

The use of intermediate stocks on some fruit trees, particularly citrus, may affect the quality as well as the production of the fruit. Propagation of trees with intermediate stocks involves a method of double budding or grafting in which a variety providing certain influences is placed on the original stock, followed by final working with the desired variety.

Soil Type

Satisfactory fruit setting and bearing depend essentially on the suitability of the soil type for the kind of fruit. Good-quality, well-drained, and friable soils greatly assist proper functioning of the root systems, and this has a very important bearing on the success of fruit production. Good physical structure and humus content of soils are essential. Heavy clay soils of poor physical structure may cause rapid deterioration or poor functioning of the root systems, which is detrimental to the health of the trees and seriously curtails their cropping capacity.

In some districts or localities the soil may be best suited to one or more kinds of fruits, and growers need to know the fruits their soils are capable of producing satisfactorily. In general, citrus fruits do best on the lighter soils and peaches, nectarines, and apricots prefer deep, friable, well-drained soils. Pears and quinces grow better on the heavier soils and can stand more soil moisture without detrimental effects than can citrus or stone fruits. Apples and plums show a wide tolerance for soils, but grow better on the heavier types. Disappointment is sometimes the result of insistence on trying to grow fruits which are unsuited to local conditions.

Drainage

Many New Zealand orchard soils are reasonably well drained as a result of either the natural fall of the land or the friable and free-draining texture of the topsoil and subsoil and have little need of tile or other artificial drainage. This is one of the factors influencing selection of land for fruit growing. The retentive nature of much of the Auckland and Nelson clay subsoils presents its own drainage problems.

However, in many orchards drainage cannot cope efficiently with the heavy rains of autumn, winter, and early spring. Under such conditions root activity during autumn and early spring is restricted severely through lack of oxygen at the rooting area. The main damage is to the small feeding roots which begin to develop in spring. These fine roots are very important to the trees, and any breakdown of or interference with their proper functioning causes a severe check to the trees at a critical time. The buds may begin to burst open in spring and then wilt and die or become stagnant because root action is insufficient to maintain growth as the demand increases.

Drainage, either natural or by tiles, must be adequate to prevent over-saturation of the soil at all times, but particularly in spring. Good drainage also allows the soil to warm satisfactorily, whereas over-saturated soil tends to remain very cold and retards spring development of the trees.

If the soil remains over-saturated for long periods, the roots in the lower strata of the soil become weakened and die, leaving the trees dependent on the roots closer to the surface for survival. If dry conditions follow, the root systems cannot maintain the top growth and the fruit fails to develop properly or may drop from the trees. Furthermore, trees debilitated by lack of drainage over long periods cannot set or carry satisfactory crops, as die-back occurs and lack of growth and foliage become severely restricting factors.

Some kinds of fruit trees are more tolerant of inefficient drainage than are others. Quinces and pears are in this category, but peaches, nectarines, and apricots must have particularly well-drained conditions.



A sketch of part of an apple tree showing distinct, well-spaced limbs allowing for good distribution of fruiting wood.

Cultivation

Care needs to be exercised during spring cultivation, as damage by implements to roots, both large and small, may cause a severe reduction in the supply of moisture and nutrients to the trees at the vital fruit-set period. Some of the very fine roots are close to the surface, even down the middle of a row or bay, and deep cultivation, particularly by ploughs and disc harrows, can cause damage which will, at least temporarily, cut off supplies to the trees. This is usually more evident in soils which are rather shallow or have been mulched, irrigated, or highly fertilised, as in those conditions a large proportion of the fine roots are close to the surface.

An orchard with a dry, friable soil in loose cultivated condition, or one which is carrying tall and extensive weed or plant growth, is more liable to frost damage by light or marginal frosts in spring than is one with a fairly firm and moist soil which is free from weeds. A firm, moist, weed-free soil may give protection against a frost of 2 or 3 degrees, and this aspect is worth consideration when spring cultivation is being undertaken. The ideal would be to cultivate the soil to a reasonably fine tilth as early as conditions allow and then firm it with a Cambridge roller to draw the soil moisture close to the surface. Cultivation can then be continued after danger from frost has passed. Such a system may not be necessary or possible, however, on heavy clay soils.

Pruning

Unless pruning achieves proper balance of fruiting and non-fruiting wood, biennial bearing or partial crop failures may result. New fruiting wood must be encouraged in the tree so that the fruit is borne mainly on reasonably young growth. This entails cutting away much of the older fruiting wood which has become exhausted and cannot be relied on to crop regularly. Fruit buds on the younger growth are healthier and stronger, and ample replacement of old wood and maintenance of young fruiting wood in the trees can contribute much to regularity of cropping.

Proper development of fruit buds is associated in a high degree with the provision of ample light and air throughout the trees. Training and pruning of trees to facilitate penetration of light is important to the proper development of the buds. Overcrowded trees bear mostly on the outer surface and this restricts their bearing capacity.

To foster regular cropping trees must be kept in moderately strong growth once the bearing habit has become established. At the same time the balance between fruit-producing wood and new growth must be regulated to maintain stable cropping and good health in the trees.

Fairly severe pruning of old and debilitated trees often stimulates them into much-improved growth and fruit bearing.

Heavy thinning of fruit spurs over a period of years results in better lateral growth and new fruiting wood of better type for consistent cropping. Very often insufficient detailed pruning is attempted, with the result that too much old wood and too many spurs are left on the trees.

Excessive pruning causes undue stimulation of the trees into vegetative growth at the expense of fruiting. Lack of pruning retards the development of new growth and usually results in an excess of weak buds which will not set fruit.

Fairly heavy spur pruning when a heavy crop is expected is claimed to offset the tendency to biennial bearing by reducing the fruit buds and spurs and preventing the trees from exhausting themselves by overcropping.

For best results the relation between fertiliser application and pruning must be close. Heavy pruning and heavy application of nitrogenous fertiliser can result in excessive vigour at the expense of fruiting, whereas light pruning without fertilising may be followed by heavy cropping requiring extensive thinning to produce fruit of good size. An intermediate course should be followed.

Excessive pruning of younger trees delays fruit bearing. This tends to upset the balance between root and top growth, and some years may elapse before adjustment has taken place. Vigorous trees are best pruned lightly to encourage and maintain fruitfulness.

Biennial Bearing

Kinds and varieties of fruit trees differ considerably in form, type of fruiting wood, and cropping habits. Some varieties, particularly of apples, naturally tend to bear well in one season and to carry a poor crop in the following season. This biennial bearing is the cause of many otherwise-good varieties losing popularity.