

DOC 2. Agroforestazione – 2. Agroforestry

General Objectives:

- Increase the organic matter in soils, which have become impoverished, and enhance the carbon sequestration capacity of the soil.
- Increase biodiversity.
- Improve wood production.
- Enhance environmental and landscape quality.

Specific Objectives:

- Evaluate the performance of MSA clones.
 - Assess the behavior of clones in an agroforestry context.
 - Evaluate the effects on associated agricultural crops.
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Poplars in Sasse

Clone Name | Genetic Origin

1. Aleramo | *Populus x canadensis*
 2. Tucano | *Populus x canadensis*
 3. Diva | *Populus x canadensis*
 4. Senna | *Populus x canadensis*
 5. Moncalvo | *Populus x canadensis*
 6. Mombello | *Populus x canadensis*
 7. Brenta | *Populus x canadensis*
 8. Moleto | *Populus x canadensis*
 9. Lena | *Populus deltoides*
 10. BL Costanzo | *Populus x canadensis*
 11. Taro | *P. x Canadensis x P. x generosa*
 12. Lux | *Populus deltoides*
 13. Soligo | *Populus x canadensis*
 14. Mella | *Populus x canadensis*
 15. Dvina | *Populus deltoides*
 16. PLF – BC1 | *Populus x canadensis*
 17. PLF – BC2 | *Populus x canadensis*
 18. PLF – BC3 | *Populus x canadensis*
 19. NND | *Populus x canadensis*
 20. T I-214 (Control) | *Populus x canadensis*
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Clone Comparison Field and Agroforestry Rows

Trial Site B: Agroforestry Rows

- Poplar rows planted along the edge of 9 drainage ditches (on one side only), spaced about 35-40 meters apart, with a total length of 1460 linear meters.

- Trees are spaced 6 meters apart within the row, totaling 243 plants, equivalent to a density of about 30 plants/hectare.
 - The area between the tree rows is used for crop rotation as per the farm's cultivation plan (wheat, soybeans, corn).
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Wheat Grain Yield and Protein Content

Grain Yield | Grain Quality

- No yield losses.
- Arkeos +14%, LG Ayrton +4% vs. Control.
- Higher yields at distance H (tree height).
- Significant increase in protein content.
- Arkeos +2.1, LG Ayrton +0.9 vs. Control.
- Higher protein content at $\frac{1}{2}H$ distance.

Biscuit Wheat Arkeos:

- More advantaged by the presence of trees compared to bread wheat.
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Main Results on Soybeans

Chlorophyll Content | Grain Yield

- Increased leaf greenness closer to the tree row.
- No significant differences between clones.
- Significant yield reduction near the row (-31%).
- Yields similar to control at H distance.
- Increased isoflavone content near the row (especially at H distance).

Poplar-Soybean Association: Soybeans (Year 2020)

From the poplar perspective:

- Greater growth compared to the same clones in open fields.
- Requires two rounds of formative pruning due to regrowth.
- Pruning activities need to be synchronized with agricultural crops; it's not always possible to prune.
- Technological characteristics of the wood...
- Attention to spacing between tree rows; too close causes ovalization.

The same clones in Agroforestry, compared to the clonal field, have the following increased diameters:

- Tucano: +18.3%
 - Moncalvo: +12.8%
 - Aleramo: +10.9%
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Poplar Wood Demand: 2.3 million cubic meters
Italy's Production: 700,000 cubic meters
80% of poplar wood is imported.
Price is continuously increasing.

Poplars in Rami

Location of Poplar Tree Plantations in the Agricultural Area of Rami

Plantation established in February 2022 with one-year-old saplings.

Plantation established in February 2022, later removed and replanted in February 2023 with one-year-old saplings.

Paulownia: Ongoing Trials

2020: Start of experimental trial on hybrid clones of Paulownia.

Clonal field:

- 6 clones
 - Plots of 3x3 plants, repeated 3 times
 - Coppicing
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COMPARISON FIELD BETWEEN PROVENANCES

In spring 2021, the establishment of a comparison field began among 11 different provenances of Paulownia belonging to 3 different species:

- Tomentosa
- Elongata
- Fortunei
- Plus the Italy variety.

Agroforestry Rows:

- 2 rows with provenances
 - 1 row with clones
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2 agroforestry rows with Paulownia clones.