

Cost E42



INTERNATIONAL CONFERENCE

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New cultivation trends in Italian tree farming plantations

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The tree farming plantations in Italy have derived its know-how from:

- Industrial plantations
- Intensive poplar plantations
- Fruit tree plantations



First pure plantation with medium stoking density has been realized



- Firstly, a typical spacing of 3x3 m has been adopted
- Secondly, a spacing of 5-6 m has been preferred

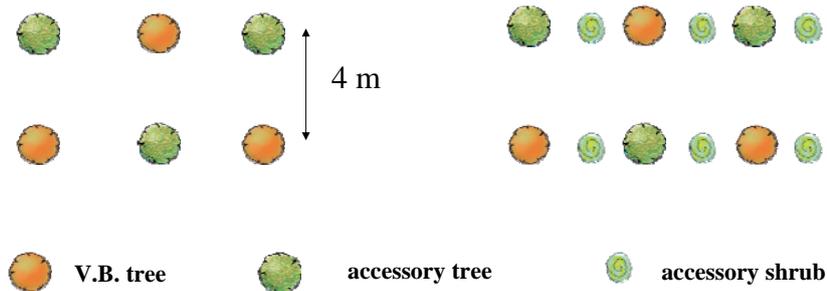
Advantages and disadvantages

- Faster soil cover and best weed control
- Best tree selection with thinnings
- Intermediate incomes with thinnings (fuel wood)
- Necessity of extensive cultural practices on a high number of trees (pruning particularly)
- Difficult allocation of felled material into the market

As a matter of fact, the cost of plantation, weed control, pruning and thinning on a large number of trees were not compensated by the products obtained with the thinning.

How to reduce the costs? Mixed plantations could be a possibility

- Between valuable broadleaved trees some accessory plants have been inserted.



- The use of accessory trees and shrubs have permitted a cost reduction (i. e. pruning) and a better weed control.

In these old plantation types

the position of the trees that would arrive at the end of the rotation (crop trees “principal trees”) will be selected during the cultivation cycle.

This approach has been named

“Postponed Decision Planning”

New plantation types

The position and the spacing of principal trees is predefined (definitive distance) in order to reach the productive goals at optimal distances

With this method, a couple of trees, 1 m spaced, is planted and the selection of the principal plant between the two is carried out during the qualification phase (5-6 year).

The new approach has been developed owing to the evolution of the pruning techniques.

We call this new type of plantation design

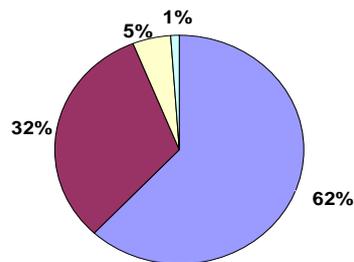
“Anticipated Decision Planning”



Stem quality improvement

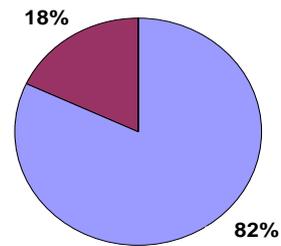
The production of valuable timber is ensured by the progress of the pruning techniques and the choice of the best tree of the couple.

Total walnuts



Before selection

Best walnuts



After selection

■ 1 ■ 2 ■ 3 ■ 4

Quality stem classes

Costs reduction

- The cultural practices are done only on a restricted number of trees
- Pruning costs of a couple are similar in comparison with a single tree.
- Accessory trees do not need any pruning.
- The shrub cover reduces the cost of weed control.



Couple of trees

Juglans regia



Fraxinus angustifolia



Couple of trees

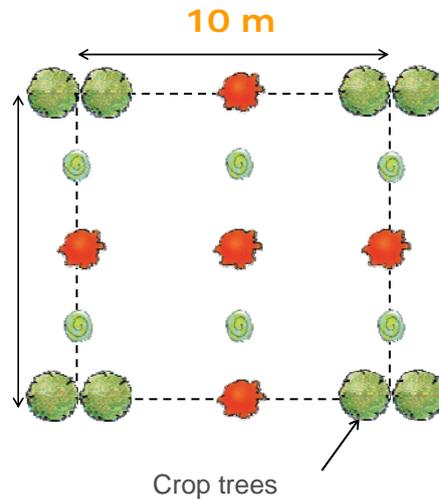


Sorbus torminalis



Pyrus pyraeaster

Example of plantation design



A further development

The Anticipate Decision Planning technique leads to wide spaced plantations with a consistent loss of productive surface.

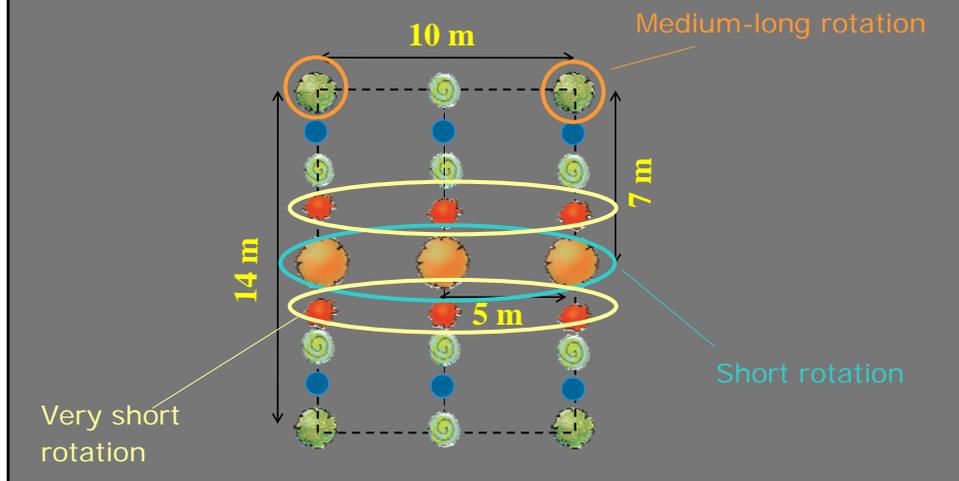
Therefore,

within the interlines short rotation trees are planted in order to provide a medium term income for the owners.

the “polycyclical plantations”

“Polycyclical plantations”

Plantations in which are present, at the same time, “principal” trees with different rotations.



A careful attention in plantation design is necessary

The spacing between long rotation principal trees and medium rotation principal trees must be carefully designed in order to avoid negative competition.

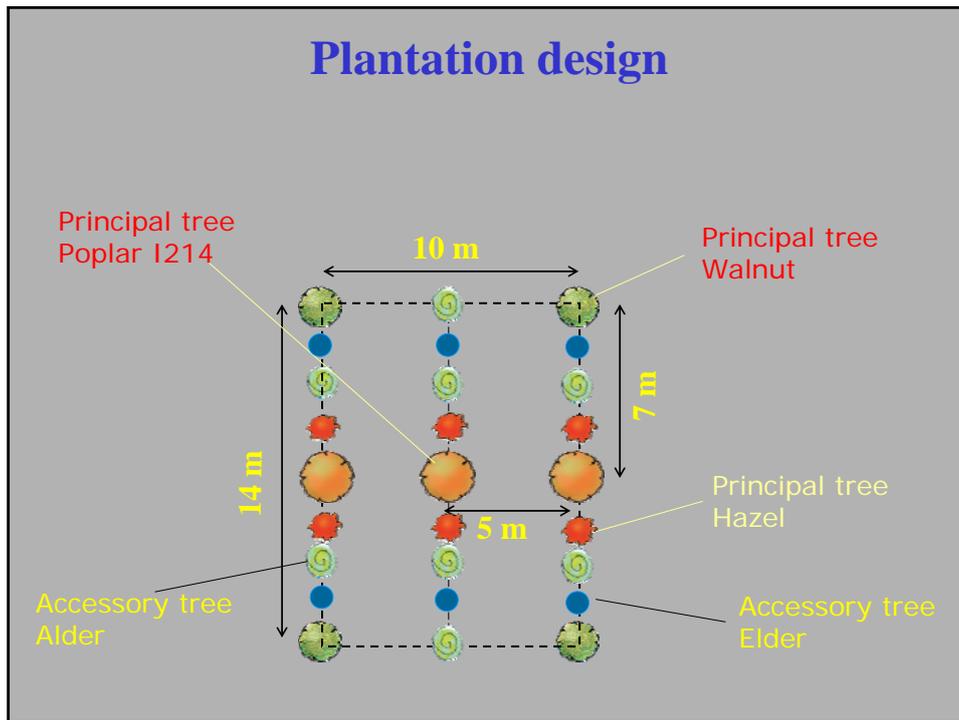
In the last experimental plantations the production of timber has been associated with fuelwood production (SRF).

The experimental plots of polycyclical plantations in North Italy have showed interesting results:

- An increase of timber production in comparison with pure plantations (i. e. poplar-walnut plantations vs. pure walnut plantations).
- A diversification of production in terms of assortments and a consequent reduction of hazards due to market price fluctuations.
- An anticipated income from the medium rotation principal trees and from SRF.

Farm afforested surface 62 ha	Plantation winter 1998-99:	16 ha
Experimental scheme: randomized blocks		Repetitions 4
<p>Consociations</p> <ul style="list-style-type: none"> • <u>V.B.T.</u> Juglans regia Prunus avium Fraxinus angustifolia • <u>Poplar clones</u> I214 and BL P.alba Villafranca • <u>N.F.T.</u> Alnus glutinosa Elaeagnus umbellata • <u>Shrubs</u> Sambucus nigra Corylus avellana 	<p>Example - Casalbuttano plantation (CR)</p>	

Plantation design



**Why it is important to discriminate between principal and accessory trees?
Because every trees have a specific role**

Walnut and Poplar



- Good quality timber

Hazel



- Biomass

Elder and Alder



- Soil cover
- Soil fertility improvement
- Positive modification of walnut trees structure and architecture
- Sheltering of isolated walnuts after poplar felling

Results

The parameters considered in walnut tree plantations grown with / without poplar I214 were:

dbh

Total height

Length of net trunk

	2004 Dbh 6 yr (cm)	2005 Dbh 7 yr (cm)	2006 Dbh 8 yr (cm)	2007 Dbh 9 yr (cm)	2004 H 6 yr (m)	2005 H 7 yr (m)	2006 H 8 yr (m)	2007 H 9 yr (m)	2005 net trunk 7 yr (cm)
Poplar I214	30.5	34.6	--	--	23.2	24.1	--	--	834
Walnut with I214	9.0	11.1	13.0	15.2	8.4	10.2	--	--	380
Walnut without I214	8.3	11.2	13.5	15.9	7.6	9.6	--	--	328

- **No significant differences of all parameters (dbh, H and net trunk) were noticed between walnut trees grown with / without poplar**

- **No significant differences among trees grown in various blocks**





Conclusions

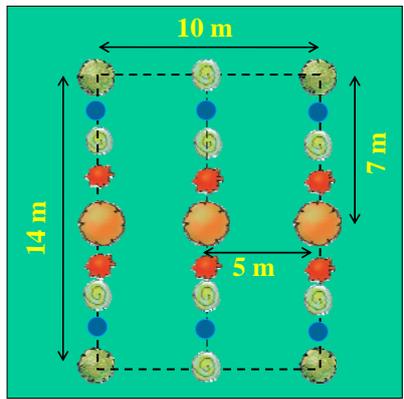
- **Dbh and height increments of walnuts is not reduced by the presence of poplar trees**
- **After the poplar trees harvesting, the walnuts continue to grow without suffering the significant lighting increase** ▶
- **The walnut real net trunk is slightly higher in walnut/poplar plantations.** ▶
- **Poplars, thanks to the wide spacing, show higher dbh increments, and thanks to the presence of associated species, do not need any treatment (fertilization, pesticides, irrigation, etc.)**

	2004 dbh 6 yr (cm)	2005 dbh 7 yr (cm)	2006 dbh 8 yr (cm)	2007 Dbh 9 yr (cm)	2004 H 6 yr (m)	2005 H 7 yr (m)	2006 H 8 yr (m)	2007 H 9 yr (m)	2005 net trunk 7 yr (cm)
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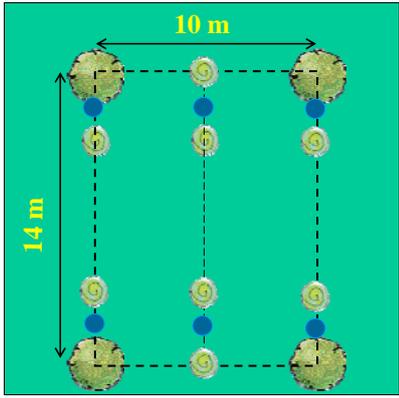
The spacing of 7 m between walnuts and poplars is:

- **Optimal for walnut tree in order to avoid negative competition with poplar tree**
- **Optimal for poplar tree in order to reach quickly suitable commercial dimensions**

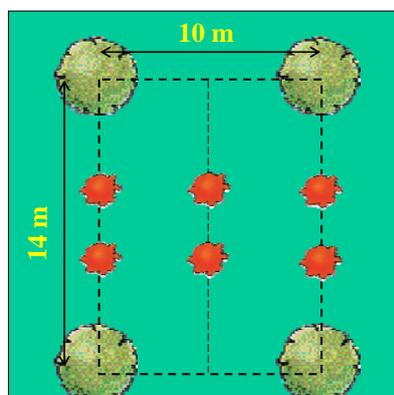
And the future....



After the harvesting of hazel and poplar

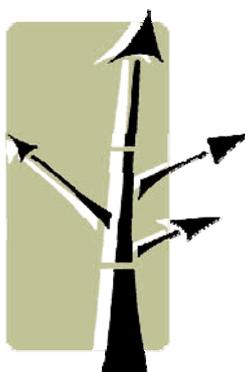


A new planting



 Shade tollerant trees (i.e. *Carpinus betulus*)

Thank you for the attention



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