



# Weed suppression in alley cropping in Hungary

The benefits of mulching with herbaceous biomass

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## Why use mulch?

Mechanical weed management can be problematic because of eg. space availability and risk of tree damage. The costs of weed control per area is, therefore, higher than in large scale monocultures. Use of herbicides is not recommended, due to potential damage to the trees. Straw cover is a possible method of weed control, but its effectiveness depends on local circumstances (e.g. it is not effective in windy areas). Further, its removal is required during winter as it attracts rodents.

The use of herbaceous biomass has been shown to be both technically successful and economically viable. Furthermore, improved water use efficiency can be attained due to a reduction in soil evaporation within the tree rows.

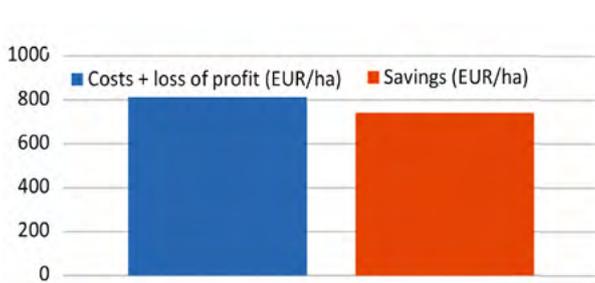


Biomass mulch in tree rows. Ref : Péter Schettler and Andrea Vity

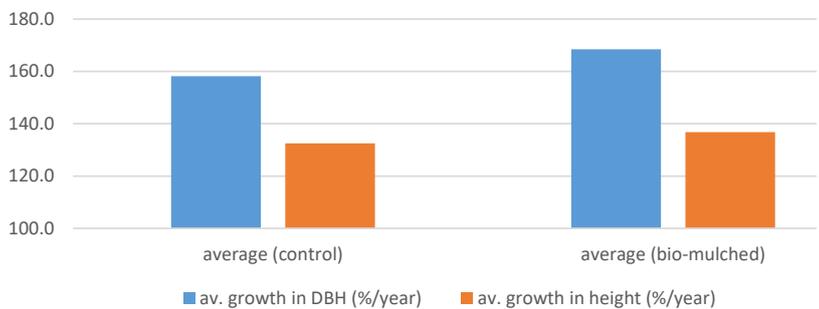
## A comparison of treatments

Herbaceous flora of the tree rows and a part of the first harvest of the alfalfa crop were used to mulch the tree rows. It is important to harvest weeds before flowering, otherwise mulching will lead to the spread of weeds within the tree rows.

The innovation was tested in three of the six tree rows planted in an experimental agroforestry system. In three other tree rows manual weed control was performed to compare the results with. The herbaceous cover was made in early May in order to assess effectiveness during the most intensive growing period of the year. Weeds were cut using a motor-manual method, while alfalfa was harvested mechanically and spread by hand in the tree rows. The percentage cover of weed, as well as the labour time and costs of covering the surface for weed control were recorded.



Costs, loss of profit and savings of the tested innovation compared to control method (without external costs and benefits)

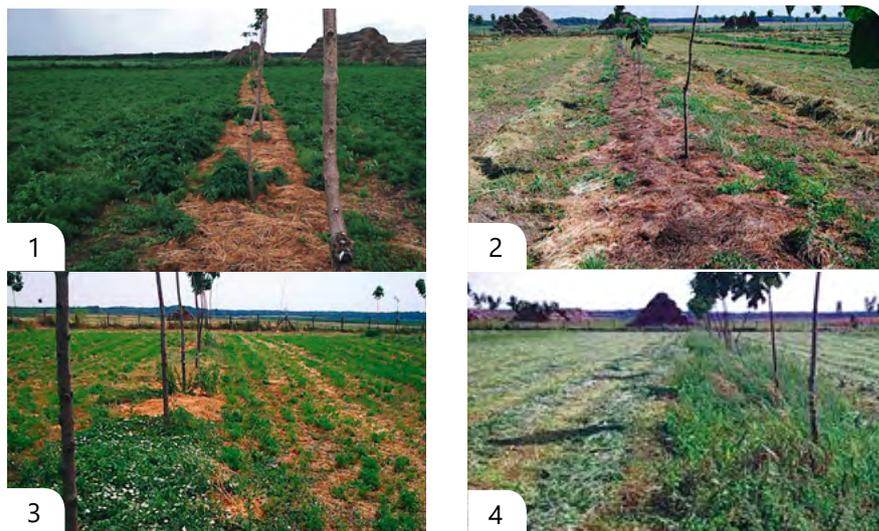


Effect of bio-mulching on tree growth rate

## Advantages

The benefits of the bio-mulch are that it:

- is wind-proof
- lowers overall cost
- is environmentally-friendly (replaces chemical and mechanical treatment)
- improves soil fertility in tree rows
- decreases erosion
- reduces manpower needs and mechanical working time and costs
- improves soil microclimate and water management
- accelerates tree growth



Change of weed pattern in tree rows in relation to time (1-2-3) and control rows without bio-mulching (4). Ref: Péter Schettler & Andrea Vityi

### Effectiveness

The weed control ability of the mulch was shown to be very effective:

- the bio-mulch effectively suppressed weeds for approximately 60 days and resulted in a reduction of two weed-cutting periods during the growing season,
- the percentage of weed cover in treated rows was 25% less than the non-covered rows by the end of the second month,
- the number of weed species and their density decreased significantly.

The thickness of the bio-mulch layer is crucial. It is recommended that it is 10 cm at a minimum. Using material harvested close to tree rows is the most economical approach.

### Impact on tree development

The annual growth of trees was measured in the mulched and control (without bio-mulch) rows. The results showed a significant difference in tree growth for rows covered with bio-mulch (alfalfa and weed), when compared to non-covered rows.

### Economic assessment

There is no significant difference between the overall balance – costs and savings – of the different methods (chemical treatment and mechanical treatment vs bio-mulching). However, taking the additional benefits provided by bio-mulching (e.g. improved microclimate and soil fertility; better tree development; reduced chemical stress and soil erosion) and the lower external costs of chemical or mechanical treatment (eg. contaminated soil, soil water and feed material, air pollution, external costs of herbicide production), the overall economic benefits of bio-mulching is more favourable.

Based on the results, mulching with locally available fresh biomass can be effective in organic production systems as well.

## Further information

Vityi A, Marosvölgyi B, Kiss A, Schettler P (2015). System report: Alley cropping in Hungary. AGFORWARD (613520)

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