



Selective thinning in pinus nigra artificial stands

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**NUOVI APPROCCI PER LA GESTIONE
SOSTENIBILE DEL PINO NERO:**
biodiversità e mitigazione

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Black pine treatment (theory)

High density plantation (1900/2500 trees/ha)

Cleaning at thicklet stage

Thinning every 10 years

100 years rotation – 500 trees/ha

Clear cutting and artificial regeneration



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Italian black pine stands are typically thinned from below (dominated trees are removed) with moderate intensity

Precautionary approach

Mainly for helophyte stands this kind of approach doesn't show any results as it doesn't modify the stand structure and soil microclimate (crowns cover stays the same)

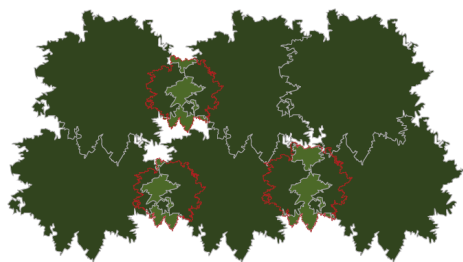


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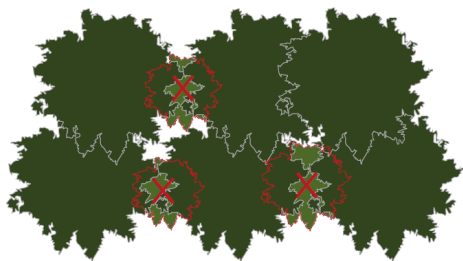
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DIRADAMENTO TRADIZIONALE IN UNA GIOVANE FUSTAIA COETANEA

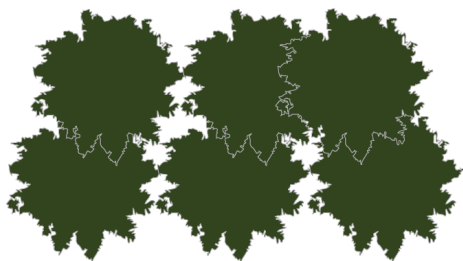
■ Piante del piano dominato
■ Piante del piano dominante



La struttura del bosco prima del diradamento.



La martellata a carico del piano dominato.



La struttura del bosco dopo il diradamento. L'intervento è praticamente influente sulla copertura delle chiome.

Traditional thinning of a black pine young even age high forest

Thinning investigation

Efficacy of late first thinning has been studied through stands reaction to different thinning intensity

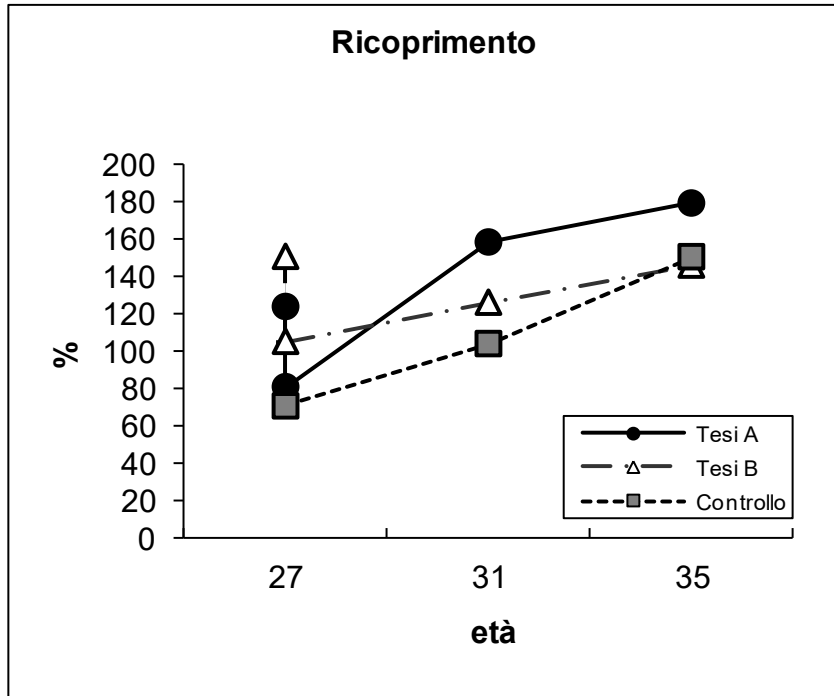


Before thinning



After thinning

Black pine stands take anyway advantage from thinning also at late stages



A young black pine stand shows better performance in crown canopy recovering after 8 years from the first thinning with high intensity (47% trees 35.5% BAI)

A Thesis

comparing to a low intensity thinning case (39% trees 28% BAI)

B Thesis

Similar results have been recorded in older stand

The dominant part of the stand is the one thinning sensitive

High intensity thinning (dominant plane interested) improve trees mechanical stability over time

Statistically significant differences have been found among different treatments

Studies carried on 88 experimental stands in Tuscany show that the dominant and dominated planes ratio stay stable in the early (pole stage/young high forest) and late stages (young high forest/mature high forest).

In these stages the dominated trees number is the 25.7% of the total so the first thinning (30% removed trees) don't affect the dominant crowns cover



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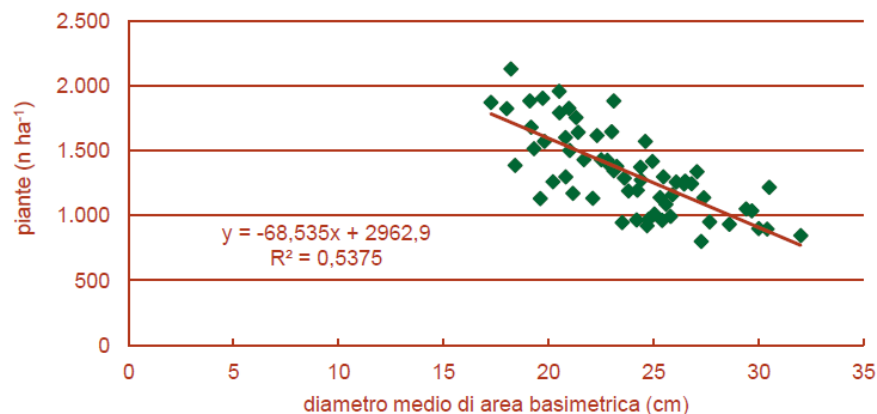


Figura 3.1 - Densità in funzione del diametro medio di area basimetrica.

Assuming the same planting density (average 2.500 trees/ha) between ages 30 and 45 we have almost 35% mortality (on average)

So a thinning from below (following the regional law) remove just the trees would be naturally dead in the following 15 years (self thinning).

This kind of thinning don't positively affect competition among dominant trees (source of the main harvesting product at the end of the rotation period and main potential stability component of the stand)

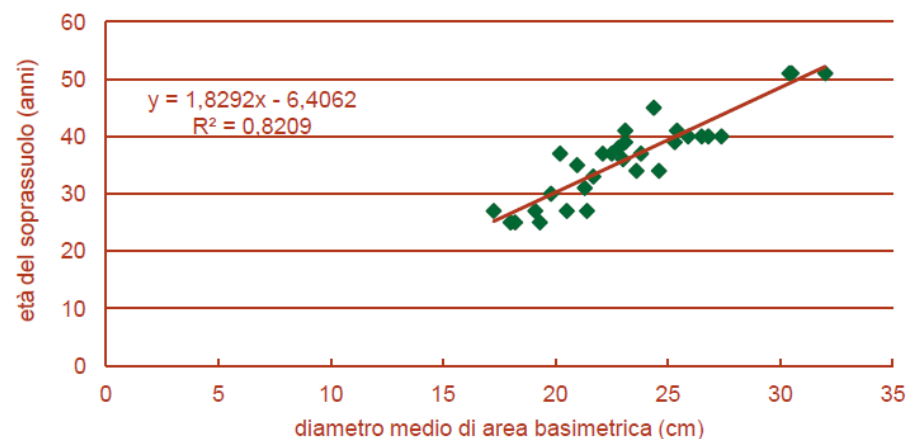


Figura 3.2 - Età del soprassuolo in funzione del diametro medio di area basimetrica (elaborazione dati di 33 popolamenti sperimentali non trattati).

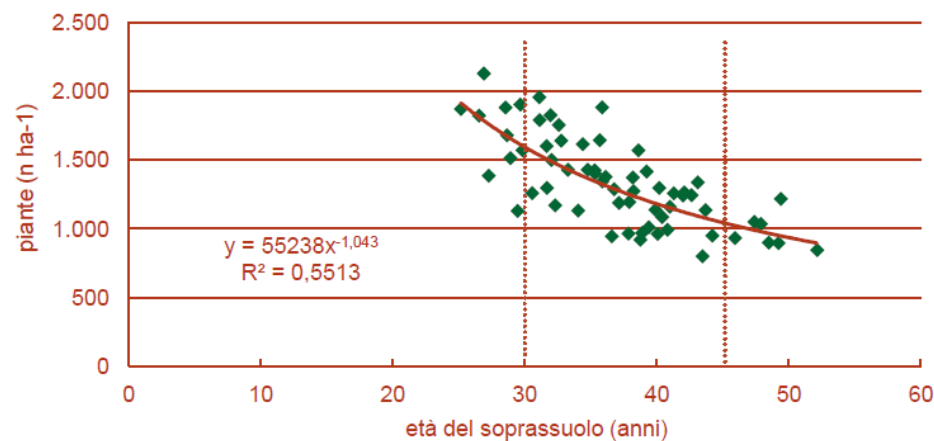


Figura 3.3 - Densità in funzione dell'età del soprassuolo (elaborazione dati di 66 popolamenti sperimentali non trattati).

Before the thinning



So a thinning able to really
affect the dominant plane has
been tested:
the selective thinning

Thinning from below (high intensity)



Selective thinning



Selective thinning is an easy methods to apply:

1) Choose the candidate trees

among the more stable trees

2) Clear the space around target trees' crowns

dominant plane thinning to give light to the candidate trees crowns

leave dominated trees (if they are a negative harvesting cost)

A) Choose and permanently mark the candidate trees (100 per ha)

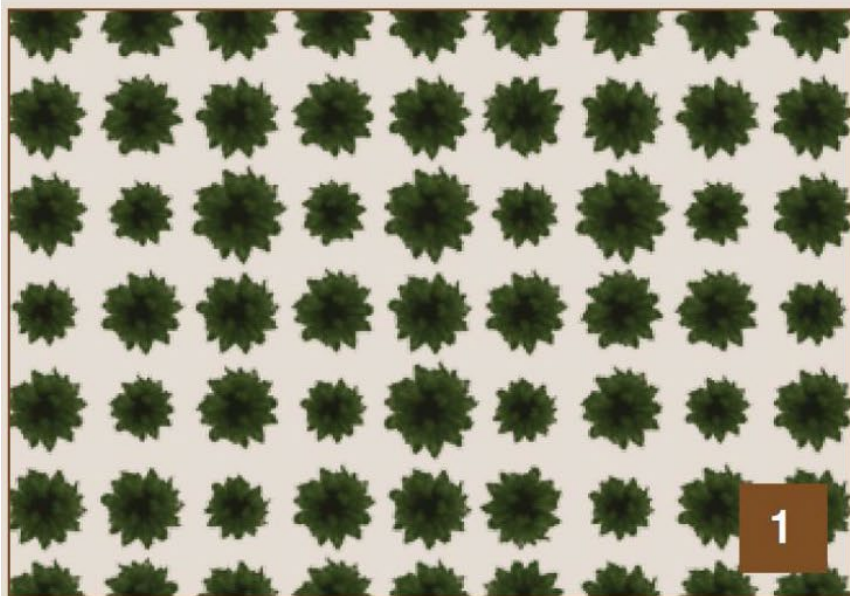


B) Assign to the cutting candidate trees' competitors

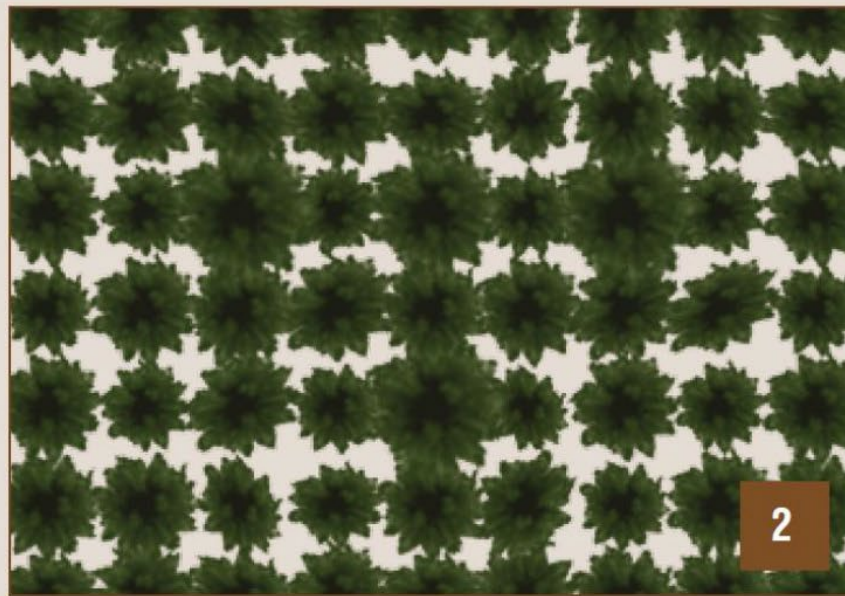


Post harvesting candidate trees are free from close competitors

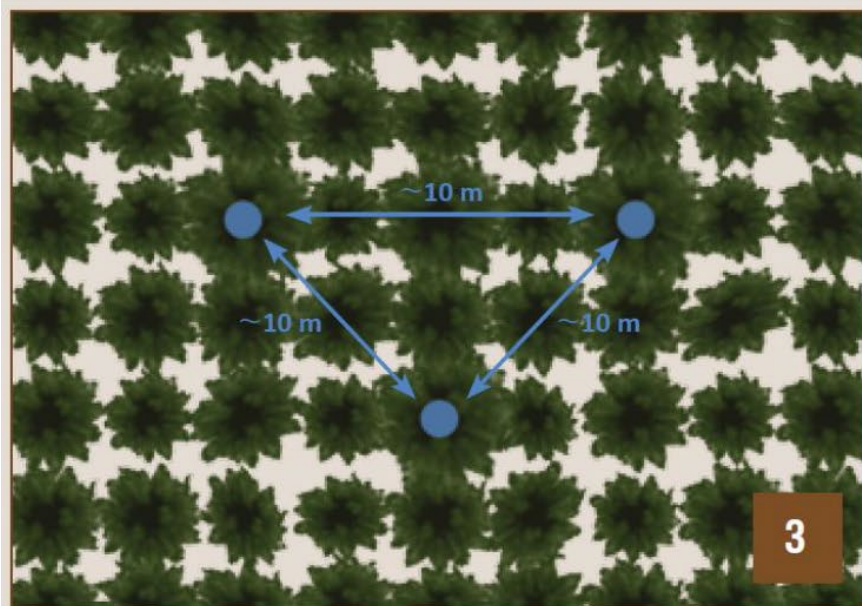




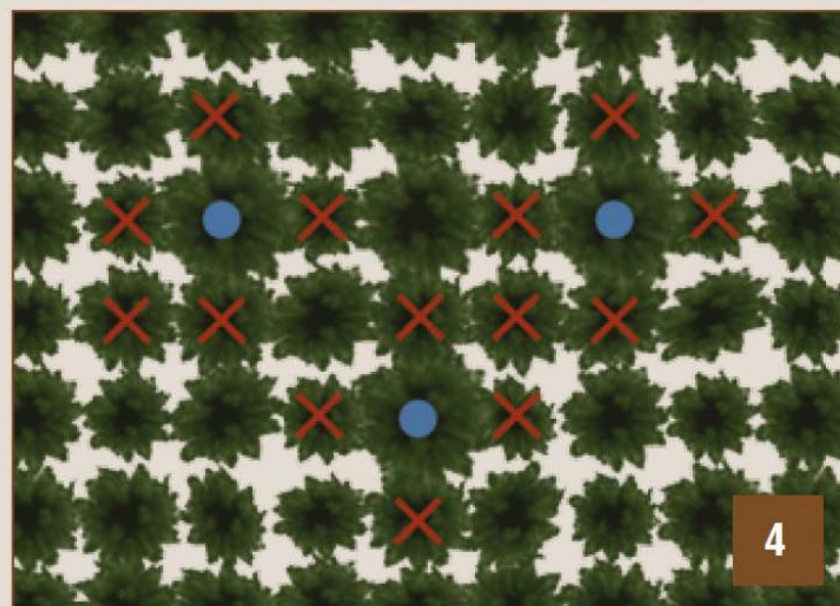
Giovane pineta di origine artificiale in cui le chiome delle piante non si toccano ancora.



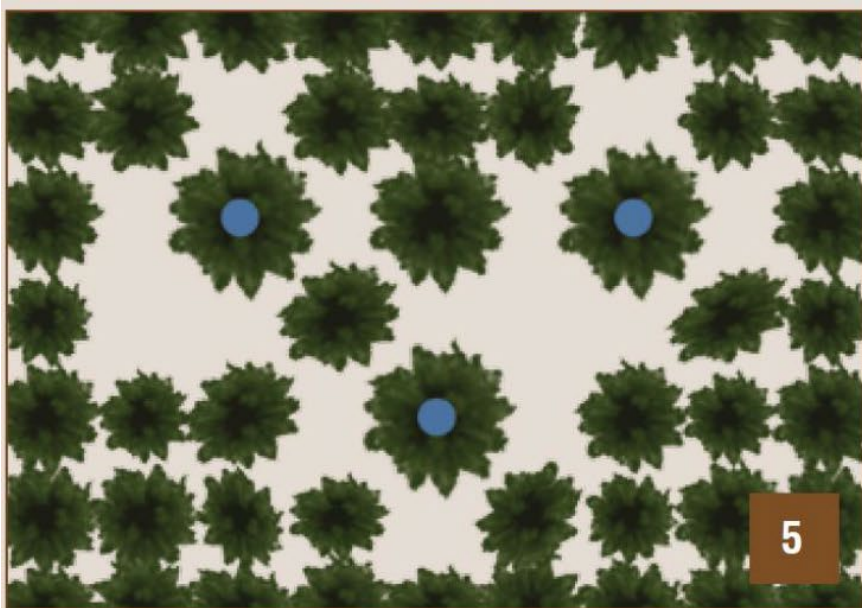
Fase in cui le piante entrano in competizione, le chiome arrivano a toccarsi: è il momento di fare il diradamento.



Si scelgono le piante candidate (vedi § 3.3.1). Per le pinete circa 100 candidate ad ettaro, la distanza media è di circa 10 m.

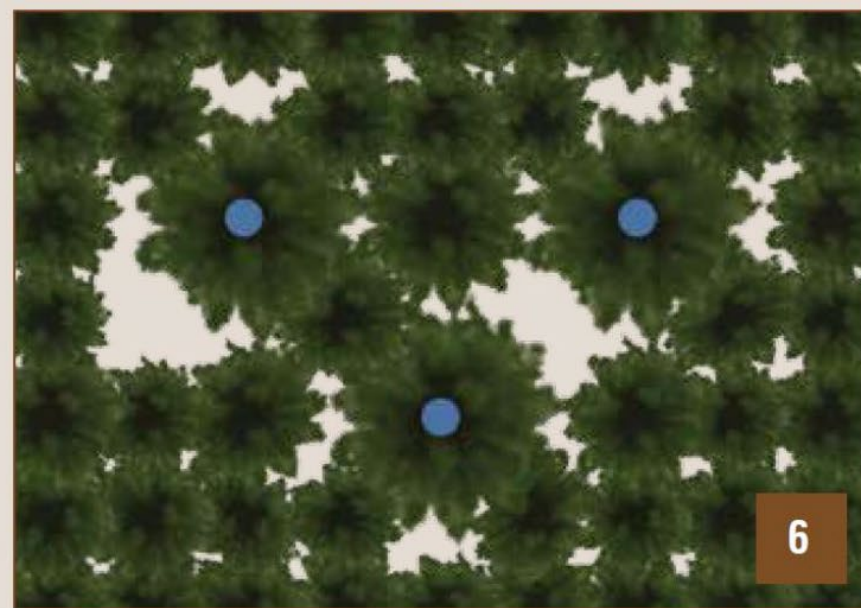


Si scelgono le piante dirette concorrenti delle candidate soprattutto sul piano dominante.



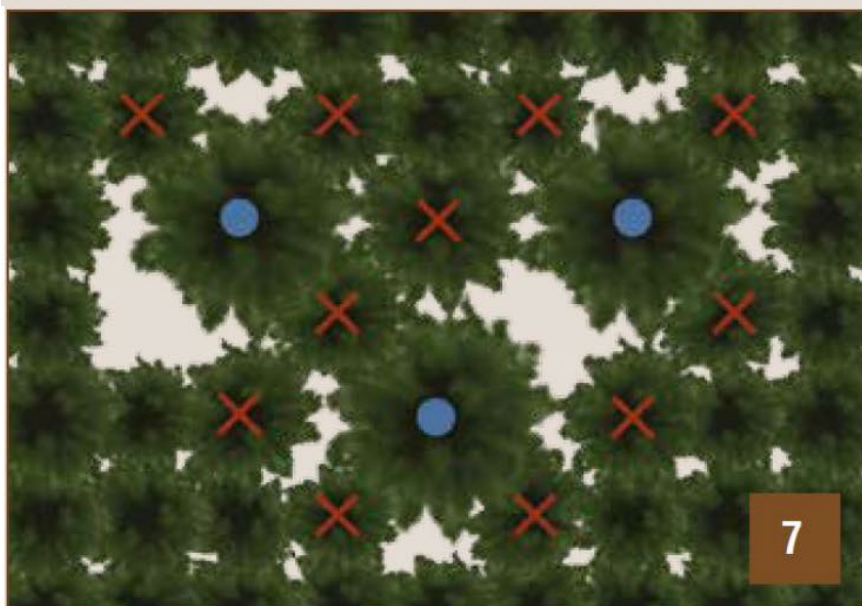
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Situazione dopo il diradamento selettivo che ha eliminato le dirette concorrenti.



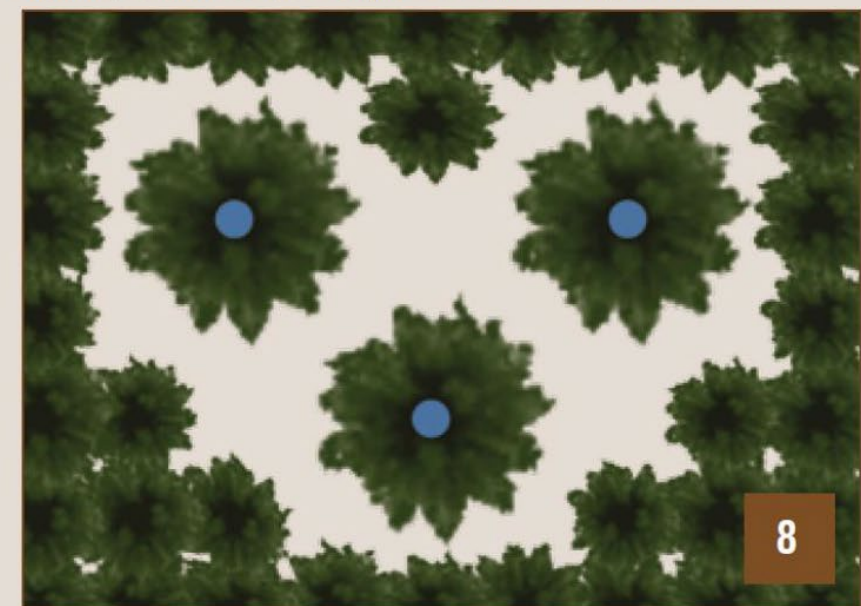
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Le piante, sia le candidate che quelle di margine, si avvantaggiano degli spazi creati dal diradamento, fino a quando le chiome tornano a toccarsi.



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È il momento di un nuovo diradamento per eliminare le attuali competitrici dirette delle candidate.



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Situazione dopo il secondo diradamento selettivo.

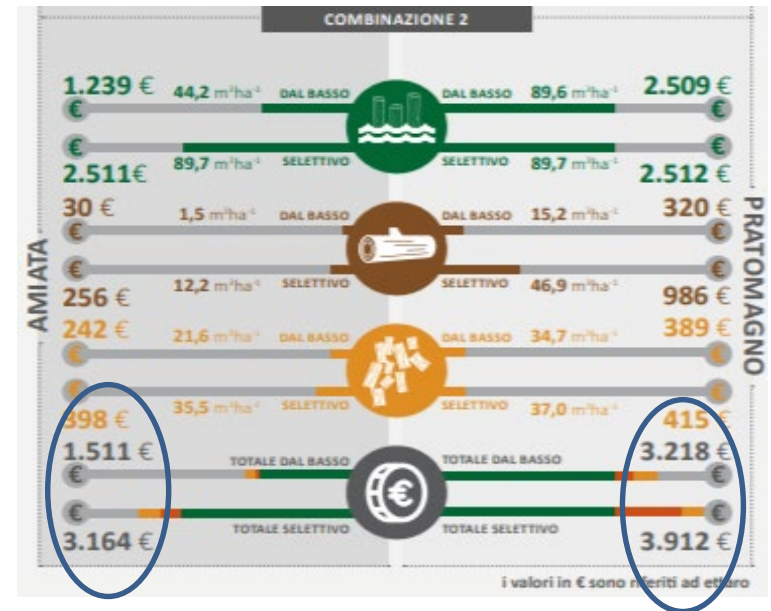
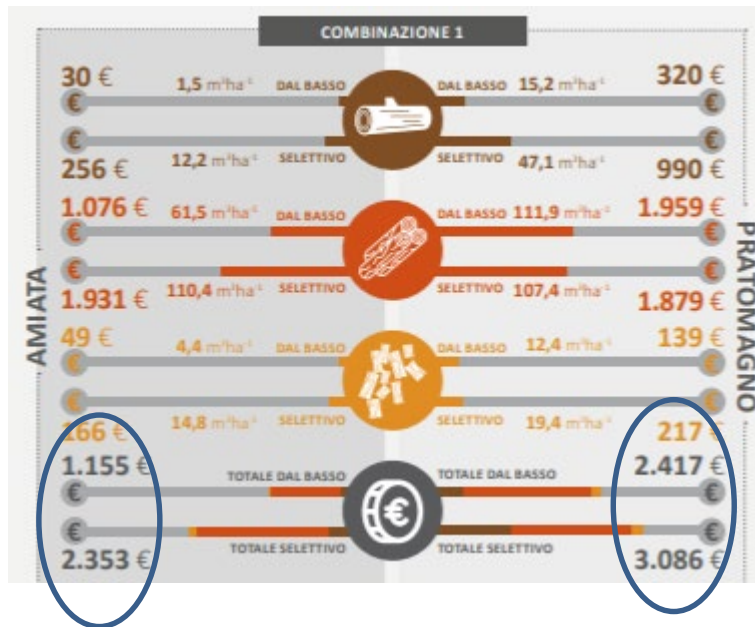


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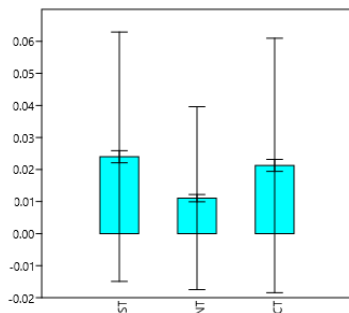
Potential financial incomes

A recent market survey carried out in Tuscany region enlightens more remunerative black pine assortments are **logs for sawmill** and **stilts**. At the bottom of this slide you can see the incomes from two different combinations of the two assortments (from the same forest intervention carried out in the framework of SelPiBio LIFE)

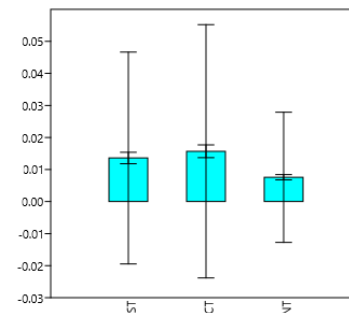


Stand dynamics three years after silvicultural treatment applied

Forest growth



Amiata: current biomass increment three years post thinning.
Significant differences among thesis



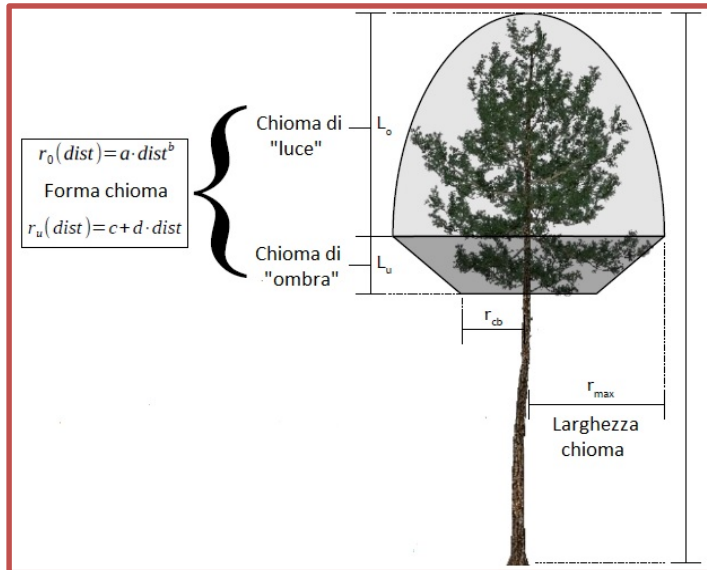
Pratomagno: current biomass increment three years post thinning.
Significant differences between ST and control and CT and control. No significant differences between ST and CT

“candidate” (effective candidate trees) and “potential candidate”. Variation of percentual of diameter current increment (three years after vs five years before)

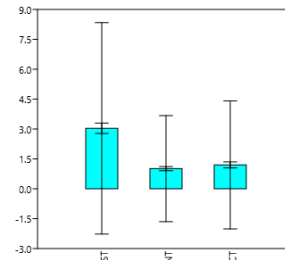
	Control	Traditional	Selective
	%	%	%
Pratomagno	+ 24,53	+ 21,56	+ 27,20
Amiata	+ 41,56	+ 36,27	+ 45,91

Stand dynamics three years after silvicultural treatment applied

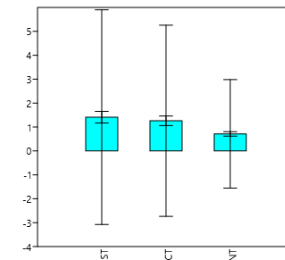
Structural dynamic



Crown volume increment three years post thinning



Amiata: significant differences among thesis



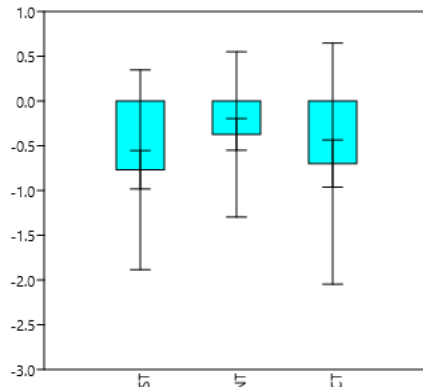
Pratomagno: significant differences among thesis with intervention and control. No significant differences between thesis with intervention.

crowns volume variation % (dominant layer only)		
	Amiata	Pratomagno
Control	+ 6,0 %	+ 4,0 %
Classic	+ 4,2 %	+ 1,6 %
Selective	+20,7 %	+ 17,1 %

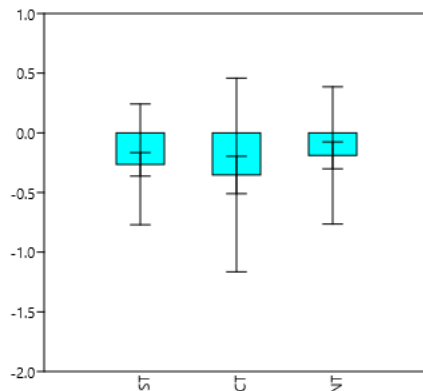
Stand dynamics three years after silvicultural treatment applied

Dominant trees stability

Dominant trees (candidate and potential candidate) Height – DBH ratio (H/Dbh) three years post thinning



Amiata: H/Dbh decreases between (significant differences) among thesis



Pratomagno: No significant differences among thesis.



grazie



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