Use of Nitrapyrin to Reduce Nitrogen Losses in Western Canada. Degenhardt, R.F., MacRae, A.W., Juras, L.T., and Ford, L.R. Dow AgroSciences Canada Inc., Calgary, AB.

Nitrapyrin is a potent nitrification inhibitor from Dow AgroSciences Canada that keeps more nitrogen in the root zone by delaying the conversion of NH_4 to NO_3 in the soil. Two formulations of nitrapyrin are now approved for use in Canada: N-Serve ™, an emulsifiable concentrate formulation for use with NH_3, and eNtrench™, a water-based micro-encapsulated formulation for use with urea, urea ammonium nitrate (UAN) and liquid manure. In 2013 and 2014, performance of eNtrench and N-Serve in spring preplant applications with urea, UAN or NH_3 was evaluated in twenty field research trials conducted in Alberta, Saskatchewan and Manitoba. All treatments were banded or injected into the soil, or broadcast applied and incorporated, prior to planting of spring wheat or canola. Primary assessments were soil nitrogen balance (NH_4-N and NO_3-N) at depths of 0 to 30 and 30 to 60 cm from samples collected 2, 4 and 6 weeks after crop emergence (WAE). Averaged across trials, application of eNtrench with urea or UAN increased the amount of NH_4-N in the soil (0 to 60 cm) by 29, 13 and 12% at 2, 4 and 6 WAE, respectively, relative to application of urea or UAN. In a subset of trials conducted on coarse-textured soils, eNtrench also decreased the amount of NO_3-N moving below the root zone to the 30 to 60 cm depth range by 26 and 16% at 4 and 6 WAE, respectively. Application of N-Serve with NH_3 increased the amount of NH_4-N in the soil (0 to 60 cm) by an average of 21, 59 and 63% at 2, 4 and 6 WAE, respectively, relative to application of NH_3. N-Serve also decreased the amount of NO_3-N moving below the root zone to the 30 to 60 cm depth range by 32, 30 and 18% at 2, 4 and 6 WAE, respectively. eNtrench and N-Serve will provide Canadian farmers with new tools to optimize crop yield and improve nitrogen use efficiency by keeping more nitrogen in the stable NH_4-form and reducing losses associated with NO_3 leaching or denitrification.