

Important technical components for a working gap detection system in orchards

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Gap detection in orchards seems to be a good possibility to improve the precision of the application of plant protection products on target area and to minimize potential inputs into the environment.

In the two projects LADUS and OLSVA, funded by the Federal Ministry of Food and Agriculture, three different sprayer prototypes were developed. These prototypes were equipped with different fans and different allocations between sensors and nozzles. For testing the novel application system under different climatic conditions and pathogenic potentials, the prototypes were distributed at different fruit growing regions in Germany.

The results of the field trials showed that the use of the gap detection systems resulted in high saving potentials of plant protection products depending on the age and the structure of an orchard. At the same time, drift reduction was possible, which is an advantage to protect the environment.

For achievement of market maturity of these sprayers, different technical components had to be tested for their suitability during the project period. First of all, the primary used infrared sensors

showed inaccuracies in application due to higher driving speeds (> 6 km/h), which is out of step with common practice and could be one explanation for worse results of the biological scoring in the first project year. Therefore, novel infrared sensors were developed, that work with higher scanning frequencies and can improve the detection of an object.

Magnetic valves were other important components, of which the efficiency of the gap switching depends on. The problem was that the grower cannot apply plant protection products if the magnetic valves do not open the nozzles. Measurements in the laboratory showed that the coating of the valves was vulnerable to corrosion and resulted in sticking together of individual parts of the valves. Based on the knowledge gained, novel magnetic valves were developed with nano-coating as protection against corrosion.

The sensors as well as the magnetic valves highly influence the efficiency of the gap detection system. The results of year 2017 will show whether the developed gap detection system with the new technical components was successful.