Cover Crops and Snow Capture

Jim Staricka, NDSU Williston Research Extension Center

The Current Scenario

Many producers use cover crops to improve soil health. However, in areas where water is often limited like western North Dakota, concerns regarding soil water depletion has slowed the adoption of cover crops. Enhanced snow capture by cover crops increases the amount of water available to crops, but data on this seems to be scarce or non-existent.

Data Source

In 2013, the Williston Research Extension Center started a research project investigating the use of diverse crop rotations to improve soil health and crop production. In this project, soil water content was measured weekly or biweekly, generally from mid-April to mid-October. Over-winter soil water recharge was determined by calculating the change in soil water content that occurred between the end of one growing season and the start of the next. Data for these calculations were available for four winters. Four different experimental treatments, having different cropping treatments during the antecedent summer and thus different types of ground cover at the onset of winter, were chosen for this presentation (see Table 1).

Antecedent crop	Resultant ground cover
Fallow	Minimal ground cover
Durum	Short stubble
Perennial mix	Tall standing plant material
Cover crop mix	Tall standing plant material

Table 1: Ground cover conditions at the start of fall.

Results

Over-winter precipitation amount (including both rain and snowmelt water) and maximum snow depth for each winter are listed on the graphs (see next page). The over-winter recharge that occurred in each winter x treatment combination is indicated by the bars.

Precipitation ranged from 1.5 to 4.3 inches and maximum snow depth ranged from 5 to 22 inches. Soil water recharge was generally much less than precipitation.

Averaged across all winters and treatments, the soil retained 43% (1.6 inches) of the over-winter precipitation. The fallow treatment lost water three of the four winters with an average over-winter precipitation retention of -14% (-0.2 inches). Durum retained 39% (1.5 inches) of the over-winter precipitation, the perennial mix retained 65% (2.4 inches), and the cover crop mix retained 83% (2.9 inches). During the winter of deep snow cover (2016-2017), soil water recharge exceeded over-winter precipitation in the cover crop mix. This water resulted from enhanced snow capture.

Discussion

This project will continue to monitor the frequency and magnitude of snow capture by cover crops to help answer the question "Do producers adequately consider the possibility of snow capture when making decisions on cover crops?"

