

Growing Fruit Trees in Your Backyard

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Abstract

The main scope of our article is fruit cultivation in residential gardens. The success of cultivating private gardens is largely influenced by how carefully we choose the appropriate soil, crown shape, cultivars and manage watering protocol and soil nutrient replenishment. This article addresses these aspects while highlighting the significance of growing produce in residential gardens as well as the challenges involved and potential solutions.

1 Introduction

Gardeners find it highly rewarding to care for plants, it is a popular hobby and a worthwhile leisure time activity. Besides experiencing success in outdoors manual work, an excellent way of recharging, gardeners may generate income by harvesting fruits from trees and bushes grown by themselves in their garden. Without sufficient expertise, however, failures may also occur. Our aim is to provide guidelines to help gardeners avoid common beginner mistakes in cultivating and planting fruit trees. You will be advised on how to start fruit cultivation and how to manage a successful home orchard.

2 Significance

The decades from the 1960s to the 1980s saw the high peak of household vegetable and fruit cultivation and home-scale gardens. In addition to growing produce for the household, gardeners also sold their products at the farmer's market resulting in an abundant local supply. Backyard gardening is experiencing a resurgence these days and some producers choose to sell their surplus at the market. Furthermore, growing garden-to-table fruits and vegetables without applying chemical substances provides enormous environmental and public health benefits [1]. An increasing number of gardeners use their private garden space to plant fruit trees, rare cultivars such as Mediterranean-origin trees with edible fruits, such as silverleaf trees, pecan trees and kiwi trees in particular. Building raised beds for vegetables, herbs and ornamental plants has also gained immense popularity [2]; [3]. Plant genetic diversity can be promoted through companion planting which also enhances the biodiversity of organisms, particularly insects, inhabiting them [4].

Middle-class gardeners form the primary group engaging in planting fruit trees next to ornamental plants even when garden space is limited. National projects promoting gardening include 'Hungary in Bloom' Contest [5]. Locally, the town of Kecskemet has initiated a contest for the area to find the "Most Beautiful Kitchen Garden" [6].

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2.1 Why is home gardening beneficial?

- Increased health: gardeners know what substances are applied to their plants (no chemicals if they opt out of using ones)
- Fresh harvest: produce ready to eat
- Cost-efficiency: homegrown food can cost less over time than retail purchases
- Mental health benefits: a hobby that helps alleviate stress
- Environmentally responsible: reduced amount of packaging, delivery, waste. Less or no pesticides. Protection of pollinating insects. Enhancement of biodiversity.

3 Discussion

Prior to selecting fruit species and cultivars, the attributes of the cultivation site should be considered. Plants suited to very different ecological conditions must not be interplanted. The ones out of their hardiness zone will suffer and be more susceptible to pathogens – harmful organisms and pests – due to their weakened inherent vigour and poor condition. Eventually, they may become infection foci in the garden. As our primary goal is using zero or reduced amounts of chemical substances, selecting fruit tree species and cultivars that are suitable for the cultivation site must be our top priority.

3.1 Space Requirements:

The space requirements for various fruit tree cultivars suitable in backyard gardens are depicted in Table 1.

In a relatively large site or garden (1500 m²<) we can plant 1-2 trees with large canopy spread (80-100 m²) such as walnut (*Juglans regia*), chestnut (*Castanea sativa*), or pecan (*Carya illinoensis*). Pecan (*Carya illinoensis*) may reach the considerable height of 30 m but its canopy spread is smaller than that of a nut tree. The sweet cherry cultivar grafted onto wild cherry rootstock, which was so prevalent in the garden of our grandparents' generation, can also grow a large canopy without pruning. Apricot trees (*Prunus armeniaca*) can also grow broad crowns.

Most fruit trees spread moderately, requiring a cultivation area of some 5-50 m². Regularly pruned cherry, sour cherry (*Prunus avium*), plum (*Prunus domestica*), greengage (*Prunus italica*), peach (*Prunus persica*), Cornelian cherry (*Cornus mas*), rosehip (*Rosa ssp.*), elderberry (*Sambucus nigra*), quince (*Cydonia oblonga*).

The tree size of apples (*Malus x domestica*), pears (*Pyrus communis* and *P. pyrifolia*) and medlars (*Mespilus germanica*) are highly dependent on canopy shape, on rootstock management and pruning techniques. However, they are generally considered medium-size or small-size spaced trees. Chinese hawthorns (*Crataegus pinnatifida* 'Amur'), kiwis, (*Actinidia ssp.*) and sea buckthorns (*Hippophae rhamnoides*), autumn olive (*Elaeagnus umbellata* 'Fortunella') may also be listed in the category [7]; [8]; [9].

Plants with minimal growing area – less than or up to 1 m² – include garden and woodland strawberries (*Fragaria x ananassa* and *F. vesca*), currants (*Ribes spp.*) and small standard gooseberry trees (*Ribes uva-crispa*), as well as raspberry (*Rubus idaeus*), and blackberry (*Rubus fruticosus*). Additionally, this category comprises of some more cultivars such as honeyberry (*Lonicera caerulea*), Japanese quince (*Chaenomeles japonica*), and blueberry (*Vaccinium ssp.*), occupying even less than 1 m² of growing area.

Actual planting should be preceded by studying the required growing area for each species. Furthermore, gardeners are advised to consider legal requirements regarding minimum distances

from property boundaries [10]. Gardeners should consult the local set of regulations concerning the matter.

Table 1. – Required growing area of fruit trees suitable for home gardens (too)

Large spaced species (8-10- or more m ²)	Medium spaced species (~5 m ²)	Small spaced species (1-3 m ²)	Very small spaced species (< 1 m ²)
walnut chestnut pecan nut apricot cherry grafted on wild cherry	apple pear sweet cherry sour cherry plum greengage apricot peach Cornelian cherry rosehip elderberry quince	apple pear Japanese pear medlar Chinese hawthorns kiwi sea buckthorns	strawberries currants gooseberry honeyberry (<i>Lonicera caerulea</i>) Japanese quince blueberry

3.2. Our gardens microclimate should define which species and cultivars to grow

In warm and sunlit gardens where regular irrigation is difficult trees with large canopies and deep rooting should be planted, that may even be fruit trees such as pecan nuts, to provide partial shading. Besides fruit trees, we may decide to plant linden, horse chestnut or golden rain trees. Trees with shade ensure more agreeable microclimate in our garden. Moderately warm and irrigatable areas are excellent sites for most fruit cultivars. Specific soil requirements must indeed be considered in these cases, too. Almond trees thrive in loose soil. Cherry and sour cherry trees are suitable for planting in such conditions as well provided the soil is properly aerated. Heavy soil is optimal primarily for berries. They also need partial shading as they prefer lower temperatures so they should be planted in shaded and well-draining gardens. Loam sites are suitable for all fruit-bearing plants as their thermal and water management is excellent and fruit crops prefer such conditions [11]. Rootstocks ensure that grafted stocks adapt well to the soil. Different types of rootstocks are suitable for different soil types so rootstocks should be purchased from nurseries according to the given soil conditions (*Table 2*).

Table 2: Classification of rootstocks suitable for different soils (Kajtárné Czinege, 2025, based on Hrotkó, 1999)

Heavy, compact clay soil with excessive water retention	Loam	Quickly warming, sandy soil with poor water retention and low nutrient level
Mirobalan – for plum and apricot Marianna – for plum and apricot Plum rootstocks– for plums Sour cherry rootstock – for sour cherry	Wild peach rootstock– for peaches	Sour cherry – for cherry and sour cherry Mirobalan (29C) – for plum and apricot Marianna – for plum and apricot Peach-almond rootstock – for peach, apricot almond Almond – for peach and almond Vigorous apple rootstock (MM106, MM111)
Quince rootstock – for pear, quince and medlar Sloe plum (St Julien rootstock varieties) – for plum Weak and medium vigour apple rootstocks (M27, M9, M26)		
	Wild cherry - for cherry, needs aeration Sour cherry – for cherry and sour cherry Wild apricot – for apricot Wild pear rootstocks – for pear	
OH x F hybrid rootstocks – for pear		

In addition to physical properties, the pH level of the soil is an equally essential factor. The relevant details are summarized in the table below. Most fruit bearing trees prefer moderately acid, neutral soil conditions. Chestnut and blueberry thrive in fairly acid soil with pH level 4-5 as they live in mycorrhizal fungus association and can confer nutrients mostly through this symbiotic relationship. Thus, fungal hyphae play a vital role in their survival and fungal mycelia prefers soil with low pH [12] [13]

Table 3: Fruit species suitable for soils with different pH levels (Kajtárné Czinege, 2025 based on [14])

Tolerant to <u>acidic</u> soil (3-6 pH)	Plants tolerant to <u>neutral</u> soil (6,5-7,5 pH)	Plants tolerant to <u>calcareous</u> soil (7,5 < pH)
blueberries (3-5 pH) sweet chestnut (3-5 pH) quince (5-6 pH) gooseberry (5-6 pH)	peach jostaberry medlar	Cornelian cherry (8 pH) wild rose (8 pH) apricot, sea buckthorn, elderberry, Japanese plum
apple (5,7-7,6 pH) sweet cherry (5,7- 7,5 pH) sour cherry (5,7-7,5 pH) currants (5,8–7,2 pH)		pear (6,2-8,2 pH) walnut (6,2-8,0 pH) almond (6,5–8,3 pH) almond-peach
plum (5,5–8,5 pH) hazelnut (5,5–8,7 pH)		

3.3 Resistant species prioritized

Plant protection treatments can be partially or completely impossible to carry out in residential gardens where fruits as well as vegetables are grown or various fruit species ripe constantly. It may occur that garden owners choose not to treat their plants with pesticides at all. Therefore, species to be planted should be selected with special consideration: they should be resistant or tolerant to major diseases. Plant protection spraying may be eliminated altogether [15]; [16]

3.4 Self-pollinating varieties are favorable whenever possible

Due to limitations in area size, planting several trees of the same variety might fail to be an option. Hence, whenever it is possible, we should select self-pollinating varieties. More skillful gardeners can try to grow two-species trees or mixed-species trees by grafting the main cultivar onto a pollinator cultivar. In case we select triploid cultivars ('Jonagold' cultivar and its clones, or a 'Charden' cultivar, or a 'Sirius'), then we are required to plant two other pollinating cultivars for successful fruit set [15]

3.5 Two-layer Cultivation

We prefer two-layer cultivation. To improve space efficiency, fruit species that tolerate moving shade can also be used in two-layer cultivation systems. This means that berry-producing fruit plants can be planted beneath trees with larger canopies. These species tolerate moving shade [17] and are capable of producing yields (e.g. raspberry, blackcurrant, honeyberry, wild strawberry, Cornelian cherry, blueberry).

If we wish to grow not only fruit trees but also vegetables and medicinal plants in the shade of the trees, such plants can be sown or planted in the canopy drip line. Plant associations are beneficial both in terms of plant protection and plant vitality. This approach also enhances diversity: it is advantageous not only for plant diversity, but it also enriches the species richness of fauna [4].

3.6. The establishment of space-efficient canopy training systems is recommended.

Traditional canopy shapes can be grown in our garden if the area is large enough and we aim at creating shades.

At the same time, we can train our cultivars as a slender spindle, which is rather common in commercial orchards. This canopy shape for small trees is optimal as it allows for harvesting without equipment such as ladders. Apple and pear trees can be trained as small fruit trees (2-2.5-3 m) (Figure 1.). Plum and peach trees can be trained to medium height (2.5-3.5 m), while tall trees (3.5-4 m) from sour cherry and sweet cherry. The main characteristic of slender spindle canopy shape is that three main scaffold branches are trained above the short trunk, growing lateral fruiting branches. Only fruiting branches grow above the scaffold branches [14].

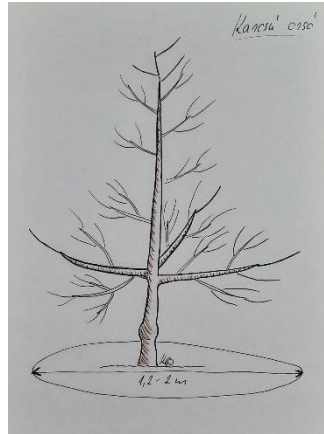


Figure 1 Slender Spindle (Kajtárné Czinege A. 2025)

3.6 Mulching and Mowing Natural Weeds

Preventing weed growing and maintaining soil moisture are primarily achieved by covering the soil. Covering may be attained with mulch or with mowings from regularly cutting the grass or the natural weeds. Annual or perennial ornamental plants, vegetables or herbs are excellent alternatives to cover the area under the tree canopy, also known as 'drip line'. Mulch can be easily prepared from shredded pruning. It is generally not advisable to grow grass between tree to cover the soil surface as lawns are usually grown from seed mixes of 1 or 2 grass species. Sowing a seed mixture containing 16-20 species [18] can result in a stronger, more vigorous, more traffic-tolerant, more drought-resistant lawn. Similar results can be attained by regularly cutting natural weed flora in the area which is also a cost-effective solution. Natural weed flora gradually changes year by year. During the initial one or two years, annual weeds dominate, then perennial, mowing-resistant weed species appear over time. They provide excellent soil cover and are also more natural to the given ecological conditions [19].

3.7 Irrigation and Nutrient Supply

Growing beautiful trees in well-maintained and healthy gardens must be supported with irrigation. Watering systems, even fully automated, can be installed with the use of drip lines, drippers, micro-sprayer nozzles [20].

In addition to irrigation, nutrients mainly in the form of organic matter must be regularly replenished. Various types of organic matters of high value such as granulated cattle manure, or bird guano are commercially available which make organic nutrient supply possible.

3.8 Bio-stimulants and plant-conditioners for enhancing vigour

Should we aim at enhancing fruit tree vigorousness and productivity, we can use foliar fertilizers, or plant growth regulators which are to be applied by spraying on the foliage. These do not constitute harmful chemicals but mixtures of various nutrients, organic matter, and substances containing hormones. Their pre-harvest interval for work, food safety, and health is very brief (0-1 day) thus can be applied effectively in residential gardens [21].

3.9 Pesticides should be replaced by non-pesticide methods such as traps or natural enemies

Plant protection is one of the cornerstones of successful home growing. Whether we should use pesticides or not? The use of toxic agents and non-selective herbicides should be avoided. In certain cases, when pest builds up, it is not unwise to apply pest control methods but even then, the protection of the environment and beneficial organisms should remain in focus. Pest populations have several natural enemies which are also purchasable by residential orchard owners. These specialized nematodes are effective against cockchafer grubs among others. Sawfly larvae act as natural enemies to moths. Natural enemies (ladybirds, lacewings, predatory mites and bugs) live in the orchard's native fauna too if we refrain from applying chemicals. These beneficial insects should be protected in our gardens [22]; [23]; [24]; [25]; [26].

Total eradication of the pest population is similarly not advisable; they should be repressed under the minimum threshold value of economic damage. Their natural enemies have a habitat and will grow in population over time just to shield our fruit trees from pests.

4 Conclusions and Recommendations

Several technologies used in commercial orchards may find their way into home garden cultivation: the slender spindle training system, organic matter fertilization, bio-stimulants, mowing the natural weeds, and releasing natural enemies of pests.

In certain cases, it is also possible to apply tools and methods atypical in commercial orchards such as companion planting and sowing seed mixtures of 18-20 wild plant species. The latter may be slightly more expensive but feasible in small areas. Mechanical and preventive plant protection is highly recommended which means that the main priority should fall on collecting and destroying pests as well as improving plant condition.

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