of S in the surface. Cold temperatures and winter precipitation may combine to cause low availability of S early in the season. Growth responses to starter zinc (Zn) are likely in soils testing low in Zn. Zinc requirements may be increased by banded P.

Environmental conditions that cause uptake problems for one nutrient, such as P, can also lead to problems for other nutrients. Starters should be tailored to the needs for specific situations. However, extra assurance of nutrient availability can be purchased at minimal costs by using a complete starter containing N, P and K, and, where soil conditions suggest, S and Zn.

Summary

A logical argument can be made that in high residue cropping systems, a portion of the maintenance nutrients should be applied in a starter band. When producers manage more surface residue, as a result of higher yields and less tillage, starter fertilizer is a best management practice that can help improve the potential benefits of modern residue management by increasing yields and profits . . . and providing better environmental protection. ■

Saskatchewan

Yield Response of Canola to Nitrogen, Phosphorus, Precipitation and Temperature

IN THIS 16-year study, researchers measured the response of canola to nitrogen (N) and phosphorus (P) fertilization in relation to soil tests for these nutrients. Tests were conducted on a silty clay which had been previously cropped to spring wheat. Nitrogen was applied at rates of 40 and 120 lb/A in factorial combination with P_2O_5 rates of 0, 20, 40, 60 and 80 lb/A.

Both grain and straw responded to N and P fertilization, but the N by P interaction was not significant. The interaction effects of year by fertilization (both N and P) were significant. This indicates a wide range of response to fertilization because of precipitation, temperature and nutrient effects.

Researchers concluded that soil tests for N and P accounted for much of the variation in response to fertilization despite large yield differences among years. ■

Source: W.F. Nuttall, A.P. Moulin and L.J. Townley-Smith. Agron. J. 84:765-768 (1992).

North Carolina

Ranges in Soil Phosphorus Critical Levels with Time

THE AUTHOR points out that mathematical functions used to determine critical levels result in different soil test interpretations for phosphorus (P). Interpretations also differ because the critical soil P level may not be the same from year to year.

The long-term study from which the conclusions were drawn included nine years of crop production . . . corn (five crops), soybeans (four crops) and wheat (three crops). The soil was a Portsmouth, with a low P-fixing capacity. Yield responses to soil P were excellent. Two mathematical functions, as well as economic analysis, were used to interpret results.

Considerable ranges in critical soil P levels were formed with each crop and with each mathematical function. The author concluded that recognition of these ranges gives some justification for recommending P fertilizer on soils with P levels 50 percent greater than the average critical level for a crop grown on similar soils. ■

Source: Cox, F.R. 1992. Soil Sci. Soc. Am. J. 56:1504-1509.