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# Soils 101: How to Apply the Information in the Clay County Soil Survey for Northeast Iowa Farmers and Ag-Professionals

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## Soils 101: How to apply the information in the Clay County Soil Survey for Northwest Iowa farmers and ag-professionals.

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The Soil Survey of Clay County, Iowa is a publication of the National Cooperative Soil Survey. Major field work was completed in 1999. Soil names and descriptions were approved in 2002. The survey was made cooperatively by the Natural Resources Conservation Service; the Iowa Agriculture and Home Economics Experiment Station and the Cooperative Extension Service, Iowa State University; the division of Soil Conservation, Iowa Department of Agriculture and Land Stewardship; and the Clay County Conference Board.

Soil survey information has many useful purposes, including such diverse items as suitability for building site development, wildlife habitat selection, and selection of construction materials. Differences in crop production and crop suitability can also be explained by soil survey information. Agronomists who work with production agriculture can use the information in the soil survey report for many purposes. Some scenarios and possible soil survey report information are listed below.

Possible Scenarios	Reference tables are available for
Troubleshooting crop yields	Corn Suitability Rating, subsoil nutrients
Suitability for alfalfa	alfalfa yields, water table
Subsoil soil fertility levels	subsoil P, subsoil K
Troubleshooting problem fields	clay content, water holding capacity
Drainage problems	subsoil clay content

A production agronomist might be asked to troubleshoot low corn or soybean yields in a field. For example, Wadena, Webster and Collinwood soils would appear in a similar position on the landscape and could be described by a casual observer as 'good black soil'. Furthermore, these soils could be present in the same field. However, major differences in the subsoil will affect crop production. The Wadena soil has mostly gravel in the subsoil (clay content 1-5% 26 to 80 inches deep). Webster soils have clay loam in the subsoil (clay content 12-22% 32-60 inches deep). Collinwood soils are formed in old lakebeds and have a high clay content in the subsoil (clay content 34-60% 15-33 inches deep). Corn Suitability Ratings (CSR) are therefore very different for these three soils. The Webster soil has an ideal amount of clay in the subsoil and has a CSR of 77. The Wadena soil has a CSR of 52 since the low subsoil clay content does not retain moisture during dry summer months. Conversely, the Collinwood soil has a CSR of 67 because the excessive clay in the subsoil restricts root growth. The example of the Wadena soil is likely fairly obvious to anyone involved in production agriculture. Water holding capacity is listed for each soil mapping unit for the topsoil and subsoil. The information on water holding capacity further explains the differences in crop productivity between a Wadena, Webster and a Collinwood soil.

Information in the soil survey report can be useful for selecting fields for different crops. For example, the expected corn and soybean yields from a Webster soil and a Clarion soil (SMS 138) would be similar. However, the alfalfa yield from a Clarion soil would be reported as 5.5 ton per acre versus 3.9 ton per acre for the Webster soil. Past experience would likely confirm these production figures. However, the soil survey would give some explanation as to the cause. The seasonal high water table for a Webster soil is listed as 0 to 1.0 foot deep during the early growing season. Clarion soils would have a high water table listed as 4.0 to 6.0 foot deep for most of the growing season.

Clay County has three major soil associations; Galva-Primghar, Everly-Wilmonton-Letri, and Clarion-Nicollet-Webster associations. There are several minor associations in Clay County. One of these is the Wilmonton-Ransom-Afton association which occupies 20 percent of the county. Another association is the Clarion-Nicollet-Webster association which occupies 25 percent of the county.

Galva-Primghar-Marcus soils were the predominant soils in the western part of the county as reported in the previous soil survey report. The current soil survey report further delineates some soil properties and replaced those soil mapping units. The Galva-Primghar-Marcus soils have over 60 inches of loess over glacial till. The current soil survey actually found that there were very few areas in the county that had more than 60 inches of loess. Therefore, the Annieville, McCreath and Gillett Grove soil mapping units were created. The Annieville-McCreath-Gillett Grove soils have 40-60 inches of loess over glacial till.

The Sac-Ransom-Rushmore soils were mapped in Clay County. The Sac-Ransom-Rushmore soils have 20-40 inches of loess over till. Everly-Wilmonton-Letri soils were also mapped in Clay County. The Everly-Wilmonton-Letri soils have characteristics of loess and erosional sediments over glacial till. The Everly-Wilmonton-Letri would be somewhat similar to the Kenyon-Clyde-Floyd soils in northeast Iowa. Everly soils were mapped in the previous soil survey report. However, the Wilmonton series replaced Nicollet clay loam (soil map symbol Nc), and the Letri series replaced Tripoli (soil map symbol Tr).

## **References**

National Cooperative Soil Survey et al. 2002. Soil Survey of Clay County, Iowa.