

AI spraying cuts tomato herbicide use by 71%

New research from the University of Florida shows that targeted weed-spraying technology can reduce herbicide use in tomato farming by 71%, while also cutting weed management costs by 75%. These findings have significant implications for the Florida tomato industry, which is valued at nearly \$500 million annually, according to the USDA.

The study was led by Nathan Boyd, a professor of horticultural sciences at UF's Institute of Food and Agricultural Sciences (UF/IFAS). He explained that conventional weed management typically involves spraying herbicides across the entire field, even though weeds tend to grow in specific patches. Targeted spray systems use artificial intelligence (AI) and machine vision to detect and spray only where weeds are present, significantly reducing the amount of herbicide released into the environment.



Most tomatoes in Florida are grown in open fields using plasticulture — a method where crops are planted in raised beds covered with plastic mulch. Weeds can emerge in transplant holes, grow between the beds, or puncture the plastic. Boyd's team tested a program that combines several targeted spray strategies. One approach involved applying herbicide only to the bare soil between the raised beds instead of treating the entire area. Another method is to spray directly into the transplant holes, where weeds compete closely with the tomato plants. A third strategy focused on targeting nutsedge weeds that pierce through the plastic mulch, with herbicide applied only to those specific locations.

The study, conducted at the UF/IFAS Gulf Coast Research and Education Center and supported in part by USDA funding, is the first to show that integrating multiple targeted spray methods into a single weed control program can be effective in vegetable production systems. Boyd emphasized that weeds compete with crops for water and nutrients, reduce yields, lower fruit quality, and raise production costs. Florida growers have used integrated weed management for years, but this new approach brings added precision and efficiency.

Boyd said that the research is shaped by input from growers, ensuring it addresses real-world challenges. He hopes to commercialize these AI-based technologies in the future to help farmers remain productive and sustainable.

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