

To: Newspaper Group  
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### **Biomass Production and Nutrient Uptake of Drought-Damaged Corn**

Lately we get many questions regarding the value of some residue and drought-damaged corn. These include:

Do you have a need or market for the corn as hay or silage, which will also be influenced by plant nitrate content? The plant nutrient content of the crop and what portion of those nutrients would be available to future crops. The need for residue cover to prevent wind or water erosion. The value of additional soil moisture for future crops from maintaining residue cover.

Previous data collected in Kansas on drought-affected corn used measurements of the plant stand, height, dry matter, and moisture content to estimate biomass production and nutrient uptake/value of the biomass.

#### **Forage Yield**

A general rule of thumb is that corn with <20-bushel yield potential is best used as forage, while corn with > 50 bushels per acre yield should be harvested for grain.

#### **Nutrient content of the vegetation**

What is the potential value of the crop left in the field for residue cover? The majority of the nitrogen (N), phosphorus (P), and sulfur (S) in plant material are generally present as protein and other organic compounds. For these nutrients to become available to plants, these compounds must be broken down and the N and P mineralized. This process will normally take 3 or more years to complete, with the C:N ratio being the primary factor controlling the release rate. Corn stalks are normally a very high C:N material, with a C:N ratio of around 60 to 1. In high C:N materials, very little net N mineralization will occur until the organisms utilizing this material as a foodstuff reduce the carbon content of the residue to a C:N ratio of roughly 25:1. In these severely drought-damaged crops, the N content is much higher than normal, since there is little or no grain present. The C:N ratio in many of these severely damaged crops is less than 35:1. Thus, net mineralization will occur much quicker, in a matter of months rather than years. In very severely damaged corn where N content is around 2% or more, roughly 50% of this N, P, and S is likely to be available for a summer crop planted next spring.

Corn silage with much more stalk and grain contain about 25 pounds of K<sub>2</sub>O per dry ton. When the biomass is removed, the amount of K<sub>2</sub>O removed from the field is usually much higher than nitrogen. Potassium can leach from the residue and back to the soil in a few months. Unfortunately, wheat planted this fall into these residues will not benefit nearly as much from the N, P, and S present in the vegetation as there will not be as much time for soil organisms to break the residues down and mineralize these nutrients.

Therefore, a number of factors should be considered when assigning a value to drought-damaged corn. Nutrient removal from the field is one key aspect since biomass can export significant amounts of nutrients. Some nutrients like K can be primarily present in the plant biomass, and in a typical grain production system, most of the K stays in the field/crop residue and is available for the subsequent crops. Other nutrients such as N, P, and S will become available after residue decomposition and mineralization, which will require time and maybe only be partially available in the short term.