

## Subsoil Moisture Levels for 2002

Todd Vagts, crop specialist  
ISU Extension

### Introduction

Each spring and fall a soil moisture survey is conducted to determine the amount of plant-available water (PAW) in the top five feet of the major soils in Iowa. Adequate soil moisture reserves increase the probability of average or above average crop yields the following season. Producers may use this information to alter their crop management plans according to expected soil moisture levels. Several sampling sites are located at the Western Research and Demonstration Farm.

### Materials and Methods

The maximum amount of PAW in the top 60 inches of soil is around 11 inches for most northwest Iowa soils. The subsoil moisture samples are taken to a depth of five feet in one-foot increments. Five feet is the normal depth that corn, soybeans, and alfalfa can extract moisture. On the average, a corn and soybean crop requires 26 inches of water to produce a normal yield. Timeliness and intensity of the rain events greatly affect water infiltration into the soil and the plant's ability to use the moisture. Keep in mind that rainfall has been variable across the region, and the samples capture only a snapshot of time and location of actual subsoil moisture status.

### Results and Discussion

*Spring soil moisture status.* The spring 2002 subsoil moisture survey indicated that most sampling areas received 2–3 inches of PAW over the winter and spring months when compared with the fall 2001 samples. Soil moisture status remained variable across the region. Subsoil moisture status ranged from a low of 2.0 inches (17% soil capacity) PAW under an alfalfa field in Monona County to 11.0 inches PAW (91% soil capacity) under a soybean field in Sac County. On the average across sampling locations, this was the best

spring soil moisture condition the region experienced since the spring of 1999.

Carroll, Sac, Ida, and Pocahontas counties had the best soil moisture profiles, averaging 9.2 inches of PAW in the top five feet. This is an average of 78% of the soil's total holding capacity. Ida County had the greatest increase in soil moisture over the winter; adding 4 inches of PAW to the soil profile. On the other hand, Monona, Crawford, and Calhoun counties needed substantial spring rains to replenish the soil moisture profile. These three counties had an average of 4.7 inches of PAW, which was 40% of the soil's holding capacity. The soil profile in the driest counties needed to be recharged in the 3 to 5 foot depth level.

*Fall soil moisture status.* Most sampling areas had an equal or greater amount of PAW in the top 60-inch soil profile compared with the spring sampling period, a result of very plentiful fall rains across the region. When compared with the 4-year average fall moisture levels (1999–2002), the fall 2002 sub-soil moisture condition was about 150% of the average, with a range of 99% (soybean field near Dow City) to 204% (soybean field near Holstein). On the average across sampling locations, this was by far the best fall soil moisture condition for the area in the last several years.

Carroll, Calhoun, Sac, Ida, and Pocahontas counties had very good soil moisture profiles, averaging 9.6 inches of PAW in the top 60 inches, 0.4 inches more than the spring 2002 and 2.7 inches more than the fall 2001 sampling period. Carroll and Sac counties had the wettest subsoil moisture profile with their PAW capacities filled to 93% and 89%, respectively. On the other hand, Monona and Crawford counties needed spring rains to replenish the soil moisture profile. These two counties had an average of 4.8 inches (PAW), which is 41% of the soil's holding capacity. The soil profile in the driest counties needed to be recharged in the 36–60 inch depth level.

**Table 1. Spring and fall 2002 subsoil moisture.**

<u>County</u>	<u>Spring PAW* inches</u>	<u>% of Capacity</u>	<u>Fall PAW* inches</u>	<u>% of Capacity</u>
Crawford	5.0	43	5.2	44
Monona	4.0	34	4.4	37
Ida	9.2	75	9.1	75
Woodbury	7.0	-	8.7	-
Carroll	9.5	77	11.5	93
Sac	9.3	80	10.9	89
Pocahontas	8.8	80	8.5	76
Calhoun	5.9	53	8.0	72

\*PAW = Plant Available Water

Spring sampling date = April 5, 2002; Fall Sampling date = October 30, 2002

Sampling depth = 60 inches