PRODUCTION OF PECAN TREES

HORST DARGEL
Fitzroy Nurseries
Pink Lily, Rockhampton, Queensland 4700

The pecan nut (*Carya illinoensis*) is a close relative of the walnut; both are members of the family Juglandaceae. The pecan is native to the eastern half of the U.S.A., embracing the states of Illinois down to Texas and east to the Atlantic Ocean. Since the European settlers were first introduced to it by the Indians, the pecan has enjoyed a tremendous popularity in the U.S.A. Huge pecan groves have been established in California, Texas and New Mexico. Some forty years ago trial plots were planted in Australia and in a number of other countries which have a suitable climate.

The pecan tree can produce fruit for over 100 years and it can grow to an enormous size. To illustrate, there are old orchards in the U.S.A. where four trees occupy a full acre. The trend there and elsewhere is to select or breed cultivars and match them with rootstocks which will produce medium sized trees, rather than the giants of the past. Of course, as with all relatively uncommon crops such as avocadoes, macadamias, pecans etc., our knowledge of cultivar performance relative to areas or regions is confused, to say the least.

Flowering. Separate male and female flowers are produced on each tree. Male flowers, which appear as catkins, are formed in buds in one season and complete their development and shed pollen during the early season's growth the following spring. Female flowers are produced on new season's growth. In most pecan cultivars, pollen release and stigma receptiveness do not coincide. Therefore a plantation needs to be interplanted with pollinators.

Seed Treatment. Seed is obtained from a well run orchard in June (early winter) and stored at an even temperature until August (late winter). We do not store fresh seed in plastic bags as it may turn moldy. Hessian (burlap) sacks are best. We soak the seed for 48 hours, by stacking bags of it in a tank; weighting them down as they are extremely buoyant, and then letting water into the tank.

Preparation of Seed Beds. Two months prior to seeding, an area of sandy loam soil designated for outdoor seed beds is ripped to the depth of 18″, graded for runoff, then fumigated with methyl bromide, about 750g per $10m^2$.

Planting and Care of Rootstocks. Seeds are planted into long drills by mid-August. Seedlings set out in rows are easier to keep clean. The main advantage lies in the use of a mechan-

ical digger when seedlings are dug and prepared for planting out into the field nursery. After seeding, the bed is rolled down, then covered by two inches of potting medium which is also rolled down. After the beds are soaked, they are completely covered with mulching film (40 μm or 0.0015″) held down by a thin layer of soil spread evenly over the film. This mulching plastic provides the seed with an even temperature and moisture for three weeks. This is usually long enough to start even germination. The mulching film is then removed and 60% Sarlon frames are put up to prevent the emerging seedlings from being scorched.

We have learnt from past experience that we must take all these precautions in our climate. Our temperature fluctuations are enormous, especially in winter. In August, we can go from 0°C at night to 35°C during the day. The Sarlon frames are removed as soon as the seedlings have formed their own leaf canopy. Seedlings are transplanted into the open field nursery the following winter in July.

Open Field Planting. Prior to planting, the field is treated with Treflan, a pre-emergent weedicide which remains effective for about six months. We apply Treflan every six months on all field nurserystock and obtain an excellent control of grasses.

Seedlings are precision planted along a spacer line 96 cm (3′2″) × 20 cm (8″). This spacing allows adequate growing room for each plant and all our row crop implements and high clearance tractors are set to this spacing. These seedlings stay here for three years, first as seedlings and then as grafted plants.

Preparation of Grafting Wood. In any nursery a stock patch of mother plants is essential, unless, of course, the nursery is near a fruit growing area and grafting wood can be drawn from clean orchards. Our nursery is completely isolated from fruit growing areas by hundreds of miles so we are compelled to grown our own mother fruiting plants. There is a distinct advantage in this as diseases prevalent in some orchards cannot easily be carried into the nursery. Grafting scions (young mature branches) are cut from pecan mother plants at the end of July (mid-winter). Vigorous mature growth makes the best scion wood. The tips of these scions, although mature, are discarded because of the soft pithy condition. Wood with large pithy centres is also useless.

Since the wood cannot be used immediately it is prepared for cold storage. The wood is cut to a suitable length and sorted into sizes; the large sticks for patch budding and the smaller sticks for whip-grafting. Correct wrapping for cold storage is of the utmost importance as the wood cannot be left to dry out, nor can it be stored too wet. After many trials, we found that

newspaper is by far the best packing material available. Moss, peat, or sawdust are not satisfactory for wrapping of scion wood. Eye patches release much better and whip-graft scions give better takes when wrapped in moist paper. Finally plastic is wrapped around the lot with a label on the inside and a label on the outside, giving cultivar and origin. Wood may be stored safety for up to 12 months at 1°C to 4°C (35°F to 39°F). Preferably hold the temperature as near freezing as possible.

Grafting. The whip and tongue method of grafting pecans is being used in our nursery. Established seedlings in the open field require very little preparation. They are merely cut off some 8″ above the ground prior to grafting and thoroughly rubbed clean, as any dirt will dull the knife; one cannot work well with a blunt knife, as pecan wood is very hard.

Grafting scions are taken out of cold storage as required. We usually work in teams of two persons, a propagator who is experienced in a particular grafting method and his tyer, usually a junior or casual worker. The whip and tongue method is used so that the graft stays in place until it is tied with one inch wide plastic tape. As pecan wood is so hard it is very difficult to establish a safe union. After tying with plastic the top of the scion is sealed with Colgraft (a bitumen substance).

The timing of grafting or budding, as in all propagation, is of the utmost importance. Complete records should be kept from year to year to avoid mistakes when planning a major job like grafting pecans.

Budding. As pecans do not accept T buds, but will accept patch buds this method is used. Patch budding is faster than grafting, but unfortunately, it will not produce a tree as fast. A double bladed knife is used for patch budding. A bark patch about 1″ long and ¾″ wide is removed from the rootstock and discarded. A patch of similar size, with an active bud in the centre, is removed from the grafting wood and placed onto the rootstock. The whole thing is then tied with a plastic band. The method is relatively simple.

Propagation using dormant bud-wood requires more detailed attention and two approaches are possible. The first and more popular method is to cut fresh but mature wood directly from the mother plant and use it immediately for patch budding. Any delay or exposure will cause dehydration and the wood will not release the bud patch. Patches which are forced off or scraped off will not take. Timing is critical and it varies with the cultivar. In principle, budwood fresh from mother plants must be mature enough so that patches can form callus in their own right. If the wood is taken too young the patches will simply shrivel up. If the wood is taken too late (mother

plants approaching dormancy) the wood will not release suitable patches. The correct time for this method is during summer.

In the second method, cold-stored, fully dormant wood which was cut from mother plants in mid-winter is used. Since the rootstocks begin to release their bark in mid-spring there is no point in applying this method sooner as everything depends upon a free release of bark from the stock and from budwood. Timing is not as critical here as budwood can be prepared at will any time during their peak growing period from November to March. After March pecans begin to enter their dormant stage.

Budwood is removed from cold storage and exposed to moisture and warmth. This gets the sap moving which, in turn, allows us to remove the bud patch for budding. There are several methods which can be used with varying success. Wood is buried in sand or in peat or wrapped in paper or placed under mist in the propagation house, all of which can cause all sorts of problems. The trouble is that while you are getting the sap moving, you also get the buds underway. Advanced bud-growth is not suitable for budding, so the trick is to get the sap moving for easy bark removal but hold bud growth back. To achieve the correct conditions, we find that evaporative cooling gives good results. Dormant wood is stood in 1 in. of water and hessian is draped over the wood with the ends of the hessian in the water. Water draws up the hessian keeping the budwood moist and cool by evaporative cooling. The wood is ready for budding within six days. When it is ready it must be used without delay because this type of wood also suffers from dehydration if exposed to dry air after this treatment.

Post Graft Treatment. Before we graft a position plan is made for each cultivar; all cultivars are always positioned in alphabetical order. If a stock book is lost or mislaid, cultivars are easily found by deduction. In all of our propagation of plants, we try to give ourselves two chances to succeed. In pecans, we use the whip graft in September and October and, if a large percentage fails due to severe climatic conditions or shortage of suitable grafting wood, we can fall back onto patch budding as soon as grafting failures are evident.

The usual post-graft treatments are applied; de-suckering, trimming and finally crowning.

The trees are ready in July. We use power digging by hitching two high clearance tractors one in front of the other. The heavier tractor has a digging blade with depth control attached to its three point linkage. Pecans have a strong carrot-like tap root which we sever about twenty inches below ground level. After digging, the trees are graded into three sizes: large,

medium and small. They are heeled into a sheltered area prior to dispatch.

PROPAGATION OF BEDDING PLANTS IN SOILESS MEDIA

GEORGE O. GAY

B.J. Gay & Sons,
Gosnells, Western Australia

When bedding plant production commenced in Western Australia early this century soil used for seedling trays was basically composted plant material, the source being straw, weeds, expended plant material, stable manure and straw, or any decayed plant material available. As the demand for larger volumes of growing media outstripped the supply, various mixtures of loam, sand, cinders and stable manure were used.

The acceptance of the U.C. system for container grown plants saw, for the first time, a soil mix with actual measured amounts of the elements required for plant growth. Spagnum peat and fine sand provided the basis of inert material. Problems continued with the volume of sand used. The local sand supply was abundant although the particle sizes were considered small. Variable pH meant a close watch was needed on this. The weight factor was a problem in loading up mixing machines, conveyors, conveyances and caused increased delivery costs.

In recent years, because of the high cost of spagnum peat, a substitute lightweight material was searched for. Local sedge peats were available but did not prove a satisfactory substitute for spagnum peat in seed raising mixtures. After a great deal of trial and error, our hardwood sawdust showed great promise. Firstly, it is low cost; it is plentiful, very lightweight, low pH and contains no growth affecting toxins. It leaches well and has a moderating affect on temperature. Hardwood sawdust appears to inhibit root destroying pathogens that are problems with peat and fine sand mixtures.

As a result of a visit to Holland during 1977 I decided to experiment with a sand-free medium, using a mixture of ⅔ jarrah (*Eucalyptus marginata*) or wandoo sawdust and ⅓ medium-grade spagnum peat of German origin. Using 6 lbs. of urea formaldehyde or I.B.D.U. to each cubic yard of sawdust to control the consumption of nitrogen by the slowly composting process we were able to stabilize the situation and add the balance of elements required for plant growth. Success in the field was immediate. The only heavyweight component was water.