



Better Guidance for Battling Corn Earworm

Much of the sweet corn grown in the United States is sold as a fresh-market product, so it needs to be visually appealing to attract a buyer. Corn earworms can devastate the yield and appearance of the ear and are therefore a major concern for growers.

Adult corn earworm moths lay eggs on corn silks and on leaves, husks, and stems near the silks. After eggs hatch, larvae travel along the silks to feed on kernels, where they remain protected by the husks. *Bt* corn offers some protection against feeding by corn earworms, but some growers still conduct aerial spraying operations as often as once every 4 days to control the pest.

Bradley Fritz, an agricultural engineer at the Southern Plains Agricultural Research Center in College Station, Texas, conducted a study to see if aerial spray rates and droplet sizes make a difference in whether insecticides reach the target to control corn earworms. To be effective, the insecticides must penetrate the plant canopy and reach the silks, where larvae begin feeding soon after hatching.

Fritz sprayed test plots three times in June 2008 with insecticides approved for organic operations. He sprayed some plots with 400-micron droplets and some with 220-micron droplets. Insecticides were mixed with water at label-recommended levels and sprayed at rates of either 5 gallons or 9 gallons per acre. He and other ARS researchers then collected silks from ears of corn growing on the plots to assess how much spray actually reached the targeted silks.

Fritz's results, published in the *International Agricultural Engineering Journal*, showed that higher spray rates with larger droplets worked best to ensure the insecticide reached the targeted corn silks.

The work is part of an ARS program to optimize aerial spraying technology to control corn earworms. The results will guide future corn earworm spraying operations, and the methods may be used in future studies of spray rates for other crops and pests.—By **Dennis O'Brien**, ARS.

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Subtract Pounds of Weeds, Add Pounds of Grass = More Cows

An Agricultural Research Service scientist has created an online weed calculator that tells ranchers the number of additional cows they could raise if they eliminated one or two widespread exotic invasive weeds.

Rangeland ecologist Matt Rinella, at the ARS Fort Keogh Livestock and Range Research Laboratory in Miles City, Montana, created a computer model that predicts weed impacts on forage production. Data for developing the model came from 30 weed researchers working throughout the western United States. In addition to developing the calculator so that ranchers can calculate what weeds are costing them on any given site, Rinella used the data to estimate what weeds are costing ranchers in a 17-state region. He calculated that if leafy spurge were eliminated, ranchers in that entire region could graze up to 200,000 more cows per year and save tens of millions of dollars.

Spotted knapweed is another exotic invasive weed whose elimination would greatly increase the number of cows ranches could support, and the calculator also predicts its impacts.

Interested parties can access the calculator at tinyurl.com/WeedImpact.

All the rancher needs is a datasheet, clipboard, pencil, yardstick, and homemade sampling frames of any size, rectangular or circular. The datasheets can be downloaded. Ranchers tally weeds in each frame and group them by height categories. The necessary data can be gathered in about 30 minutes.

After the numbers are entered into the calculator, the ranchers learn how many pounds of weeds they are producing per acre and how many more cattle they could raise per acre if those pounds of weeds were replaced by forage plants.

The calculator reflects a fundamental principle of integrated pest management: It is only worth controlling a pest if the profits from doing so outweigh the costs.—By **Don Comis**, ARS.

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