



Affordable phenomics for crop breeders

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In phenomics, specific sensors are used to analyze different plant traits. These sensors range in

In phenomics, specific sensors are used to analyze different plant traits. These sensors range in affordability, so researchers outlined which ones are the most accessible in a recent The Plant Phenome Journal review. Illustration courtesy of Valerio Hoyos-Villegas, Michigan State University.

Plant phenotypes aren't just controlled by genes—complex traits are the result of interactions between multiple genes and the environment. Crop breeders need to directly observe these traits before they can accurately select the best candidates for new lines. However, traditional phenotyping is often slow and labor intensive. Breeders thus need accurate and fast tools to genetically improve their crop lines. New technology (sensors, cameras, and software) can be used to collect and process massive amounts of data quickly and accurately, but many of these tools are too expensive for most breeding programs. Plus, managing high data volumes requires powerful computers and skilled personnel.

Aiming to break these barriers, researchers reviewed currently available and accessible phenomics hardware, sensors, software, and platforms. One of the primary tools that the phenomics community views as affordable—drones—was heavily featured in the review, and many case studies comparing the performance of different drones at different costs were included.

The researchers highlighted existing phenotyping tools and techniques that can be used by breeding programs with restricted budgets, such as those located in economically developing countries. By using affordable phenomics, researchers can utilize highly accurate, high-throughput technologies without breaking the bank.

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Hoyos-Villegas, V., Jackson, M., Vargas-Cedeño, M., Farmer, E.

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