

Could biological clocks in plants set the time for crop spraying?

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A crop field. Credit: Dr. Antony Dodd

Dr. Antony Dodd, Senior Lecturer in the School of Biological Sciences and senior author of the paper, said: "This proof of concept research

suggests that, in future, we might be able to refine the use of some chemicals that are used in agriculture by taking advantage of the biological clock in plants. Approaches of this type, combining biotechnology with precision agriculture, can provide economic and environmental benefits."

Just like human jet lag, [plants](#) have [body clocks](#) that are crucial for their life in a world that has day and night. Plant biological clocks make a crucial contribution to their growth and the responses of crops to their fluctuating environments.

In a new paper, published today [Friday 16 August] in the journal *Nature Communications*, the researchers found that the death of plant tissue and slow-down in growth resulting from the herbicide glyphosate depends upon the time that the herbicide is applied and also the biological clock.

Crucially, the biological clock also led to a daily change in the minimum amount of herbicide that is needed to affect the plant, so less [herbicide](#) was needed at certain times of day. This provides an opportunity to reduce the quantity of herbicides used, saving farmers time, money and reducing environmental impacts.

In medicine, "chronotherapy" considers the body clock when deciding the best time to give a medicine or treatment. This new research suggests that a similar approach could be adopted for future agricultural practice, with crop treatments being applied at times that are most appropriate for certain species of weed or crop. By employing a form of agricultural chronotherapy might have a future role in the sustainable intensification of [agriculture](#) required to feed the growing population.

More information: 'Plant circadian rhythms regulate the effectiveness of a glyphosate-based herbicide' by Belbin FE, Hall GJ, Jackson AB, Schanschieff FE, Archibald G, Formstone C, Dodd AN in *Nature*

Communications

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