

Practices to improve soil fertility and nutrient availability in organic fruit orchards

Problem

Organic fruit orchards are dependent on commercial organic fertilizers derived from intensive conventional animal husbandry. These inputs are contentious and to be phased out.

Solution

Develop new fertilization strategies based on farm internal resources (e.g., clover based), plant-based sources (e.g., grain legumes as living mulch in the tree row, cover crops).

Benefits

Leguminous plants grown as living mulch or cover crops (in mixture with grasses) increase soil fertility and microbial biodiversity or activity, with a positive effect for the overall soil biological fertility through the seasons.

Practical recommendation

To improve soil fertility and nutrients availability, we recommend to:

- Use legumes (e.g., pea) as short-term living mulches in the tree row (Picture 1)
- Use mixtures of a leguminous and grass (e.g., micro-clover and sheep grass) in the inter-row (Picture 2). The cut can then be used as row mulch
- Apply clover grass silage to orchards as a farm internal nutrient source
- Sowing winter peas or early sowing of spring peas allows Nitrogen (N) release after incorporation reaching a sufficient N supply during flowering. Notice that N availability from mineralization of the pea biomass depends on the time of sowing and the biomass incorporation into the soil
- Leguminous cuts from the inter row can serve as a N source later in the season, as mineralization proceeds slowly
- Clover grass silage has higher storability than the inter row grass cuttings. Hence, application of clover grass silage allows to plan earlier applications (e.g., in autumn of the previous year). If availability of land and specific machinery for silage is an obstacle, we recommend setting up collaboration with arable farms.

Applicability box

Theme

Crop production, farm management

Keywords

Crop management, fertilisation, horticulture, nutrient management

Context

All Europe

Application time

Growing season

Period of impact

Year of application and following seasons

Equipment

Seed sowing and other common tillage machines

Best in

All practices should be integrated with other inputs to reduce the risk of nutrients imbalance



Picture 1. Summer-sown peas (left) and winter-sown peas (right) in the tree row before mulching in April. (Photo by B. Lepp)



Picture 2. Clover and grass mixture in the interrow. (Photo by E. Malusa)

Further information

Further reading

- Zikeli, S., Lepp, B., Boutry, C., Dhzuvinov, V., Fumancyk, E., Holtz, T., Malusa, E., Neri, D., Ponzio, C. 2021. Deliverable 4.8 of the Domino project: [Final Report on new fertilization management to improve soil fertility and health in intensive organic orchards](#)

Weblinks

- [Website of the Core Organic project Domino](#)
- Holtz, T., Kelderer, M. 2020. Practice abstract: [Organic fertilisation of young apple orchards](#). Laimburg. Domino practice abstract.
- Check the [Organic Farm Knowledge platform](#) for more practical recommendations

About this practice abstract

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