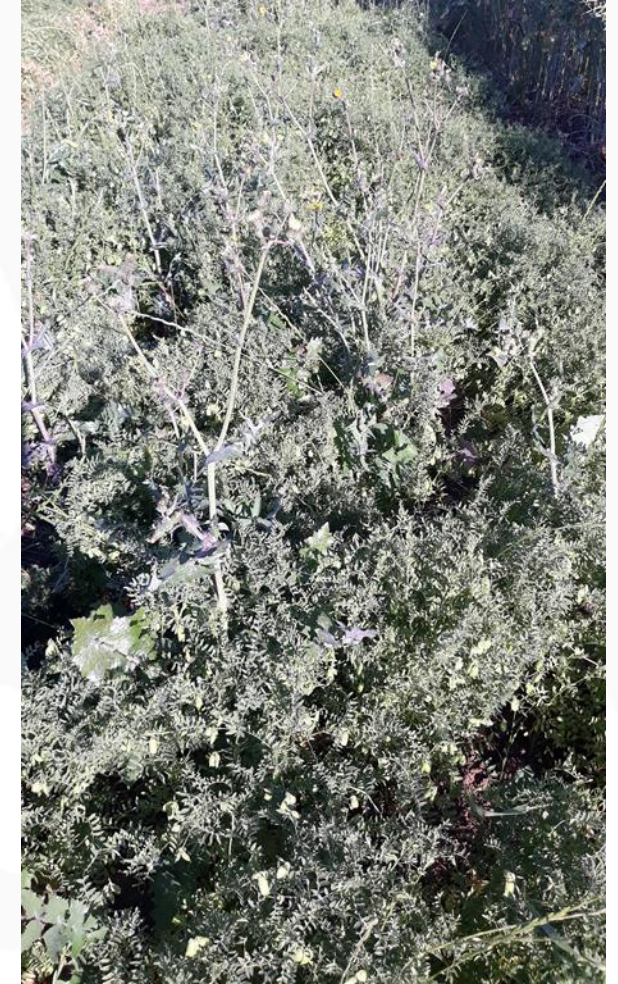


## Broadleaf weed management in pulses

**Navneet Aggarwal, Sam Trengove, Jordan Bruce, Stuart Sherriff, and Penny Roberts**



# Background

- There is significant increase in area under pulses in South Australia
- >200% higher lentil adoption in last decade, especially herbicide tolerant XT lentils
- Wide adoption of imidazolinone tolerant varieties across cereals, pulses and oilseeds
- IMI resistance development in broadleaf weeds including Indian Hedge mustard, wild turnip, common sowthistle and prickly lettuce in SA
- Weeds causing ~ \$ 20 million worth of yield losses in pulses every year
- Additional ~ \$ 70 million spent on herbicides to control resistant weeds in pulses out of total ~ \$170 million

# New opportunities to overcome the challenges

## *Reflex (Fomesafen): Group 14 (previously Group G) herbicide*

A herbicide that provides selective control of broadleaf weeds  
in both conventional and herbicide tolerant pulse cultivars

- Broadleaf weeds that are:
- Not effectively controlled with current herbicide options
  - Resistant to IMI herbicides



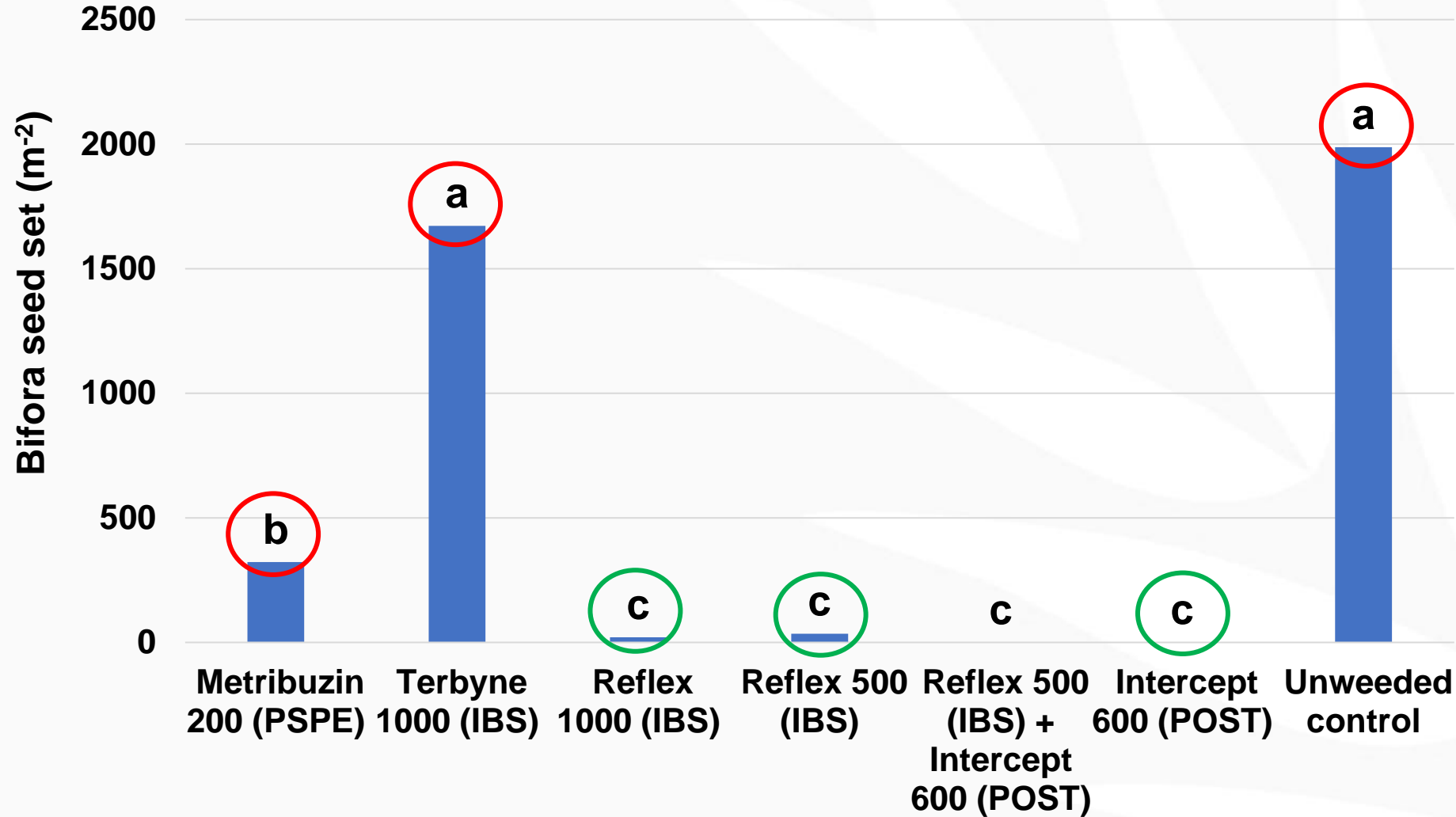
# 2021 TRIALS - SITES

Location	Site	0-10 pH (CaCl <sub>2</sub> )	0-10 pH (H <sub>2</sub> O)	ECEC Cmol/kg	OC (%)	Texture	Weeds assessed
<b>Alford</b>	Alkaline herbicide tolerance	7.7	8.4	11.7	0.94	Sand	Indian hedge mustard ( <i>Sisymbrium orientale</i> ), burr medic ( <i>Medicago polymorpha</i> ), common sow thistle ( <i>Sonchus oleraceus</i> ), and wild turnip ( <i>Brassica tournefortii</i> )
<b>Bute</b>	Acidic herbicide tolerance	4.7	5.8	3.09	0.76	Sand	As above + Cape weed ( <i>Arctotheca calendula</i> )
<b>Bute</b>	Loam weed control	7.5	8.1	NA	1.33	Loam	Bifora ( <i>Bifora testiculata</i> ), Indian hedge mustard and common sow thistle
<b>Bute</b>	Alkaline Sand weed control	6.8	8.1	NA	0.82	Loamy sand	Indian hedge mustard

## More details:

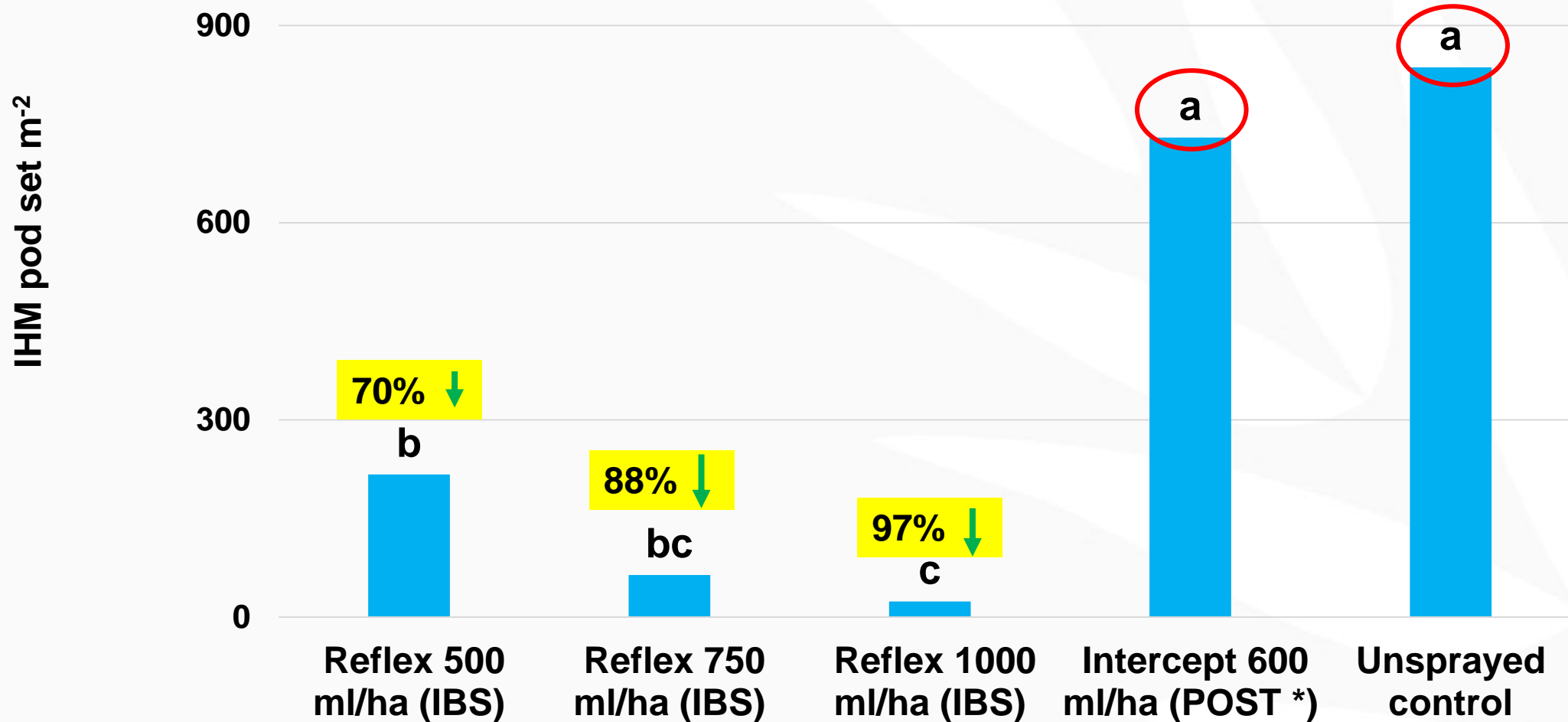
Bruce J, Aggarwal N, Sherriff S, Trengove S and Roberts P (2022). Crop safety and broadleaf weed control implications for various herbicides and combinations in lentil. *In* 2022 SOUTHERN GRDC GRAINS RESEARCH UPDATE SERIES, pp 72-79.

# Bifora seed set in lentil at Bute 2021



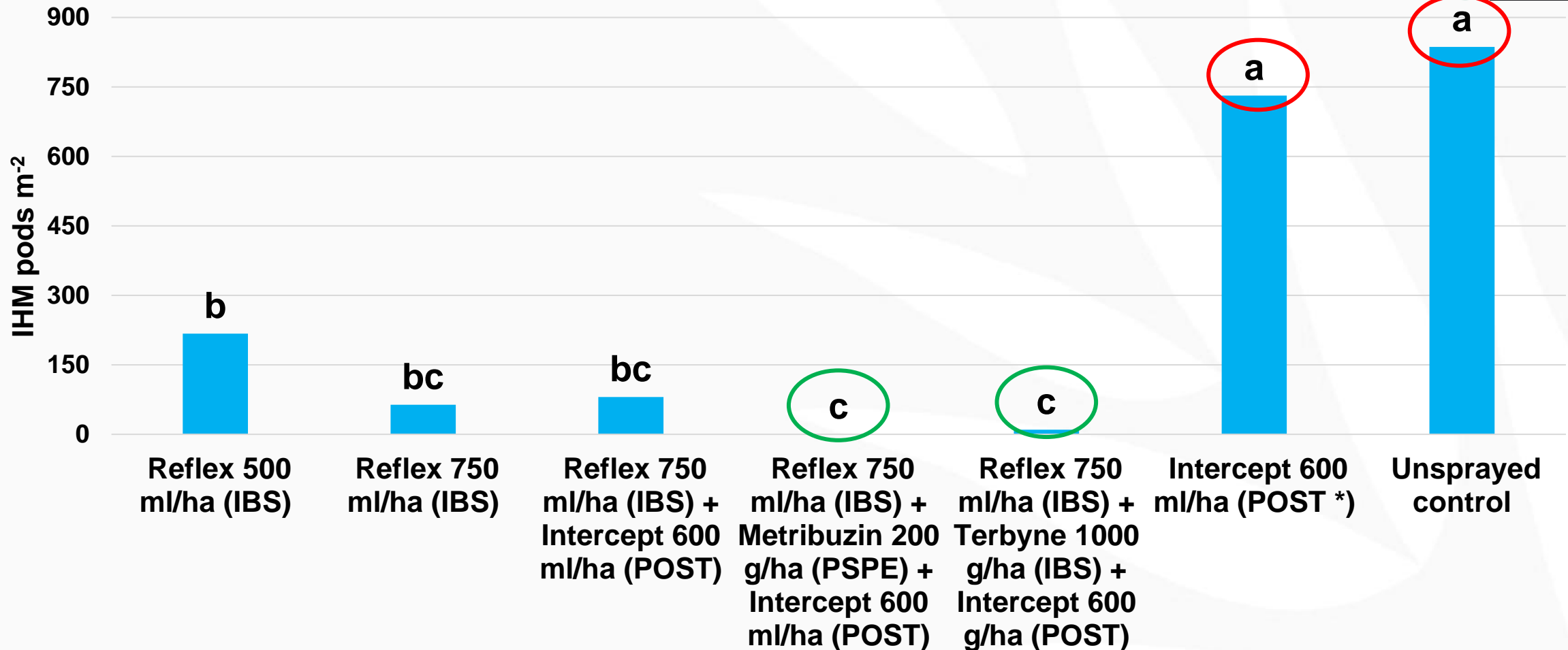
\*post emergence spray at 5-6 crop node stage

# Indian hedge mustard pod set in lentil at Bute 2021 on loamy soil



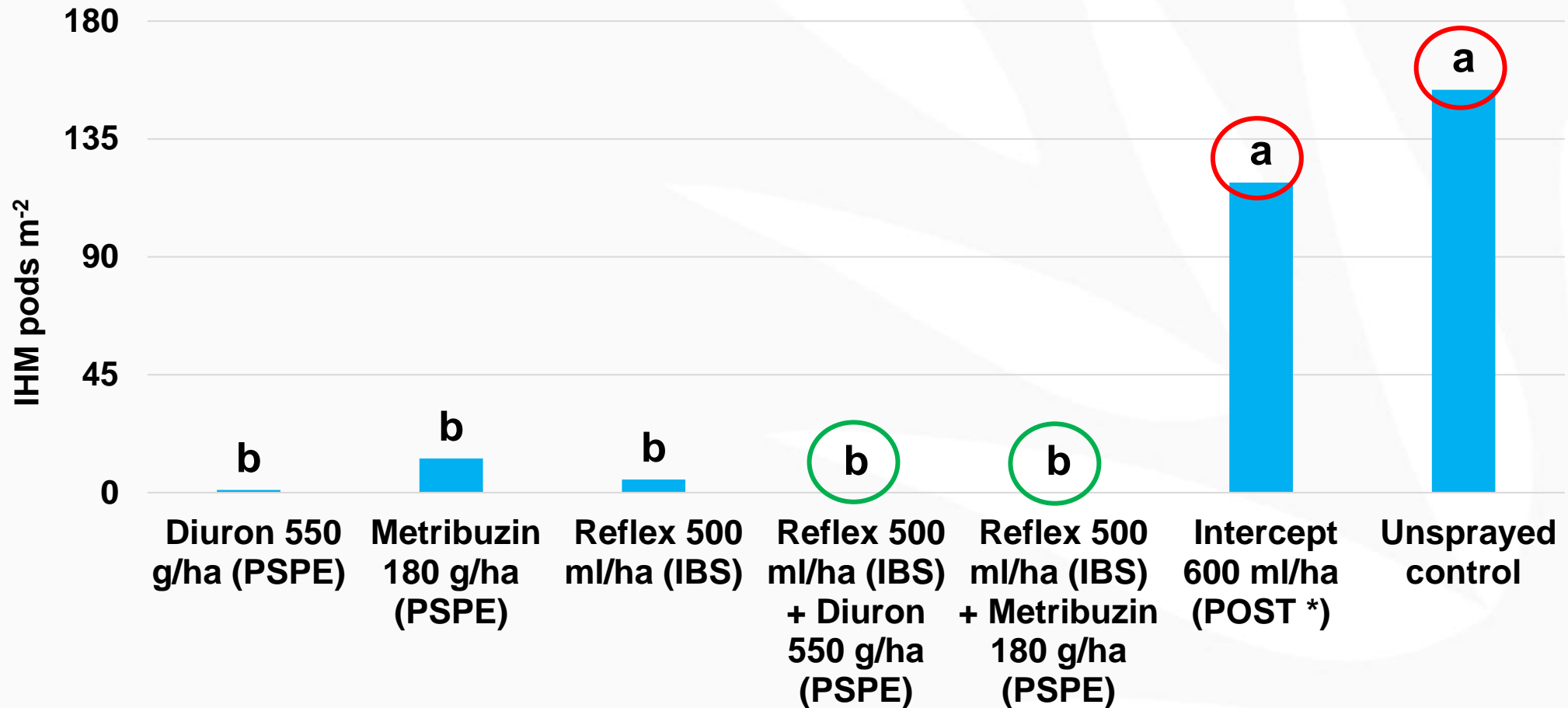
\*post emergence spray at 5-6 crop node stage

# Indian hedge mustard pod set in lentil at Bute 2021 on loamy soil



\*post emergence spray at 5-6 crop node stage

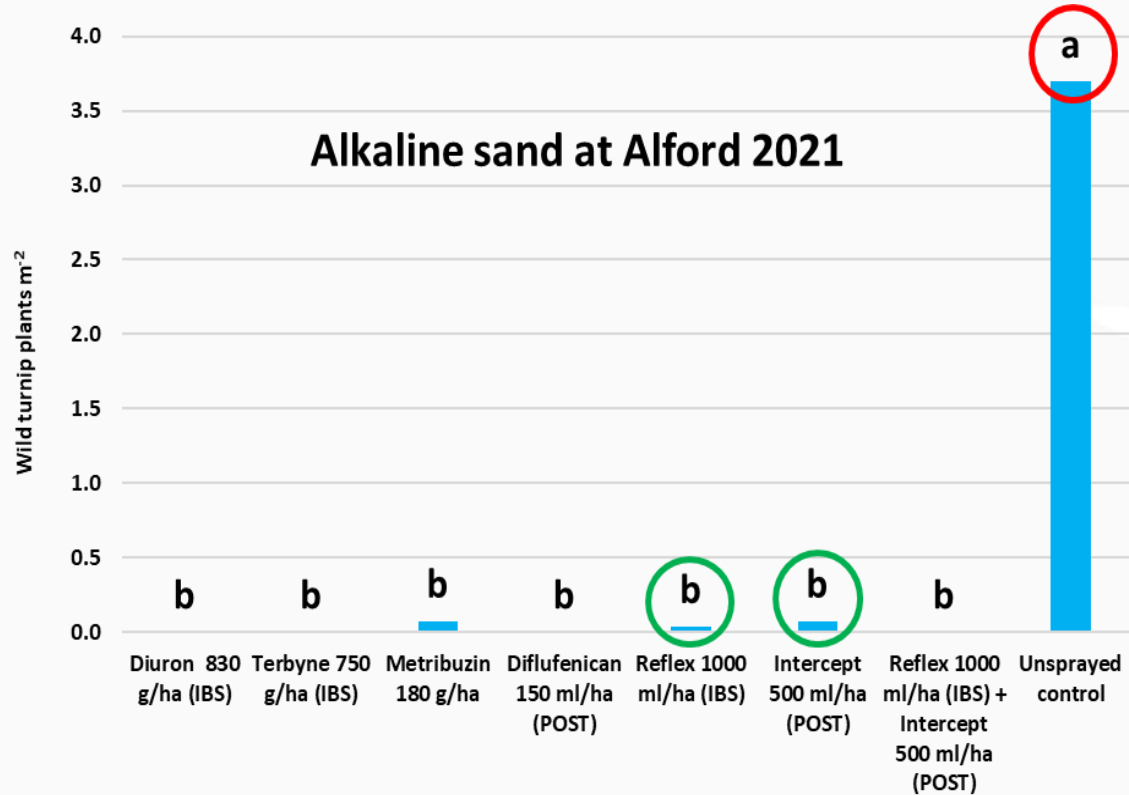
# Indian hedge mustard pod set in lentil at Bute 2021 on alkaline sandy soils



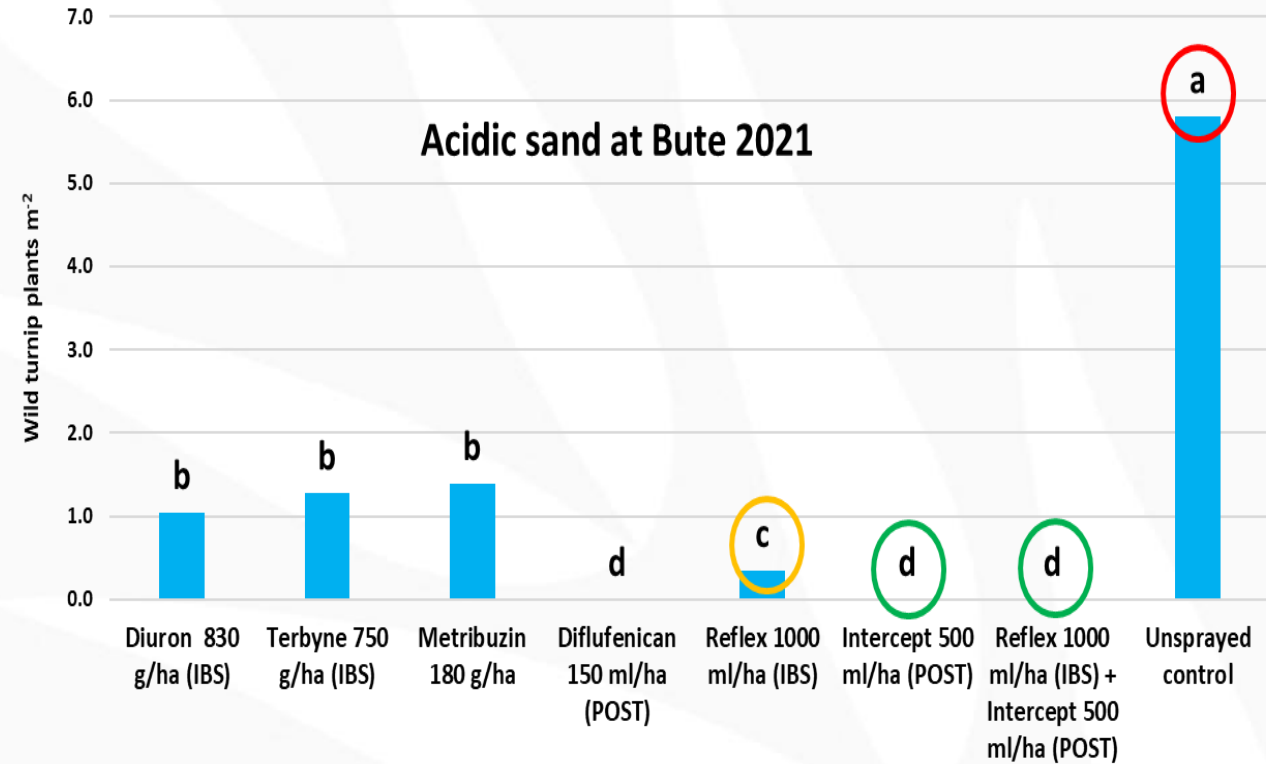
\*post emergence spray at 5-6 crop node stage



# Wild turnip management in lentil



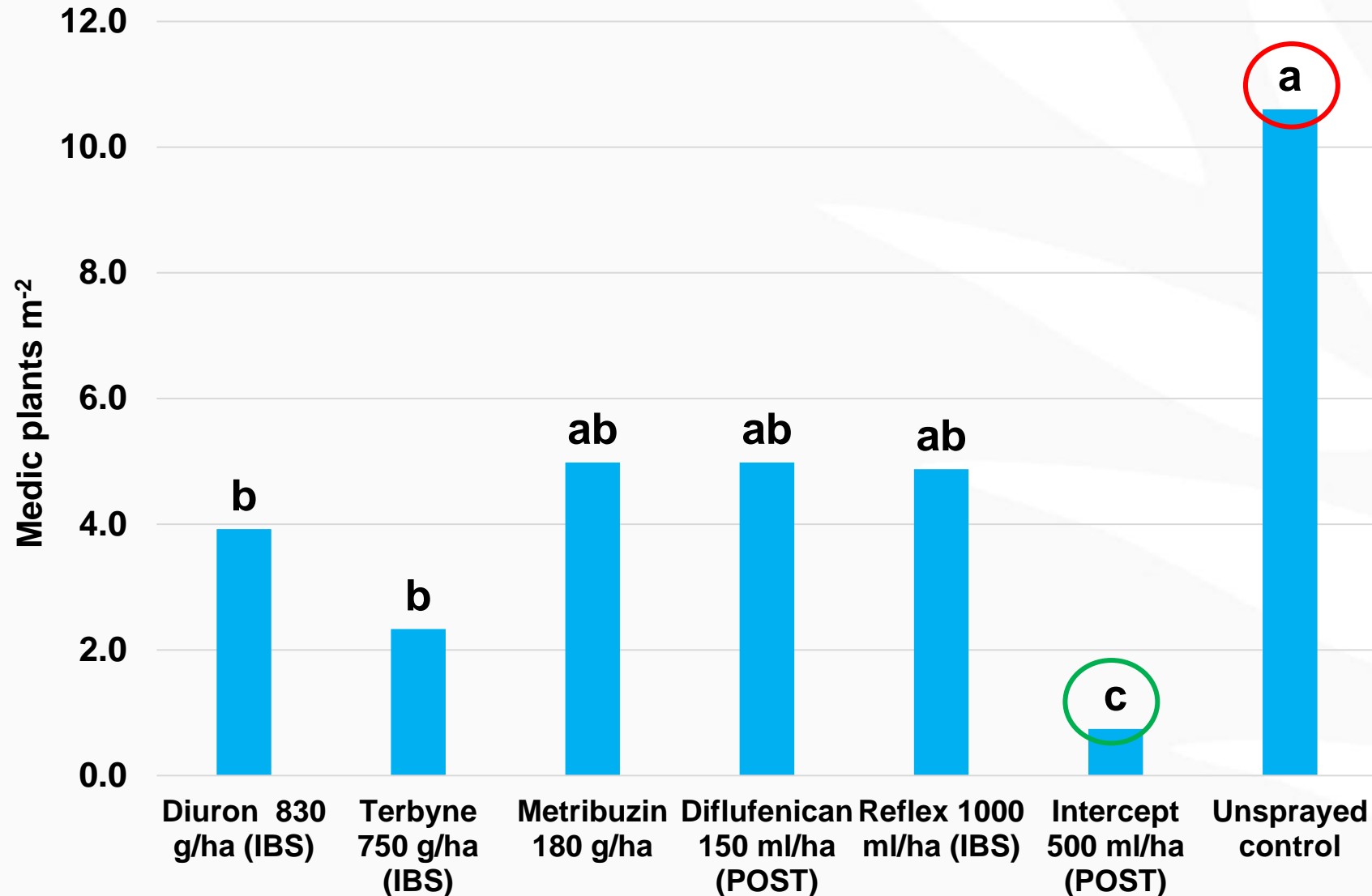
- IMI herbicide proved equally effective as Reflex



- Few survivors with Reflex alone when background weed population was higher

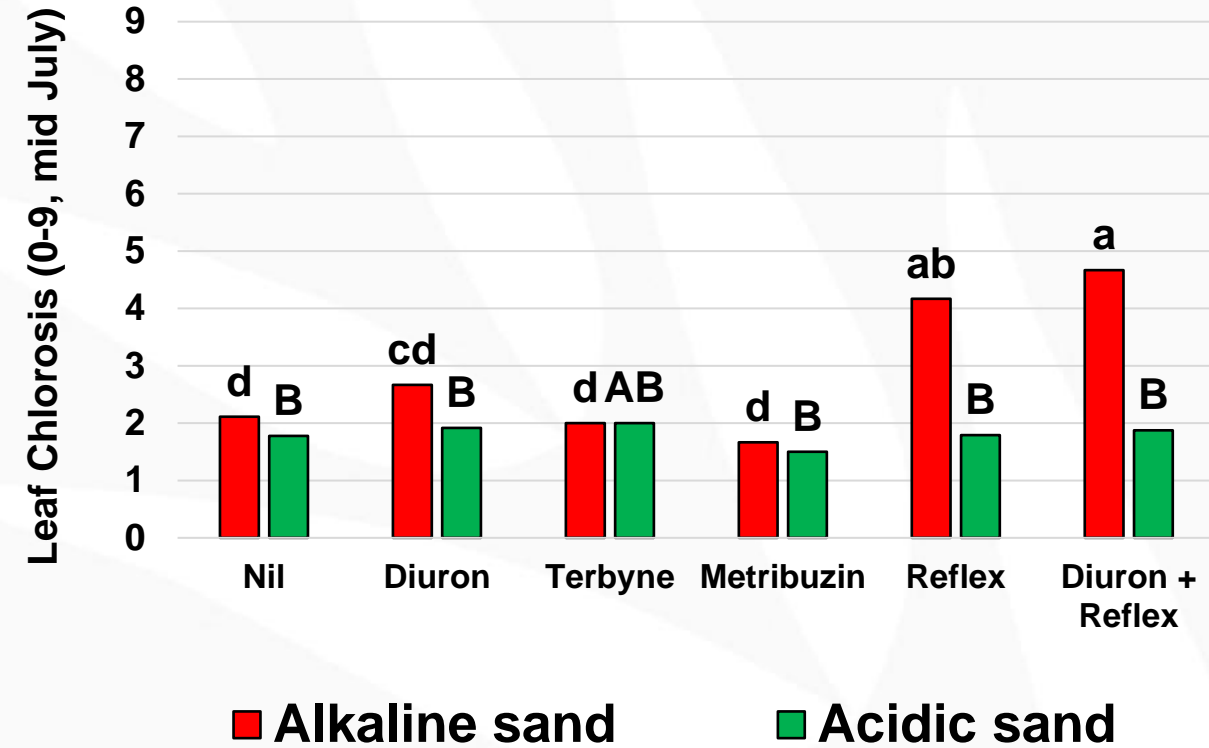
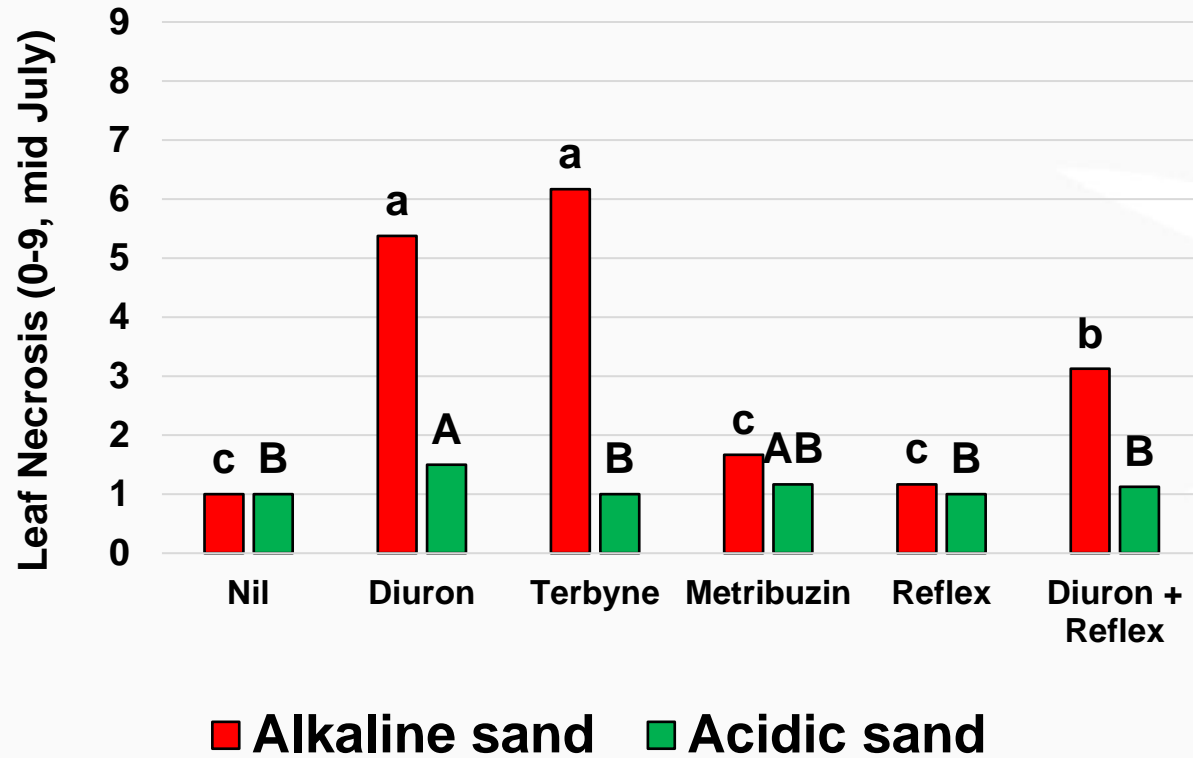
**Two-way and three way combinations of Reflex with Group 5 and Group 2 herbicides provided >99% control of wild turnip**

# Medic control in lentil at Alford 2021 on alkaline sand

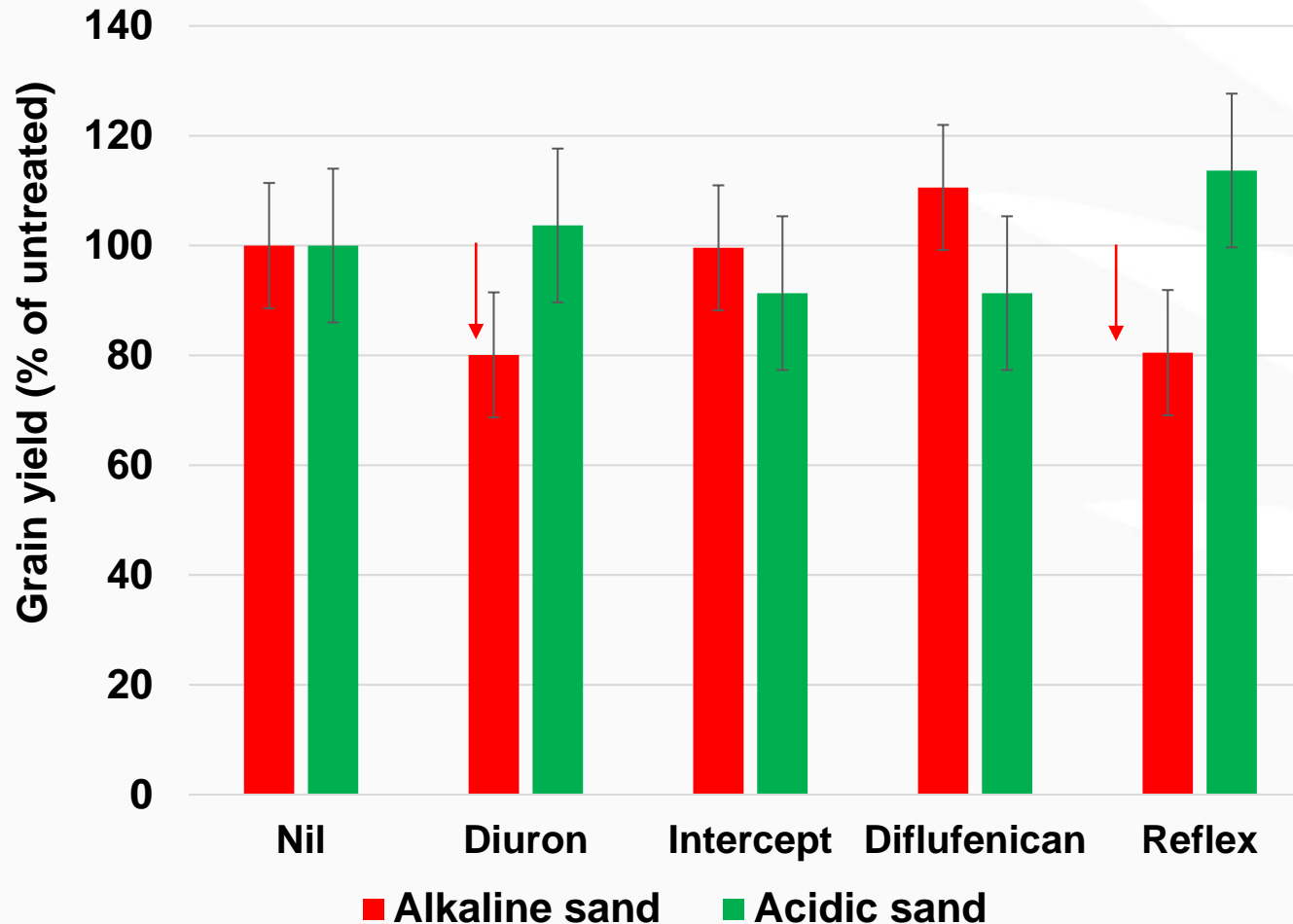


**Intercept® application was the stand-out herbicide for achieving medic control**

# HERBICIDE DAMAGE SCORES



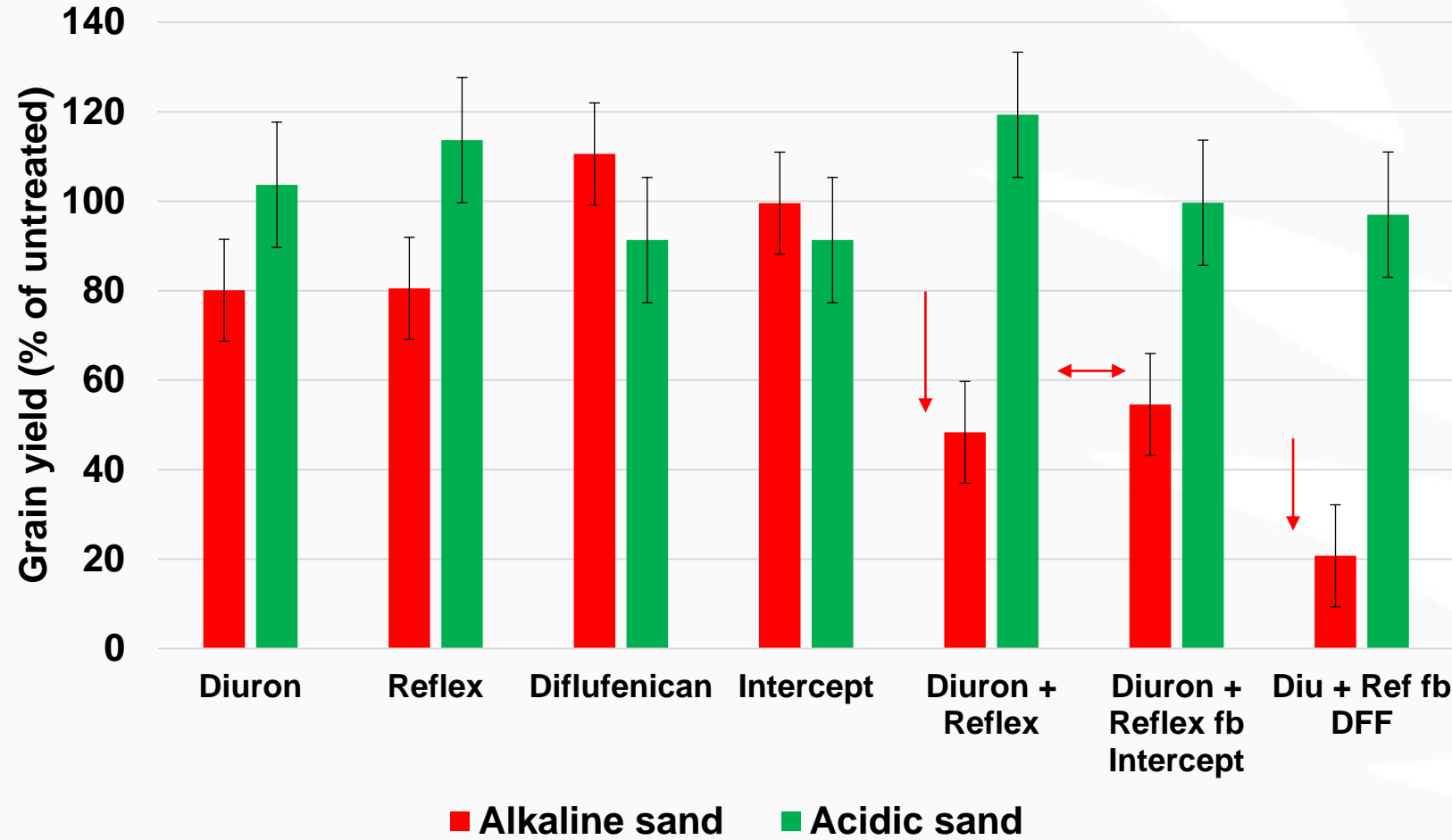
# GRAIN YIELD RESULTS



- No yield loss occurred from these treatments at the acidic site
- Diuron and Reflex caused yield loss of 20% (0.32t/ha) at the alkaline site
- DFF caused bleaching symptoms at the alkaline site
  - Symptoms were no longer present by flowering resulting in no yield loss

Error bars represent LSD (5% level of significance)

# GRAIN YIELD RESULTS



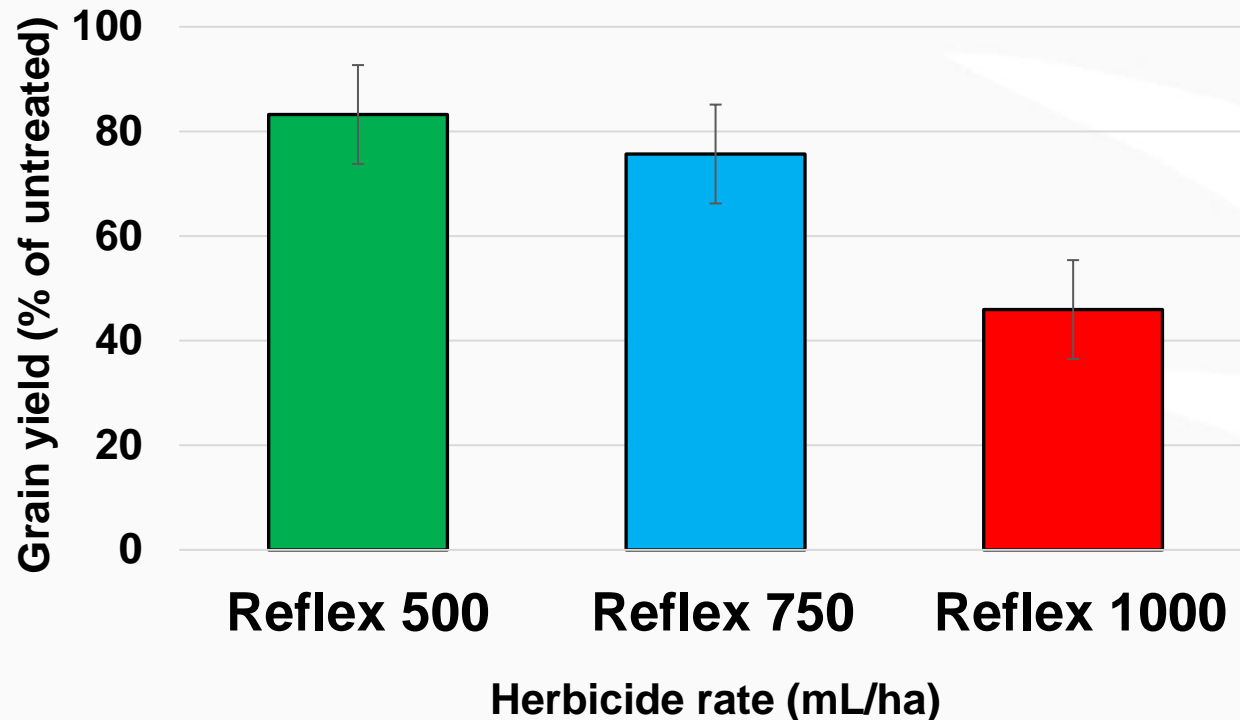
Error bars represent LSD (5% level of significance)

- Combining diuron and Reflex further decreased yield to 48% of untreated at the alkaline site
- Following with post-emergent Intercept did not further decrease yields
- Diuron + Reflex followed by DFF resulted in significant yield loss at the alkaline site



# REFLEX CROP SAFETY RATE RESPONSE

## Bute Alkaline Sand Trial 2021



\*Please note this trial is separate from the earlier results. Rolling occurred immediately after sowing.



- Finding a safe rate for lentils on alkaline sands is key to limiting crop damage
- Reflex IBS at 500mL/ha resulted in a 17% reduction in yield from the untreated control
- The yield loss was 24% and 54% when used at the rates 750 and 1000mL/ha, respectively



# REFLEX CHLOROSIS SYMPTOMS





# ALFORD ALKALINE SITE

6<sup>th</sup> September 2021



**Control plot (nil herbicide)**

6<sup>th</sup> Sep NDVI = 0.53

Average yield = 1.61 t/ha



**Diuron 830g/ha**

6<sup>th</sup> Sep NDVI = 0.36

Average yield = 1.29 t/ha



**Reflex 1000mL/ha**

6<sup>th</sup> Sep NDVI = 0.43

Average yield = 1.29 t/ha



# Take home messages

- **Reflex<sup>®</sup> (Group 14 herbicide)**
  - Provided effective control of broadleaf weeds such as bifora, Indian hedge mustard, wild turnip, common sowthistle and capeweed
  - Including populations resistant to Group 2 imidazolinone herbicides
- **IMI herbicides still continue providing excellent control** of some broadleaf weeds
  - If there is no resistance
- **Broad-spectrum broadleaf weed control was achieved**
  - Reflex<sup>®</sup> in combination with registered herbicides including Group 2, 5 and 12 herbicides
- **Herbicide strategies on high-risk alkaline sandy soil types** needs careful planning to balance between avoiding crop damage and achieving adequate weed control.