leads us to expect the distribution of K between available and non-available forms to change over space and time in the field. These processes repeat themselves because of wetting and drying cycles during the growing season, which cause the soil to alternate between oxidized and reduced states. Bacterial activity, which is affected by temperature and organic matter, also has a large effect on the oxidation state of the soil minerals and will rise and fall throughout the year. As these and other redox processes proceed throughout the season, and over the years, the distribution of K will be affected.

We attempted to mimic these processes by subjecting Fe-rich montmorillonite to six redox cycles in the laboratory. The amounts of Fe^{++} and fixed K were measured in the initial, reduced, and reoxidized state (which comprises one complete redox cycle) for each cycle. The results for K fixation during five redox cycles are shown in **Figure 2**. During each reduction step the amount of fixed K increased sharply, then decreased after reoxidation but failed to return to the pre-reduction level. With the completion of each cycle, the fixed K progressively increased, at first sharply then only gradually (**Figure 4**). The amount of Fe^{++} also increased sharply during the reduction step of each cycle, but reoxidation failed to restore all the Fe to the Fe^{+++} state (**Figure 3**). The amount of Fe^{++} remaining in the sample after reoxidation steadily increased with the completion of each cycle (**Figure 4**). This indicates that Fe^{++} in the clay is protected to some extent by the presence of K, presumably because of the collapse of superimposed clay layers. This same action could contribute to a stabilization of fixed K.

Summary

These results are encouraging, but much has yet to be learned because direct correlation between the control of oxidation state during soil tests and plant response to the resulting fertilizer recommendations have not been established. Some new ideas are emerging, however, and offer hope for the future. Perhaps we will soon be able to tell exactly how much K will be available to the plant during the growing season. BC

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Great Plains Soil Fertility Leadership Award to John T. Harapiak

Mr. John T. Harapiak is the 1996 recipient of the Great Plains Soil Fertility Leadership Award. The Award was presented during the Great Plains Soil Fertility Conference in Denver, CO. It recognizes individuals who have contributed substantially to the development of information and to education in the area of soil fertility, plant nutrition and fertilizer use.

Mr. Harapiak is Manager of Agronomic Services for Western Cooperative Fertilizers Limited (Westco). He is noted for development and promotion of the deep banding concept widely used in Prairie agriculture. Adoption of this technology has resulted in improved nitrogen use efficiency and economics for small grain producers. BC