Study shows variable-density planting can be a cost-effective tool for weed control

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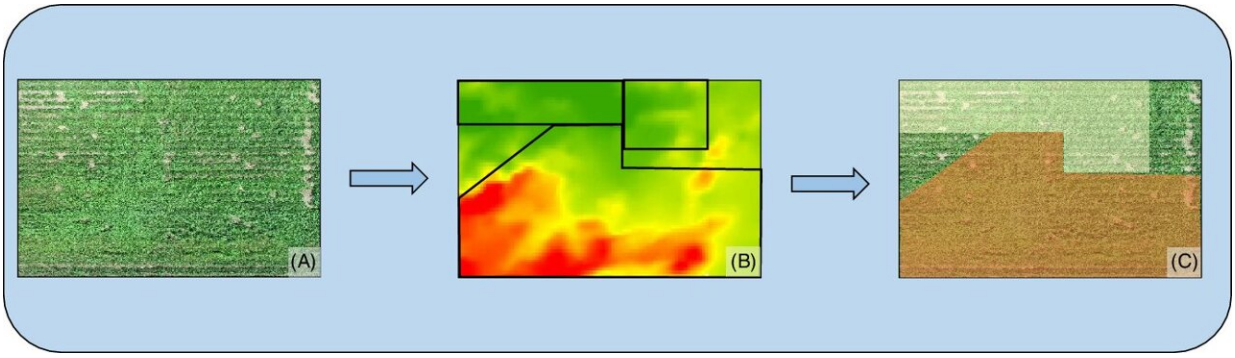

Schematic representation of (A) an aerial image using an unmanned aerial vehicle (UAV) to scout fields in year 1, (B) detection of areas of high (orange) and low (yellow) weed density in year 1, and (C) implementation of year 1 weed maps to calibrate precision planter to plant in high (red) and low (green) crop densities in year 2. Credit: *Weed Science* (2022). DOI: 10.1017/wsc.2022.62

High-density crop planting is a proven approach for suppressing patches of weeds that escape other controls. Unfortunately, though, the cost of seed keeps many growers from considering this dense planting strategy.

Researchers writing in the journal *Weed Science* describe a bioeconomic model growers can use to overcome the cost barrier. The model is based on a two-year study conducted in maize, cotton and soybean crops. Researchers explored whether the cost of higher-density plantings in areas with weed escapes could be balanced by lower-density plantings

elsewhere in the field.

The study demonstrated distinct physiological differences in each crop that impact the balance needed to achieve a cost-neutral result. For example, maize grown at a 75% planting density produced a 229% increase in yield, a 43% increase in return and a 79% increase in profit as compared to areas planted at a 2X density. Cotton planted at a 25% density produced a 1,099% increase in yield, a 46% increase in return and a 62% increase in profit as compared to a 2X planting density.

These results decrease the low-density area needed to compensate for higher-density plantings for weed suppression. By contrast, soybean crops exhibited a one-to-one ratio for the same measures, regardless of planting density.

"By using our optimization model, growers can now adopt variable planting strategies at a large scale to increase weed suppression while maintaining or even reducing their costs," says Sandra Ethridge of North Carolina State University. "They can balance denser plantings in areas where weeds have been identified with lower-density plantings in areas known to be weed-free or at lower risk."

More information: Sandra R. Ethridge et al, Crop physiological considerations for combining variable-density planting to optimize seed costs and weed suppression, *Weed Science* (2022). DOI: 10.1017/wsc.2022.62

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