Production of walnut timber

(Juglans regia L.)

in 3 steps

关于生产核桃木材的三个步骤
Tree farming for walnut timber production

Tree farming is set of cultivation practices aimed exclusively at quality timber production.

Many tree species can produce high quality timber getting up to high prices on the European market. Among these the following may be quoted: sweet-cherry, pear, sorbus spp., maple-tree, chestnut, poplar spp., but, in Italy, **walnut** is certainly the most requested one.

This handbook contains information on the walnut tree farming techniques, which provides not only commercially valuable logs, but also fruit production.

Walnut trees, planted at suitable distance from each other, may be cultivated as a pure walnut plantation or mixed with other tree species.

The walnut logs may be classified in three price classes, maintaining same relative score over the time (**prices 2003 are listed in the Table**).

<table>
<thead>
<tr>
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<th>Euro/m³</th>
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<tbody>
<tr>
<td>1st class</td>
<td>1.100</td>
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<tr>
<td>2nd class</td>
<td>350</td>
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<tr>
<td>3rd class</td>
<td>160</td>
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**MAIN TECHNICAL FEATURES OF FIRST QUALITY TIMBER**

Sizes

Straight and cylindrical stem

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**Presence of knots**

**Homogeneous wood colour**

**Regular growth**

**ATTENTION!**
The presence of only one of these defects can downgrade the stem to the second or third class.
The three production are:

1st step > ROOTING
The rooting step is devoted to overcoming the transplanting stress

2nd step > QUALIFICATION
The qualification step is devoted to obtain a stem at least 250-300 cm tall. The stem should be clean of branches before reaching the size of 8-10 cm in diameter.

AIMED PRODUCTION HEIGHT

Rooting  Qualification

50 cm  250-300 cm

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The dimensioning step aims to obtain tree sizes of 30-40 cm in stem diameter with constant width of the growth rings.
1st step: **rooting**

In order to be successful in this step it is necessary:

- to produce or to purchase well-developed plants;
- to plant correctly and at the right time in a well-prepared soil suited for the species
- do not prune the plants before they reach at least 50 cm in length.

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**Robust bud**

It is not important to have a long stem, but a **strong stem**, having a length/diameter ratio ≤ 40.

**Weak bud**

The root system should be well-developed and the tap-root should not be cut.
A tank filled with earth, as shown in the figure below, can be used as a nursery bed for the production.

How to graft

Plants aged one year may be outplanted, or grafted and then outplanted in the following year.

After one or two growth seasons

A shoot of 50 cm or more shows that the plant has overcome the rooting stress.

If the plant shows a proper architecture, it is possible to begin the qualification step. Otherwise, it is convenient to cut the plant at the ground level in order to obtain a new-formed, straight and vigorous stem.
2nd step: qualification of

If the walnut is planted in a soil with very good characteristics, it may develop apical shoots 100 cm long and over.

In such conditions it is possible to carry out the “pivot pruning” until the apical shoot is more than 250-300 cm.

When the “pivot pruning” has been decided, it is necessary to fix in the soil a strong pole 50 cm higher than the productive goal.

The twines between the plant and the pole should be located in the stem portions aged 1 and 2 years. It is indispensable to control periodically the twines: if they are too tight or too slack, they could cause defects which would decrease the price of wood.
vigorous plants

The “pivot pruning” is the systematic cutting of the shoots growing on the stem during the first or the following years. The elimination of the shoots, which should be carried out during the spring in one or more repeated cuttings. This practice improves the stronger growth of the apical shoot and makes it covered with leaves.

This kind of pruning is very stressing for the plant, but provides the best production of first quality wood and a higher quantity of fruits.

When the aimed production height is reached, the crown is being left to its natural development or branches may be grafted.

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2nd step: qualification of “mean” and “mean-low”

If the walnut tree is planted in a good (but not very good) soil, it may develop apical shoots between 50 and 100 cm.

In these cases it is advisable to carry out a “reiterative pruning”. Pruning after pruning, this practice drives the walnut plant to rise its crown and to build up the same architectural pattern which is characterised by:

- an apical shoot where the crown will be located in the following year;
- a crown located on the two years old stem for vigorous plants, and on the two-three years old stem for plants showing medium/low vigour;
- a stem clean of branches.
The “reiterative pruning” aims at obtaining a crown composed by many small-size branches. In order to achieve this result, it is necessary to carry out, at the end of the winter or at the beginning of the summer, the following pruning action:
- top branches
- too thick or too upright branches
- 2/3 years old branches

Pruning of a medium/low vigour 5 years old plant

Pruning of a vigorous 5 years old plant
2nd step: **qualification**

How and when the pruning cut should be done

For walnut, the period of the year and the point of the branch in which the cut is done gives rise to different reactions.

**Correct cut**

- Cut giving rise to healing problems and to the related wood depreciation

If the cutting is made at the **beginning of the summer season**, it is difficult that the walnut may produce new shoots close to the cut.

If the cutting is made at the **end of the winter season**, it is possible that the walnut may produce new shoots close to the cut.

The new shoots should be eliminated as soon as they appear.
Leaving a branch portion decrease the wood quality because it will give rise to undesirable knots.

The branches should be eliminated before the stem reaches 10 cm of diameter. In this way, both knots and heals will be grouped in a small central cylinder.
3rd phase: **dimensioning**

The aim is focused on a sustained and regular growth pattern.

Regular growth of the diameter is obtained by allowing the walnut tree to “explore” with the roots and the crown progressively wider spaces.

In order to produce first quality wood, the availability of growing space should be decided at the time of outplanting, making the choice of an interplanting distance between 9 and 12 m (81-144 m²).

A walnut tree, having a stem diameter of 30/40 cm, fast and regularly grown, needs an available area between 81 and 144 m², according to the pruning technique.
The regular diameter growth is the indispen-
sabile feature of first quality wood.

If the walnut trees are planted at a distance less than 9 m, it is necessary to clear the 50% of the trees two years before their crowns get in touch.
Examples: **walnut plantations**

The walnut can be planted both in pure or mixed with other species

The plantation models presented in the two following pages are examples showing the wide possibilities of different outplanting schemes, distances, species that can be chosen in order to address the social-economic situation and to respect the local environmental conditions.

**WALNUT and AGRICULTURAL CROPS**

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材料型核桃木的栽培技术

材料型核桃木的栽培技术是指在核桃木的生长过程中，通过合理的管理措施，使其生长快速、健康，以达到高产的目的。材料型核桃木的栽培技术主要包括以下几个方面：

1. 土壤管理：选择肥沃、排水良好的土壤进行种植。
2. 水分管理：根据土壤和气候条件，合理灌溉。
3. 施肥：根据树木的生长需求，适时适量施肥。
4. 病虫害防治：采取生物防治和化学防治相结合的方法，防止病虫害的发生。

材料型核桃木的栽培技术的成功实施，不仅可以提高核桃木的产量，还可以提高其品质，满足市场需求。
Enrico B. Lattes e Paolo Mori

[Images of wood grain samples and descriptions]

Note: The text in the image contains a description of wood grain samples and their classification.
移植繁殖技术可分为三个阶段：

第一阶段：移植栽种

移植栽种阶段主要要避免移植后的植物变质状态。

第二阶段：生产合规格的幼苗

生产的幼苗须在温室中至少达到250到300毫米的高，直径达到8到10厘米水质之后，移入水池中继续生长。

利用幼苗木的幼干继续提高

生产合规格的幼苗
细长的树干，树干周围有明显的年轮
此植物适合生长在气候适宜的30到40度之间，树干呈长圆形。
第1阶段：移植前准备

选择或购买栽种成活好的杨苗，在距离枝干起树的土堆上，按顺序间隔。在树苗长到30厘米的高度之前，不要被任何修剪。

图中显示的剪枝技巧:

- 枝条不要剪得太高，但要确保剪得合理。
- 剪掉较短的枝条，保持高度不超过40厘米。

图中显示的树干修剪:

- 不要对主根做任何修剪。

怎样嫁接

成功的关键在于砧木的选择，芽接或枝接都是可行的方法。水芽在嫁接时。

在一个或两个生长季节之后

如果枝条生长到了至少30厘米以上，便可以进行移栽。若枝条上芽点发育良好，就可以进行第三阶段。

如果枝条生长状态良好，就可以进行第三阶段。若枝条生长状况不良，就要进行修剪和回收。

Enrico B. Lattes a Paolo Mori 23
第二章  合植树木栽培

如果将不同种类的树木种植在一块的土壤中，
增强树木径宽可能超过10倍。

如果达到上述程度，可指定一根木棍起钉接，即为“根式钉接”，
这样树木的径宽长度可达到250到300厘米。

例如进行“根式钉接”时，
就把一根根木棍钉入根部，固定在上面，
并在木棍上装上根部，固定在上面，
在直径的1米至2米的范围内，
在树干的平面上钉钉子，并回填土。
这种“倒式的修剪”是在树干长到一年以后枝干完全长到的阶段进行。修剪可以在春季进行，一次或者多次，这样就能够实现树干达到最大的生长速度，达到预期效果。当树干长到比样板高度高时，就可以不对树干进行修剪。让树干自然生长或者对树进行修剪。
第二阶段：中等相拉或中下等相拉穗木前品选优株

如果在上述选择基础上进行土壤改良和砧穗组合，穗木的地面生长可达30至100厘米的长度。

在这种条件下，建议使用“重复移接”，也就是说，在每次移接后，株穗枝条再发枝条的部位高度向上平行移动。

根据移接重复移接的结构特点，因为
- 株穗枝条化性垂直移动至当年的最根枝枝部。
- 如果穗木长度成长相拉，在两年的成穗树下二会长出枝条。如果穗木长成假拉，就需要超过一年的时间。
- 条下不断增高三根枝会有枝条出现。

第一年成株

第二年成株

第六年成株
重复的枝条使树木长出许多小分枝，
为此目的，在未成熟或不适宜的
需要在适当的时间进行剪枝，
去掉树枝上的枝条，
太长太粗的枝条或者不直的枝条。
已长成两年以上的枝条

适用“反复剪枝”该
长成的枝条，
需要进行再次剪枝的提示

原地五年成树成枝的树木图示

折枝五年成树成枝的树木图示
第Ⅱ阶段：标准削枝的方法

解释，现时进行削枝

一年生中的不同季节，直接操作上不同部位会否有削枝，结果也不同。

正确的削枝方法

不正确的削枝方法

如果在削枝中不慎将枝条连根切断，
削枝时不会出现危害的情况

如果在削枝中将枝条切得太长，
可能在削枝处出现一个新老组织的分界
剪枝时应选择靠近主干长的10厘米左右的枝条，这样就不会导致枝条的生长集中在树干中心部位的范围。
第三阶段：树木品种选择及栽培

目的：为了使树木高效地生长

该阶段根据树木和环境要求的生长空间和距离逐渐扩大，以确保树木生长的健康和稳定。

树木在树木生长的初期，需在适宜的土壤和气候条件下进行移栽。移栽后，树木需在适宜的环境中生长。

树木移栽期间需用细木条在树木的根部周围固定，以防止树木的根系受到损坏。
Wide-Importance Research Project

Agroforestry: Agro-Alimentare, Ambiente

Involved Structures
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Further reading
www.ibaf.cnr.it
www.arboricoltura.it

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