

Smart Sprayer Selects Weeds for Elimination

Weeds in soybean fields are taking a beating from a smart sprayer that combines computer chips, high-power light, and infrared emitters with sensitive silicon photodetectors to determine the precise location of individual weeds.

A combination of sprayer heads applies herbicide in short bursts directly onto foliage, without spraying the surrounding area.

The sprayer, originally developed for use in orchards and vineyards, has shown promise for killing weeds between the rows in some crops while reducing herbicide use, says ARS agricultural engineer James E. Hanks. He is in the Application and Production Technology Research Unit at Stoneville, Mississippi.

Herbicides for weed control in soybeans and cotton represent a major production cost for producers.

“The grower who applies herbicides with this type of controlled precision is definitely going to save on production costs,” he says.

“Herbicides won’t be wasted on areas of bare soil.”

Hanks isn’t just making an educated guess. He adapted the smart sprayer for use in controlling weeds in soybeans on a farm in Leland, Mississippi. He cut holes in the tops of spray hoods so nozzle-equipped sensors could be added to them.

When the sensors detect green plant material under the hood, a spray nozzle is activated, releasing herbicide onto weeds growing between crop rows.

ARS recently signed a cooperative research and development agreement with Patchen California, Inc., of Los Gatos, California, to develop a system to use the smart sprayer for row crops.

On Dean Cumbaa’s Leland-area soybean farm, Hanks used an 8-row hooded spray system. Half was equipped with sensor-controlled spray hoods and the other half with conventional continuous spray hoods. In the half where he used the inter-

mittent sprayer to apply herbicides, weeds were killed with only one-half the herbicide used by the continuous sprayer. Weed control was the same for both methods, reports Hanks.

Results of the study done in the spring of 1995 showed that applying chemicals with intermittent sprayers reduced chemical use on soybeans by 50 to 85 percent.

“Even using much less herbicide, we achieved excellent weed control,” says Hanks.

That’s because the sprayer heads put the herbicide down only where weeds are detected. It has found weeds as small as three-fourths of an inch in diameter. In 1996, Hanks will test the technology on cotton and re-evaluate its use in soybeans.—By **Linda Cooke, ARS.**

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As these hooded spray nozzles move between rows of soybeans, sensors detect individual weeds and trigger a spray of herbicide.