

# **IHARF Winter Meeting**

**Oat and Weed Competition**

**Intercropping**

**Chickpea and flax**

**Camelina and Lentil**

**Cover crops – hemp and sunflower**

**Caraway**



# **Row Spacing and weed Density in Oat**

**William May and Chris Willenborg**

**AAFC**

**and University of Saskatchewan**



# Locations

- Indian Head
- Saskatoon



# Funding

**ADF**

**WGRF**

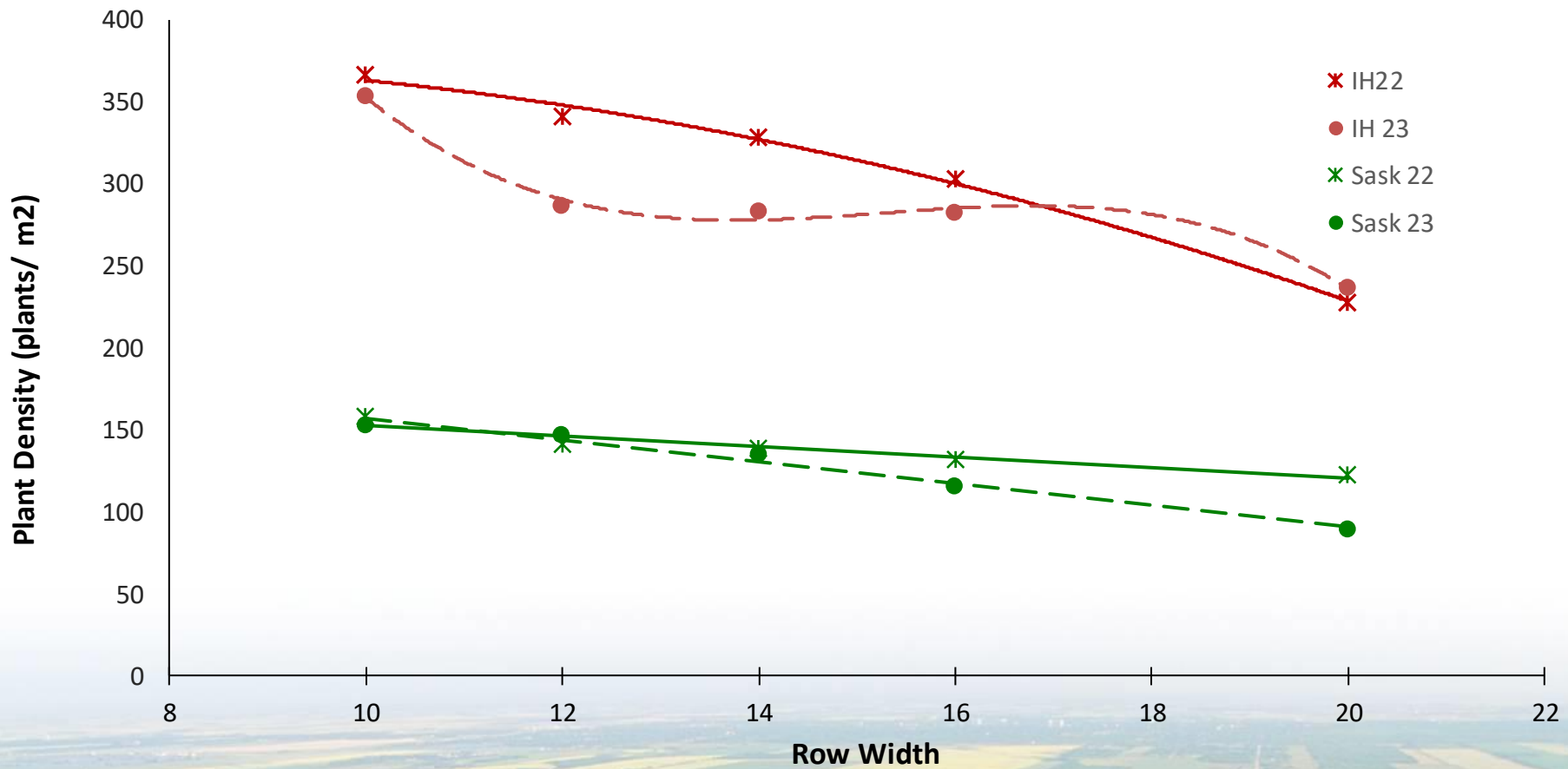


# Experimental Design

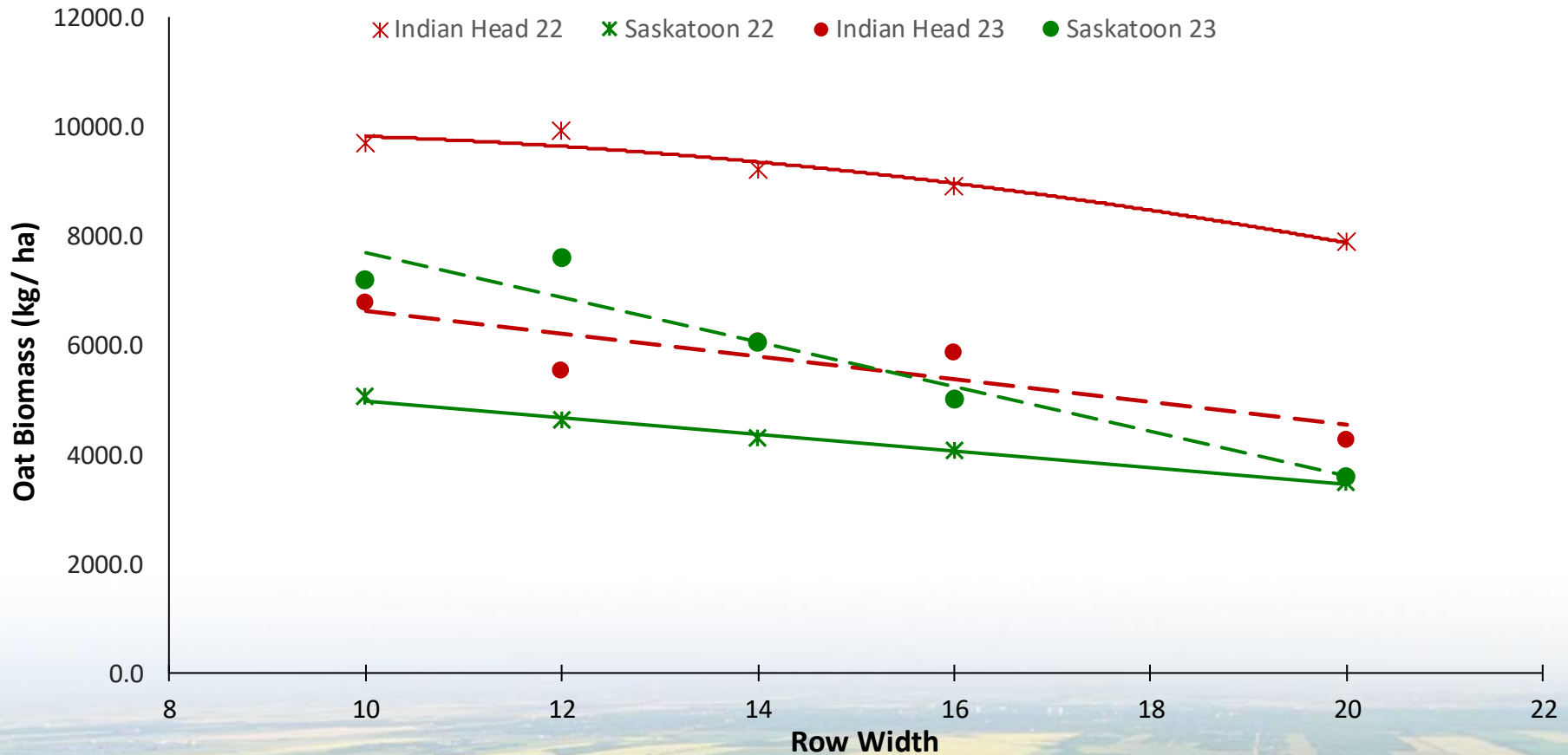
- 1) **Weed density**  
**0, 13 and 26 canola/m<sup>2</sup>**
- 2) **Row spacing**  
**10, 12, 14, 16 and 20 inches**
- 3) **Cultivar**  
**AC Morgan and CDC Endure**



# Effect of Row Spacing on Oat Density



# Effect of Row Spacing on Oat Biomass



10

12

14

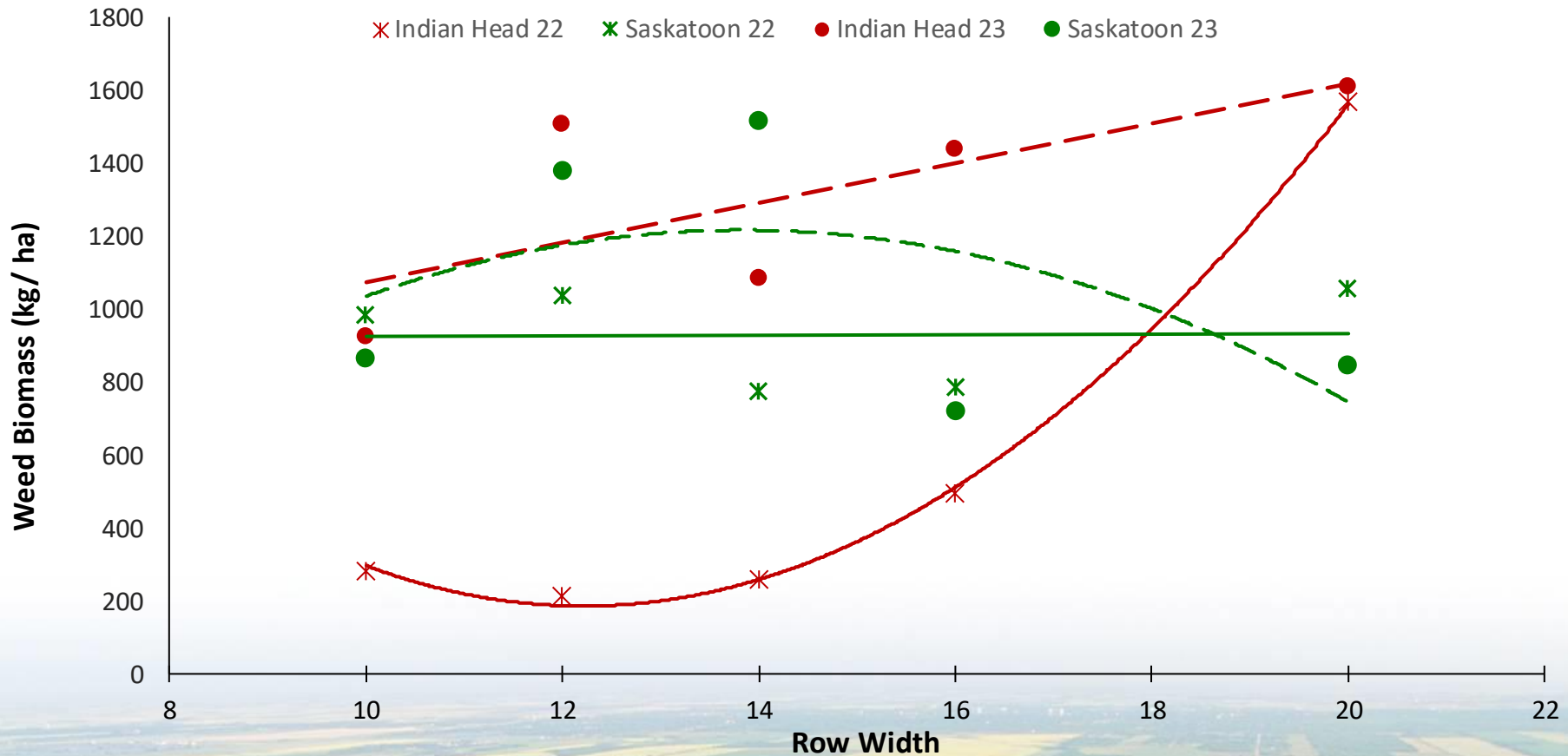
16

20

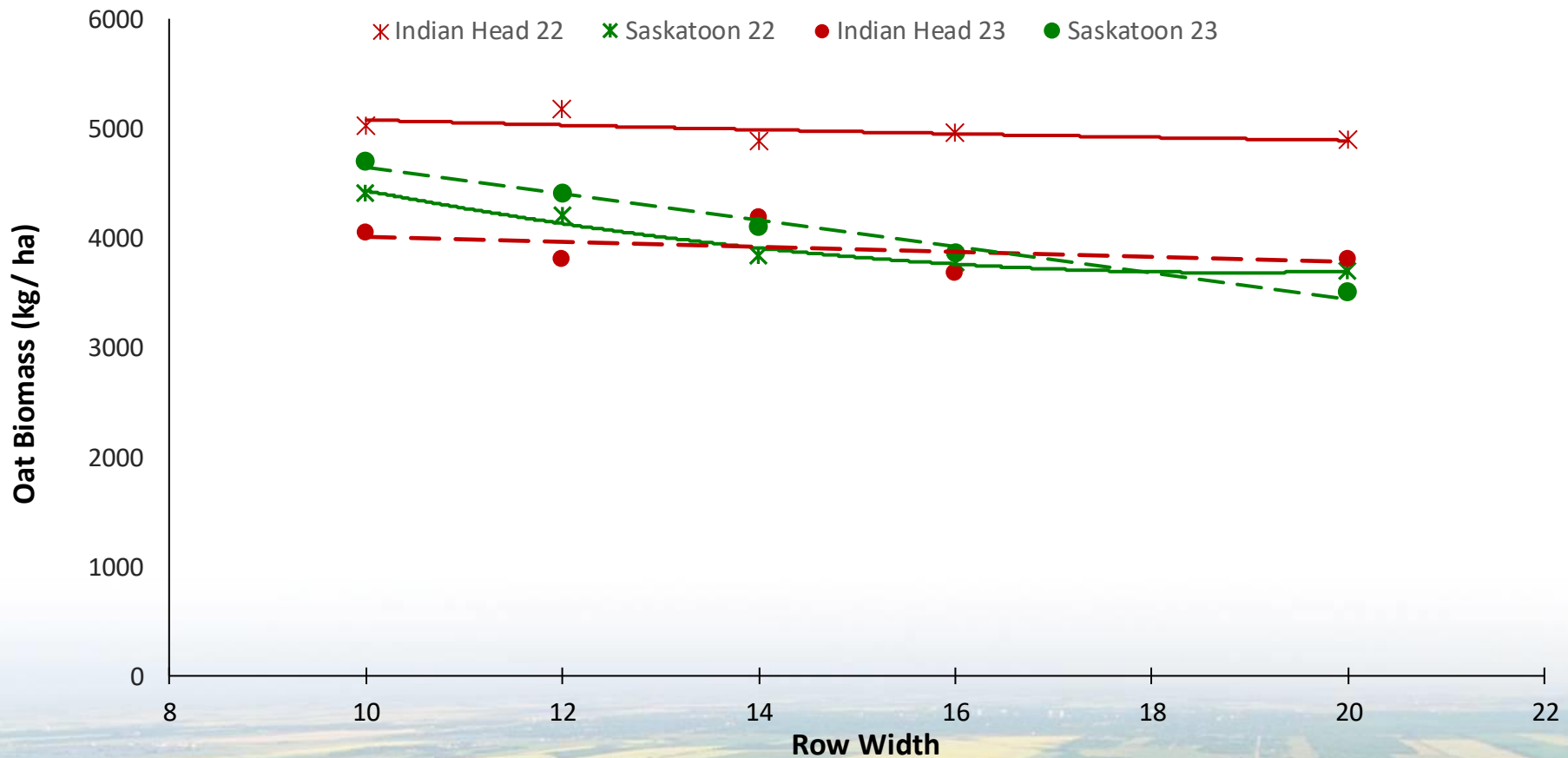




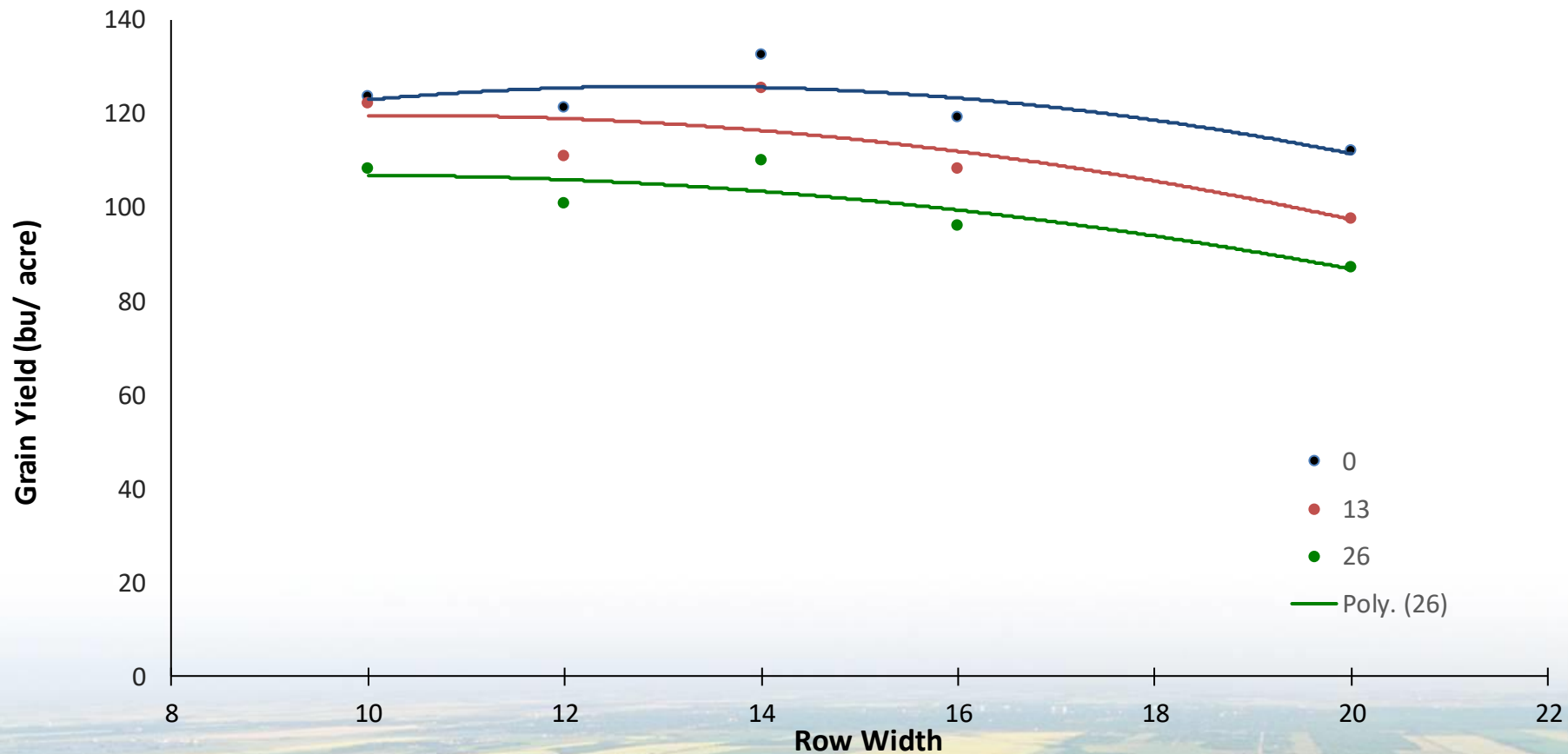
# Effect of Row Spacing on Weed Biomass



# Effect of Row Spacing on Grain Yield



# Effect of Row Spacing and weed density on Oat Yield



- One more season
- No really wet years
- High plant density is a big tool for weed control in oat or in any crop with problematic weeds
- If we want to go to a wider row width than other production practices can become even more important.
- Grain yield has been more stable out to 20 inches than I expected.



# INTERCROPPING

## Chickpea and flax



Agriculture and  
Agri-Food Canada

Agriculture et  
Agroalimentaire Canada



# Intercropping Chickpea and Flax

## 1) Crop Placement (special arrangement)

Intermixed (both crops in same row)

Single alternate rows

## 2) Flax seed density

(seeds  $m^{-2}$ )

Approx. lbs/acre

a. 0	0
b. 75	5
c. 150	10
d. 300	19
e. 600	38

## 3) Nitrogen Rate ( $kg\ ha^{-1}$ )

0

60

## 4) Flax Mono Crop (2018)





Crops Intermixed  
Flax seed density 300 per m<sup>2</sup>  
Nitrogen Rate 0 kg/ha

19/07/2018

I, 300 flax, 0 N



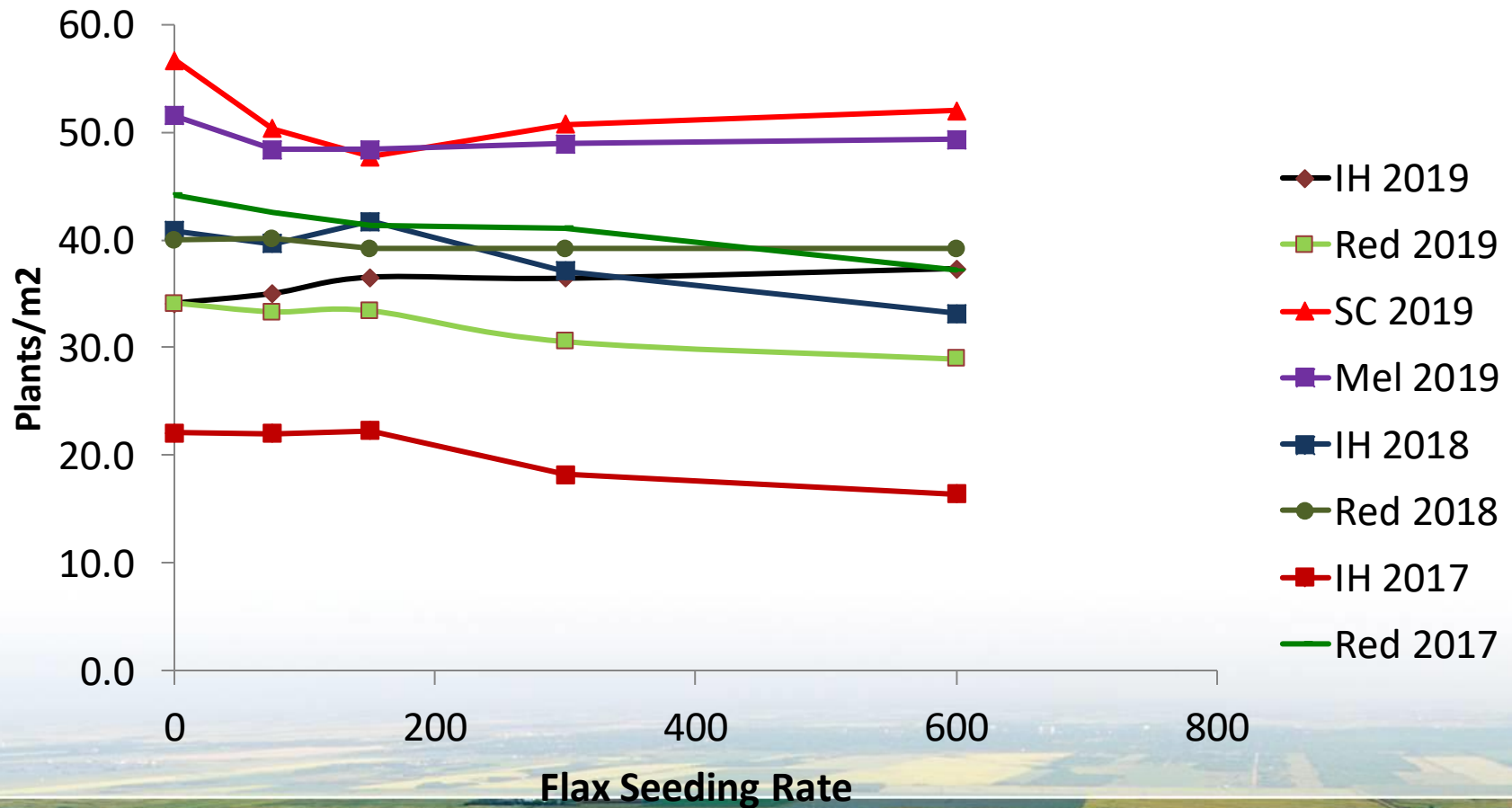
Crops Alternate Rows  
Flax seed density 300 per m<sup>2</sup>  
Nitrogen Rate 60 kg N/ha

19/07/2018

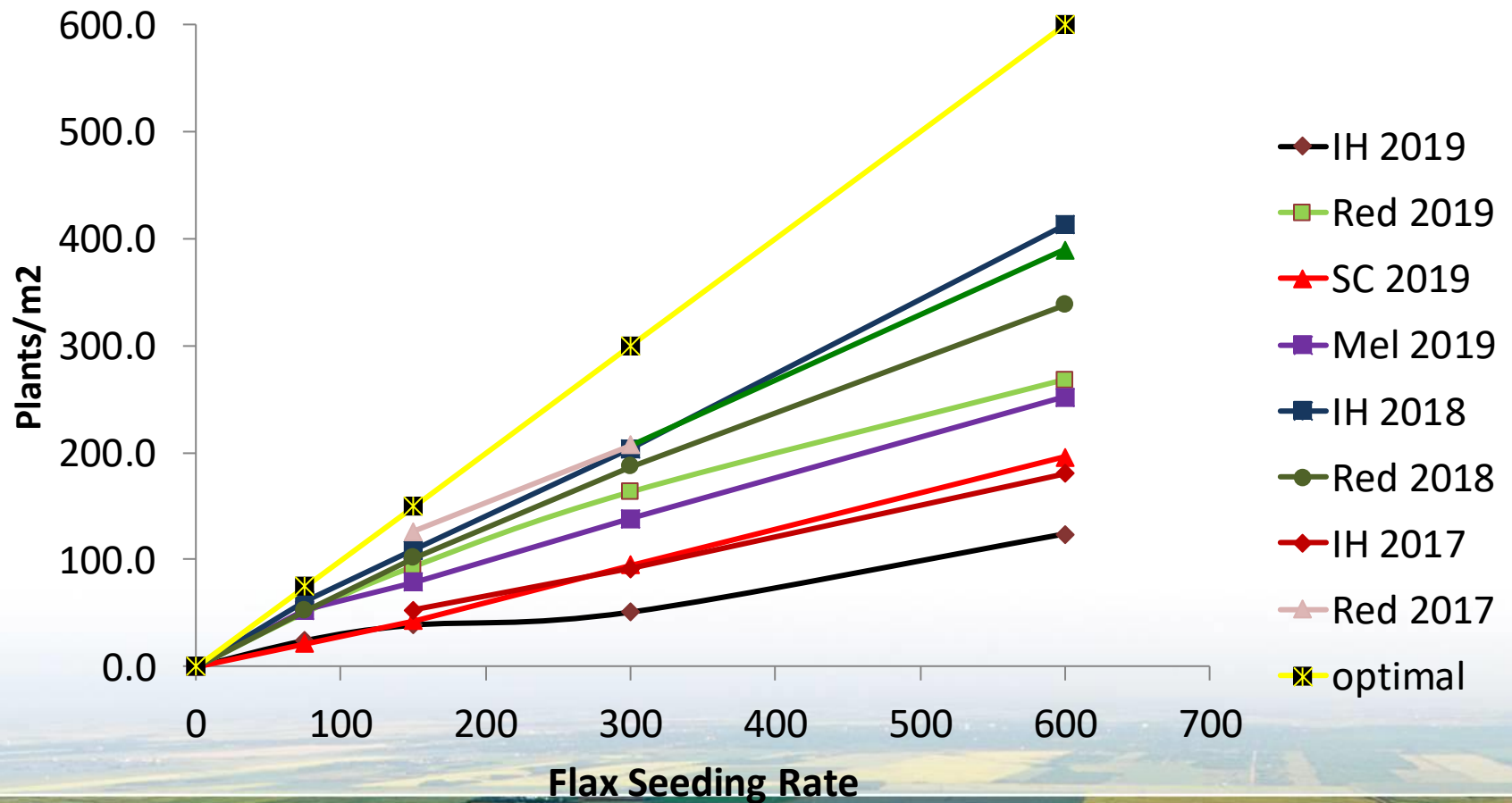
A, 300 flax, 60 N



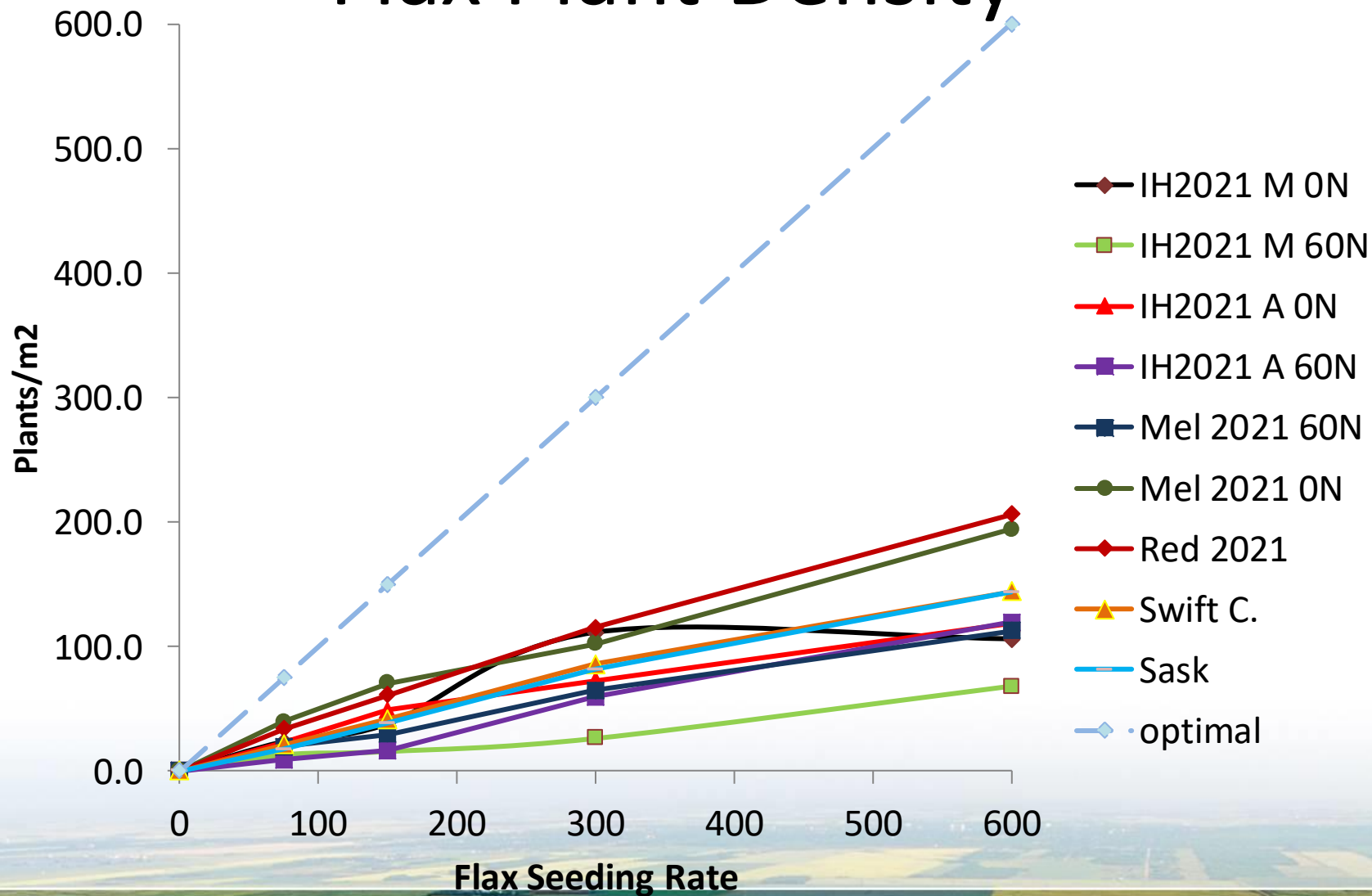
# Chickpea Plant Density



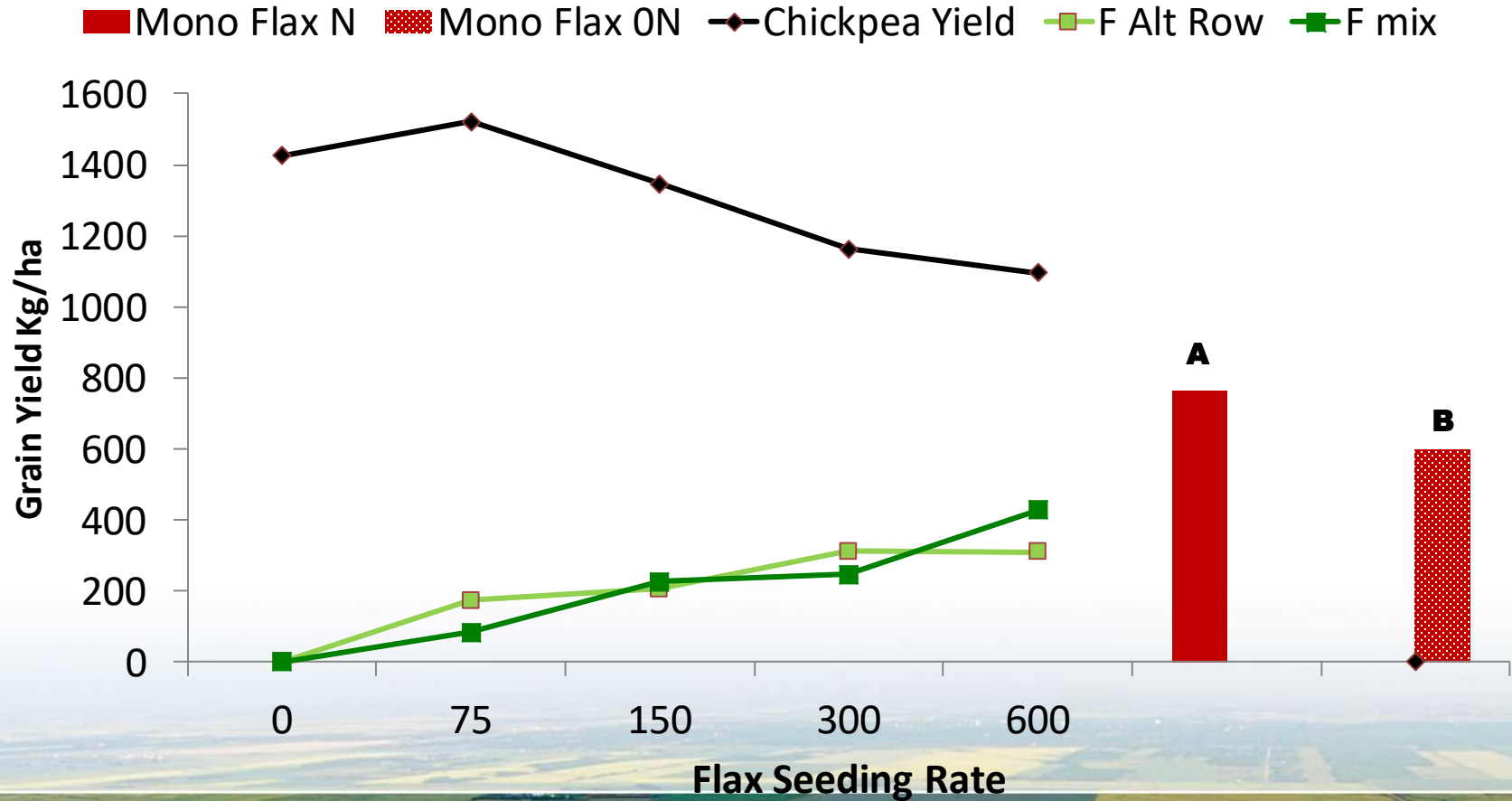
# Flax Plant Density



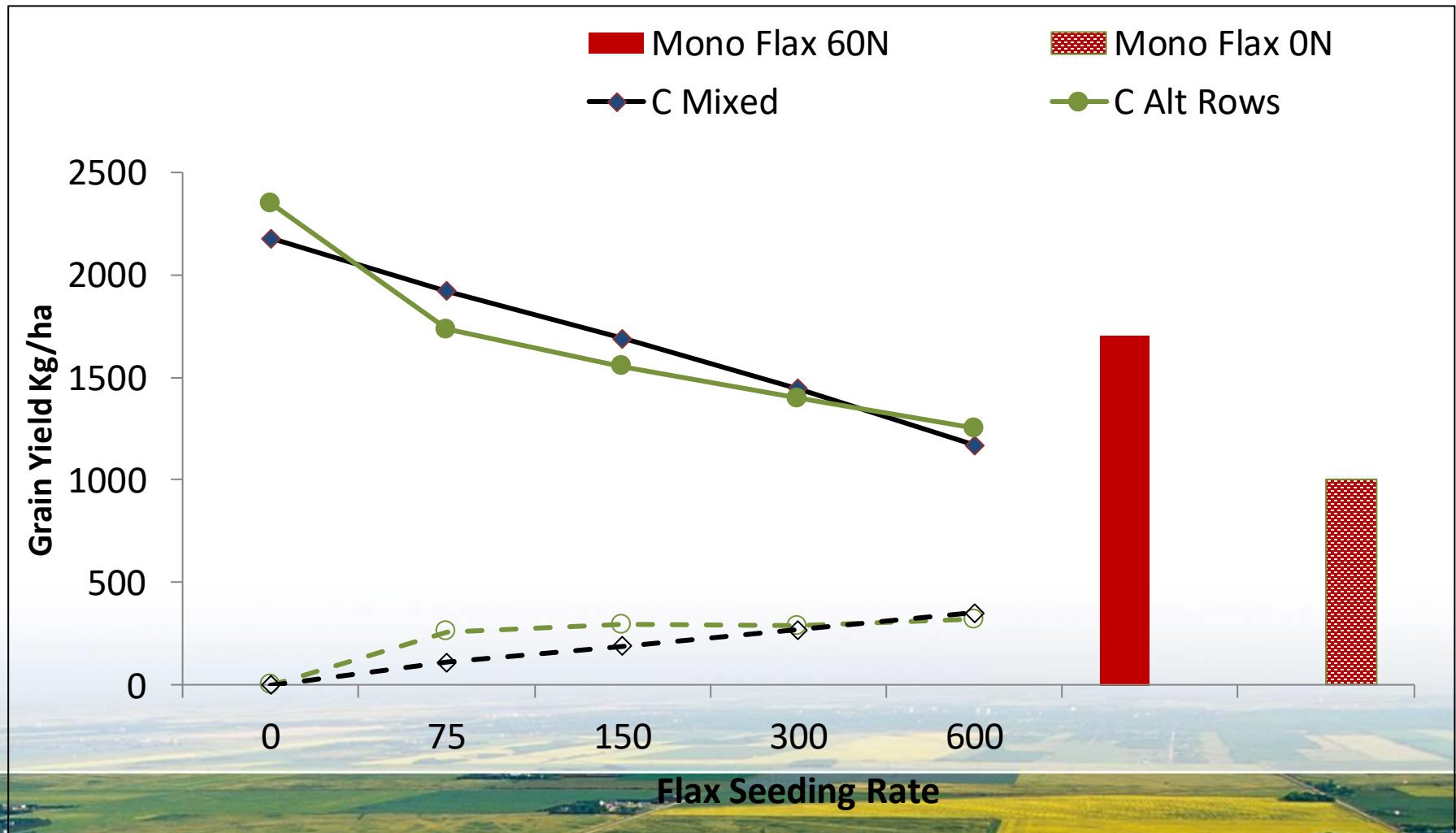
# Flax Plant Density



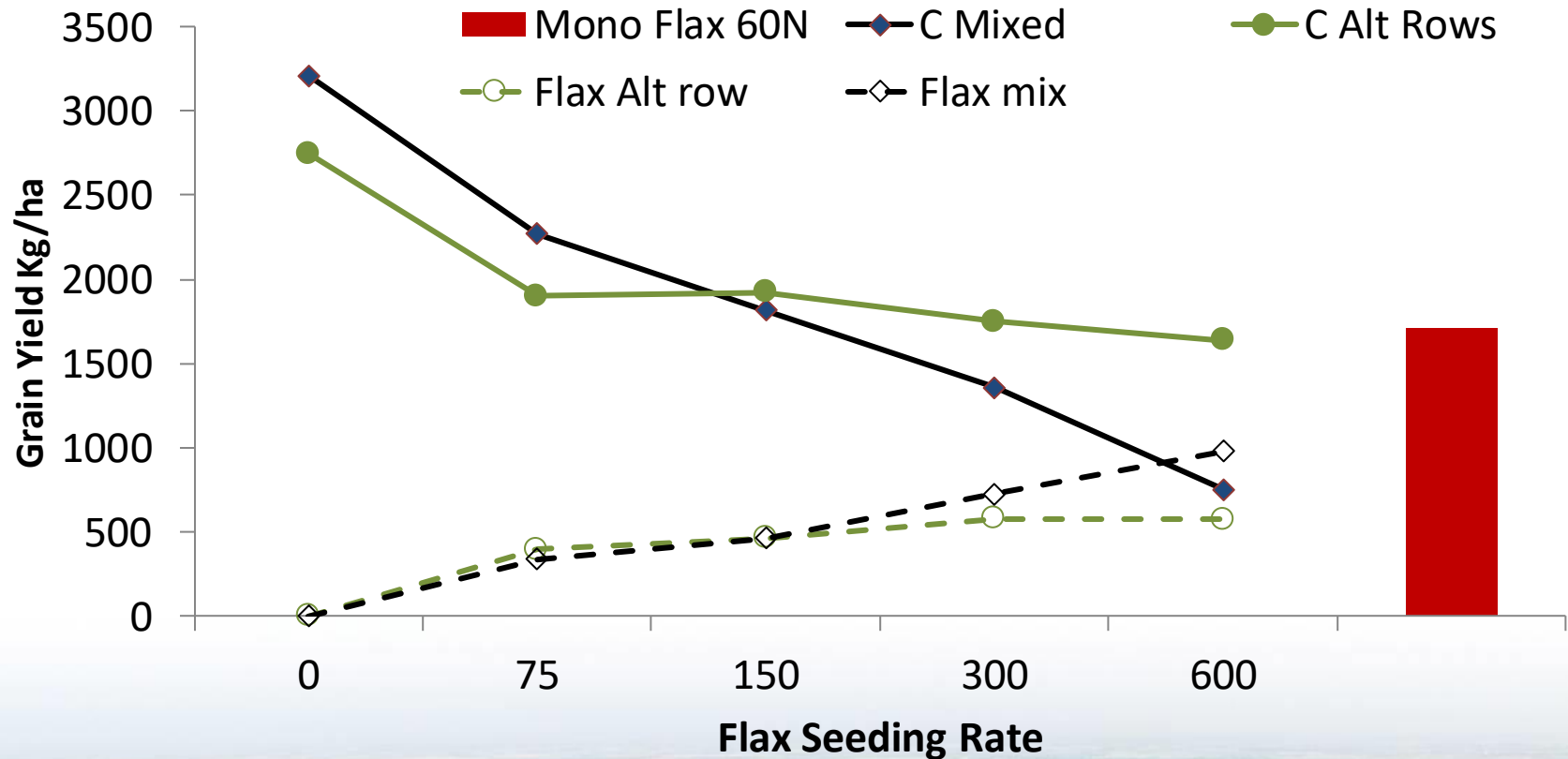
# Grain Yield Redvers 2021



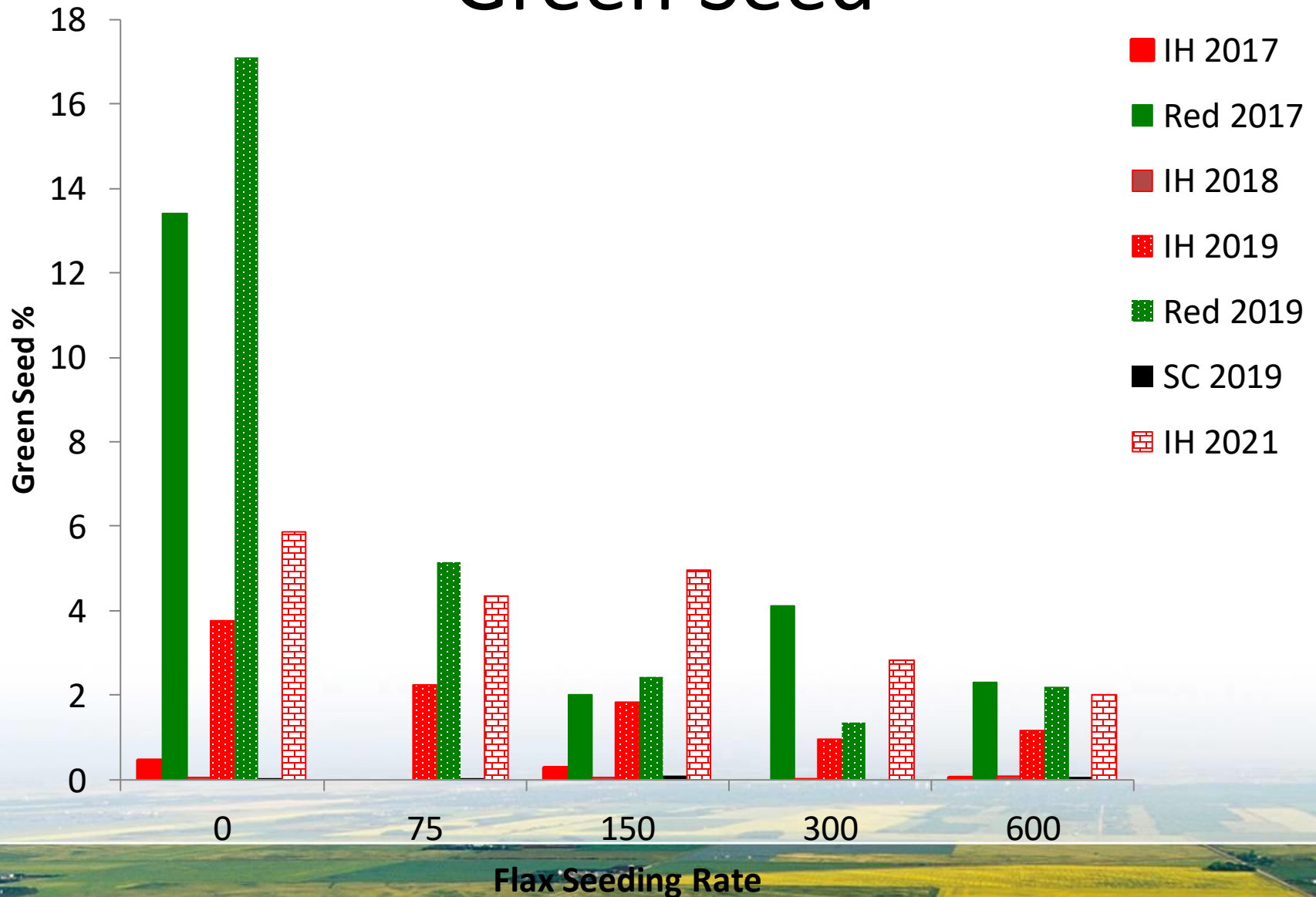
# Grain Yield Indian Head 2019



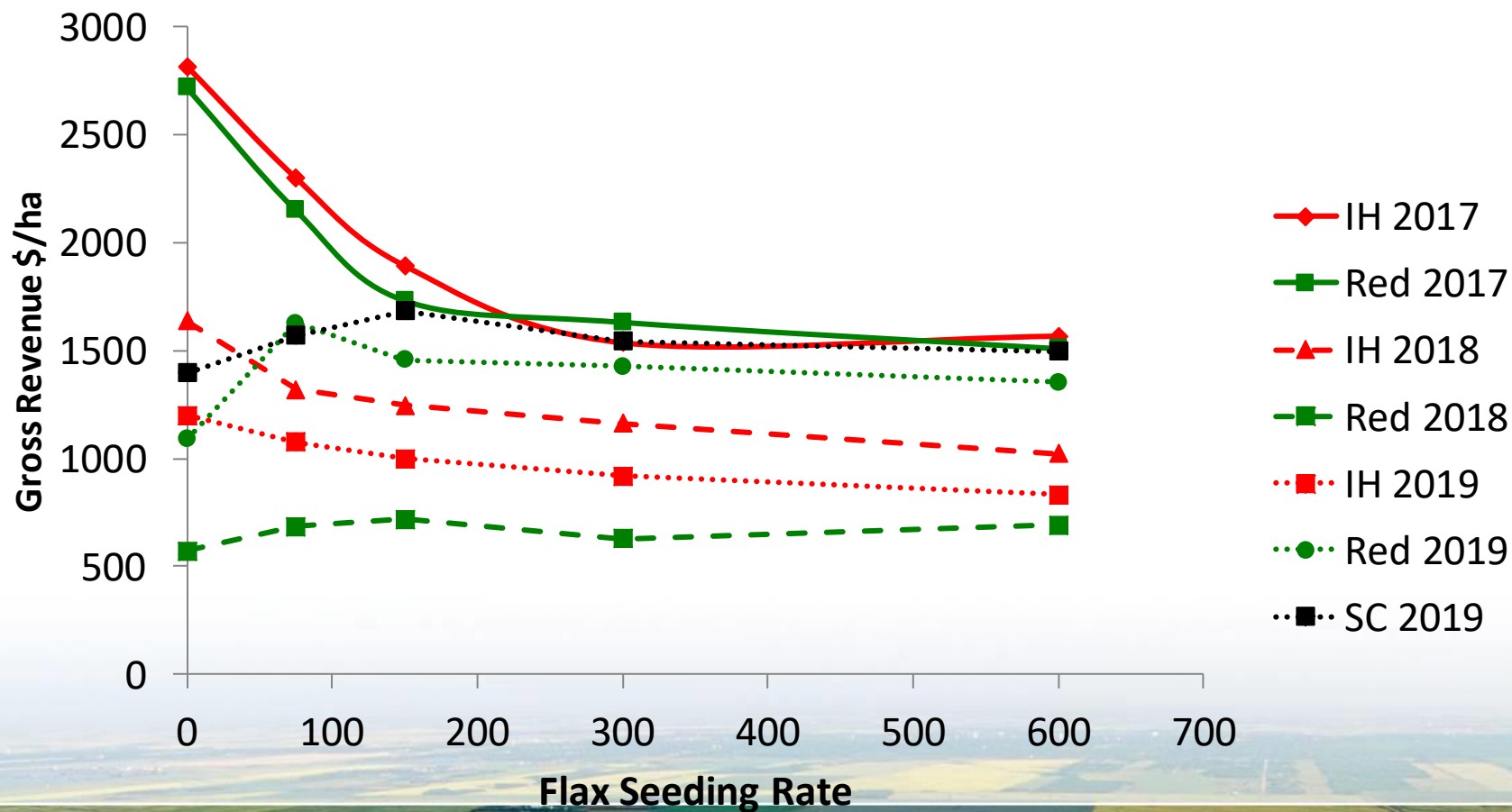
# Grain Yield Indian Head 2018



# Green Seed



# Gross Income





# Field Scale Chickpea-Flax

		Flax Density	Chickpea Density	Flax Yield	Chickpea
Flax	Nitrogen (lbs/acre)	Plants/m <sup>2</sup>	Plants/m <sup>2</sup>	Kg/ha	Kg/ha
10 lbs/acre	8.5	99	67	401	2221
20 lbs/acre	76	258	46	689	1594



# Conclusions

- **Flax Seeding Rate is the Driver**
- **Stability of economic returns is the greatest advantage**
- **Demonstrations at the field scale will continue**
- **Need normal wet years**
- **Full Report will be coming**



# Tips

- **Focus on**
  - **Use full chickpea seeding rate correct**
  - **Place Seed at 1 inch or a little deeper if dry (favour chickpea)**
  - **Flax seeding rate start at 20 lbs/acre**
  - **You can lower rate if needed as you gain experience**
  - **Only failure was late rain after dry conditions**
    - **flax matured while chickpea regreened**



# Intercropping Camelina and lentil

1) Lentil seeding Rate (seeds  $m^{-2}$ ):

a. 60

b. 90

c. 120

2) Nitrogen Rate ( $kg\ ha^{-1}$ )

21

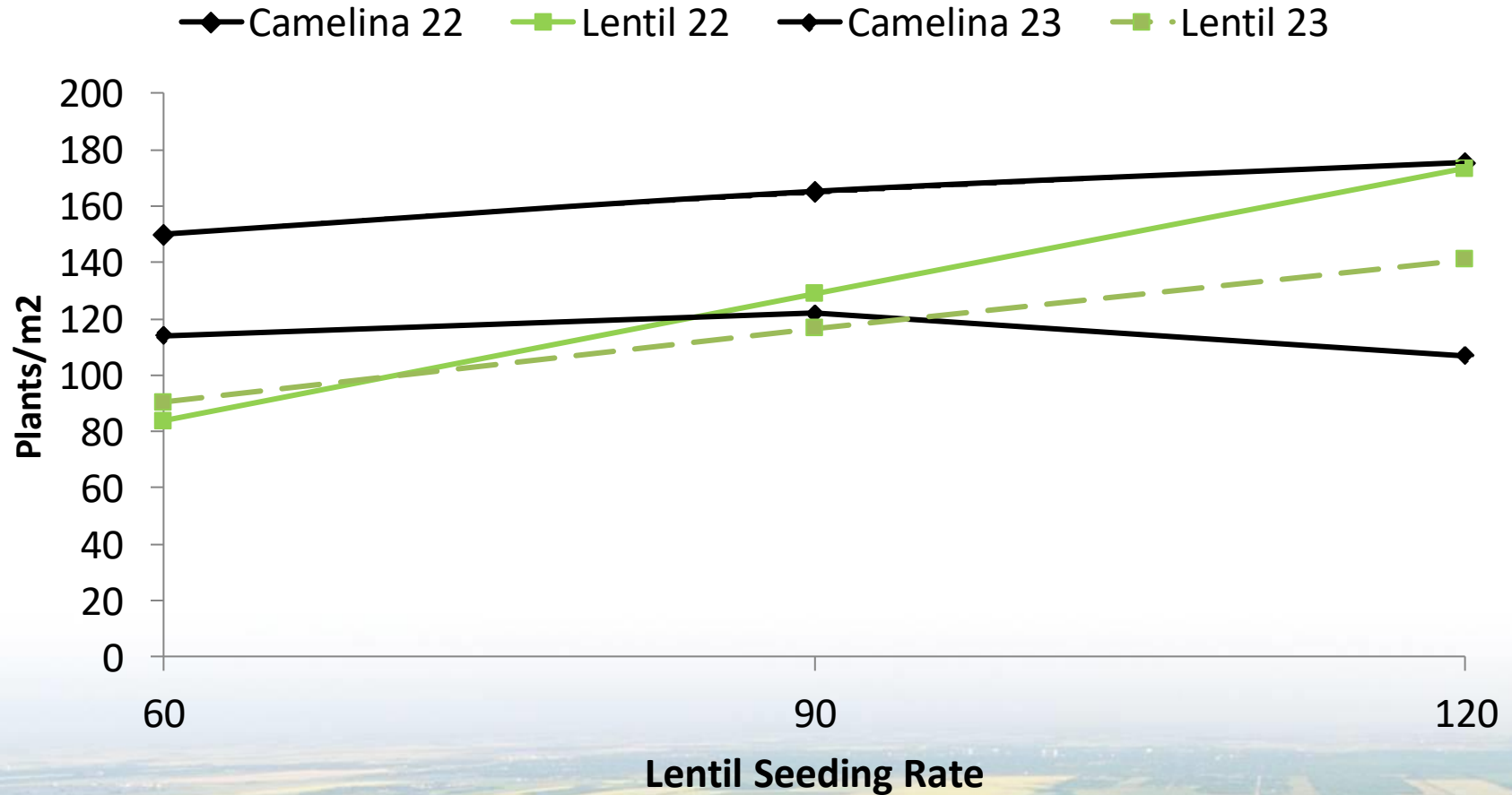
75

Camelina Mono Crop

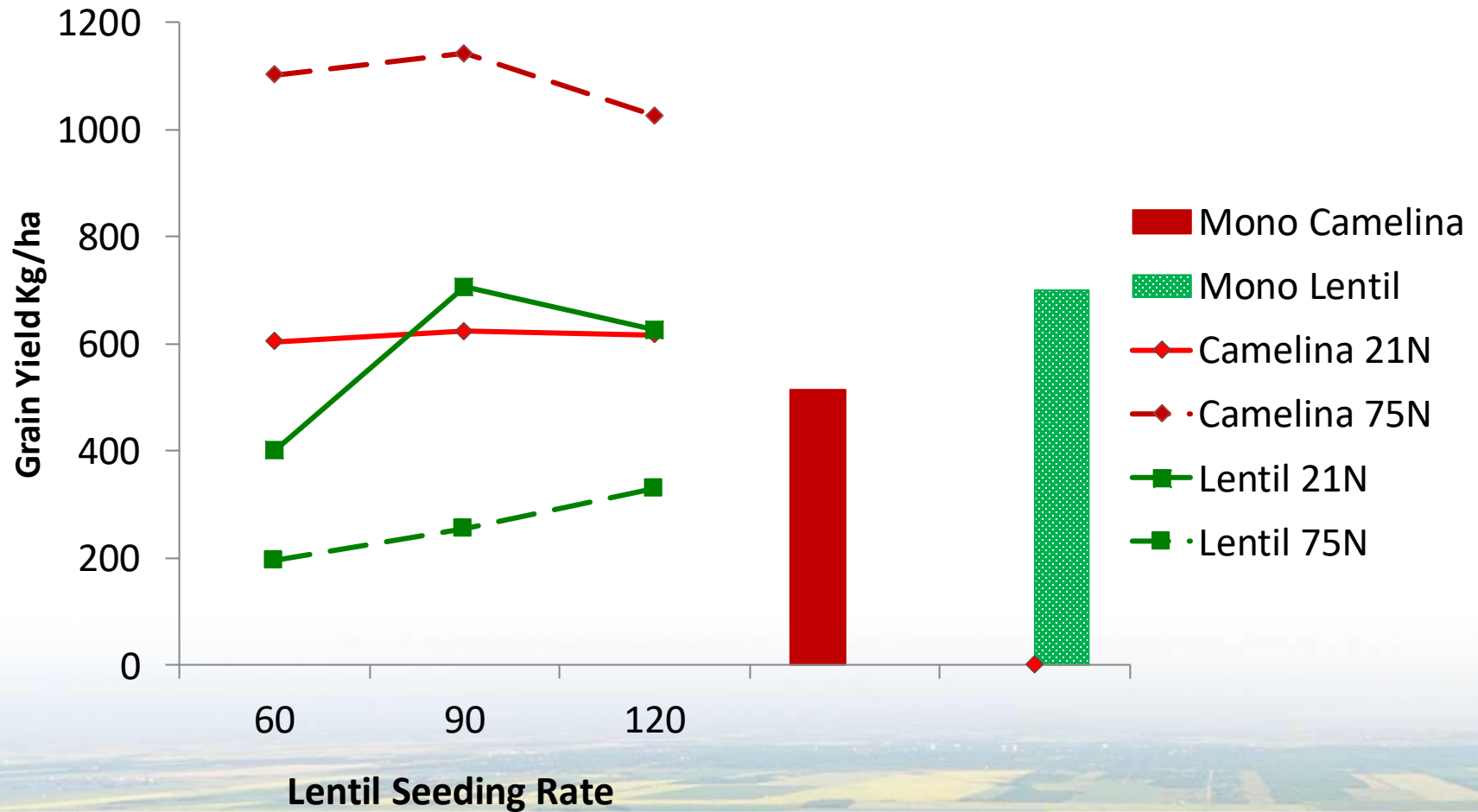
Lentil Mono Crop



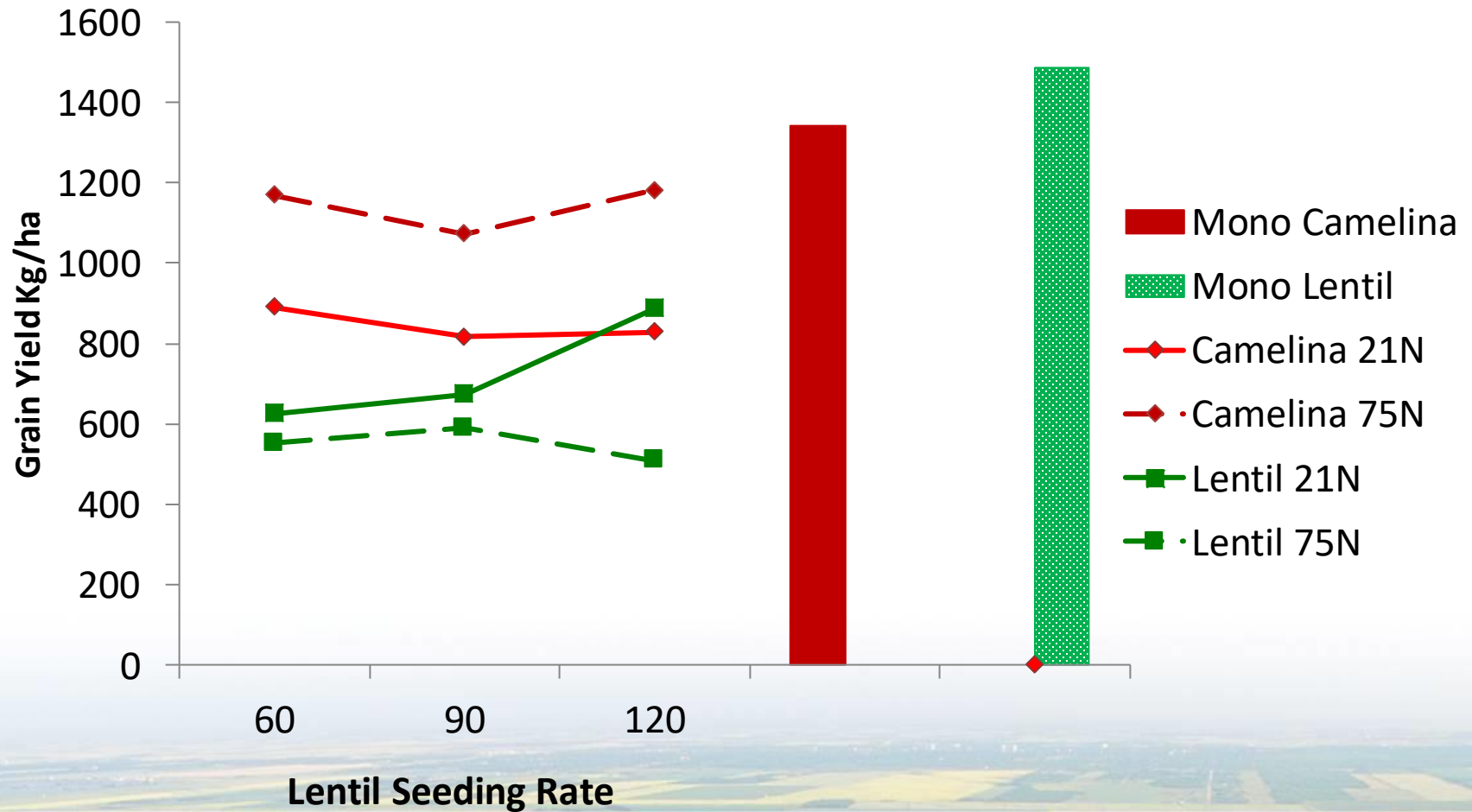
# Camelina & Lentil Plant Density



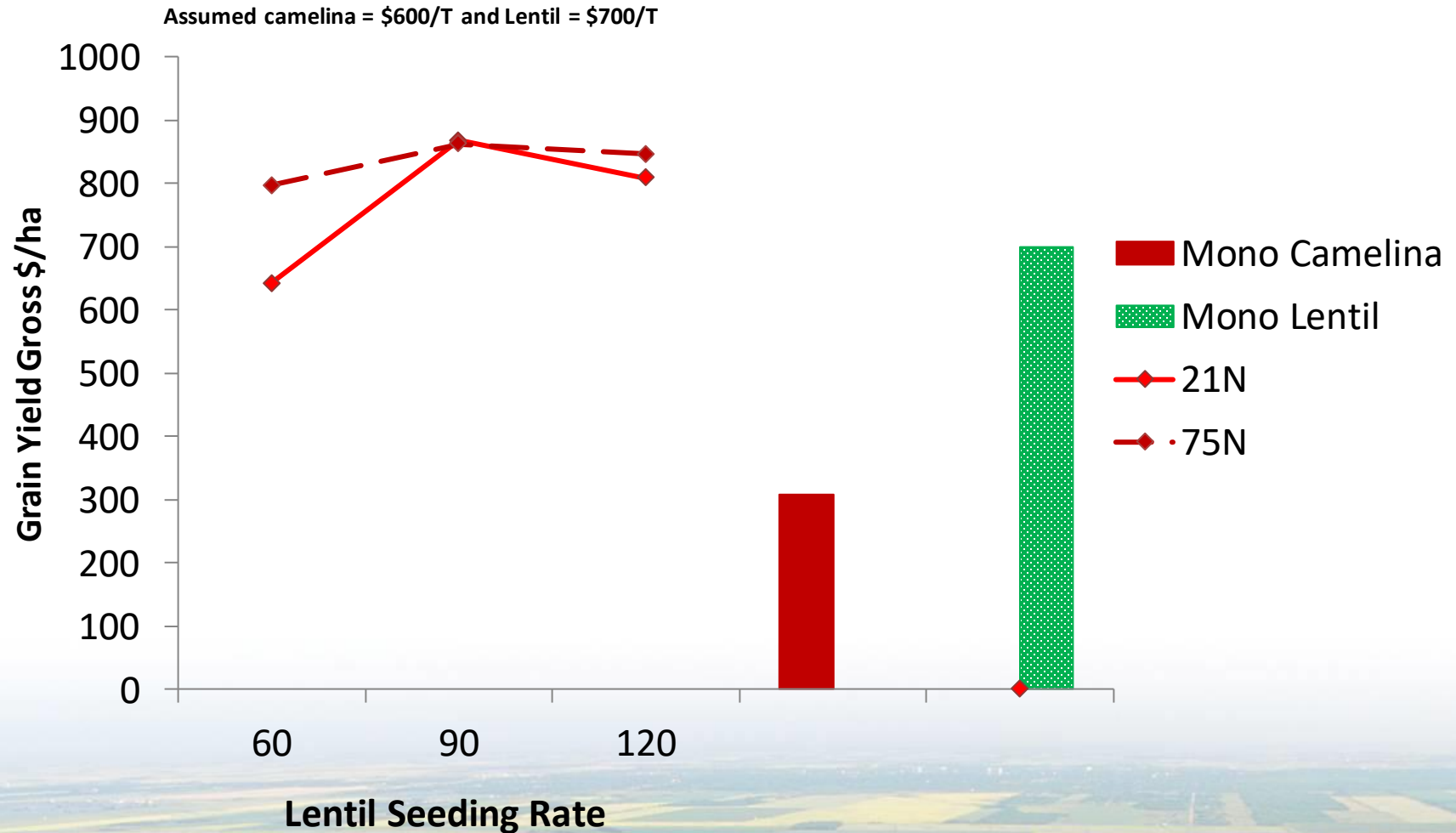
# Grain Yield Indian Head 2022



# Grain Yield Indian Head 2023

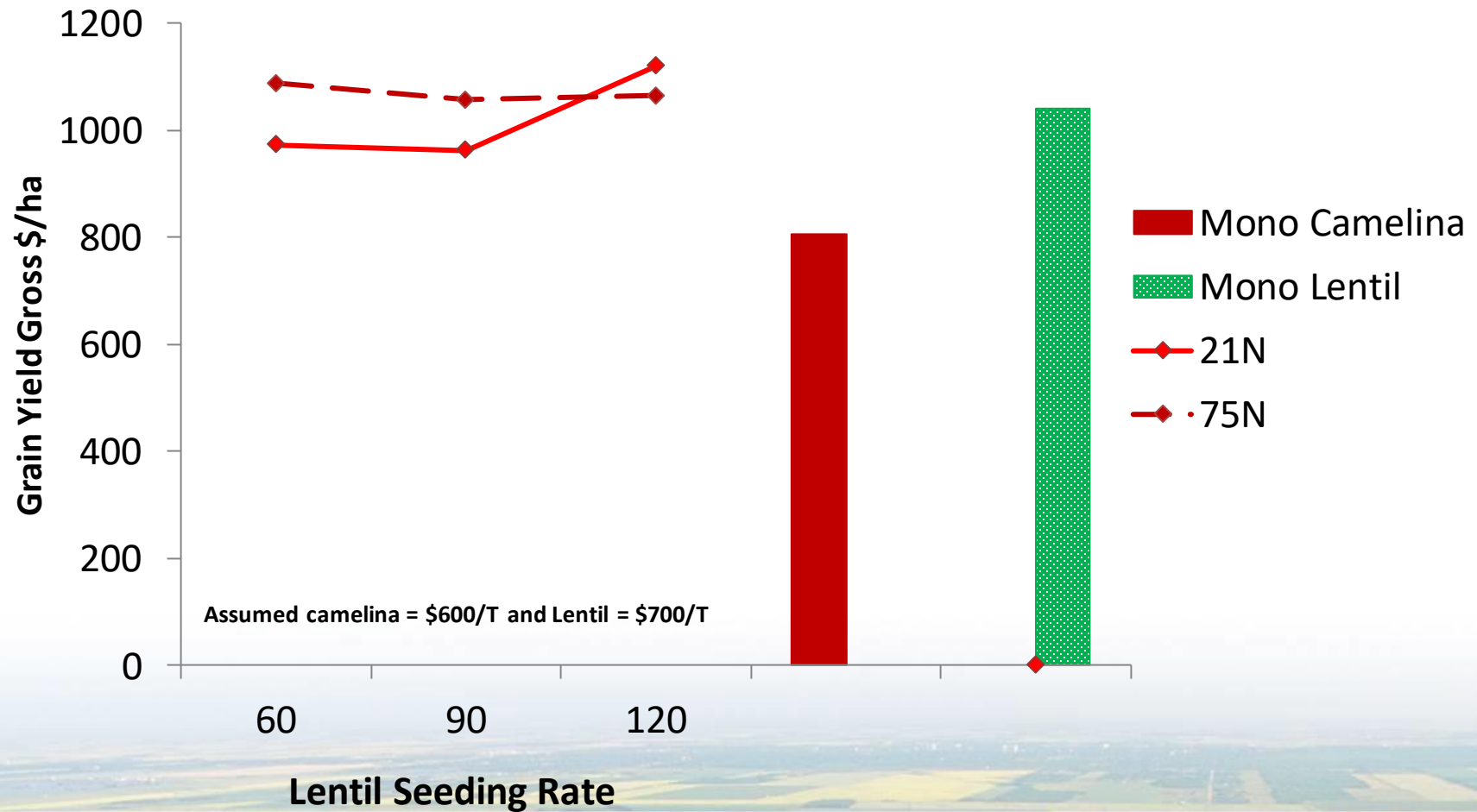


# Gross Income - Indian Head 2022





# Gross Income - Indian Head 2023



# Conclusions

- Crops maturities match
- Weed control will be an issue
- Benefit when growing camelina
- What will be the root disease impact on lentil?



# Cover crops

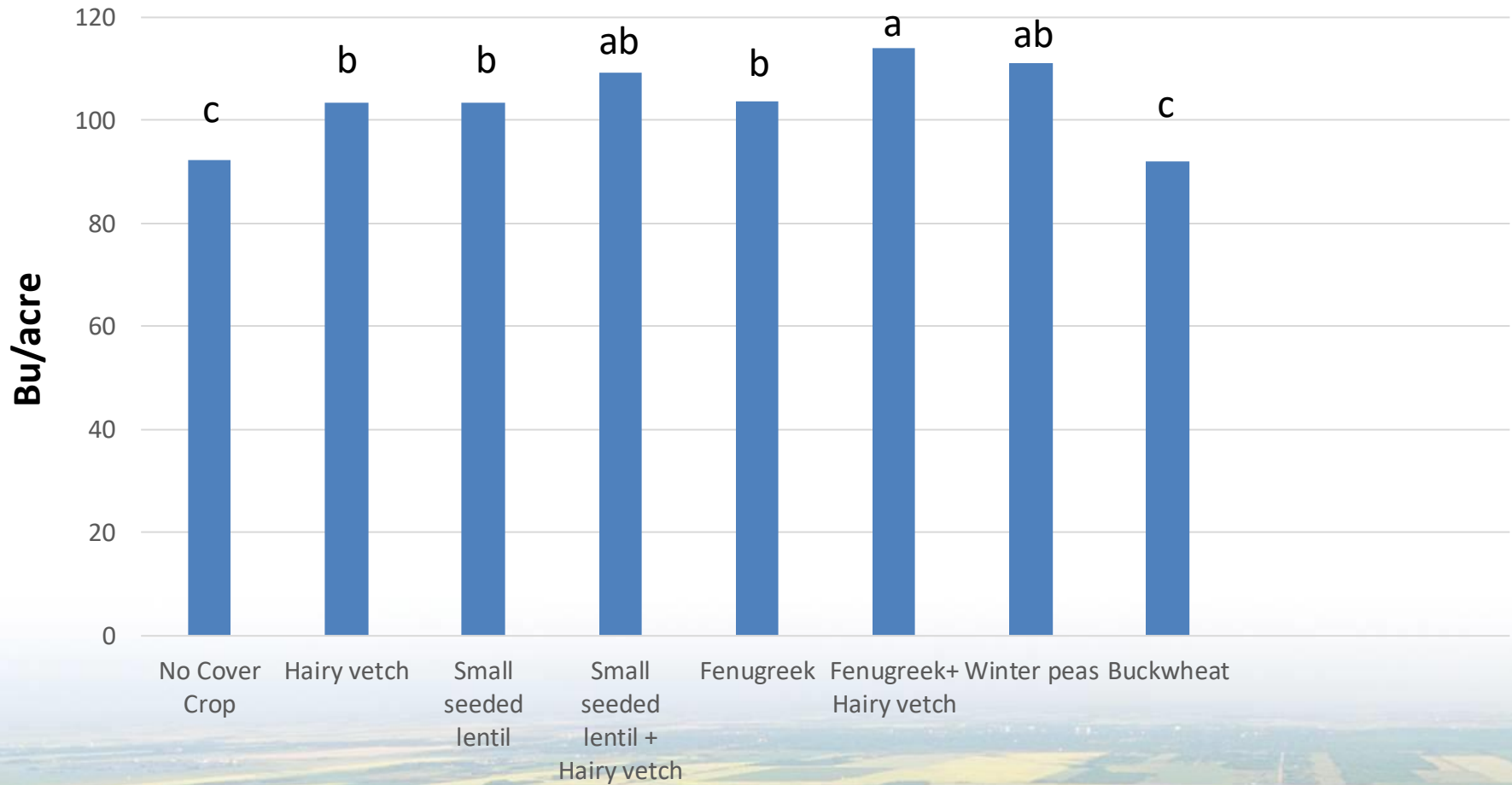
1) None	0
2) Hairy vetch	5.6 kg/ha
3) Small seeded lentil	75 seeds/m <sup>2</sup>
4) Small seeded lentil+ Hairy Vetch	75 seeds/m <sup>2</sup> + 5.6 kg/ha
5) Fenugreek	35 kg/ha kg/ha
6) Fenugreek+ Hairy Vetch	35 kg/ha kg/ha +5.6 kg/ha
7) Winter peas	40 seeds/m <sup>2</sup>
8) Buckwheat	15 kg/ha
9) Alfalfa	10 kg/ha
10) Caraway	13 kg/ha







# Oat on Sunflower Grain Yield – Year 2



# Oat on Hemp Grain Yield – Year 2



# Conclusions

- More Questions than answers



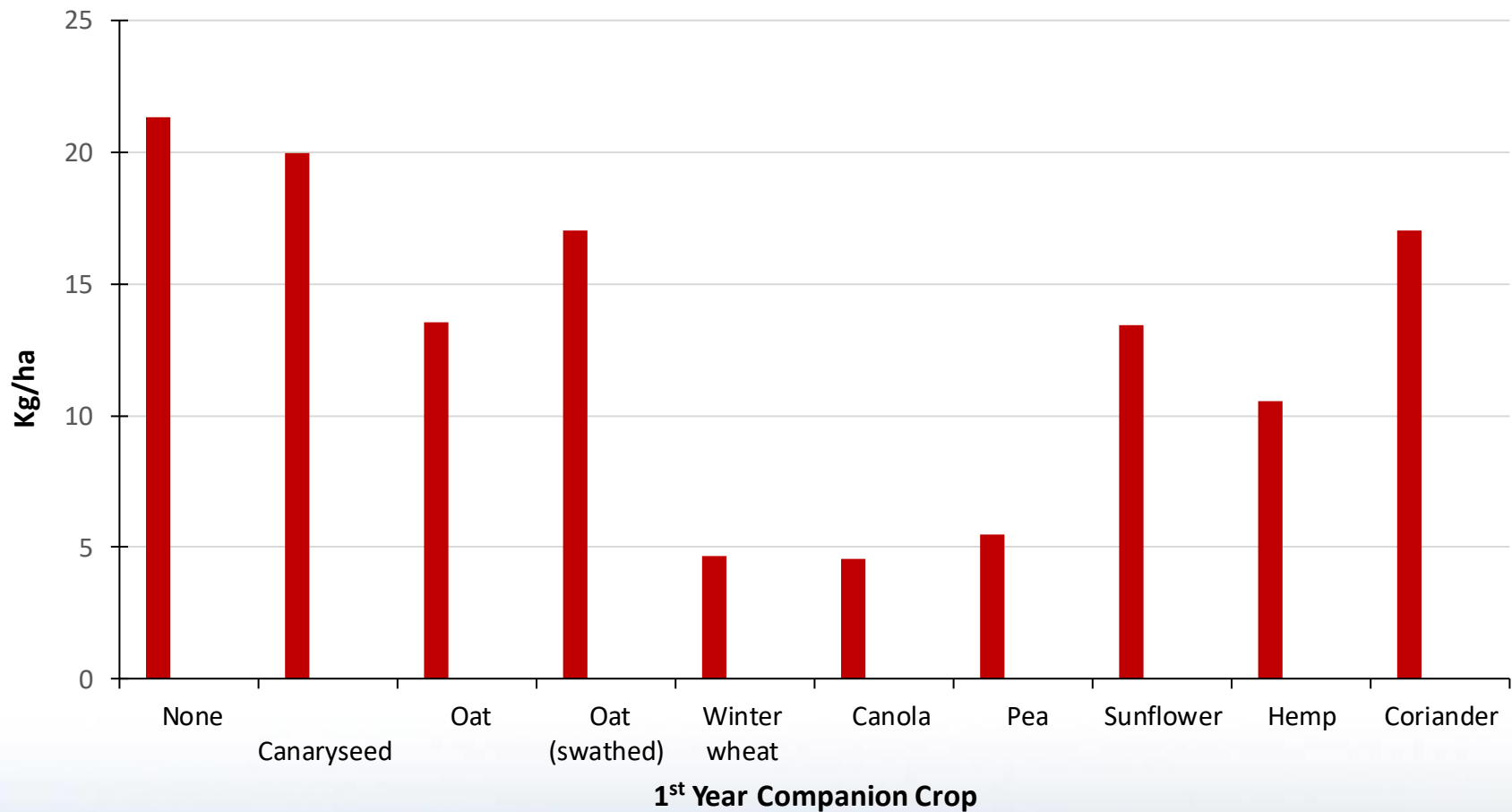


# Caraway Companion Crops

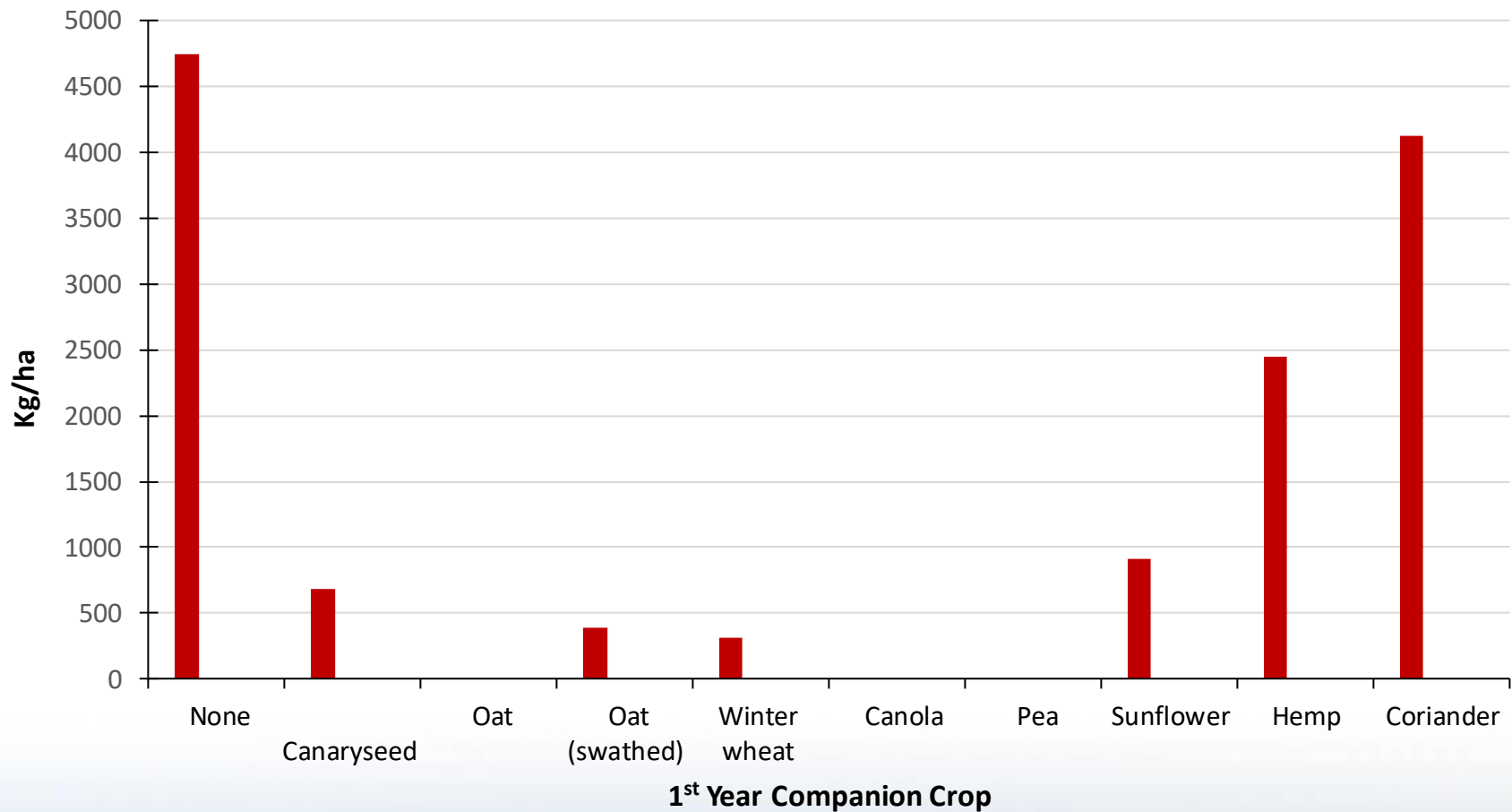
- 1) None
- 2) Canaryseed (35 kg/ha)
- 3) Oat (300 seeds m<sup>-2</sup>)
- 4) Oat (swathed and baled at milk stage)
- 5) Winter wheat (killed in fall) (250 seeds m<sup>-2</sup>)
- 6) Canola (9 kg/ha)
- 7) Pea (90 seeds m<sup>-2</sup>)
- 8) Sunflower (8 seeds m<sup>-2</sup>)
- 9) Hemp (75 plants m<sup>-2</sup>)
- 10) Coriander (33 kg/ha)



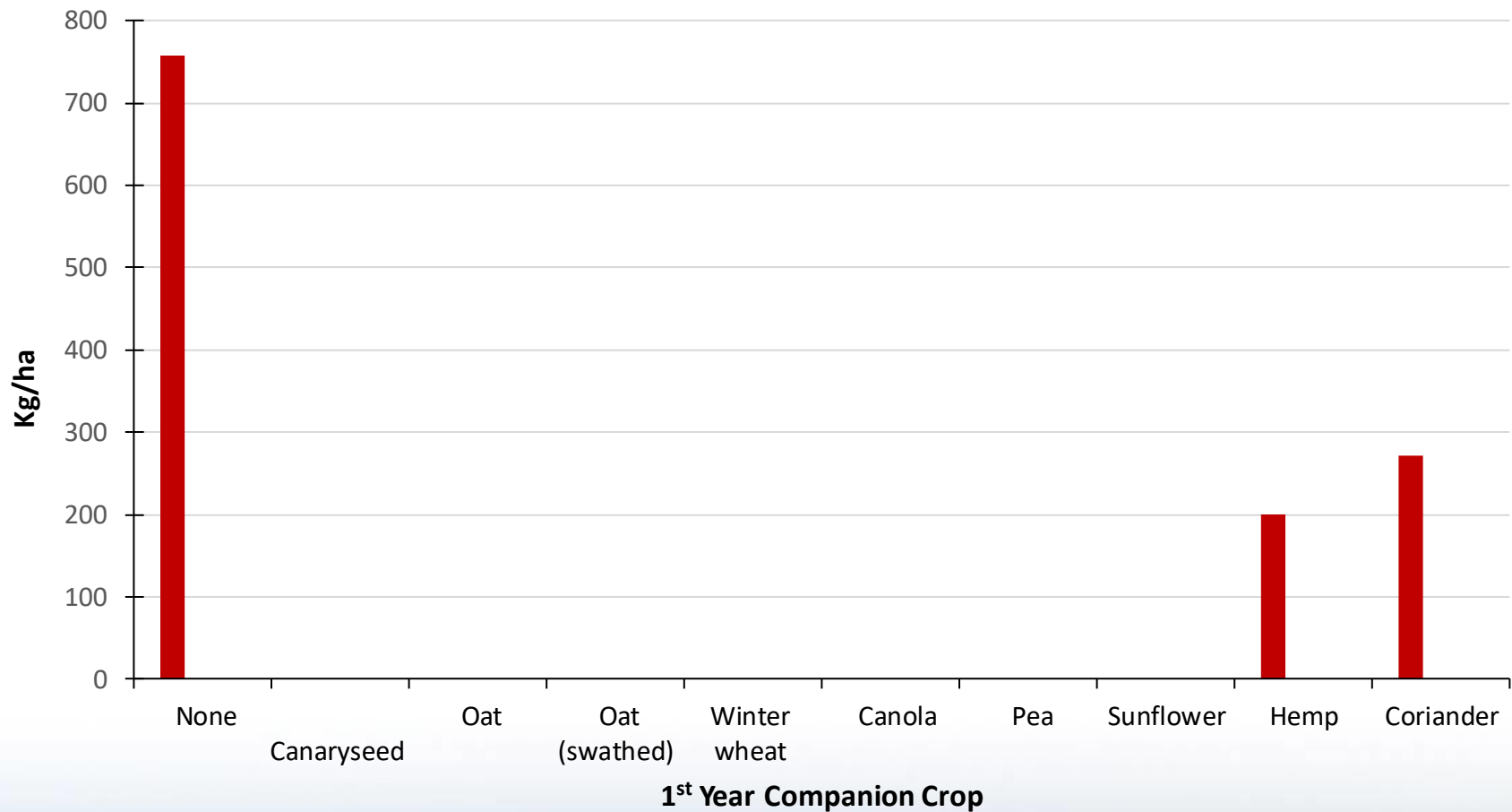
# Caraway Spring Plant Density in Seed Year



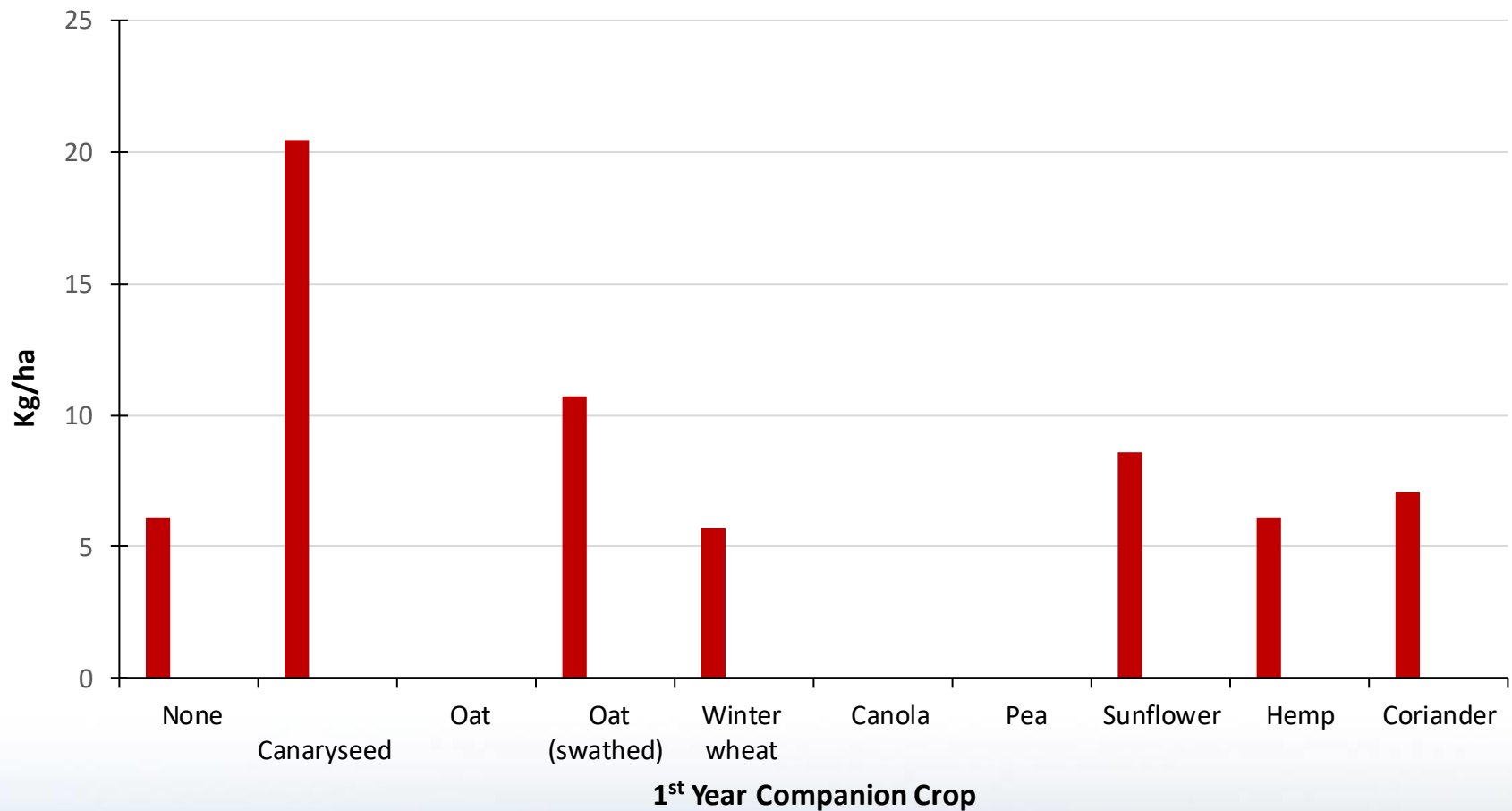
# Caraway Biomass in Seed Year



# Caraway Grain Yield in Seed Year



# Caraway Fall Plant Density in Seed Year



# Caraway Research

- Just getting starting
- Make some adjustments to seeding density of companion crops
- Look at other potential companion crops
- Funding received from ADF to further this Research

