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On silt loam sites in Central Europe, autumn strip tillage (ST) might offer an option to produce high sugar beet yields at lower costs and improved erosion control compared to full-width tillage practices. Three field trials were conducted in 2013/14 and 2014/15 at Goettingen, Lower Saxony, Germany, to investigate the effect of three tillage systems (intensive tillage (IT), reduced tillage (RT), ST) and two fertilizer nitrogen levels (no fertilizer nitrogen (N0), fertilizer nitrogen required for optimum yield (Nopt)) on sugar beet growth.

Compared to IT and RT, field emergence period under ST was prolonged by 5-7 days, which was presumably caused by a coarse and uneven seedbed. In the early growth stage, chlorophyll present in the leaves (SPAD value) was higher for IT and RT compared to ST, indicating a lower nitrogen supply for ST, especially under N0. This was supported by a slightly higher nitrogen concentration in the plant dry matter and a higher soil mineral nitrogen content in spring under IT and RT compared to ST. Leaf area index of sugar beet was almost equal between IT and RT, while values for ST tended to be lower. As a result, plant dry matter yield and white sugar yield were approximately 7% higher for IT and RT compared to ST.

Penetration resistance and root length density in the top soil revealed no relation to yield. It was concluded that both, the prolonged field emergence period and the lower nitrogen supply under ST possibly impaired a rapid development of an adequate leaf canopy that facilitates efficient light interception and a high yield.