

New Weeding Technologies for the 2022 Growing Season

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At the UC Cooperative Extension Automated Technology Field Day in Salinas, CA a couple of weeks ago, several automated technologies were showcased operating in the field for the first time to a general audience. One of the “new” machines designed specifically for in-row weeding in vegetable crops is highlighted here. I’ll discuss other technologies in future articles.

The first is an autonomous robot that uses lasers to kill weeds (Fig. 1a). The machine, developed by Carbon Robotics¹, identifies weeds from camera captured images of the bedtop using artificial intelligence techniques. The device is equipped with eight CO₂ lasers that emit laser beams roughly 0.25” in diameter in short, < 50 millisecond bursts. As such, it is best suited for controlling small weeds (< 3-4 leaf stage) in high density crops such as baby leaf spinach, spring mix, carrots, and onion. The machine worked well in the demonstration plot, annihilating small weeds, turning plant material into black charcoal (carbon!) and grey ash, and causing significant damage to and potentially killing larger weeds (Fig. 1b).

The percentage of weeds targeted and travel speed (significantly less than 1 mph) of the 80” wide (1 wide bed) machine was comparable to that shown in videos on the company’s website (<https://carbonrobotics.com/>). The version the company is marketing, however, is a 20’ wide (3 wide beds) tractor pulled implement, and according to sales representatives, has upgrades that increase travel speed. This combination should provide adequate machine productivity (acres/hour).

Company reps reported that the first production units are being delivered to commercial farms presently. Some will be operating in the Yuma area this fall. If interested, I would be more than happy to work with you to help conduct and design experiments for assessing the machine’s performance – % weed control by species, % of weeds targeted, hand weeding labor savings, machine work rate (acres/hour), etc. Please feel free to contact me anytime at siemens@cals.arizona.edu.

¹ Reference to a product or company is for specific information only and does not endorse or recommend that product or company to the exclusion of others that may be suitable.

a)



b)



Fig. 1. Autonomous laser weeding machine developed by Carbon Robotics¹ a) demonstration at UCCE Automated Technologies Field Day and b) image of bedtop weed control post treatment.