

Nitrogen Focused Practices

Project: Assessing Pea Best Management Practices



Integrating peas into crop rotations offers benefits like improved soil health and nitrogen fixation, but requires adjustments to planting, fertility, and weed management practices.

Key Learnings:

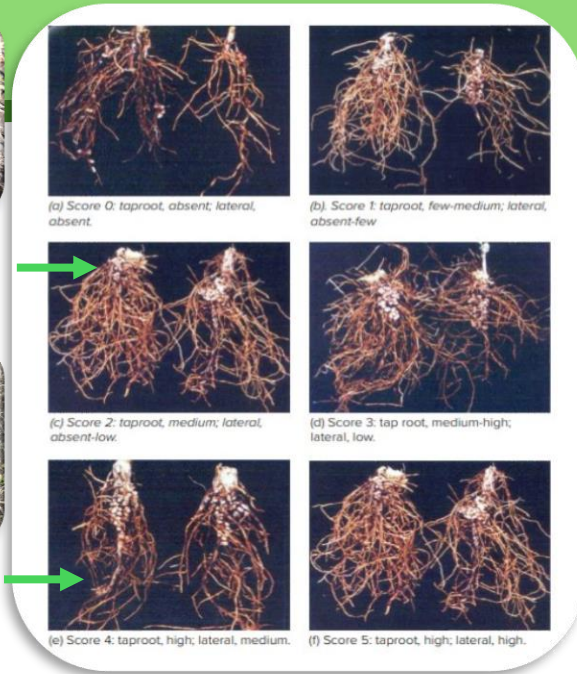
- Weed Control is Vital:** Peas are poor early-season competitors, so pre-plant and early-emergence weed management is critical to protect yields. In Southern Alberta these could include:
 - Pre-seed burndowns: AIM, Glyphosate
 - Pre-seed: Edge, Authority 480
 - Incrop: Quasar, Viper, Basagran
- Plant Early:** Peas tolerate frost and should be planted early to avoid summer heat during flowering, reducing flower abortion and yield loss.
- Starter Nitrogen Helps:** While peas fix nitrogen, 15-20 lbs/acre at planting and inoculants support early growth before nodules develop (6-9 node stage).
- Monitor Nodulation:** Assessing nodulation helps evaluate nitrogen fixation efficiency.



Crown nodulation is observed when seed is inoculated



Lateral nodulation occurs when native rhizobia species (or granular inoculation) colonize roots



Example of a nodule assessment scoring that can be done on any pulse crop.

- An effective way to gauge the nitrogen fixation occurring. Nodulation location can be an indication of the pulse's nitrogen availability.

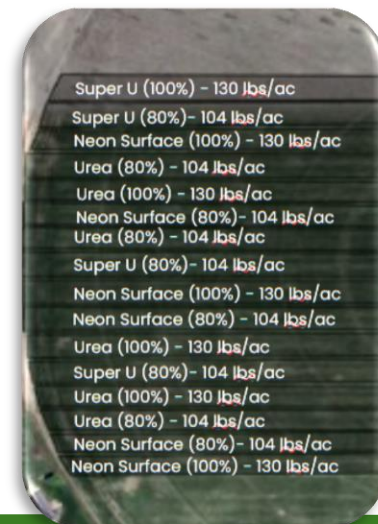


Projects: Investigating different Enhanced Efficiency Nitrogen Fertilizers (EENFs)

Optimizing nitrogen use efficiency is critical for crop productivity and environmental sustainability. This project evaluated the effectiveness of dual-inhibitor EENFs in improving nitrogen retention and utilization in spring durum and winter wheat. Two dual-inhibitor products were tested on spring durum at planting, and one was tested on winter wheat during a spring fertilizer application. Treatments included 100% and 80% of standard nitrogen rates. Plant counts, soil tests, and harvest samples were collected to assess crop response.

- No Impact on Emergence or Early Growth:** None of the three dual-inhibitor products affected plant emergence or early-season growth in spring durum or winter wheat.
- Protein Improvement in Winter Wheat:** Winter wheat treated with 100% nitrogen plus an inhibitor showed higher protein content compared to 100% nitrogen without an inhibitor.
- No Yield Difference in Spring Durum:** Spring durum showed no visual or yield differences across all fertility treatments, including reduced nitrogen rates.

Conclusion: Dual-inhibitor EENFs improved winter wheat protein but did not affect spring durum yield, highlighting potential benefits for grain quality. Further research will continue in 2025 to explore their broader applicability and economic viability.



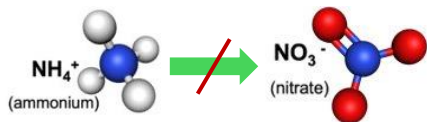
Strip Trialing project setups



There are many different inhibitor products on the current market under different names. Different products will have different active ingredients and formulations and can vary greatly in price but will be based on preventing **two main** mechanisms of nitrogen loss.

Nitrification Inhibitors : Slow the conversion of ammonium to nitrate (nitrification), protecting from leaching and denitrification
- Active ingredients include dicyandiamide (DCD), nitrapyrin, and pronitradine

Examples: N-Serve, Centuro, Eclipse-D66, eNtrench, plus others



Project: Split Compost Application

This project explores the impact of split-applied compost as a soil amendment, a key practice in nitrogen nutrient management following the 4R principles. The focus is on the effect of applying compost the year before planting the target crop. Initial soil tests indicate a noticeable increase in available nutrients in fields treated with half a compost rate compared to untreated fields, though no yield difference was observed in the harvested cereal crop. Soil samples were collected for DNA testing to assess potential changes in the soil microbiome. Further testing next season will be conducted after the full compost rate is applied to evaluate its influence on nitrogen breakdown in the soil once the targeted crop is planted.

Key Learnings

- Split applications of compost can be a simple way to spread out nutrient breakdown in the soil
- Examining the effects of this can be difficult other than yield checks
- Soil tests showed differences in measurable NPK in treatment regions
- Soil DNA testing is new and not calibrated to specific regions yet
- Soil DNA results from two different companies resulted in no measurable differences in the soil microbial populations

Urease Inhibitors : slow the conversion of urea to ammonium, protecting from volatilization
- Active ingredients include N-(n-butyl) thiophosphoric triamide (NBPT) and N-(n-propyl) thiophosphoric triamide (NPPT)

Examples: Active Stabilizer, Agrotain, SylockUp, Nitrain 2.0, Contain

