

Irrigation of Cocksfoot seed crops in New Zealand

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ADDING VALUE TO THE BUSINESS OF CROPPING

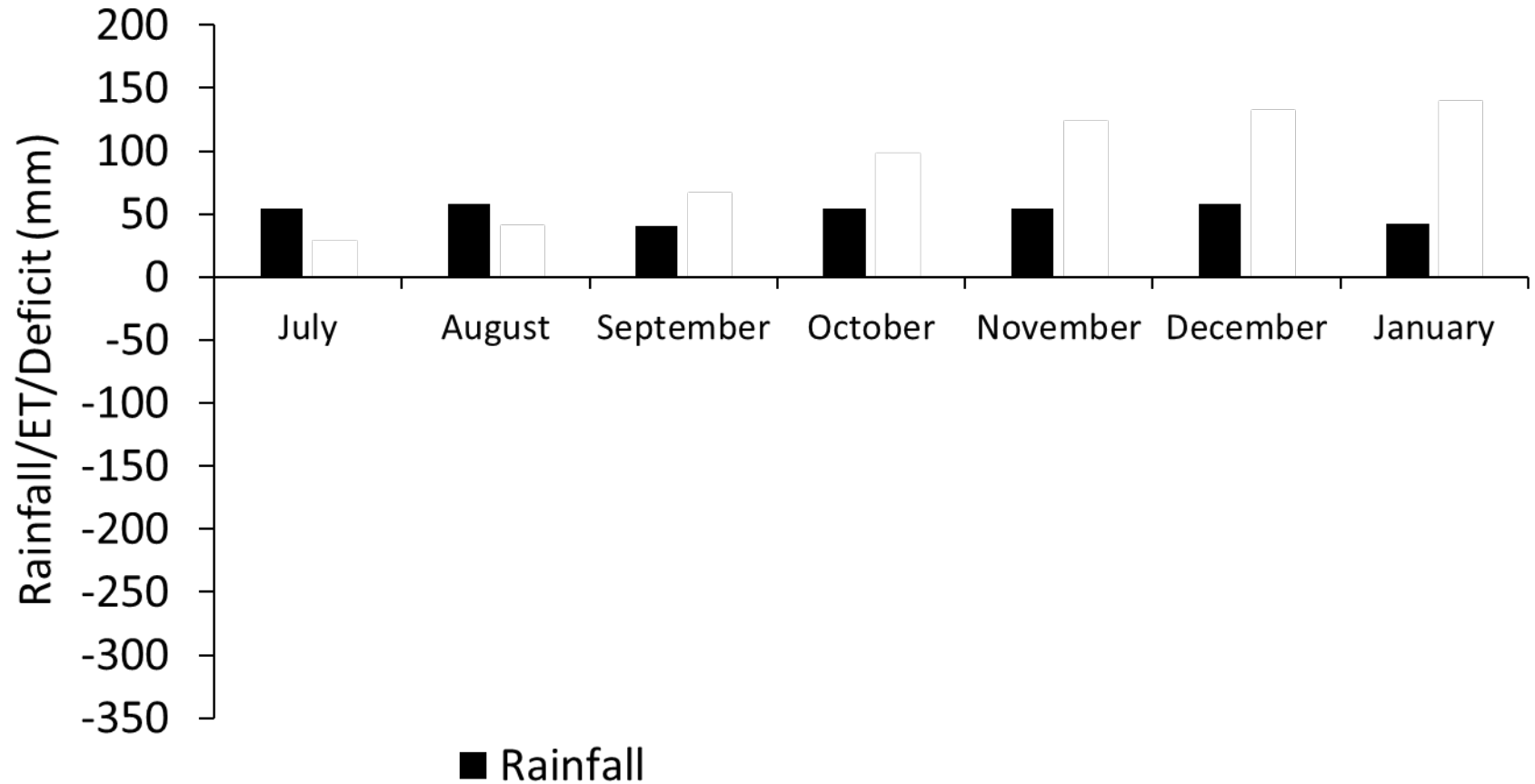


Background

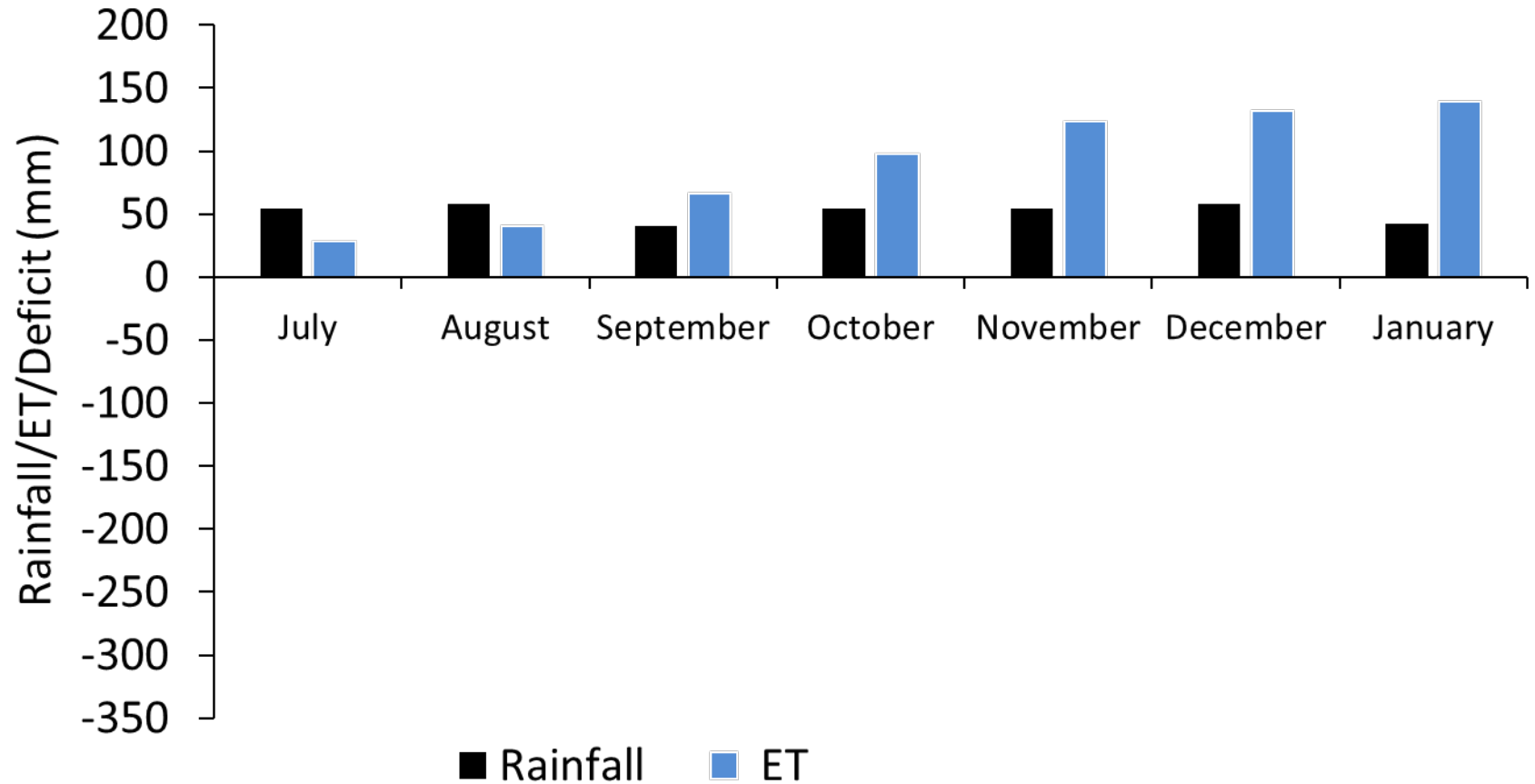
- Variable soils
- Variable rainfall



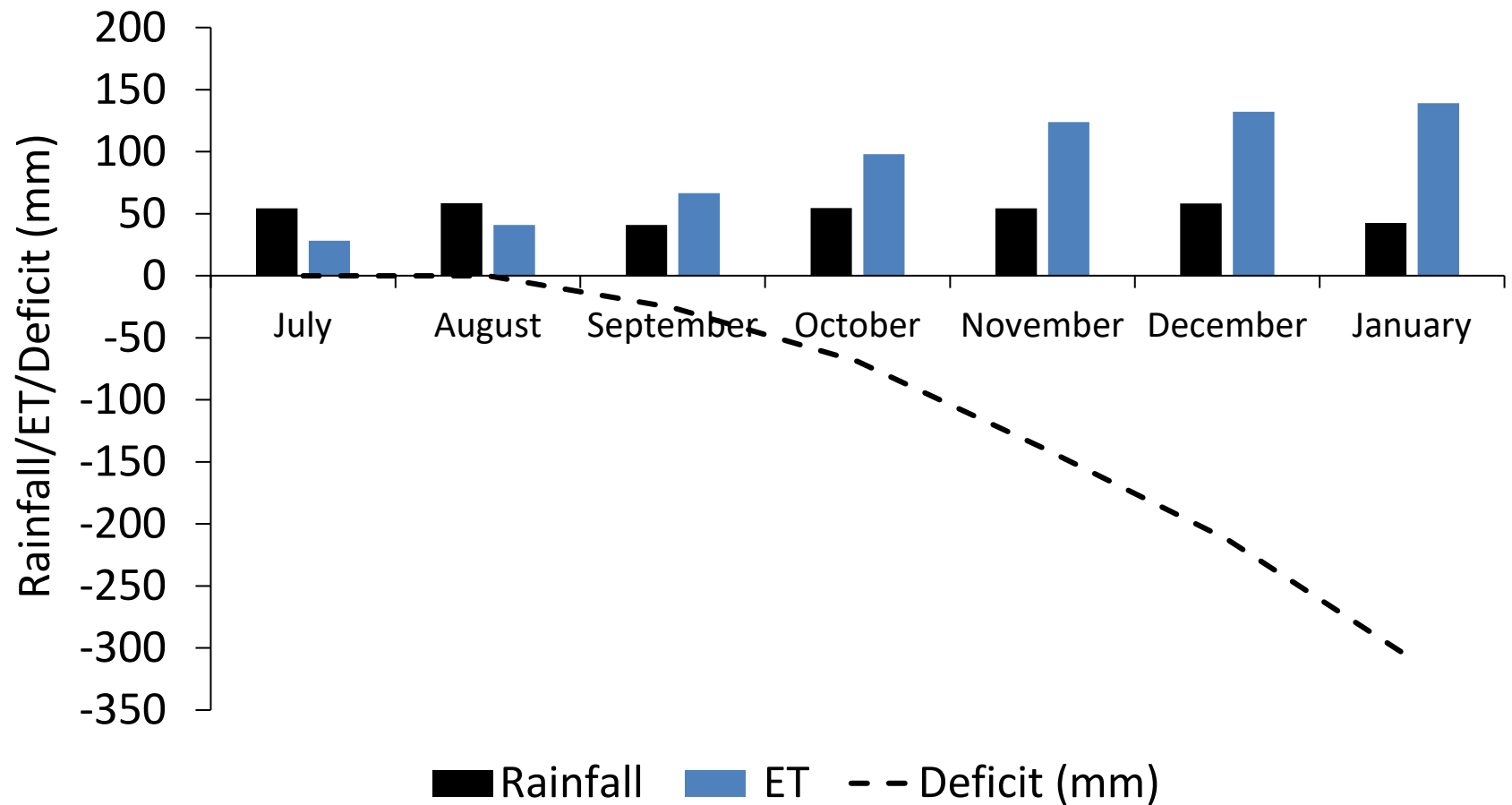
Spring growing season means



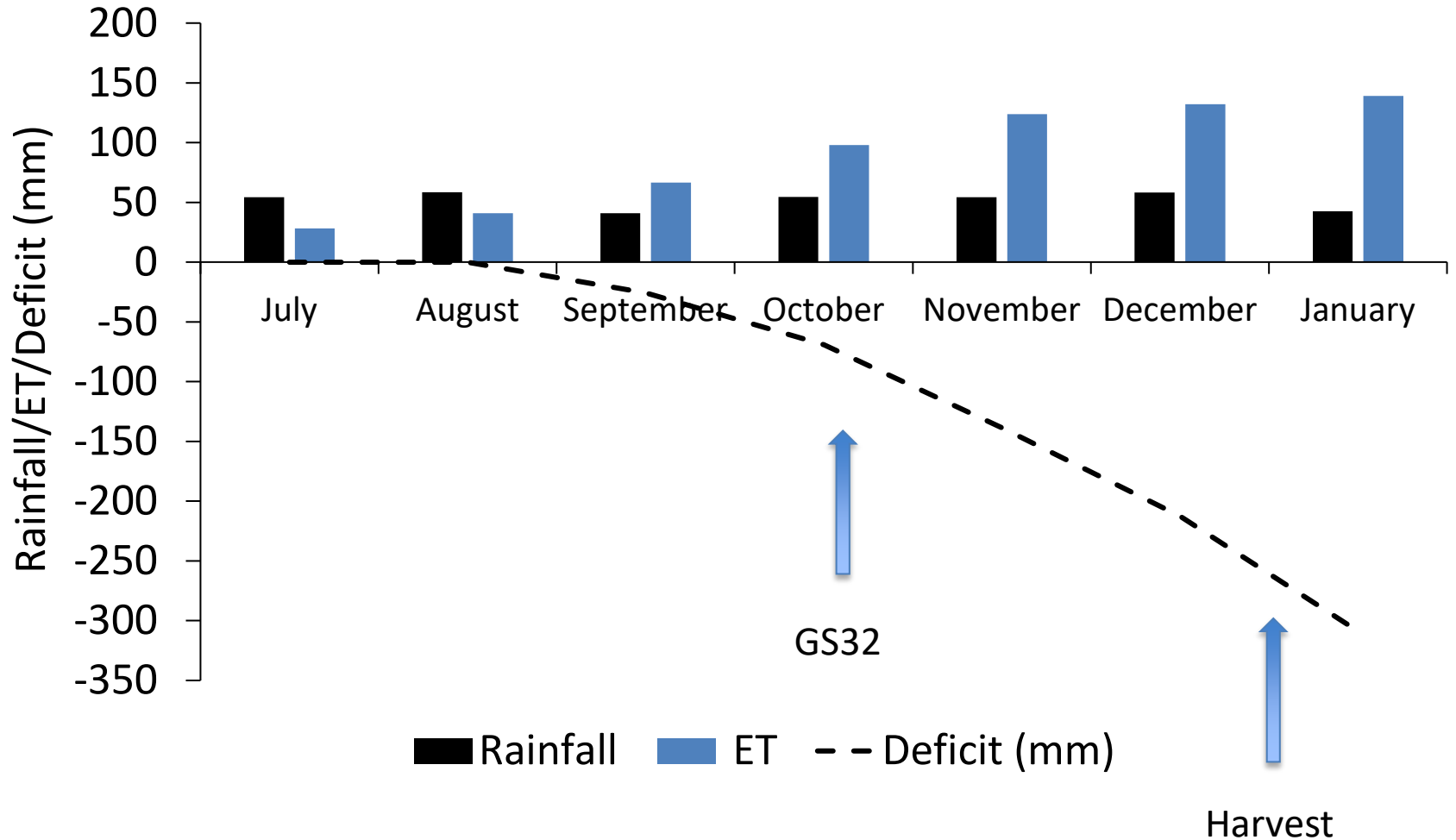
Spring growing season means



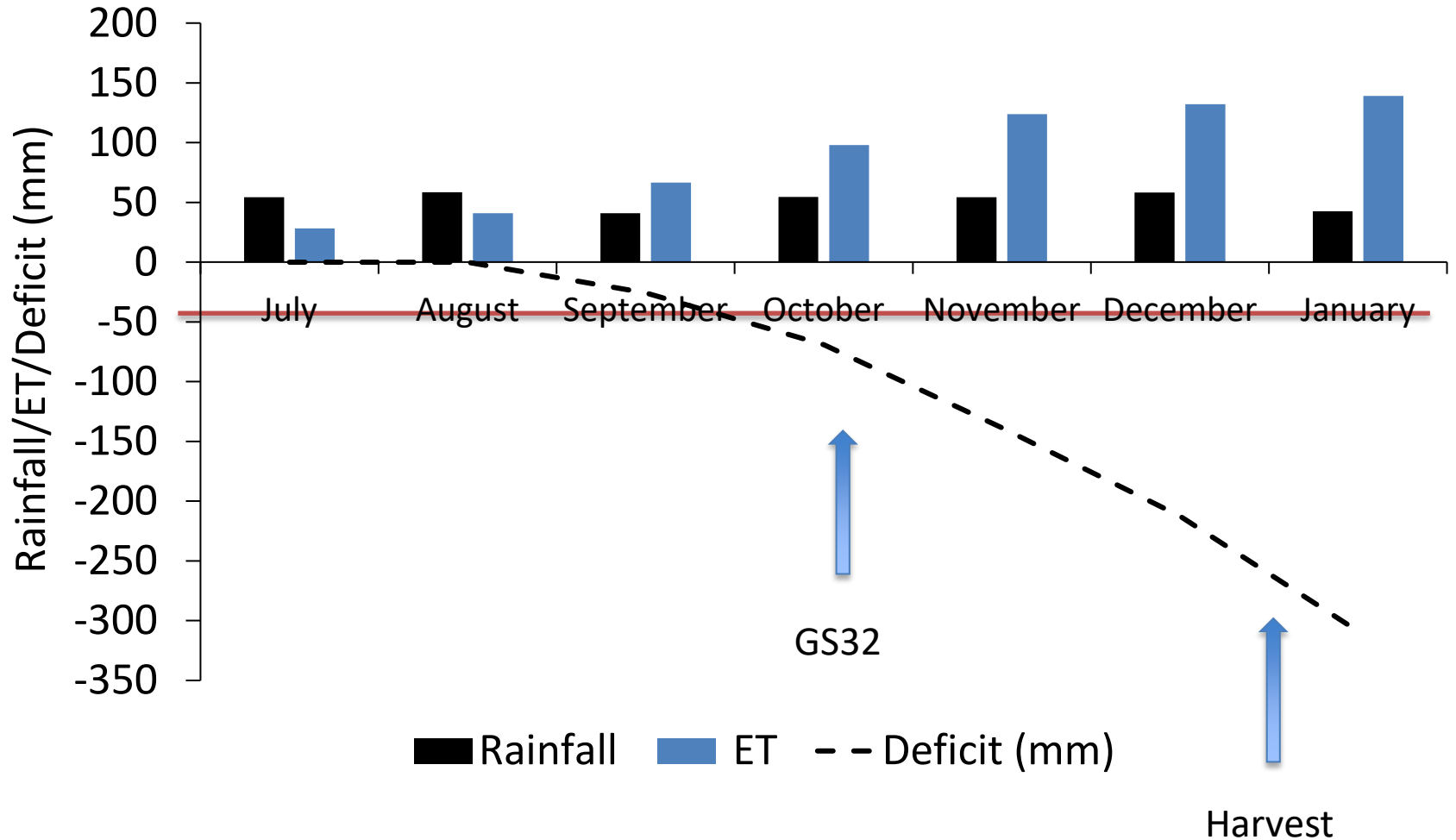
Spring growing season means



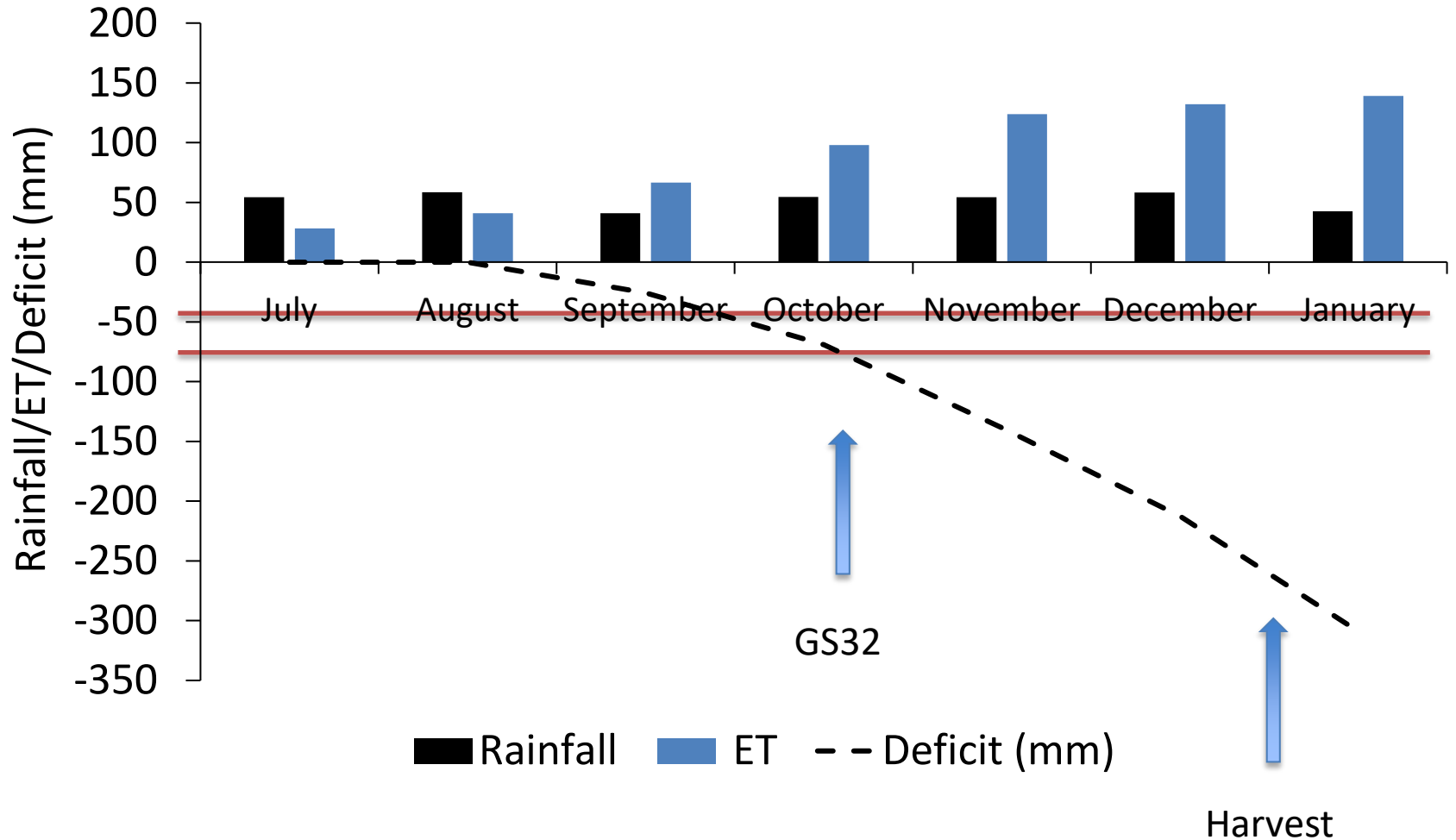
Spring growing season means



Spring growing season means



Spring growing season means



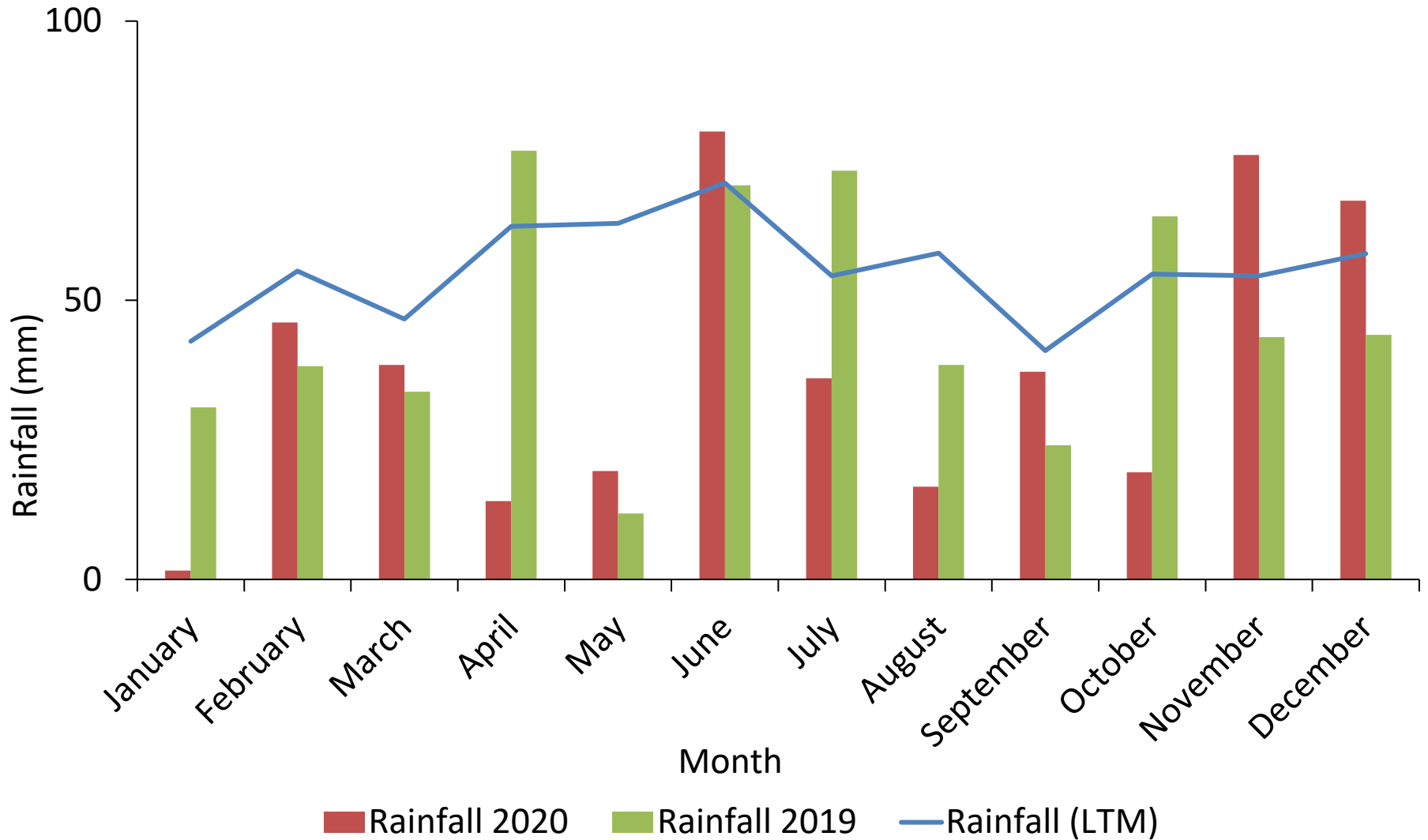
Methods

- Cultivar Saavy
- Measured soil water usage
- Irrigation applied via a trickle tape system
- Machine harvested





Climate during 2019 and 2020



Results – applied irrigation

Treatment	Applied water (mm)	
	2019/20	2020/21
1 No irrigation	0	0
2 Mid drought f.b. MWU	148	155
3 MWU until flowering	115	125
4 MWU until early seed fill	138	210
5 MWU until mid seed fill	198	250
6 MWU	263	280
7 50% of MWU	141	140



Results – measured deficit

Treatment	Applied water (mm)		Maximum measured deficit (mm)	
	2019/20	2020/21	2019/20	2020/21
1 No irrigation	0	0	108	104
2 Mid drought f.b. MWU	148	155	97	77
3 MWU until flowering	115	125	96	99
4 MWU until early seed fill	138	210	94	73
5 MWU until mid seed fill	198	250	54	71
6 MWU	263	280	50	66
7 50% of MWU	141	140	77	71

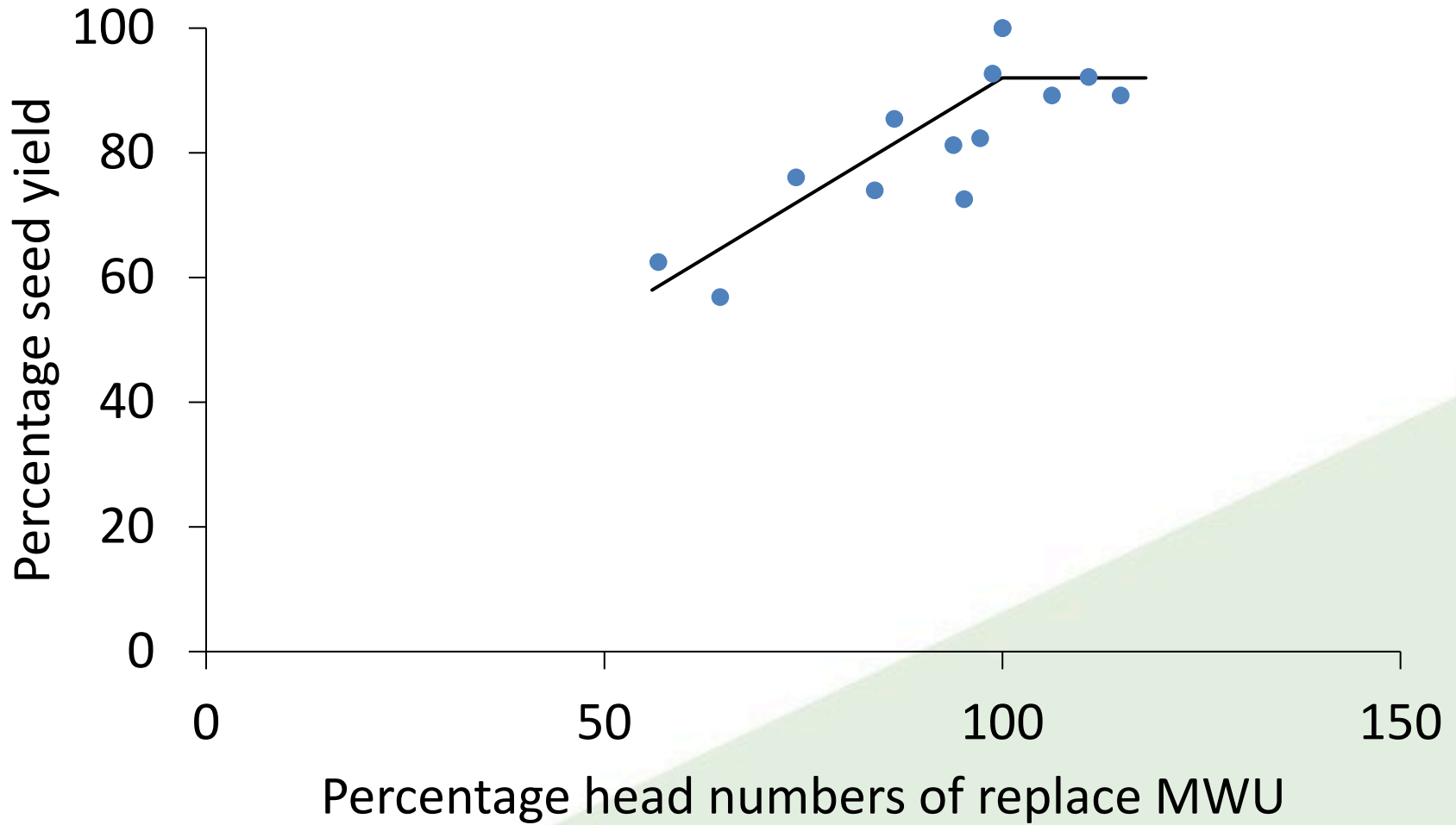


Results – Seed yield

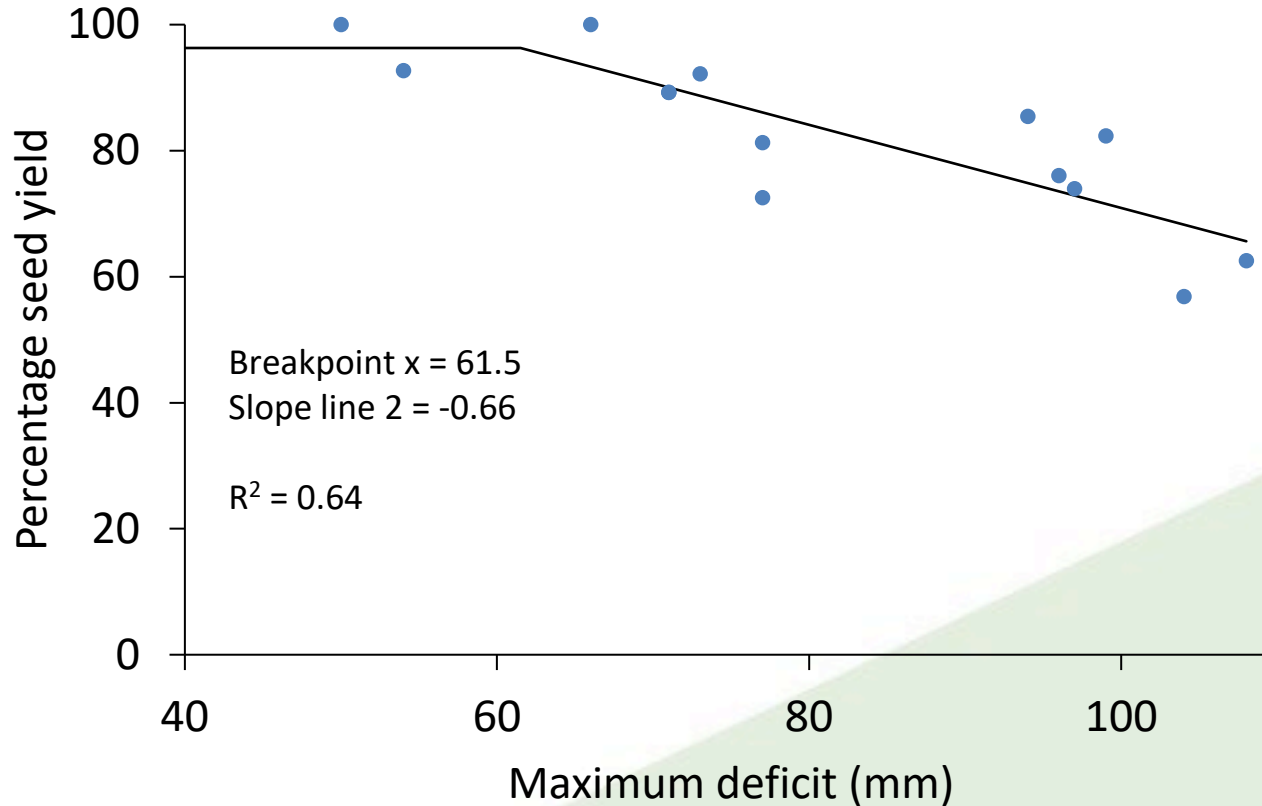
Treatment	Applied water (mm)		Maximum measured deficit (mm)		Seed yield (kg/ha)	
	2019/20	2020/21	2019/20	2020/21	2019/20	2020/21
1 No irrigation	0	0	108	104	600	580
2 Mid drought f.b. MWU	148	155	97	77	710	740
3 MWU until flowering	115	125	96	99	730	840
4 MWU until early seed fill	138	210	94	73	820	940
5 MWU until mid seed fill	198	250	54	71	890	910
6 MWU	263	280	50	66	960	1020
7 50% of MWU	141	140	77	71	780	910
				P value	<0.001	<0.001
				LSD _{0.05}	103	136



Head numbers



Influence of deficit



1 mm deficit = 14 kg/ha or \$63



Conclusion

- Must understand soil water supply.
- Yield loss occurs regardless of drought timing.
- Each 1 mm of deficit above the critical = 14 kg/ha seed reduction

