

Fertilizing Eroded Knolls

Many producers across the province have fields dotted with eroded knolls. These knolls are relatively unproductive.

Physical limitations

In many cases, water and/or wind erosion on knolls has completely stripped away the organic-matter-rich topsoil and has exposed dense, compact subsoil. These soils typically have poor structure, are difficult to work into a good seedbed and have a tendency to crust, resulting in poor emergence.

In addition, water infiltration and water-holding capacity on eroded soils are also low, and often, root growth is restricted by soil density making these areas susceptible to drought.

Other limitations

In addition to these physical limitations, there may be significant chemical and nutritional limitations. The loss of nutrient-rich organic matter reduces the general fertility of knolls. Also, if erosion has left a calcareous (high lime) subsoil near the surface, the high pH will also reduce the availability of some nutrients, such as phosphorus and some micro-nutrients. Nitrogen (N) losses from urea or anhydrous ammonia applications will also tend to be higher on these knolls, due to the alkaline pH contributing to greater volatility.

Restoring productivity

The best way to restore the productivity of eroded knolls is to apply a combination of phosphorus (P) fertilizer and manure. Soil test P levels on eroded knolls will likely be very low.

To begin restoring productivity, producers should first consider adding about 75 to 100 lb/ac of P_2O_5 to the knolls in addition to normal P fertilizer applications.

Then, manure applied at a rate of 10 to 20 tons/ac will also improve soil tilth and help restore the long-term fertility of these problem areas. If manure is not readily available, chopped straw can be used instead. Keep in mind that although straw will add some organic matter, it does not add much N or P, and it may actually immobilize soil and fertilizer N until the straw decomposes.

Once phosphorus is brought up to adequate levels, watch the knolls for nitrogen (N) deficiencies. Soil test the knolls separately, and if the soil test indicates that N levels are lower than the rest of the field, fertilize accordingly.

The third part of reclaiming eroded knolls is to prevent future erosion. Increased crop productivity from the phosphorus and manure will add root biomass below ground and leave more stubble above ground. Straw and chaff should be chopped and returned to the soil and baled as infrequently as possible. Tillage should also be kept to a minimum.

Eroded knolls are not likely to fix themselves.

Eroded knolls are not likely to fix themselves through normal farming practices. Reclaiming eroded knolls involves extra work and additional inputs in the short term, but these investments should produce a reasonable return on time and money through increased productivity.

Prepared and revised by

Ross H. McKenzie
Sr. Research Scientist - Agronomy

Doon Pauly
Agronomy Research Scientist
Crop Diversification Division
Lethbridge, AB

More information

Contact the Alberta Ag-Info Centre
Call toll-free 310-FARM (3276)

Website: www.agriculture.alberta.ca

Or contact your fertilizer dealer or fertilizer industry agronomist.