



South East Research Farm Inc.

Redvers, Saskatchewan

Intercropping Chickpea and Flax

Agri-Arm Research Update

Jan 15, 2015

ADOPT Project

A photograph of a field of chickpea intercrop. The field is filled with green and brown plants, likely chickpeas and a cereal crop. A white sign is placed in the field, reading "ADOPT Chickpea Intercrop". The background shows a flat horizon under a clear blue sky.

**ADOPT
Chickpea
Intercrop**

Reasons to Consider Intercrops

- Agronomic Obstacles
 - Weeds, Disease pressure, Maturity
- Possibility of Over-Yielding
- Biodiversity
- Desire to complicate your life ??

Obstacles to Intercropping

- Both must be compatible with herbicide
- Complicates seeding and harvest
- Over-yielding is elusive and inconsistent
- Practical separation of harvested product

Chickpea-Flax Combination

Why this combo?

- High value chickpeas, large agronomic problems
- Flax as 'nurse crop' for chickpea; flax yield is a bonus
- Herbicide: Authority pre-seed registered on both
- Low levels of shattering prior to harvest for both
- Low cost of flax seed

Potential Benefits:

- Late competition affects chickpea maturity ??
- Lower chickpea disease pressure ?? (Aschochyta blight)
- Both are Arbuscular Mycorrhiza Fungi (AMF) associated
 - Sharing fixed N through fungus ??

Objectives of studies:

- Investigate the possibility that area of adaptation can be increased
- Investigate the effect on yield and disease incidence



Aug 23, 2012 at SERF



October 2012 – SERF Intercrop



INTERCROPPING CHICKPEA FLAX TRIAL – 2013, 2014 REDVERS

3 rates of Kabuli Chickpea
3 rates of Desi Chickpea

Compared with

Monocropped Flax (high N)
Monocropped Flax (low N)
Monocropped Kabuli
Monocropped Desi

Locations in 2014:
Redvers, Indian Head, Scott, Outlook,
Swift Current



MATERIALS AND METHODS – REDVERS 2014

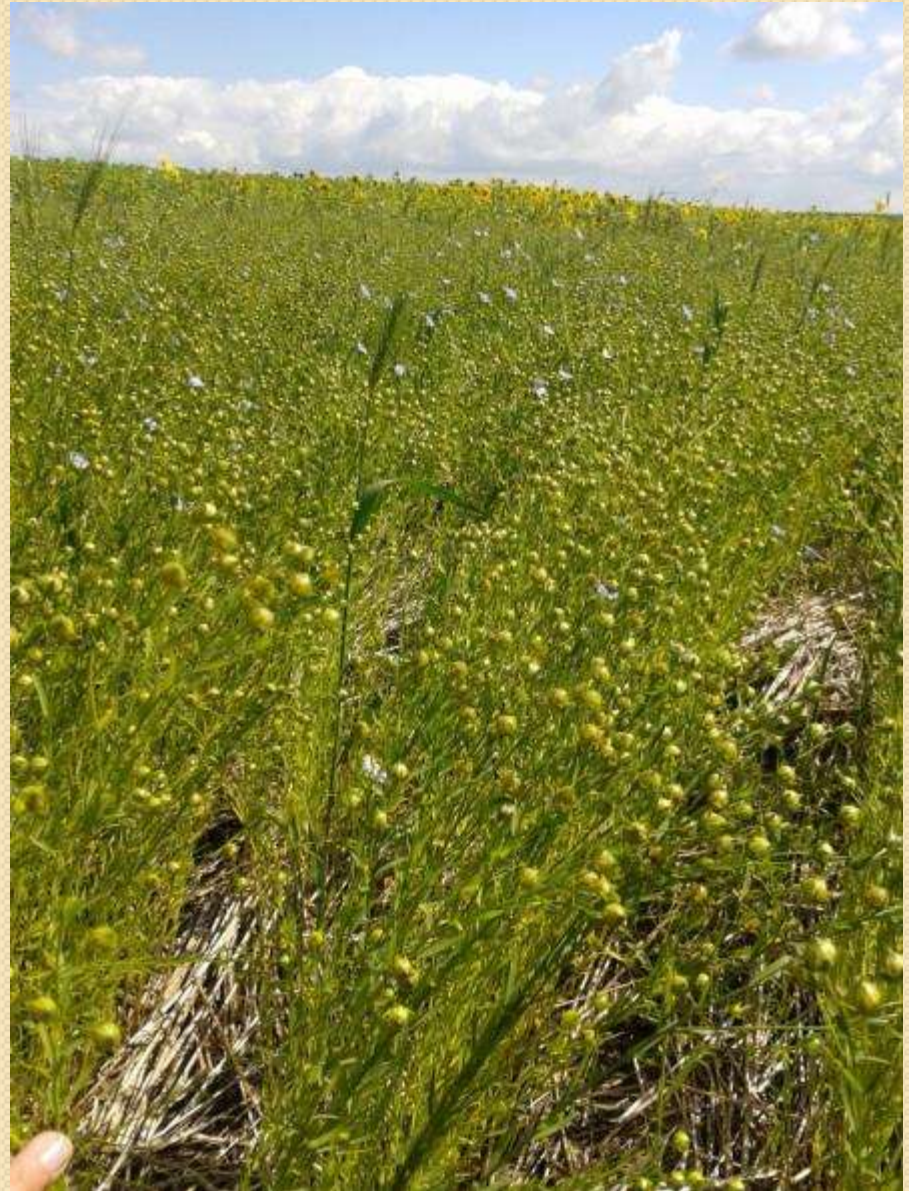
- CDC Alma Kabuli Chickpea
- CDC Cory Desi Chickpea
- Three target seeding rates for intercrops
 - 30 pl/m²
 - 40 pl/m²
 - 50 pl/m²
- Monocrop seeding rates were 40 pl/m² chickpea
- Flax
 - 40 lb/ac intercrop
 - 56 lb/ac monocrop

CHICKPEA – FLAX TRIALS

- Lessons from 2014
 - Don't put trial on canola stubble (Scott location lost)
 - Chickpeas do poorly with 500 mm of rainfall.

MONOCROPPED FLAX (LOW N)

- Poor competition with weeds
- Low yield



89 Flax - Olive N



A wide-angle photograph of a field of monocropped flax plants. The plants are densely packed and have long, thin, feathery seed heads that are blowing in the wind. The color of the plants is a mix of green and brown, indicating they are in a late stage of growth or maturity. In the background, there is a line of taller, greener vegetation, possibly a hedge or a different type of crop. At the bottom of the image, there is a white rectangular box containing black text.

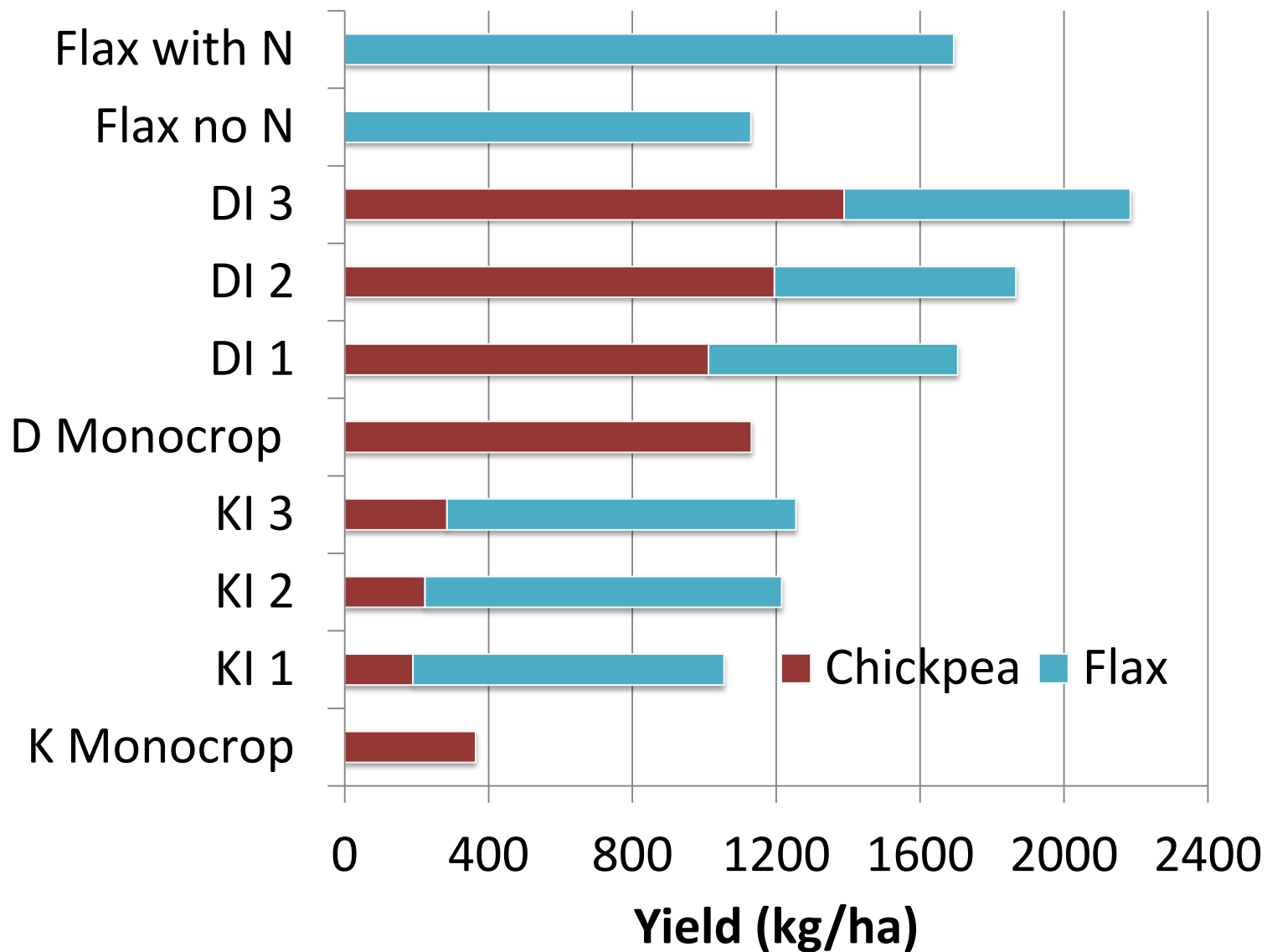
Monocropped Flax – 50 lb/ac N

DESI CHICKPEA (40 PL/M²) AND FLAX

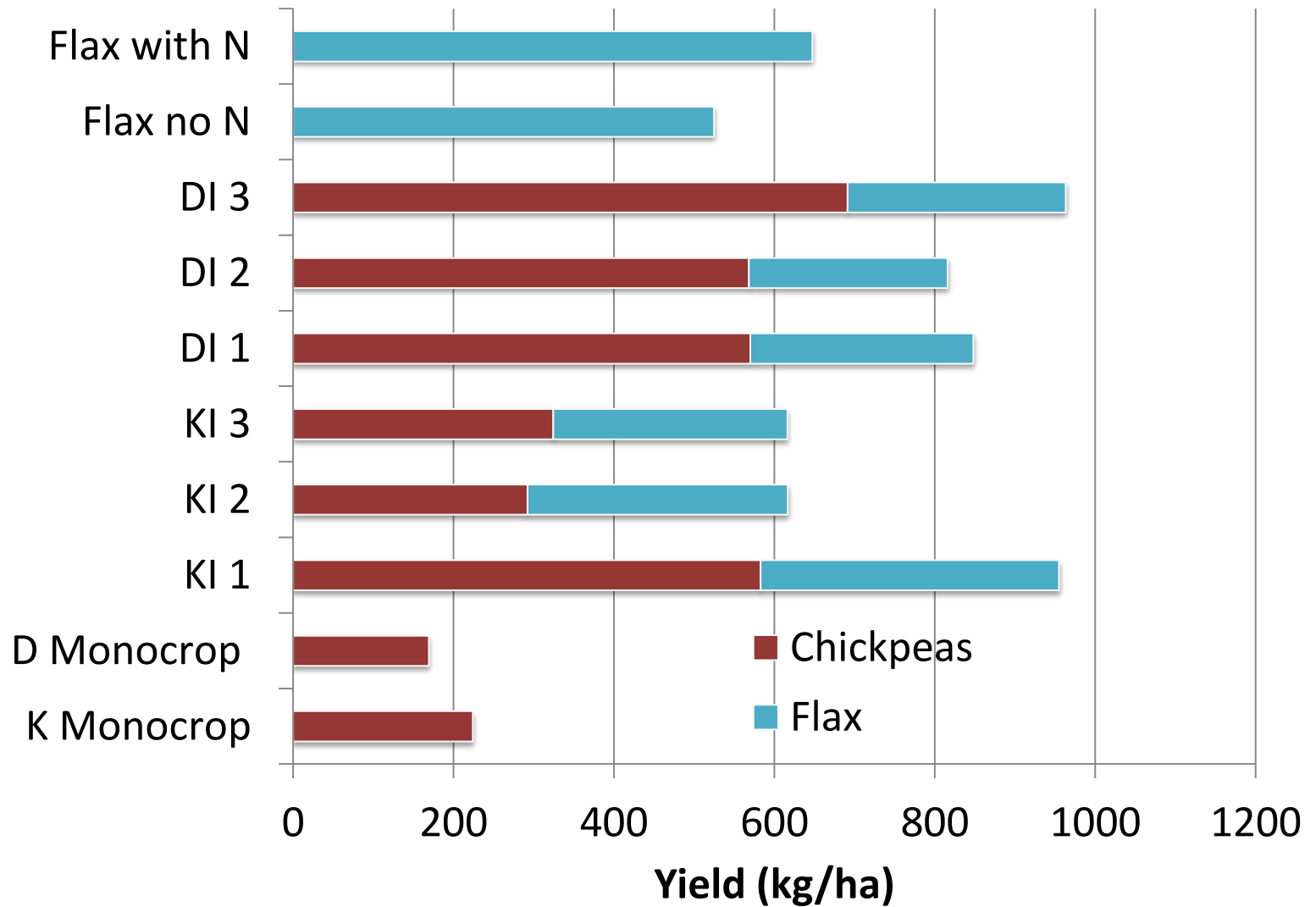
- Faster row closure
- Weed competition
- Canopy structure is altered



REDVERS 2013 – TRIAL YIELDS

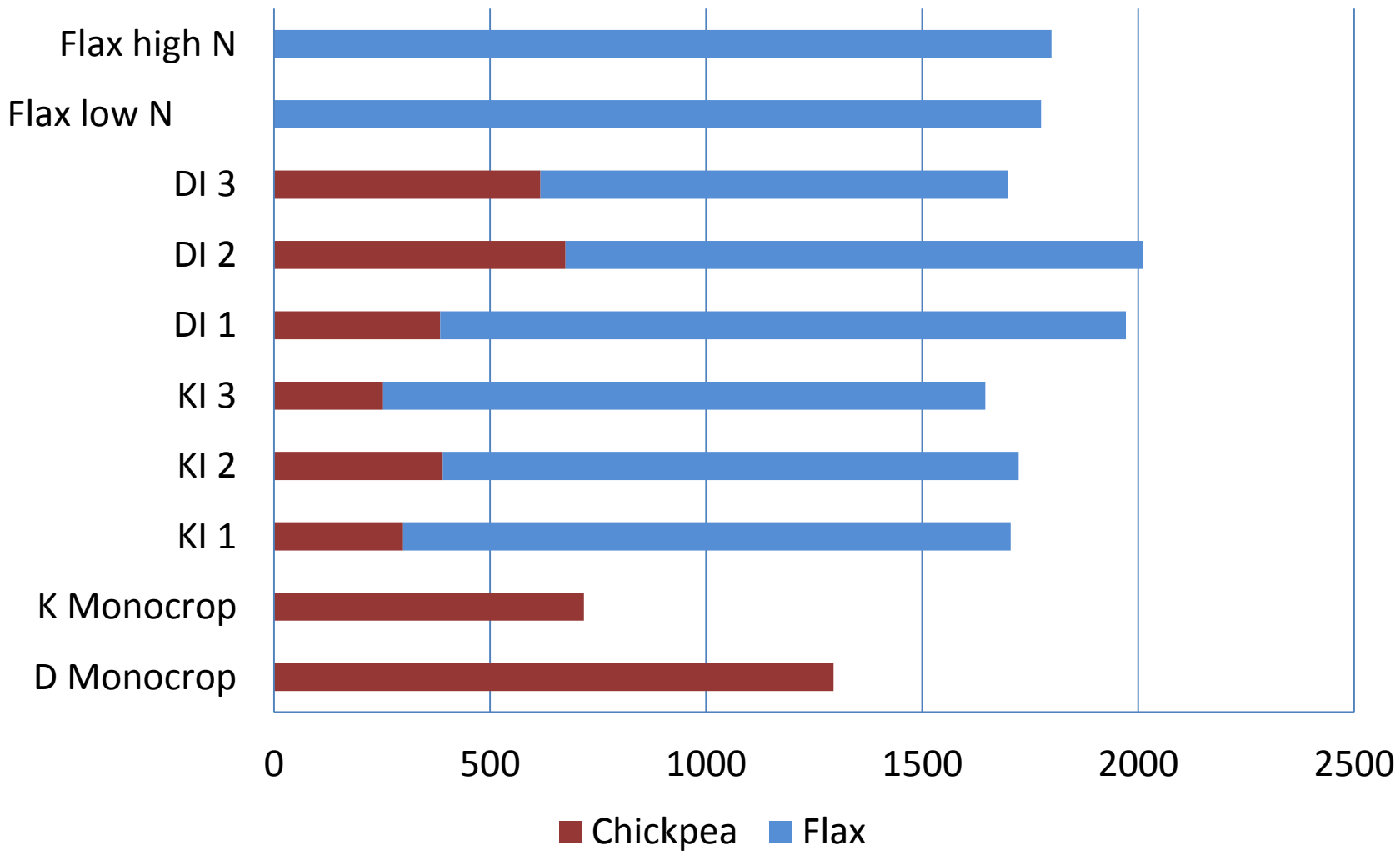


REDVERS 2014 – TRIAL YIELDS



OUTLOOK 2014

Yield kg/ha



ADDITIONAL REDVERS 2014 RESULTS

- Plant Count – variable ($p = <0.1$)
- Disease Incidence on Aug 30 (% severity) significant ($p = <0.01$)
- TKW – not significant
- Mature Pods on Sept 24 (%) – not significant

REDVERS 2014

Disease incidence was reduced in intercrop plots

Chickpea *Aschocyta*
Incidence on Aug 30 (% severity):

51% for monocrop plots

17% for intercrop plots

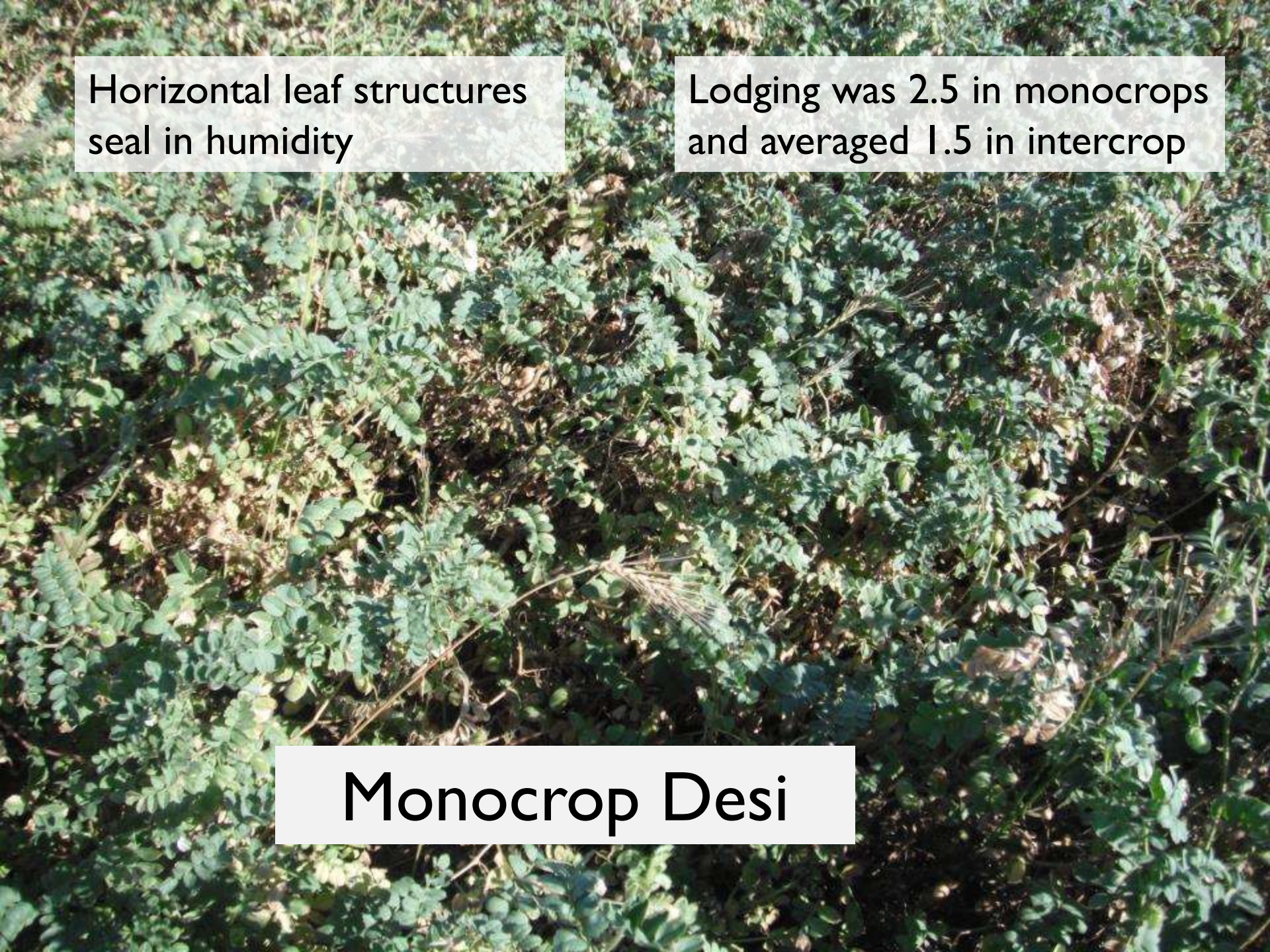
- Significant difference



Horizontal leaf structures
seal in humidity

Lodging was 2.5 in monocrops
and averaged 1.5 in intercrop

Monocrop Desi



BEST CASE INTERCROP 2014, REDVERS

Highest yields were in the highest elevation plots low disease incidence.

- Moisture
- Soil fertility
- 1460 kg/ha desis
- 300 kg/ha flax



2013

Chickpea	Desi Intercrop	Desi Monocrop	Kabuli Intercrop	Kabuli Monocrop	Flax (black soil zone)
Yield	1200lb/ac 12 bu flax	1100 lb/ac	1400 lb/ac 12 bu/ac flax	1300 lb/ac	24 bu/ac
Revenue	\$315 + 150 = \$465/ac	\$297	\$490 + 150 = \$640/ac	\$455	\$300
Seed costs	36 + 11	36	69 + 11	69	11
Fertilizer	13	13	13	13	49
Herbicide/Fungicide	36	36	36	53	14
Inoculant	11	11	25	25	
Total Input Cost	107	96	143	160	74
Return over inputs	350	200	500	300	230

ONGOING GOALS

Identify combinations of production practices that work best for desi and kabuli intercrops with flax.



NITROGEN DYNAMICS ARE UNKNOWN

**Moderate rate of Rhizobium
inoculant used in trial.**

Left – Intercropped Flax - Low N

Right – Monocropped Flax – Low N

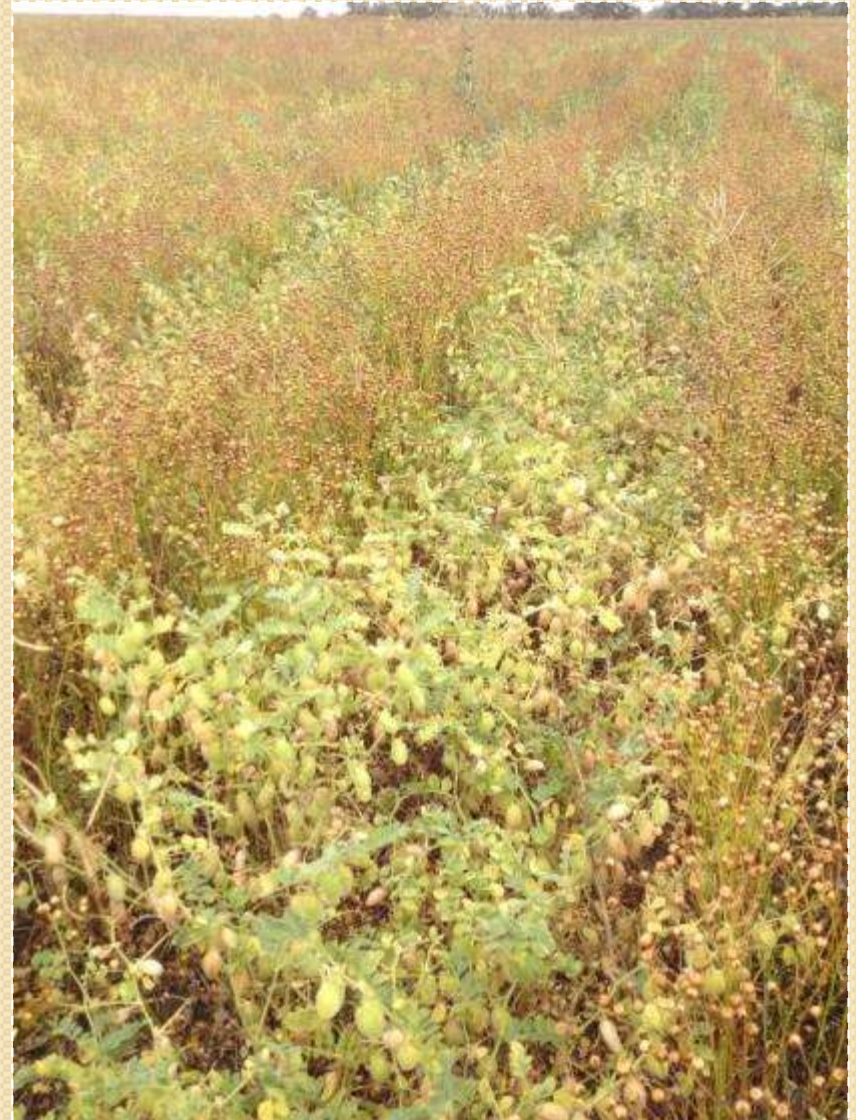
**SPG is funding an NI5 study led by
Dr. Fran Walley**

- **Apply NI5 and sample biomass
from Chickpea intercropping
trials**





Colin Rosengren – production field, Midale area



BEST ADVICE SO FAR

- Use Authority herbicide unless organic producer
- Cereal stubble good – canola stubble bad
- Seed chickpeas deeper than flax and at same time
- Consider using N fertilizer instead of inoculant to assist with terminal stress

**SERF – NEVER A DULL
MOMENT**





Contact SERF:

SERF Farm

Box 129

Redvers, SK

S0C 2H0

Lana Shaw – SERF Research Manager

(306) 891-5050

lshaw.serf@gmail.com