

## Spot Sprayers – An Option for Reducing Pesticide Application Costs?

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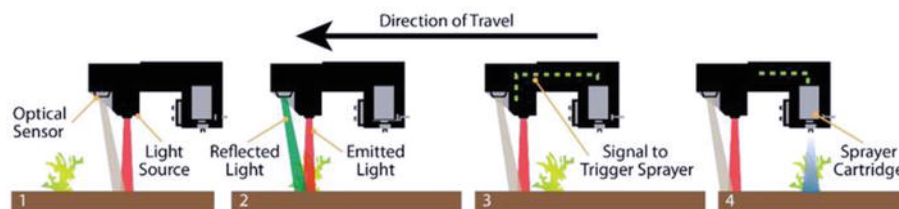
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Automated thinning machines have been commercially available since 2012. These machines identify crop plants and intermittently deliver an herbicidal spray or dose of liquid fertilizer to thin the stand to the desired plant spacing. Some growers have converted older machines to spot apply pesticides to crop plants rather than thin lettuce. Spot spraying just the crop plant makes sense – it reduces applied chemical amount by about  $1/3^{\text{rd}}$  as compared to band spraying and by roughly 90% as compared to broadcast. I have heard reports of improved efficacy with this technique, perhaps due to better coverage, however this potential benefit has not been validated in formal trials.

A drawback with automated thinning machines is their high cost. Retail prices for machines are approximately \$25,000 per seed line, or about \$200,000 for a 4-row, 2-line machine. Another option might be to use automated systems designed for spot spraying weeds. These devices have been commercially available since the mid 90's and function similarly to automated thinning machines in that they use optical sensors to detect plants and solenoid activated spray assemblies to intermittently spray unwanted plants (Fig. 1). The cost of these devices is quite reasonable – about \$3,000 per unit, or about \$24,000 for a 4-row, 2-line machine.

Automated spot sprayers are typically used in agriculture to control weeds in fallow fields (Fig. 2), but could easily be adapted to apply pesticides or even fertilizer to vegetable crops. Spot applying foliar fertilizers to vegetable crops is an interesting concept and is being investigated in California with lettuce.

Another potential use of spot sprayers is to control herbicide resistant weeds. The device can be positioned between crop rows to spot spray a non-selective herbicide to target weeds. Placing the sprayer in a hooded enclosure prevents unwanted drift onto crop plants. We are conducting trials using this technique in cotton this season (Fig. 3). We are also looking for collaborators interested in trying the device as a pesticide and/or fertilizer spot applicator in vegetable crops for this upcoming season. If you are interested collaborating or would like to see a demo of the device, please feel free to reach out to me.



**Fig. 1. Illustration of spot sprayer operation. Optical sensor detects weed and spot applies an herbicide. (Image credits: Grisso, R.)**



**Fig. 2. Automated spot sprayer operating in a fallow field.**



**Fig. 3. Hooded automated spot sprayer in cotton. (Photo credits: Andrade-Sanchez, P., University of Arizona)**