

Trial name	Organic/inorganic N fertilization	Mineral fertilization in continuous maize cropping	Organic/inorganic fertilization in different rotation	Tillage in maize-wheat biculture
Starting year	1984	1969	1964	1972
Coordinates	46.733253 N, 17.230350 E	46.741814 N, 17.239980 E	46.734926 N, 17.232808 E	46.734599 N, 17.229782 E
Altitude (m)	118	115	115	119
Pedo-climatic zone	Southern sub-continental Cambisol			
Available data	bulk density, aggregate stability, soil water retention, plasticity index according to Arany, organic matter content, pH, calcium carbonate, AL – P <sub>2</sub> O <sub>5</sub> , AL – K <sub>2</sub> O, N total, NO <sub>3</sub> <sup>-</sup>	aggregate stability, plasticity index according to Arany, organic matter content, pH, calcium carbonate, AL – P <sub>2</sub> O <sub>5</sub> , AL – K <sub>2</sub> O, N total, NO <sub>3</sub> <sup>-</sup>	aggregate stability, plasticity index according to Arany, organic matter content, pH, calcium carbonate, AL – P <sub>2</sub> O <sub>5</sub> , AL – K <sub>2</sub> O, N total, NO <sub>3</sub> <sup>-</sup>	bulk density, aggregate stability, soil water retention, plasticity index according to Arany, organic matter content, pH, calcium carbonate, AL – P <sub>2</sub> O <sub>5</sub> , AL – K <sub>2</sub> O, N total, NO <sub>3</sub> <sup>-</sup>
Treatments in experiment	organic and mineral fertilization, residue removal and incorporation	mineral NPK rates (0-900 kg/ha N, P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O), timing of N application (1 × autumn, 1 × spring, 2/3 + 1/3 spring)	crop rotation (winter wheat, alfalfa, alfalfa, winter wheat, maize; sudan grass, winter wheat, oats and vetch, winter wheat, maize), organic and mineral fertilization.	different systems of soil tillage (conventional, minimum, shallow), increased rates of N fertilization.

Soil-improving cropping systems:

- crop rotation icluding perennial legume, or green manure crop,
- reduced soil tillage system,
- regular farmyard manure application in the rotations,
- recycling crop residues to the soil.

Challenges:

- physical degradation,
- soil organic carbon loss,
- acidification.

Existing dissemination activities:

- field days for farmers, extension specialists and scientists,
- publishing in scientific and in other journals.

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Photos of the experiments

Organic/Inorganic fertilization in rotation



Mineral fertilization, in maize monoculture



Tillage in maize-wheat biculture



Organic/Inorganic N fertilization



Key publications:

Dunai A., Tóth Z.: 2015. Long-term effect of organic and mineral fertilization on the stability of soil aggregates on a brown forest soil, Agrochemistry and Soil Science. 64:1. 29-52.

Kismányoky, T., Hoffmann, S., Tóth, Z. 1997. Long-term effect of different soil tillage systems on crop yield and nitrate content of soil. Agroecological and economical aspects of soil tillage. Proceedings of the 14th ISTRO Conference. 27 July. - 1 August. Pulawy, Poland. Bibliotheca Fragmenta Agronomica. Tom. 2B. ISSN 0860-4088. 359-362.

Kismányoky, T., Tóth, Z. 1997. Role of the crop rotations and organic manures in the sustainable land use. Agrokémia és Talajtan. Tom 46. No. 1-4. 99-106.

Kismányoky, T., Tóth, Z. 2010. Effect of mineral and organic fertilization on soil fertility as well as on the biomass production and N fertilization of winter wheat in a long-term cereal crop rotation experiment (IOSDV). Archives of Agronomy and Soil Science 56: 473-481.

Tóth, Z., Dunai, A., Jolánkai, P. 2012. Effect of soil tillage on soil water content. Növénytermelés. Vol. 61. Supplement, 235-238.

Tóth, Z., Kismányoky, T. 1997. Long-term effect of fertilization and crop rotation on the wheat yields, aggregate size distribution and organic matter content of the soil. Agrokémia és Talajtan. Tom 46. No. 1-4. 107-112.

Tóth, Z., Kismányoky, T. 2001. A kukorica (Zea mays L.) és a búza (Triticum aestivum L.) szemtermésének vizsgálata különböző vetésforgókban és kukorica monokultúrában. Növénytermelés. Tom. 50. No. 1. 123-134.

Tóth, Z., Kismányoky, T. 2001. A trágyázás hatása a talaj szervesanyag-tartalmára és agronómiai szerkezetére vetésforgókban és kukorica monokultúrában. Agrokémia és Talajtan. Tom. 50. No. 3-4. 207-225

The **SOILCARE** project is a 5 year project aimed at identifying and evaluating promising soil improving cropping systems and agronomic techniques increasing profitability and sustainability across scales in Europe.

The SOILCARE project consortium consist of 28 partner institutes from 18 European countries  
The SOILCARE project is coordinated by ALTERRA, Wageningen UR, The Netherlands.

• Starting date: March 1st 2016 • Ending date: February 28th 2020. • EU contract number: 677407

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