

Direct sowing with green manure

Problem

The traditional cultivation of maize is accompanied by numerous mechanical cultivations and the application of herbicides. It leads to soil compaction, has a negative impact on the environment and worsens growing conditions for the following crops.

Solution

Maize is a crop that can establish well in a no-till system without compromising soil quality. Trials outside of Bulgaria have shown that rolling of the previous crop can be a successful method to create a mulch suitable for drilling. Pea and cereal mixtures are commonly used because they cover the soil well and tend not to regrow. The yields obtained elsewhere are, in some cases, equivalent to traditional ploughing methods and subsequent treatments. We tested the technology in two farms at two precursors (mixed crop of peas/wheat and wheat only). In the same plot, there were two fields: test with direct sowing and control with traditional sowing. To evaluate the effectiveness of the technique, the key factors – crop development, weed establishment and soil composition (moisture content, structure, activity of worms) – were measured in both plots. At the end of the period, the harvested yield was measured in the test and control field. Results are from the experience of one farm (Ivan Danchev) as crop establishment was not successful in the second farm.

Outcome

- Initially, directly sown plants showed better establishment. However, growth was uneven (some of the plants were in 2- to 4-leaf stage; others passed the 8-leaf stage). This may be because the mulch prevented evaporation of moisture.
- There was no moisture in the surface soil layer of the control field. The plants were, therefore, slightly withered and had curved leaves. The number and growth of plants was even (3-4-leaf stage).
- The yields (in fresh mass) are well below expectations. The yield in the control field is higher:
 - ✓ Control field: 14450 kg (from 0.6 ha), average yield: 24083 kg/ha
 - ✓ Test field: 15200 kg (from 0.7 ha), average yield: 21714 kg/ha

Practical recommendations

- After harvesting the main crop (cereals or rape), perform the stubble cultivation in August.
- Sow the wheat-legume mixture – winter forage peas and wheat (triticale) – by mid-October.
- At the end of May, grind the cover crop (mixture) with a roller crimper, then sow the corn with a direct sowing machine (drill). The mulch lying on the soil surface should dry before sowing.
- The mulch reduces mineralization, so it might be better to use nitrogen fertilizer in the row.



Image 1: Sowing the test and control fields, June 16 (Photos: Bioselena)



Image 2: Maize growth control, July 20



Image 3: Silage making, August 27

Conclusions

1. The no-till technology is applicable in Bulgaria. However, it is still not applied on Bulgarian organic farms.
2. In order to obtain yields similar to traditional cultivation techniques, several years of consistent application of the no-till technology as well as proper planning and implementation of the activities are necessary.
3. The weight of the tractor and seed drill of the no-till technology in Bulgaria is significantly above the processing method. Currently, there are no suitably sized machines compatible with small fields in organic production. In the first years of applying the technology, the weight of the machines will be an important factor regarding soil compaction.
4. It is necessary to share experiences with farmers who have practiced the method for a long time and have achieved positive results.

Practical testing

To check the effectiveness of the method on your farm, we recommend the following steps:

- Divide the plot into two fields: a test field with direct sowing and a control field with a traditional seed drill. Harvest the crop from the control field.
- Test the new method on the test field. Proceed with ploughing, sowing and cultivation as usual (as described above) on the control field.
- Observe and take notes on the crop, weed and soil (moisture content, structure, activity of worms).

Evaluation and sharing of the results

Visual evaluation: In order to evaluate the effectiveness of the method, compare the development of maize at different stages. Assess the effectiveness of the method. Document the two fields with photos for later evaluation

Quantitative assessment: To evaluate this tool, compare yields from both fields (per 1 ha).

Use the comment section on the [Farmknowledge platform](#) to share your experiences with other farmers, advisors and scientists! If you have any questions concerning the method, please contact the author of the practice abstract by e-mail.



Further information

Video

- The Internet platform [farmknowledge.org](#) offers several information videos on the functionality and applicability of a number of crop cultivation tools (mainly English, German and French).

Links

- The [database](#) provides practical information on soil quality and fertility in arable crops.

About this practice abstract and OK-Net Arable

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