

Soil nitrogen dynamics in maize field trials after slurry injection compared to broadcast application using a new sampling strategy

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Slurry injection below the maize seeds is a new application technique developed to improve the nitrogen use efficiency. However, better understanding of the soil mineral nitrogen (SMN) dynamics is essential. We developed a soil sampling strategy, in which the soil profile is sampled grid-like to a depth of 90 cm. Around the injection zone soil monoliths (SM) are sampled using a purpose build shovel, while below the SMs and in the interrow space an auger procedure is performed. This sampling strategy was used in a maize field trial on a sandy soil in lower Saxony (Germany) on several dates in 2014 to compare broadcast application to slurry injection below the maize row. In the slurry broadcast treatment most of the applied nitrogen leached out of the 0 – 30 cm layer until six leaf stage due to heavy rainfall occurring after planting. Especially nitrogen in the interrow space was lost for maize nutrition. Also in the slurry injection treatment nitrogen leaching was determined, but the displacement out of the injection zone was delayed and thus nitrogen was available for maize over a longer period. Based on the new soil sampling strategy it was revealed that reduced leaching is one reason why slurry injection enhances nitrogen use efficiency in maize.