High precision weed control by a direct injection system

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Often agricultural tank mixtures with several plant protection products (PPP) are used, whereby a site-specific application of individual pesticides is impossible. With direct injection systems, a site-specific use of single PPP on the other hand is possible. Direct injection systems dose pesticides and water from separate containers in real-time with immediate mixing before application, without having incurred residues. The technical implementation in practical devices represents a major challenge. A prototype of a field sprayer with direct injection system was developed and used in first practical tests in cooperation of Herbert Dammann GmbH and the Julius Kühn-Institute.

Precision Farming requires a site-specific application of plant-protection products. Without the direct injection in crop protection site specific application cannot be implemented in agriculture. The aim of the project is the intensive testing of the direct injection system in the field in order to evaluate the reliability of the system and the effects of site-specific treatment. An important question in this context is how to optimize the handling of the prototypes, the electronics and the direct injection system itself. An important role for precision farming is the handling of residues and the creation of application maps. For the market maturity and the consequent implementation into commercial use this is of fundamental importance.

To verify the accuracy of the direct injection system, different plots were calibrated in a field test on farmland with GPS to create an application map. Based on this map, the prototype treats the entire area and the selected parcels with various herbicides. The plots were designed to get different section widths for use with different plot sizes.

The effectiveness of the treatment to the appropriate plots confirmed the metering accuracy of the direct inject system. The switching at the beginning or end of each plot showed that the developed field sprayer works without delay with direct injection. The investigations have shown that the sprayer prototype with direct injection is able to apply liquid formulated pesticides site-specific and without delay times. In a further development step, the operation and cleaning of the prototype will be simplified. The initial experiences with the sprayer prototype show that practical systems for delay-free direct injection can be realized and a site-specific application of various pesticides is possible.