Laser technology for weed management

Laser weeding

In laser weeding, plants are treated one by one with a few millimetre wide laser beam. So the method is highly selective and enables treatment of weeds very close to the crop plants. The beam destroys crucial points of the target plants causing them to wither.

Solution and expected outcomes

In order to be able to use laser technology economically in agriculture, it is necessary to develop an automated device. This device must be able to both recognize plants and distinguish crops from weeds to ensure that crops are not harmed during this treatment.

The device itself will consist of a perception system and a laser application system. The former acquires images by using multiple cameras. Machine learning algorithms analyse the image data and identify target weeds. The coordinates of the target-weeds' meristems or other target tissue are then passed on to the laser application system. This system will consist of a laser scan head, which directs the laser beam to the desired position as efficiently and quickly as possible, and the system's core component, the high-power laser source. This laser source will provide lethal doses of radiation to the target weeds. In agreement with previous studies, a laser wavelength of 2 µm is chosen for this application.

Current status

The initial systems design has been agreed among WeLASER partners and is now being realized. A setup for investigating the suitability of some of the technical components (e.g. cameras) is under construction. This setup will feature the main components like high-power laser source and laser scan head while already fulfilling important requirements like dimensions, working distance and processing speed as communicated with the project partners and stakeholders.

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