



## Soil respiration in different tillage systems under crop rotation

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We present here the results of a five-year-long study on soil respiration ( $R_s$ ) in different tillage treatments. The Józsefmajor Experimental and Training Farm (JETF) study site is located in Western Hungary, near city Hatvan, and was set up in 2002. Two treatments were selected to study the effect of systematic soil disturbance on soil  $CO_2$  emission: mouldboard ploughing (P) and no-tillage (NT). In the crop rotation each year presented different crops sown including both winter and summer crops. Soil respiration measurements were carried out between 2013 and 2017 using the static chamber method, once per week in seven spatial replicates during the vegetation season and less frequently in dormant season. Besides soil respiration, we also monitored basic meteorological parameters, soil water content and soil temperature.

The average measured  $R_s$  ranged between  $0.09 - 0.1 \text{ mg CO}_2 \text{ m}^{-2} \text{ s}^{-1}$  in NT and  $0.08 - 0.11 \text{ mg CO}_2 \text{ m}^{-2} \text{ s}^{-1}$  in P throughout the year. During the five years of measurements  $CO_2$  emission in NT was higher than that in P regardless of the crops sown, however, the trend differed among years and also had intra-annual variability. When investigating the years separately, we only found significant differences in three years ( $p < 0.01$ ), with higher emission in NT in all cases compared to P, and differences in  $CO_2$  efflux were larger during growing season. In 2015 and 2017 (winter crop years)  $CO_2$  emission in NT treatment was not significantly higher than P, which can be due to the cropping system, different characteristics of winter and summer crops.