Thinning in chestnut coppices, effects on the forest ground and recovery capacity

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ABSTRACT

The abandonment of traditional forestry practices and the lack of updating through more modern practices, as for the coppice's government, has led to a dangerous homogenization of the landscape with consequent loss of ecosystem variety, landscape complexity and biodiversity. The coppice management combined with the basic requirements of sustainability is possible with a careful logging activity and a continuous monitoring of the impacts on the ground and on the renovation. The chestnut coppice management corresponds to a specific productive model, with questionable values of naturality but without heavy impacts. It is known that the greatest impact is due to the harvesting, so it must be carried out carefully. If the wooden assortments request is connected to a local management, production and consumption chain, the coppice government can be a valid forest management method both in terms of biomass, landscape diversity and heterogeneousness of forest cover, fulfilling the commitments of preservation of biodiversity.

KEYWORDS

thinning, harvesting, soil, sustainable forest operations

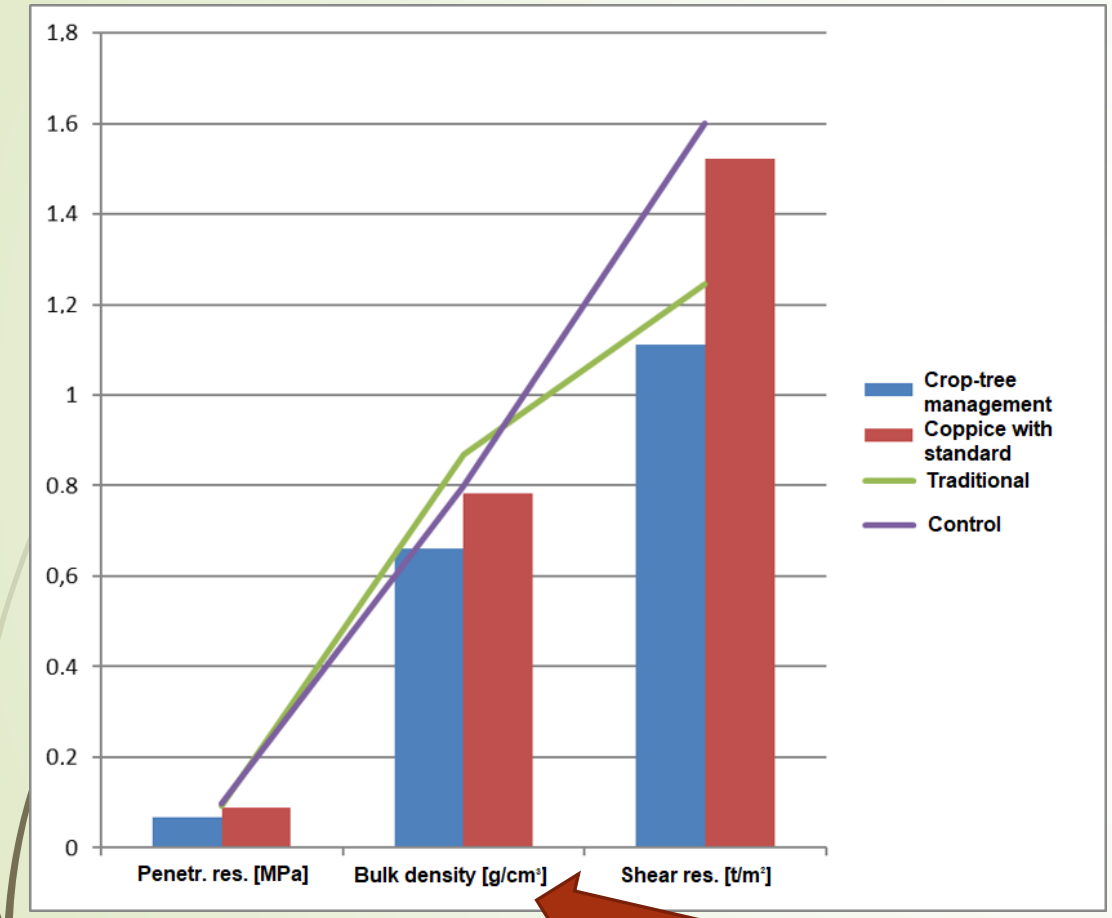
INTRODUCTION

- Chestunut coppices represent very important ecosystem in Central Italy
- These stands are able to produce high quality timber with a short rotation period
- To increase the quality of the retrievable timber thinning intervention are very important
- However, cost-effectiveness of thinnings is not always ensured
- Therefore there is interest in developing alternatives to the traditional thinning method
- There is consequently the need of investigating the possible implications of alternative thinning methods on soil

Materials and Methods

- Study area consists of a chestnut coppice located in Mount Amiata (Tuscany, Central Italy)
- Rotation period: 25 years, coppicing with 60 standards per hectare
- Traditional thinning: 12 years, thinning from below
- Alternative thinning: crop tree management
- Applied harvesting system: Tree-Lenght System with motor-manual felling by chainsaw and bunching - extraction by forestry-fitted farm tractor equipped with a winch
- Investigated parameters were: soil bulk density, penetration resistance, shear resistance, organic matter and biological quality of the soil assessed via the QBS-ar method

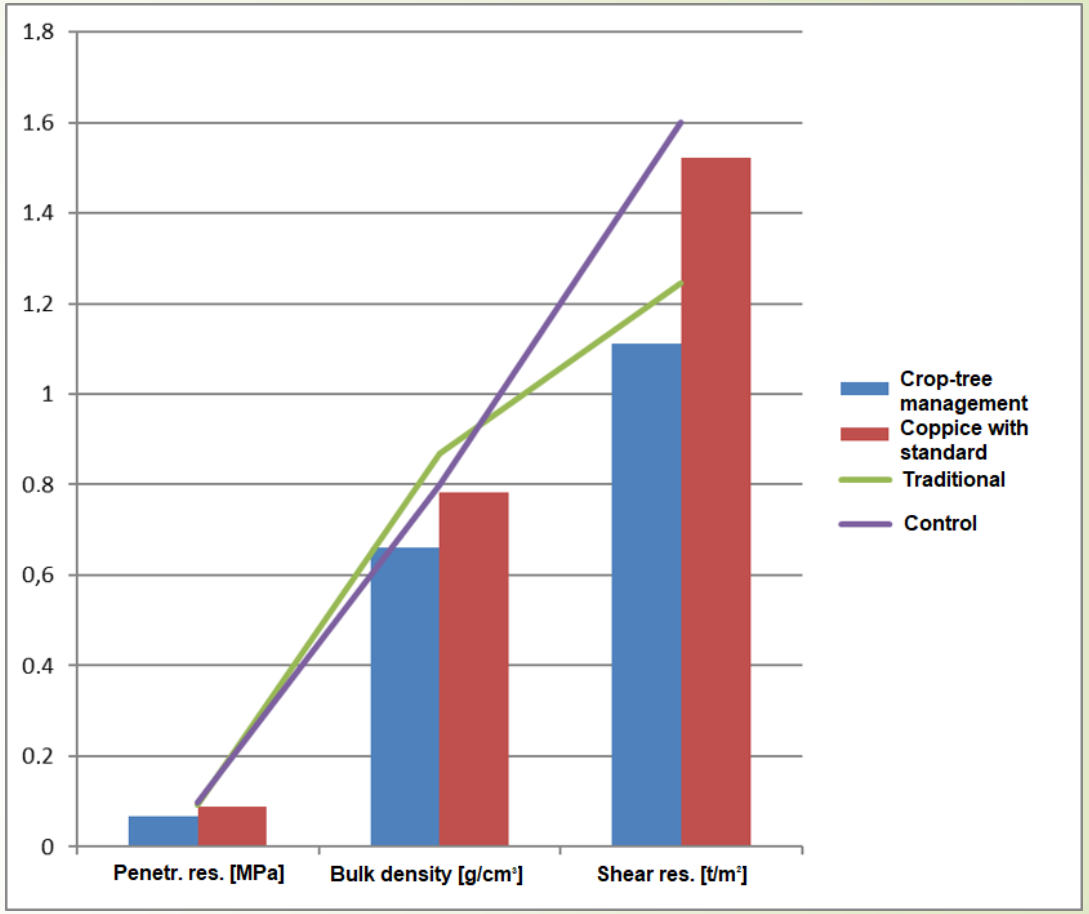
Results



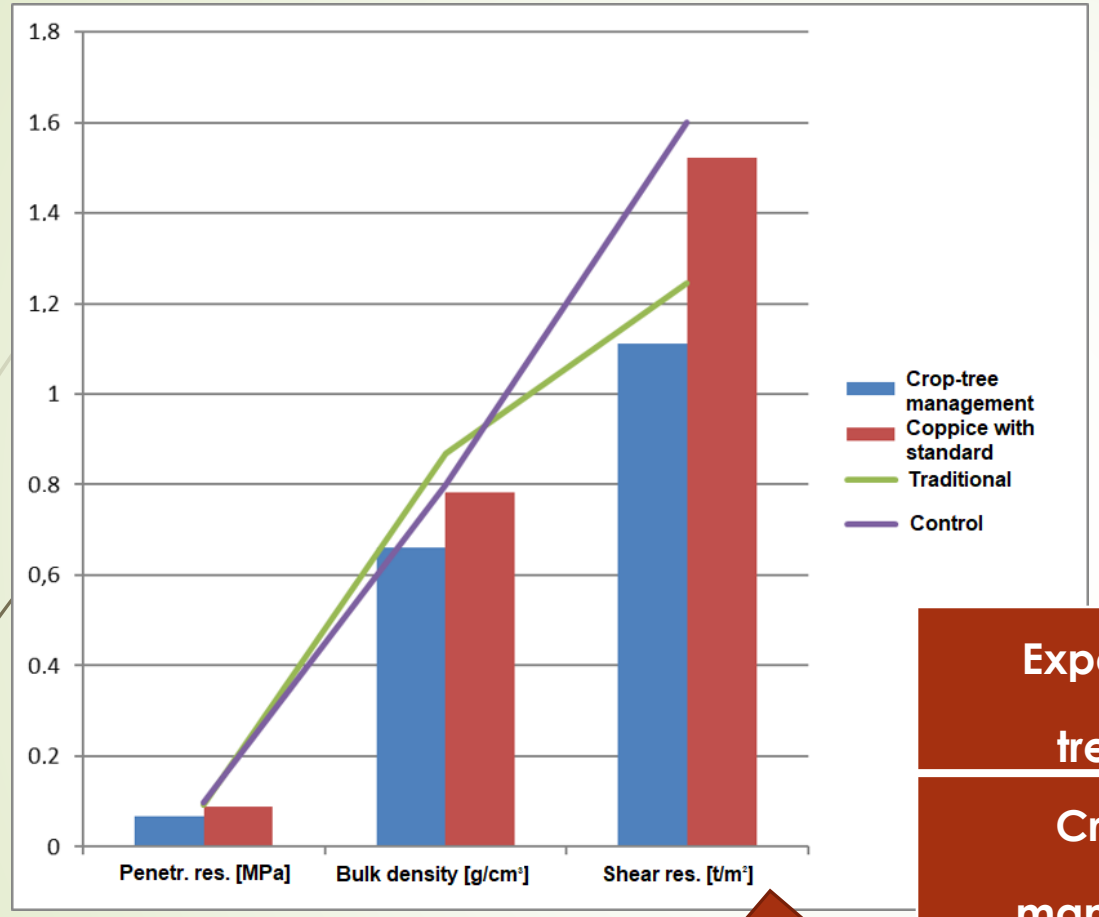
Experimental treatment	Bulk density (g/cm^3)
Crop-tree management	0,662a
Control area	0,799b
Traditional thinning	0,868c
p-value	<0,05

Results

Experimental treatment	Penetration resistance (MPa)
Crop-tree management	0,067a
Control area	0,097b
Traditional thinning	0,092b
p-value	<0,05

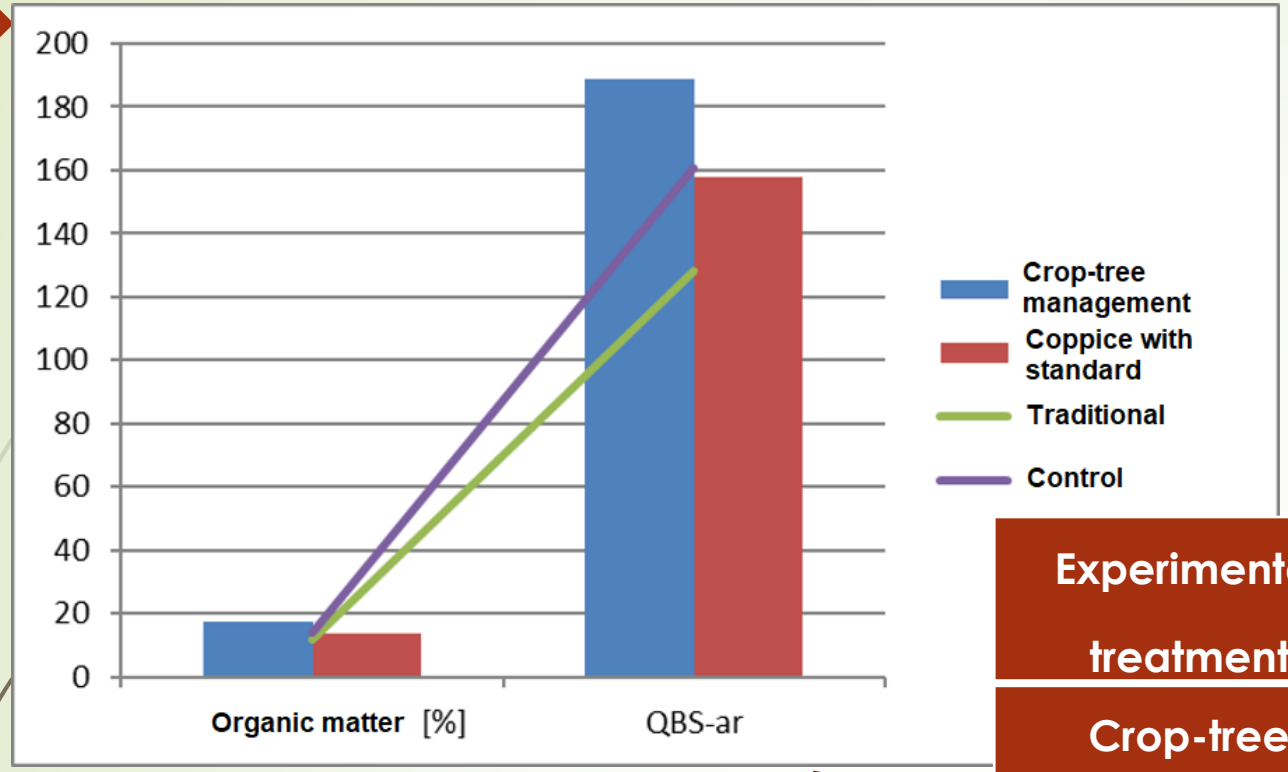


Results



Experimental treatment	Shear resistance (Mpa)
Crop-tree management	1,111a
Control area	1,600b
Traditional thinning	1,244a
p-value	<0,05

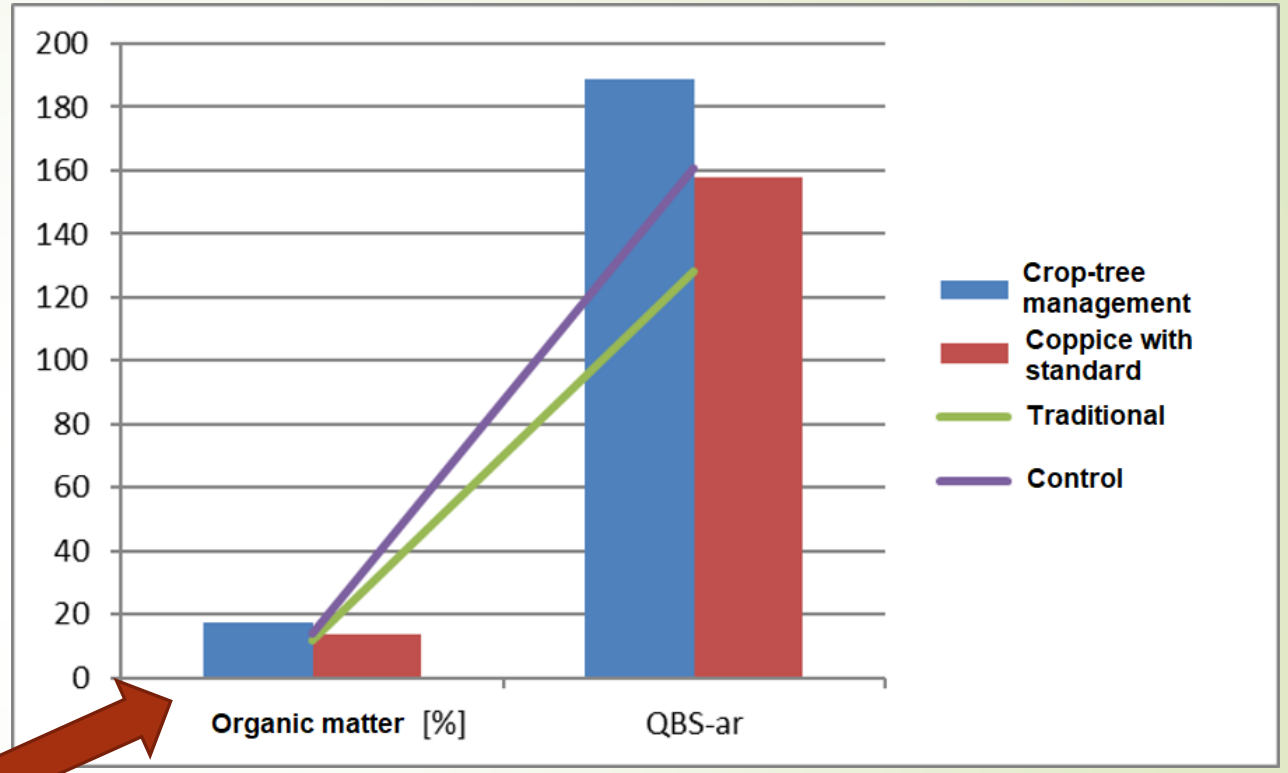
Results



Experimental treatment	QBS-ar
Crop-tree management	189a
Control area	161b
Traditional thinning	128c
p-value	<0,01

Results

Experimental treatment	Organic matter (%)
Crop-tree management	17,6a
Control area	14,2b
Traditional thinning	11,8c
p-value	<0,05



Discussion

- Crop tree management resulted less impactful than traditional thinning for what concerning both physical and biological characteristics of soil
- Larger application of crop tree management is therefore recommended in chestnut coppices
- An extensive training effort to increase the familiarity of the local forest operators with crop tree management is fundamental to increase the spreading of this thinning method