about 2.5cm (1in) long.



3 Brush a little hormone rooting powder or liquid into the cut, pack with sphagnum moss to keep cut open.



4 Pull the sleeve over the cut area and pack it with moist sphagnum moss. Tie at the top with more tape or wire.

AFTERCARE

- Care for the parent plant normally, do not remove the layered section until you can see roots.
- Once plenty of roots have formed, cut through the stem below the layered area. Tease out some roots when you pot it up.

PLANTS TO TRY

Air layering is commonly used for leggy indoor plants, but it can be used for garden trees or shrubs.

Indoors

Ficus elastica (rubber plant)
Dracaena

Outdoors

Hamamelis (witch hazel)
Magnolia
Rhododendron (below)
Syringa (lilac)



SERPENTINE LAYERING

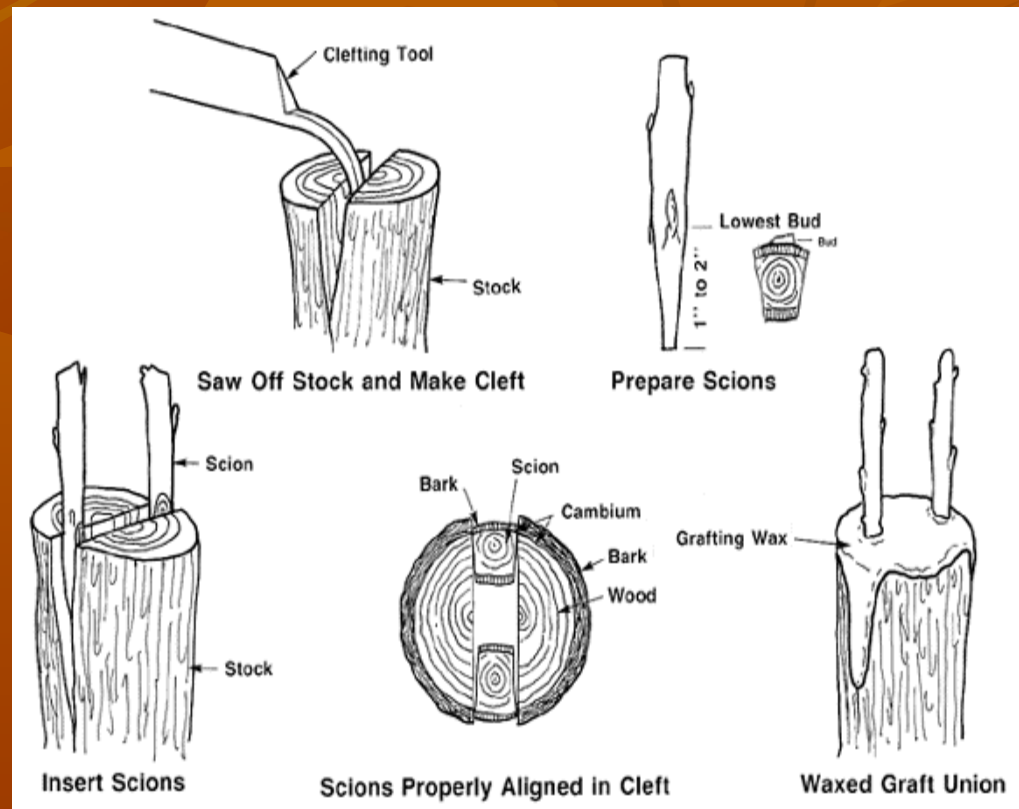
Strip the leaves from a healthy shoot at points where the stem will be buried, leaving several intact. Make a slanting cut at each joint almost half-way through. Insert a piece of matchstick into the cut to keep it open. Pin down with wire, cover with soil, keep moist.

Plants to try Serpentine layering is suitable for climbers and trailers with long stems that can be pegged down into the ground such as:
Clematis (opposite)
Lonicera (honeysuckle)
Parthenocissus (Boston ivy)



Grafting

- **Preparing the Rootstock.** The stock should be sawed off with a clean, smooth cut perpendicular to the main axis of the stem to be grafted. Make a split or "cleft" through the center of the stock and down 2 to 3 inches.
- **Preparing the Scion.** Select scions that have three or four good buds. Using a sharp, clean grafting knife, start near the base of the lowest bud and make two opposing smooth-tapered cuts 1 to 2 inches long toward the basal end of the scion. Cut the side with the lowest bud slightly thicker than the opposite side.
- **Inserting the Scion.** Insert a scion on each end of the cleft, with the wider side of the wedge facing outward.
- **Securing the Graft.** Pressure from the rootstock will hold the scions in place. Thoroughly seal all cut surfaces with grafting wax or grafting paint to keep out water and prevent drying.



Tissue-culture

