



THE PULSE AGRONOMY NETWORK
PARTNERSHIP WITH INDUSTRY

PAN ALL PULSE BULLETIN #1 – FEBRUARY 1, 2006

What's in the PAN –

- • Heating up the PAN
 - • Balancing Seed Protein and Soil Nitrogen – Research Results
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Heating up the PAN

We are firing up the PAN for the 2006 season. Once again, we are planning on forwarding short bulletins on related topics throughout the season. As well, we are looking to enhance the ability to turn around pest reports as they come in from the field – more to come on this topic.

Updating the PAN distribution list – if you have new staff, or know of someone who should be receiving the PAN directly, please reply to egreenhough@pulse.ab.ca and I will add them to the list.

Topics for PAN – If there is a topic you would like to see more information on, please drop me a line and we'll try to fill in the blanks.

THIS IS THE FIRST IN A SERIES ON CURRENT PULSE RESEARCH.



NITROGEN FIXATION IN PARKLAND PULSE CROPS
“BALANCING SEED PROTEIN AND SOIL NITROGEN”
Submitted by: Sheri Strydhorst, University of Alberta

One of the main reasons producers grow pulse crops is for their nitrogen benefits. Properly inoculated pulse crops are able to fix atmospheric nitrogen into a form usable by the crop, thereby removing nitrogen fertilizer from production costs. Not only are fertilizer input costs reduced, but pulse producers can grow high protein pulse crops and receive rotational benefits in the subsequent year's crop.

Research conducted at Lacombe, Barrhead, and Edmonton is examining nitrogen fixation and rotational benefits of tannin free faba beans, narrow leafed lupin, and field pea. Faba beans have the highest rates of nitrogen fixation followed by lupin and then field pea. Nitrogen fixation provides large quantities of available nitrogen to the plants so that they

can produce high protein seeds (seed protein = 6.25 x seed N content). Based on our 2004 results, tannin free faba bean seeds contain 26.2% protein, narrow leafed lupin seed contains 34.1% protein and field pea seed is 21.6% protein.

In the research project, hard red spring wheat was grown on faba bean, lupin, pea, and barley stubble without nitrogen fertilizer. Early in the growing season, wheat plant heights and canopy densities differed depending on the previous year's stubble type. These early season differences translated into seed yield differences. Wheat grown on pea stubble had the highest yields, wheat grown on faba bean or lupin stubble had moderate yields while wheat grown on barley stubble had the lowest yield.

Based on nitrogen fixation rates, these yield results may be unexpected. One may expect faba stubble to produce the highest yields since it is the crop with the highest nitrogen fixation rates. However, high rates of nitrogen fixation are required to produce high protein faba bean seed. With most of the nitrogen being exported off the field in the grain, there is less nitrogen available to next year's crop. The high protein benefit of the faba bean seed (26.2% protein) in combination with high faba bean seed yields is balanced by the reduced amount of nitrogen available to next year's crop.

Although field pea has lower nitrogen fixation rates, the highest wheat yields were produced on pea stubble. Higher wheat yields may be related to faster breakdown rates of the decomposing pea straw and therefore, increased nitrogen availability. Because field pea has a lower seed protein content (21.6% protein), less nitrogen is exported off the field in the grain. The lower seed protein content of the field pea seed is balanced by the increased amount of nitrogen available to next year's crop.

In summary, nitrogen fixed by a pulse crop is partitioned into the harvested seed and into the soil for next year's crop. All pulse crops balance the fixed nitrogen differently. Most nitrogen fixed by faba beans is contained in its high protein seed leaving moderate amounts of nitrogen for next year's crop. With field pea, a large quantity of the fixed nitrogen remains in the soil as usable nitrogen to next year's crop leaving moderate amounts of nitrogen for the seed. With high protein seed or high soil nitrogen levels, pulse crops have great nitrogen benefits!