

Project *brief*

Thünen Institute of Organic Farming

2025/21a

Mulch as weed control in silage maize production

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- **Vigorous, winter-hardy cover crops reduce weed pressure in maize**
- **Cooler, wetter conditions can slow down cover crop development, potentially delaying maize sowing and resulting in yield losses**

Background and objectives

In silage maize cultivation, weed control, nutrient supply, and harvesting place high demands on crop management. Cropping systems that maintain continuous soil cover with organic material can address these challenges. The aim was to develop cultivation strategies as a preventive approach to offer an alternative to mechanical weed control; including reduced tillage before maize sowing, suitable preceding crops, and narrower row spacing.

Approach

We conducted a systematic investigation of a crop rotation component consisting of a winter-hardy cover crop (CC) followed by maize cultivation. As cover crops, we tested winter peas and winter vetch either as sole crops or in mixtures with triticale or rye, intended either for forage use or as mulched green manure. Maize was then cultivated with reduced tillage or direct seeding, using both standard row spacing (75 cm) and a narrower spacing (37.5 cm).

This collaborative project was carried out by the University of Kassel (coordination), the Thünen Institute of Organic Farming, and the Bavarian State Research Center for Agriculture.

Results

Vigorous, winter-hardy cover crops combined with subsequent reduced tillage have the potential to lower weed pressure in maize and improve soil protection (Fig. 1). However, this approach requires more advanced technology and management practices. Its success depends on site-specific and weather conditions to effectively implement the strategies. In northern Germany, delayed cover crop development led to later maize sowing and lower yields compared to standard cultivation. In central Germany, maize following rolled legumes or harvested mixtures with reduced tillage achieved yields comparable to standard cultivation.

In southern regions, only maize following rolled peas reached similar yields to the standard system. Harvesting the cover crop resulted in higher total annual yields. These led to greater gross margins compared to the standard system, especially when the standard system also included cover cropping. Extensive on-farm trials conducted during the project confirmed the experimental findings.

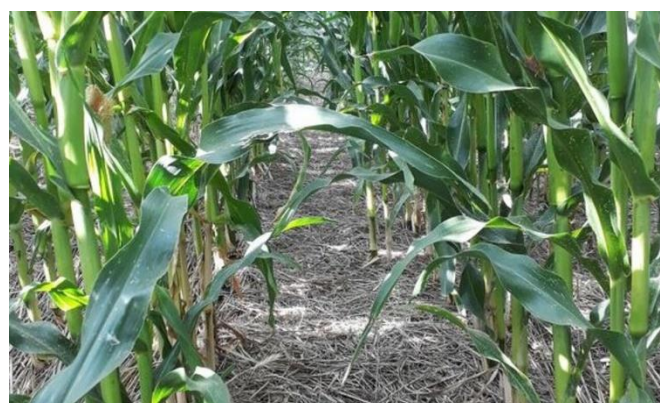


Figure 1: Maize grown with mulch from rolled cover crop (Source: Thünen Institute/ Herwart Böhm)

Conclusion

The evaluated cropping systems demonstrate considerable potential for reduced tillage while maintaining effective soil conservation. However, further refinement is necessary to enhance their performance under cool and humid conditions.

Further information

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DOI: 10.3220/253-2025-138

Run time

9.2019 - 5.2024

Project-ID

2128

Publications

Schmidt et al. (2023a), Yield stability of silage maize double cropping systems across nine German environments, *Frontiers in Agronomy* (5)

Schmidt et al. (2023b), Management Effect on the Weed Control Efficiency in Double Cropping Systems, *Agronomy* 13 (2), 467

Schmidt et al. (2022), Management Effects on the Performance of Double Cropping Systems - Results from a Multi-Site Experiment, *Agronomy*, 12 (9), 2104

Funding

