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Post-planting cultivation in a conservation plan

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Post-planting cultivation in a conservation plan

Abstract

After planting is finished, many producers turn their attention to post-planting cultivation. Even good conservation tillage programs have valid reasons to consider cultivation--primarily weed control and crust busting. The key is to be certain that cultivation is needed and to minimize crop residue loss.

Keywords

Agricultural and Biosystems Engineering, Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences | Bioresource and Agricultural Engineering

INTEGRATED CROP MANAGEMENT

The image shows a person in a field, likely a farmer or worker, with large, stylized text overlaid. The text reads 'INTEGRATED CROP MANAGEMENT'. The background is a photograph of a field with tall grasses and a person in the distance.

Post-planting cultivation in a conservation plan

After planting is finished, many producers turn their attention to post-planting cultivation. Even good conservation tillage programs have valid reasons to consider cultivation--primarily weed control and crust busting. The key is to be certain that cultivation is needed and to minimize crop residue loss.

Cultivation: the positives

With all the recent rainfall, many producers are concerned about the level of weed control that their preemergence and postemergence herbicides will achieve this season. No producer should endure serious yield and income losses due to weed infestation. When properly implemented, post-planting row-crop cultivation can help producers avoid excessive dependence on herbicides, and under the right conditions--with minimal residue and soil moisture loss--cultivation can provide excellent weed control between the rows.

Cultivation also can break up a sealed crust, improving soil aeration to the root systems. Soil crusting is a major problem in soils that have minimum residue cover. High-intensity rain breaks down soil aggregates into small particles. When rapid drying occurs, bare soils tend to seal, leading to significant subsequent surface runoff. A hard crust layer will form on the top of the soil, creating a challenge for emerging plants. Cultivators bust crusts, aerate the soil, close cracks, and reduce puddling and runoff from subsequent rainfall.

Cultivation: the negatives

If weeds or crusting are not a problem, producers should leave the cultivator in the shed. The potential for soil erosion increases with cultivation because it decreases residue cover from 5 to 10 percent and loosens the soil. Other negatives include possible root pruning, increased topsoil compaction between rows, increased fuel use, more time spent in the fields, and risk of ineffectiveness. Moreover, cultivating too deeply can increase weed problems by pulling buried weed seed to the surface where it can germinate.

Cultivation tools and techniques: rotary hoe

For weed management in soybean, especially narrow-row soybean, a rotary hoe can be effective. Risks of hoeing are greater in soybean than in corn. The key is to keep from knocking cotyledons off newly emerged soybean plants before other leaves develop. Corn is often less troublesome to hoe (although driving over the top of corn makes emergence more difficult).

Rotary hoes offer good weed control both in-row and between rows when the crop is small, and they pose little risk of compaction and limited disturbance of crop residue. Rotary hoeing must be done just after weeds germinate (white root stage). Warmer temperatures and dry, sunny, even breezy conditions are preferred for better weed kill. Keep the tractor speed high (8-10 mph) and run with the rows. Work at a shallow depth that is just enough to flip the weeds out.

Row crop cultivator

When the weeds are too big for the rotary hoe, the best option is the row-crop cultivator. It should be operated at a depth of 1.5 to 2 inches to invert and destroy weed roots. Scraping the weeds up and out of the soil without disturbing it too deeply or turning residues under. Set the sweeps as close to the row as practical (guidance systems can help limit operator fatigue). When the crop is small, use shields and keep the tractor's speed just slow enough to avoid covering or injuring the crop. As the crop grows, cultivation speeds can be increased to 7 mph.

Spend some time setting up the cultivator. Get off the tractor and behind the machine. See how deep the sweeps are going and whether you are really uprooting small weeds. Check the sweeps or shovels behind the rear wheels. Sometimes they need to be set a little deeper to get the same penetration.

Concerns

What are the risks of post-planting tillage? Timing is important; if you cultivate in wet soil the weeds simply reroot and keep growing. Other risks include reduced crop residues and increased soil erosion, soil compaction (when soils are wet), soil moisture loss from dry soils, higher fuel bills, more time spent in the fields, and the risk of actually increasing weed problems by pulling deeply buried weed seed to the surface where it can germinate.

Conclusions

Even with the best management, variables can interfere with sound weed management or conservation tillage programs. Whether it's management, weather, or bad luck, only get the cultivator out if there is weed pressure or crusting. Once the crop shades the soil and weed germination stops, put the cultivator away until next year.



Adjust the row clearance of soil-engaging tools and use shields when the crop is small.

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