Spray-on viral treatment can ‘fine-tune’ crops as they grow, without genetic engineering

[W]ith climate change in action across the globe, forecasting temperature and rainfall is becoming more challenging. Hence during the crop cycle, management tools such as pesticides, fertilizers and plant growth regulators remain the only available options to modify crop growth and resilience.

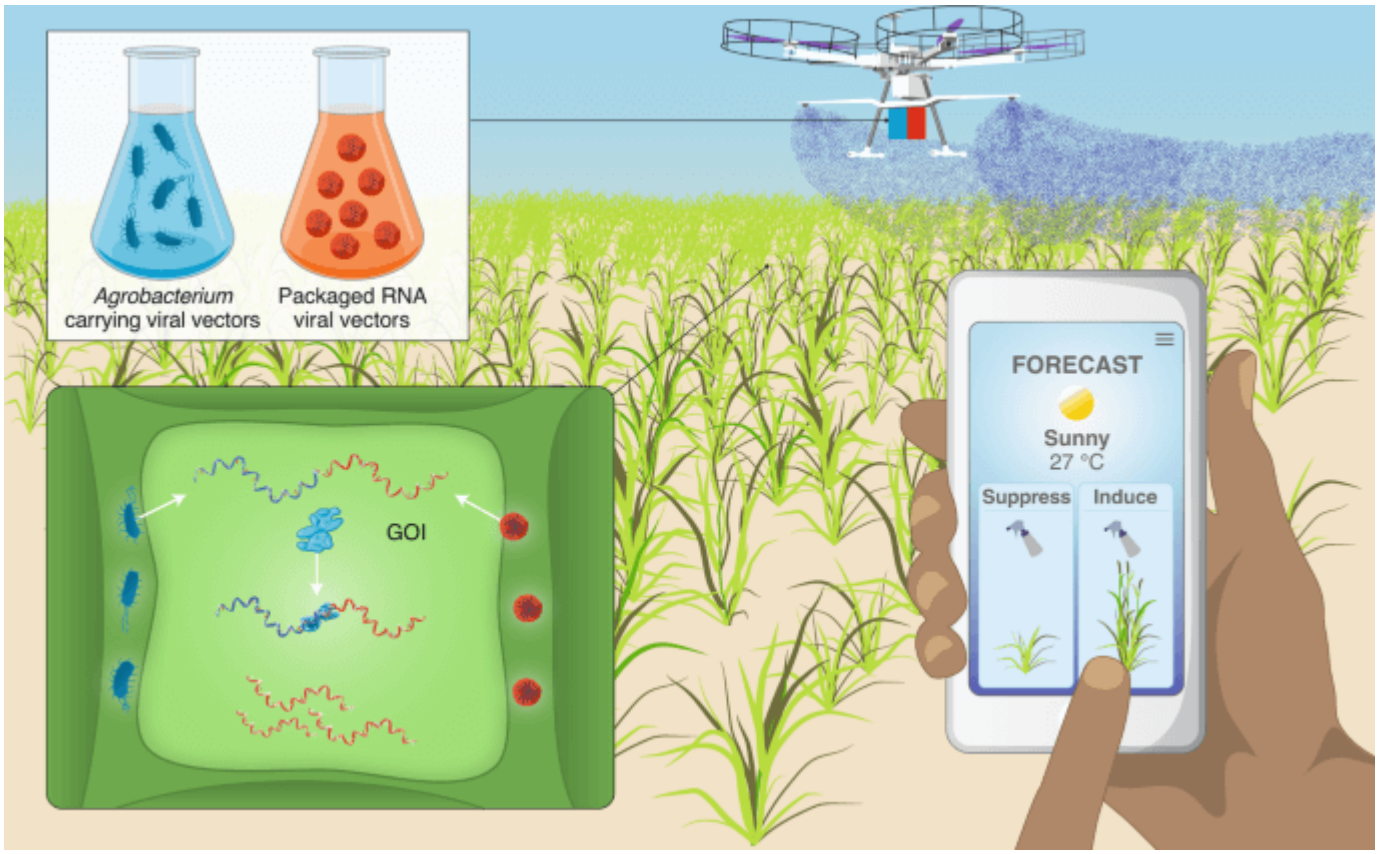
…

[However, a new] system has been progressively engineered over the past decades and focuses on biopharmaceutical applications to generate high levels of recombinant proteins.

…

[T]he viral vector system can be designed to express or silence key genes, enhancing versatility for trait manipulation while overcoming the limitations of other transient technologies that utilize double-stranded RNAs. [Stefano] Torti et al. highlight the potential of the spray-on viral transfection technology by manipulating agronomic traits, such as plant height and flowering time, across a wide range of plant species. This flexible approach means locking in the genotype at planting is no longer the main determinant of crop behaviour.

For crop production, the technology could provide a new management tool to tune agronomic performance post hoc. Depending on local weather conditions, key genes in developmental pathways could be selectively reprogrammed. For example, if no rainfall is predicted for an early sown crop of wheat, the expression of FLOWERING LOCUS T (FT) could be manipulated to induce early flowering and avoid drought stress.



Credit: Ella Maru Studio

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