

Growing Red Lentil in Alberta

How they are different from pea

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Agronomy Update
January 9th, 2018

Red Lentil

- **Background**

- **Important commodity for nutritional and crop rotational benefits around the world**
- **Red lentil represents the majority of global consumption, production and trade**
- **Majority (90%) of Canadian lentil production is in Saskatchewan**
- **In 2016, Alberta lentil acreage exploded!**



Red lentil in Alberta

- **Background**

- This increased the number of Alberta pulse producers with questions on how to grow this crop
- We had just completed a province wide project
 - Testing agronomic practices on Clearfield® red lentil
- Able to provide basic local agronomic information.
- Assumption was that they were very similar to field pea
- There are a lot of similarities
- There are some differences too



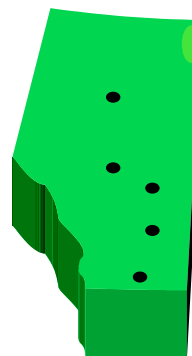
Lentil Acreage...

Acreage has varied across Alberta

Year	AFSC Lentil Acres in Alberta	Extrapolated Acres assuming 75% of Acres are Insured
2009	33,000 ac	45,000 ac
2010	105,000 ac	140,000 ac
2011	98,000 ac	130,000 ac
2012	85,000 ac	113,000 ac
2013	95,000 ac	127,000 ac
2014	110,000 ac	147,000 ac
2015	165,000 ac	220,000 ac
2016	420,000 ac	565,000 ac
2017	452,000 ac	485,000 ac

What happened in 2016

- Research had demonstrated success:
 - **5 locations across the province:**
 - Falher, St. Albert, Killam, Brooks, Lethbridge
- Had some important agronomic information
- Increased producer confidence
- **Price**
 - Increased from about \$0.18 to \$0.40 / lb
 - Average yield of 2000 lbs/ac



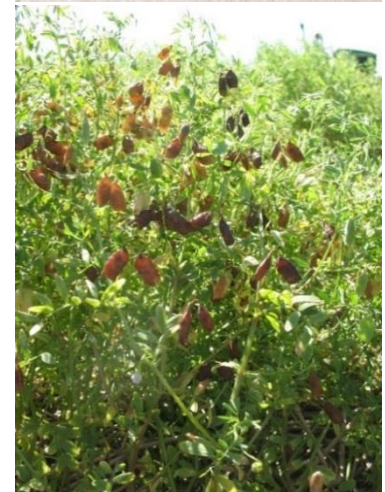
What happened in 2016

- Overall success was good
 - Heard some good feedback from some surprising areas
 - Peace region
 - St. Albert
- There was also lentil grown in areas where they should not have
 - Were some wrecks
- Why were there wrecks?
 - Weather
 - Inexperienced growers
 - Differences between lentil and field pea



Growing red lentil successfully

- **Field selection**
- **Seeding rate**
- **Fertility**
- **Weed control**
- **Disease management**
- **Successful harvest**
- **Right climatic conditions**



Field selection

- Sandy loam / loam
- Well drained
- Will not tolerate wet feet
 - Low lying fields are not a good choice
- Cannot tolerate excess moisture
- Are quite drought tolerant
- Can withstand higher temperatures during the growing season



Field selection

- Will not tolerate salinity
- Free of stones and dirt lumps
- Relatively free of perennial weeds
 - Canada Thistle
 - Sow thistle
 - Dandelion
 - Quackgrass
- Watch the herbicide rotations
 - Cropping restrictions
- Avoid fields with high nitrogen levels



Seeding

- Cool season crop early
 - Can withstand 4°C of frost
- Seed at 2" (5cm) deep
 - into cool moist soils
- Inoculate with rhizobia
- Use caution with air seeders
 - Can damage the seed if airflow too high
- Seeding rate of 11-12 ft²
 - check the TSW
 - Rate can vary from 50-95 lbs or 0.8-1.6 bu per acre



Seeding rate research

- Tested a range of populations from 4 - 20 plants ft^{-2}
- Plants can and will compensate
- Noticed differences plant structure
 - At the 4 plants ft^{-2} rate the plants were short, bushy, lots of tillers, and thick stems
 - At the 20 plants ft^{-2} rate the plants were thin, tall, spindly, with very few lower leaves
- Poor weed competitors
- Optimum seeding rate is 12 plants ft^{-2}



Land rolling

- Land rolling is highly recommended
 - For ease of harvest
 - manages rocks and lumps
 - increases harvest speed
 - reduces sickle and guard damage
- Use caution under wet conditions
 - Soil compaction
 - Compromise the plant
 - Disease will set in



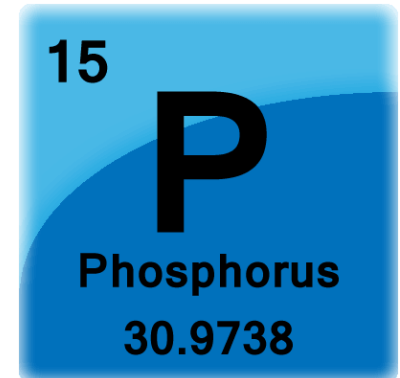
Land rolling

- Pre-emergence timing is best
- Unless...
 - **Extremely wet conditions**
 - Sink and leave ruts
 - **Extremely dry / sandy conditions**
 - Wind erosion
 - Not a great concern with direct seeding
 - **Clay soils prone to crusting**
- Up to the 6th node is safe
- Leave time between rolling and herbicide application



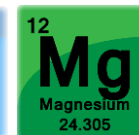
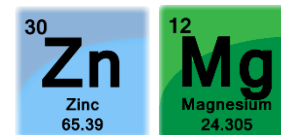
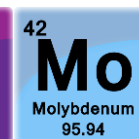
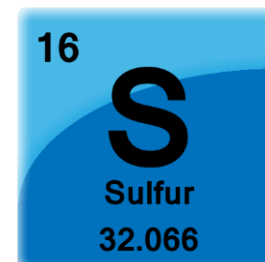
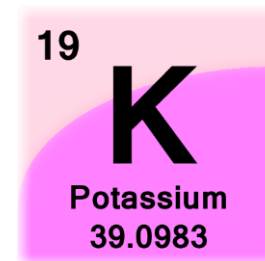
Fertility

- Phosphorus is the most important
 - Lentil crop requires quite a bit
 - About 0.8 lbs bu⁻¹ P₂O₅
 - Safe rate is 17 lbs ac⁻¹ with the seed
 - Under good moisture conditions
 - Dry conditions increase possible seed damage
 - Side band additional phosphorus requirements



Fertility

- **Additional Potassium is usually not required**
 - Unless there is a known deficiency
 - About 2.6 lbs bu⁻¹ K₂O
- **Sulphur is required in fairly high amounts**
 - About 0.3 lbs bu⁻¹
 - Soils usually have enough available
 - Addition of S is not common
- **Micronutrient requirements are of minor concern**
 - Deficiencies are not documented as widespread
 - Some have been suspected
 - More research needs to go into this area



Fertility

- What about Nitrogen?
- Lentil requirement is 3.0 lbs bu⁻¹
- Pulse crops produce their own N from the air
 - Rhizobial bacterial inoculant
- Anecdotal information suggested that starter N would be beneficial for lentil
 - Different from all other pulses
- Looked at the research



Nitrogen and inoculation research

- Is there a benefit to starter nitrogen?
 - How much is enough?
 - How much is too much?
- With additional N present...
 - What is the effect on...
 - nodulation
 - growth
 - yield
- Do we really need to inoculate?

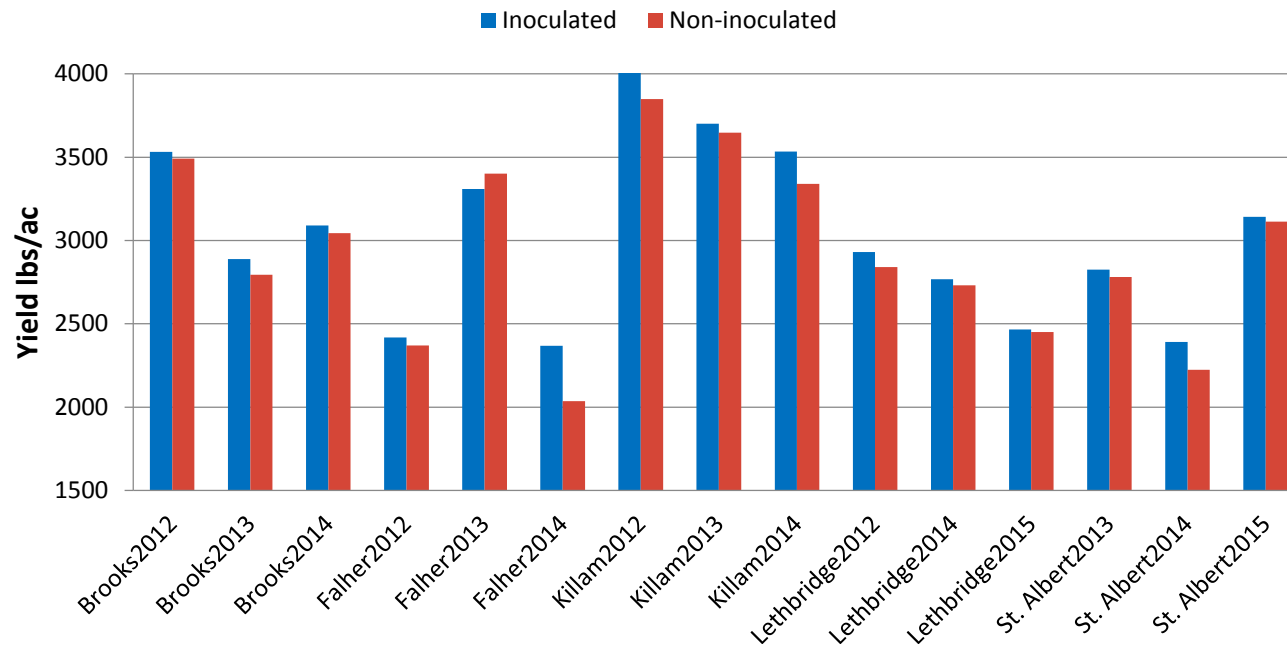


Nitrogen and inoculation research

- Inoculation is important...
 - Better nodulation
 - Higher yields



Nitrogen and inoculation research



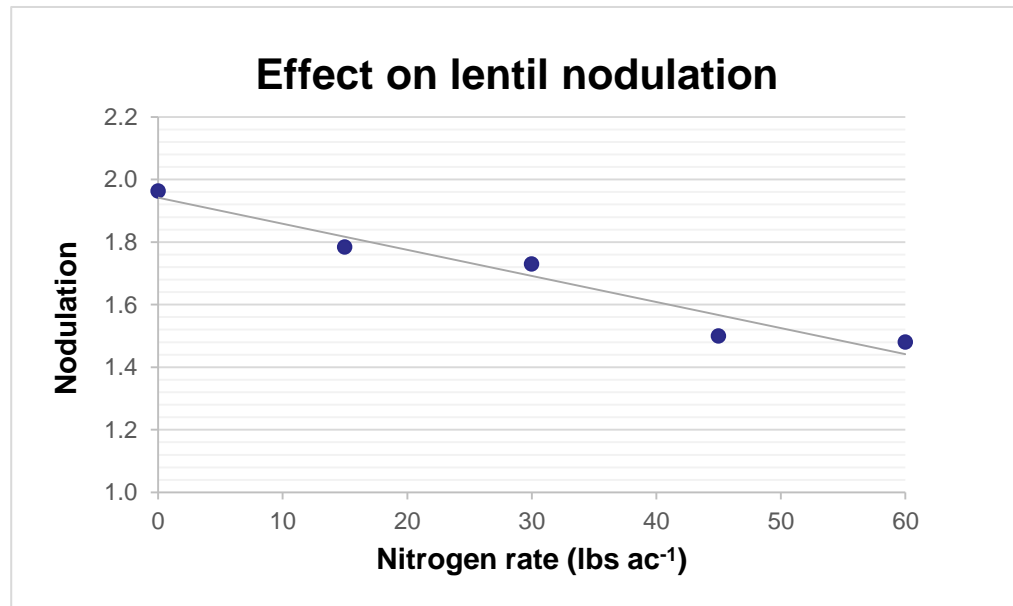
- Inoculated treatments had higher yield than non-inoculated treatments

Nitrogen and inoculation research

- Inoculation is important...
 - Can't replace the natural symbiotic partnership
- Starter N?
- Small amount (15 lbs ac⁻¹) starter nitrogen is OK
 - Didn't see positive effect every time – overall we did
- Don't go above 30 lbs ac⁻¹
 - Yields are reduced



Nitrogen and inoculation research



- As nitrogen rates increased, nodulation decreased...

Weed control

- Lentil are poor competitors
- Clearfield® trait has given us more options
 - Have the “imi” group 2 resistance
- Products available:
 - Grassy weeds:
 - Have a number that work well
 - Broadleaf weeds:
 - Sencor*
 - Ares, Odyssey, Solo



Weed control research

- These products can run a bit “hot”:
 - **Odyssey** (imazamox)
 - **Solo** (imazamox + imazethapyr + tepraloxydim)
 - **Ares** (imazamox + imazapyr)
- Do these herbicides...?
 - affect nodulation
 - stunt growth
 - lower yield



Photo courtesy of agro.basf.ca

Weed control research

- No consistent differences:
 - plant growth
 - days to flower or maturity
- Nodulation and yield were affected sometimes
 - compared to highly managed control plots
 - varied by year and location
 - not consistent
- More important to control the weeds
- All formulations worked



Lentil Diseases

- **Ascochyta**
 - one to watch for
 - good resistance in the germplasm
 - potential to be very destructive
- **Anthracnose**
 - potentially an economic problem
 - very few reports of significant impact in AB
- **Botrytis Grey mold**
 - Widespread in a wet year
 - Usually not of economic importance
- **Fungicide products available for these diseases**



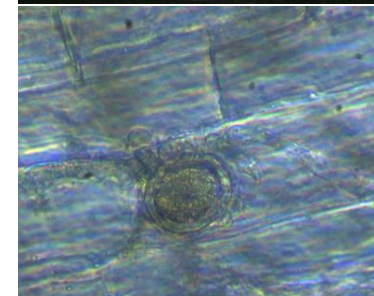
Lentil disease concerns

- ***Sclerotinia* white mould**
 - Only real foliar disease concern at the moment
 - A huge economic problem in wet years
 - Fungicides work well
 - Quite a few products available
 - Must be applied before canopy closure
- **Research that was done**
 - Consistently saw white mold in St. Albert trials
 - Black soil zone
 - More moisture
 - Higher organic matter



Root rot diseases

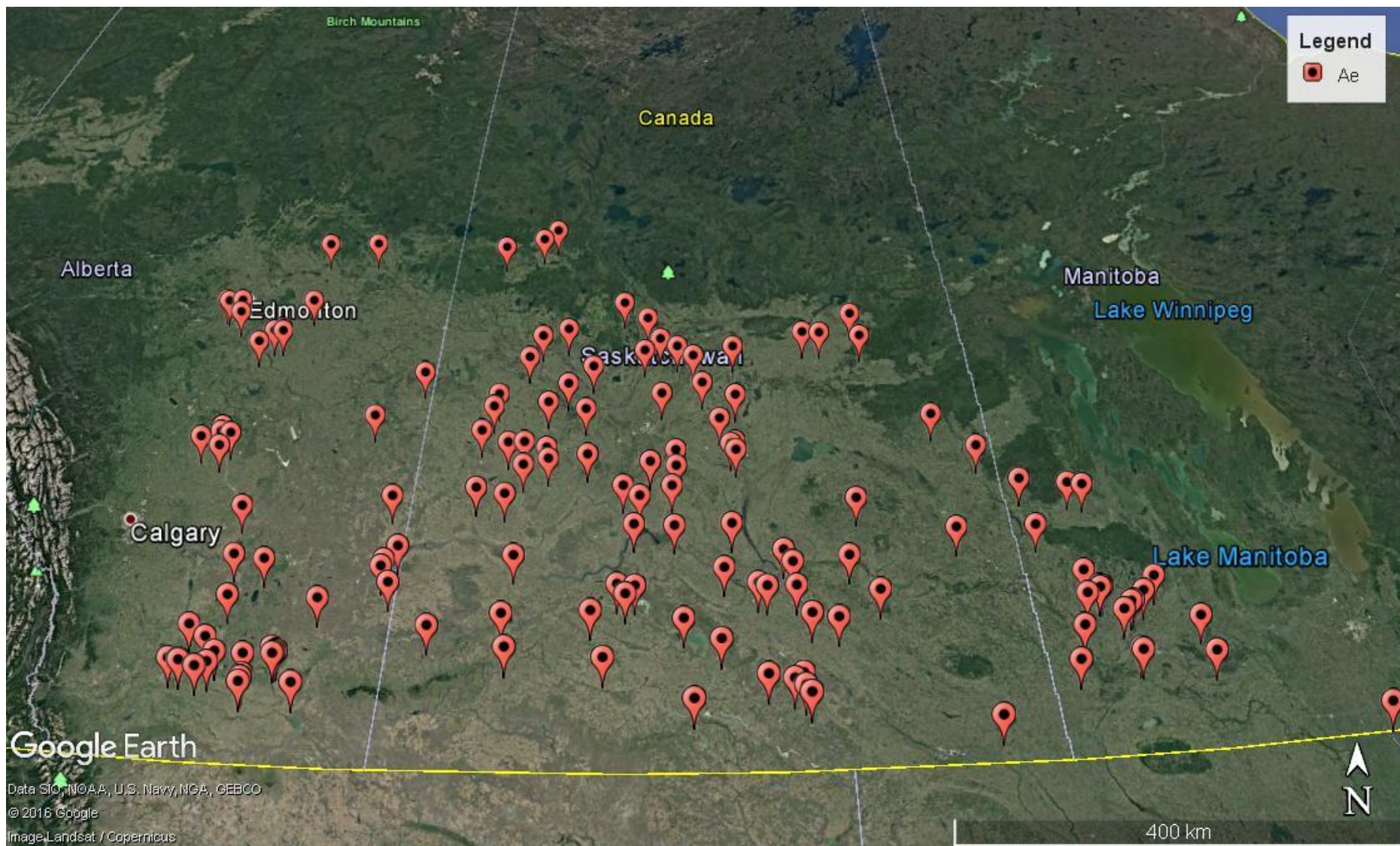
- The root rot complex containing:
 - *Fusarium*
 - *Aphanomyces*
- ↓
- Two main pathogen groups of focus
 - One very widely distributed and opportunistic
 - One highly aggressive on pea and lentil
 - Occur together in fields
 - Are very difficult to distinguish
 - Act synergistically



Aphanomyces – Why are we so concerned?

- Infection can occur at any time in the growing season
 - Infection is usually early
 - Symptoms compound later in the season (flowering)
- Produces long-living resting spores (8-10 years)
- Once diagnosed in a field there are really no options
- An in-crop fungicide application will have no effect
- No seed treatments registered for control of this disease





Harvest management

- Harvest can be tricky
- Short plants with pods low to the ground
 - Don't tend to lodge
 - Do “shrink”
 - Lifters will help
 - Flex headers will help
- Harvest at 16-18% moisture
 - Store at 14%
- Don't “handle” them too much



Harvest management

- Mature earlier (~ 95 days) than you may expect
- Prone to shattering
- Learn when to desiccate
 - When plants still look very green
 - Pods are brown, mature and seeds “rattle”
- Dessicate them
 - with Reglone (diquot)
 - glyphosate not recommended
 - Heat® (saflufenacil) not registered
 - Glufosinate
- Quality crop in the bin = success



Red Lentil vs Field Pea

- How do they differ?
 - Well drained fields are more important
 - Lighter soils are more important
 - Seeding rate is higher (11-12 plants ft²)
 - Starter N is beneficial
 - Rolling your fields is necessary
 - Herbicides are more limited
 - Clean fields more important
 - Control perennials in the fall
 - Pre-seed burn down in spring



Red Lentil vs Field Pea

- How do they differ?
 - The foliar diseases vary somewhat
 - *Ascochyta* being the only similar one
 - *Sclerotinia* being more of a concern
 - *Aphanomyces* may/may not be more problematic than in pea
 - Biggest disease concern at the moment
 - Harvest can be trickier
 - Desiccation is more important
 - Lentils are slightly harder to handle



Conclusions

- Have the recipe for the Alberta soil zones
- Have had some success and great crops
- Having some trouble with our peas right now
 - 50% import taxes from India
 - Fumigation requirements
 - Competition with Black Sea area
- So far lentil isn't facing *all* these barriers
 - 30% tax on lentil
 - Black sea area not focused on lentil... yet



Final Comments...

- Red lentil is a pulse commodity in high demand
- Alberta producers are always looking for alternative rotation crops
- Red lentil is certainly an option that Alberta producers should consider
- Price is decent right now
- Give lentil crop the additional attention it requires
- Can be successful – make money!



Thanks!

Questions?

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