Determining Corn Residue Utilization

Corn (Zea mays L.) residue provides a simple and economical practice to integrate crops and livestock. Corn residue is used for grazing, livestock bedding, supplemental livestock feed, and as a feedstock for cellulosic ethanol in the U.S. However, limited information is available on how widespread corn residue utilization is practiced by U.S. producers.

In an article recently published in Agricultural & Environmental Letters, researchers report results highlighting residue utilization from major corn-growing states. In 2010, USDA-ERS surveyed producers from 19 states on corn grain and residue management practices as part of the Agricultural Resource Management Survey.

Corn residue grazed or harvested was estimated at 12 million ac. Approximately 10 million ac were grazed by 11.7 million livestock (primarily cattle) in 2010, with Nebraska accounting for 47% of the total grazed acres. Producers in Colorado, Kansas, Nebraska, and South Dakota utilized residue on >20% of total corn acres. Residue harvests predominantly occurred in the central and northern Corn Belt with an estimated 3.2 million tons of corn residue harvested and baled across the 19 states. This study highlights the economic importance of corn residue for livestock, particularly in the western Corn Belt.


Use Visual Iteration to Determine Infiltration

Infiltration is the main process to replenish soil moisture, recharge aquifers, and reduce groundwater depletion, and it supports streamflows during dry periods. However, most mathematical and physical concepts behind quantitatively describing the infiltration and runoff processes are complex and difficult.

A recent article in Natural Sciences Education reports on a new, but intuitive and visual approach by which the actual infiltration rate into a soil from a rainfall event can be determined. To use this approach, only a simple spreadsheet needs to be developed, from which the time of ponding and the infiltration rate at any time can be determined using the visual trial-and-error method by typing a value of actual infiltration rate and visually judging whether the value is too small or too large until the correct infiltration rate is achieved. After that, the runoff rate, the total depths of cumulative infiltration, and cumulative runoff at any time can also be calculated.

The developed visual approach can be used to demonstrate ideas of how infiltration rate can be quantitatively determined in general water budget analysis in a broad context. This means that the actual infiltration rate at any time depends only on the cumulative infiltration depth to this point, which is independent of prior rainfall pattern.

Adapted from Zhu, J., and Y. Cheng. 2016. A new visual method to determine infiltration rate from infiltration capacity models. Natural Science Education 45. View the full article online at http://dx.doi.org/doi:10.4195/nse2016.07.0020

Cattle grazing corn residue. Photo courtesy of Mary Drewnoski, University of Nebraska–Lincoln.

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