Evaluation of strip-tillage technology in corn production in Hungary

Tamás RÁTONYI [1] – János NAGY [1] – Dénes SULYOK [2] – Sándor FERENCSIK [1] – Endre HARSÁNYI [1]

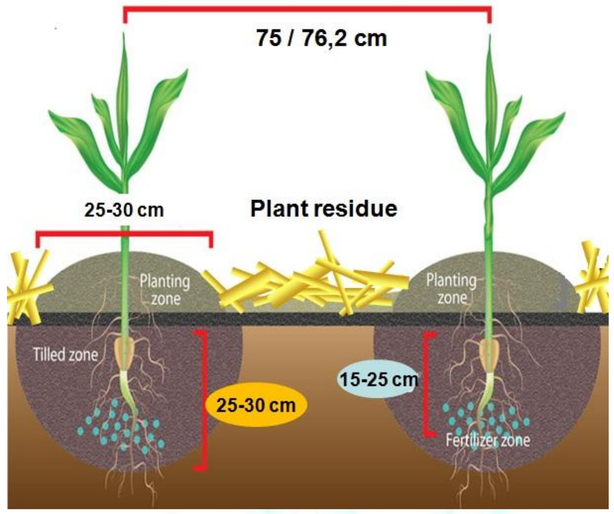
[1] Institute of Land Utilisation, Technology and Regional Development, Centre for Agricultural and Applied Economic Sciences. University of Debrecen. Böszörményi str. 138, H-4032 Debrecen, Hungary.

[2] KITE Plc, Bem József str. 1, H-4181 Nádudvar, Hungary

ratonyi@agr.unideb.hu

INTRODUCTION

In spite of the available new tillage systems, the proportion of conventional tillage system is high in Hungary, however degradation and compaction of soil structure is a concomitant effect of conventional tillage caused by frequent and intensive soil disturbance.
Strip-tillage is a form of conservation tillage systems, it combines the benefits of conventional (ploughing) tillage with the soil-protecting advantages of no-tillage systems.
The soil is tilled in 25-30 cm wide, the crop residue removed from the tillage zone. The tillage zone is typically 25 to 30 cm deep. The soil surface between these strips is left undisturbed. The residue from the previous crop remain on the soil surface. The residue-covered area reach 60-70 %. Keeping residue on the surface helps prevent soil from wind and water erosion, reduce structural degradation of the soil.

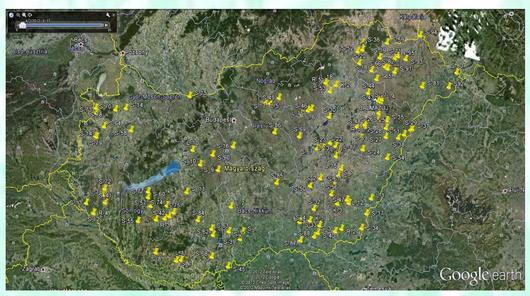




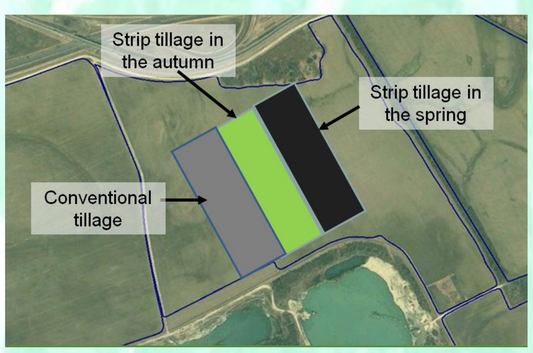
The aim of the study is to evaluate strip-tillage in corn production in different production sites of Hungary.

MATERIAL AND METHODS

➢ During the period of 2011-2012 the evaluation of strip-tillage technology has been carried out at more than 100 locations under different soil and ecological circumstances.
➢ Setting up the trials has been carried out by KITE public limited company, while strip technology analyses by the staff of the Institute for Land Utilisation, Technology and Regional Development of the University of Debrecen.



➢ Field trials have been set up on large-scale farms.
➢ Investigated treatments were strip-tillage and conventional (ploughing) tillage.
➢The loosening effects of strip-till equipment was investigated by hand operated cone penetrometer.



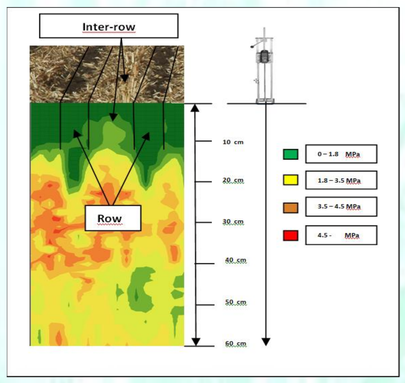


Figure 1: Penetration resistance cross section of the soil in strip-tillage treatment (Hungary, 2012)

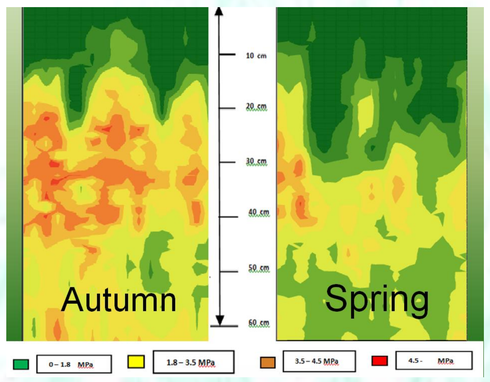


Figure 2: Penetration resistance cross section of the soil in autumn strip-tillage and spring strip-tillage treatment

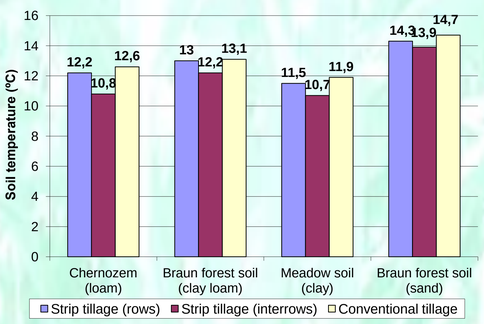


Figure 3: Temperature in the sowing depth of the soil in the conventional and strip-tillage treatments

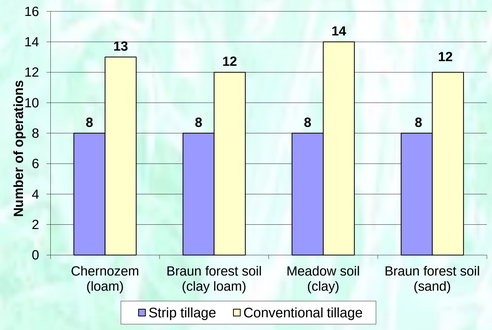


Figure 4: Number of passes in conventional and strip-tillage treatments

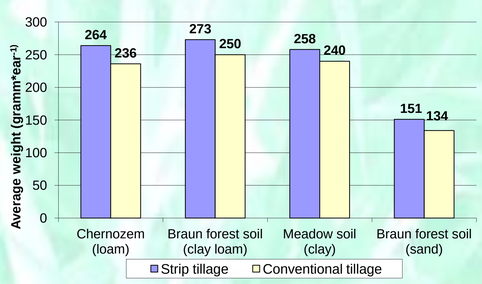


Figure 5: Individual production of corn in conventional and strip-tillage treatments

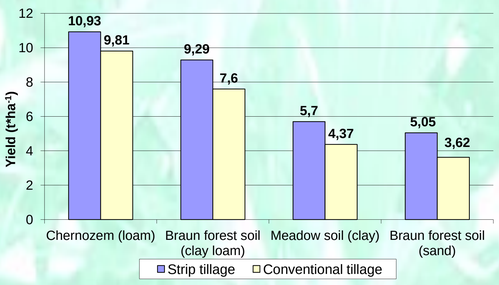


Figure 6: Corn yield in conventional and strip-tillage treatments

Conventional tillage





Strip-tillage

RESULTS

➢ The shank of the strip-till equipment had a splitting effect on the soil towards its deeper layers (Figure 1-2).
➢ There was no significant difference between the temperature in the sowing depth of strip zone and conventional tillage treatment. The inter-row zone of strip-tillage treatment was cooler owing to the compacted and wet soil condition and surface residue cover (Figure 3).
➢ Strip-tillage eliminate several tillage operation. Primarily tillage, secondary tillage and seed-bed preparation was carrying out in one-pass tillage operation. Application of chemicals and fertilizer was carrying out at the same time as tillage (Figure 4).
➢ In the droughty year of 2012, individual production of the corn in strip-tillage was 10% higher than in conventional tillage treatment. In conventional tillage treatment the deviation of individual production was lower. The cobs were more uniform in conventional tillage than in strip-tillage treatments (Figure 5).
➢ Under doughty weather conditions the significance of moisture saving technologies increased. The application of strip tillage resulted in higher yield in the case of every trial area (Figure 6).

CONCLUSIONS

➢ Benefit of strip-tillage is that the farmer can reduce the number of passes on the field.
➢ In the droughty year of 2012, the yield of corn produced in strip tillage exceeded the yield of corn in conventional tillage.
➢ Incomes were higher in strip-tillage.
➢ The investment for strip-tillage equipments is recommended beyond an involved area of 400 hectares.
➢ Our results verified the Hungarian applicability of strip-tillage technology in corn production.

ACKNOWLEDGEMENT
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