

Cinderella - automatic plant seed sorting system

Development status

Phase 3

Technology validation and implementing it in real environment. Testing the technology outside of the laboratory and its adjustment to external conditions.

IP protection status

Know-how

Partnering strategy

Co-development, Collaboration, licensing



Institution



Palacký University
Olomouc

Palacký University Olomouc

Challenge

Automation is increasingly playing a key role in agriculture and biotechnology, contributing to the acceleration and streamlining of repetitive tasks. In response to these demands, systems are being developed for handling, testing, and sorting various objects. At Palacký University in Olomouc, we have implemented technologies for automatic plant cultivation, enabling the collection of image data and its subsequent evaluation (so-called plant phenotyping). During experiments, we identified a bottleneck in the process: handling seeds during the setup of large-scale experiments. This challenge is particularly pronounced with little seeds measuring less than 0.5 mm. The current method, which involves manually transferring seeds between test tubes, is not only difficult but also practically impossible for sowing hundreds or thousands of seeds quickly.

Description

As part of our research activities, we at Palacký University in Olomouc have developed Cinderella. A device for vacuum picking of individual small seeds, which is suitable for use in automated lines. It is a robotic arm, at the end of which is fitted with an attachment for manipulating small seeds in a controlled environment. Cinderella can replace up to 4 workers. It can pipette nutrient media, optically check the correct picking of a given seed and place it in a defined position on a microtiter plate according to a programmable interface. Cinderella can work with seeds in the size range of 0.1–3 mm. It is thus a universal device for all commonly used seeds. At a speed of at least 400 seeds per hour, i.e. 9,600 seeds per day. Cinderella's design allows industrial integration within the automation of handling small seeds for testing in standardized microtiter plate (MTP) formats. Thanks to this, it can be easily integrated into commonly used phenotyping lines.

Commercial opportunity

The device and method are intended (mainly) for the field of phenotyping units, more specifically for the automatic preparation of seed samples. It can be used as part of a plant phenotyping system or

as a stand-alone device. The technology offers precise seed handling (even seeds the size of *Arabidopsis thaliana*), detection of captured seeds, handling of liquids, and a controlled environment. The technology offers high throughput and precise preparation of the culture vessel, detection of captured seeds, and handling of liquids in a controlled environment.