

Evaluation of Cover Crop Planting Date on Lettuce in Two Soil Types.

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Introduction

Use of cover crops is a cultural practice that greatly modifies soil properties and consequently affects the main crop. Cover crops help promote soil fertility, improve its structure, reduce erosion, increase biological activity, which generally increase yield (Cher et al. 2006; Maltas et al. 2012a). Many vegetable growers have integrated cover crops in their production schedule. However most of them bury the crop in the fall, leaving the ground bare all winter. The main reasons mentioned for this practice is the complexity of plowing in the following spring and the risk that ground work is slowed by too abundant residues. As soil erosion is a real problem in vegetable production, the use of cover crop during winter should be considered. Thus, this project aims determining the impact of cover crop planting date on a lettuce main crop in two soil types.

Methods

Treatments, five planting date:

T1: end of July

T2: mid August

T3: end of August

T4: mid September

T5: end of September

T6: end of July buried in autumn

T7: control

Cover crop: oat

Two soil types: sandy and gravelly loam soil

Main crop: lettuce planted the following summer

Parameters: soil compaction, harvest date and lettuce weight

Discussion

The results obtained demonstrate that cover crop treatments had an impact on soil compaction the following spring. In gravelly loam soil, soil compaction was lower in treatment with cover crop buried in autumn compare to cover crop left over winter, and this, for 10 cm and 20 cm depth (Fig.1). This impact was also observed during lettuce growing season (Fig. 2). In sandy soil, at 10 cm depth, soil compaction was higher in treatments with cover crop left over the winter compare to cover crop buried in autumn and the control (Fig. 3). Cover crop had no impact on soil compaction in sandy soil during the lettuce growing season (Fig. 4). Plowing during autumn reduced soil compaction the following spring. Soil compaction can affect lettuce development and in this trial, resulted in earlier harvest date (Fig. 5-6). In gravelly loam soil, lettuce weight was higher for lettuce produced in plots with cover crop buried in autumn compare to some cover crop treatments (Fig. 7). In sandy soil, lettuce weight was not constant (more variable), we noted bigger lettuce in control and cover crop planted at the end of August compared to cover crop planted at the end of July (Fig. 8). Results of this study showed the impact of soil work and cover crop on soil compaction. Subsequently, soil compaction affects the development of the main crop (lettuce). Soil type influences the impacts of cover crops on soil properties and must be considered before the adoption of this practice. Following this study, producers will have additional information to establish farming practices that conserve and improve soil health.

Acknowledgement

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Results

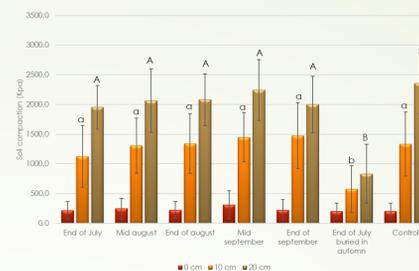


Figure 1: Soil compaction in spring, at several depths, in relation with cover crop planting date in gravelly loam soil, Oka.

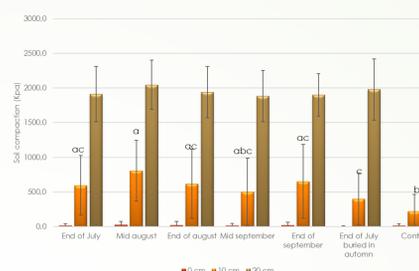


Figure 3: Soil compaction in spring, at several depths, in relation with cover crop planting date in sandy soil, Mirabel.

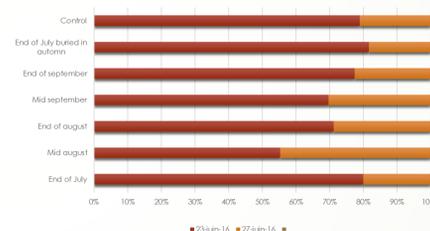


Figure 5: Lettuce harvest date in relation with cover crop planting date in gravelly loam soil, Oka.

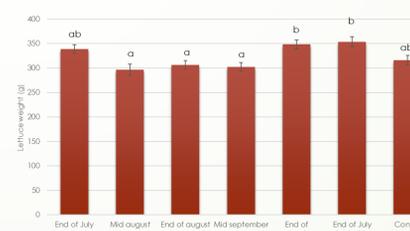


Figure 7: Lettuce weight in relation with cover crop planting date in gravelly loam soil, Oka.

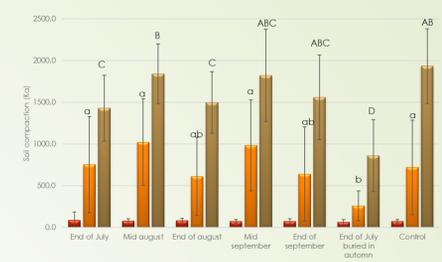


Figure 2: Soil compaction during lettuce development, at several depths, in relation with cover crop planting date in gravelly loam soil, Oka.

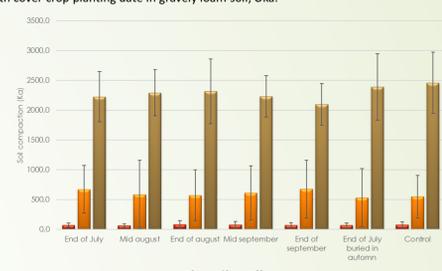


Figure 4: Soil compaction during lettuce development, at several depths, in relation with cover crop planting date in sandy soil, Mirabel.

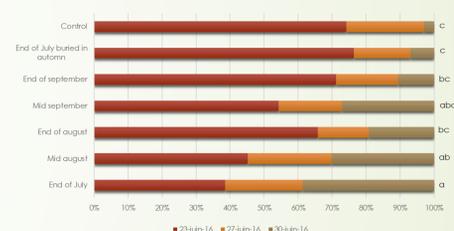


Figure 6: Lettuce harvest date in relation with cover crop planting date in sandy soil, Mirabel.

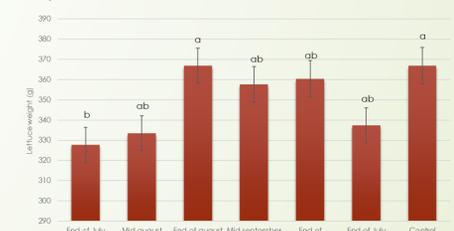


Figure 8: Lettuce weight in relation with cover crop planting date in sandy soil, Mirabel.

Legend: Letters indicate significant difference between treatments (p< 0,05), minor letter for 10 cm depth, capital letters for 20 cm depth.

References

Maltas, A., R. Charles, V. Bovet and S. Sinaj. 2012. Effet à long terme des engrais organiques sur le rendement et la fertilisation azotée des cultures. *Rech. Agro. Sui.* 3:156-163.
Cher, C.M., J. M. S. Scholberg and R. McSorley. 2006. Green Manure Approaches to Crop Production: A Synthesis. *Agronomy Journal* 98: 302-319.