

Development of a Method to Estimate Potential N Mineralization across Alberta

Mingchu Zhang, R.E. Karamanos, L.M. Kryzanowski, K.R. Cannon and T.W. Goddard

Although soil nitrate nitrogen (N) has been used as a basis for N fertilizer recommendation in western Canada, potential mineralizable N should be (or is) a more accurate indicator of the N supplying power of the soil. Potential mineralizable N, analyzed by extraction with hot KCl, and organic matter content were determined on the AESA Soil Quality Benchmark Sites in Alberta. Using these results, we developed an approach to estimate N_t from soil organic matter, based on the equation $N_t = N_o(1 - e^{-kt})^y$, and validated the calculated N_t with the hot KCl extracted N.

Results indicated that the potential mineralizable N released from soil differed among ecoregions and slope positions. Potential mineralizable N is lower in southern Alberta than central Alberta. The lower slopes released more N than higher slope positions. N_t released in soil over the growing season correlated well with hot KCl extracted N in three different slope positions. However, variability of N_t in the upper slope position was greater than middle and lower slopes due to a shallow A horizon and variable soil moisture during the growing season. After removal of outliers (9% of the total data set), the values of R^2 (regression of hot KCl with calculated N_t) are 0.529, 0.576 and 0.627 for upper, middle and lower slope position, respectively. Using calculated N_t results, a potential mineralizable map in Alberta has been developed. This map will guide producers to manage soil as well as fertilizer N.