



The 23rd World Congress of Soil Science

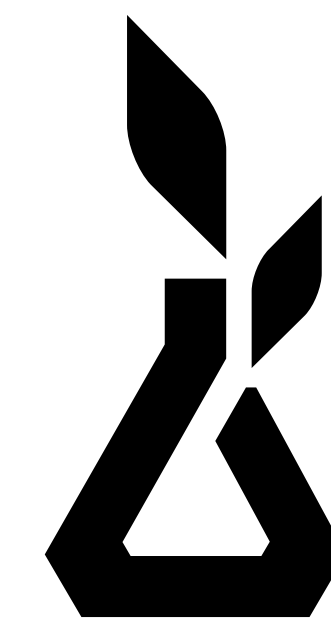
Soil and the Shared Future for Humanity



Short Rotation Coppice on Degraded and Fertile Soils

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Introduction

Introduction of trees into agricultural fields has increased recently with the aim of soil improvement and mitigation of the negative effects of climate change on agriculture.

The aim was to examine the productivity and growth of short-rotation coppice (SRC) species in an alley-cropping system on soils of varying quality and with different mulching treatments.

Methods

In 2021, an SRC trial was established with willow (*Salix alba* L.) and poplar (*Populus* spp.). Trees were planted in four 8-m belts, each belt had six rows spaced 1–2 m apart, separated by 24-m alleys for machinery access. Belts were 100 m long, each had a different mulching treatment: 1- Degraded soil (no mulch), 2 - Straw mulch, 3 - Nylon mulch, 4 - Fertile soil (no mulch). A control plantation was located on the southern edge, and a canal bordered the western side (Picture 1 and 2).

Table #1 – soil properties

	pH KCl	pH H ₂ O	OM %	P ₂ O ₅ mg/kg	K ₂ O mg/kg	CaCO ₃
Row 1 - degraded soil	7,6	8,4	1,2	47	190	13,1
Row 2,3,4 - fertile soil	6,8	7,8	2,3	79	340	2,6

Picture #1 – field before planting (2021)



Picture #2 – 3yr old trees (2024)



Row 1 – degraded soil



Row 2 – Straw mulch



Row 3 – Nylon mulch



Row 4 – fertile soil



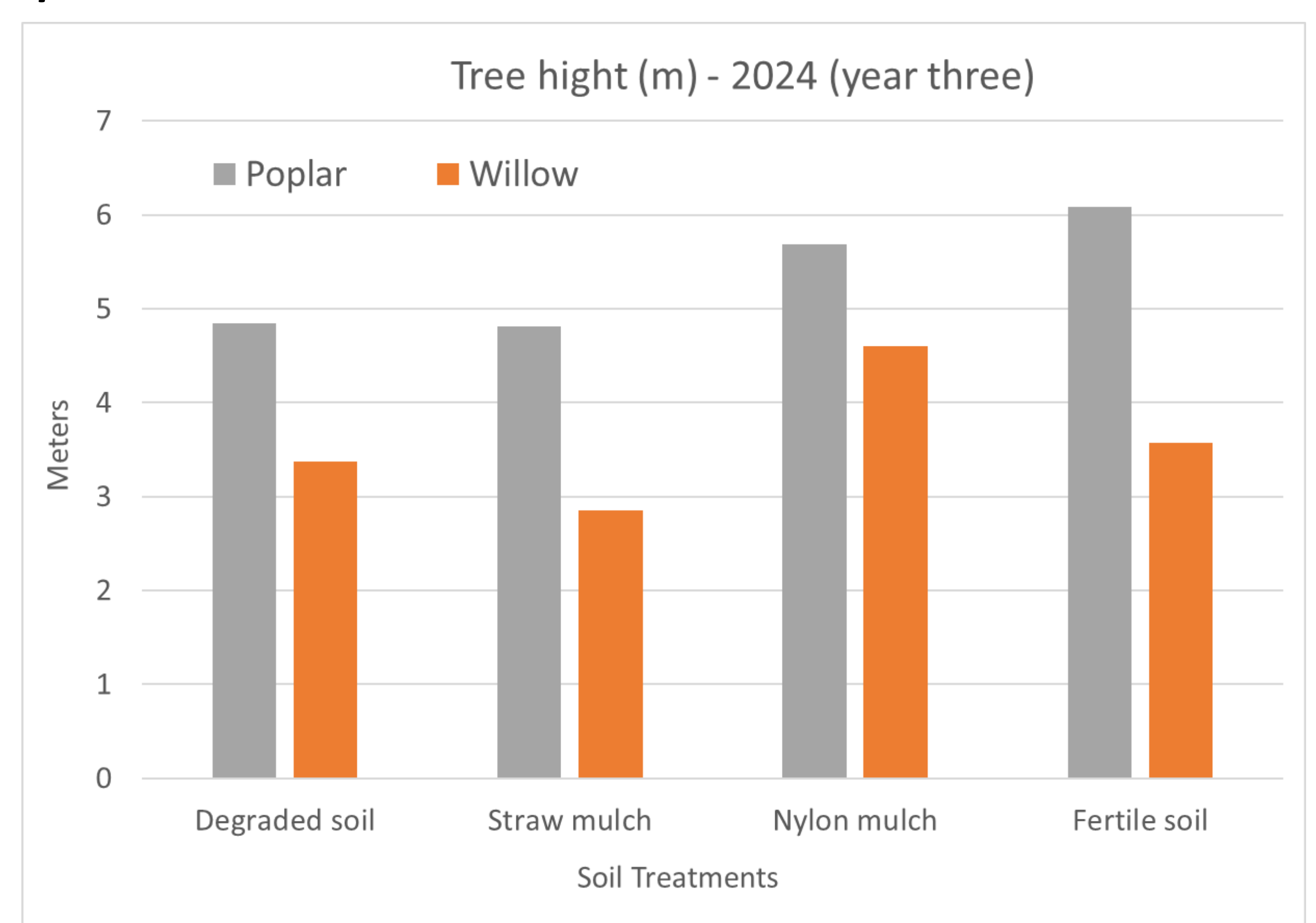
- Clear border between degraded soil and fertile soil.
- Degraded soil is the results of the soil turnover from digging up the canal



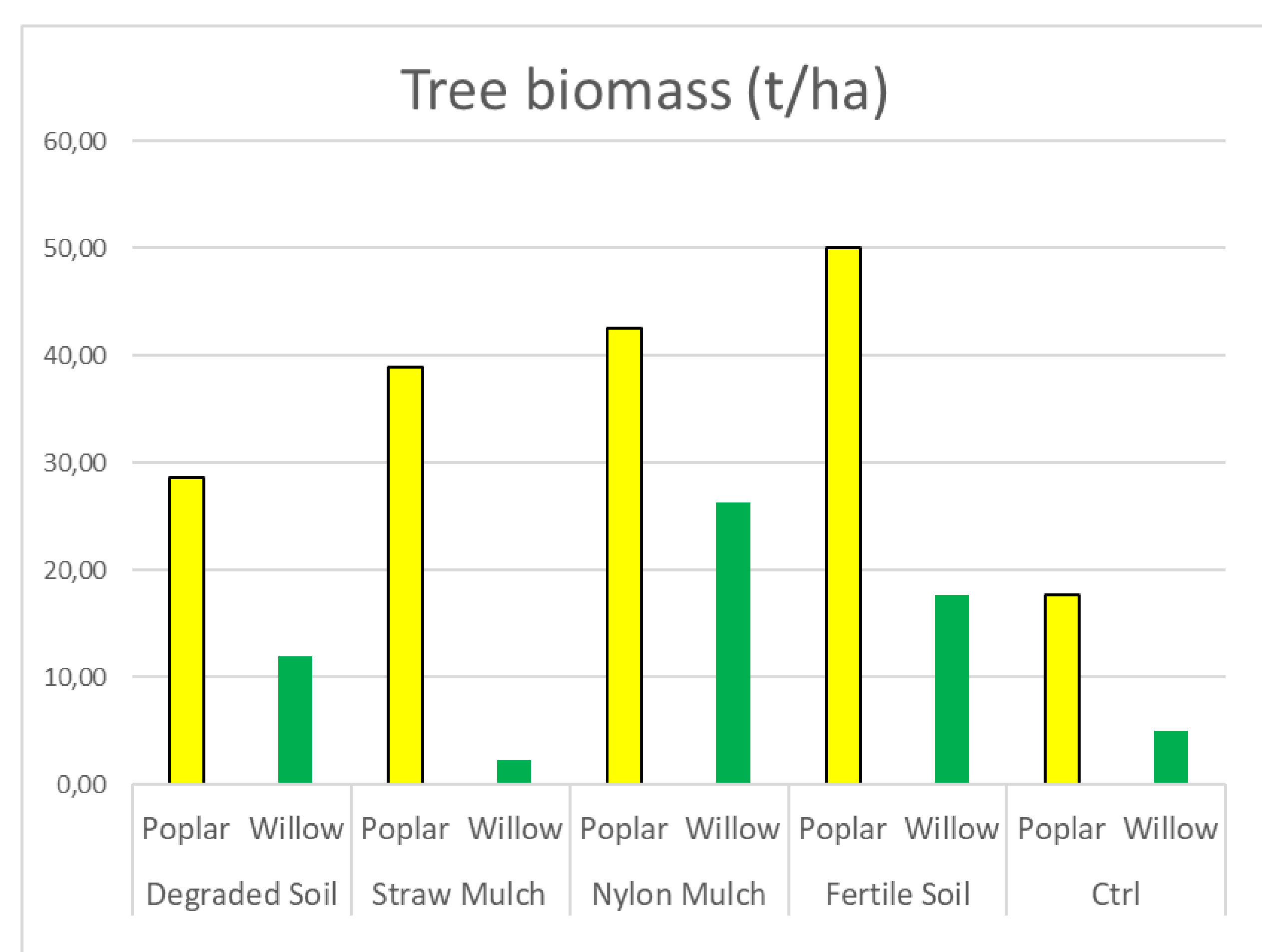
Results

- Poplar outperformed willow in biomass across all soils (2021–2025).
- Best yields: poplar on fertile soil (no mulch) (50,05 t/ha); willow on fertile soil with nylon mulch (26,32 t/ha).
- Nylon mulch improved willow growth; straw mulch gave the lowest yields (especially for willow).
- Degraded soils supported moderate growth, higher than the control.
- Height data matched biomass trends (nylon favored willow; no mulch favored poplar) (Graph 1 and 2).
- Soil quality was the main yield factor; mulch had secondary effects.
- Overall, SRC systems (willow, poplar) are effective for biomass production even on degraded soils.

Graph #1



Graph #2



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