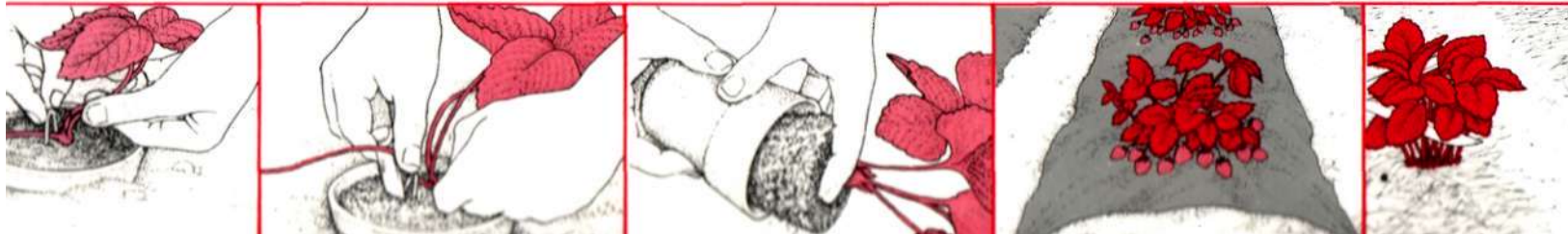




Fruit

SOFT FRUITS SUCH AS STRAWBERRIES AND BLUEBERRIES. TREE FRUITS SUCH AS APPLES AND PEACHES



Strawberries 1

The strawberry cultivated today has resulted from the interbreeding of a number of *Fragaria* species, principally the North American *F. virginiana* as well as the South American *F. chiloensis*. This intermingling of genetic characteristics has resulted in a fruit of great variety in taste and color, with a cropping ability and season of such versatility that it can be grown from the Tropics to the cool temperate regions of the world. It is no wonder the strawberry is the most popular soft fruit.

For the purposes of cultivation the strawberry is divided into three categories: the ordinary June-fruiting strawberry; the so-called ever-bearing strawberry that produces one crop in the spring and a second crop in the fall; and the alpine strawberry (*Fragaria vesca*, subspecies *alpina*), a mountain form of wild strawberry (see page 23).

Standard strawberries

The ordinary, or June-bearing strawberry, crops once only in the early summer. A few do crop again in fall and these are called "two crop" varieties, but they are cultivated in the same way as the others. The expected yield per strawberry plant is about 8-10 oz.

Cultivation

Some gardeners prefer to grow strawberries as an annual crop, planting new runners each year. This method produces high quality fruits but a lower yield than that of larger two- or three-year-old plants.

Soil and situation Most soils are suitable for strawberries, but they should be well drained. On waterlogged land, if a drainage system is not practicable, grow strawberries on ridges 2-3 in high. They prefer a slightly acid (pH 6.0-6.5) light loam in a frost-free, sunny situation. They will, however, tolerate some shade and because many varieties flower over a long period, the later flowers should escape spring frosts. Strawberries are readily attacked by soil-borne pests and diseases and a system of soil rotation should be practiced. Do not grow them for more than three or four years in any one site. For this reason, strawberries are best grown with the vegetables rather than with the more permanent fruit plants.

Soil preparation A strawberry bed will be down for three or four years, and the initial preparations should be thorough so that the land is made fertile and free from perennial weeds. In July dig in well-rotted manure or compost at about the rate of 14 lb to the

square yard. Rake off any surplus because bulky organics on the surface encourage slugs, snails and millipedes. Once applied, no more organics should be needed for the life of the bed. Just before planting, lightly fork in a balanced fertilizer such as 10-10-10 at 3 oz per square yard.

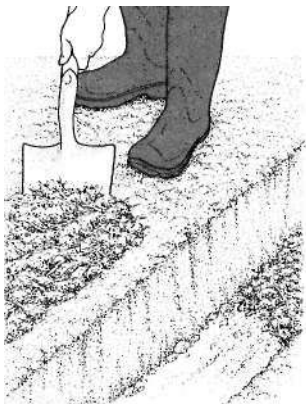
Planting and spacing The earlier the planting, the better the maiden crop in the following year. Plant in early spring after the ground has started to warm up. It is not necessary to wait until frost danger has passed. In the warmest American climates, however, it is better to plant in October. Plant the runners in moist soil with the crown of the strawberry just level with the soil surface; planting too deep may result in the rotting of the buds and planting too shallow may cause drying out. Plant with a trowel or hand fork, spreading out the roots well. Replace the soil and firm it. Space the plants 18 in apart in rows 3 ft apart. On a light soil they can be 15 in apart with 2kft between the rows. Plants to be grown for two years need only 12 in spacing.

Pollination The flowers are pollinated by bees and such crawling insects as pollen beetles. Imperfect pollination results in malformed fruits. All modern varieties are self-fertile.

Watering and feeding Water regularly for the first few weeks after planting and whenever dry conditions occur during the growing season, but try to keep water away from the ripening berries because this encourages gray mold (*Botrytis cinerea*). The risk is less with trickle or drip irrigation because only the soil is wetted. Damp conditions overnight also encourage botrytis; water in the morning so that the plants are dry by nightfall. In mid-August each year, apply a balanced fertilizer at 1/2 oz per square yard along each side of the row. No other feeding is necessary unless growth has been poor. In this case apply sulfate of ammonia at 1/2 oz per square yard in April, taking care to prevent fertilizer touching the foliage because it will scorch it.

Weed control Weeds compete for nutrients and water. Keep the rows clean by shallow hoeing and tuck any runners into the row to fill gaps. Pay particular attention to cleaning up between the rows before mulching. Weedkillers may be used (see page 17).

In general, shallow cultivation of strawberries keeps weed growth in check. But care should be taken to weed strawberry beds each fall, and particular attention should be paid to the removal of all weeds.



1 In late winter or the preceding fall, dig in well-rotted manure or compost at a rate of 14 lb per square yard. Rake off any surplus manure.



2 About April, plant the strawberries 18 in apart in rows 3 ft apart. Spread out the roots, keeping the crowns level with the soil surface. Firm the soil.



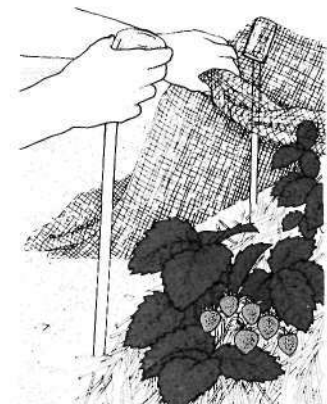
3 For the first few weeks after planting and during all succeeding dry spells in the growing season, water regularly. Keep water away from ripening berries.



4 Up to July 15 in the first year, pick off all blossoms to force strength into the plants for a big crop next year.



5 When the fruits begin to swell, scatter slug pellets along the rows. Cover the ground beneath the berries and between rows with barley or wheat straw.



6 Protect the fruit from birds. Support nets with posts at least 18 in tall. Cover posts with jars or pots first.

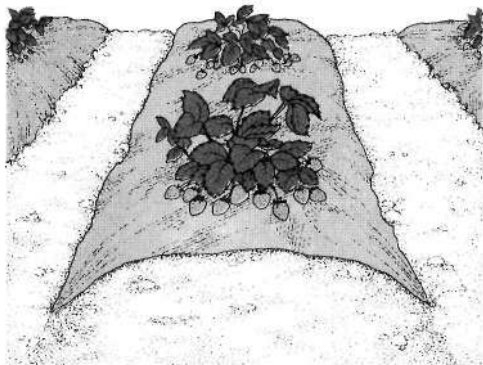
Strawberries 2

Disbudding During the first season, remove all flowers until mid-July. If the plants are allowed to set fruit in the first few months, vegetative growth will be retarded and the next year's crop will be small. In succeeding years, of course, disbudding is unnecessary.

Mulching When the fruits of two-year-old plants begin to swell and weigh down the trusses, scatter slug pellets along the rows. Then put straw down around the plants. This is to keep the fruits clean, so tuck the straw right under the berries and also cover the ground between the rows to help to keep down weeds. Do not straw down earlier than this because the straw prevents the heat from the earth reaching the flowers, which may then be damaged by frost at night. Preferably use barley straw which is soft or, as a second choice, wheat straw.

Protection from birds The best method of protection is to cover the strawberry bed with a large cage, using 3/4 in or 1 in plastic netting, supported by posts and wire or string. The height should be at least 18in; about 4ft is the ideal height for picking in comfort. Put glass jars or plastic plant pots over the posts to prevent them from tearing the netting. A simpler method is to spread

Alternatives to mulching



If straw is not available, strawberries can also be grown through black polyethylene. First, prepare the bed by raising a 3 in high ridge of soil. Water it well. Lay plastic over the ridge, tucking in the edges under the soil. Plant the strawberries

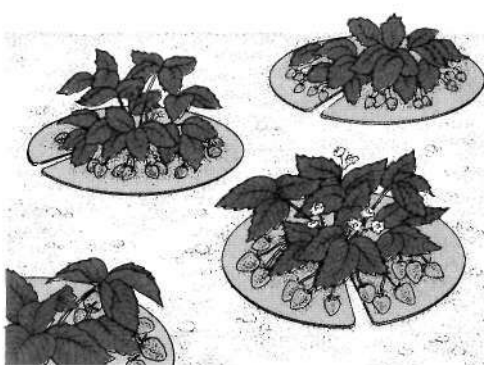
through slits in the plastic at 15-18 in intervals. Leave a 6 in bare strip between plastic strips to enable rain to permeate to the roots. Black polyethylene sheeting does slow down evaporation, but the soil under it will eventually become dry.

Harvesting

The best time to pick strawberries is in the morning when the berries are still cool. Pick them complete with stalks; try not to handle the flesh because it bruises easily.

At the end of the season

Immediately after cropping, remove the straw and cut off the old plant leaves (about 3 in above the crown) and unwanted runners using shears or a sickle. Alternatively, a rotary lawn mower can be run directly over the entire bed. Tuck in runners needed to fill in any gaps in the row. In the second year, a matted row can be grown by allowing runners to root in the row and reducing the space available, so that the quantity of fruit is greater but the quality suffers. The space between the rows is kept clear. Defoliation is good horticultural practice because it rejuvenates the plant and removes leaves and stems, which may be a source of pests and diseases. But it must be done as soon as cropping is over to avoid damaging fresh growth and reducing the crop the next year.



through slits in the plastic at 15-18 in intervals. Leave a 6 in bare strip between plastic strips to enable rain to permeate to the roots. Black polyethylene sheeting does slow down evaporation, but the soil under it will eventually become dry.

Winter protection

In zones 3-7, as soon as the fall temperature drops to 20°C/68°F, spread straw or salt or marsh hay over the entire bed. The covering should be at least 3 in deep between rows; and enough to conceal the plants themselves. The purpose of the covering is to protect the plants against frost and other winter injuries. If the temperature does not drop to 20°C/68°F before the end of November, the plants should be covered at that time in any case.

The covering is removed in the spring after growth is well started. If it is left on too long, the foliage will yellow.

Propagation

Strawberries are easily propagated from runners which the parent plant begins to produce as the crop is coming to an end. The aim is to obtain well-rooted runners for early planting and it is achieved by pegging down the strongest runners so that they make good contact with the soil. In June or July choose healthy parent plants which have cropped well. From each select four or five strong runners. Peg them down either into moist open ground or into 3 in pots buried level with the soil. Pot-grown runners are best because they are easier to transplant. Fill the pots with a seed-starting mixture or a 50-50 mixture of loam and peat. Peg close to the embryo plant but do not sever it from the parent at this stage. For the pegs, use 4 in pieces of thin galvanized wire bent to a U-shape. Straightened out paper clips are ideal.

In four to six weeks there should be a good root system. Sever from the parent, lift and plant out into the new bed. Keep them well watered.

Planting under mist or in a closed propagating case are other useful ways of obtaining very early runners. With these, sever the embryo plants from the parents at the first sign of roots—root initials—and peg them into 1 1/2-2 in peat pots.

Varieties

Strawberries soon become infected with virus diseases, so it is important to plant only virus-free stock. It is best to obtain plants from a specialist propagator who guarantees healthy stock.

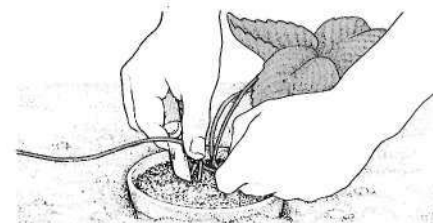
PROPAGATION



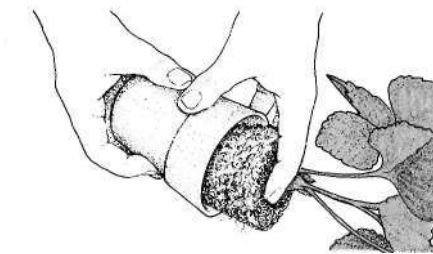
1 In June to August, select four or five runners from healthy, cropping plants.



2 With U-shaped wires, peg runners into open ground or into 3 in pots buried level and filled with a potting compost.



3 In four to six weeks they should have rooted. Sever from parents close to plants.



4 Lift out the potted runners and knock out from the pot. Plant out into the new bed and water well.

Strawberries 3

Ever-bearing strawberries

Ever-bearing strawberries have the characteristic of producing fruit in the spring and again in the fall. It is useful to cover the fall crop with cloches to extend the season, possibly in late October. It is best to grow ever-bearers for one year only because the size and weight of the crop deteriorate in the second year. Replant with new runners each year.

Cultivation

The basic requirements of soil, spacing, mulching and feeding are the same as for June-bearing strawberries. The soil should be highly fertile and moisture-retentive. Be sure to water well in late summer and fall.

Plant in the early spring and remove the first flush of flowers to ensure a good crop later in the season.

In the fall, when cropping is finished, clean up the rows, remove the old straw, surplus runners and one or two of the older leaves, and burn the debris. Cover with straw or hay in the late fall to protect against winter damage.

Do not fertilize the plants in the spring of the following year, but apply a balanced fertilizer immediately after all the spring berries have been picked to encourage a second, smaller, crop in the fall. Then remove plants entirely.

Alpine strawberries

Several varieties have been selected for garden and commercial cultivation. They

make an attractive edging plant, having masses of small white flowers. They bear dark red fruits continuously or in flushes from June until November.

Cultivation

Alpine strawberries are usually grown from seed and kept for no more than two years before re-sowing. There are a few varieties that produce runners, but most do not. Maintaining virus-free stock is difficult.

Sowing Sow the seeds in March under glass. Sow into seed boxes containing a moist seed-starting mixture. Maintain them at a temperature of 18°-20°C/64°-68°F. Cover the boxes with glass and shade until the seeds germinate. When two true leaves appear, prick out the seedlings 1 in apart into flats or peat pots.

Soil preparation, planting and feeding The soil should be rich, well drained and slightly acid (pH 6.0-6.5). Just before planting apply sulfate of potash at 1/2oz per square yard. Once the danger of frosts is over, but by the end of May, plant out the seedlings in the prepared, moist soil. Plant in the open or in light shade. Space the seedlings 1ft apart with 21/2ft between the rows. Water them in dry weather (about 3-4 gal per square yard every 7-10 days). For better cropping, when the flowers appear, feed every two weeks with a liquid fertilizer.

Harvesting

Pick carefully. Slight crushing, sugaring, and overnight soaking brings out the flavor.

Some ever-bearing strawberries produce runners and are propagated in the same way as are June-bearing strawberries, but a few varieties do not and these are propagated by division.

From late August to early September, dig up a mature plant and break off the new crowns or buds with as many roots as possible. Transfer them to the new strawberry bed and plant them immediately in the usual way. Do not plant the crowns too deep or they will rot.



1 In March, sow into seed boxes of moist seed compost.



2 Cover with glass and shade until germination. Maintain a temperature of 18°-20°C/64°-68°F.



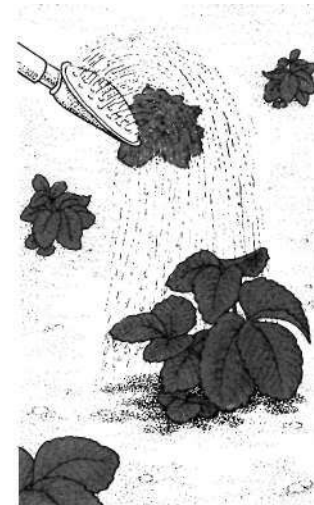
3 When the seedlings have two true leaves, prick out 1 in apart into flats or individual peat pots.



4 Just before planting, apply sulfate of potash at 1/2 oz per square yard to moist well-dug soil, forking it in lightly.



5 Once the danger of frosts is over, plant out the seedlings in the prepared bed, 1ft apart in rows 21/2ft apart.



6 In dry periods, water the plants thoroughly every 7-10 days. For better crops, feed every two weeks with liquid manure.

PROPAGATION



Raspberries 1

Like the strawberry, the raspberry is one of the quickest fruits to crop, bearing a reasonable amount in the second year and full cropping thereafter. A good average yield is 11/2—2 lb per foot run of row.

Cultivation

Most red raspberries (there are also a few with yellow fruit) flower in late spring and the fruits ripen in early to midsummer, depending upon the variety and the weather: such varieties are called standard or summer-bearing raspberries.

The stems, or canes, are biennial in that they grow vegetatively in their first year, flower and fruit in their second year and then die back to ground level. The root system is perennial and of suckering habit, producing each growing season new replacement canes from adventitious buds on the roots and new buds from old stem bases.

Some raspberry varieties have the characteristic of flowering on the first year's growth on the topmost part. These are called ever-bearing raspberries as they produce a small

crop of fruit in early summer and a larger crop in early fall. All grow in zones 3-7. Because their cultural requirements differ in some respects, they are described separately (see page 26).

Soil and situation Red raspberries grow best on a slightly acid soil of pH 6.0-6.7 that is moisture-retentive but well drained. They can be grown in dry, sandy and limy soils of low fertility, provided plenty of water is given during dry weather and bulky organic manures are liberally applied. Raspberries will not tolerate poor drainage, and even temporary waterlogging can lead to the death of the root system and subsequent death of the canes. In alkaline soils above pH 7.0, iron and manganese deficiencies may occur. See pages 10-11 for reduction of soil alkalinity and correction of iron and/or manganese deficiencies.

The site must be sheltered because strong winds damage the canes and inhibit the movement of pollinating insects. Preferably, they should be planted in full sun, although they grow quite well in partial shade with a

minimum of half a day's sun, provided they are not directly under trees and the soil is not too dry.

Soil preparation Prepare the ground in late fall or late winter by forking out all weeds, particularly perennials. Then dig a trench along the intended row three spades wide by one spade deep. Cover the bottom of the trench with well-rotted manure or compost to a depth of 3-4 in and fork it into the base so that it is thoroughly mixed with the soil. With double-dug grassland there is no need for this operation because the buried turf takes the place of the organic manure. Finally fill in the trench and fork in a balanced fertilizer such as 10-10-10 at the rate of 3 oz per square yard.

Planting and spacing If possible the rows should run north-south so that one row does not shade another too much.

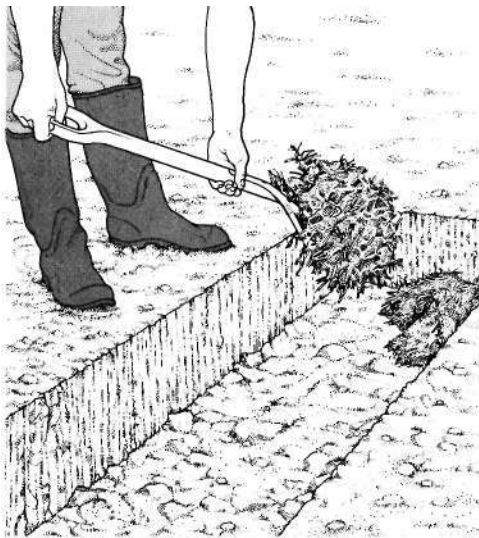
In early spring, plant the canes 18 in apart in the rows. If more than one row is planted, space the rows 6ft apart, or 5 ft apart if using the single fence system. Spread the roots out well and plant them about 3 in deep; deep planting inhibits new canes (suckers).

After planting, cut down the canes to a bud about 9-12 in above the ground. Later, when the new canes appear, cut down the old stump to ground level before it fruits. This means foregoing a crop in the first summer but it ensures good establishment and the production of strong new canes in subsequent years.

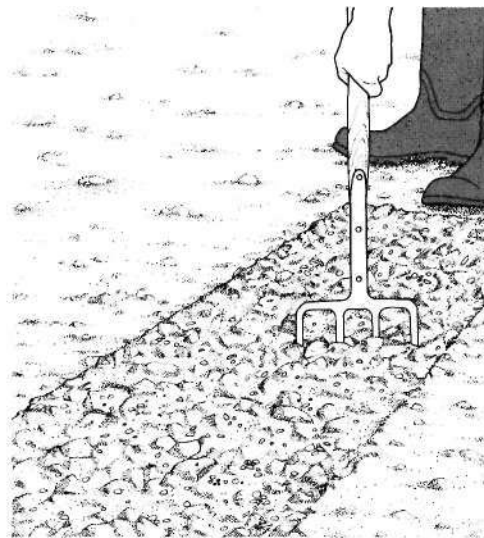
Supporting the canes

To prevent the canes from bowing over when heavy with fruit and to keep the fruits clean it is generally advisable to support the canes. The usual method is a post and wire fence for which there are various alternative systems. It is easier to erect the fence before planting, although it may be left until the end of the first summer.

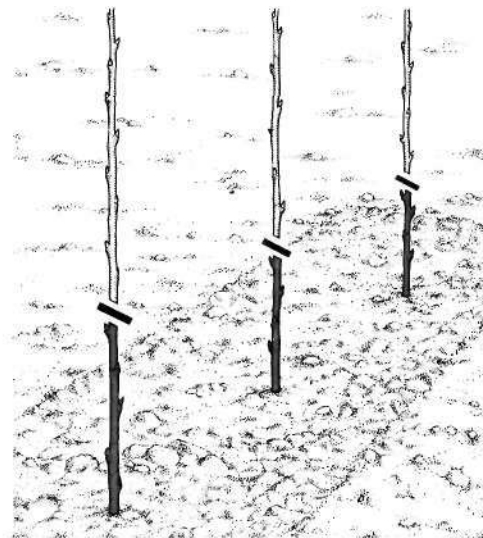
Single fence: vertically trained canes This is the most popular method and consists of single wires stretched horizontally at heights of 2 1/2, 3 1/2 and 5 1/2 ft. It requires the least space of the various fencing systems and is ideal for the small garden. The fruiting canes are tied individually to the wires and thus are secure



1 In early fall, take out a trench in prepared ground three spades wide by one spade deep. Cover the bottom of the trench with a 3-4 in layer of well-rotted manure or compost and fork in thoroughly.



2 Then, fill in the trench and fork in 3 oz per square yard of a balanced fertilizer such as 10-10-10.



3 From March to April, plant the canes at 18 in intervals. Spread the roots out well and plant about 3 in deep. Cut down the canes to a bud about 9-12 in above the ground.



4 In late March, apply sulfate of ammonia at 1/2 oz per square yard. Mulch with a 2 in layer of garden compost, keeping it well clear of the canes.

Raspberries 2

against winter winds. They are exposed to the sun, which enhances the quality of the fruits and reduces the incidence of fungal disease. The system has the disadvantages that the new canes are at risk of being trampled on during picking and of being damaged by strong winds in July unless temporarily supported by string tied to the lower wires.

Drive in preserved 7 1/2 ft posts 18 in into the ground 12-15 ft apart. Use 14 gauge galvanized fence wire.

Erect the end posts first and strut them and then drive in the intermediate posts. Finally fix the wires to the posts using straining bolts at one end and staples on the intermediates and at the opposite end.

Double fence: parallel wires The double fence is erected in a similar way to the single fence but because the top wires are not as high, the posts are only 6 1/2 ft tall. Cross bars 2 1/2 ft long by 2 in across to carry the parallel wires are fixed to the end posts and to the intermediate posts. In exposed situations, double posts should be used instead of cross bars. Parallel wires are spaced 2 ft apart at 3 ft and 5 ft from the ground. Stretch wire as cross ties every 2 ft along the wires to prevent the canes falling down in the row.

This method has the advantage of enabling a larger number of canes to be trained in and a greater yield to be obtained from much the same area. Picking the fruits from the center is difficult, however, and there is a higher risk of fungal diseases because of the more crowded conditions.

In an exposed garden the untied canes may be damaged on the wires, so the canes should be tied to the wires.

Scandinavian system (training in a low "V") This is a double fence system with only one set of parallel wires spaced 3 ft apart at 3 ft from the ground.

Drive two sets of posts 4 1/2 ft long 18 in into the ground, 3 ft apart every 12-15 ft in the row.

The fruiting canes are not tied but woven around the wires to form a "V" when viewed from the end of the row. The replacement canes are allowed to grow up the center unsupported.

With this method the fruit is presented at a low picking height and the replacement

canes are safe within the row. However, there is the risk of fungal troubles because of the crowded conditions of the canes on the wires and in the row. If more than one row is planted, space the rows 6 ft apart.

Single post system This is a method particularly suited to a very small garden. It consists of a single post to which each plant is tied. The posts are 7 1/2 ft long by 2 1/2 in top diameter, driven 18 in into the ground.

Initial pruning

In the first two seasons after planting, the number of canes may be few, but thereafter there should be more than enough.

In the second year thin out the weakest canes in the early spring so that the remainder grow more strongly, and pull out unwanted canes growing well away from the row. Allow about 8-10 canes to a plant.

Pruning and training established plants

As soon as fruiting is over, cut down to ground level the old canes which have fruited. Select the healthiest and strongest of the young canes, retaining about four to eight per stool.

If using the single fence system, tie the canes to the wires, 3-4 in apart. Either tie each one separately with a 6 in twist tie or secure them to the wires by continuous lacing using jute or strong string. Tie an occasional knot as a precaution against the string breaking later on.

With the Scandinavian system the canes are laced around a single wire, equally on each side. Gently bend them over at the point they reach the wire and then twist the canes around the wire. No tying is necessary. Do this in late August or early September when the canes are still supple. Depending upon the length of the canes, this could mean four or six canes being twisted around each other and the supporting wires like a rope. The average number of canes from each plant should be about four to six.

For the single post system the fruiting canes are tied to the posts and the replacement canes looped in as and when necessary. **Tipping the canes** (This is not applicable to the Scandinavian system). In early spring, about March, cut the canes to a bud 6 in

above the top wire. This removes winter damage to the tips and encourages the lowest buds to break.

For very vigorous varieties grown on the single fence system, where tipping would remove a lot of the cane, loop and tie the canes back on to the top wire and then prune about 6 in off the tips. This method gives extra length of canes, hence more crop, but the top wire must be strong.

Feeding and watering

In early spring each year apply 1 oz of sulfate of potash per square yard. Every third year add 2 oz of superphosphate per square yard. In late March apply sulfate of ammonia at 1/2 oz per square yard. The fertilizers should be applied as a top dressing covering about 18 in each side of the row.

Also, in late March, mulch with a 2 in layer of garden compost, damp peat or manure, keeping the material just clear of the canes. The mulch helps to conserve moisture in the summer and inhibits weed seeds from germinating.

Throughout the growing season keep down weeds and unwanted suckers by shallow hoeing. Be careful not to damage or disturb the roots of the raspberries. If preferred, herbicides can be used (see page 17).

In dry weather water the raspberries regularly but, to minimize the risk of fungal troubles, keep the water off the canes.

Protect the fruit from birds with netting.

Propagation

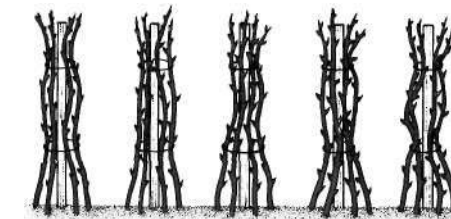
Raspberries are easily propagated by forking up surplus canes with as many roots as possible in early spring. The canes must be healthy and strong. Virus-infected plants should be dug up and burned.

Harvesting

Pick the fruits without the stalk and core, unless the raspberries are required for showing, when they are harvested with the stalk attached, using scissors. Picking of standard varieties continues for about a month. In general, pick raspberries when they are fresh, if possible, for better flavor. Use shallow containers to prevent the fruits from crushing each other.

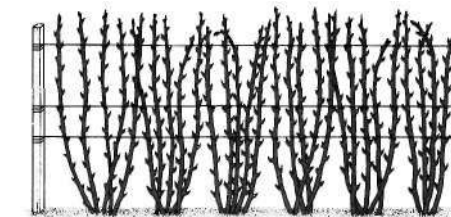
SUPPORT SYSTEMS

Single post system



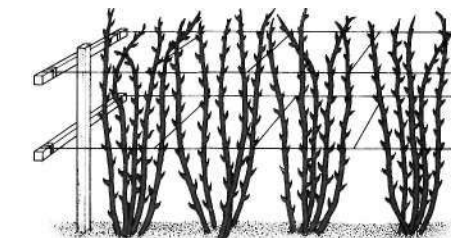
Drive 7 1/2 ft long 2 1/2 in dia. posts 18 in into the ground at each planting station.

Single fence system



Drive 7 1/2 ft posts 18 in into the ground at 12-15 ft intervals. Stretch 14 gauge galvanized wires between the posts at 2 1/2, 3 1/2 and 5 1/2 ft.

Double fence system



Drive 6 1/2 ft posts 18 in into the ground 12-15 ft apart. Fix 2 in dia. cross bars 2 1/2 ft long to the end posts and to each intermediate post. Then, stretch parallel wires 2 ft apart between the posts at 3 ft and 5 ft from the ground. Stretch wires as cross ties every 2 ft along the wires.

Raspberries 3

Pests and diseases

If aphids are present, spray with dimethoate, formothion or malathion in spring. An oil spray in winter gets rid of the over-wintering eggs. To prevent raspberry beetle grubs feeding on the fruits in summer, spray at dusk with malathion or derris when the first pink berry is seen.

The most serious diseases of raspberries are viruses, which cause the leaves to become mottled or blotched and the canes to be stunted. Seek expert advice before destroying canes because the symptoms are similar to those caused by raspberry leaf mite and bud mite. New canes should be planted elsewhere.

Canes affected by cane blight in summer will wilt, snap off easily and die. If fruiting spurs become blighted, cut out and burn affected canes. Spray new canes with bordeaux mixture.

Cut out and burn canes badly affected by cane spot and prevent it by spraying with liquid copper or thiram at bud burst and

pre-blossom time, or with benomyl every two weeks from bud burst to petal fall.

Spur blight causes dark purple blotches around the buds and shoots wither in early spring. Cut out and burn affected canes. Spray new canes when they are a few inches high with benomyl, thiram or captan repeating two, four and six weeks later.

Prevent gray mold (*Botrytis*) on ripening fruit by spraying three times with benomyl at flowering and at two week intervals. Remove and destroy infected fruits.

Selecting healthy plants

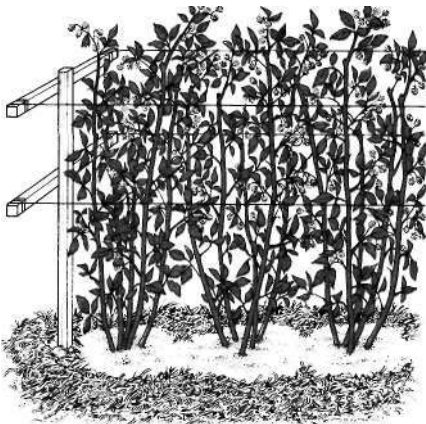
It is important to buy only certified stock, wherever possible, to ensure the plants are virus-free and healthy. Healthy plants should last at least ten years before starting to degenerate from virus infection. When this occurs, remove the plants and start a new row in soil that has not grown raspberries or other *Rubus* species before. Alternatively, re-soil over an area 2 ft wide by 1 ft deep.

should be picked as soon as ripe and, if necessary, every day. The fall crops can be quite heavy.

The cultural requirements (soil preparation, planting, spacing, initial pruning and feeding) are the same as for the summer-bearing kind. Use the parallel wire method of support described on page 25. The fruits are produced when the weather is becoming cooler, so they are best planted in the sunniest position possible, otherwise too few raspberries may ripen before the first frosts arrive.

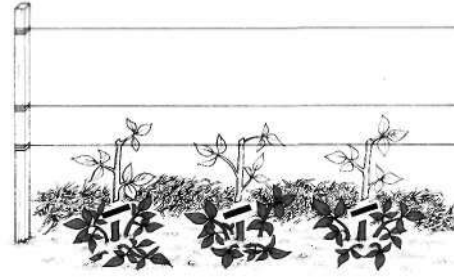
Pruning established plants Such ever-bearers do not produce a large spring crop. It is better to grow them for fall use only and to put in standard varieties for summer use. Each February cut down all canes in the row to ground level. In the following spring, new canes are produced which crop in the fall. As the canes are not in the row for more than a year, it is not necessary to thin them unless they are particularly crowded. Pull out any which are growing away from the row.

EVER-BEARING RASPBERRIES



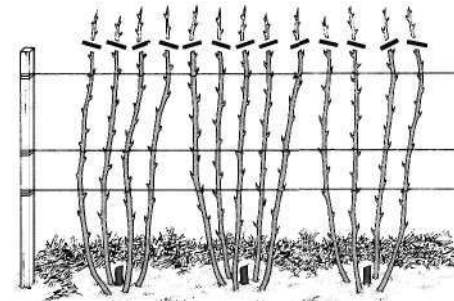
Ever-bearing raspberries bear their fruit on the top part of the current season's canes, extending back from the top over 12 in or more, depending upon the variety. The fruits ripen in early summer a little ahead of standard varieties and again from the beginning of September until stopped by the fall frosts. Ever-bearing raspberries

The first year

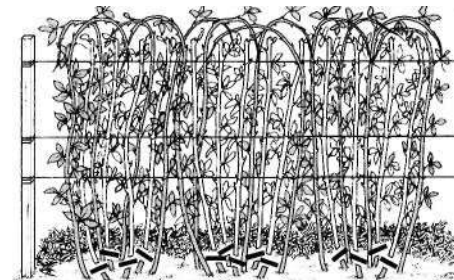


1 In spring, when the new canes appear, cut down the old stumps to ground level.

Second and subsequent years



3 In March, cut the canes to a bud 6 in above the top wire. Mulch the plants



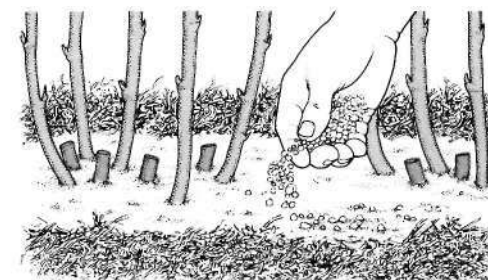
5 When fruiting is over, cut the fruited canes down to ground level. Tie in new canes 4 in apart. If growth is vigorous loop the new canes over to form a series of arches.



2 In June to September, as new canes develop, tie them 4 in apart on to the wires.



4 In midsummer, fruit is carried on laterals from last year's canes. Thin out the weakest new growth to leave strong canes 4 in apart. Pull out new shoots growing away from the row.



6 Each year in early spring, apply 1 oz of sulfate of potash per square yard as a top dressing 18 in each side of the row. Every third year apply 2 oz superphosphate per square yard.

Raspberries 4

Black and purple raspberries are generally known under the name of black raspberry, just as red and yellow raspberries are usually known as red raspberries. They are also closely related to the reds, although they are larger and more productive and greatly tolerant of heat, although less resistant to cold.

Plants with black berries, which are also called blackcaps, ripen earlier than those with purple berries, but purple berries have bigger fruit with a more distinctive flavor. The berries are not as juicy as red raspberries and are used primarily to make appetizing jams and jellies.

Both the black and the purple raspberry grow in zones 4-8.

Culture

Black and purple raspberries are somewhat more susceptible to disease than red raspberries and a little more care should be taken in finding a site for them. Do not plant for several years in soil in which potatoes,

tomatoes, peppers, eggplants or a previous crop of raspberries have been grown; and be sure to plant 300—400ft away from all wild brambles and cultivated red and yellow raspberries.

The soil, moisture and fertilization requirements of black raspberries are essentially similar to those needed by the red raspberry.

Propagation

Black and purple raspberries are reproduced by inserting the tips of young canes into the soil to a depth of 4-6 in. Left to their own devices, plants tip-layer themselves but do not produce such good plants as can the gardener. The best time to do this is in midsummer in loose soil with ample moisture.

The plants should be well rooted by late fall and ready for transplanting to the garden in early spring. Cut off the old stem at the ground as soon as new growth starts.

Training and pruning

The plants are best grown in a double-

fence system similar to that used for red raspberries. If the soil holds moisture well, set the plants 3 ft apart and 1 in deeper than they previously grew. In drier soils, increase spacing between plants to as much as 6 ft.

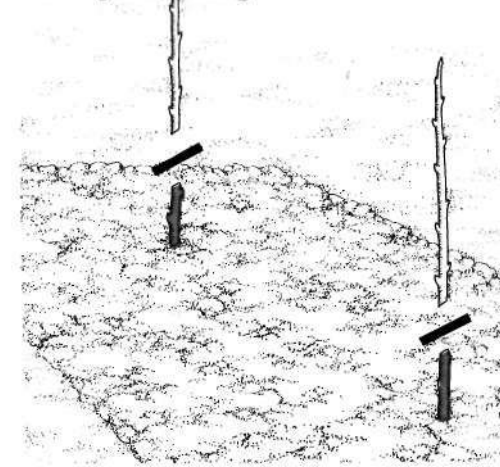
No pruning is necessary in the first year. Thereafter, in late winter or early spring, cut off all weak canes at the ground, leaving 4-6 good canes per plant. Remove weak and dead laterals, and trim back the remaining laterals on black varieties to 6-8 in; on purple varieties to 10 in. Then in early summer, before berries start to ripen, nip about 3 in off the ends of the upright canes to force the growth of the laterals.

Finally, as soon as all fruit has been picked, prune out all the canes that bore fruit to give more light and room to the new canes. Burn all prunings promptly.

Harvesting

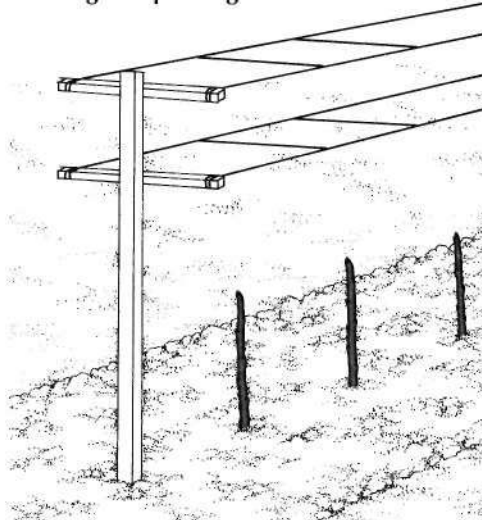
Black raspberries deteriorate more slowly than reds so it is not necessary to pick them so frequently.

Planting and spacing

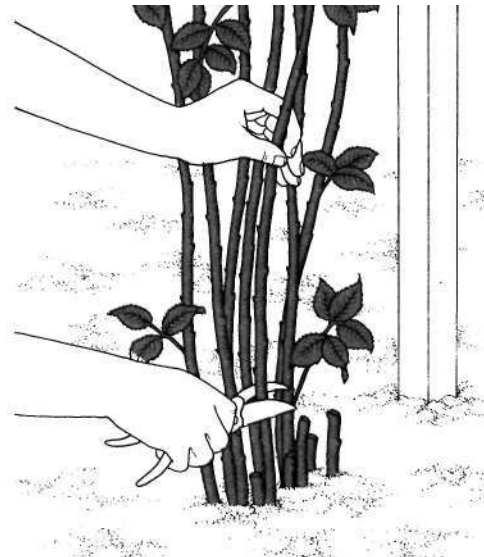


In spring, place medium-length canes 4ft apart in rows 6 ft apart. Do not plant deeply. Cut the canes down to 6 in above the ground.

Training and pruning



1 Fix two parallel wires between T-shaped supports 5 ft high. The wires should be 18 in apart. Place the canes between the wires.

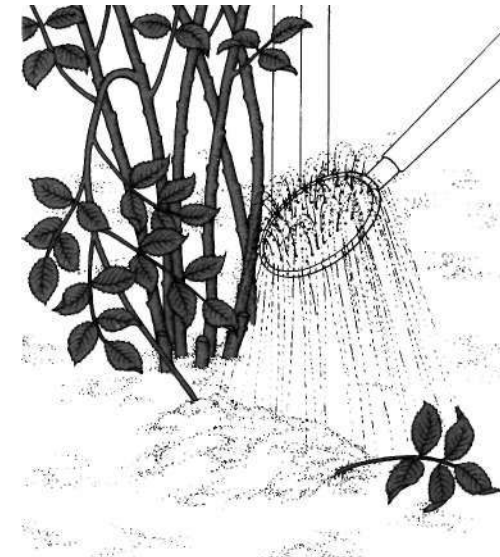


2 After first year, in late winter or early spring, cut off all weak canes at the ground, leaving 4-6 good canes per plant. Remove weak and dead laterals and trim back the remaining laterals.

Propagation



1 In midsummer, dig a hole 4-6 in deep near the mature raspberries in loose soil with ample moisture. Insert the tip of a young cane into the bottom of the hole and fix with a staple.



2 Fill in the hole, tamp down the soil, and water well. When the tip has rooted, sever from the parent plant with 10 in of stem and plant out.

Blackberries 1

The blackberry is a rambling cane fruit found growing wild in many milder parts of the United States. The canes are of arching habit, thick, strong and often aggressively thorned, although there are good thornless cultivated varieties. The plants are usually deciduous, but not always so in mild winters. They grow in zones 5-8.

A good average yield from a well-established blackberry plant is 10-30 lb of fruit, depending upon the size of the plant and the variety.

Cultivation

Cultivated blackberries are much larger and more luscious than wild varieties. They need little preventive spraying and can be planted in a spare corner of the garden to which their wide-spreading roots should be confined.

Soil and situation Blackberries grow in a wide range of soils and will tolerate slightly impeded drainage. If thin dry soils cannot be avoided, improve their moisture retentiveness and fertility with bulky organics.

Blackberries flower relatively late, from May onwards, and bloom over a long period, and so frost is seldom a problem. They are among the few fruits that can be successfully grown in a frost pocket, although this should be avoided if possible. They will also tolerate partial shade but fare better in full sun. Because of their rambling habit, they need some support.

Planting Prepare the ground in the fall. Fork out perennial weeds. Then, if the ground is poor, apply a 2-3 in deep layer of well-rotted manure, compost or peat over an area 2-2 1/2 ft square at each planting site and dig it in thoroughly. Rate in 3 oz of a balanced fertilizer such as 10-10-10 over the same area.

Plant while dormant in early spring. Young plants, in the form of rooted tips or one-year-old bedded tips, can be obtained from a nursery. Using a hand trowel or fork, dig a hole wide and deep enough to take the roots spread out well. Plant the canes to the nursery depth. After planting, firm the soil and then cut down each cane to a bud at about 10 in above the ground.

Spacing Plant the canes 4 ft apart in rows 6 ft apart. One plant is often sufficient.

Support Support is generally necessary to

keep the canes off the ground for easy picking and to keep the plants tidy. Individual plants can either be tied to sturdy stakes, or a wire fence trellis can be erected with wires every 12 in between 3 and 6 ft. Erect the wires before planting the canes.

Training The fruiting canes should be trained to keep them separate from the young replacement canes to facilitate picking and to reduce the risk of the spread of fungal diseases from the old to the new.

The three methods commonly used are the fan, weaving, and rope system trained one way. The fan is best reserved for less vigorous berries. The weaving system takes full advantage of the long canes of vigorous kinds but there is much handling at pruning time. The one-way system keeps handling to a minimum, but wastes space because young rods are trained along the wires only to one side of the plant. These fruit the following year. When new rods appear they are trained in the opposite direction.

Initial pruning In the first summer after planting, a number of young canes should spring up from the root system. Tie these securely to the lower wires in a weaving fashion. In the second summer these canes should flower and fruit. At the same time new growth springs from the base of the plant. This young growth should be secured and trained in the adopted method.

When fruiting is over, untie the old canes and cut them down to ground level. With the fan and weaving systems the young canes are then trained in to take their place. With the one-way system, the young canes are already tied in. The young growth will fruit in the next year, and so the cycle is repeated.

Subsequent pruning Pruning in the third and subsequent years consists of cutting out the canes that have fruited and replacing them with the new canes. If the replacement canes are few, the best of the old canes can be used again, but the older growth does not yield the best quality berries. Each April cut back any winter-damaged tips to a healthy bud.

Feeding and watering In early spring apply 2oz of a balanced fertilizer such as 10-10-10 as a top dressing over one square yard around the base of each plant.

A little later, mulch with a 2in layer of garden compost, peat or manure, keeping the material just clear of the canes. In dry weather water the plants but, to minimize the risk of fungal troubles, avoid the canes.

Pollination

All varieties are self-compatible and only one plant is needed.

Harvesting

Blackberries are ready for picking when they are black, plump and sweet. Some varieties turn black before they are fully ripe. Pick all fruit when it is ripe even if not required, because this helps the later fruit to achieve a good size.

Pests and diseases

Blackberries are prone to the same pests and diseases as raspberries (see pages 24-27).

OTHER BERRIES

Boysenberries, dewberries, loganberries and youngberries are all closely related to the blackberry and red raspberry, but generally grow much larger and are of trailing habit. They grow only in warm climates, usually to zone 8, but sometimes to zone 7. All are

available in thorny and thornless varieties.

Boysenberries have very large reddish-black fruits with a dusty bloom. They are soft, tartly sweet and have a delicious aroma.

Loganberries have light reddish fruits covered with fine hairs. They are tarter than boysenberries.

Youngberries are very similar to boysenberries, but the fruits are shiny and a little sweeter.

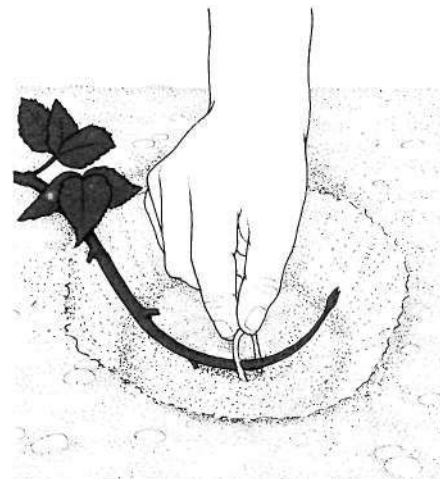
Dewberries are somewhat hardier and have sweet black berries sometimes measuring 1 1/2 in long. They ripen a week or so earlier than blackberries. 'Lucretia' is generally considered the best variety.

Culture

All of these plants have the same requirements as blackberries. Because the canes run to great length, they should be trained on a trellis. Cut out those that have fruited after harvest in August. Cut back new canes, growing on the trellis, to 6-8ft and remove all but 12-16 of the canes. Early the following spring, cut the laterals to 1 ft.

In areas where the plants are marginally hardy, remove the canes from the trellis in the fall and cover with straw. This should be some protection from frost.

PROPAGATION



Blackberries (like black raspberries) are propagated by tip-rooting. The new canes are tip-rooted in August and September. A 6 in hole is dug with a trowel near the plant, and the tip of a young cane is bent down into it. The soil is then replaced and firmed. As new canes are produced, more tips can be buried. In the following spring, the rooted tips are severed from the parent plant with about 10 in of stem, and then dug up and planted out in a new position. A few varieties produce suckers, which should be lifted with as much root as possible and planted out in the new bed.

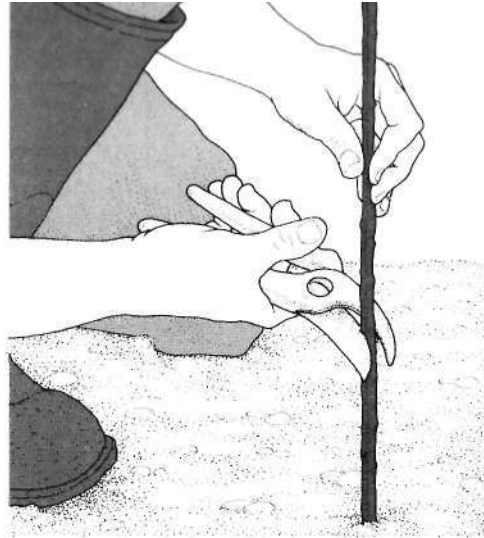
Another method is by leaf bud cuttings taken in July and August and rooted in a cold frame. This method is useful for rapid propagation when stock is limited, and when there are other growing restrictions.

Blackberries 2

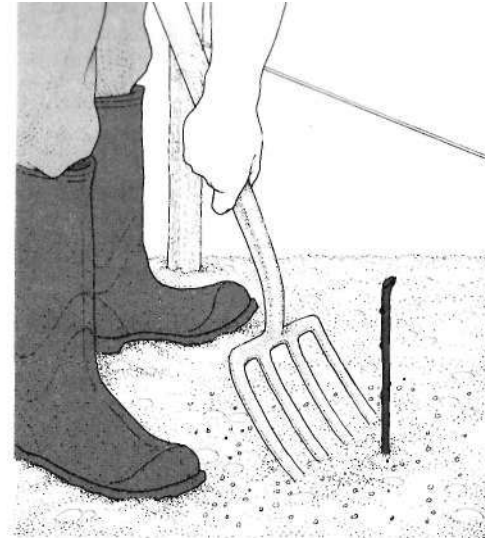
Cultivation



1 In fall, clear the ground of perennial weeds. If the ground is poor, dig in a 2-3 in layer of well-rotted manure over an area 2-2½-ft square. Fork in 2 oz of balanced fertilizer over the same area.



2 In early spring, dig a hole to take the plant with the roots spread out well. Plant to the same depth as it was at the nursery. Firm the soil and cut the cane to a bud 10 in above the ground.

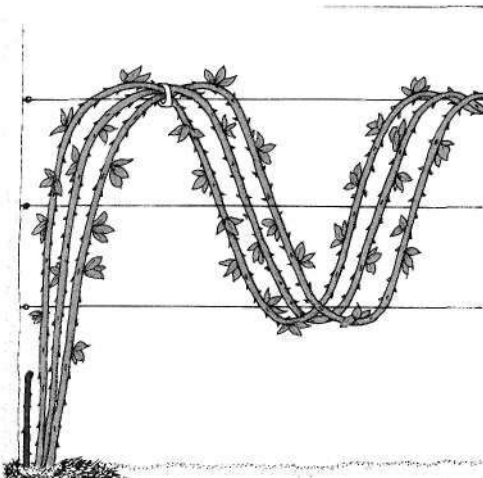


3 Fork in 3 oz of a balanced fertilizer such as 10-10-10 per square yard around the base of each plant.



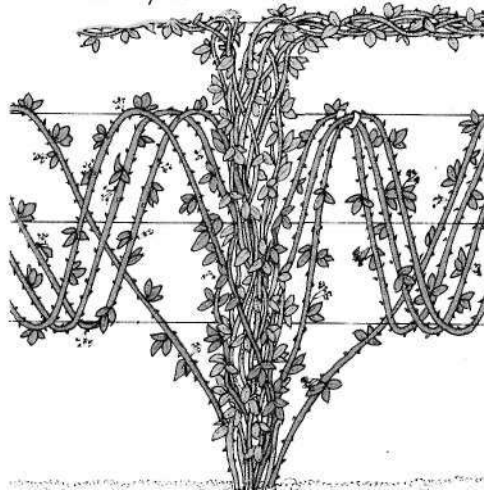
4 Later, apply a 2 in layer of garden compost keeping it just clear of the canes. During dry weather, water the plants but keep the water off the canes.

Weaving system

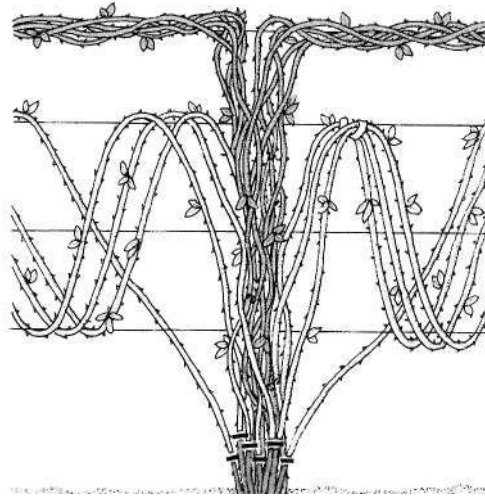


1 In summer, as the young canes appear, tie them to a strong wire support. Weave them in and out of the bottom three wires.

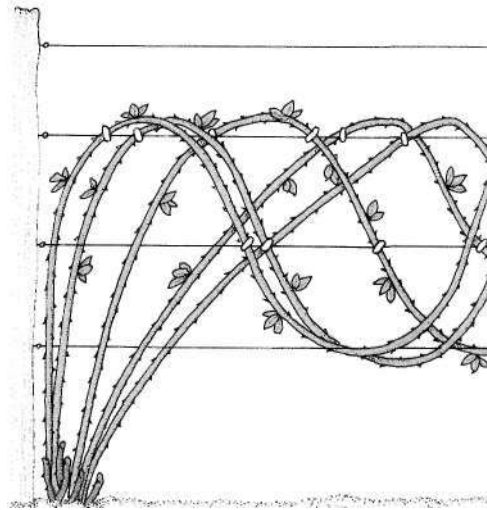
The second year



2 In summer, train the new canes up through the center of the bush and along the top wire. Fruit is carried on laterals of last year's canes.



3 After fruiting, cut out all fruited canes to base. If there are few new canes, retain the best of the old.



4 At the same time, untie the current season's canes and weave them round the lower three wires. In fall, remove the weak tips from the young canes.

Black currants 1

The black currant (*Ribes nigrum*) is a native of central and eastern Europe from Scandinavia to Bulgaria, also northern and central Asia to the Himalayas. It can be found growing wild, generally in damp woody places.

Selection in cultivation has given rise to stronger-growing and highly productive varieties. Black currants are grown on a stool system—that is, many shoots spring from below the ground rather than from a single stem. A well-grown black currant bush may reach 5-6 ft in height and spread and should last 15 years or more before it needs to be replaced. A good average yield from an established black currant is about 10-12 lb.

Cultivation

The black currant is an alternate host for white pine blister rust, a serious pest that kills those trees. Many of the states in which white pine grows forbid the planting of black currants because of the adverse effect on white pine.

Therefore, any gardener considering planting such fruit should first check with the state agricultural extension service or forestry department before ordering. Some nurseries will be able to advise if restrictions exist.

The black currant is the worst of the several alternate host plants of white pine blister rust. Consequently, black currants are difficult to find in American nurseries and only one variety, 'Boskoop Giant', is commonly offered by those nurseries that sell black currants.

Soil and situation Black currants can be grown in a wide range of soils. Ideally it should be slightly acid (about pH 6.5), highly fertile, moisture-retentive and well-drained, although black currants will tolerate slightly impeded drainage. Light soils need plenty of bulky organics. Excessively acid soils should be limed to bring the pH up to 6.5.

The site should be frost-free and sheltered from strong winds so that pollinating insects such as bees are not inhibited. Most varieties bloom early in the spring and the flowers are extremely vulnerable to frost. In frost-prone areas, plant late-flowering or more frost-tolerant varieties and cover the plants on frosty nights. Black currants will tolerate partial shade but prefer a sunny position.

Preparing the soil Prepare the ground in early fall, clearing away all weeds. Apply a 3 in layer of manure or compost over the whole area. If manure and compost are not available, apply a 2 in layer of peat with bonemeal at 3 oz per square yard. If the ground is fairly clean single dig the materials in, but if rough and weedy double dig the area. Rake in a balanced fertilizer such as 10-10-10 at the rate of 3 oz per square yard.

Planting and spacing Buy two-year-old certified bushes. Select plants with not less than three strong shoots.

Plant during dormancy in early spring. Space bushes 5 ft apart in the row (6 ft apart for more vigorous varieties), with 6 ft between rows.

Dig out a hole wide enough to take the roots spread out well. To encourage a strong stool system plant bushes about 2 in deeper than they were in the nursery—the soil mark on the stems gives an indication. Fill in the hole and firm.

Initial pruning After planting, cut all shoots to within 2 in of soil level. This encourages the production of strong young shoots from the base, and creates a good stool system for heavy cropping in the future, although it means foregoing a crop in the first summer. If the plants are certified free of disease, the pruned shoots may be used as cuttings. They root easily, so buy only half the number of bushes required and fill the vacant positions with two to three cuttings to each station.

After the hard initial pruning the young bush should produce three or four strong shoots from the base, each shoot being 18 in or more in length. If growth is poor, they should be cut down again in the winter. Assuming a strong bush has been formed, no pruning is required at the end of the first year; the young shoots are left to fruit in the following summer.

Pruning an established bush Black currants bear the best fruit on the wood produced in the previous summer, although they also crop on the older wood. Prune in early fall or at any time in the dormant season until early April.

The objective with an established bush is to stimulate a constant succession of strong young shoots to carry fruit in the next season

by fairly hard-pruning, cutting at or as near the base as possible, and by heavy feeding.

It is important to be able to distinguish the young wood from the old. This is fairly easy because the bark of the young shoots is much lighter in color than that of three years old or more.

There is no need to limit the number of main branches nor to have the center open. However, about a quarter to a third of the oldest wood should be removed annually. Cut back to a strong young shoot at or near the base or, if there is none, cut out the branch altogether.

Remove any thin mildewed shoots including those suffering from die-back in the center. Leave a working space between one bush and the next.

Feeding and watering Black currants thrive on heavy manuring and high summer moisture. Each March apply a balanced fertilizer such as 10-10-10 over the whole plantation at 3 oz per square yard. Additionally, in April apply sulfate of ammonia at 1 oz per square yard; on acid soils apply an artificial fertilizer containing calcium carbonate and ammonium nitrate. Follow this with a 3 in thick mulch of manure or compost around each bush.

In dry weather apply 4 1/2 gal of water per square yard every ten days, but keep the water off the stems as much as possible to lessen the risk of fungal trouble.

Weed control The bushes are shallow-rooted. Do not dig around the plant but keep the weeds down by shallow hoeing or by hand weeding or by using herbicides.

Pollination

Black currants are self-compatible and are pollinated mainly by bees.

Frost and bird protection

The flowers are extremely vulnerable to spring frosts which cause the fruitlets to drop. On nights when frosts are likely, drape the bushes with burlap or a few layers of bird netting (see pages 6-7); remove the cover in the mornings. Net the fruits against birds when the first fruits begin to color.

Harvesting

Pick selectively when the currants ripen but

before they begin to fall or shrivel.

Pests and diseases

The most serious pests of black currants are aphids, the black currant gall mite, and red spider mite. Use a systemic insecticide against aphids, benomyl for gall mite, and malathion, dimethoate or derris to control red spider mite.

Of the diseases, the most troublesome are reversion disease, gooseberry mildew, leaf spot and botrytis. Bushes affected by reversion should be dug up and burned. Mildew can be controlled by regular spraying with benomyl; this will also control leaf spot. Alternative fungicides are zineb or thiram. For botrytis use benomyl at flowering time.

PROPAGATION



Black currants are propagated from cuttings 8-10 in long and about a pencil's width thick, from well-budded healthy wood of the current year's growth. Take the cuttings in October or November. Make a sloping cut just above a bud at the top and a straight cut just below a bud at the base. Insert the cuttings deeply with only two buds showing above the surface in well-drained light soil. Space the cuttings 6 in apart and firm them in the row.

At the end of the first growing season dig up and plant the rooted cuttings 12 in apart. Cut them down to within 1 in of the ground. This hard pruning should create a stooled bush.

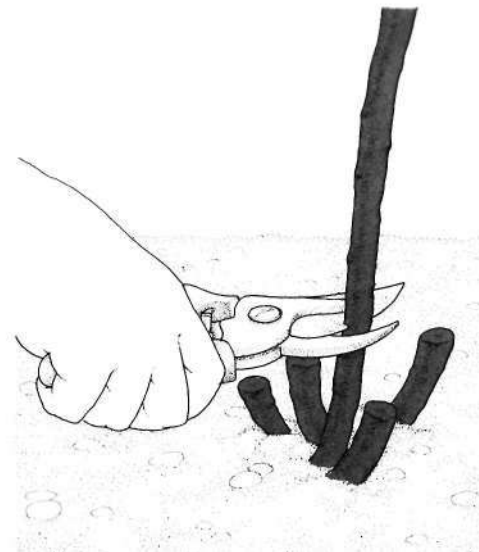
Black currants 2



1 In early spring, clear the ground of weeds. Dig in a 3 in layer of manure or compost. Rake in a balanced fertilizer such as 10-10-10 at 3 oz per square yard.

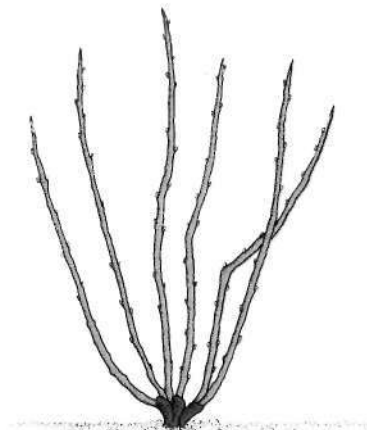


2 Dig a hole wide and deep enough to take the roots spread out well. Plant the bush 2 in deeper than it was at the nursery. Fill in the hole and firm the soil.



3 After planting, cut down all shoots to within 2 in of soil level.

The second year



4 In the fall, the severe pruning has resulted in strong new shoots appearing from the base. These will fruit the following year. No pruning is required.

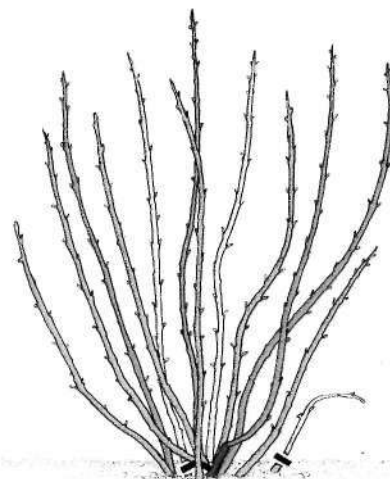


5 In March, apply a balanced fertilizer such as 10-10-10 at 3 oz per square yard. A month later, apply 1 oz sulfate of ammonia per square yard



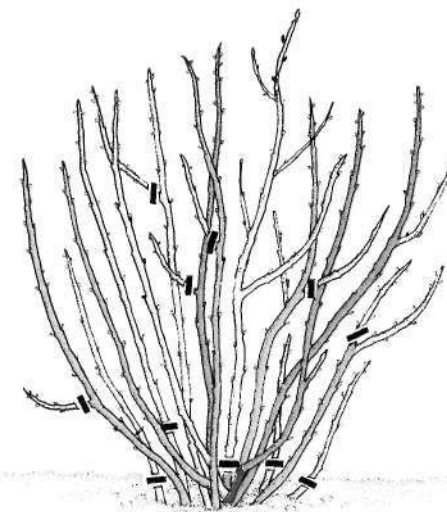
6 In July, the bush fruits best on last year's wood. New basal growths develop.

The third year



7 In winter, thin out weak shoots and any branches that are too low, broken or mildewed.

In subsequent years



8 Every winter, remove about one-third of the bush. Cut out badly-placed, damaged wood. Cut back fruited branches to a strong shoot.

Red and white currants 1

Red and white currants are basically derived from two European species, *Ribes rubrum* and *R. spicatum*. Red currants sometimes occur as garden escapes from bird-sown seed and *R. rubrum* is also found naturalized in many areas.

Cultivation

The fruit buds are produced in clusters at the base of the one-year-old shoots and on short spurs on the older wood. Because of this fruiting habit there is a permanent framework of branches, unlike the black currant for which a succession of young wood is needed.

The red currant is usually grown as an open-centered bush on a 4-6 in stem or leg, rather like a miniature apple tree, with a height and spread of about 5-6 ft. This method of growth makes cultivation around the plant easier and keeps the fruit clear of the ground. The red currant is also grown as a single or multiple cordon, and, more rarely, as a standard or fan. A well-grown bush should yield at least 8-10 lb of fruit and a single cordon about 2-3 lb. Plants should bear well for at least ten years.

The smooth-skinned, glistening red berries are attractive and ideal for jelly, pies, juice and for wine making.

Red and white currants are, like black currants, alternate hosts to white pine blister rust, and so have planting restrictions in many states. The state agricultural extension service or forestry department should be consulted before ordering.

The white currant is a mutation or sport of the red currant and for cultural purposes is treated in exactly the same way. The berries, of somewhat milder flavor than the red, are also useful for jelly and for wine making.

Soil and situation Ideally, the soil should be neutral to slightly acid (about pH 6.7). Red and white currants are less tolerant of poor drainage than the black currant but, provided the soil is reasonably well drained and not deficient in potash, they are tolerant of a wide range of conditions.

The flowers of the red and white currants are hardier than those of the black currant, so it is a useful plant for north-facing walls and fences and for shaded areas, provided the soil is not dry and over-hanging trees do

not drip on the plants. They grow in zones , 3-8. A sunny position is best if the berries are to acquire their full flavor. The site should be sheltered but not a frost pocket.

Soil preparation Prepare the soil in the fall or late winter by clearing away all weeds. Apply a light dressing of well-rotted manure or compost about 1 1/2 in thick over the whole area. If farmyard manure or compost are not available, apply a 1 in layer of damp peat. If the ground is fairly clean, single dig the dressing in; but if weedy, double dig the area. Rake in a balanced fertilizer, such as 10-10-10, at the rate of 2 oz per square yard and sulfate of potash at 1/2 oz per yard.

Selection of plants Buy plants from a reliable source because certified stock is not available. One- or two-year-old bushes are usually supplied by the grower. Select a plant with a clear stem, or leg, of about 4-6 in with a head of about 3-6 evenly balanced shoots. The single (or multiple) cordon may be two or three years old and should consist of one (or more) straight stems with sideshoots.

Planting and spacing Plant during the dormant season in March or April, unless the plants are container-grown, when they can be planted at any time.

Space bushes 5 ft x 5 ft (5 ft x 6 ft on fertile land) and single cordons 15 in apart, or 12 in apart on light soils. Allow 12 in between each stem of a multiple cordon; for example, double cordons should be planted 24 in apart from the main stem at ground level. Cordons should be trained up a vertical cane for straight growth and support. If planting cordons in the open, before planting erect a wire fence with horizontal wires at 2 ft and 4 ft and tie canes to the wires at each planting station.

Next, take out a hole large enough to contain the roots well spread out, and plant the bush or cordon to the same depth as it was in the nursery. Fill in and firm the soil.

Feeding and watering Each March apply a balanced fertilizer, such as 10-10-10, over the whole planting at 2 oz per square yard and sulfate of potash at 1/2 oz per square yard. On light soils also apply a mulch of rotted manure, compost or peat 2 in thick around each bush. If manure, compost or peat are not available, apply sulfate of ammonia at 1 oz per square yard. Water copiously in dry weather.



1 In late winter, dig in a 1 1/2 in layer of well-rotted manure. Then, rake in a balanced fertilizer, such as 10-10-10, at 2 oz per square yard and sulfate of potash at 1/2 oz per square yard.



2 In early spring, dig a hole large enough to take the roots well spread out and plant the bush to the same depth as it was at the nursery. Delay planting if the ground is very wet or frozen.



3 Each March, apply 10-10-10 at 2 oz per square yard and sulfate of potash at 1/2 oz per square yard. On light soils also apply a 2 in mulch of rotted manure, compost or peat around each bush.



4 During the winter, protect the fruit buds with netting against attack by birds and frost at blossom time. Remove it during the day at flowering time.

Red and white currants 2

Pruning bush currants

The objective is to create a goblet-shaped bush with about 8-10 main branches growing upwards and outwards on a 4-6 in clear stem with an open center. Prune in the same way as the gooseberry bush (see pages 36-7) except that the leaders are pruned to outward-facing buds, unless the branches are drooping, when they are pruned to upward-facing buds.

Pruning the single cordon: initial pruning

On planting a one-year-old rooted cutting, shorten the central leader by about one-half to an outward-facing bud. Cut back all other laterals to about 1 in at a bud, and remove any buds lower than 4 in to create a short clear stem. If planting an older pre-shaped cordon, shorten the leader by one-third and prune maiden laterals to one bud.

In late June to early July cut back the current season's side-shoots to 4-5 leaves. Tie the leader to the cane as and when necessary throughout the growing season, but do not prune it.

The first year: Cordon

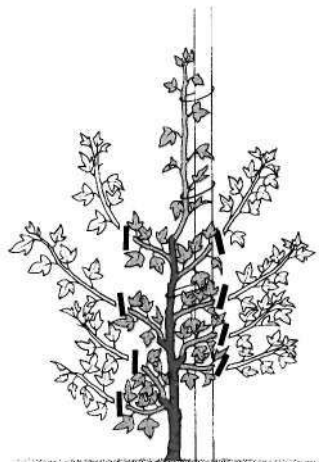


1 In winter, when planting a one-year-old shorten the central leader by about one-half to an outward-facing bud. Cut back all laterals to 1 in at a bud and remove any lower than 4 in.

Second and subsequent years A cordon is pruned in much the same way as a bush. Each summer at the end of June or early in July prune the current season's side-shoots to 4-5 leaves. Do not carry out summer pruning earlier than this or secondary growth may be stimulated. The leader is trained and tied to the cane, but not pruned in the summer until it has reached the required height, usually about 5-6 ft. From then on it is summer-pruned to 4-5 leaves.

Each winter, cut all the previously summer-pruned laterals to about 1 in at a bud. Prune the leader to a bud leaving 6 in of new growth. Once the leader has reached the required height, it is also pruned to leave one bud of the previous summer's growth. This helps to maintain the cordon at approximately the same height for some years.

Multiple cordons, such as the double- and triple-stemmed cordon, are pruned in exactly the same way as the single, except that in the early formative years suitably low placed laterals are used to form the main stems of each goblet-shaped bush.



2 From late June to early July, cut back the current season's side-shoots to 4-5 leaves. Tie the leader to the cane as it extends but do not prune it.

Weed control

Red and white currants are shallow rooted. Do not dig around the plants but keep the weeds down by shallow hoeing or by using herbicides.

Pollination

Red currants are self-fertile and insect pollinated, so pollination is not a problem.

Frost and bird protection

Red and white currant flowers are fairly hardy, although they will not tolerate hard frosts. Cover them with burlap or two or three layers of bird netting on frosty nights.

The berries are extremely attractive to birds in the summer, as are the fruit buds in the winter. Net the bushes in the winter and at fruit ripening time. Remove the netting at flowering time, because it inhibits insect pollination.

Harvesting

Red and white currants are ripe in July or August and should be picked as soon as they

are clear in color. Pick whole clusters to avoid injury to the delicate fruit.

Propagation

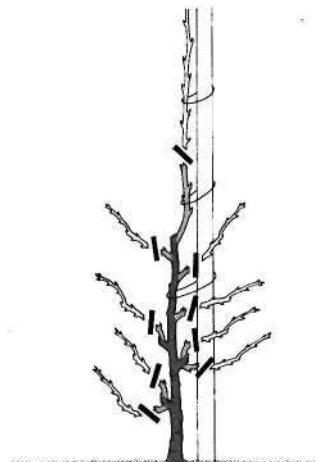
Propagate new red and white currant plants in the fall from hardwood cuttings, which should be 12 in long or more. Before planting the cuttings, remove all the buds except the top three or four. Insert into the soil with the third bud within 2 in of the soil surface and label the cuttings. After they have rooted (in about a year's time) plant out the cuttings. This method produces rooted cuttings with four good branches and a short leg.

Pests and diseases

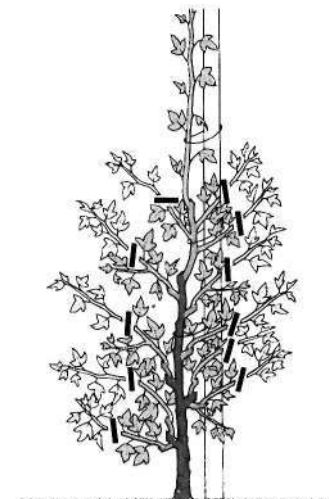
The most serious pests are aphids and, to a lesser extent, sawflies and currant fruit flies. Control aphids with a systemic insecticide rotenone.

Occasionally anthracnose and cane blight can be troublesome. Early season sprays of ferbam give satisfactory control of anthracnose. If the canes are blighted, cut back to healthy wood and burn the prunings.

Second and subsequent years

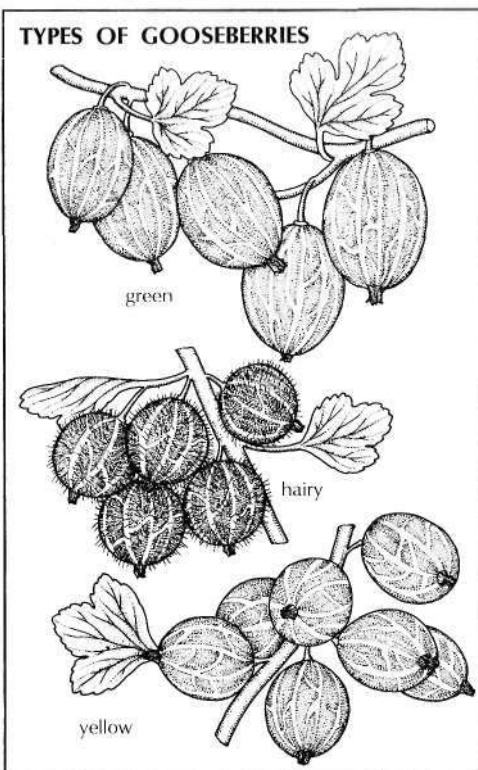


3 In winter, prune the leader to a bud leaving 6 in of new growth. Cut all previously summer-pruned laterals to 1 in at a bud. In later years, cut the leader back to one bud.



4 From late June to early July, prune the current season's side-shoots to 4-5 leaves. Tie the leader to the cane as it extends.

Gooseberries 1



The gooseberry (*Ribes uva-crispa*) is a deciduous thorny shrub growing in zones 3-8.

Like the red currant, the gooseberry bears its fruit on spurs on the older wood and at the base of the previous summer's lateral growth. For this reason it is grown with a permanent framework of branches, usually in the form of an open-centered bush on a short stem, or led, of about 4-6 in. It is also widely grown as a cordon in single or multiple form and occasionally as a standard on a 3 1/2 ft stem or as a fan.

The fruits may be smooth or hairy, yellow, white, green or red according to variety.

A well-grown bush should reach a height and spread of 5 ft and crop well for 12 years or more. A good average yield from a bush is 5-6 lb, and from a cordon 1-2 lb.

Like currants, gooseberries are alternate hosts of white pine blister rust and can be planted only in areas where this disease is not a problem. The local state agricultural extension service or forestry department should be contacted before ordering plants.

Cultivation

One-, two-, or three-year-old bushes can be bought from a grower. A one-year-old bush should have about 3-5 shoots evenly placed

around the stem, a two-year-old about 5-7 and a three-year-old 6-8 primary and secondary branches. Gooseberries are self-fertile, so they can be planted singly.

Soil and situation The soil requirements of the gooseberry are similar to those of the red currant. The soil should not be allowed to become potash-deficient. The plant tolerates a little impeded drainage, provided it occurs below 18 in. The ideal soil, however, is a slightly acid (pH 6.7), well-drained medium loam.

The gooseberry is tolerant of cool, partial shade, but grows best in an open sunny site, which should be sheltered against strong winds, especially at flowering time in early April. Do not plant it in a frost pocket.

Soil preparation Prepare the soil in the fall or late winter. It is essential to eliminate perennial weeds because the gooseberry is thorny and not easy to weed around. On light soils, dig in a 1 1/2-2 in layer of well-rotted manure or compost over the whole area. On rich soils there is less need for bulky organics because too much of them encourages soft growth, which is prone to snapping and to mildew. Rake in a balanced fertilizer such as 10-10-10 at 2 oz per square yard and sulfate of potash at 1/2 oz per square yard.

Planting and spacing Plant during the dormant season in March or April, preferably when the soil is warm.

Dig a hole wide and deep enough to contain the root system with the roots well spread out. Before planting, clean off any suckers at the base of the plants and any shoots too near the ground, then plant it to leave a clear stem of 4-6 in. Fill in the hole and firm the soil.

Space the bushes 5 ft apart, or on highly fertile ground 5 ft by 6 ft apart, and single cordons 1 ft apart. Allow 1 ft space for each stem of a multiple cordon. For straight growth and support, train a cordon up a cane. If growing cordons in the open, erect a wire fence with horizontal wires at 2 ft and 4 ft and tie the canes to it.

Feeding and watering Each March apply a balanced fertilizer such as 10-10-10 over the whole plot at 2 oz per square yard and sulfate of potash at 1/2 oz per square yard. Mulch around the base of the plant with a 2 in layer of well-rotted manure, compost or peat on light soils, but less on medium or fertile soils. In the absence of bulky organics apply sulfate of ammonia at 1 oz per square yard.

Water copiously in dry weather but do not water irregularly or heavily at the ripening stage because this causes the fruit to split.



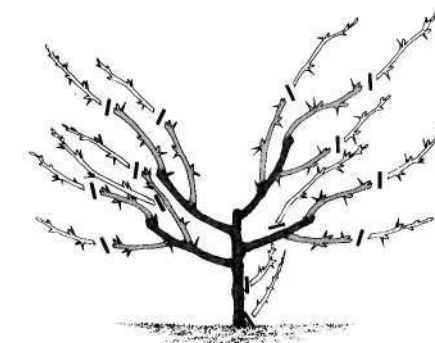
1 Clear the soil of perennial weeds. Rake in a balanced fertilizer such as 10-10-10 at 2 oz per square yard and sulfate of potash at 1/2 oz per square yard.



2 In early spring, dig a hole wide and deep enough to take the roots spread out well. Plant the bush so that there is a clear stem of 4-6 in above ground.



3 At the same time, cut back each framework branch by one-half to an inward- and upward-pointing bud. Clean off the suckers at the base and any shoots too near the ground.



4 In winter, shorten the leaders by one-half to inward- and upward-facing buds. Select well-placed shoots to form further permanent branches and cut back by one-half. Remove suckers and low stems.

Gooseberries 2

Formative pruning: Bush

Most varieties have a tendency to form drooping growth and, in order to maintain an erect bush, counteract this habit by pruning the leaders to inward- or upward-facing buds or back to upright laterals. The center of the plant is kept open to make picking and spraying easier, to ripen the wood and fruits, and to improve air circulation (which lessens the risk of mildew).

When planting a one-year-old bush, cut back each framework branch by one-half to an outward-facing bud if the shoot is upright. Cut back to an inward-facing bud if the shoot is weeping.

The second year (or a two-year-old bush)

In late winter, shorten the leaders by one-half. Select well-placed shoots to form further permanent branches and cut back by one-half. Remove any suckers or low-growing shoots growing from the stem.

The third year (or a three-year-old bush)

The bush should have developed a main framework of about 6-8 branches with well-spaced leading shoots; it is at the start of its cropping life. In winter, shorten the leaders by one-half to a bud facing in the required growth direction. Cut out shoots crowding the center and shorten those not required

In the framework to about 2in. thereafter, prune the bush both in the summer and in the winter.

Pruning an established bush

Each summer, in late June to early July, prune all laterals (that is, the current season's growth) back to five leaves. This opens up the bush and removes any mildew and aphids at the tips of the shoots. Do not prune gooseberries earlier because this might induce secondary growth. Do not prune the leaders unless they are affected by aphids or mildew.

Each winter, cut back the leaders by one-half to a bud facing in the required direction. If the branch is weeping badly and there is a suitably placed upright lateral on it, then cut back to this.

Next deal with the laterals that were pruned the previous summer. Where smaller quantities of large high-quality dessert fruits are required, cut all of these laterals back to about two buds. Where a large amount of fruit is required, pruning should be moderated accordingly. Vigorous varieties should be pruned less severely because this could encourage excessive growth. Cut out dead and diseased wood, and any growth crowding the center of the bush.

As the bushes become older and branches less productive or too spreading, leave in some suitably placed strong, young shoots to replace the old which are then cut out.

The third year

Pruning a single cordon Prune in the same way as the red currant cordon (see page 33).

Weed control

As with most bush fruits, the gooseberry is shallow rooted. Keep the weeds down by light hoeing or with herbicides.

Protection against frost and birds

The gooseberry flowers early, during April, and spring frosts can substantially reduce the crop. On frosty nights protect the plants when they are in flower. Cover with burlap or two or three layers of bird netting, but remove it during the day to allow in light and give access for pollinating insects.

The fruit buds are attractive to bullfinches and sparrows in the winter and the ripening fruits to blackbirds and thrushes in the summer. Net the bushes in the winter and when the fruits begin to ripen. For further information on netting against birds, see under separate headings (page 17).

Thinning and harvesting the fruits

For large dessert fruits start thinning the fruits in June, removing every other one, and use the thinnings for cooking.

For small or medium dessert fruits, do not thin the fruits but leave them to ripen and develop their full flavor. Pick gooseberries for cooking when they are a good size, but still green, from late June.

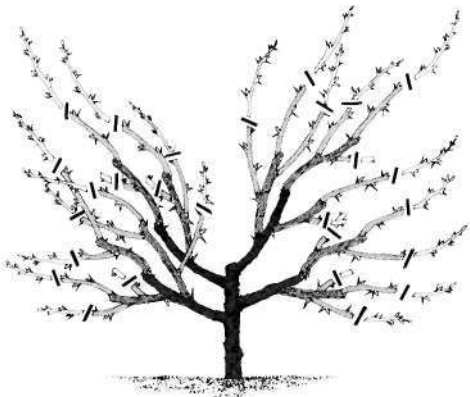
Propagation

Propagate gooseberries using 12 in hardwood cuttings taken from healthy shoots in late September. First remove the weak tip and all but four buds from the upper part of the cutting. This produces a miniature, open-centered bush on a short leg. Dip the base of the cuttings in a hormone rooting powder. Insert the cuttings in the open ground with their lowest buds 2 in above the soil surface. Leave the cuttings in the nursery bed for the growing season. Lift and replant, exposing more of the stem.

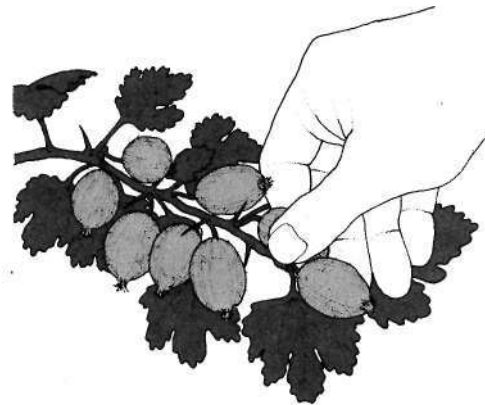
Pests and diseases

The pests and diseases that plague the gooseberry are similar to those that attack the currants. For example, aphids and anthracnose (see page 33).

The third year

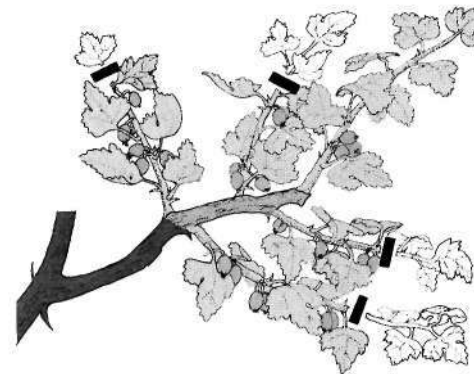


5 In winter, shorten the leaders by one-half to a bud facing in the required growth direction. Cut out shoots crowding the center. Shorten laterals not required for the framework to about 2 in.

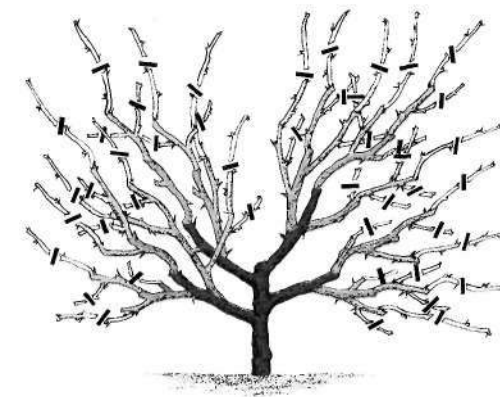


6 When the fruits are large enough for cooking, thin the fruits by removing every other one. Cover the bush with burlap or bird netting to protect the fruits from birds.

The established bush



1 In late June to early July, prune all the laterals produced that season to five leaves. This opens up the bush and removes aphids at the tips of the shoots. Do not prune the leaders.



2 In winter, cut back the leaders by one-half. Cut back laterals pruned in the previous summer to about two buds. Cut out diseased and dead wood and growth that crowds the center.

Grapes 1

The art of growing grapes, or viticulture, has a long and illustrious history. The vine grows wild in the temperate regions of North America, western Asia, southern Europe and parts of North Africa and it is thought to have originated in Asia Minor.

The vine is a perennial deciduous climber that clings to supports by tendrils. The leaves are hand- or heart-shaped and 4-8 in in size.

The grapes most commonly grown by home gardeners in the northern part of the United States are the so-called American, or bunch, grapes, descendants of wild grapes. The blue, black, green, red and yellow berries usually have slip-skins (separable from the pulp) and ripen from mid-summer on. They are largely self-fruitful. Although American bunch grapes can be grown from zones 3-10, they do best in zones 5-7.

Muscadine grapes are generally grown in the South (zones 7-9). These form much larger vines up to 90ft long and produce fruits singly or in loose clusters. Several self-fruitful varieties are available but most varieties are self-unfruitful. Since the fruit of self-fruitful varieties is inferior to that of the self-unfruitful varieties, self-fruitful varieties are best used to pollinate the self-unfruitful varieties.

Vinifera, or wine, grapes are descended from European grapes and are best employed in wine-making. A number of varieties, all with skins inseparable from the pulp, are eaten at table and are considered among the best grapes for this purpose. Some varieties are also used for raisins. All vinifera grapes are self-fruitful, producing berries in extremely large clusters. They grow best in California, but there are numerous hardy varieties that can be grown as far north as zone 6. There are also many new hybrid varieties resulting from crosses of American and vinifera grapes. These combine characteristics of the parents and are therefore difficult to classify.

Cultivation

Grapes are sun-loving plants and must be grown where they will be exposed to the sun all day or at least for the greater part of the day. But the base of the plant need not be in full sun although it is essential that the upper part of the plant catches as much

strong sunlight as possible. (Grapes growing wild in forests often take root at the foot of trees and soon clamber above the trees).

The location selected for the vines should have good air drainage. In colder areas, protection from winter winds is necessary.

Soil

The vines are fairly tolerant of a wide range of soils, although the soils must be deep and well drained, and not too sandy. The plants require a soil pH of 5.5-7.0. If there is any possibility that the soil may become badly waterlogged, a good drainage system should be installed.

Two or three weeks before actual planting, prepare the soil by double-digging to break up any hard layers and to clear away perennial weeds. Dig in leafmold or well-rotted manure at the rate of about one wheelbarrow load per 20 square feet. Also rake in a balanced fertilizer such as 10-10-10 at the rate of 3 oz per square yard.

Planting

Plant one-year-old vines in early spring before

Staking and planting



1 Bore or dig holes and drive 8 ft posts 3 ft into the ground, spaced according to the pruning system to be followed. Stretch wires between the posts, spaced according to the pruning system.

they start to leaf out. Dig large, deep holes; spread out the roots; firm them well; and water thoroughly. Then cut off all but one strong cane and trim this back to eight buds.

Maintenance

Except for pruning and training, grapes do not demand a great deal of attention.

In dry spells, they should be watered deeply, but, as the fruit begins to mature, the water supply should be reduced somewhat. This helps the maturation process and also inhibits succulent growth. In the fall, however, after the fruit has been picked, one heavy watering is necessary to help protect the vines from winter injury.

Unless the plants are doing poorly, they need little fertilizer. Give each plant 2-4 oz of ammonium nitrate or a somewhat more balanced fertilizer in early spring. This should carry them through the growing season.

Keep encroaching weeds pulled. An application of an organic mulch around the plants discourages weed growth in addition to supplying the necessary nutrients for healthy growth.



2 In early spring, plant the vine to the nursery depth between posts in prepared ground. Firm the soil and water well. Cut back the vine to one cane and eight good buds.

Training and pruning

the training and pruning of grapes are matters of critical importance. The main purposes of training are to keep the large, fast-growing vines under control, to facilitate care and harvesting, and to expose all parts of the plants to the sun. The purposes of pruning are to maintain vigorous growth, to provide new canes for the next year, and to limit the number of fruit-producing buds so that the vines do not produce too much small fruit of inferior quality.

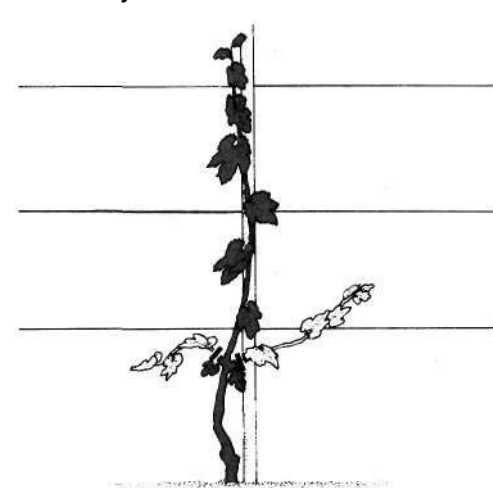
Various training systems are used for all three types of grapes.

American bunch grapes

Four-Arm Kniffin system This is the most popular method of training American bunch grapes since it gives good production and requires little summer tying of the vines.

The trellis required consists of 4-6 in posts and galvanized steel wires. Space the posts 16 ft apart. Sink the end posts 3 ft into the ground and brace them with diagonal struts or guy wires. Sink the intermediate posts 2 ft. The posts normally extend 5 ft above ground,

The first year



3 For both pruning systems, allow one rod to develop. Pinch back to one leaf any other shoots. Leave two good buds (Kniffin) or three (Guyot).

Grapes 2

but increasing the height to 6 ft exposes the vines to more sunlight and is especially recommended for short-season areas.

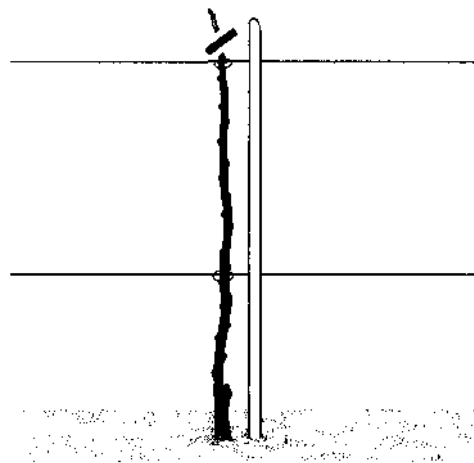
Use 9-gauge wire at the tops of the posts and 11-gauge at 30 in above ground. The wires can be stapled to the posts or run through holes drilled in the posts. Drilled holes give greater security. If staples are used, do not drive them down tight because it may be necessary to tighten the wires when they sag under the weight of the vines.

Plant the grape vines between posts. If planted at the base of posts, they may be injured by any wood preservative in the treated posts, and would undoubtedly be damaged when the posts had to be replaced.

The first year When the two top shoots on the young plant are about 1 in long, rub off all other shoots.

The second year Select the strongest cane for the trunk and tie it to the top wire. Cut the cane just above the wire and remove all other canes. If no cane reaches the top wire, tie the strongest one to the bottom wire and extend it to the top wire the next year. If no cane reaches either wire, reduce the vine to

Kniffen system—The second year



1 In spring, select the strongest cane, tie it in and cut off just above the top wire. Remove all other canes.

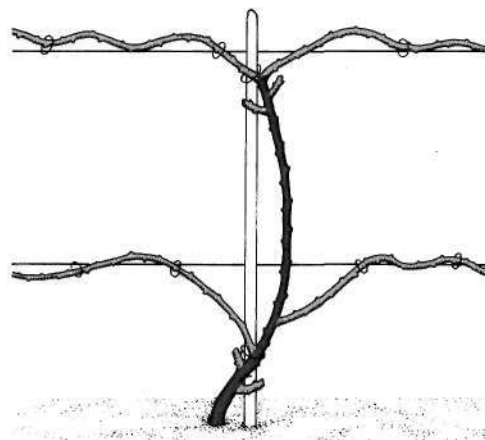
a single stem with two or three buds and start all over again.

The third year Pick four good canes for the arms; cut them back to approximately 10 buds in length; stretch them out along the top and bottom wires in both directions from the trunk; and tie them. Cut four other canes back to two or three buds for renewal spurs and remove all other canes.

Subsequent years Each year cut off the 10-bud fruit-bearing canes of the previous year and replace them with the renewal spurs (which are shortened to approximately 10 buds). The renewal spurs are replaced with new renewal spurs cut back to two or three buds. All other canes are removed.

The actual number of buds that should be left on fruit-bearing canes each year depends on the variety of grape and the growing conditions. Until the home gardener has raised grapes for some time, the best way to determine how hard to prune is as follows. First rough-prune the vine, leaving a few more buds than needed. Weigh the wood removed. For the first pound of wood, leave 30-40 buds, more or less equally divided

The third year



2 In spring, select four vigorous canes and tie them in to form arms. Prune them to ten buds each. Prune four other canes to form four renewal spurs for the next year.

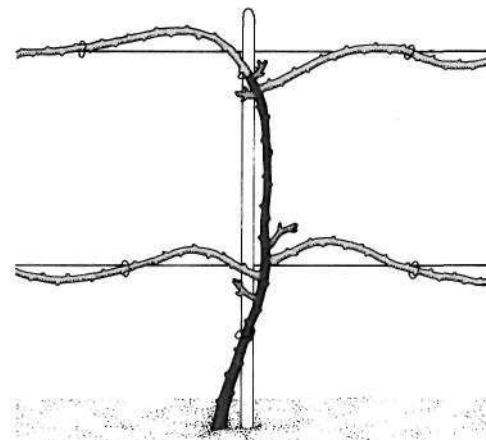
between the four fruit bearing canes, on the plant. For each additional pound of wood removed, leave eight more buds on vine vine. (This weighing plan is used not only for the Four-Arm Kniffen training system, but also for all other training systems).

All pruning is done in early spring while the vines are dormant and after danger of severe freezes has passed. If pruning is done too early, heavy frost can compound the winter injury already suffered by the plant, and the gardener cannot be certain which canes are alive and which are dead. Pruning late does no serious damage, but there is a good chance that some of the buds meant to be saved will be destroyed. If the cut canes "bleed", there is no need for worry as this does no great harm.

Munson system This is an excellent system for humid climates because the grapes are carried well above ground where they are exposed to more air currents.

The trellis consists of sturdy and large posts (4 x 6s are recommended) with stout 24 in crossarms 5 ft above ground. Brace the cross-arm. Staple two No 9 wires to the ends of the

Fourth and subsequent years



3 In spring, cut off the old fruiting arms. Tie in four new canes chosen from the renewal spurs. Cut each new cane back to six buds. Cut four new canes back to two buds to form renewal spurs.

crossarms on the top edge. Run a third wire through the posts 6-8 in lower.

Train the new vine, as above, to a single trunk extending to the bottom wire. In the third year, prune it to two fruit-bearing canes and two renewal spurs. Tie the canes along the lower wire, and as the young shoots develop, drape them over the upper wires, allowing them to hang down.

Each year thereafter replace the arms with the canes from the renewal spurs and replace the spurs.

Modified Chautauqua system This system is used where tender grape varieties need winter protection. The trellis is made with 4-in posts and three No 9 wires spaced 12, 28 and 44 in above ground.

In the first year, simply let the vine grow upward and tie it to the wires. In the fall of the same year, select the best cane for the trunk, reduce it to 30 in long, and remove all other canes. Lay the trunk on the ground and cover it with about 8 in of soil for a measure of protection.

In the spring, pull the cane out along the bottom wire at an angle and tie it. As new growth develops, tie to the other wires.

Prune the new growth to short two-bud spurs in the fall. Keep the cane closest to the end of the trunk to form an extension of the trunk. Remove the vine from the trellis and bury it as before.

In following years, repeat this procedure. Let the trunk grow to a maximum length of about 7 ft.

Muscadine grapes

Muscadines can be trained by any of the systems described, but the vine is such a strong, rampant grower that it is often cultivated on arbors. In this case, train the young vine to a trunk 6-7ft long before allowing it to branch out to the sides along wires, spaced about 2 ft apart, forming the arbor roof.

In the Four-Arm Kniffen system, train and prune the vine to form a trunk and four strong arms. Do not cut the arms back until they meet those of the neighbouring vines. Thereafter, annually prune out deadwood, weak canes, and side growth on the trunk and the tendrils. Cut the remaining canes back to two or three buds.

Grapes 3

In the warmest regions, pruning should be done after the first killing frost in the fall or early winter. Further north, prune in early spring. Muscadines pruned at this time bleed great deal, but there is no damage to the plants.

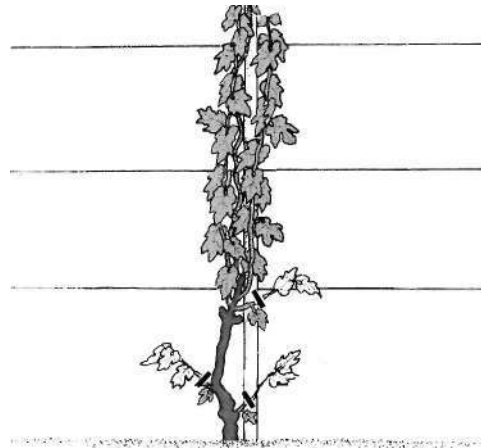
Vinifera grapes

The Four-Arm Kniffin system is the method generally chosen in warm climates, but a modification called the Spur system is used for varieties such as 'Csaba' and 'Cardinal'. The Spur system allows the fruit-bearing arms to be permanent, that is they are not renewed annually. Each arm has 6-8 vertical fruiting spurs and each spur has 2-3 buds that produce fruit shoots.

In cold climates, where tender varieties need winter protection, the Modified Chautauqua system can be used.

Guyot system This is actually two systems. In the single Guyot system there is one fruit-carrying arm while in the double Guyot system there are two fruit-carrying arms. The double Guyot system is the more popular and is described below.

Double Guyot system—The second year



1 In spring, cut the vine down to within 15 in of the ground, leaving three buds. Train the resulting shoots vertically. Pinch back any laterals to one leaf as they develop.

Each year, allow three new main stems to develop. Retain two for fruiting and cut back the others to produce replacement stems for the next year. The fruiting canes are trained close to the ground to take advantage of its radiated warmth.

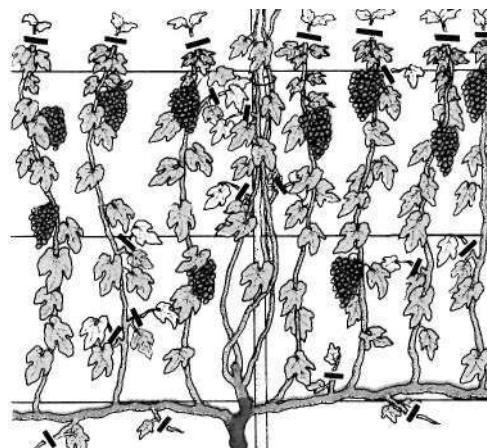
The trellis consists of 4-in posts spaced 8-10 ft apart. Brace the end posts. Attach a No 12 wire to the posts 15 in above the ground and two No 14 wires so they cross at each post.

The first year At planting, cut the vine down to about 6 in from ground level if the vine is on its own roots or, if it is a grafted plant, 6 in above the graft union, leaving at least two good buds. During the summer following planting, train one shoot up the post and pinch out all others to one leaf.

The second year In the spring, cut the vine down to within 15 in of ground level, leaving three good buds. During the summer, train in three shoots vertically. Pinch back any laterals to one leaf as they develop. In the next spring, the vine should be pruned as for an established vine (below).

Pruning an established vine Each spring

Third and subsequent years



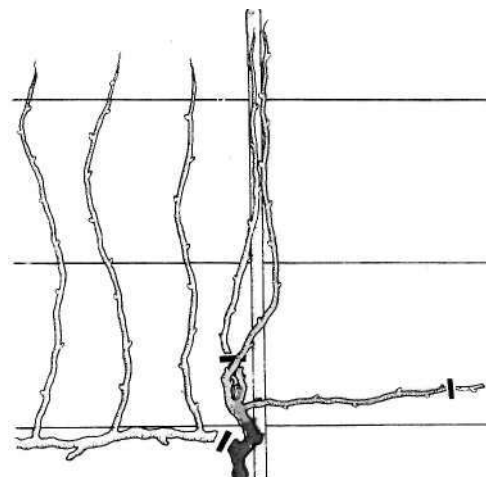
2 From April to August, train three shoots vertically from the center. Pinch back any laterals produced on them to 1 in as they develop. Tuck in the vertical fruit-carrying laterals through the double wires. Cut them back to three leaves.

(except the first) cut back the arms that bore fruit the previous summer to the replacement spurs. Do not allow fruit on the plants in the second year after planting, but allow them in the third. Tie down on to the lowest wire one replacement shoot to the left and one to the right. Cut down the remaining spur to three or four buds to provide replacement spurs for the following year. Cut back the immature wood on the replacement spur, leaving about 2-2 1/2 ft of strong growth either side.

Third and subsequent years From April to August, tuck in the vertical fruit-carrying laterals between the double wires. Cut them back to two or three leaves above the top wires, as necessary, and remove any sub-laterals. Train the three replacement spurs from the center for the following year up the post. Pinch back any sub-laterals on the replacement spurs to one leaf and remove any blossom. Remove any surplus spurs coming off the main stem.

Thinning

Thinning of the fruit is recommended for vinifera grapes, but not for American and



3 In November, cut out the two arms that bore fruit in summer to the replacements. Tie down one replacement shoot to the left and one to the right. Cut back each to leave 2-2 1/2 ft of strong shoot. Cut down the remaining shoot to three buds.

Muscadine grapes. Viniferas are very heavy producers, and thinning is needed to improve fruit size, thinning of varieties with very large or compact fruit clusters is done by removing individual berries immediately after fruit set. On varieties with loose or straggly clusters, remove some of the immature flower clusters appearing with the new growth in the spring.

In addition, with all vinifera varieties, it helps to remove entire fruit clusters soon after fruit set. The number of clusters left depends on the size and vigor of the vine. Keep about 20-30.

Harvesting

Even when grapes are fully colored, they are not ripe because they need a finishing period for sugars to form. This period can vary from 4-8 weeks. Once picked, grapes do not continue to ripen.

Pests and diseases

Grapes are not greatly bothered by pest and disease problems. But it is advisable to spray the plants in late winter with dormant oil. A general-purpose fruit spray should be applied when the new growth is about 8 in long, just before bloom and two weeks thereafter.

Mildew should be sprayed with a fungicide whenever it appears. Spraying with carbaryl takes care of Japanese beetles, which have a particular liking for grape vines. Repeat treatment as necessary.

It is almost impossible to cover grape vines securely with nets to protect them from birds. But the individual fruit clusters can be enclosed in mesh or with paper bags.

In some years, wasps are even worse than birds, attacking the fruit just as it is ready to harvest and quickly destroying entire bunches. Only paper bags can keep wasps in check.

Disease or pest infestation should not prove a hindrance in viticulture if the grape vines are tended so that they remain in a healthy condition. Soil balance is the greatest determinant influencing grapevine health while weather is the most unpredictable factor. Wet, humid weather usually means mildewed grape vines.

Melons

Gray-green or ochre-colored melons with rough, netted skins are known to most Americans as cantaloupes, but the true cantaloupe is a hard-shelled European fruit that is rarely grown in the United States. Gardeners wishing to attempt to grow it usually have to order seeds from a foreign supplier.

Melons Americans grow fall into two categories: Muskmelons and Winter or late melons. Muskmelons mature in roughly 90 days and can be grown in zones 5-10 and even into zones 3 and 4, if the quick-maturing varieties are chosen. Winter melons, including the 'Casaba', 'Crenshaw', 'Honeydew', and 'Persian' varieties, are larger fruits with variously colored skins and most of them take about four months to mature, so they are grown primarily in warmer climates.

Cultivation

A popular misconception about melons is that they cannot be planted with cucumbers, squashes or other members of the cucurbit family because they are cross-pollinated and this changes the flavor and aroma of the melons. This does happen if seeds from melons grown the year before are used. But the use of fresh seed every year eliminates the problem.

Melons are tender and vulnerable and cannot be sown outdoors until the soil is warm and all danger of frost is past. In short-season areas, this makes melon-growing by this common method impossible.

Soil The soil for melons should be reasonably fertile but not too rich, with a pH of 6.7-7.0. Good drainage is essential. Dig the soil well before planting and mix in considerable humus to improve fertility and moisture retention. Also mix in about 24 oz of 5-10-10 fertilizer per 50 square feet.

Sowing the seed In the North, therefore, seeds are sown in flats or peat pots indoors about 3-4 weeks before the mean date of the spring freeze. When the plants have two or three true leaves, they are moved into the garden and grown under cloches or polyethylene tunnels, usually about two weeks after the last frost.

Planting Further south, however, direct sowing in the garden is a simpler and better method. Sow the seeds in 1/2 in deep drills

about 6 in apart and thin them to stand 2ft apart. In setting out transplants, space them 2 ft apart. The rows should be 5-6 ft wide. The alternative is to sow seeds or plant seedlings in gently rounded mounds (hills) 6 ft wide and a few inches high at the center spaced 4 ft apart. Allow two or three plants per hill.

Furrows about 10 in wide can be dug on the south side of the hills to a depth of about 6 in to allow watering without wetting the foliage. Water well, especially during dry spells, but do not keep the soil soaked.

If nematodes are a problem in the garden, the soil should be fumigated before planting. **Watering and feeding** Melons need plenty of moisture throughout the growing season and this should be provided by deep weekly watering in dry spells. Pull out weeds as they appear. Mulching the plants with organic matter or black polyethylene film is a good idea to hold in moisture and keep down weeds. When the vines begin to run, side-dress them lightly with balanced fertilizer or nitrate of soda.

For example, apply 4-8-4 balanced fertilizer carefully at 1/2oz to each mound in a circle around each mound after thinning the plants. Keep the fertilizer well clear of the plants and cover the dressing with nearby soil. The dressing should ideally be applied 4-6 in away from each plant.

Harvesting

When melons start to turn their characteristic mature color, they are ripening and will soon be ready for picking. In the home garden, however, actual harvest should not start until the fruits pull away from the stem easily. At this time they are in prime eating condition. Do not leave them on the vine any longer, because they begin to deteriorate within a couple of days. Ripe melons have a strong, fruity scent.

Pests and diseases

Melons are attacked by a few insects, but these are not generally very troublesome and can usually be controlled by spraying with malathion or carbaryl when they appear. But diseases can be difficult, especially in warm, humid weather. The best protection against disease is to plant resistant varieties.

Melons under cloches



1 About four weeks before the expected date of the last spring frost, sow melon seeds in peat pots indoors. Harden off gradually before removal to the garden.

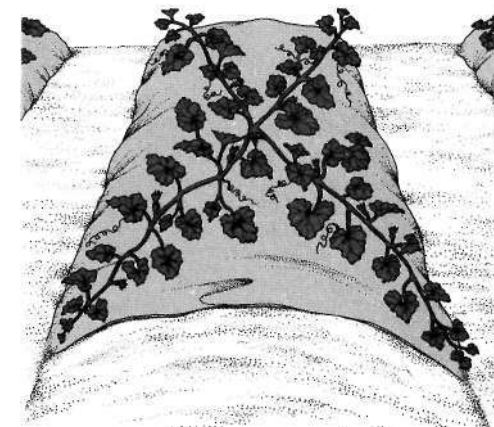


2 Plant out under cloches when the danger of frost is past. Make a hole wide and deep enough for the root ball to fit into comfortably.

Melons in the open



1 Dig soil well before planting and incorporate humus and 5-10-10 balanced fertilizer at 24 oz per 50 square foot. Mound up the soil.



2 Mulch the plants with black polyethylene and water well. Train as usual. Check for dryness at regular intervals thereafter. Mulching will help to warm cold soil.

Tree fruits

Introduction

Tree fruits (also sometimes referred to as top fruits) form a group comprising all the larger growing fruits which, in the natural state at least, attain tree form. The exceptions to this are the fig, elderberry, mulberry and quince, which may have several main stems and be more shrub-like in appearance; they are, however, still generally classified as tree fruits.

Botanically, the most familiar tree fruits are members of the rose family (*Rosaceae*), including the apple, pear, plum, cherry, peach, apricot and quince; the mulberry and fig are outsiders belonging to the mainly tropical family *Moraceae*. Also included in the tree fruit section are some of the most popular nuts, such as almonds, chestnuts, filberts, hazelnuts and walnuts.

Tree fruits are not difficult to grow provided the soil is well drained but moisture-retentive and of a moderate to good depth (see pages 10-11). The site must be sunny and not prone to severe late spring frosts (see pages 6-7).

Unlike growing soft fruits, cultivating tree fruits in the garden is a long-term project. Full fruiting capacity is reached by the tree only after several years, but with care it will then continue for a lifetime. However, the fruit grower is compensated by the fact that the fruiting season for tree fruits is much longer than that of soft fruits. Furthermore, if fruits such as peaches or figs are grown in a greenhouse the season can be prolonged.

Rootstocks

Apples, pears, cherries and plums can all eventually make sizeable trees if grown on their own roots; some even become too large for most gardens. For this reason they are grafted on to rootstocks which control their eventual size. Usually apples are grafted on to

a range of apple rootstocks to produce dwarf or less vigorous trees which are ideal for the small garden (see page 45). Pears are traditionally grafted on to quince rootstocks and this lessens their vigor and ultimate size. A dwarfing rootstock for cherries has proved harder to find but a less vigorous one has now been produced, although it is not as dwarfing as some of the apple stocks that are now widely available.

Pruning and training

For all tree fruits, initial training and subsequent pruning is necessary to keep them in good shape and productive throughout their lives. Methods of training, particularly pruning, can seem daunting to an amateur but this need not be so if the instructions with each fruit entry in this book are followed closely. There is also a companion volume on pruning in this series.

Pruning terms The terms used frequently in fruit tree pruning are defined as follows. Maiden describes a one-year-old, for example, a maiden tree. A scion is a variety grafted on to a rootstock of another tree; the union is where the two join. A branch is a limb that arises from the trunk. Primary branches are the first formed, and secondary branches arise from the primary ones. A leader is a main central stem of a tree or a shoot selected to extend a main branch; a lateral is a side-shoot. Spurs are short laterals that bear flower buds and which can occur naturally or be induced by selective pruning of the laterals. Flower buds, or blossom buds, are unopened flowers, often referred to as fruit buds. Wood buds open to give rise to a shoot, as opposed to a flower. Suckers are shoots that grow from below the ground or below the union.

Choice of site

The site should be chosen with care and the soil cleared of perennial weeds either with a selective herbicide (see page 17) or by hand weeding during digging. If some weeds still persist, herbicide treatment can be given again after the tree is planted, but take care to choose one which will not damage the tree.

Protection against birds

In areas where bird damage is expected (and few rural or suburban districts are exempt), protection is necessary. For small tree forms, such as dwarf bush trees, cordons or espaliers, this can be provided by a fruit cage, ideally one with tubular steel or metal alloy poles and netting, although 7 ft headroom is a minimum (see page 17). It is generally impracticable to protect larger tree fruits against bird damage.

Wall- and fence-trained trees

If there is no room in the open garden for free-standing tree fruits, good use can be made of walls and fences if restricted tree forms such as fans, cordons or espaliers are grown. North-facing walls can be used in this way for Morello cherries. Some plums are even more successful on walls than in the open, ripening well in the sheltered and warmer environment. Figs are often best grown on a warm wall (see pages 8-9).

Pollination

Unlike most soft fruits which will produce an adequate crop even if only one plant is grown, many tree fruits are totally or partially self-incompatible, or self-unfruitful. This means that some varieties cannot produce a good crop of fruit if their flowers are fertilized with their own pollen. In such instances at

least two different compatible varieties must be grown close enough for bees to be able to carry pollen from one to the other. Sweet cherries provide the best example of self sterility, but practically all the tree fruits set heavier crops if two or three varieties are planted together. They must, of course, flower at the same time and produce plenty of good pollen.

Storage

If it is decided to plant enough apples and pears to provide fruit for the late fall to winter period, storage facilities are necessary. This can be provided by a cool but frost-free cellar or shed (see page 90). Late apples and pears finish ripening many weeks after they have been picked, and so they should not be stored with mid-season varieties until this ripening has taken place because the gases given off by the earlier varieties shorten the storage life of the later ones. Deep freezing is suitable for these two fruits only if they are to be used in cooking when thawed.

Fruit under glass

Figs, peaches and nectarines produce luscious fruits under glass in cool areas. Artificial heat is not required although ripening can be hastened by its use early in the season. Wall or roof space not less than 10 ft long is needed for a well developed peach or a fig rooted in the floor of the greenhouse. Alternatively, much smaller trees can be grown in large pots and housed in all but the smallest greenhouse. Space outside should be set aside where hardy potted trees can be kept with the roots protected during the winter after the fruit has been picked. For fruit in the greenhouse, see page 19; for fruit in tubs and pots, see pages 80—81.

Pollination

Pollination is the transfer of pollen from the anthers or male parts of the flower to the stigmas or female parts of the flower. This results in fertilization and the eventual production of fruit. It is usually carried out by bees or other insects or by the wind. Occasionally, it is necessary to pollinate by hand.

The flowers of most garden fruits contain both anthers and stigmas. Some fruits, such as melons and hazelnuts, bear separate male and female flowers on the same plant.

Some fruit trees, such as peaches, nectarines, apricots and certain plums, are self-compatible—that is they can be fertilized by their own pollen. Others, such as nearly all sweet cherries, elderberries and many varieties of apples and pears are self-incompatible (self-unfruitful); they must be grown with another variety of the same fruit that flowers

at the same time so that the two varieties can fertilize each other.

Pollination groups

Different varieties of plums, apples, pears and cherries are divided into pollination groups according to when their flowers are open and ripe for pollination. Those varieties in the same pollination group will cross-pollinate because their flowers are open at the same time. Those in adjacent groups are also acceptable because in most years their seasons of flowering overlap. However, a plant that blossoms very early cannot be counted on to cross-pollinate another plant that blossoms very late.

Incompatibility groups

Not all varieties of the same fruit can cross-

pollinate, even when they are in the same pollination group. This is called cross-incompatibility. These varieties are divided into incompatibility groups and will not set fruit with their own pollen or that of any variety in the same incompatibility group. They will cross-pollinate with varieties in another group or in adjacent groups (provided they flower at the same time).

Ineffective pollinators

Some varieties of apples and pears, although not strictly cross-incompatible, are ineffective pollinators. This can occur for a number of reasons.

Most varieties are diploid, that is, they have the normal number of chromosomes. A few are triploid, that is they have 1 1/2 times the normal number. Triploids are poor pollinators

and should be grown with two diploid varieties to pollinate each other and the triploid.

Some varieties of pears are known to be ineffective pollinators. Also some varieties of both apples and pears flower only every two years (biennially) or, irregularly. These cannot, therefore, be relied upon to pollinate other varieties.

Many triploids, ineffective pollinators and irregular flowering varieties are good varieties in their own right and popular with gardeners. If planting these varieties, remember to plant other varieties near them to provide the necessary pollen.

The following list gives the specific pollination nature of a selection of popular garden tree fruits from apples to sweet cherries.

Specifics

Apples No variety is completely self-compatible, so more than one variety should be grown.

Apricots Usually self-compatible with a few exceptions (for example, 'Moongold' and 'Sungold' should generally be planted together).

Crabapples Self-compatible.

Nectarines Self-compatible.

Peaches The great majority of varieties are self-compatible.

Pears No variety is fully self-compatible. Plant two or more varieties. Most bloom at about the same time.

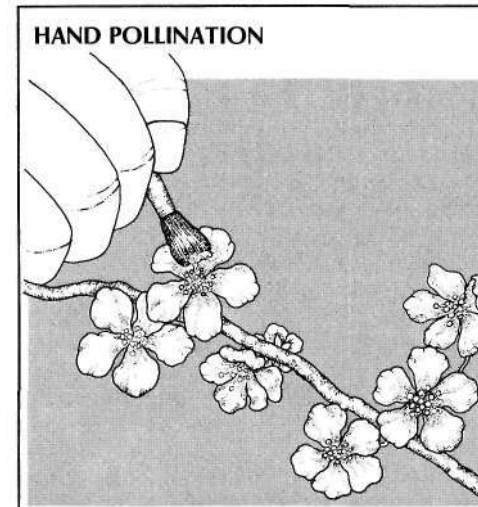
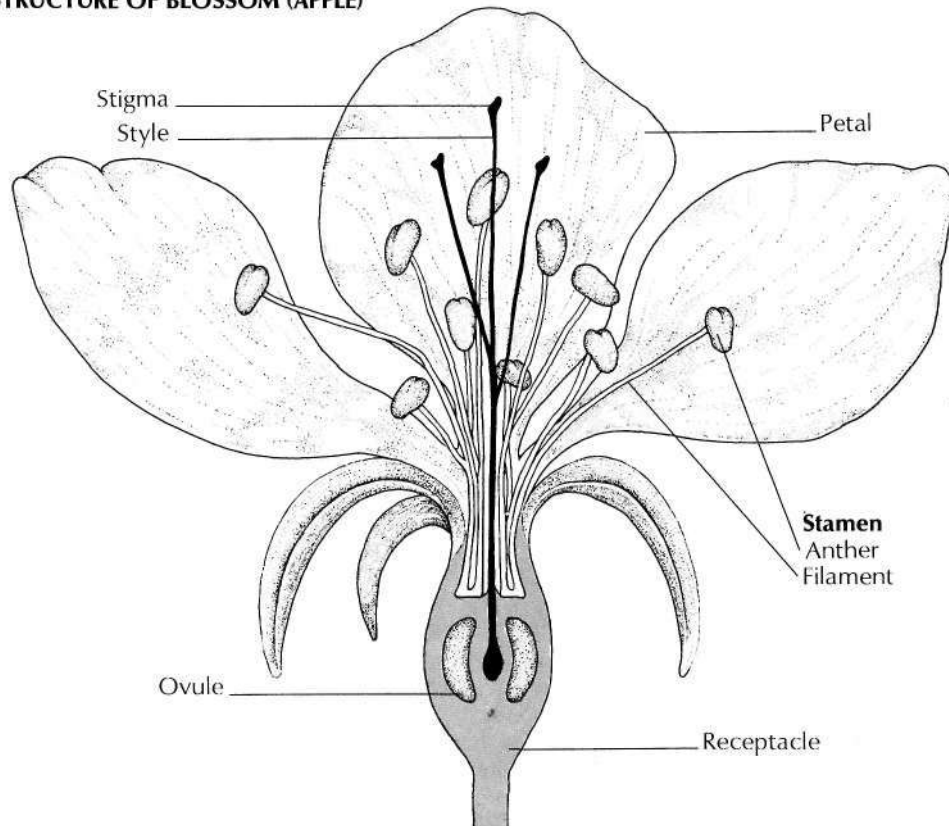
Plums Most varieties are self-incompatible, and even those that are self-compatible bear more reliably if planted with another variety. European plums cannot pollinate Japanese plums or vice versa. Native plums are pollinated by other native varieties, sandcherry-plum hybrids or Japanese varieties, if a native variety has been crossed with a Japanese.

Quinces Self-compatible.

Sour cherries Self-compatible. Sweet cherries are not suitable pollinators for sour cherries, but sour cherries can pollinate sweet cherries, although most flower too late.

Sweet cherries Self-incompatible. Two or more varieties are needed. However, some varieties, such as 'Bing', 'Emperor Francis', 'Lambert' and 'Napoleon' do not pollinate one another.

STRUCTURE OF BLOSSOM (APPLE)



Some fruits require hand pollination. First draw the finger-tip over the anthers. A deposit of yellow grains on the finger indicates pollen is being shed. Pollinate at midday and when the weather has been warm and dry for two or three days.

Very gently transfer the pollen from the anthers to the stigmas by using a soft camel-hair brush or a piece of cotton wool on a matchstick.

Carry out hand pollination every day until flowering is over.

Planting fruit trees

Good establishment, healthy growth and eventual successful cropping of a fruit tree depend a great deal on how well it is planted.

Preparation

Before planting prepare the ground in early fall as described on pages 10-11. Then, for each tree, prepare an area 3ft square by single digging clean ground and double digging weedy land. Prepare the ground over-all for closely planted trees such as those on dwarfing rootstocks. Apply lime if the pH is less than 5.8 (see page 10).

Just before planting, fork in a balanced fertilizer, such as 10-10-10, at a rate of 3 oz per square yard with bonemeal at 2 oz per square yard.

Time to plant

Plant in the dormant season from late October to April; but spring planting is generally recommended. Container-grown trees can be planted at any time. Do not plant when the soil is frozen hard or very wet.

If the tree arrives from the nursery when the soil conditions are not right, heel it in in a sheltered part of the garden. If the ground is too cold and hard to heel in, keep the tree in an unheated, frost-free place such as a cool basement. Unpack the upper parts of the tree but keep the roots in damp straw wrapped in burlap until planting.

Staking

Mark out the planting position and drive in a stake to a depth of 18 in on heavy soils and 24 in on light. Standard trees require 7 1/2—8 ft posts, semi-dwarfs 6-6 1/2 ft and dwarfs 3 1/2-4 ft. Central-leader trees need a stake as long as the height of the tree plus the depth into the soil. A large-headed standard, such as a sweet cherry, is best supported by two stakes 18 in apart with a crossbar (to which the tree is tied) nailed just below the stake tops. The top of the stake should be 2-3 in clear of the tree's head to avoid chafing the lowest branches. Stakes come in a variety of materials (see pages 12-13).

Trees on very dwarfing rootstocks, for example apples on Mailing 9, are best staked permanently. But for trees on more vigorous stocks, the stake can usually be removed

after four or five years, depending on the vigor. Before removing the stake, check if the anchorage is sound by rocking the tree.

Planting

If the roots are a little dry, soak them for an hour before planting. Keep them covered.

On the day of planting, dig out a hole deep and wide enough to take the roots fully spread out. Mound the soil in the center. Keep the fertile top-soil separate from the lower layers. Fork the bottom and prick the sides of the hole to allow the roots to develop outwards. Dig in into the base rotted-down sods or a bucketful of well-rotted manure, compost or peat. Trim off with shears any broken or long tap roots. If planting a container-grown tree, gently tease out the soil and roots around the edge of the rootball.

Place the tree on the mound with the stem 2-3 in away from the stake. Ensure that the lowest branches clear the top of the stake. Plant the tree to the same depth as it was in the nursery, indicated by the soil mark. Keep the union between scion and rootstock at least 4 in above the soil surface to prevent the scion from rooting.

Fill in the holes; this is easier if one person holds the tree while another fills it in. Sprinkle a little of the fertile top-soil over the roots first then return the remaining soil a spadeful at a time. Occasionally shake the tree gently so that the soil falls among the roots. Finally, firm the soil and level off the surface.

Next, mulch the tree with well-rotted manure compost or peat over an area 18 in in radius to a depth of 2-3 in, keeping the material 1-2 in clear of the trunk to prevent fungal diseases from infecting the base.

Tie the tree to the stake. A one-year old can be secured with plastic chainlock strapping using a figure of eight tie, but older trees need a more substantial tie with a cushion between stake and tree to prevent chafing. There are a number of proprietary makes, or one can be made (see pages 12-13).

Dwarfs require one tie placed 1 in from the top of the stake. Semi-dwarfs and standards require two ties, one at the top and one half-way down. Nail the ties to the post to prevent them slipping down.

Where animals are particularly trouble-

some, protect the trees with wire netting.

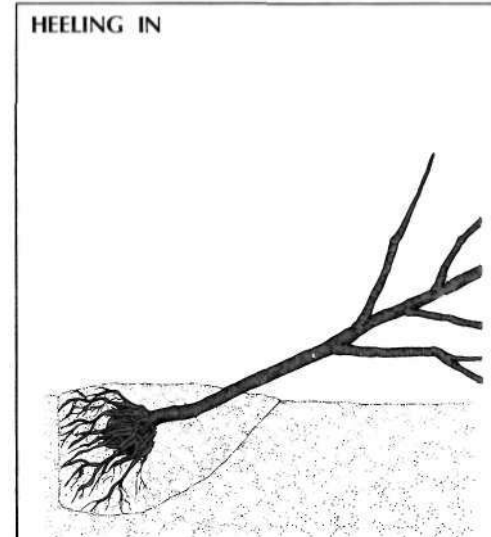
Each year in April, July and October check the tree ties and if necessary loosen to avoid constriction. Re-tie home-made ties.

Planting against a wall

The soil at the foot of a wall can become very dry and poor, especially if it is protected from rain-bearing winds or is sheltered by overhanging eaves.

Where the soil is poor and the drainage is bad, construct a drywell or a single line of tiles 3 ft deep to take the water away (see page 10). Re-soil over an area at least 6 ft x 3 ft wide x 2 ft deep with a fibrous, medium chalky loam, if possible made from sods stacked for six months before use. Add rubble to the loam in the ratio ten soil to one rubble. Two weeks before planting thoroughly mix in base fertilizer at the rate of 8 oz per 2 gal bucketful of soil.

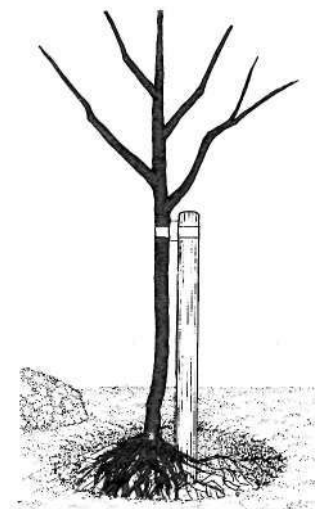
The tree should be planted about 9 in from the wall base. During the growing season, water it whenever the soil is dry, applying 4 gal at a time around the base of the tree.



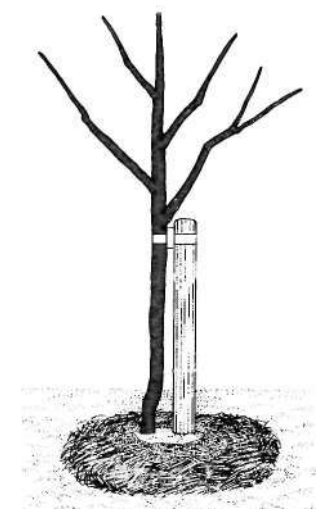
Take out a shallow trench. Unpack the tree and lay it in the trench at an angle. Cover the roots with moist, friable soil.



1 If the roots are dry, soak them for an hour before planting. Trim off broken or long tap roots with shears.



2 Drive in stake. Dig a hole deep and wide enough to take the roots fully spread out. Mound the soil slightly in the center.



3 Set the plant on the mound 2-3 in away from the stake with the union at least 4 in above the soil surface. Replace the soil, firming gently. Mulch well.

Apples and pears 1

Introduction and rootstocks

The domestic apple (*Malus domestical*) is of complex hybrid origin but it has evolved, under human influence, from various species, all of them belonging to the series *Pumilae*. It has been estimated that up to 1980 there were at least 6,000 named varieties of apples in the world.

Like the apple, the pear (*Pyrus communis*) has long been cultivated. It is a native of Northern Europe. In the United States, apples are grown in zones 3-8 and pears in zones 5-8. In both cases, however, a very few varieties will grow further north or further south of these zones.

Site

Ideally, the site should be frost-free, in full sun, and sheltered from strong winds. Pears flower in late April to early May and apples in the first half of May, when they are at risk from spring frosts. The gardener in a frost-prone site should consider growing trees on dwarfing stocks or using the restricted forms whose small size makes it practicable to protect them by covering the trees on frosty nights. With apples, the alternative is to plant varieties that flower late, but this is not applicable to pears because even the later varieties flower in the danger period.

Ample sunshine is important, particularly for pears, if the fruits are to develop their full color and flavor. Apples will tolerate some shade, provided they receive at least half a day's sun in the growing season. Where there is a choice, allocate the sunniest position for pears and dessert apples, and the less sunny positions for cooking apples, for which color and flavor are not so critical.

Shelter is essential because both kinds of fruit are insect pollinated and strong winds inhibit the insects' flight, which results in poor pollination. Wind-breaks, either living or artificial, should be provided on exposed sites or, again, choose apples and pears on dwarfing stocks or in restricted form because they are easier to shelter than are taller trees (see pages 6-7).

Soil

The ideal soil for both apples and pears is a medium well-drained loam, not less than

24 in deep and slightly acid (pH 6.7). They are, however, tolerant of a wide range of soils. Pears and dessert apples require good drainage, whereas cooking varieties can be grown in heavy soil and marginally poorer drainage, but the soil must never be waterlogged.

Light sandy soils are acceptable provided bulky organics are incorporated and heavy mulching and watering is practiced. Thin soils over limestone are unsuitable because lime-induced chlorosis and lack of water and nutrients generally occur. Deep soils over limestone can support apples and pears quite satisfactorily.

Soil preparation

In late winter, prepare the soil by clearing away perennial weeds over an area 3 ft square. Fork in a compound fertilizer such as 10-10-10 at 3 oz per square yard.

Planting and staking

In early spring, plant the tree to the same depth as it was at the nursery, spreading the roots out well (see page 44).

Standard trees and semi-dwarfs require stakes and tree ties. The restricted forms are supported by wall or fence wiring.

Selecting the rootstock

Apples and pears are not grown on their own roots for a number of reasons. Some will not root easily, some are prone to root troubles, and some make large unproductive trees. To overcome these problems, apple and pear varieties are grafted by the nursery on to various rootstocks.

The rootstock is the most important influence on the eventual size of the tree. An apple grafted on to a dwarfing stock, for example, will stay small, whereas on a vigorous stock it will eventually become large. It can also affect how long it is before the tree will fruit and its cropping capacity, so it is important to know the rootstock on which the tree is grafted or, when ordering a new tree, to indicate to the nursery what size of tree is required so that the appropriate rootstock is selected.

The stocks most widely used are listed right. The size of the tree quoted under the rootstock is an estimate.

ROOTSTOCKS

Apples

M7: Semi-dwarfing tree that can be controlled by training and pruning and grown to a height of about 15 ft.

M9: Very dwarfing One of the most dwarfing stocks, M9 is widely used, making a tree about 6-10 ft in height and spread. It soon bears fruit, usually from the third year onwards, sometimes even in the second year. It requires good soil conditions and will not tolerate neglect, or competition from grass and weeds. The root system is brittle and such a tree requires staking throughout its life. An excellent stock for the small garden. Used for dwarf, dwarf pyramid and cordon.

M26: Dwarfing M26 makes a dwarf tree 8-12 ft in height and spread. It tolerates average soil conditions. It soon bears fruit, usually within three or four years of planting. It requires staking for the first four or five years, longer on exposed sites. Used for dwarf pyramid, and cordon and occasionally espalier and fan. It is a suitable stock for the small garden.

M27: Extremely dwarfing It is too soon to comment about its suitability for garden use but first reports are that it will make an ideal tree for growing in pots and in small gardens. It needs careful feeding and watering.

MM106: Semi-dwarfing MM106 makes a tree 12-18 ft in height and spread. It is tolerant of a wide range of soils. Trees on this stock soon bear fruit—usually within three or four years—and can produce heavily in later years. Such a tree requires staking for the first four or five years. Used for cordon, espalier and fan.

MM11 and M2: Vigorous The trees on these stocks make trees 18-22 ft in height and spread, but their growth varies according to soil and variety. They make large trees on good loamy soils, but only medium-sized trees on poorer sandy soils. Used by nurseries for half-standard and standard trees, espaliers and occasionally cordons and fans. They are slow to fruit in comparison with the more dwarfing

stocks, sometimes taking seven to eight years. They are too vigorous for most gardens except where the soil is poor.

Pears

Pears are usually grafted on to quince rootstocks, which make them small to medium-sized trees. Some pears have a weak and spreading habit, and others are vigorous and upright, therefore the sizes given below are only an approximation.

There are three rootstocks: Quince C, Quince A and Pear. Both Quince C and A are suitable for the garden.

Quince C: Moderately vigorous Quince C makes a pear tree about 8-18 ft tall. It bears fruit in four to seven years. It is suitable for highly fertile soils and vigorous varieties, but not where conditions are poor. Used for cordon, dwarf pyramid and espalier.

Old stocks of Quince C may be infected with a virus, so where possible obtain stock certified as virus-free. If in doubt, use Quince A because there is not much difference in vigor between the two.

Quince A: Medium vigor Slightly more vigorous than Quince C, it is the stock upon which most pears are grafted. It bears fruit in four to eight years. Pears on Quince A make trees between 10-20 ft in height and spread. It is used for all forms of pear tree except standards.

Certain pear varieties are not compatible with quince and these have to be double worked by nurseries. This means a piece of pear graftwood compatible with both the quince rootstock and the pear variety, such as 'Beurre Hardy', is used as an intermediate between the two. Varieties requiring double working include 'Bristol Cross', 'Dr Jules Guyot', 'Doyenne d'Ete' and 'William's Bon Chretien'. If this is not done, the pear could eventually separate at the graft union.

Pear stock: Very vigorous Pears grafted on to pear rootstock make very large standard trees, and, consequently, are too big for most gardens.

Apples and pears 2

Selecting the tree form

Just as important as the correct choice of rootstock is the choice of tree form.

There are two basic types of trees, those that are planted in open ground and pruned in the winter, and those that are grown in restricted form, usually against a wall or fence, and pruned mainly in summer. The restricted form of tree is not widely available in the general market and it may be necessary to seek out a nursery specializing in this form.

Where a gardener has plenty of land and a heavy yield is the main criterion, the unrestricted winter-pruned trees planted in the open are the best choice. Where the gardener has little room, or prefers the neat look of well-trained summer-pruned trees, or wants to fill a blank space on a wall or fence with fruit trees, then the restricted forms should be chosen.

Trees in the open

The tree forms commonly grown in the open are the dwarf, semi-dwarf and standard. These are all open-centered trees and they differ only in the length of stem or trunk before the first permanent branch and in the size of the head, or framework.

Dwarf tree The dwarf tree has an open center and is goblet-shaped with a short stem of about 18-24 in. It is used only for apples because there is as yet no truly dwarfing stock for pears. Dwarf apples are grafted on to a Mailing 9 rootstock or the equivalent and, because of their small size, are suitable for any garden. The soil must be very fertile, however, and the trees have to be fed and watered regularly or they will be stunted. Gardeners with less fertile soils should choose trees on more vigorous rootstocks.

Dwarf trees are easy to prune, spray and pick, and they soon bear fruit, but obviously their cropping capacity is not as great as that of larger trees. It is best not to plant dwarf bush apples in a lawn because they cannot compete with grass but if this is unavoidable, maintain a grass-free area for at least 2 ft around the base by mulching and water the tree regularly.

Semi-dwarfs The semi-dwarf tree has a clear stem or trunk of about 20-30 in before the first primary branch is reached, and its total

full-grown height is roughly midway between the height of a dwarf and a standard tree.

Semi-dwarf apples develop into moderately-sized trees which bear fruit in about three to six years, depending on the rootstock used, the variety of the apple, and the growing conditions.

Semi-dwarf apples and pears are suitable for the medium to large garden and can be planted in a lawn provided the grass does not inhibit the young tree's growth. They are not suitable as shade trees because the head is too low.

Standard The standard has a clean stem of 6-7 ft, and, in the case of a few varieties, may reach an ultimate height of 40 ft. But they should be kept much smaller by pruning, about 20 ft at most. The gardener needs a long ladder for picking fruit and a powerful sprayer for pest and disease control. Vigorous trees are slow to bear fruit but, because of their large size, they eventually yield heavy crops.

Restricted tree forms

The restricted tree forms are used where trees have to be contained in some way, for example, against a wall or fence. They are ideal for the small garden or where space is limited. However, because they are restricted, the yield in comparison with trees in the open is relatively small.

The main restricted tree forms for apples and pears are the cordon, the espalier and the dwarf pyramid. The fan is occasionally used.

The cordon is intended for a low fence. If closely planted, many varieties can be grown in a relatively small space and the gardener can more easily meet the cross pollination requirements (see pages 50-1).

The espalier may be planted against a low or high fence, depending upon the number of arms it is intended to have. Its long horizontal arms require more room than the cordon. It is a handsome form (see pages 52-3).

The fan requires a high wall, the height depending on the kind of fruit grown (see pages 8-9). Unlike the cordon or espalier it cannot be planted against a low fence unless the gardener is prepared to increase the height with trellis work. The fan is used mainly

TREES IN THE OPEN: SPACING AND YIELDS

Dwarf tree

Spacing Plant the trees 8-10 ft apart.

Yield A good average yield from an established tree is about 40-60 lb.

Semi-dwarf tree

Spacing Plant 18-20 ft apart.

Yield 70-90 lb.

Standard tree

Spacing Plant 30-35 ft apart.

Yield A good average yield from a well grown standard apple is 60-120 lb and from a pear 40-100 lb.

for stone fruits such as peaches, cherries and plums, and for this reason it is described only on those pages.

The dwarf pyramid The dwarf pyramid is a small tree, pyramidal or Christmas tree-like in shape and kept this way by summer pruning. If, like the cordon, it is closely spaced, many

trees can be planted in a relatively small area (lose attention to summer pruning is necessary, however, to maintain space between the framework branches and adjoining trees, otherwise a row of dwarf pyramids can soon degenerate into an unproductive hedge).

Although a restricted form, the dwarf pyramid is intended for planting in the open, not against a wall or fence (see pages 54-5).

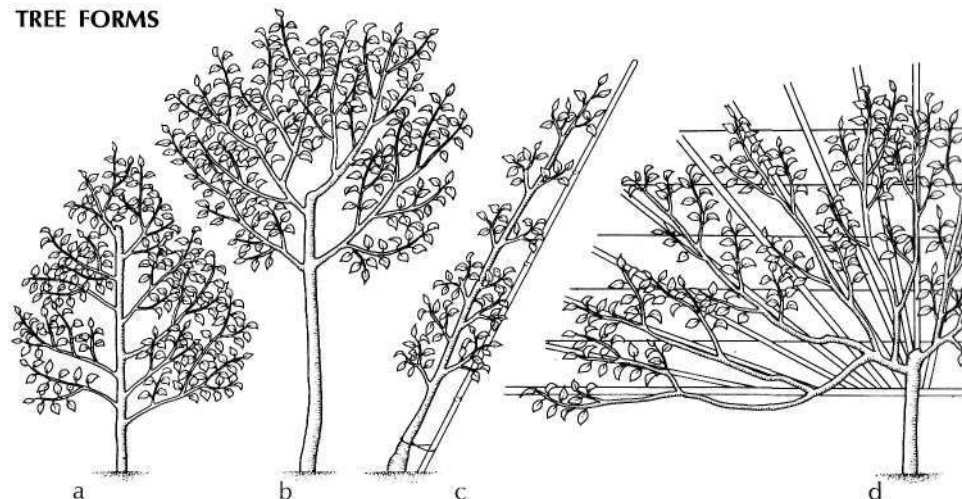
Varieties

The choice of varieties depends upon the personal preferences of the gardener. Nevertheless, when making the final selection, ensure that the varieties will pollinate each other (see page 43).

Many triploid varieties are very vigorous and are not suitable for growing in restricted form unless grafted on to the dwarfing rootstocks Mailing 26 for apples and Quince C for pears.

The description of the apple and pear varieties gives the season when the fruit is mature and fit to eat or cook. The picking date and maturity are not necessarily the same and this varies from locality to locality.

TREE FORMS



The dwarf tree (a) is made up of the top, an inter-stem of 18-24 in, and the rootstock. The cordon (c) is planted and trained obliquely. The fan (d) is shaped.

The standard tree (b) has a clear stem of 6-7 ft grafted onto a vigorous rootstock. The cordon (c) is planted and trained obliquely. The fan (d) is shaped.

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Trees in the open

The dwarf, semi-dwarf and standard tree forms are commonly grown in the open.

Selecting the tree

A nursery can supply one-year-old, two-year-old or three-year-old trees. Trees older than this are not recommended because they may not establish well.

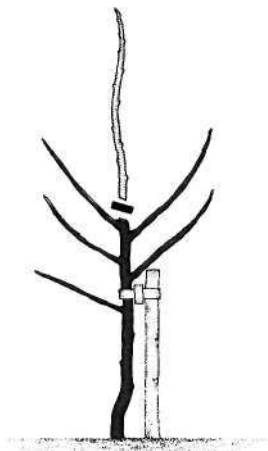
A one-year-old, or maiden, tree consists of a straight stem with or without laterals. A maiden with laterals, sometimes called a feathered maiden, is a better choice because if the laterals are suitably placed they can be used as primary branches, and a year is saved in the formative pruning stage. The maiden is the least expensive type, but it requires initial shaping and takes longer to bear fruit.

Trees of two and three years old will have already been partly shaped by the nursery and, being older, bear fruit sooner.

Soil preparation and planting

Prepare the soil in the late winter (see page 44). Plant the tree while dormant, in March or April, driving in a stake first.

Pruning a feathered maiden



1 In late winter, prepare the soil and drive in a stake. Plant a maiden tree to the same depth as it was at the nursery. Tie to the stake. Cut the main stem back to a bud or lateral at about 24 in for a dwarf, 30 in for a standard.

Pruning

Prune in late winter, but not when the air temperature is below freezing.

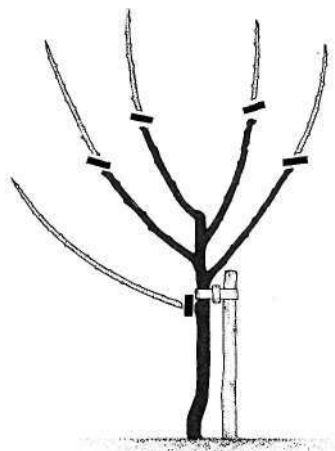
The first winter The work of forming the head begins with the maiden tree.

Unfeathered At planting, shorten the maiden tree to 24 in for a dwarf bush or to 30 in if a standard is to be formed. Cut back to just above a bud, making a sloping cut away from the bud and ensuring there are three or four good buds beneath it. This cut stimulates the formation of primary branches the next year.

Feathered Cut back the main stem to a lateral at about 24 in for a dwarf or 30 in for a standard, ensuring there are two or three suitably placed laterals just beneath it. Remove all others flush with the main stem. Shorten the selected laterals by about two-thirds to an outward-facing bud.

The second winter (or the two-year-old tree) In the dormant season, select three or four strong leaders to form the primary branches, taking care to select those that are evenly spaced and have formed wide angles with the main stem. The wide angles ensure a stronger joint; a narrow-angled branch may break

The second year



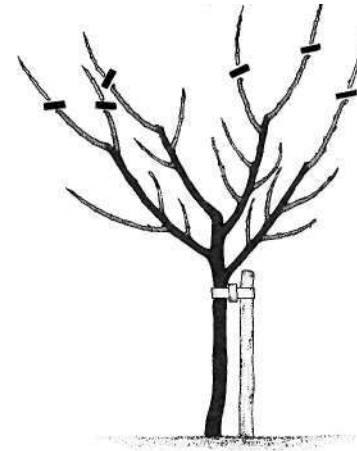
2 In late winter, select four of the primary branches that have formed wide angles to the stem. Cut back vigorous ones by one-half and less vigorous ones by two-thirds. Prune to outward-facing buds. Remove unwanted branches.

off under the weight of the crop later on. Notice the effect of apical dominance, that is, the topmost shoot is the most upright and it is often unsuitable because it is too central and forming a narrow angle with the stem. If this is so, cut it out, heading back to the next branch. Next, shorten the selected primary branches by one-half and shorten the less vigorous ones by two-thirds. Cut each to an outward-facing bud. The remaining shoots are removed altogether. Protect the cuts.

During the summer, the branch growth following the hard pruning should be strong, with secondary branches forming.

In the third winter (or the three-year-old tree) Select about four more widely-spaced branches. The framework now consists of about eight branches. Shorten these by one-half or, if weak, by two-thirds, cutting back to outward-facing buds. Prune back to about four buds those laterals not required for secondary branches and those competing with the leaders. If the tree is growing vigorously, some laterals on the outer part of the tree can be left unpruned to form flower

The third year



3 In late winter, select a further four well-placed new growths to form permanent branches. Cut back vigorous ones by one-half and less vigorous ones by two-thirds. Prune to outward-facing buds.

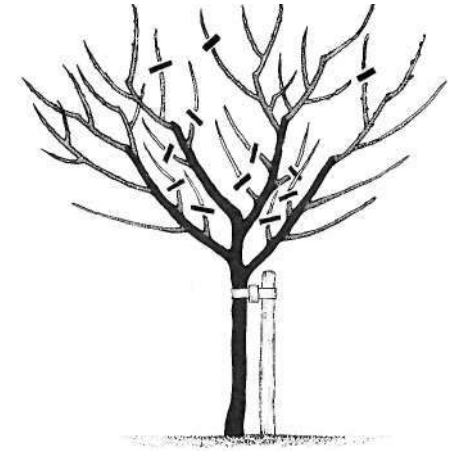
buds. Shoots crowding the crotch of the tree should be removed. The center should be open, but not completely barren of growth. Growth from the main stem lower than the primary branches should be cut off to maintain the clean leg. Protect the cuts with a tree paint.

The fourth winter The tree is entering the cropping phase of its life, but a little more formative pruning is still necessary, as described for the third winter. Weak varieties may need further formative pruning for the next two or three winters.

Winter pruning the cropping tree By the fourth or fifth year the tree should start bearing fruit. From then the pruning guidelines are flexible, exactly how much is pruned depends on the condition of the tree.

Before pruning an older tree, remember that the harder the tree is pruned, the more growth is obtained, but in consequence the less fruit is produced. Thus, a heavily pruned tree will be vigorous but unfruitful, whereas a lightly pruned tree may crop heavily, but the fruit will be small and the framework weak and badly shaped.

Fourth and subsequent years



4 In late winter, the branch framework has now been formed and leader pruning can cease, unless growth is weak. Leave laterals on the outer parts of the tree unpruned. Cut back laterals on the inside to about 4 in.

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Pruning the cropping tree

Before pruning apple or pear trees that are past the formative stage, it is important to distinguish between the spur-bearing and the tip-bearing varieties. A spur-bearing variety produces fruit buds on the two-year-old as well as on the older wood, where they are carried on short stubby shoots called spurs. Where these shoots become very branched, typically on old wood, they are called spur systems. The spur-bearer is the most common type of apple and pear tree.

A tip-bearing variety produces fruit buds at the tips of slender shoots made in the previous summer. A few spurs are also produced on the older wood, but considerably fewer than on a spur-bearer. The tip-bearer has a more gaunt appearance in comparison. There are also partial tip-bearers, which produce spurs on the older wood as well as fruit buds at their tips. For pruning purposes they are treated as spur-bearers.

There are three basic pruning techniques: spur pruning, renewal pruning, and regulatory pruning.

Spur pruning As mentioned above, spur-bearing varieties form spurs naturally, but they can also be induced to form spurs. Each winter cut back a proportion of maiden laterals to four or five buds. Choose those that have insufficient room to extend as secondary branches.

In the following summer, a lateral so pruned produces one or two shoots from the uppermost buds, but usually the lower buds develop into flower buds by the end of the growing season.

In the second winter, cut back the laterals to the topmost flower bud, thus removing the previous summer's growth. However, where there is room and no risk of the spur overlapping an adjoining branch, extend the spur system by cutting back to three or four wood buds on the previous summer's growth.

After some years, a spur system may become crowded and complicated and, as a result, the fruits are too numerous and therefore small. Then spur thinning is undertaken by reducing the length of the spur systems, cutting away the weakest buds and those buds growing on the undersides of the branches.

Renewal pruning of spur-bearers This also depends upon the tendency of many apple and pear varieties to produce flower buds on unpruned two-year-old laterals. It is best reserved for the strong laterals on the outer part of the tree, where there is room for such growth.

The renewal system of pruning is a method that encourages regular cropping by the removal of fruiting laterals that have passed their peak in growth. Young laterals are trained to take the place of the old laterals. This system is only effective when done by experienced gardeners and so should be practiced with great care.

In the winter, select a proportion of strong, well-placed laterals on the outer part of the tree and leave them unpruned. Prune the others as described in spur pruning. During the following growing season, the terminal bud on each unpruned lateral extends to produce a further maiden shoot, while most of the remaining buds develop into flower buds.

In the second winter, cut back the laterals to the topmost flower bud. In the following summer the cut-back laterals produce fruit.

In the third winter, half the laterals that have fruited can be retained as an elongated spur system. The others are cut back to leave a 1 in stub. This severe shortening stimulates the production of a new lateral from the stub, and so the cycle is repeated.

To sum up, at any one time the tree carries a number of one-year-old laterals unpruned, two-year-old laterals pruned back to a flower bud, and three-year-old laterals which are stubbed back to 1 in after fruiting—or left if there is room.

Regulatory pruning This applies to the tree as a whole rather than to specific parts of it as in spur or renewal pruning. Basically it entails keeping the center open by removing crowding and crossing branches and cutting out dead, diseased and broken wood. There is no need to prune the leaders after the early formative years except with poorly growing varieties, which require the stimulus of hard pruning.

The framework branches, laterals and spurs also should not be crowded. As a rough guide, in an old tree no main branch

should directly over-shade another by less than 18 in, nor should branches be closer than 18 in when side by side. Laterals should be spaced about 18 in apart and spurs not less than 9 in along the framework of branches.

If in later years, as a result of light pruning, the tree over-crops (with consequent small fruit) and growth is weak, adopt a policy of harder pruning to reduce the number of flower buds and to stimulate new growth. Simplify some of the over-long spur systems, and where they are crowded cut out some

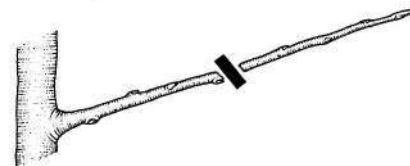
of them altogether. Increase the amount of renewal pruning.

Pruning of tip-bearers In the winter, prune lightly on the regulatory system (see above). Leave any maiden shoots less than 9 in long unpruned because they have fruit buds at their tips. Prune longer laterals back to four buds. This induces short shoots in the following summer with fruit buds at their tips—spur pruning in effect.

Always prune the leaders of tip-bearing varieties because this induces more laterals to bear fruit in the following year.

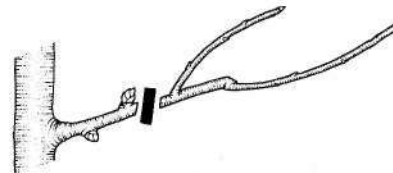
SPUR PRUNING

The first year



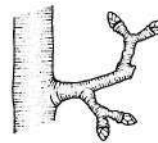
1 In late winter, cut back a maiden lateral to four buds.

The second year



2 In late winter, cut back the lateral to a flower bud.

Third and fourth years



3 In late winter, a spur system begins to be formed.

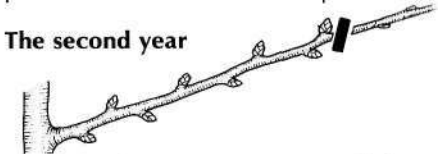
RENEWAL PRUNING

The first year



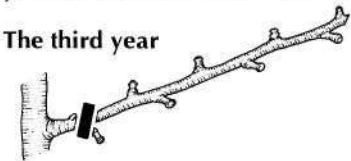
1 In late winter, select a strong well-placed lateral and leave it unpruned.

The second year



2 In late winter, extension growth has occurred. Flower buds have formed on last year's wood. Cut back to the junction between old and new wood.

The third year



3 In late winter, cut back the fruited lateral to leave a 1 in stub.



4 In October, at the end of the growing season, a strong new lateral has been produced from the 1 in stub. This is left unpruned to repeat the cycle.

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The central-leader tree

The success of this form, which is not common in the United States, depends upon producing wide-angled branches off the central leader. Depending on the training method, it is referred to as a vase shape or modified-leader form. Therefore buy a feathered maiden, because the laterals on such a tree are naturally formed at the correct angle. Such a form may be used if the gardener does not desire maximum fruit production, but only wants a specimen of beauty.

Soil preparation and planting

Prepare the soil in the early fall (see page 44). This form requires a long stake to support the central leader. The stake should be 8-8 1/2 ft long by 1 1/2—2 in top diameter.

Drive the stake in first, 18 in deep on a heavy soil and 2 ft deep on a light soil. Plant the tree and tie it to the stake.

Pruning and tying down in the first year (or the one-year-old tree)

During the dormant season from November to February, select three or four laterals to form the first tier of branches starting at not less than 24 in from the ground. Choose strong, well placed laterals coming off the main stem at a wide angle. Prune these back by one-half to an outward-facing bud. Remove the rest of the laterals entirely. Cut back the central leader to the third bud above the topmost selected lateral.

By August the original laterals will have extended and possibly new laterals will have been produced. A new central leader will have grown on. Tie the leader to the stake using a figure of eight tie with soft thick string. Choose three or four good laterals that form a wide angle with the main stem and gently tie the extension growth of each down to 30 degrees above the horizontal with soft

thick string secured to 9 in long wire pegs pushed into the ground. Remove any upright laterals and those directly beneath the central leader.

Pruning in the second winter

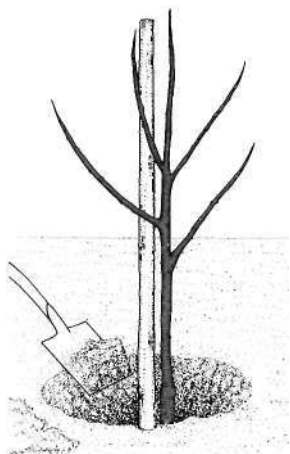
Cut back the central leader by about one-third of the previous summer's growth to a bud on the opposite side to that of the previous year. The technique of cutting to an opposite bud is called "zig-zagging" and helps to maintain the more or less straight growth essential in the central leader. Remove any upright laterals and those competing with the leader. Prune each remaining lateral by one-quarter to a downward-facing bud. Check the string ties to ensure there is no constriction and remove any where the branch has set at about 30 degrees.

In August, again tie down suitable new laterals to form branches.

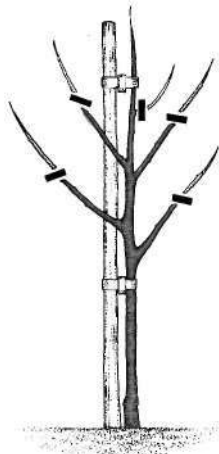
Pruning the cropping tree

In the third and subsequent years a similar procedure is followed. The central leader is pruned by one-quarter (if weak by one-third) to induce the lower buds to produce new laterals. The more vigorous the leader is, the lighter it is pruned. Branches are allowed to grow from the central stem at regular intervals, choosing those with a wide angle. Narrow-angled laterals are removed. The higher placed branches must be kept shorter than those beneath to allow sunlight to reach the lower parts. After the laterals at the very top have fruited, they must be pruned on the renewal system (see page 48). Tying down is discontinued once the branches have set at the required angle.

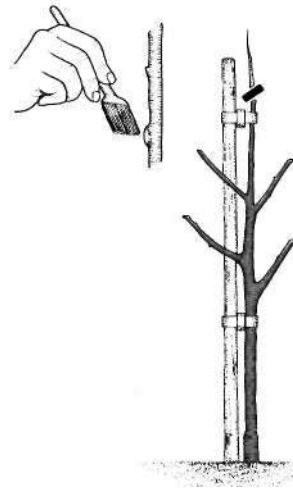
Each winter cut back the extension growth of the central stem to a weaker side branch once it has reached a height of 7-8 ft. Tie up the side branch to the stake as the new leader.



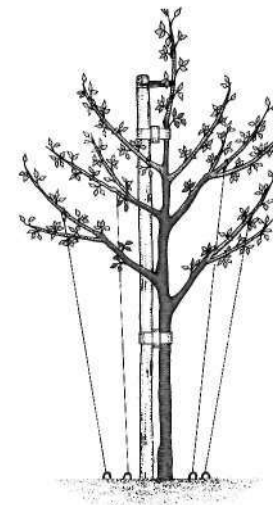
1 In November to March, prepare the ground and drive in a stake. Plant the feathered maiden tree to the same depth as it was at the nursery. Tie it to the stake.



2 At the same time, select three or four laterals to form the first tier of branches at about 24 in from the ground. Prune them back by one-half to an outward-facing bud. Remove remaining laterals entirely.

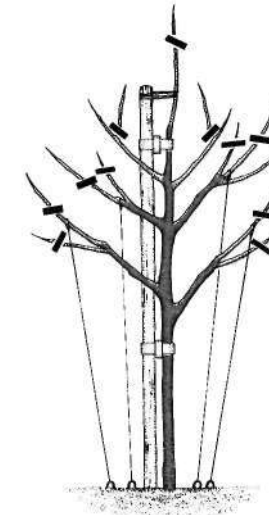


3 Then, cut back the central leader to the third bud above the topmost selected lateral. Protect the pruning cuts with a wound paint.

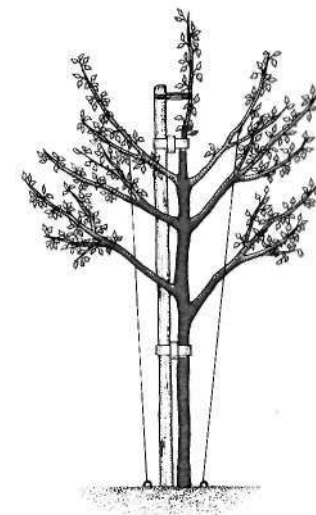


4 By August, the original laterals will have extended and a new central leader will have grown on. Tie the leader to the stake. Tie down the extension growth to 30 degrees above the horizontal using soft string.

The second year



5 In winter, cut back the central leader by one-third of the previous year's growth to a bud on the opposite side. Remove any upright laterals. Prune each remaining lateral by one-quarter to a bud.



6 Every year, check the string ties. Remove the ties where the branch has set at 30 degrees. In August, tie down new laterals. Cut back the leader to a weaker lateral. Tie it up as the new leader.

Apples and pears 6

Restricted tree forms: The cordon

A cordon consists of a single straight stem furnished with side-shoots or fruit spurs which are kept short by summer pruning and sometimes by winter pruning. It may be planted and trained vertically or obliquely, usually the latter because it requires less height and its growth is more easily controlled. There are also multiple cordons, with two or more stems.

The single stem apple cordon is not difficult to care for and is an ideal way for the amateur gardener to experiment.

The cordon is a form that, perhaps more than any other, is suited to the small garden. It is closely planted, so many varieties can be grown in a relatively small space and the gardener can more easily meet the cross-pollination requirements of apples and pears. Cordons can be grown against walls and fences or out in the open on a wire fence.

Choice of rootstock

For apple cordons, the dwarfing rootstock Mailing 9 is the most suitable where space is very limited and the cordons are to be kept down to a height of 5-6 ft. The soil must be fertile, however, if in doubt about the soil, obtain trees on a slightly more vigorous stock.

For pears, the cordons must be grafted on to Quince A or C rootstocks.

An apple cordon crops high quality fruit early and heavily because it is raised on dwarfing rootstock. Other fruits that can be grown on the cordon system include gooseberries, red currants, sweet cherries, and white currants.

Selecting the tree

Cordons of one, two or three years old can be planted. If selecting a maiden tree, preferably choose one with plenty of laterals because these are the foundation of the fruit spurs to come. Two- or three-year-old cordons will be quicker to bear fruit, but they must be well furnished with spurs and laterals.

Spacing

Space the cordons 2 1/2 ft apart on medium to good soils or 3 ft apart on poor, shallow or sandy soils with the rows 6 ft apart.

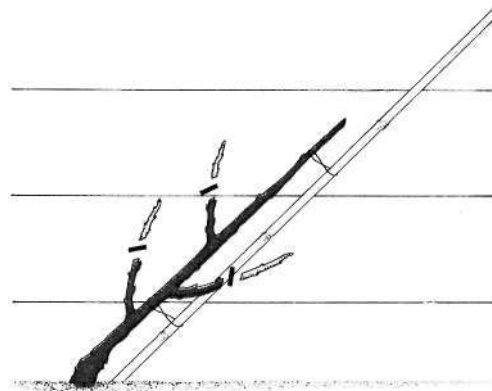
Support system

Cordons may be planted against a wall or fence or out in the open on a wire fence. On walls and wooden fences erect horizontal wires every 2 ft as described on pages 8-9. Out in the open drive in wooden posts every 12 ft to hold the wires. The posts may be 2 1/2 in x 2 1/2 in oak or 3 1/2 in top diameter in other woods. Set the posts 2 ft deep or 3 ft in sandy soils. The end posts should be strutted. Alternative materials include iron, steel or concrete posts. Erect the wires at 2 ft, 4 ft and 6 ft and use 10 gauge wire for the upper wire and 12 gauge for the other two. Securely tie 8 ft bamboo canes to the wires at an angle of 45 degrees, with the tops pointing towards the north if the rows run north-south, or to the east if they run east-west. Space the canes at 21/2—3 ft intervals to correspond with the planting stations.

Planting and training oblique cordons

Prepare the soil in the early fall (see page 44). Plant in the dormant season, unless using container-grown plants, which can be

The first year



1 In late winter, plant the maiden tree with the union uppermost, against a cane secured to wire supports at about 45 degrees. Do not prune the leader. Cut back any feathery branches to four buds.

planted at any time. Against walls and solid fences, the cordon should be planted 6-9 in away from the structure to allow room for the growth of the trunk. Set the cordon at an angle of 45 degrees with the union between stock and scion uppermost, and then securely tie the cordons to the cane using thick soft string or plastic chainlock strapping in a figure of eight. If the one-year-old tree has laterals, shorten those over 6 in long to four buds. Thereafter, prune each summer. Do not prune the leader.

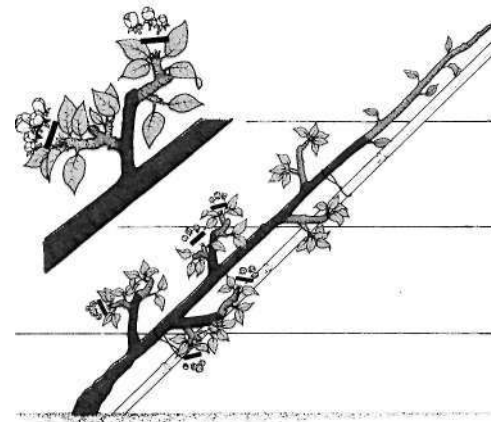
It is not wise to allow a cordon to crop in the first year after planting, so in the spring remove any flowers, taking care not to cut the growing shoot just behind the blossom.

Summer pruning: Modified Lorette System

Summer pruning is necessary to confine the growth to the limited space available. It also induces the production of fruit spurs close to the main stem. The Modified Lorette System is the simplest method.

Summer prune in about mid-July for pears and in the third week of July for apples in

Second and subsequent years



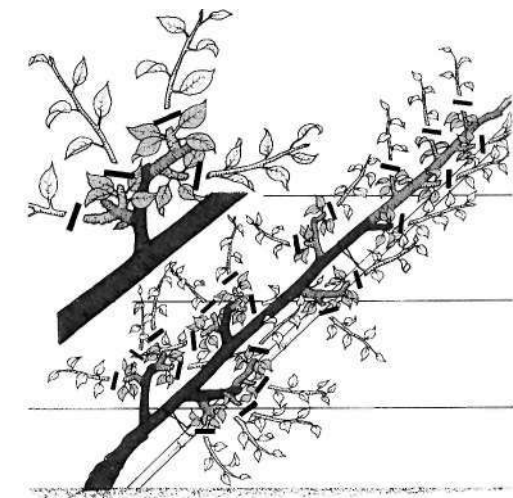
2 In spring, after a further year's growth spurs will have formed on the cut-back feathery branches. Remove any flowers as they appear, leaving intact the growing shoot behind the blossom.

warm climates. Prune seven to ten days laterals arising from existing side-shoots or all mature shoots of the current season's growth that are growing directly from the main stem. Cut back those mature sub-laterals arising from existing side shoots or spurs to one leaf beyond the basal cluster or rosette of leaves. Mature shoots have a stiff woody base, dark leaves and are 9 in or more long. Leave immature shoots until mid-September. Do not prune shoots that are shorter than 9 in because they usually have fruit buds at their tips.

Pruning the cropping tree

Each May, once the cordon has passed the top wire and reached the required height (usually 7 ft), cut back the extension growth to its origin. Each July subsequently, cut the leader to 1 in. From mid-July onwards the remaining shoots on the cordon are pruned on the Modified Lorette System (see above).

If, later on, there are secondary growths from shoots pruned in July, cut them back to mature wood just before leaf-fall. In areas



3 In late July, cut back laterals longer than 9 in arising directly from the main stem to three good leaves from the base, ignoring the basal cluster. Cut back sub-laterals from existing spur systems to one leaf beyond the basal cluster.

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where secondary growth is prolific after pruning, for example in high rainfall regions, delay pruning until later in the summer. If much secondary growth still occurs, then stop summer pruning altogether and prune in the winter instead, pruning to one bud from existing spurs and three buds on laterals arising directly from the main stem.

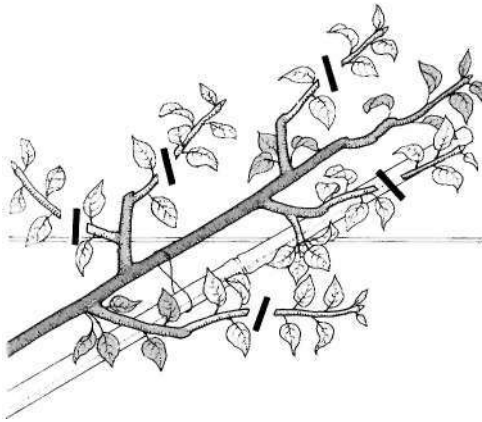
Winter pruning

Normally neither the leader nor the side-shoots are pruned in the winter except when a tree makes too much secondary growth, or makes poor growth, or to renovate it.

When a young cordon does not produce sufficient side-shoots, resulting in bare areas of stem, laterals may be induced by pruning the leader (previous summer's growth) by up to one-third of its length. Treat newly planted tip-bearers in the same way.

Neglected cordons can be brought back into shape by winter pruning. Thereafter prune them in the summer. Overlong or complicated spur systems should be reduced to two or three fruit buds.

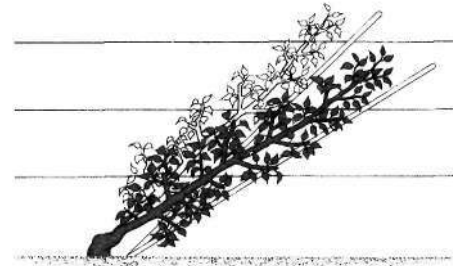
Secondary growths



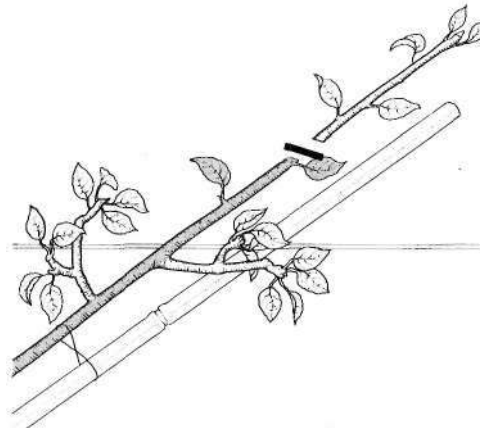
Just before leaf-fall, if further growth has developed from pruned shoots, cut it back to mature wood. In high rainfall areas, where much secondary growth occurs, stop summer pruning and prune from November to March instead.

LOWERING THE CORDON

When the cordons reach the top wire they may be lowered to obtain a longer stem. Lowering also helps to check the vigor of an overvigorous cordon. Lower carefully five degrees at a time and not lower than 35 degrees, so that there is no risk of breaking the stem. Lowering the angle slows down the movement of sap and limits extension growth while encouraging fruit bud protection.

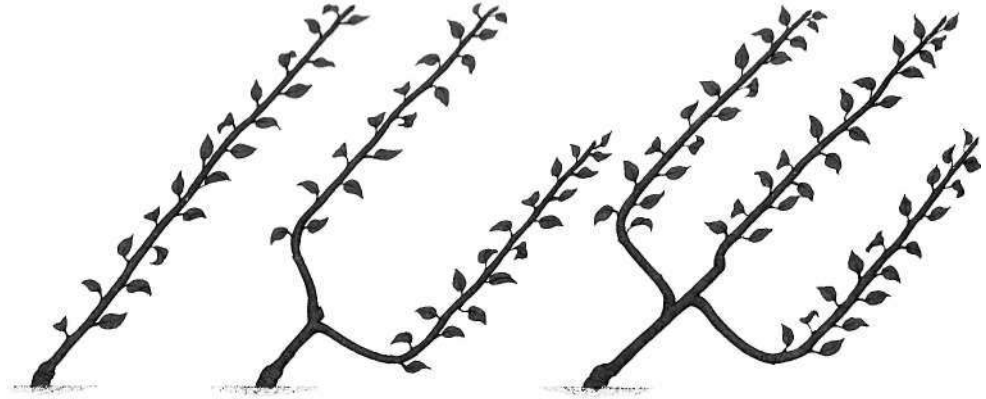


The fruiting cordon



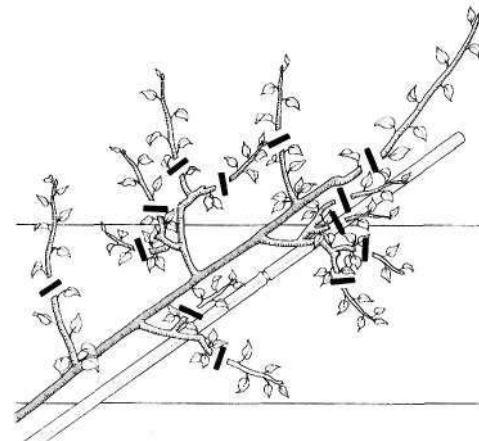
1 In May, when the leader has passed the top wire and reached the required height of about 7 ft, cut back the extension growth to its origin.

MULTIPLE CORDONS



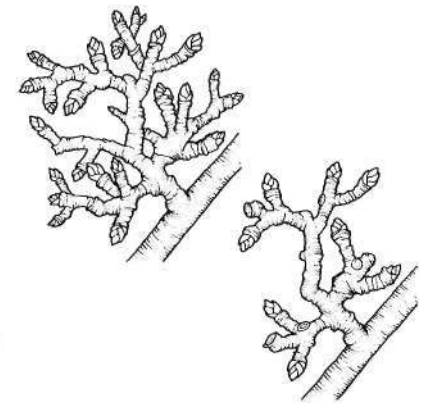
Cordons may also be formed with two, three or more arms, trained either vertically or at an angle. The training of a multiple cordon is initially similar to the formation of the first horizontal arms of an espalier. Thereafter each stem of the

multiple cordon is treated as a single cordon. Vertically trained cordons are generally more vigorous and often less fruitful than those trained at an angle of about 45 degrees. The angle can be reduced further (see Lowering the cordon).



2 Each July, cut back the leader to 1 in. Cut back to three leaves all mature laterals longer than 9 in growing directly away from the main stem and those from existing side-shoots and spurs to one leaf beyond the basal cluster.

OVERCROWDED SPUR SYSTEMS



As the tree matures thin out in the winter by reducing overlong overlapping or complicated spur systems to two or three fruit buds. Remove buds that are weak on the underside and shaded parts of the branches.

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Restricted tree forms: The espalier

An espalier consists of a central stem from which horizontal fruiting arms (tiers) grow at about 15–18 in intervals. The tree is trained in one plane and makes a handsome boundary marker or can be used to cover walls or fences.

Choice of rootstock and spacing

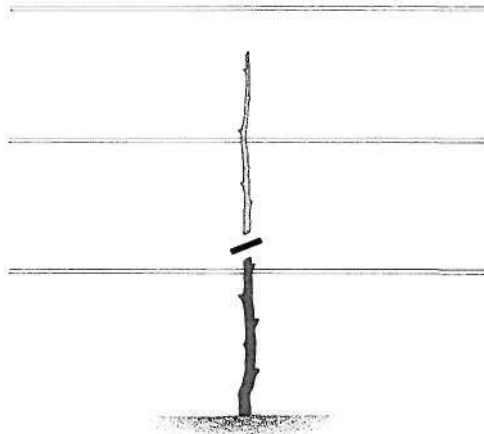
If a small espalier apple is required, for example, against a low fence, the tree should be on the Mailing 9 rootstock. This means obtaining a maiden tree and shaping it, because pre-formed espaliers on this stock are not usually available. For more than one espalier, plant 10 ft apart.

Where more vigorous trees are required, to clothe a large wall for example, they should be on vigorous rootstock and spaced 15-18 ft apart. Pears should be on Quince A or C rootstock.

Selecting the tree

The number of horizontal arms or tiers required depends upon the height of the wall or fence. Most nurseries that sell trees for espaliering supply two-tier and three-tier

The first year



1 In late winter, plant an unfeathered maiden tree. Cut back the stem to within 15 in of ground level. Leave room for a short leg and select three good upper buds for training.

espaliers and further arms can be trained in if required. A formed espalier is much more expensive but crops sooner.

Support system

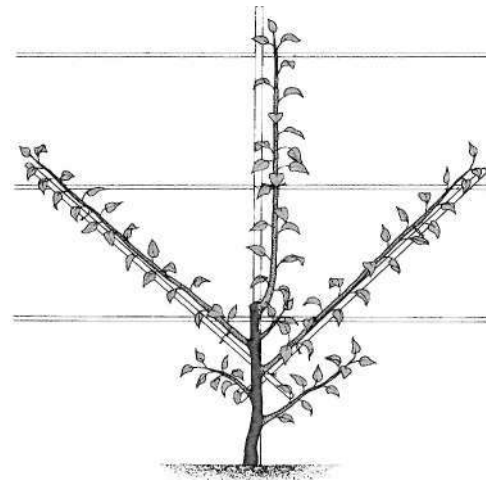
On walls and fences erect the horizontal wires to coincide with the espalier arms (as described on pages 8-9); usually each tier is 15-18 in apart. Out in the open, drive in posts to hold the wires every 12-18 ft, depending upon the spacing of the espaliers. The end posts should be strutted. Plant the espaliers centrally between the posts. Use 10 gauge galvanized wires and strain tight with straining bolts on the end posts.

Soil preparation and planting

In late winter, prepare the soil (see page 45). Plant in March or April. To allow room for the trunk to grow when sited against a wall or fence, the espalier should be planted 6 in away.

Formative pruning

Formed espaliers may be obtained or the gardener may prefer to start off with a maiden



2 From June to September, train the shoot from the top bud vertically up a cane. Train the shoots from the two lower buds at an angle of 45 degrees to the main stem. Tie them to canes fixed on the wire support.

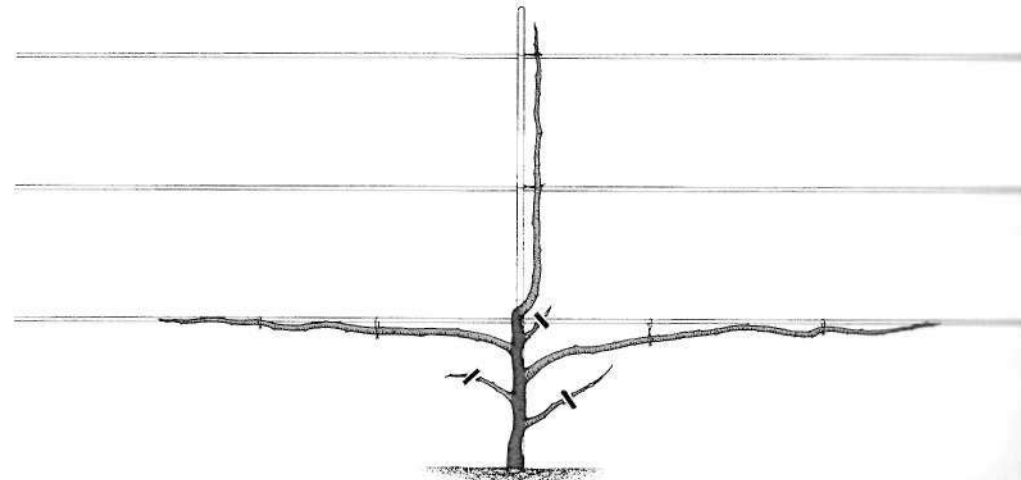
tree. The formative pruning steps in the first, second, and subsequent years are described below in as much detail as possible.

The first year Plant an unfeathered maiden tree in late winter or early spring. Cut back the stem to within 15 in of ground level, making sure that room for a short leg is left, together with three good topmost buds. The two lower ones should point in opposite directions.

In spring carefully direct the shoot from the top bud vertically up a cane and the others to the right and the left. It is difficult to obtain horizontal shoots in the first year without a check to growth and it is best to train the two shoots initially at angles of about 45 degrees to the main stem. This can be achieved by tying them to canes secured to the wire framework.

During summer the angle can be varied so that a weaker shoot is encouraged to catch up by raising it a little towards the vertical.

In November, at the end of the first growing season, lower the two side branches to the horizontal and tie them to the wire supports. Prune back the central leader to within 18 in of the junction, with the lower arms to



3 At the end of the growing season, lower the two side branches to the horizontal and tie them carefully to the wire supports

coincide with the next wire, the intention is to promote a further three growths one to continue the central axis and the other two to form a second tier of side branches. Shorten surplus laterals from the main stem to three buds. Prune the two horizontal leaders to downward-pointing buds, removing about one-third of each shoot. If growth has been particularly satisfactory, perhaps because of a good growing season, the leaders can be left unpruned.

Second and subsequent years The next years are a repetition of the first, with subsequent tiers of branches being trained in. In late winter lower the side branches to the horizontal and secure them to the wire support! Cut back the central leader to within 18 in of the last tier of arms at the next wire. Cut back unwanted laterals from the main stem to three buds. The horizontal leaders should be cut back by one-third, cutting in downward-pointing buds, if growth has been quite poor.

Cut back competing growths from the main stem to three leaves during the summer from July to September.

with soft string. Cut back surplus laterals on the main stem to three buds.

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There is a tendency for vertical shoots to grow from the horizontal arms. These laterals are pruned in summer, cutting each back to three leaves above the basal cluster. Do not tie the extension growth of the horizontal arms until the end of the summer because early tying checks growth. In winter train and prune both the horizontal and vertical leaders

in the same way as before. This regime of winter and summer pruning should continue until the desired number of tiers has been built in.

The number of tiers finally achieved depends on soil, site and inherent vigor, but four or five is usual. Eventually both the central axis and the horizontal arms fill their

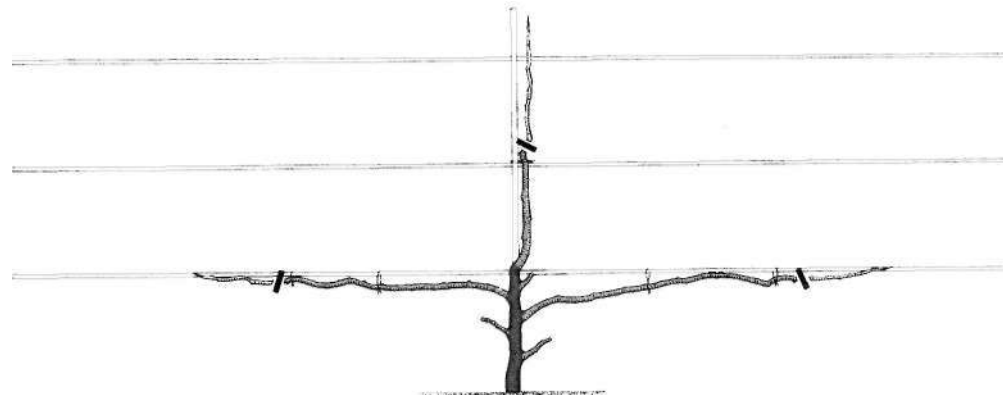
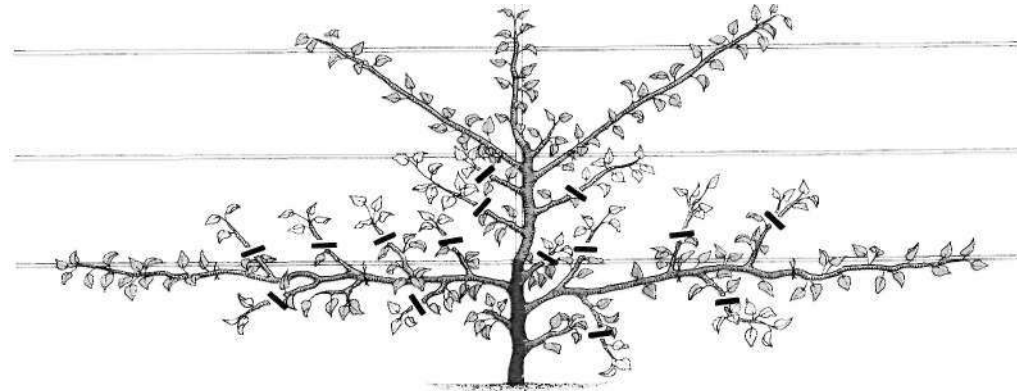
allotted space, from then onwards cut back the new terminal shoots to their origin each May and summer prune subsequent growth.

The fruiting stage

Each summer The fruits are carried on spur systems on the horizontal arms. The spurs are formed by the summer pruning of laterals

on the Modified Lorette System in exactly the same way as for cordons. Regard each arm as a horizontal cordon (see pages 50-1). **Winter** After a few years of fruiting, the spur systems may become complicated and should be simplified by removing clusters of weak buds and by cutting back some of the spurs to two or three fruit buds.

Second and subsequent years

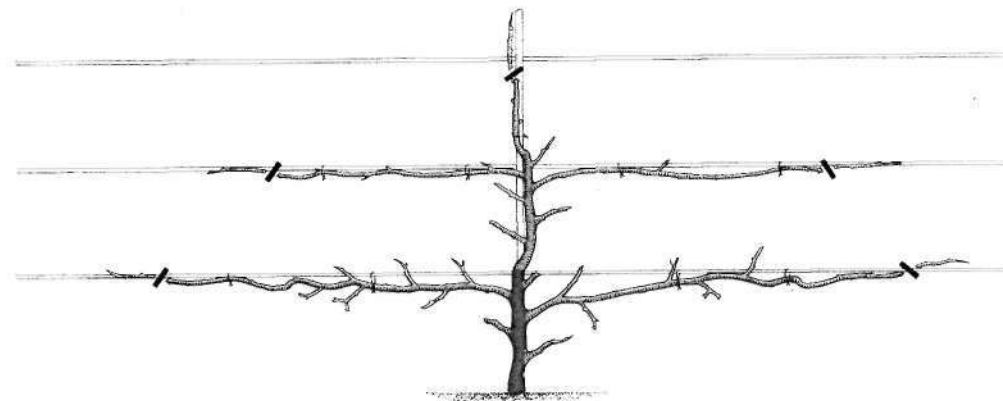


4 At the same time, cut back the central leader to within 18 in of the lower arm at the next wire, leaving three good buds to form the central leader and two new

horizontal arms. If growth is weak, prune back the horizontal leaders by one-third, cutting to downward-pointing buds.

5 From July to September, train the second tier of branches in the same way as in the previous years (see caption 2). Cut back competing growths from the main stem to

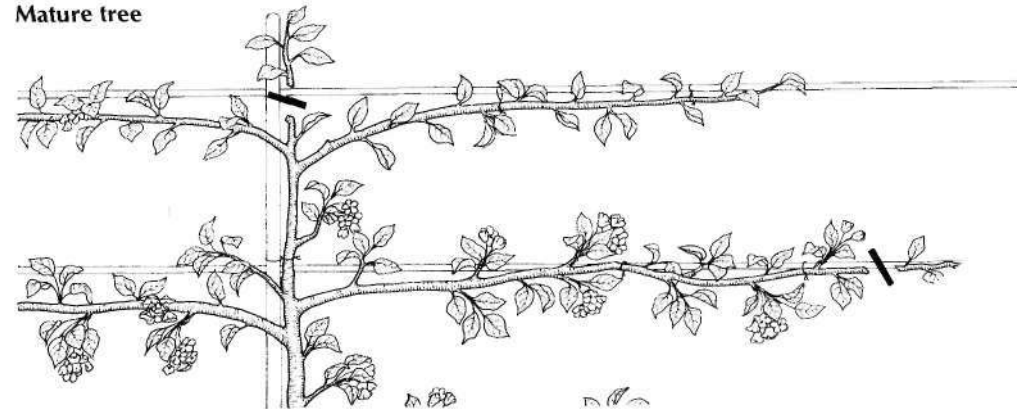
three leaves. Cut back laterals from the horizontal arms to three leaves above the basal cluster.



6 In winter, cut back the central leader to within 18 in of the lower arm, leaving three good buds to form the new central leader and two new horizontal arms. Cut

back surplus laterals on the main stem to 3 buds. Tie down the extension growth of each arm to the horizontal. If growth is poor, prune back the leaders by one-third.

Mature tree



7 In May, when the final number of tiers is produced and the tree has filled its allotted space, cut back the new terminal growths

of the vertical and horizontal arms to their origins. From now on prune them each summer as if they were cordons.

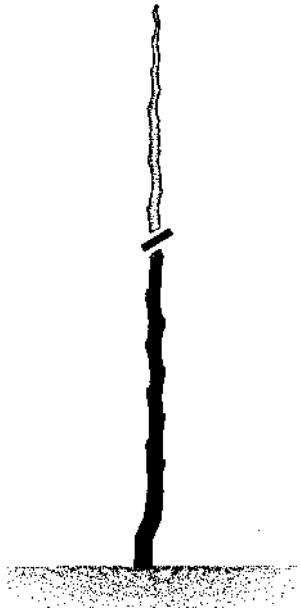
Apples and pears 10

The dwarf pyramid

The dwarf pyramid was evolved by commercial fruit growers as an easier method of producing apples and pears intensively. The pear, in particular, when grown on Quince rootstock, responds well to this method of training and in recent years the technique has been extended to plums. With apples and pears the aim is to produce a central-leader tree some 7ft high with a total branch spread of about 4 ft through the tree, tapering to the top to form a pyramid.

It is essential to keep such a closely

The first year

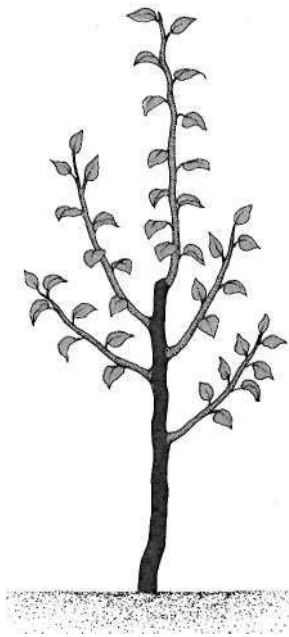


1 In early spring, at planting cut back the maiden to a bud within 20 in of ground level.

planted and compact tree under control. This control is exerted by a combination of summer pruning, early cropping, the complete removal of any vigorous upright shoots, and the choice of a rootstock capable of sustaining the required balance between steady cropping and the renewal of bearing wood.

Choice of rootstock

Mailing 9 and Mailing 26 rootstock are suitable for apples in most gardens and either Quince A or the re-cloned Quince C (when generally available) can be used for pears.



2 From July to August, four or five strong shoots will have been produced. No pruning is necessary.

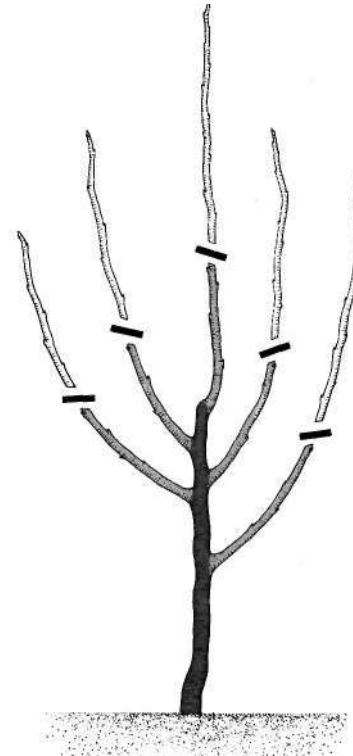
Planting and staking

In early fall, prepare the soil (see page 45). Plant in the dormant season from November to March. Individual stakes are not necessary unless planting only one or two trees. With a row of trees, support them by erecting two posts at the ends of the row, and stretch two horizontal wires between them, one at 18 in and the other at 36 in. Tie the trees to these, using string or strapping.

Spacing

Space apples on M9 rootstocks at 4-5 ft

The second year

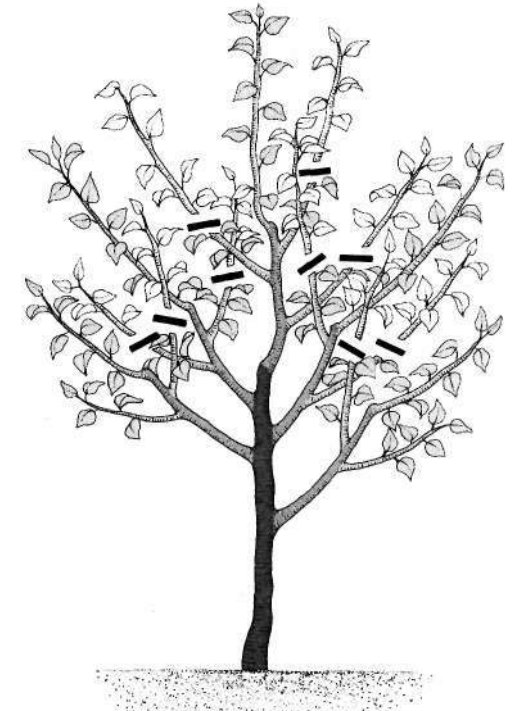


3 In late winter, cut back the central leader to leave 9 in of new growth. Cut to a bud that points in the opposite direction to the last pruning. Cut back side branches to downward-pointing buds to leave 8 in of the maiden extension.

apart, and apples on M26 rootstocks and pears 5-6 ft apart. Allow the wider spacing on fertile soils. The rows should be 7ft apart.

Pruning and training

The first year A start is made with a maiden tree, which is cut back to about 20 in on planting during the dormant season in early spring. Prune to a bud on the opposite side to the graft. The result of this initial pruning is the production of four or five strong shoots. The uppermost shoot, which will become the leader, grows vertically.



4 In late winter, cut back laterals not required for the framework to three leaves or 3-4 in and sub-laterals to one leaf beyond the basal cluster. Leave leaders unpruned.

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The second year In the following winter prune the central leader to leave about 9 in new growth, taking care to cut to a bud that points in the opposite direction to the last pruning. This is aimed at keeping the successive stages of the central stem as straight as possible, in a series of zig-zags. It would be easier not to prune the leader at all because the stem would be straighter if left untouched, but such pruning is necessary to stimulate the annual production of side branches during the formative stages. These side branches, perhaps four in number and

evenly spaced around the tree, are pinned back to within 8 in of the maiden extension, cutting each to a downward-pointing bud to maintain the horizontal direction.

During the following summer begin summer pruning, starting in mid-July for pears and about the end of July for apples. Cut back laterals (the current season's growth) longer than 9 in arising directly from the side branches to three leaves, and laterals from existing spurs to one leaf beyond the basal cluster. Leave immature shoots until September and then prune them in the same way.

Do not prune the leaders in summer.

Third and subsequent years Prune the central leader in winter. Aim to leave about 9 in of new growth, cutting to a bud that is pointing in the opposite direction from the bud to which the stem was pruned in the previous winter. This stimulates the production of new side branches. Cut back any secondary growth that may have occurred as a result of summer pruning to a mature bud.

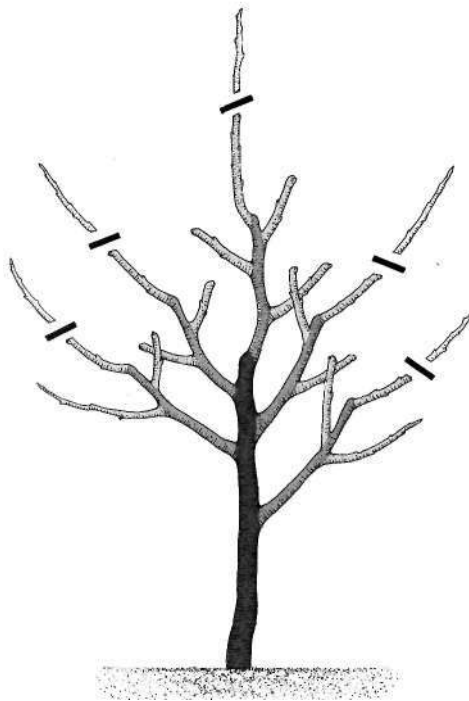
Every summer, prune the current season's growth on the side branches using the Modified Lorette System (see page 56), treating

each side branch as if it were a cordon. Prune the branch leaders to six leaves.

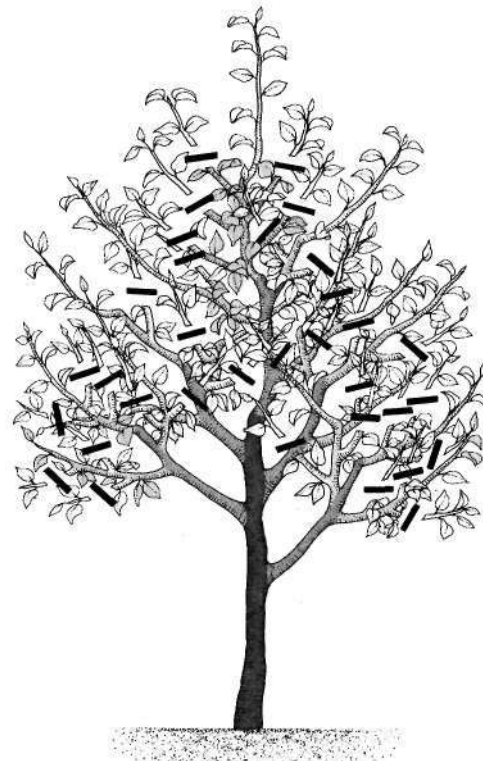
When the tree reaches 7ft, further extension growth should be stopped by cutting back the leader to its origin each May. Prune any other shoots that need restriction, such as vigorous upright shoots at the top or branch leaders growing into adjacent trees.

In winter it is occasionally necessary to shorten branches to a downward-pointing shoot in an attempt to maintain the essential horizontal position of the fruiting arms. Trim overcrowded spurs at the same time.

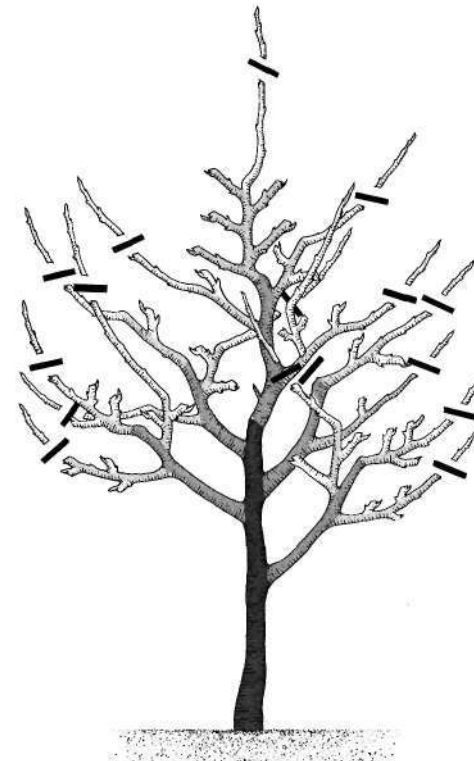
Third and subsequent years



5 From November to February, prune the central leader to leave about 9 in of new growth, cutting to a bud on the opposite side to the previous pruning.

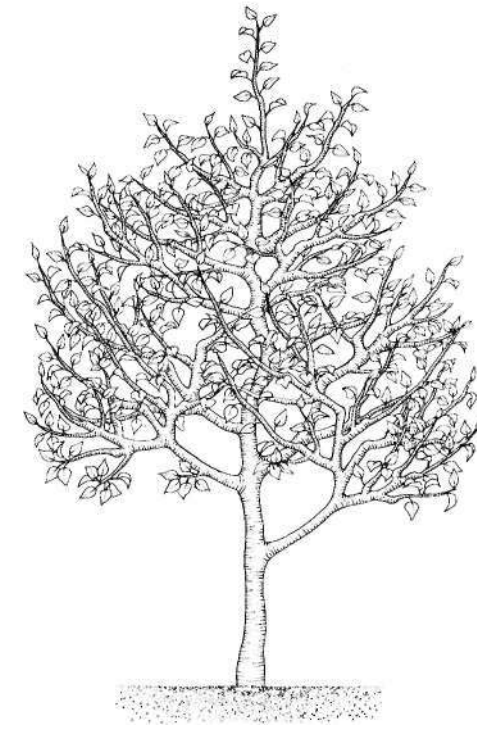


6 From July to August, throughout summer cut back laterals to three leaves or 3-4 in and sub-laterals to one leaf beyond the basal cluster. Prune the leaders of the side branches to six leaves.



7 In late winter, prune the central leader to leave 9 in of new growth. Remove entirely any over-vigorous shoots. Shorten branches to downward-pointing buds as necessary to maintain the horizontal position of the fruiting arms.

THE MATURE TREE



When the tree has reached the required height of about 7 ft, cut back the leader to its origin each May. Thin fruiting spurs as necessary. Maintain the central stem and retain the pyramid shape by close pruning and removal of vigorous shoots.

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Cultivation

Feeding and mulching Apply fertilizers as a top dressing over the rooting area, which is roughly equivalent to the spread of the tree and slightly beyond. Inorganic fertilizers can scorch grass, therefore brush well in and water the grass if the weather is dry. If the soil tends to be acid, with a pH lower than 6.7, sulfate of ammonia should not be applied because it makes the soil more acid. Instead use an artificial fertilizer containing calcium carbonate and ammonium nitrate. It does not affect the pH.

In early March, mulch newly planted and young trees with well-rotted manure, compost or peat to a depth of 2 in over a radius of about 18 in, but keep the mulch just clear of the stem.

Dessert apples In mid-winter apply sulfate of potash at 3/4 oz per square yard. Every three years, in mid-winter apply superphosphate at 2 oz per square yard. In late winter apply sulfate of ammonia or the fertilizer mentioned above, at 1 oz per square yard.

Dessert apples in grass See cooking apples.

Cooking apples The same rates and timings given for dessert apples apply except that extra nitrogen is necessary, so double the application of sulfate of ammonia or the fertilizer mentioned above. This also applies to dessert apples grown in grass.

During heavy rainfall in spring and summer, and in high rainfall areas, some apple varieties suffer from magnesium deficiency (see pages 14-16). At the first signs, apply three foliar sprays at 14-day intervals, using 8 oz magnesium sulfate in 2 1/2 gal water, plus a spreader (1/4 fl oz washing-up liquid). To avoid a recurrence, apply the magnesium sulfate as a top dressing in April, at 2 oz per square yard over the rooting area.

Pears, dessert and cooking Pears benefit from additional nitrogen, but if too much is given, vigorous growth is encouraged which, in turn, encourages fire blight. In the first year, therefore, apply only a few handfuls of balanced fertilizer such as 10-10-10. From the second year until the tree starts to bear, apply 8 oz of ammonium nitrate. Then increase the application to 16 oz and then, when the tree is about 10 years old, apply 24 oz. Thereafter, apply 32 oz per year.

Watering To ensure good establishment and strong growth, young trees (especially newly planted ones) need to be watered in the growing season whenever the soil is dry. As a guide, apply 4 gal per square yard every ten days throughout dry periods.

Cropping trees also respond to irrigation by producing heavier crops of larger and better quality fruit. Lack of water may induce a biennial bearing pattern (see page 58). The total amount of water needed is about 4 in (18 gal per square yard) in July, 3 in (13 1/2 gal per square yard) in August and 2 in (9 gal per square yard) in September.

Obviously, in cool wet regions these totals will be met by natural rainfall, but in dry areas some water must be applied, the actual amount depending upon the rainfall. Apply 2 in (9 gal per square yard) at a time under the trees, starting in early July. Use a slow-running hose as a soaker and keep the water on the ground rather than on the foliage, irrigating over the rooting area.

Fruit thinning The main purpose of fruit thinning is to obtain larger and better quality

Manuring



1 In mid-winter, apply sulfate of potash at the recommended rates. In late winter apply sulfate of ammonia.

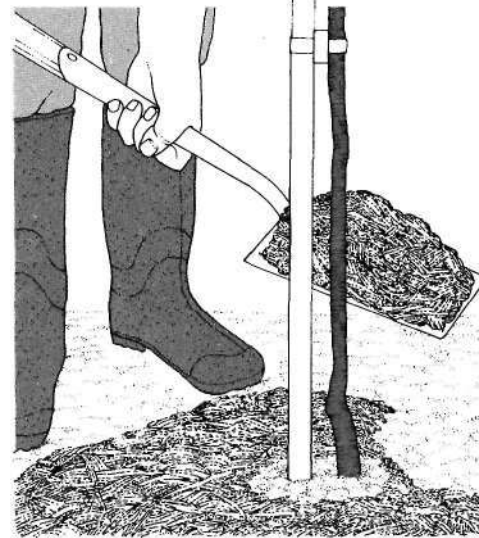
fruits. In heavy cropping years if the fruits are not thinned, the resultant crop will consist of small, medium to poor quality apples or pears and, as with lack of water, the strain imposed upon the tree might put it into a biennial habit. Much depends upon the condition of the trees: trees with healthy foliage and a strong framework can carry more fruit than can weaker trees. Young trees should not be allowed to crop so heavily that the branches are bowed down and the tree cannot make the essential strong growth needed for its framework.

Some varieties naturally shed some of their fruitlets in late June or early July which is called the June drop, but this may not be sufficient. Start lightly thinning before this in mid-June by removing the malformed fruits, and then complete the task after the June drop in about mid-July.

Cooking varieties should be thinned harder than the dessert fruits.

Use sharp scissors or press the fruitlet with the thumb and finger, leaving the stalk behind. In the final thinning, dessert apples

Mulching



2 In early March, mulch newly planted and young trees with a 2 in layer of well-rotted manure or compost over a radius of 18 in.

should be spaced on average 4-6 in apart with about one fruit per cluster and occasionally two where there is a good show of supporting leaves. Cooking apples should be spaced on average 6-9 in apart.

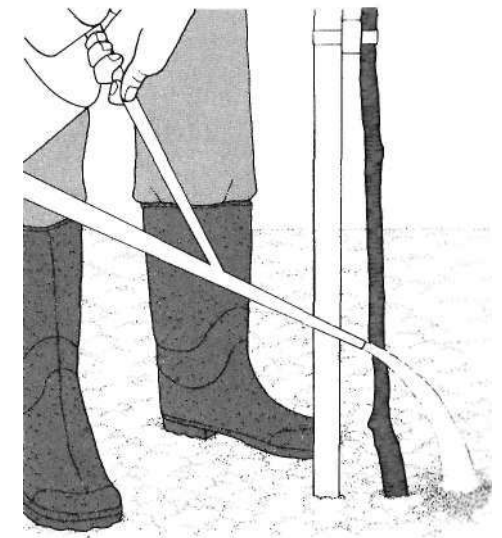
With apples, sometimes the "king" or "crown" fruit produced in the center of a cluster is virtually stalkless and malformed. If this is the case, remove it, but if the apple is well shaped, leave it because the king fruit can be the best in the cluster.

Pears need less thinning than do apples. Start thinning after the natural drop in late June, but not until the fruitlets turn downwards. Thin to two fruits per cluster and occasionally to one where the foliage is poor or sparse.

Supporting heavily laden branches Prop up heavily laden branches well before there is a risk of the branches breaking. Use forked poles or stakes but place a cushion of soft material such as a piece of rubber tire between the prop and the branch.

Weak branches can be tied to stronger ones with rope or webbing. Small trees can

Watering



3 In summer, apply 4 gal per square yard every ten days in dry periods.

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be supported by "maypoling". This involves driving a tall stake into the ground near the stem of the tree and tying rope or thick string from its top to each branch that will benefit from support.

Protection from wasps and birds

Apples and pears (especially the early varieties) sometimes need protection against wasps and birds. The trees can be netted or collars placed around the fruit stalks against birds (see page 17) but wasps are more difficult to combat. One remedy is to find and destroy the wasps' nests. They can also be trapped in jam jars partly filled with beer and sugar. However, these two methods guarantee only partial control, and the most positive (if tedious) protection against wasps is to enclose each fruit, or cluster of fruits, in a muslin bag or piece of nylon stocking.

Harvesting and storing

The time for picking apples and pears varies according to the season and the locality so it is not possible to give exact picking dates. As

a guide, the earliest varieties of apples are ready for picking in late July to early August.

Apples A good test for ripeness is to lift the fruit in the palm of the hand and if it leaves the spur easily with its stalk intact, it is ready. Another sign is the first windfalls (discounting drops from strong winds and codling moth attack). With the later ripening varieties, the color of the pips is an indication. They should be beginning to change color from white to straw-coloured and eventually to brown. With dessert apples in particular the skin of the fruits becomes more brightly colored.

Early varieties are best picked when slightly immature because they soon go mealy. Pick those apples that have colored rather than clearing all the apples in one go. Usually those apples in full sun are ready first and those in the middle of the tree last. Handle the fruits very gently because bruised fruits do not keep. Put the fruits carefully into a picking container lined with soft material and transfer them just as gently into their final container.

Late apples reach maturity in storage

sometime after picking, depending upon the variety. Most should be off the tree by about the third week of October, but there are a few varieties which keep better and acquire more flavor if left on as long as possible, birds and winter gales permitting. These include 'Granny Smith'.

Store only sound fruits (see page 90 for details of storage).

Pears The correct time for picking pears is harder to assess than it is for apples. The best test of readiness is to lift the pear in the palm of the hand and with a slight twist and tug, it should leave the spur with its stalk intact. There is also an almost imperceptible change in the ground color of the skin from dark green to lighter green.

Early and early mid-season pears (August to September) must not be left on the tree until they are fully ripe otherwise they may go "sleepy", that is very soft, mealy and brown at the center. Pick them when they are almost ready but still firm, and then let them mellow in storage. Their storage life can be extended considerably by keeping them

under cool conditions (3°-7°C/37°-45°F).

Late pears should be left on the tree until they leave the spur easily; the first sign of windfalls is an indication. The fruits are hard at this stage but will mellow in storage. Keep them under cold conditions and bring the pears into room temperature to finish ripening whenever required. (See page 82 for details of storage).

Pests and diseases

Apples The most troublesome diseases are scab, mildew and canker and the most troublesome pests are aphids, leaf-eating caterpillars, sawfly and codling moth larvae.

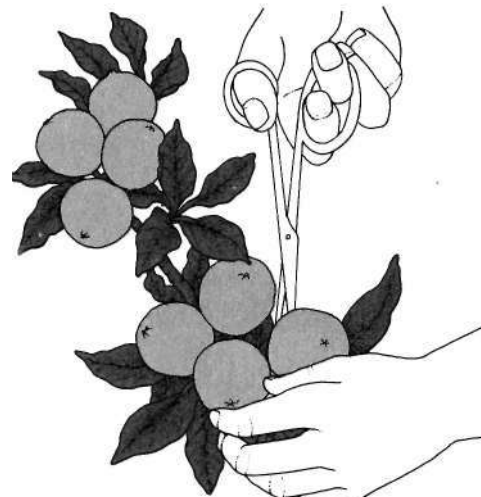
Scab and mildew can be controlled by regular spraying with benomyl or captan starting at bud burst and finishing in July. If canker occurs, cut out the rotting wood and paint the clean wounds with a canker paint. In bad attacks also apply liquid copper sprays after harvest and at 50 per cent leaf-fall, and the following year at bud burst. Check that the soil is not badly drained (see pages 10-11).

Use a systemic aphicide against aphids.

Thinning

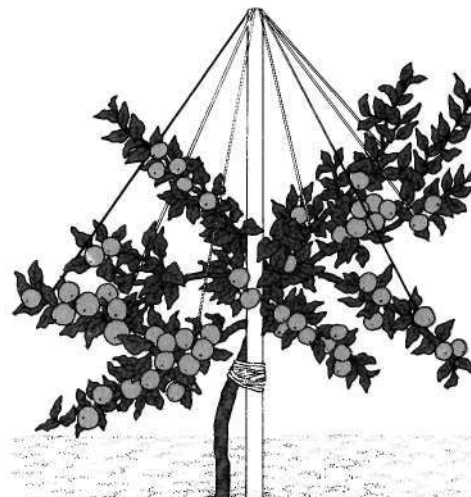


4 In mid-June, thin the fruits using sharp scissors or press the fruitlets off with the thumb and finger, leaving the stalk behind



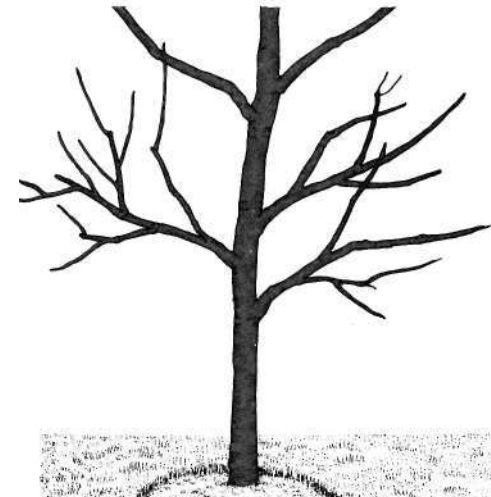
In mid-July, thin again to leave one or two dessert apples per cluster 4-6 in apart, cooking apples 6-9 in apart. Pears need less thinning; leave two fruits per cluster.

Maypoling



5 On small trees, to support branches with a heavy crop, drive a tall stake into the ground near the stem of the tree. Tie a rope from its top to each branch.

Grassing down the orchard



6 After four or five years, sow grass in the orchard. Sow a fine lawn mixture at 2 oz per square yard, leaving a grass-free area of 2 ft radius around the base of each tree.

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Spraying with dimethoate one week after petal fall controls sawfly larvae. Use a general-purpose fruit spray against codling moth caterpillars in mid-June and again at the end of June.

Pears The most troublesome disease of pears is scab and the most troublesome pests are aphids and leaf-eating caterpillars.

For scab spray with captan or benomyl at bud burst, repeating every two weeks as necessary until late July.

The whole business of pest control can be greatly simplified if a general-purpose fruit spray containing an insecticide and fungicide is used on a systematic schedule throughout the growing season.

In winter, during dormancy, spray with a dormant oil. Then use the general-purpose spray (1) just before blossoms open, (2) when three-fourths of the flower petals have fallen, (3) two weeks after petal fall, and (4) every 10-14 days thereafter until about three weeks before harvest.

Adding a "sticker" (a gluey liquid) to the spray keeps it from being rapidly diluted by the rain. If the "sticker" is not used, it may be necessary to increase the frequency of spray in wet or very humid weather to every seven days.

Propagation

Apples and pears do not come true from seed nor are they satisfactory from cuttings, so they are propagated by budding or grafting on to suitable rootstocks, a task normally performed by the fruit tree nursery.

Biennial bearing

Biennial bearing or the carrying of a heavy crop one year and little or none in the next, is a common problem with apples and pears. Certain varieties are prone to it, although almost any variety can fall into this habit. It is more likely to happen to trees which are starved or receiving insufficient moisture, which makes them unable to carry a heavy crop and at the same time develop fruit buds for the following year. Frost destroying the blossom one spring can sometimes be the start of biennial bearing. Once the tree is into this cropping pattern it is difficult to correct, although there are certain techniques the

BIENNIAL BEARING



1 In spring, before a heavy crop year, rub one-half to three-quarters of the fruit buds from the spurs, leaving one or two per spur.

gardener can try which sometimes improve the situation.

In early spring before an expected heavy crop year, half to three-quarters of the fruit buds are rubbed off the spurs, leaving about one or two per spur. This lessens the burden of too heavy a crop in that year and may enable the tree to develop fruit buds for the next year.

In conjunction with bud rubbing, a policy of more generous feeding and watering should be adopted in "on" and "off" years. But remember the danger of over-feeding pears.

First, clear away grass or weeds from the base of the tree over a radius of at least 2 ft.

Each March apply a balanced fertilizer such as 10-10-10 at 4 oz per square yard and sulfate of ammonia at 2 oz per square yard. Small trees should also be mulched with well-

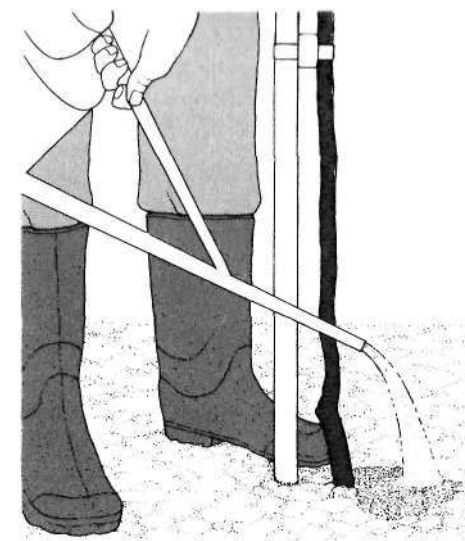


2 Each March, apply 4 oz per square yard of a balanced fertilizer, such as 10-10-10, and sulfate of ammonia at 2 oz per square yard. Mulch small trees with a 2 in layer of well-rotted manure over a radius of 2 ft.

rotted manure or compost to a depth of 2 in over a radius of 2 ft but keep the material clear of the stem.

In late August apply a further 2 oz per square yard of sulfate of ammonia. Throughout the growing season, whenever the conditions are dry, the tree should be irrigated copiously by applying at least 1 in of water (4 1/2 gal per square yard) over the rooting area every ten days until rain restores the balance.

If bud rubbing does not work, an alternative technique is to induce the tree to crop biennially over half the tree by removing half the blossom. Alternate branches are selected and marked in some way. Half the branches are designated to crop in the even years (1980, 1982, and so on) and half the branches are designated to crop in the odd years (1981, 1983, and so on). Each spring, those branches not selected to crop in that par-



3 In late August, apply a further 2 oz per square yard of sulfate of ammonia. In dry weather water copiously, giving at least 1 in of water (4 1/2 gal per square yard) over the rooting area every ten days until rain restores the balance.

ticular year must be rigorously deblossomed. At first this deblossoming represents quite a task, especially with a large tree, but after the third or fourth year it should be found that the branches have accepted this alternate pattern and very little blossom removal is necessary. However, a careful watch should be kept to see that the tree does not slip back into the full biennial cropping. As with the first technique, generous feeding is recommended.

Grassing the orchard

After four or five years, sow grass seed throughout the orchard. Grass checks the vigor of the trees and promotes color in the fruits, so grass down dessert fruits, but not cooking apples or cooking pears for which size is more important than color. Delay grassing if the trees are growing poorly.

Plums 1

A classification of plums

Plums grow in varieties of color, shape, and size and are known by different names in various parts of the world. Understandably, therefore, confusion often occurs among gardeners and botanists over names in the plum family.

The plum is a deciduous tree ranging in height from 15-30 ft when mature. It bears small fruit and is popular with gardeners. For reasons of simplification, the plum can be classified into three broad categories or groups: European, Japanese and native. But there are several other fruits which are also called plums, and these will be described briefly at the end of this section.

The European plum, primarily a blue fruit growing in zones 5-7, is further sub-classified simply as plum, or as, for example, gage, damson, or bullace. These fruits are recognized in the United States as plums, but a varietal name, such as green gage plum, damson plum, or Stanley prune plum, is appended for more precise identification.

The Japanese plum is a red fruit somewhat

larger than the European plum, and grows in zones 5-9. Native plums, the best of which are for the most part hybrids, are the results of crosses with Japanese plums. The fruits are red or yellow and fairly small. These trees grow in zones 3-7.

All plums can be canned or made into jams or jellies, but not all are ideal for immediate consumption. The Japanese plum is generally the best of the many plums available for eating when ripe and fresh, but many of the European plums are also excellent eating.

Since the plum does not form a very large tree, it is generally grown as a free-standing tree in the open. Standard, semi-dwarf and dwarf specimens are available. Some of the European varieties can be fan-trained against a warm wall or a fence, or as a pyramid, a very good form for the small garden. It is not suited to such restricted forms as the cordon or espalier.

Pollination

As a rule of thumb, plums are self-unfruitful. The numerous exceptions to this rule are

noted in the lists of varieties (above). A general safeguard, however, is to plant any variety of plum in the proximity of another variety to ensure a good set of fruit. But it should be realized that European and Japanese plums cannot pollinate each other. Native plums are pollinated either by other native varieties, by sandcherry-plum hybrids or, in the case of crosses between native and Japanese plums, by Japanese varieties.

Cultivation

The cultivation of all the various types of plums is broadly the same. The major variations are in pruning.

Yield A good average yield from a fully-grown plum tree in the open ranges from 30 to 120 lb.

Soil and situation Plums require a deep, moisture-retentive, well-drained soil with a pH from 6.5 to 7.2. Shallow soils over light, sandy subsoils are unsuitable. The plums grow best in clean soil. Control grass and weeds around the tree by shallow hoeing. Avoid too deep cultivation because this

encourages suckering. Plum varieties on vigorous rootstocks can be surrounded with grass, but a clean area 2 ft square should be maintained right around the base of the tree.

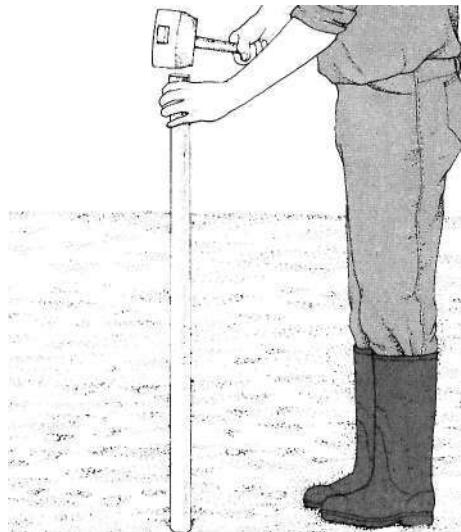
Plums flower early, and so a sheltered, frost-free site must be chosen because this is essential to avoid irregular cropping. Japanese plums, which bloom very early, should be planted on a north-facing slope or the north side of a building or wall in order to retard blooming and thus protect the plums from late frosts.

Soil preparation In the fall or early spring, prepare the ground by thoroughly clearing away perennial weeds over an area 3 ft square. Fork in a balanced fertilizer such as 10-10-10 at 3 oz per square yard and bone-meal at 2 oz per square yard just before planting. If the soil is light, also fork in well-rotted manure or compost at one 2-gal bucketful per 2 square feet.

Planting and spacing Plant bare-root trees in March or April while the tree is dormant. Container-grown trees can be planted at any



1 In autumn, prepare the ground, clearing away perennial weeds. Lightly fork in 3 oz of a balanced fertilizer and 2 oz of bonemeal per square yard.



2 For trees in the open, drive in a stake. For fan-trained trees construct a system of wires on the wall. Plant the tree and tie it to the stake or to the wall wires.



3 In February, apply a balanced fertilizer at 4 oz per square yard. One month later, apply sulphate of ammonia at 1 oz per square yard. Mulch the tree with a 1-2 in layer of compost or manure.



4 Thin the fruits when they are the size of hazelnuts and once the stones have formed within the fruits. Repeat when the fruits are twice this size to leave them 2-3 in apart on the branches.

Plums 2

time. Dig a hole wide and deep enough to take the roots fully extended. For trees in the open, before planting drive in a stake to reach just below the lowest branch. For fan-trained trees, construct a system of supporting, horizontal wires spaced 6 in apart (see pages 8-9). Plant the tree to the same depth as it was in the nursery. Return the soil and firm it well. Tie to the stake with a tree tie and cushion or tie in the branches of a fan to the wall wires. Water well. Trees in the open require staking for the first two or three years.

Space trees grown in the open 20 ft apart. Fan-trained trees are spaced 15-20 ft apart.

Pruning

Since Japanese and native plums grow more vigorously than European varieties, they require more pruning. This includes cutting back the head to some extent almost every year.

The first year In late winter, cut back the central stem of the maiden tree to a bud at about 2-3 ft for a dwarf, or 4-5 ft for a standard. It may be necessary to grow the

tree on for another year to acquire the needed height for a standard before cutting it back. Shorten all laterals to about 3 in to help thicken the stem.

In July or August, select four to five evenly spaced primary branches around the stem at the top. Pinch out the growing points of all others at four or five leaves, including those lower down the main stem.

The second year In late winter, select four branches that have formed wide angles with the stem. Cut back each leader of those selected by one-half to outward-facing buds. Remove the remainder, including the lower laterals of the last year to thicken the stem.

In the summer, remove any suckers that appear from the ground as well as shoots on the main stem below the head.

The third year Repeat the procedures adopted in the previous spring and summer, but allow more secondary branches to develop to fill the increased space, providing up to eight strong, well-placed outward-growing branches. In late winter, cut these back by one-half to two-thirds of the maiden

growth to outward-facing buds. I cave shoots on the outer parts of the head not required for leaders. Prune back unpruned laterals on the inside of the tree to 3-4 in.

Little pruning of European plums is necessary in subsequent years. Generally, all that is needed is to cut out dead, broken, rubbing and crossing branches and to thin out the head when it becomes crowded. Japanese and native plums require the same general treatment, but, as noted above, may need some heading back.

Pruning the fan-trained tree Starting with a maiden tree, the framework of a fan-trained plum is built up in the same way as a fan-trained peach (see pages 67-9). Thereafter, the pruning is different because, unlike the peach, the plum fruits on short spurs on three- and four-year-old wood as well as on growth made in the previous summer. However, the older wood tends to become bare with age and from damage by frost or birds. The aim in pruning is to encourage spur formation and, when necessary, to replace worn-out branches.

In the early years, extend the framework, as with the peach, to fill in the wall space; then follow the steps below.

In the spring of later years, cut out a proportion of the old, worn-out wood back to young replacement branches. Paint the wounds.

Feeding and watering

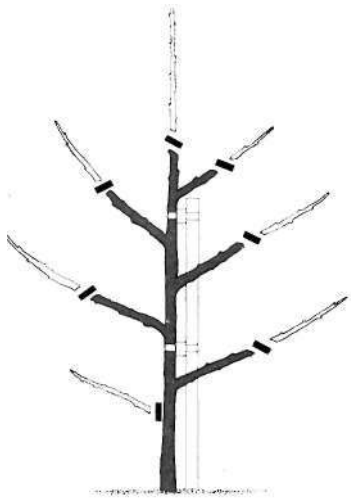
In early spring, apply a balanced fertilizer, such as 10-10-10, at 4 oz per square yard. Mulch young trees with a 1-2 in layer of well-rotted manure or compost over a radius of 18 in, keeping the mulch clear of the stem.

Water well and regularly in dry weather during the growing season, applying 1 in of water (4 1/2 gal per square yard) every ten days until rain corrects the balance. Avoid irregular heavy watering because this can cause splitting of the fruits, especially near the ripening stage.

Thinning the fruits

Thin the fruits (if the tree carries a heavy crop) after the stones have formed within the fruits

The pyramid plum: the first year

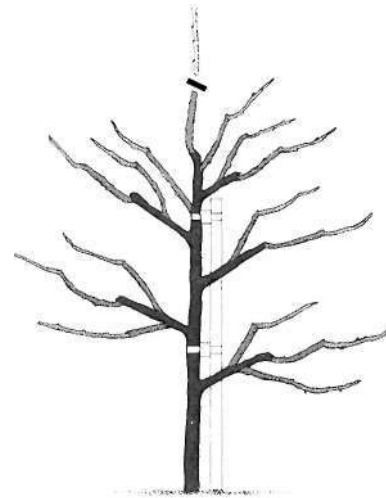


1 In March, cut back the leader to 5 ft. Cut back to the stem all laterals up to 18 in from the ground. Cut back the remaining laterals by one-half.

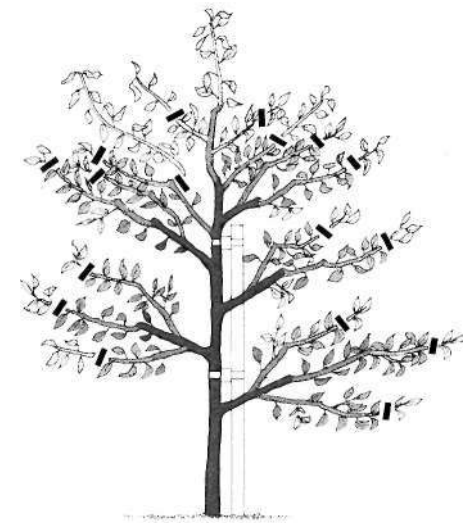


2 In late July, shorten the new growth of the branch leaders to 8 in to downward-facing buds. Shorten the current season's laterals on the branches to 6 in. Do not prune the central leader.

Second and subsequent years



3 In March, shorten the central leader by two-thirds of the previous summer's growth until the tree has reached about 9 ft, then shorten the central leader to 1 in each May to keep the tree at this height.



4 In late July, shorten the current season's growth of each branch leader to eight leaves. Shorten the laterals to six leaves. Cut out any vigorous shoots at the top of the tree.

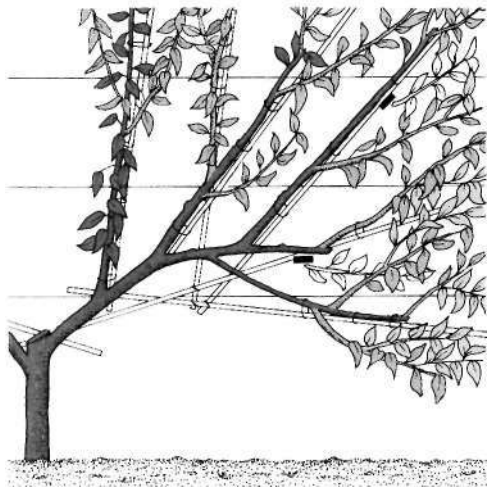
Plums 3

to avoid loss of flavor and the possibility of a biennial pattern of bearing. I bin once when the fruits are about the size of hazelnuts, and again when they are twice this size. On most European and native plums, fruits left on the tree to ripen should be 2-3 in apart; however, allow 4 in in the case of very large varieties. Japanese plums should be thinned to 3-4 in apart. Do not tug the fruits off because this may tear away the following year's fruit buds; cut the fruit stalk with scissors or shears.

Supporting the branches

It is essential to support very heavily laden branches because they may break and spoil the shape of the tree. Such wounds also increase the risk of bacterial infection. Support individual branches with a clothes prop or forked stake driven into the ground at an angle. Wrap the branch with burlap where it meets the crotch of the support. Alternatively, the branches of dwarf trees can be supported with ropes tied to a central stake in maypole fashion (see illustration 5 on page 57).

The plum fan



1 For the first three years, follow the formative pruning steps for the peach fan (see pages 69-70), extending the framework to fill in the wall space. Prune only in spring or summer.

Protection against birds

The fruit buds of the plum are susceptible to bird damage in winter and the ripe fruit is also at risk in the summer. Where necessary and practicable, protect the tree with netting (see page 17).

Harvesting and storing

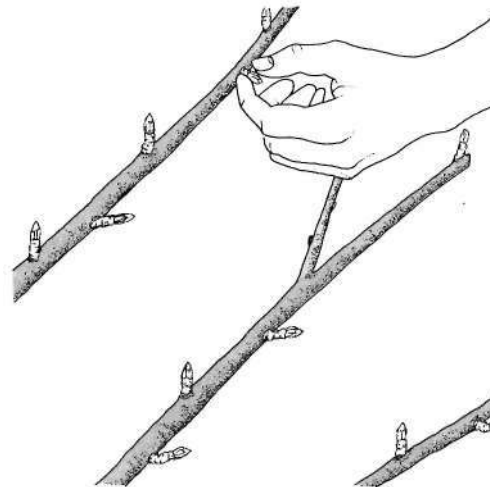
Plums ripen from midsummer on. They do not ripen simultaneously and it is necessary to go over the tree several times. Pick fruits intended for canning, jam and cooking while still slightly under-ripe. Pick all fruits with the stalks intact.

Plums cannot be stored for prolonged periods, but they will keep for two to three weeks if picked when a little under-ripe and kept in a cool place, at about 6°-7°C/42°-45°F.

Propagation

Plums are propagated by budding or grafting, a task normally carried out by the nursery. For details see the companion volume in this series, *Plant Propagation*.

Fourth and subsequent years



2 Each spring, as growth begins, rub out shoots growing directly towards the wall and breastwood.

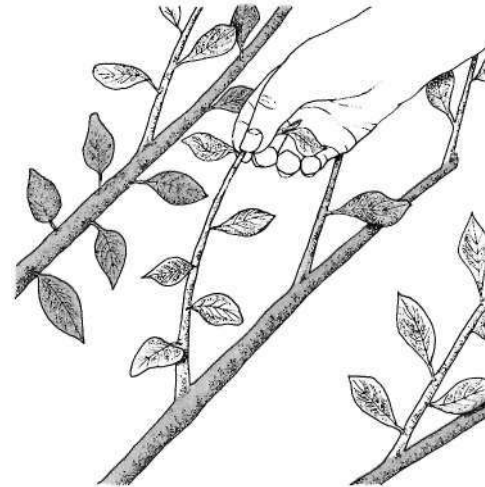
Pests and diseases

Spray trees with dormant oil in late winter. Then apply a general-purpose fruit tree spray when the petals fall and at 10-14 day intervals until approximately a month before harvest. Brown rot is a problem if the weather is warm and humid at time of bloom or in the three-week period before harvest. To control it, spray with captan at 3-4 day intervals.

Sandcherry-plum hybrids

These small (1/2 into 1 1/4 in diameter) plums are also known as cherry plums. They are the result of crossing native sandcherries with plums, usually native but sometimes Japanese. Accordingly, the deciduous plants range from shrubs no more than 4 ft high to trees about 25 ft high. The fruits have purple, red or green skins and yellow to purple flesh. Sandcherry-plum hybrids are most commonly grown in zones 2-6, where true plums do not thrive.

The many varieties all fruit from mid-August to September.



3 From late June to late July, as new shoots are made, pinch out the growing points of shoots not wanted for the framework when they have made six or seven leaves. This begins to form the fruit-bearing spur system.

Cultivation

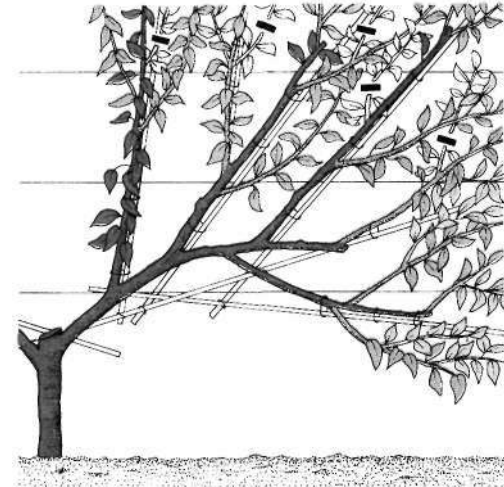
The sandcherry-plums are grown like plums and in dry regions require about as much space. In wetter areas, however, spacing can be reduced considerably. The best fruit is borne on young growth, so the plants must be pruned rather hard every year. A good procedure is to remove entire branches after they have fruited for about three years. The plants are self-unfruitful; plant two or more varieties.

Beach plums

The beach plum is generally associated with Cape Cod, where it grows wild in profusion, but it can be grown throughout zones 6-8 near the ocean.

Cultivation

The beach plum grows in indifferent soil so long as it is well-drained, but needs full sun. A little balanced plant food can be applied in early spring, the plants can be mulched with leaves, and then pretty well forgotten. Watering is required only in long dry spells.



4 After cropping, between mid-August and mid-September, cut back the pinched-out shoots to three leaves to encourage fruit buds to form at the bases of the pinched-out shoots the following year.

Sweet and Duke cherries 1

The cultivated sweet, or dessert, cherry is a hybrid between *Prunus avium* and *P. cerasus*. It is a hardy deciduous tree which is cultivated in many areas of Europe and western Asia. It bears clusters of attractive, white flowers in spring and bears fruits, ranging in color from yellow and pink to almost jet black, from June onwards in cool temperate areas. It grows in zones 6 and 7, and in protected locations in zone 5.

The Duke cherry is thought to be a cross between the sweet and sour cherry and it is intermediate in character between the two.

'May Duke', 'Olivet', 'Reine Hortense' and 'Royal Duke' are good varieties, but are difficult to find.

Cultivation

Although this delicious fruit merits a place in any garden, it has one serious drawback—its extreme vigor. Despite the introduction of increasingly dwarfing rootstocks, the cherry remains quite vigorous and is therefore not suitable for a small garden. It is often grown as a fan on a wall, but the wall must be fairly

high. In the open it is grown as a standard. By using the less vigorous rootstock Colt, it could be grown as a pyramid. Treat Duke cherries in the same way as sweet cherries.

Yield The yield from the different kinds of cherry can vary enormously depending, of course, on the size, age and form of the tree and the climate. A good average from a fan is about 30 lb and from a well-grown standard 100 lb.

Soil and situation Cherries grow in any good, well-drained soil but it must be deep, ideally more than 2½ ft. The pH should be between 6.7 and 7.5. Light, sandy and shallow soils are not suitable.

Cherry blossom is susceptible to frost and young trees to wind damage so the site should be sheltered from winds, in full sun and not in a frost pocket.

Soil preparation In the spring clear away weeds over an area 3 ft square, single digging clear ground and double digging weedy ground. Just before planting, fork in a balanced fertilizer such as 10-10-10 at the rate of 3 oz per square yard with bonemeal at

2 oz per square yard.

Planting and spacing Plant when dormant in March or April. Container-grown trees can be planted at any time. Dig a hole wide and deep enough to take the roots fully extended. For trees in the open, before planting drive in a stake to reach just below the lowest branches. Standard cherries require two stakes and a crossbar. For fan-trained trees, erect a system of horizontal wires on the wall using 14 gauge wire and spaced 6 in or two brick courses apart (see pages 8-9).

Plant the tree to the same depth as it was at the nursery. Return the soil and firm it well. Tie to the stake with a tree tie and cushion, or tie in the branches of a fan to the wall wires. Space fan-trees 18-25 ft apart; half-standards and standards at 30-40 ft apart and dwarfs 25-35 ft apart.

Pruning the fan-trained tree

The sweet cherry fan is pruned as shown in the step-by-step instructions below. Prune in spring as the buds burst and not in winter because of the risk of bacterial canker. If the

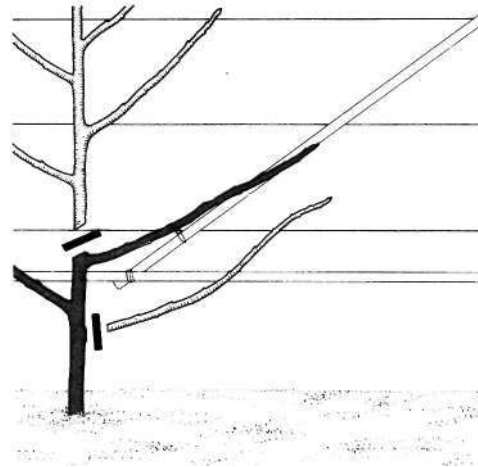
maiden tree is well feathered use two strong laterals, one to the left and one to the right at the first wire to form the initial ribs. Tie these to canes fixed to the wires at 35 degrees.

Pruning dwarf, semi-dwarf or standards

The first year: the maiden tree Prune in the early spring just as the buds begin to open. The head is formed by cutting back to three or four suitably placed buds in the same way as for the apple (see page 47). The objective is to obtain three or four well-placed primary branches by the end of the summer. Pinch out any flowers that are produced. Shoots lower down on the main stem should be pinched back to four leaves. These help to stiffen the stem and should not be removed until the cherry is four years old. Protect the pruning cuts.

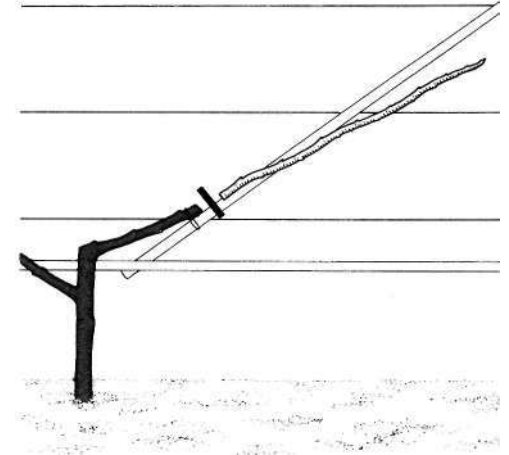
The second year In spring, prune each leader by one half to an outward-facing bud. Summer prune the pinched-back shoots on the main stem by pinching out the growing points. Weak or diseased branches should be entirely removed.

Pruning the fan-trained tree: the first year



1 In spring, tie two strong laterals to canes fixed to wires at 35 degrees. Head the center stem back to the uppermost of the selected laterals. Remove all other laterals and protect the cuts.

The second year



2 In spring, select suitable buds and shorten each leader to about 12 in. This encourages shoots to develop in the summer which are used as the ribs of the fan.



1 In spring, prepare the soil. Dig a hole wide and deep enough to take the roots fully extended. Plant the tree against a wired wall for fan-training (or with two stakes and a crossbar for standards).



2 Each April, apply a top dressing of balanced fertilizer at a rate of 3 oz per square yard over the rooting area. Mulch with a 2-3 in layer of well-rotted manure over a radius of 18 in.

Sweet and Duke cherries 2

The third year by the third spring six to nine well-spaced leaders should have been formed. Prune them lightly, leaving about 24 in of the previous summer's growth. Prune laterals competing with the leaders back to three buds. Upright laterals in the center should be cut out because these may grow too vigorously and spoil the shape of the tree. Where there is room, leave other laterals unpruned.

Fourth and fifth years No more leader pruning should be necessary. In the fourth spring clean up the trunk by removing the pinched-back shoots. Protect the wounds by sealing them with bituminous paint.

Pruning an established tree

Very little pruning is necessary while the tree is well furnished with cropping wood and of manageable height. Each year cut out dead, broken, crowded or crossing branches, cutting them flush to avoid any snags. Prune in the spring and protect the wounds by sealing them with bituminous paint.

Grassing down For the first four or five years

the soil around trained trees must be kept clear by maintaining a 3 ft wide border along the length of the wall over the spread of the tree. The border may then be planted to grass if the tree is developing in a satisfactory manner.

Dwarf and standard trees should also be grassed down after five years. For the grass mixture (see page 57). Keep the grass clear of the trunk of the tree, as not to do so will encourage pests or diseases.

Feeding and watering In March or April apply a balanced general fertilizer, such as 10-10-10, at 3 oz per square yard as a top dressing over the rooting area. Young trees, both fan-trained and in the open, should also be mulched to a depth of 2-3 in over an overall radius of 18 in.

Cherries against walls require watering in dry spells during the growing season. Once a good set of cherries has been achieved, water the border soil copiously in times of drought. Apply 1 in (4 1/2 gal per square yard) over the rooting area every seven days (ten for the sour cherry) until rain falls. Keep the

tree accustomed to moist soil conditions. Do not suddenly give heavy applications of water after the soil has become dry because this may cause the fruits to split and so spoil the subsequent crop.

Pollination

With one exception (the variety 'Stella') sweet cherries are not self-compatible, in fact, cross-incompatibility occurs. Most Duke cherries are self-compatible and can be planted singly but a few are not.

Protection against frost and birds

It is feasible to protect the blossom of a fan-trained tree against frost, but hardly practicable with a tall standard. Drape the fan with burlap or netting (see page 7). Other birds destroy the buds in the winter while starlings and blackbirds eat the ripe fruits. Protect the tree by covering it with adequate netting.

Harvesting

Leave the cherries on the tree until ripe unless they start cracking. Pick with the stalk on

using scissors or shears: if fruits are pulled off and the stalk is left hanging it encourages brown rot. Cherries should be eaten as soon as possible after picking as they can deteriorate quite quickly.

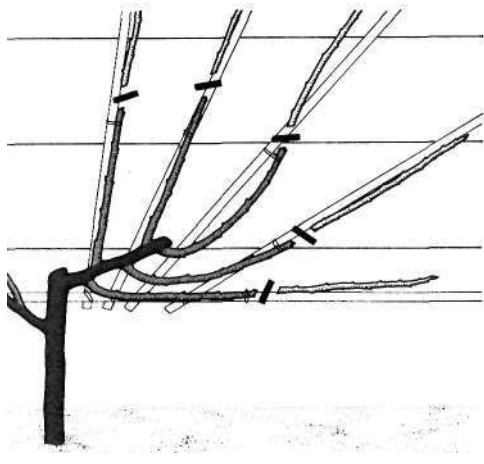
Propagation

Cherries are propagated by budding, or by grafting on to rootstocks, tasks normally carried out by the nursery but which can be done by keen amateurs if great care is taken in the exercise.

Pests and diseases

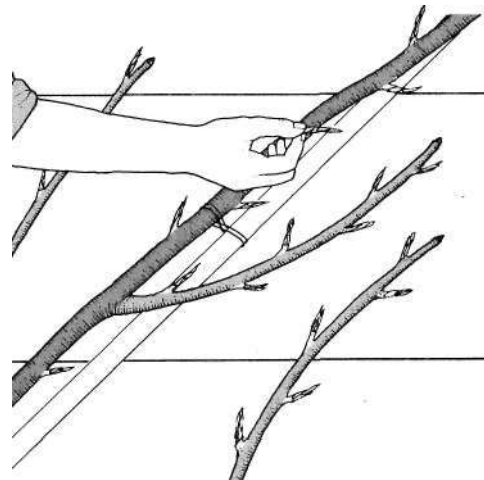
Tent caterpillars, cherry slugs, and brown rot are the most troublesome problems. Cherry slug and tent caterpillar as well as most other problems can be controlled by a regular spray program. The program should include the application of a dormant oil in late winter or early spring followed by consistent use of a general-purpose fruit spray after petal fall. To prevent brown rot, spray the plants with captan during periods of warm and humid weather conditions.

The third year

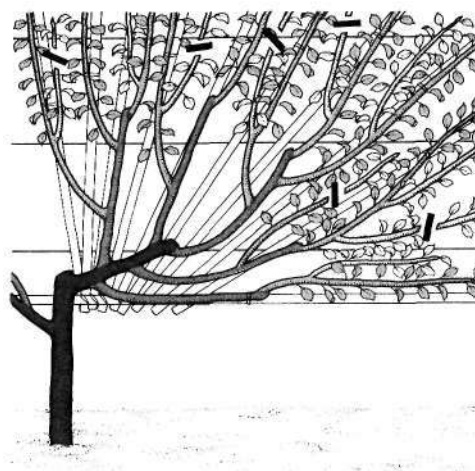


3 In spring, cut back all leaders to suitable buds, leaving 18-21 in of new growth.

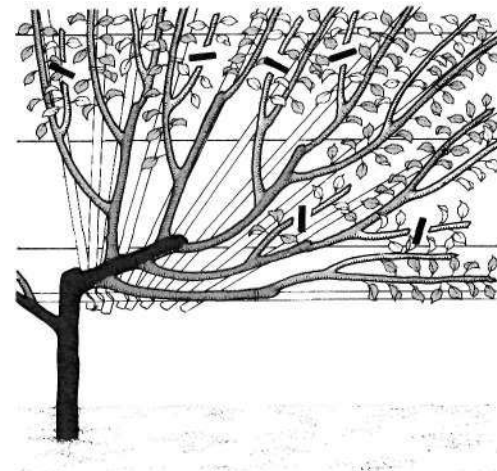
Fourth and subsequent years



'4 In spring, when most of the wall space has been filled, rub or cut out any breastwood or laterals growing directly towards the wall.



5 In late July, cut back to six leaves any laterals not wanted for the framework. When growth reaches the top of the wall, cut back to a weak lateral just below. Or, bend and tie down the shoots.



6 At the end of September, cut back to three leaves the laterals that were pinched out in July to encourage fruit buds to form at the base of the shoots in the following year.

Sour cherries

The sour cherry is a culinary fruit derived from *Prunus cerasus*. It is a hardy deciduous tree that is much less vigorous than the sweet cherry and can be grown in a small garden. There are two types of sour cherry: the Morello with dark red, almost black fruits and red juice; and the Amarelle, with red fruits and colorless juice. Both are self-compatible and can be planted singly in zones 4-7.

Cultivation

Usually grown as a small tree in the open, or as a fan on a wall, the sour cherry can also be grown as a central leader tree in pyramid form.

The sour cherry begins to bear fruit in its third or fourth year. A maiden tree can be planted but a few years are gained if a two- or three-year-old tree already partly shaped by the nursery is obtained.

Soil and situation Provided the soil is well drained, the sour cherry is tolerant of a wide range of soils but it prefers one that is neutral to slightly alkaline (pH 7.0).

The sour cherry flowers early in spring and so should not be planted in a frost pocket. It will tolerate partial shade and can be grown as a fan on a north-facing wall.

Planting and spacing Plant the tree when dormant in early spring. Prepare the soil and plant, stake and tie as for the sweet cherry (see page 62). Bush and central-leader trees should be staked for the first four or five years. For fan-trained trees, erect a support system of horizontal wires on the wall before planting. Use 14 gauge wire and stretch the wires at every 6 in. or two brick courses (see page 9).

Space trees grown in the open 20-25 ft apart. Fans are spaced 12-15 ft.

Control weeds and grass by shallow hoeing or use weedkillers (see page 17). Leave a border of uncultivated soil around the tree.

Pruning the fan-trained tree

The formative-pruning and training is the same as for a peach fan (see page 67), taking care to cut the leaders back hard in the first three years of training so that a head with plenty of ribs arising close to one another is formed.

Pruning the cropping tree is based on the fact that the sour cherry fruits almost solely on the growth made in the previous summer. As with the peach, the aim is to obtain a constant supply of strong new shoots to carry the next season's cherries.

In spring and early summer, thin out the new shoots to about 4-6 in. apart along the framework branches. Leave one replacement shoot at the base of each fruit-carrying lateral. Tie the young shoots to the wires while they are still flexible. Do not pinch out the growing points of the young shoots, but let them extend where there is room.

After harvesting in mid-summer, cut out the laterals that have fruited back to the young replacement shoots.

Some sour cherries are relatively weak growing and the fruiting laterals do not readily produce replacement shoots near the base. If these fruiting laterals are left unpruned and no replacements form, they become extremely long with the base and center of the fan bare and the crop carried only on the perimeter. When this happens, in March, cut out a proportion of the three- and four-year-old branches back to younger laterals to stimulate the development of new growth.

Pruning the bush and pyramid

The initial training for these forms is the same as for the open-centered bush and pyramid plum. The leaders are cut back in early spring as growth begins to establish the framework.

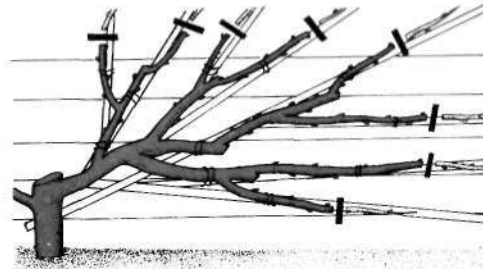
Mature trees bear fruit along young wood formed in the previous season. In March cut back a proportion of the older shoots to one-year-old laterals or young shoots so that the old growth is continually replaced.

As the trees become older, the center may become bare and unproductive. Each year after harvesting, cut back one-third of the main branches to within about 3 ft of the head to produce vigorous young replacement branches. Protect the cuts with a wound paint.

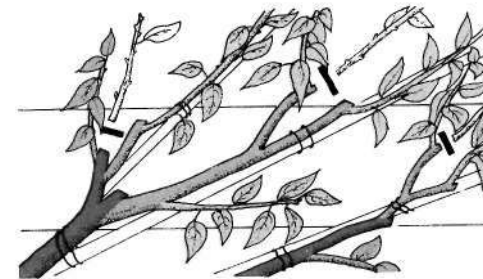
Routine cultivation

For feeding, watering, protection, thinning, harvesting, propagation, pests and diseases see Sweet and Duke cherries (pages 62-3).

Fan-trained tree

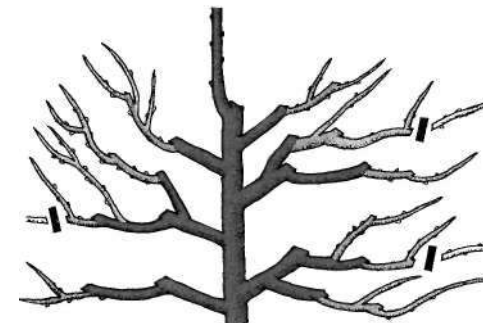


1 For the first three years, follow the eight steps for formative pruning of a peach fan (see pages 67-70), cutting the leaders back hard).



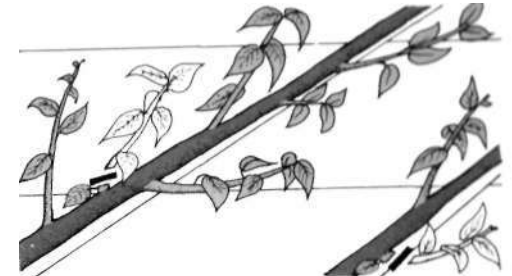
3 After harvesting, cut out the laterals that have fruited back to the young replacement shoots.

The mature tree



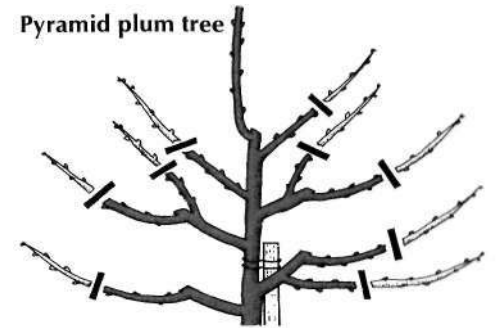
2 In March, cut back some of the older shoots to one-year-old laterals or young shoots to replace the older growth.

Fourth and subsequent years



2 In spring and early summer, thin out new shoots to 4-6 in. apart along the framework branches. Tie in young shoots to the wires.

Pyramid plum tree

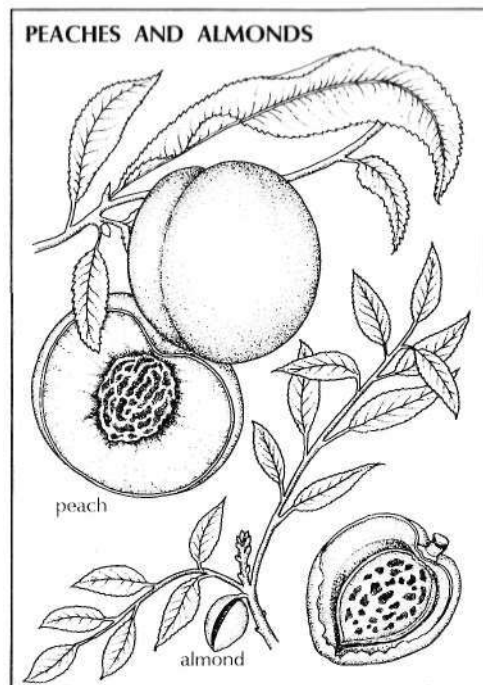


1 For the first three years, follow the steps for the initial pruning of a pyramid plum. **Cut back the leaders in early spring.**



3 After harvesting, if the tree is bare and unproductive, cut back one-third of the main branches to within 3 ft of the head,

Peaches and almonds 1



Peaches, nectarines and almonds (outdoors)

The peach (*Prunus persica*) is a small deciduous tree with long, tapering light green leaves and attractive pink flowers borne singly in the early spring. Despite its name, the peach did not originate in Persia, but almost certainly in China where it was cultivated for many centuries before being introduced to Europe. The peach is grown throughout the warm temperate regions of the world (zones 6-8).

The nectarine is a smooth-skinned sport, or mutation, of the peach. Generally the fruits are smaller than peaches and often considered to have a better flavor. For most cultural purposes, however, it is treated in exactly the same way as the peach.

The almond tree is similar in size, habit, leaf form and flower to the peach, but it blossoms even earlier and therefore in cooler areas the blooms are frequently destroyed by frost or affected by cold. For this reason in northern latitudes (zone 7) it is grown largely for its beautiful blossoms. The almond tree is a reliable producer of nuts in zone 8 and

especially in zone 9. It does best in the hot Sacramento and San Joaquin valleys of California.

Cultivation

The peach and the nectarine are self-compatible and single trees can be planted. The almond is only partly self-compatible and two or more varieties should be planted.

Yield The yield from a peach or a nectarine can vary enormously depending upon the size of the tree and the environment. A good average, yield from a fan is about 30 lb and form a bush 30-100 lb.

Soil and situation The peach is tolerant of a wide range of soils but it is essential that they are well drained. To improve the drainage of a heavy soil place brick and stone rubble and chopped sods in the bottom of the planting hole. The ideal soil is a medium to heavy, moderately limey loam, not less than 18 in in depth with a pH of 6.7-7.0.

The peach is quite hardy, preferring a cold winter and a sunny dry spring rather than a warm, wet winter which causes the buds to open only to be damaged by subsequent frosts. The site must be in full sun and sheltered from cold winds and ideally not in a frost pocket. The peach flowers very early so it is ideally grown as a fan on a wall or fence with a southerly aspect where it can be protected against frost at flowering time and benefit from the warmth of the structure. When planted in the open, as it generally is, the peach can be placed on a northern slope or the north side of a building so that it will bloom late after frost danger is past.

Soil preparation Where there are poor soils at the base of a wall, it is worth while preparing the border specially (see page 44).

On good soils, however, it is sufficient to fork in a balanced fertilizer such as 10-10-10 at the rate of 3 oz per square yard with bonemeal at 3 oz per square yard over an area of two square yards.

Selecting the tree For a tree to grow in the open buy a well-feathered maiden tree. For a fan obtain a fan that is already partly formed. Choose one with 5-12 shoots (depending upon the age of the tree) that are evenly

spaced to form the first ribs of the fan.

Planting Plant during the dormant season, usually in March or April. If planting a container-grown tree, it can be planted generally at any time. In the prepared soil, dig a hole wide and deep enough to take the roots fully spread out. Plant the tree to the same depth as it was at the nursery. Give each tree grown in the open a space of about 20 ft in diameter.

A fan must be planted 6-9 in away from the wall or fence to allow for growth, with the stem inclined slightly towards its support structure (see page 44).

After planting, apply a 2-3 in mulch of well-rotted manure, compost, peat or mushroom compost for 18 in around the tree.

A system of horizontal wires is necessary to support the fan. Fix the wires to the wall or fence every 6 in or two brick courses apart, starting at 12 in above the ground (see pages 8-9). Tie canes to the wires where needed with thin wire.

Pruning and training

Stone fruits such as the peach are pruned in late winter or early spring.

The fan-trained tree

The first year In March, starting with the feathered maiden tree, cut back to a lateral at about 24 in above the ground, ensuring that there are two good buds, or laterals, beneath it, one to the left and one to the right. Cut all remaining laterals to one bud. If there is not suitable lateral, cut back to a wood bud which is slender and pointed. If in doubt, cut to a triple bud which consists of two round flower buds and one wood bud.

In the early summer select three strong shoots. Train the topmost shoot vertically and of the other two, train one to the left and one to the right, choosing those that come from just below the bottom wire. Remove all other buds or shoots entirely.

As the two side-shoots lengthen, tie them to canes at an angle of 45 degrees. When both these shoots are about 18 in long, in June or July, cut out the central shoot entirely. Protect the wound with a wound paint to prevent disease or pest infection.

The second year In March, cut back the two side-shoots to a wood or triple bud at 12-18 in

from the main stem. This will induce new shoots in the coming summer. Protect the cuts with wound paint.

In summer, select four strong shoots from each arm. One to extend the existing rib, two equally spaced on the upper side and one on the lower side of the branch to give the tree a total of eight ribs by the end of the season. Pinch back all other shoots as they develop to one leaf.

Carefully train each new shoot to a cane to extend the wings of the fan. Keep the center open at this stage.

The third year In March, shorten each leader by about one-third, cutting to a downward-pointing wood bud. Paint the wounds.

In the summer, allow the leading shoot on each of the eight ribs to extend. Also select three more shoots on each branch and train these outwards, tying them to canes on the wires, to fill in the remaining space on the wall or fence. Rub out buds growing directly towards the structure and breastwood. Of the remaining buds, allow young shoots to grow every 4 in on the upper and lower sides of the ribs. Pinch back to one leaf any surplus shoots. Repeat this process as and when necessary throughout the summer. When the selected laterals have made 18 in of growth, pinch out the growing points, unless they are required as part of the framework. In late summer tie them to canes on the wires. Fruit will be borne on these laterals in the following summer.

Fourth and subsequent years From this point onwards the tree must be regarded as a cropping tree. The wall or fence should now be more or less completely covered with framework branches on which every 4 in are fruit-bearing laterals.

The peach carries its fruits on shoots made during the previous summer so pruning is aimed at a constant and annual renewal of young shoots. It follows also that the shoots which have borne fruits are cut out to make room for the new young ones.

Each late spring, about May, remove shoots growing directly towards and away from the wall or fence but leave one or two leaves or shoots which have flower buds at the base. Next deal with the previous summer's laterals which should be carrying both blossom and

Peaches and almonds 2

side-shoots. Select one side-shoot at the base as the replacement, one in the middle as a reserve and one at the top to extend the fruit-carrying lateral. Pinch back the remaining side-shoots to two leaves. When the basal side-shoot and the reserve lateral are 18 in long and the fruit-carrying lateral has a further six leaves, pinch out the growing points of each.

Pruning the standard tree The formative pruning is the same as for an apple (see page 47).

In the cropping years the objective is to encourage plenty of strong new growth each year to carry fruit in the next summer. This new growth is then cut back 50 per cent or more in the early spring of the year if it is to bear fruit. Long branches at the top of the tree should be removed at the same time. It is occasionally necessary to cut back some of the older wood which has become bare to young healthy replacements. Avoid, however, making large wounds because peaches are susceptible to bacterial canker.

Feeding and watering In early spring each year apply a balanced fertilizer such 10-10-10 at the rate of 3 oz per square yard as a top dressing over the rooting area. Replenish the mulch if necessary.

Trees over the age of three years need nothing more than nitrate of soda or ammonium sulfate unless a soil test indicates the soil has a potassium or phosphorus deficiency.

Keep the soil moist at all times until just before the fruit begins to ripen. Ample water is essential to good production. But it is also important to keep the tree accustomed to moist soil conditions at all times. In other words, do not suddenly apply a lot of water near ripening time because there is the risk of splitting the fruits. Because the soil at the base of a wall tends to dry out rapidly, fan-trained peaches must be watered with special care. Direct water at the base of the tree so that moisture gets to the roots. Do not wet the foliage.

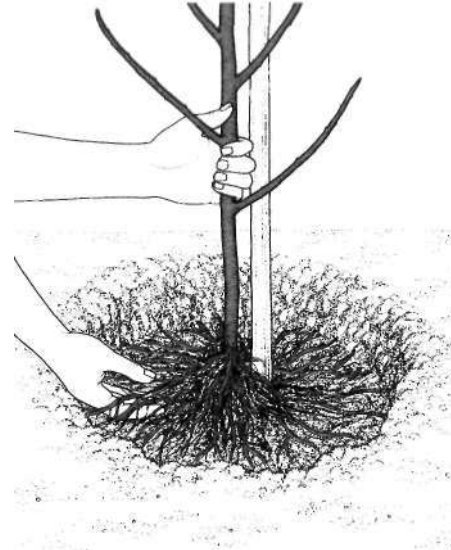
Frost protection

Protection of the blossom against frost is also essential from pink bud stage until the danger of frost has passed. Drape the fan-trained tree with burlap or bird netting (see page 17). Remove during the day.

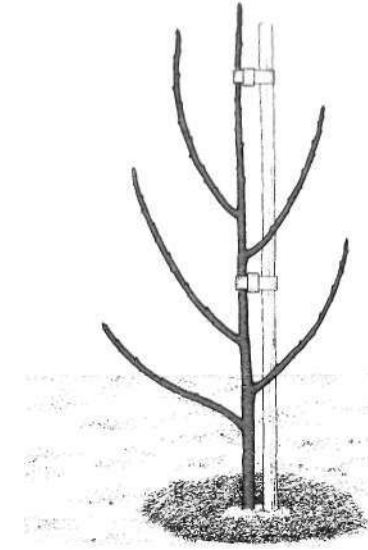
Planting



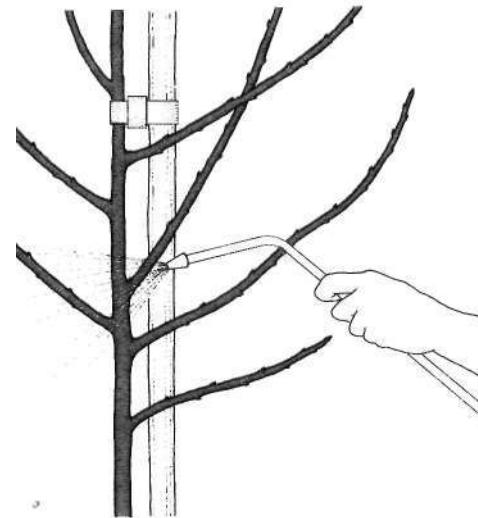
1 Before planting, fork in 3 oz per square yard of a balanced fertilizer, such as 10-10-10, with 3 oz bonemeal. Repeat every March.



2 In March or April, plant during the dormant season. A fan should be 6-9 in away from the wall or fence with the stem inclined towards it.



3 After planting, mulch to a depth of 2-3 in with manure or compost for 18 in around the tree. Replenish every year in late winter.



4 In March, spray with a copper fungicide or Bordeaux mixture against peach leaf curl. Also spray with dormant oil.

Thinning



5 From early May to July, thin the fruits, starting when they are the size of large peas.

Harvesting



6 From August onwards, pick the fruit when the flesh feels soft at the stalk end. Hold the fruit in the palm of the hand, lift and twist it slightly.

Peaches and almonds 3

Thinning

To obtain good-sized fruits it is essential to thin the fruits. Thin over a period, starting when the fruitlets are the size of large peas and stopping when they are the size of walnuts. Peaches should be 9 in apart and nectarines 6 in apart after the final thinning.

Harvesting peaches and nectarines

The fruit is ripe when it has a reddish flush and the flesh feels soft near the stalk end. Hold the peach in the palm of the hand, lift and twist it slightly. It should part easily from the tree. Store the fruits in a cool place until they are to be eaten. They will keep for only up to a week and for long-term storage they must be canned or frozen without the stones.

Pruning the fan-trained tree after harvesting

Immediately after cropping, not later than the end of September, cut out the laterals which carried the fruits back to the replacement shoots. Tie in the young shoots and cut out any dead or broken branches.

Once the peach has reached the required height and spread, remove any unwanted extension growth by cutting to a lateral further back along the branch. Cut out bare wood back to strong young replacements. Protect the wounds with a wound paint.

Harvesting and storage of almonds

Harvest the nuts when the husks split and the nuts fall naturally. Remove the nuts from the husks and dry them thoroughly in well-ventilated conditions: in sunshine is ideal, or in an airing cupboard. Keep the nuts off the ground by laying them on wire netting to allow air circulation. Once dry they should be kept in cool and dry conditions.

If squirrels are troublesome, harvest the nuts slightly earlier and dry both husk and nut initially before splitting them open.

Propagation

Peaches, nectarines and almonds are propagated by budding or grafting, a task normally carried out by the nursery, but it can be performed by the keen amateur.

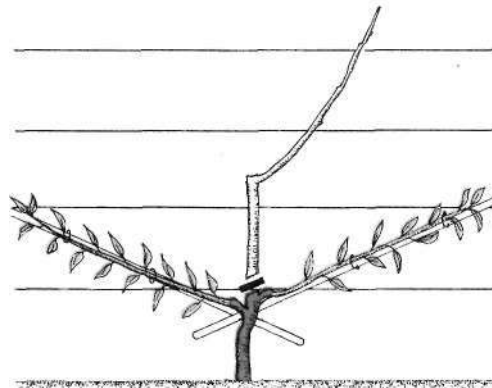
Pests and diseases

Peaches and nectarines are attacked by a

number of diseases and insects but this need not cause worry if a consistent spray program is followed faithfully. A dormant oil can be sprayed on in late winter. Then, after about 75 per cent of the petals have fallen, apply a general fruit-tree spray and continue with this at about two-week intervals for the next two months, or even up to within a month of harvest. Such treatment will take care of most problems.

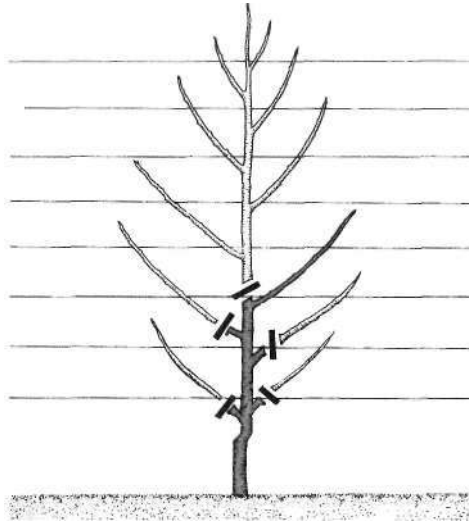
To control brown rot, especially troublesome on nectarines and, in some years, just about as bad on peaches, spray with captan. Do this every three days if there is a spell of hot, humid weather at the time of bloom. Captan spraying can also be carried out in the three-week period prior to harvest as well as during a hot and humid spell.

Leaf curl causes first leaves to thicken and curl as well as tinting them red and yellow. To control this, apply a liquid copper fungicide before the buds open in the spring. Bordeaux mixture can also be employed, and, if so, it is mixed and applied with dormant oil. Almonds require regular spraying with a general-purpose fruit spray.



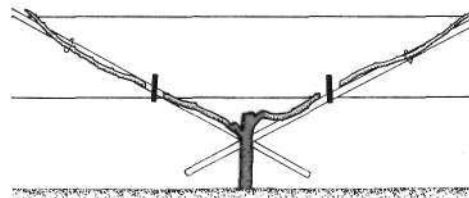
3 In June or July, tie the lengthening side-shoots to canes set at an angle of 45 degrees. Later that summer, cut out central shoot and protect cut with wound paint.

The fan-trained tree: the first year

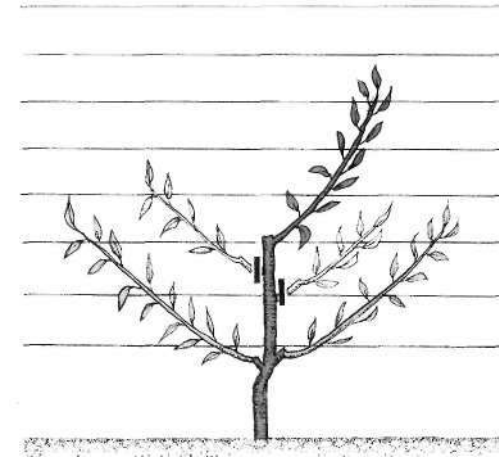


1 In March, cut back a feathered maiden peach to a lateral about 24 in above the ground, leaving one good bud on each side beneath it.

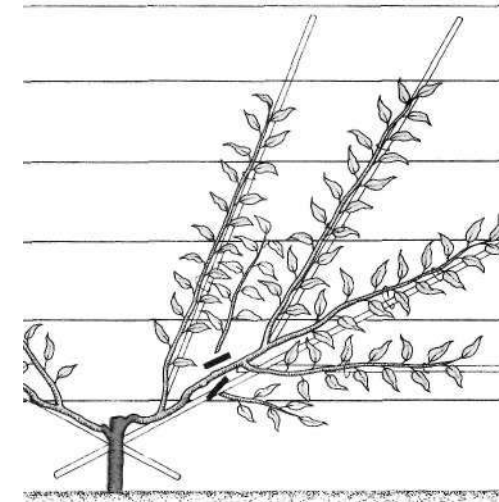
The second year



4 In March, cut back the two side-shoots to a wood or triple bud at 12-18 in from the main stem. Protect the cuts with wound paint.



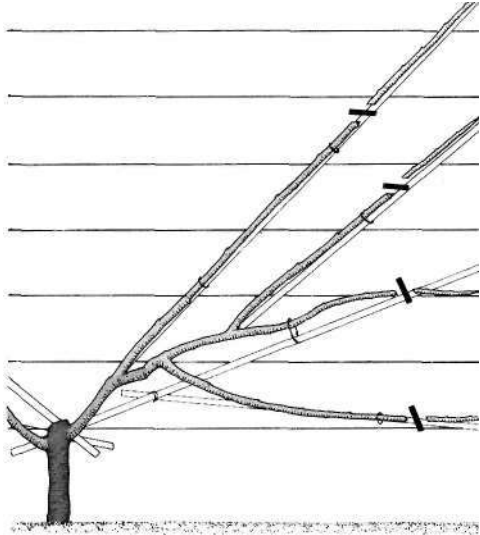
2 In early summer, select three shoots. Train the topmost vertically, and one to the left and one to the right. Remove all other buds or shoots.



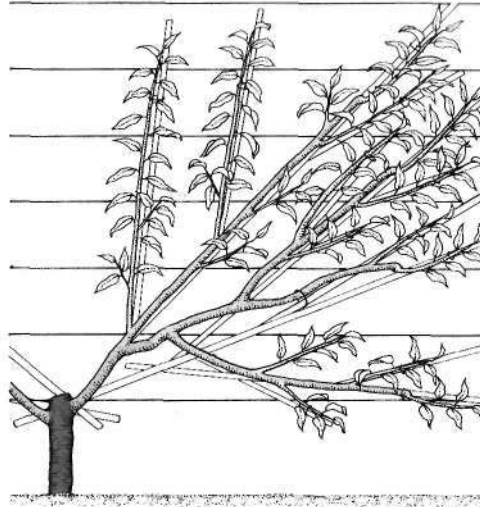
5 In summer, select four shoots on each arm, one to extend the existing rib, two spaced equally on the upper side and one on the lower. Stop other shoots at one leaf.

Peaches and almonds 4

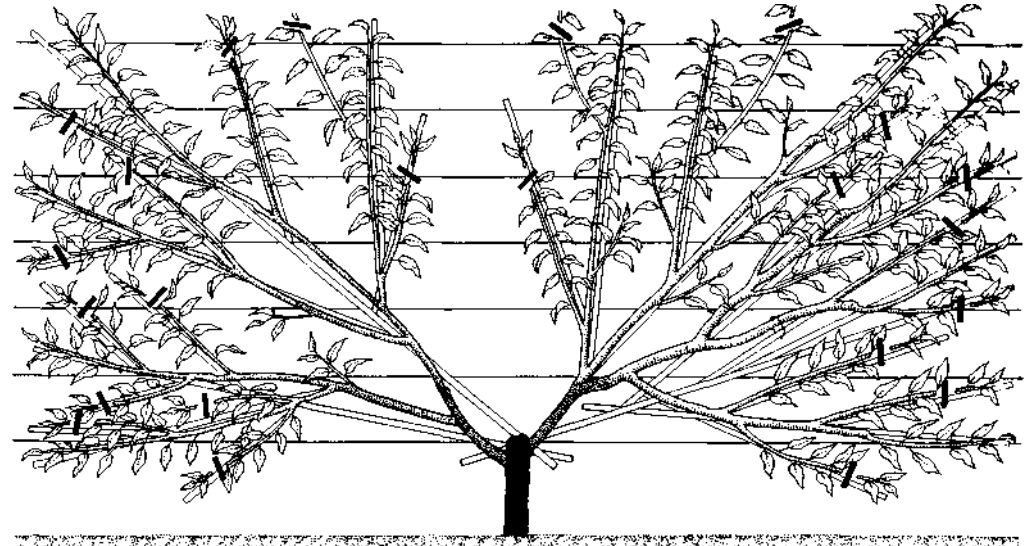
The third year



6 In March, shorten each leader by one-third by cutting to a downward-pointing wood bud. Protect the cuts.



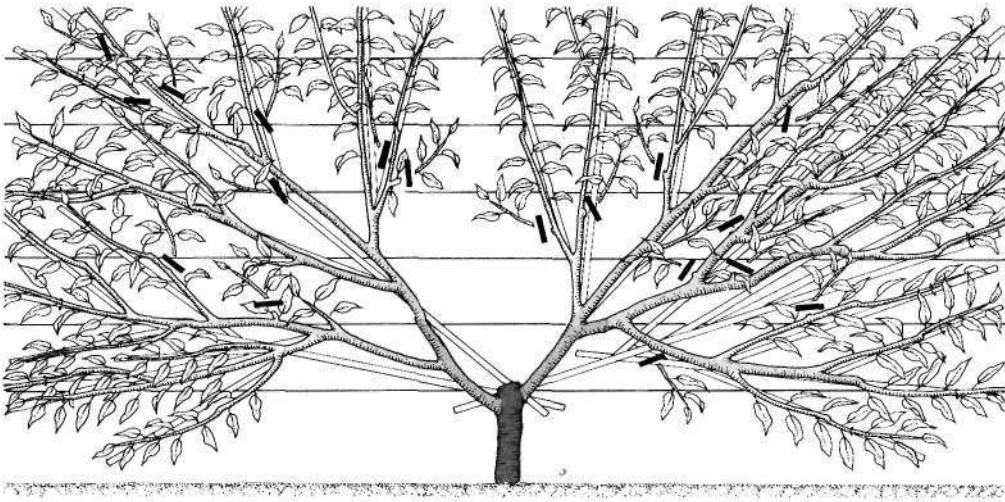
7 In summer, allow the leading shoots on each rib to extend. Train three shoots on each branch outwards, tying them to canes. Allow shoots to grow every 4 in.



8 In late summer, when the selected laterals have made 18 in of new growth, pinch out the growing points of each and

tie them to canes on the wires. These laterals will bear fruit the following summer.

Fourth and subsequent years



9 Each year in about May, remove shoots growing directly towards and away from the

wall or fence. Leave shoots with flower buds at their base one or two leaves.



10 Select two replacement laterals on each leader: one at the base and a reserve in the middle. Allow a lateral to extend the fruit-carrying lateral. When the basal and

reserve laterals are 18 in long and the extension has six leaves, pinch out the growing points. After harvesting, cut the fruited laterals back to their replacements.

Apricots

The apricot (*Prunus armeniaca*) is a hardy deciduous tree. It is a native of China and is widely grown in California and Washington, but can be raised successfully elsewhere in zones 5-8.

Cultivation

A dwarf tree is best for the garden where space is limited. Even this can reach a height of 8 ft and a span of 15 ft. Buy a two- or three-year-old tree.

Soil and situation The apricot needs a well-drained but moisture-retentive and slightly alkaline soil with a pH range of 6.5-8.0. Light, sandy soils are not suitable.

Warmth in summer is essential and, although the apricot can be grown in the open in warm temperate areas, it thrives best fan-trained against a south- or west-facing wall in the cooler regions. It can also be grown successfully in containers.

Shelter the tree from frost and wind to encourage pollinating insects and to protect the ripening fruit. Keep the soil around the tree clear of weeds and grass so that ample moisture can reach the roots.

Planting In all but the mildest climates, where fall planting is safe, apricots should be planted only in the spring. To prepare the ground, clear away perennial weeds over an area 3 ft square. Dig in well-rotted manure or compost at a rate of one 2-gal bucketful per square yard. Plant the tree, water well, and mulch lightly.

Plant fan-trained trees 15 ft apart and 6 in from the wall or fence. Plant bush trees 15-20 ft apart.

Formative pruning and training The formative pruning of the fan-trained apricot is the same as that of the fan-trained peach. The formative pruning of the bush apricot is the same as that of the bush plum, but prune it in early spring before growth begins.

Pruning the cropping tree Mature fan-trained apricots are pruned in the same way as are fan-trained plums. Mature bush apricots are pruned in the same way as sour cherries (see page 64).

The apricot carries the best quality and most abundant crops on short spurs on two- and three-year-old wood. Extensive pruning is not necessary because it results in a poor

crop. Every four to six years, cut out the older shoots that have fruited to make room for new young ones. This means cutting out some of the lateral and sub-lateral branches of a fan-trained tree. Retain and tie in the same number of new shoots to replace them. Do not prune or pinch back these shoots until the second season, but only if required.

Thinning Thin the fruits at intervals from the time they are the size of cherries until they are almost full size. First remove misshapen fruits and those growing towards the wall. Later, thin pairs and clusters so that those left to ripen have 3-4 in between them.

Feeding Root dryness is a common problem with wall-trained trees. Water generously until the root area is soaked, especially if the weather is dry when the fruit is setting or when it starts to swell.

In late winter, sprinkle an artificial fertilizer containing calcium carbonate and ammonium nitrate around the tree at a rate of 1 oz per square yard and apply a general fertilizer, such as 10-10-10, at a rate of 2 oz per square yard. Every four years, if necessary, apply ground limestone to maintain the pH at a little above 7.0. In late spring, mulch the root area to 1 in.

Pollination Most apricots are self-compatible but, because the flowers open early in spring when few insects are about, hand pollination is sometimes necessary (see page 43). The new and very hardy 'Moongold' and 'Sungold' are not self-fruitful and must be planted together.

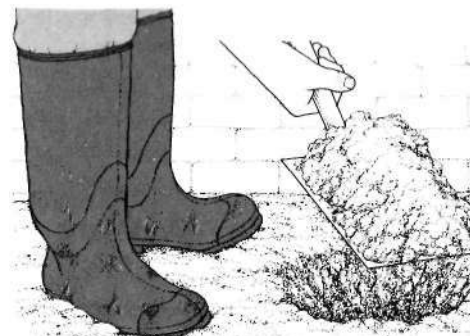
Protecting the blossom The apricot is highly susceptible to frost damage. Protect it with polyethylene or netting (see pages 6-7).

Harvesting

Depending on the variety, apricots ripen from midsummer to early fall. Pick the ripe fruit carefully and try not to break the skin.

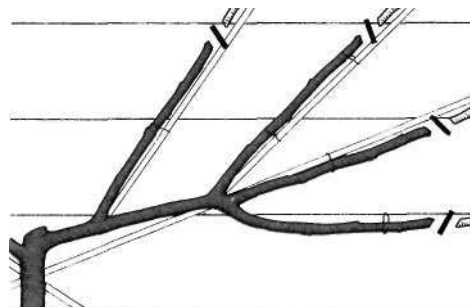
Pests and diseases

Spray trees on the same schedule and with the same materials as peach trees. The trees are very susceptible to brown rot if the weather is humid and warm at the time of bloom and in the three weeks before harvest starts. To control this, spray frequently with captan during these periods.



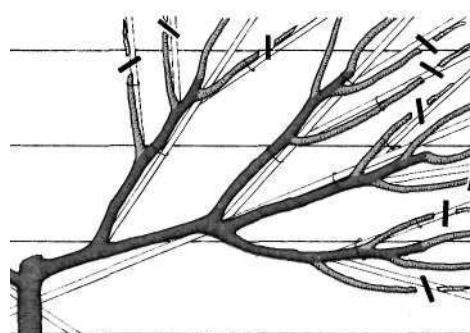
1 In early spring, in prepared ground dig a hole large enough for the roots. Plant at the same depth as at the nursery. Mulch well.

The first year



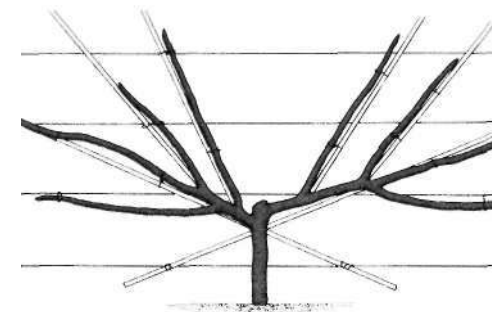
3 In March, shorten each leader by one-third, leaving about 30 in of growth.

The second and subsequent years

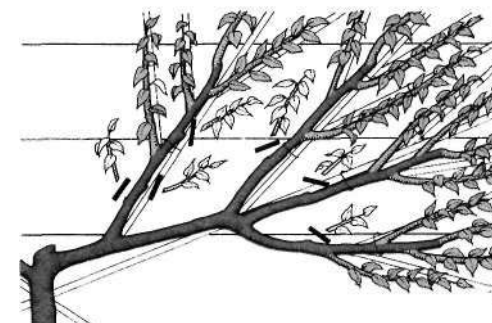


5 In spring, rub out buds pointing towards or away from the wall or fence. Prune the leaders by one-quarter.

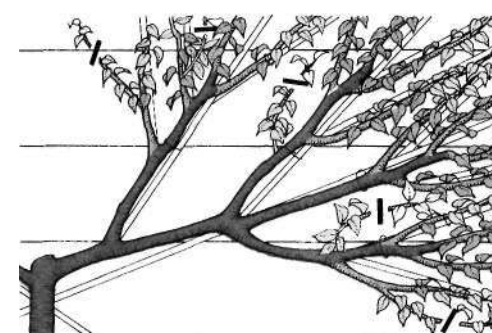
A three-year-old fan-trained tree



2 Erect supporting horizontal wires 9 in apart on the wall or fence. Tie in the young branches to the canes on the wall wires.



4 In July/August, select and tie in three additional shoots from each pruned leader. Pinch out all remaining shoots.



6 Early in July, pinch off the tips of side-shoots at six leaves. After cropping, cut back these laterals by one-half.

Mulberries

The common or large black mulberry (*Morus nigra*) is a deciduous tree native to western Asia. In the United States it grows from zone 6 southward. The red-black fruits resemble loganberries and have a sharp but sweet flavor particularly suitable for cooking.

Cultivation

The mulberry is long-lived and decorative. It is self-compatible and so will fruit if grown as a single plant. When mature it reaches a height of 20-30 ft.

Soil and situation The mulberry is tolerant of a variety of soils but thrives best planted in rich, fertile well-drained but moisture-retentive soil with a pH of 5.5-7.0.

It should be planted in a sheltered, warm and sunny position. In the coldest areas it is best grown against a south-facing wall or fence.

Planting In early spring prepare the ground thoroughly, clearing away perennial weeds over an area 3 ft square. For planting in the open, drive in a stake to reach just below the

lowest branches. For wall- or fence-trained trees, construct a system of supporting horizontal wires, spaced every 9 in (see pages 8-9).

Dig a hole wide and deep enough to take the roots fully extended. The roots are brittle and so take care not to damage them at planting. Never dig near a mulberry tree.

Plant the tree to the same depth as in the nursery, spreading the roots out well. Return the soil and firm it carefully. Tie the tree to the stake with a tree tie and cushion. For wall-trained trees, tie in the branches to the wall wires. Water well and mulch with well-rotted manure or compost.

Pruning and training The mulberry is slow growing, taking eight to ten years to begin cropping, so a three- to five-year-old tree already shaped at the nursery is best.

Prune mulberries grown in the open in winter. Cut back to four or five buds any strong laterals longer than 12 in that are not required as framework branches. Remove or shorten any which spoil the shape of the head. Protect the cuts with a wound paint.

Prune wall-trained mulberries in summer. Train in the main branches 15-18 in apart to cover the wall. Tie down the leaders at the end of the summer and once they have reached the required length stop them by cutting back each leader to one bud on the previous year's growth in April. Prune side-shoots to four or five leaves in late July to encourage fruit spurs to form.

The branches of mature trees become crooked and brittle and may need supporting with a forked stake. Wrap the branch with burlap where it meets the crotch.

Watering and feeding Watering is necessary in extremely dry weather.

In April, apply a balanced fertilizer, such as 10-10-10, at a rate of 2 oz per square yard. In spring, mulch with well-rotted manure or compost.

Propagation

Propagate from cuttings. In early October, after leaf-fall, remove a one-year-old stem with all the year's growth. Make a sloping

cut just above the proposed top bud and a horizontal cut about 6 in below it. Dip the basal cut only in rooting hormone. Heel in several cuttings, in bundles of ten, into a sandbox almost to their full depth. Label them and leave for the winter.

Just before the dormant buds break in spring, dig the propagation bed thoroughly. Make a furrow 5 in deep. Lift the cuttings and plant vertically 4-6 in apart. Firm back the soil leaving about 1 in of the cutting exposed. The following fall, lift and transplant the rooted cutting.

Harvesting

The fruit ripens from late August over a period of about three weeks. Pick fruit for cooking when it is slightly unripe. Fruit for eating is almost black.

Pests and diseases

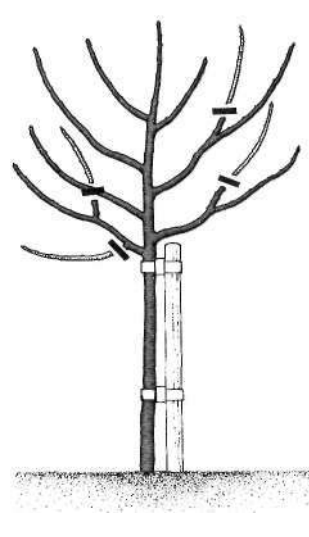
The mulberry is generally free of pests and diseases but protect the ripening fruit against birds (see page 17).

Trees in the open



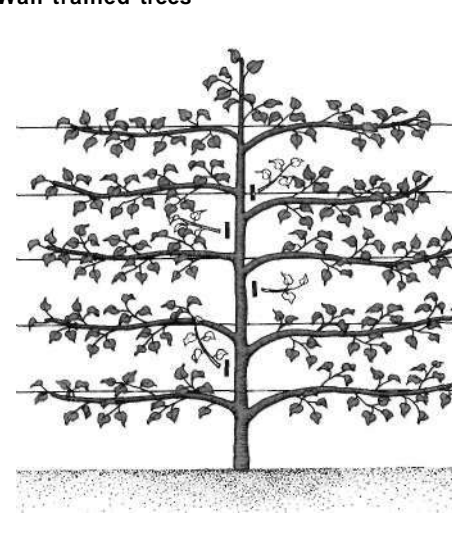
1 In spring, clear the ground of perennial weeds. Dig a hole wide and deep enough to take the roots. Drive in a stake.

2 Plant the tree, spreading the roots out. Return and firm the soil. Tie the tree to the stake. Water well. Mulch with manure or compost.

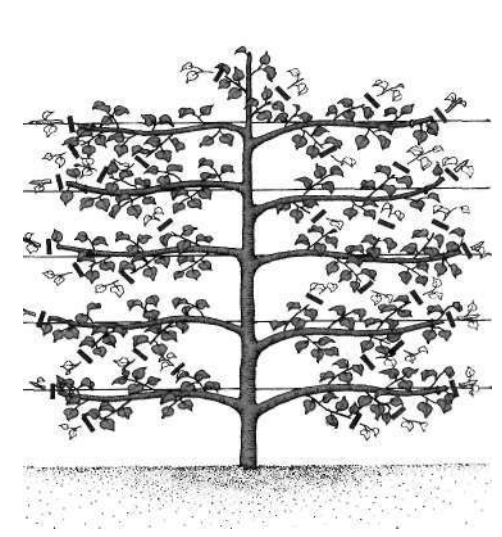


3 In winter, cut back to four or five buds laterals longer than 12 in not required for the framework. Cut out branches spoiling the head.

Wall-trained trees



1 In summer, train in the main branches 15-18 in apart. Tie down the leaders at the end of summer. Cut out breastwood and any branches growing into the wall.



2 In April, once the leaders have reached the required length, stop them by cutting back to one bud on the previous year's growth. In late July, prune the side-shoots to four or five leaves.

Elderberries

The common elder (*Sambucus nigra*) is a deciduous tree native to Europe, western Asia and parts of northern Africa and now grows wild over much of the USA and Canada. The shiny purple-black blue or red berries are widely used in preserves, and both the fruit and flowers are popular for making wine. The plant grows as a large shrub or small tree and is often considered too wild and vigorous for the garden. Its new woody growth gives off an unpleasant smell and was used in the past as a fly-repellent. In the northern USA, the American or sweet elder (*S. canadensis*) is widely grown and several improved clones are available. They have an extremely high Vitamin C content. Depending on the variety, they grow from zones 3-9, but are not common in zones 5-8.

Cultivation

Only elders with black berries are grown for their fruit. The red-fruited kinds are inedible.

Soil and situation The elder is tolerant of a wide variety of soils, including those with bad drainage, and a wide range of soil pH. It is lime-tolerant.

The elder will grow in most situations but it fruits most freely in a sunny position. Common elder is hardy to zone 6; *S. canadensis* in zone 3.

Planting The elder may be grown as a standard on a single stem but it is more usually grown as a large rounded bush with a number of branches from near ground level.

Plant a one- or two-year-old tree in early spring. Four weeks before planting prepare the ground, clearing away perennial weeds over an area 3 ft square. Fork in a balanced fertilizer, such as a brand of 10-10-10 at a rate of 3 oz per square yard.

Dig a hole wide and deep enough to take the roots fully extended. For standards, drive in a stake to reach just below the lowest branches. Place the plant in the hole at the same depth as at the nursery and then fill in the soil gradually, firming it at the same time. Tie the standard to the stake with a tree tie and cushion. The bush does not need staking.

The American elder is not self-compatible. For cross-pollination to occur there should be a minimum of two varieties, planted about 10ft apart.

Pruning After planting, cut out weak and damaged growth and cut back main shoots by a few inches to a good, outward-facing bud. This ensures that during the first growing season the plant's energy is concentrated on producing a strong basic framework of branches. Cut back any unwanted suckers to ground level. Little flower is produced in the first year.

In subsequent years, in late winter, cut out dead and congested branches to maintain a good shape. Cut out about a quarter of the old wood back to base each year to encourage new growth. Cut back unwanted suckers to ground level and protect the cuts with a wound paint.

Feeding In dry spring and summer weather water well and mulch the root area with well-rotted manure or compost. If growth is weak or slow, feed with a balanced fertilizer at a rate of 2 oz per square yard.

A 5-20-10 balanced fertilizer or ammonium nitrate can be applied each spring. Ammonium nitrate may be applied at 1 oz per year of shrub age up to a maximum of 16 oz, and 5-20-10 fertilizer at 16 oz per year up to a maximum of 64 oz.

Propagation

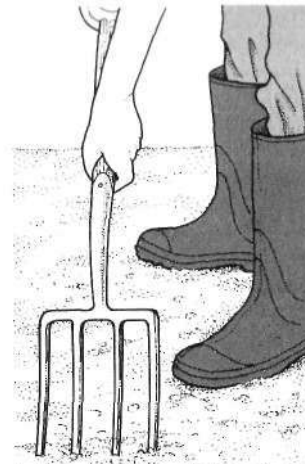
In late October take a 9-12 in cutting from a sturdy one-year-old stem. Plant in open ground 6 in deep. Alternatively, in July, take 4-6 in cuttings of semi-hard wood stems. Insert them 2 in deep in a cold frame 4-6 in apart. In October in the following year, lift the rooted cuttings and re-plant them in a permanent position.

Harvesting

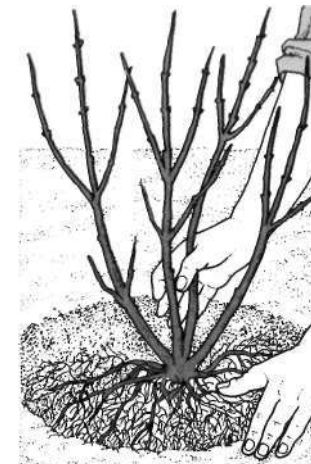
Pick fruits when dark in color with a noticeable bloom. It is preferable to use them as soon as possible, but they will keep in a refrigerator for about two weeks.

Pests and diseases

The elder is generally free of pests and diseases, except for the elder borer, which deposits its eggs under the bark of old canes. This pest can be controlled by burning annual prunings. If mites become troublesome, spray with a miticide. Plants may need to be netted to keep off birds.

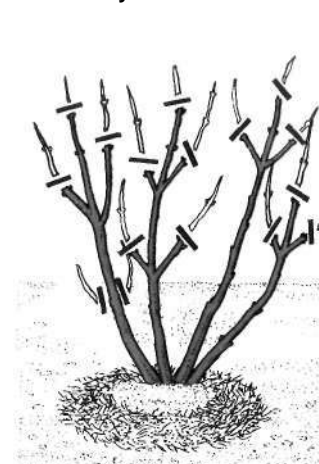


1 Four weeks before planting, clear away weeds over an area 3 ft square. Fork in a general fertilizer at 3 oz per square yard.



2 In spring, plant the elder at the same depth as it was in the nursery, spreading the roots out. Firm the soil. Water well.

The first year

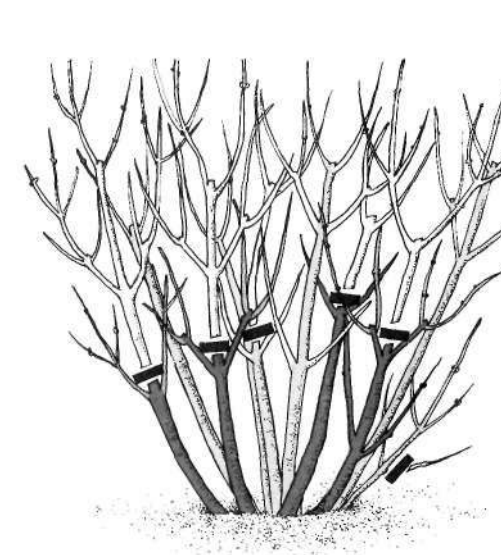


3 After planting, cut out all weak growth and cut back the main shoots a few inches to a good outward-facing bud. Mulch well.

Second and subsequent years



4 In April, if growth is slow, feed with a balanced fertilizer at a rate of 2 oz per square yard.



5 In winter, cut out dead and congested branches. Cut out about a quarter of the old wood back to base. Seal the cuts with a wound paint.

Quinces 1

The true quince (*Cydonia oblonga*) is a native of central to south-western Asia. It has been cultivated since ancient times. It is related to the pear, for which it is often used as a rootstock to induce a more dwarfing effect on the vigor of the pear tree. The true quince is often confused with its distant relatives the oriental quinces (*Chaenomeles* spp), referred to as "Japonicas", which are grown as garden shrubs. "Japonicas" have light pink to deep red flowers, spines and edible fruits.

The true quince is a low, deciduous, thornless tree with a crooked irregular mode of growth. When fully grown it is about 15 ft in height and spread, although it can be half as tall again on fertile soils. It may also be grown as a fan against a warm wall in much the same way as a pear. This method is particularly suitable for more northerly areas where it would not thrive in the open.

The tree's natural form is attractive and it can serve an ornamental purpose in the garden. It often lives to a great age and, once established, requires little attention. It comes into cropping in the fourth to fifth year. The flowers are large (1½–2 in), solitary, white to

very light pink and most attractive, resembling the wild dog-rose. It has a pale grey bark and dark green oval leaves with downy undersides.

Quince fruits are apple- or pear-shaped, mostly with a grayish-white down on the skin; when ripe they are pale or deep, clear, golden-yellow. The flavor is acid and astringent, and the texture rather gritty—they are too harsh, in fact, to be eaten raw when grown in northern climates. When grown in warmer, sunnier areas (such as Turkey), the fruits become much sweeter and are eaten raw. Quinces are not grown commercially in cool temperate areas, but they can be cultivated fairly easily by the amateur, providing an interesting alternative to the more conventional tree fruits.

Quinces make a delicious orange-colored jelly, marmalade or preserve; and a slice or two of quince in an apple pie provides a subtle aromatic taste to the dish.

Cultivation

The tree is hardy in zones 5-8, but, as mentioned above, warmth is necessary for the

fruits to ripen properly. Quinces can be raised from seed but this is a lengthy process so buy a plant from a nursery or garden centre and ask advice.

Soil and situation The quince succeeds in most soils but grows best in a deep, light fertile and moisture-retentive soil.

It does well planted near a pond or stream. In warmer areas, it can be grown in the open, but in a sunny, sheltered position. In more northerly areas, extra protection is needed, the best situation being a sunny corner where two walls meet, with the plant grown as a fan or bush tree.

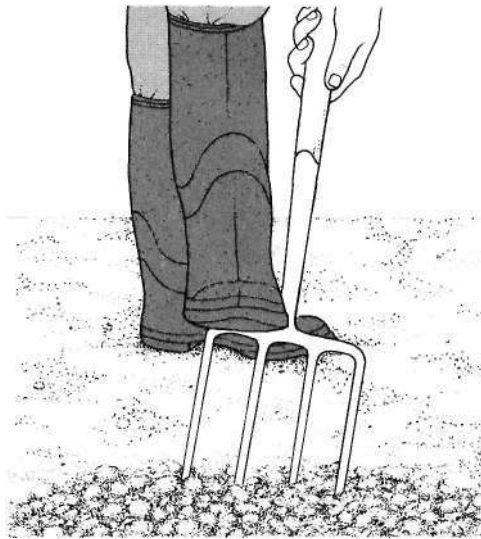
Planting and spacing Since it grows rather crooked, the quince tree needs support for the first three or four years of its life until the stem has acquired sufficient strength to support the head.

Plant in early spring during the dormant period. Container-grown plants can be planted at any time of the year. Prepare the ground thoroughly in the fall before planting, clearing away perennial weeds over an area 3 ft square. Fork in 4 oz per square yard of a balanced fertilizer such as 10-10-10 and a

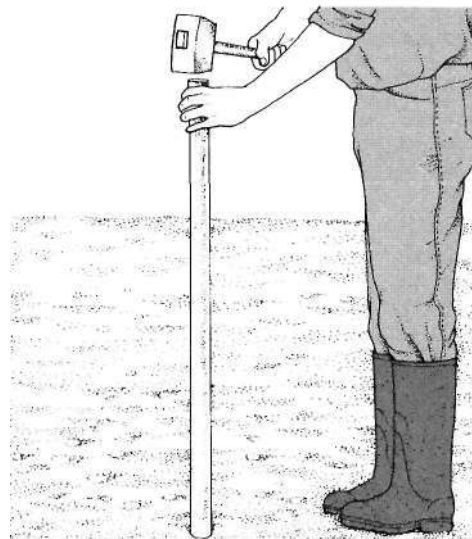
Planting the tree



1 Between November and March, prepare the ground, clearing away perennial weeds over an area roughly 3 ft square. Choose the planting position carefully.



2 Fork in 4 oz of a balanced fertilizer such as 10-10-10 and a handful of bonemeal over the area where the tree is to be planted.



3 Prepare a stake by coating it with bituminous paint. Drive it about 1½–2 ft into the ground. Be sure it is not loose.



4 Dig the planting hole deep and wide enough to accommodate the tree's whole root system with tendrils well spread out.

Quinces 2

handful of bonemeal. Drive the supporting stake in first so that it will just clear the lowest branches. Dig a hole deep and wide enough to take the whole root system with the roots spread well out. Plant with the main stem about 2 in away from the stake and the tree at the same depth as it was in the nursery, ensuring that the union between the rootstock and scion (grafted stem) is not less than 4 in above soil level. Firm the soil well. Tie the tree to the stake with a tree tie and cushion.

Dwarf trees should be spaced about 10-12 ft apart, semi-dwarfs at about 15 ft, and standards about 20 ft apart.

Pruning and feeding The quince is a difficult tree to train in the first year, and so it is best to obtain a tree already partly shaped by the nursery. Buy a two-year-old for a dwarf tree or a three- or four-year-old for a standard or semi-dwarf.

The aim is to achieve a goblet-shaped tree with an open but by no means barren center. Prune during winter for the first three or four years by cutting back the leaders of the main framework branches by one-half the previous

summer's growth, to an outward-facing bud. Prune back to two or three buds any side shoots that compete with the leaders and those crowding the center. Leave other side shoots unpruned to fill in the framework where there is room. Twist off any suckers around the base and cut off unwanted shoots on the main stem back to their point of origin. After the fourth year, little pruning is necessary apart from the removal of shoots that cause crowding, low-lying branches, or suckers at the base. The quince bears its fruit on spurs and on the tips of the previous summer's growth, therefore prune only to keep the head tidy. Cut back any vigorous or badly placed laterals but do not prune every lateral otherwise a large number of fruit buds will be lost.

Each March apply a general fertilizer such as 10-10-10 at 3 oz per square yard, and in early April apply sulfate of ammonia at 1 oz per square yard. On poor soils, mulch the trees in the early spring with well-rotted manure or compost. Maintain a weed-free area over an 18 in radius around the base of the tree.

Harvesting and storing

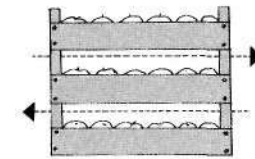
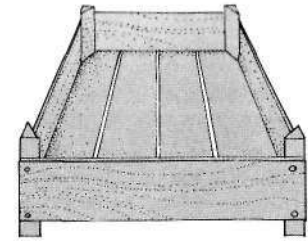
The fruits should be left on the tree as long as possible to develop their full characteristic flavor, provided there is no danger of frosts. They usually ripen from the middle of September on, depending on the locality. Once gathered, they should be stored in trays or apple boxes in a cool dark place and allowed to mellow for about a month before use. Quinces are strongly aromatic and should be stored by themselves because their aroma will affect the taste of any other fruits stored in the same container.

Pests and diseases

Many of the insect pests such as aphids, codling moth, slugworm and various caterpillars that attack apples and pears also attack quinces. If these pests prove troublesome, a spray program similar to that for apples and pears may be used.

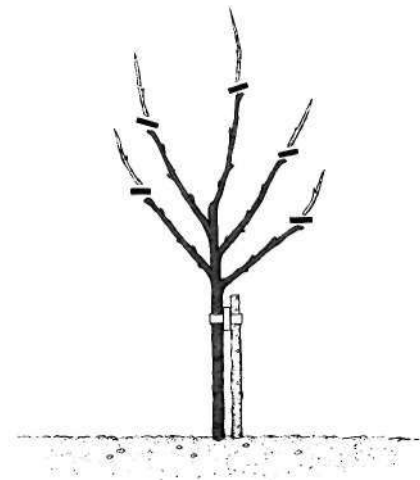
The only diseases that may occur are leaf blight (*Entomosporium maculatum*) and brown rot of the fruit. To prevent them, spray with Bordeaux mixture in mid-June and again two or three weeks later.

STORING



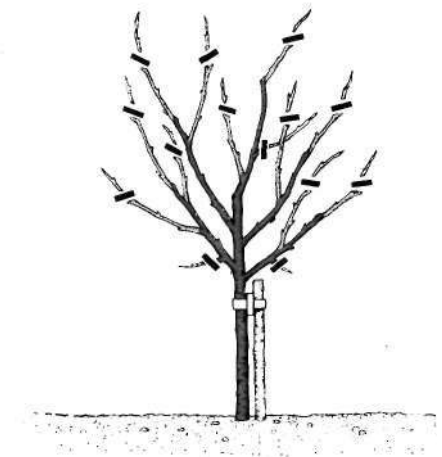
Once the quince fruits are gathered, store them in trays or apple boxes. The receptacle should be put away in a cool and dark storage area so the quinces can mellow.

The first winter after planting

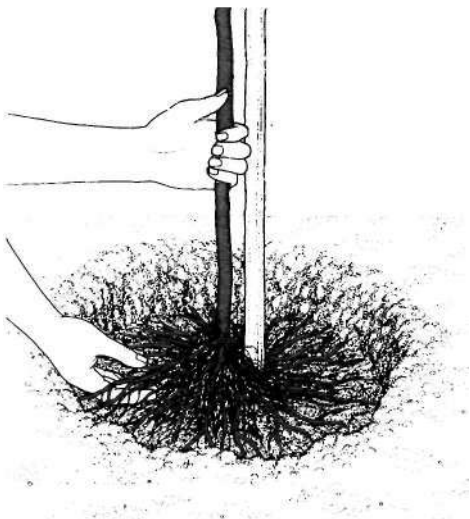


7 Cut back the leaders of the main framework branches by about one-third, pruning each to an outward-facing bud. Cut back to 2-3 buds weak lateral shoots.

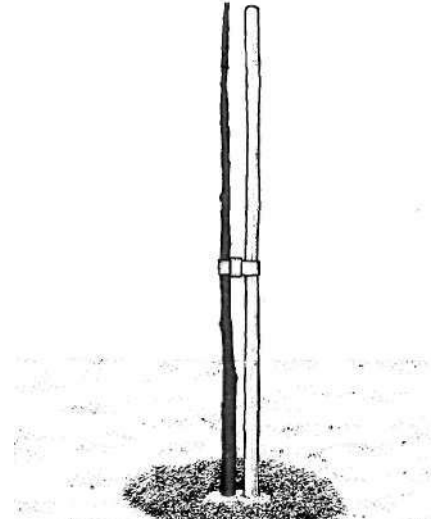
In the second and third years



8 In winter, cut back the leaders of the main framework branches by about one-third to an outward-facing bud. Cut back weak lateral shoots to 2-3 buds.



5 Then, plant the tree to the same depth as it was at the nursery, about 2 in away from the stake, firming well during planting.



6 Tie the tree to the stake using a tree tie and cushion. In the second year, it may be necessary to prop the tree up if the crop is heavy.

Hazelnuts

Botanical authorities have recently decreed that the small shrubby nut trees belonging to the *Corylus* genus should all be called filberts. To many people, however, they are still, and always will be, hazels or hazelnuts. They are frequently found growing wild in the Northeast of the United States. Cultivation is most common in zones 8 and 9 in the Northwest; but the plants do fairly well in zones 6 and 7 more or less everywhere.

In the Northwest, most filberts grown are European varieties. American varieties are hardier, but produce smaller nuts and smaller crops. Consequently, filberts grown in the eastern and central United States are crosses between American and European filberts.

Soil and situation The trees will grow on almost any soil from light gravel to heavy loam, but they require moderately good drainage. They are lime-tolerant and do best on a medium loam over limestone with a pH of 7.5-8.0. Rich soils tend to cause vigorous leafy growth at the expense of the nut yield.

As these are woodland plants by nature, they tolerate light shade but usually produce heavier crops in an open sunny position. Plant them out of the wind.

For good crops, keep the ground clean between the trees. Fork the soil in fall and hoe regularly in spring and summer.

Planting Plant two- to three-year-old trees. In the Northwest, planting is done in early winter; elsewhere in early spring.

Before planting, prepare the ground thoroughly, clearing away perennial weeds over an area 3 ft square. Lightly fork in lime at the rate of 7 oz per square yard.

Dig a hole wide and deep enough to take the roots fully extended. Drive in a stake to reach just below the lowest branch. Plant the tree to the same depth as at the nursery. Return the soil, and firm it in. Tie the tree to the stake with a tree tie and cushion and water well. If planting more than one tree, allow 15 ft between them.

Pruning The filbert is best grown in bush tree form with a 15 in tall stem and six or seven good main branches, giving a cup shape.

Prune during the latter part of flowering (about late February). For the first four to six years, cut back the leaders by about half to an outward-facing bud. Keep the trees at a height of 6-7 ft and, if necessary, cut back to a lateral at the required height. Cut

back vigorous laterals to three or four buds. Do not prune the laterals that bear the tiny red female flowers (these are usually carried on the weaker shoots). Pull out suckers.

In August, break off by hand strong lateral growths to about half their length (six to eight leaves from the base) and leave them hanging. This is called brutting and allows air and light into the tree to help ripen fruit buds. It is the brutted side-shoots which are usually shortened back a further 2-3 in in winter.

Feeding In March, apply a balanced fertilizer, such as 10-10-10, at a rate of 3 oz per square yard. In April, apply an artificial fertilizer containing calcium carbonate and ammonium nitrate to old trees making poor growth, at a rate of 1 oz per square yard.

In fall, on light soils, lightly fork in well-rotted manure or compost at the rate of one 2-gal bucketful per square yard.

Every third winter, on acid soils, to keep the soil alkaline, lightly fork in lime at a rate of 7 oz per square yard.

At all times maintain a heavy organic mulch, not only to control weeds and hold in moisture, but also to improve the fertility of the surrounding soil.

Propagation

The most usual methods are by layering or by removing suckers.

For layering, select a young vigorous stem in spring and mark its position on the soil 9 in behind its tip. Dig a hole with one straight side 4-6 in deep. Peg the stem down against the straight side, and return and firm the soil. Keep the soil moist.

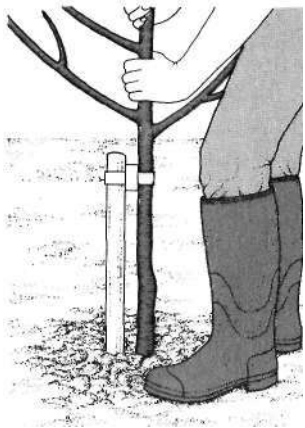
In late fall, after leaf-fall, sever the layered stem from the parent plant. In the early spring, cut off the growing tip. Lift and transplant the layered stem.

Harvesting

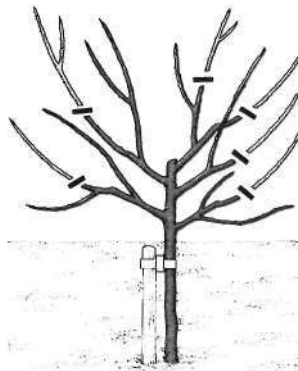
Filberts come into production about three years after planting. Harvest the nuts from the ground after they drop, and remove husks that remain. Spread the nuts out in a cool place to dry.

Pests and diseases

Spray with derris to combat nut weevil two or three times in May and early June. Spray in late summer with Bordeaux mixture to control filbert blight. Hazelnut trees are on the whole disease-free.



The first four to six years



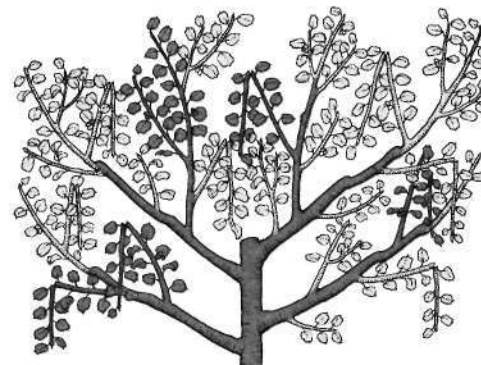
1 After preparing the soil, dig a hole large enough to take the roots spread out well. Drive in a stake. Plant the tree, firming the soil. Tie the tree to the stake.

2 In late February, cut back the leaders by about half to an outward-facing bud. Cut back vigorous laterals to three or four buds. Twist and pull out suckers.

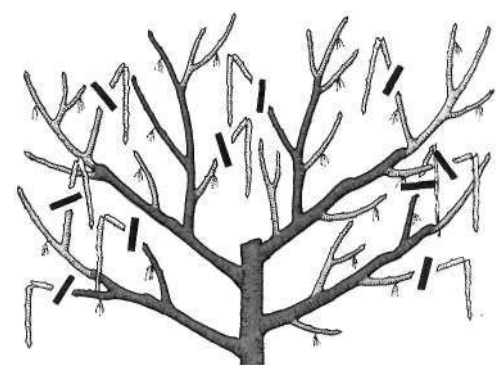


3 In March, apply a balanced fertilizer at a rate of 3 oz per square yard. Every third winter, on acid soils, fork in lime at a rate of 7 oz per square yard.

In subsequent years



4 In August, break off by hand strong lateral growths to about half their length (six to eight leaves from the base) and leave them hanging.



5 In February, cut back previously brutted laterals to three or four buds. Do not prune laterals carrying female flowers. Twist out suckers around the base and cut out dead and crowded growths.

Chestnuts/Walnuts

Chestnuts

Big, productive American chestnut trees have been wiped out by blight, and although there is some hope that agricultural scientists have finally come up with a solution to the problem, it will undoubtedly be a long time before this once-prized tree is again widely grown.

The sweet Spanish chestnuts that are cultivated throughout Europe for both nuts and timber are equally susceptible to chestnut blight and therefore are not grown in the United States.

This leaves the Oriental varieties. Of these, the Chinese chestnut is the most reliable. An attractive deciduous tree growing to 50 ft and spreading just as wide, it is resistant to the blight and produces masses of good nuts. It grows in zones 5-8. Because it is essentially self-unfruitful, two varieties must be planted together to assure nut production.

Cultivation

Although chestnuts bloom late, the swollen buds may be killed by frost, so locate the trees accordingly. Allow plenty of space for them and, since the branches hang low, do not plant them near a terrace or in other areas where headroom is needed.

The chestnut does well in light, well-drained soils with a pH of 5.5-6.5, but shallow,

clay, waterlogged, and alkaline soils are unsuitable.

Planting Prepare the ground thoroughly, clearing away perennial weeds over an area 4-5 ft square. Dig in well-rotted manure or other humus at a rate of about one 2-gal bucketful per square yard. Dig a hole wide and deep enough to take the roots fully extended and drive in a stake to reach just below the lowest branches.

Grafted trees are generally preferred to those grown from seed because they produce bigger nuts at an earlier age. In any case, plant the trees to the same depth as at the nursery, spreading the roots out well. Firm the tree to the stake, and water well.

Feeding and pruning

Fertilize the trees after they are established in early spring with about 1 lb of balanced fertilizer per inch of trunk diameter. If grafted specimens are used, however, cut the application in half until it is certain the tree will survive the winters.

Cut back by half the laterals produced during the first growing season when they reach 9-12 in. A few of the upper laterals produced later in the season may be left unpruned. In early winter, cut back the

pruned laterals flush with the stem. Repeat this training process each year until the required length of clear trunk has been produced.

Little pruning is required after the main branch system has been formed. Where there is congestion, cut out thin shoots in summer. Prune lightly in winter.

Pests and diseases

To control chestnut weevils, the worst pests, spray three or four times in August with carbaryl.

Harvesting

Nuts are borne in the current season's growth. Crafted specimens start bearing after 4-5 years; seedlings take a little longer. Harvest nuts when they fall to the ground after the burrs surrounding them open. Since the nuts deteriorate if left on the ground in the sun, gather them daily and place them in open trays in a dry, airy place to cure until they feel a little soft. The nuts can be stored for a long time if mixed with slightly damp peat in plastic bags and kept under cover at just above freezing.

Walnuts

Despite its name, the English walnut (*juglans regia*) is native to China, Iran, the Himalayas and south-western Europe and is more properly called the Persian walnut. It is hardy in zones 8-10 and most widely grown in central California valleys.

The rather widely advertised Carpathian walnut is an unusually hardy strain of Persian walnut and grows in zones 5-8. In actual fact, however, it is likely to be a disappointment in all zones except 6.

The eastern black walnut (*J. nigra*) is widely grown in the eastern and central parts of the United States. It is hardier and bigger than the English walnut. It grows in zones 4-8. The nuts have a distinctive rich flavor. All walnuts are self-fruitful, but nut production is more reliable if two different varieties of the same species are planted together.

Cultivation

Usually grown as a central-leader standard, the walnut reaches a height of about 25 ft

in 20 years and a final height of 60-70 ft. It is therefore suited only to large gardens. It is slow to crop, taking five to ten years before beginning to bear fruit.

Soil and situation The walnut grows well on a wide variety of soils provided they are deep, fertile and well-drained. The ideal soil is a heavy loam, at least 2 ft deep, over limestone, with a pH of about 7.0.

An open position with shelter from spring frosts is best because both the young growths and flowers are prone to frost damage.

Planting For fruiting purposes, it is best to obtain a three- or four-year-old grafted tree of a named variety. Before planting, lightly fork in ground lime at a rate of 7 oz per square yard on acid soils. Clear away perennial weeds over an area 4-5 ft square. Fork in a balanced fertilizer, such as 10-10-10, at the rate of 3 oz per square yard.

Dig a hole wide and deep enough to take the roots fully extended. Drive in a stake to reach just below the lowest branches. Plant the tree at the same depth as at the nursery. Return the soil. Tie the tree to the stake with a tree tie and cushion. Water well.

If planting more than one tree, allow a space of 40-50 ft between them.

Pruning Once the head of the tree has formed, very little pruning is required. Cut out any dead or awkwardly placed branches in August. Protect the cuts with a wound paint.

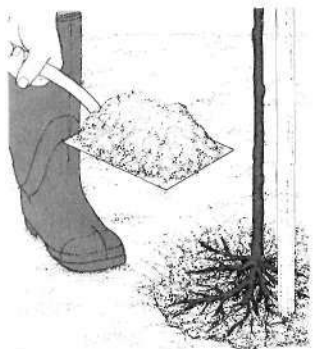
Pests and diseases

To control walnut blight on English and Carpathian walnuts spray with Bordeaux mixture when leaves begin to develop, after pollination and during spells of wet weather. For anthracnose on black walnut, spray with zineb when leaves are 12 in long and three times after that at two week intervals. Use malathion or carbaryl to discourage such insect pests as may appear.

Harvesting

English and Carpathian walnuts start bearing in 4-5 years; black walnuts take a little longer. Harvest the nuts as they drop. Remove the husks (wear rubber gloves so the hands are not indelibly stained); wash the nuts; and spread out in a dry place to dry for a few days before storing.

The first year



1 In prepared ground, dig a hole large enough for the extended roots. Drive in a stake and plant the tree. Tie to the stake.

Second and third years



2 Cut back by half all lower laterals produced during the first growing season when they reach 9-12 in.

3 In late fall or early winter, cut back the pruned laterals flush with the stem.