Types of fruit trees

Cultivating fruit trees allows **crop diversification in a regenerative farm together with the production of fruits and noble woods**. Fruit trees are classified (**1**) **according to their climatic adaptation** and (**2**) **by the characteristics of their fruits**. Each climatic area determines which species and varieties of fruit trees can best grow there. Compliance with the necessary resting or dormancy time, induced by low temperatures, is essential for optimal production and quality of the fruit of fruit trees.

Classification of fruit trees

In the fruit growing treatises (Urbina, 2001) there are two systems for classifying fruit trees which are the most common: **1**) according to their climatic adaptation and **2**) by the characteristics of their fruit.

According to climate adaptation (**Table 1**):

- **Fruit trees from the temperate-cold zone**. These trees withstand low winter temperatures (between -10 ºC or -15 ºC) without being damaged. They need the winter cold to get out of rest and are not suitable for areas with mild winters. The main species are: apple tree (**Figure 1**), pear tree, cherry tree, quince tree and European plum, as well as some species of small fruits such as raspberry and currant bush.
- **Fruit trees from the temperate-warm zone.** They are species more sensitive to low winter temperatures (below -10 ºC), but they need winter cold when they rest. They are adapted to hot summers. Some species in colder areas are peach tree and apricot tree, while in warmer areas some examples are: almond, pistachio, hazelnut, walnut, olive and vine.
- **Subtropical fruit trees.** These species are very sensitive to low winter temperatures (below -5 ºC). They do not need winter cold during rest and have moderate or high heat needs during the vegetative period. This group includes, ordered from least to greatest need for heat: fig tree, persimmon, orange tree, lemon tree, mandarin, avocado, custard apple and medlar, and the most demanding, the date palm.
- **Tropical fruit trees.** They do not support temperatures below 0 ºC, they need warm climates. Some examples are the banana tree, mango and the papaya.

According to the productive characteristics and the type of fruit:

- **Fruit trees with sweet fruit: a) pip**: pear, apple and quince; **b) stone**: peach, apricot, cherry and plum; **c) other species**: fig tree, kiwi, persimmon, banana and pineapple.
- **Fruit trees that produce nuts:** almond, hazelnut, walnut and pistachio.
- **Fruit trees with small fruits**: currant, raspberry, blackberry, blueberry and blackthorn.
- **Citrus:** orange, lemon, mandarin and grapefruit.
- **Vine.**
- **Olive.**
- **Exotic fruit trees** (lychee, papaya) and other fruit trees.

Figure 1. Apple tree cultivation. Photo: Pxhere, CC0.

Crop purpose

Fruit trees and shrubs are grown primarily to **produce fruit**. Fruit production can be used for direct consumption, such as **fresh fruits** or **nuts** (when the seeds are consumed), or it can be used for transformation into **wine** (grape), cider (apple) or preserves (**Table 1**). They can also be cultivated for nursery, ornamental purposes or to produce **noble woods**.

Two of the species most used and of greatest economic interest to **produce quality wood are cherry and walnut** (**Table 1**). Noble or quality woods are those that are used to produce veneer or planks that are used for furniture, platforms, musical instruments, etc. Our country (Spain) currently has a deficit in the production of these woods, so the sector is forced to import it. Their plantations are increasingly valued by the owners since they are a profitable alternative that, in addition, can be combined with **agroforestry**. This mixed production technique **intersperses agricultural or livestock crops with cherry and walnut plantations**. These systems have proven to be a source of biodiversity, decrease the use of pesticides and increase the CO_2 storage capacity of the soil.

Environmental needs of fruit trees

One of the environmental needs that most affects fruit production in fruit trees (corresponding to temperate, cold and warm zone fruit trees) is **rest or dormancy**, which is the temporary suspension of the growth of any structure of the

	SPECIES	Low temperatures tolerance	Winter cold (CH, Cold Hours)	Heat need	Type of fruit	Type of main consumption
COLD-WARM ZONE	APPLE TREE (*Malus domestica*)	VERY HIGH	500-1700	LOW	SWEET FRUIT (pip)	FRESH FRUIT TRANSFORMATION (cider)
	PEAR TREE (*Pyrus communis*)	VERY HIGH	500-1500	LOW	SWEET FRUIT (pip)	FRESH FRUIT
	CHERRY TREE (*Prunus avium*)	VERY HIGH	500-1500	LOW	SWEET FRUIT (stone)	FRESH NOBLE WOOD FRUIT
	RASPBERRRY BUSH (*Rubus idaeus*)	VERY HIGH	750-1700	LOW	SMALL FRUITS	FRESH FRUIT TRANSFORMATION (tined food)
TEMPERATE-WARM ZONE	PEACH TREE (*Prunus persica*)	HIGH	100-1100	MEDIUM	SWEET FRUIT (stone)	FRESH FRUIT TRANSFORMATION (tined food)
	WALNUT TREE (*Juglans regia*)	HIGH	600-800	MEDIUM	NUT FRUIT (stone)	FRESH NOBLE WOOD FRUIT
	OLIVE TREE (*Olea europaea*)	MEDIUM	100-500*	HIGH	OLEAGINOUS FRUIT (stone)	TRANSFORMATION (tined food, oil)
SUBTROPICAL ZONE	FIG TREE (*Ficus carica*)	LOW	90-350	HIGH	GRAIN FRUIT	FRESH FRUIT TRANSFORMATION (nut)
	LEMON TREE (*Citrus X limon*)	LOW	NO	HIGH	TROPICAL FRUIT	FRESH FRUIT
TROPICAL ZONE	BANANA (*Musa paradisiaca*)	VERY LOW	NO	VERY HIGH	TROPICAL FRUIT	FRESH FRUIT
	MANGO (*Mangifera indica*)	VERY LOW	NO	VERY HIGH	TROPICAL FRUIT	FRESH FRUIT

Table 1. Characteristics of some of the main species of fruit trees related to their ability to respond to environmental factors and their fruits.

plant containing a meristem. The rest is induced by the low temperatures of autumn, together with the shortening of the day. Each species and variety is characterised by requiring a different resting period which, if not obtained, causes a delay in **sprouting**. This delay means that the plant has a lower amount of nutrients (due to the lack of foliar surface necessary to carry out photosynthesis), with very important negative effects on fruit production: both lower production and quality (smaller size, colouration and firmness).

There are different models to count the latency periods, these are important because they are **agroclimatic indicators** that help when making decisions about the species and varieties of fruit trees that can be grown in an area. The **Weinberger cold-hour (HF) model** is one of the most widely used: in this model an hour with temperatures below 7.2 °C is counted as a **Cold Hour (CH)** (**Table 1**).