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## Test results with weeding robots reveal opportunities for a more sustainable and profitable approach to agriculture

**Together with the University of Göttingen (Section of Agricultural Engineering) and the IfZ (Institute for Sugarbeet Research), KWS tested various robotic weed control systems for sugarbeets during the 2020 growing season. The initial results are promising: Two mechanical weeding robots significantly reduced weed density during several field passes. An herbicide-based robotic system resulted in a nearly 80-percent reduction in the amount of herbicides used compared to conventional spraying methods. The system resulted in approximately a 70 percent reduction in weed populations**

Weed populations before and after robot use were analyzed during the field trials. Stefan Meldau, who manages the project for KWS, summarizes the results: “As a company, with this project titled Future Live — Robotic Weeding in the Field, we are offering precision weeding technology manufacturers a platform to gain experience regarding the practicality of these systems. Our first conclusion is: None of the systems tested until now are completely ready; however, a look into the future reveals that robotic technologies with other measures or methods looks promising.”

In terms of organic farming, mechanical weed removal with robots was compared with use of a hand hoe. In addition to the mechanical destruction of weeds, FarmDroid’s field robot also conducted precision sowing. The first of both mechanical applications were conducted prior to the emergence of the sugarbeets to eliminate weeds that appeared early in the season. The FarmDroid trial areas exhibited approximately 40 percent fewer weeds when the sugarbeets emerged than the other test areas. Continued weekly use until row closure eliminated the formation of new weeds during the plant’s early growth stages. In each of the three field passes, the system from farming revolution was capable of removing up to one-third of the weeds in each row per robot application. Weeds adjacent to sugarbeets were not adequately covered by either system. “We are now interested in the number of hours of work saved between hand hoeing and the time it will take to maintain the system. The focus of further studies lies in this cost-usage analysis,” says Meldau.

When it comes to the topic of herbicide-based weed control, the field robot from ecoRobotix eliminated nearly 70 percent of weeds through a follow-up application. The selective precision spraying then, in comparison to conventional applications, required only one-fifth of the amount of herbicides. “The precision spraying system can significantly reduce the amount of herbicides on smaller fields. However, in terms of efficient large-scale use, the robot having a two-meter working width of does not have the necessary capacity for these larger fields,” explains Stefan Meldau. ecoRobotix has already responded to these findings and now also offers conventional spraying systems with significantly higher capacity for large scale fields.

Dr. Peter Hofmann, Member of the Executive Board at KWS responsible for the Sugarbeet Segment underscores the company’s commitment to sustainable farming: “We want to actively contribute to significantly reducing the use of crop protection agents in the long term. Our commitment to this extends beyond our core business – the development of seed that is resistant to diseases and climatic influences. With projects such as testing the field robots, we are promoting promising technologies for the future. The findings show that the systems can

contribute to saving herbicides in terms of conventional farming and making organic farming even more profitable.”

**Background information:**

**FarmDroid**

The field robot from FarmDroid electronically records the location of seed while sowing and later removes the weeds around the sugarbeet plant mechanically using the information on the plant’s location.

**farming revolution**

The system from farming revolution differentiates weeds from sugarbeets using a camera system and uses this information to guide its mechanical tools to remove weeds.

**ecoRobotix**

When it comes to herbicide-based weed control, the field robot from ecoRobotix uses a camera to recognize weeds and combats them with a highly precise, selective spraying of herbicides.

### **About KWS\***

KWS is one of the world's leading plant breeding companies. In the fiscal year 2019/2020, more than 5,700 employees in 70 countries generated net sales of EUR 1.3 billion. A company with a tradition of family ownership, KWS has operated independently for more than 160 years. It focuses on plant breeding and the production and sale of seed for corn, sugarbeet, cereals, rapeseed, sunflowers and vegetables. KWS uses leading-edge plant breeding methods to increase farmers' yields and to improve resistance to diseases, pests and abiotic stress. To that end, the company invested more than EUR 200 million last fiscal year in research and development.

\*All indications excluding the results from the companies accounted for using the equity method AGRELIANT GENETICS LLC, AGRELIANT GENETICS INC. and KENFENG – KWS SEEDS CO., LTD.

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