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Which crop inputs have the greatest impact on canola yield?

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Canada

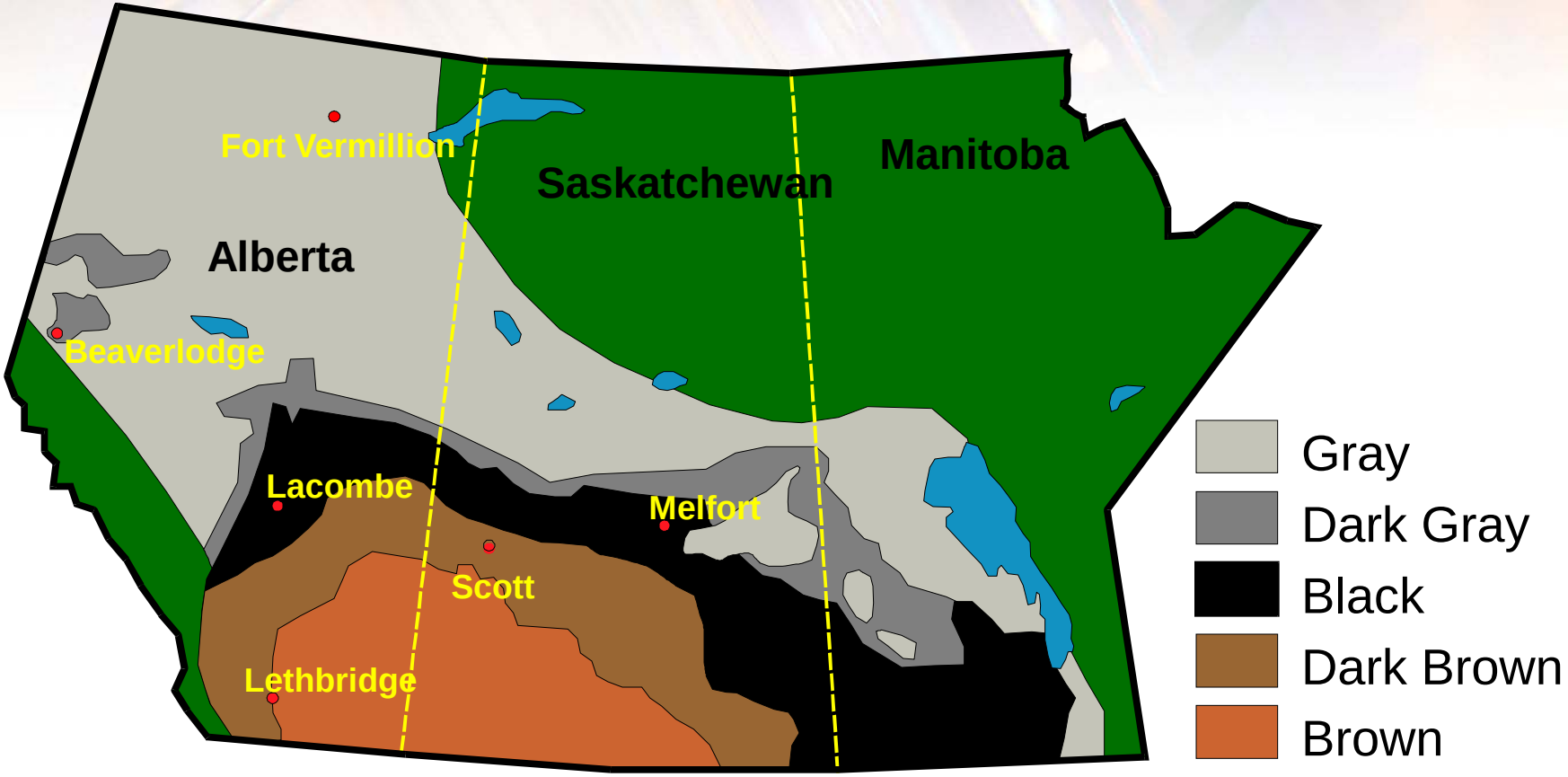
Background

- Canola is an important crop in western Canada – 15 million acres
- Study was initiated after the drought years of 2001/2002 and when crop prices were low
- Farmers wanted to reduce production costs and minimize economic risk
- Hybrid cultivars were being introduced but higher seed costs were a concern
- Seed, fertilizer and herbicide inputs were the focus of the study

Materials and Methods

- Compare ‘full’ input package with ‘empty’ input package
- Remove inputs from full package or add them to empty package
- Input treatments were applied in four consecutive years within a canola-barley-canola-barley rotation (both crops present each year)
- Study conducted at 6 sites on the Canadian prairies
- 24 site-years of data

Study Sites and Soil Zones



- **Agriculture and Agri-Food Canada sites (2005-2008)**

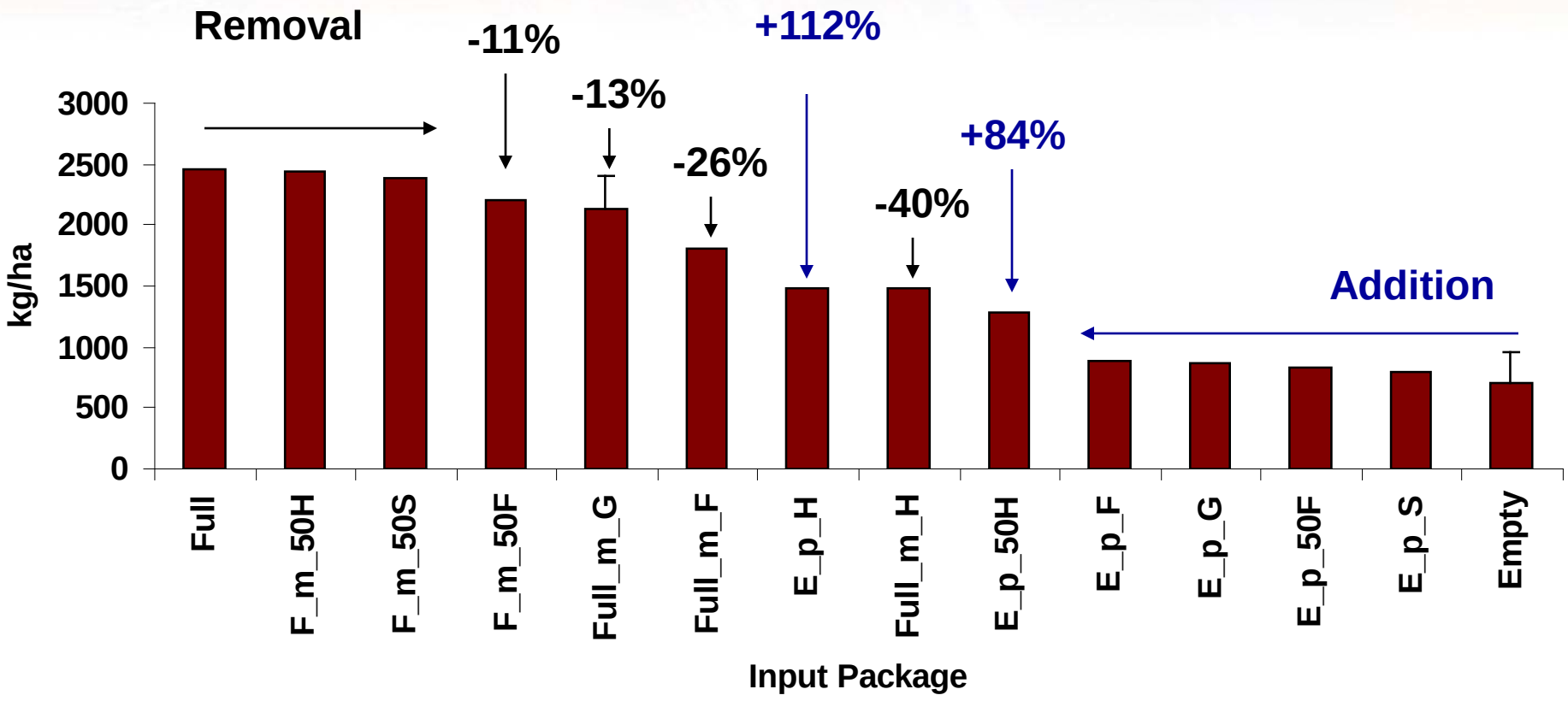
Treatments

- Genetics: hybrid or open-pollinated (OP) cultivars of Liberty Link canola
- Seeding rate: 75 or 150 seeds/m^2
- Fertilizer rate: 0, 50 or 100% of soil test recommendation
- In-crop herbicide rate: 0, 50 or 100% of registered rate (glufosinate plus clethodim)

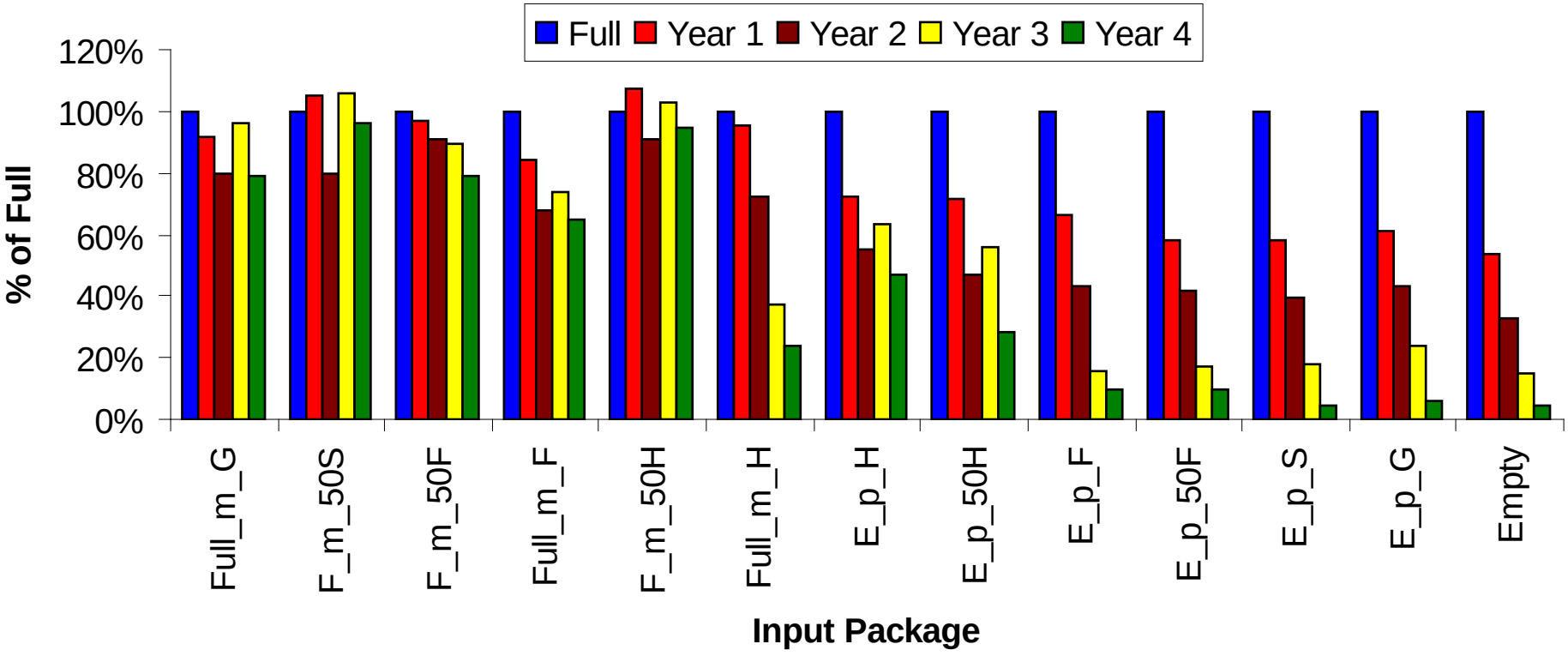
Treatments

1. Full package
2. Full minus best genetics
3. Full minus 50% seed
4. Full minus 50% fertilizer
5. Full minus all fertilizer
6. Full minus 50% herbicide
7. Full minus all herbicide
8. Empty package
9. Empty plus best genetics
10. Empty plus 100% seed
11. Empty plus 50% fertilizer
12. Empty plus all fertilizer
13. Empty plus 50% herbicide
14. Empty plus all herbicide

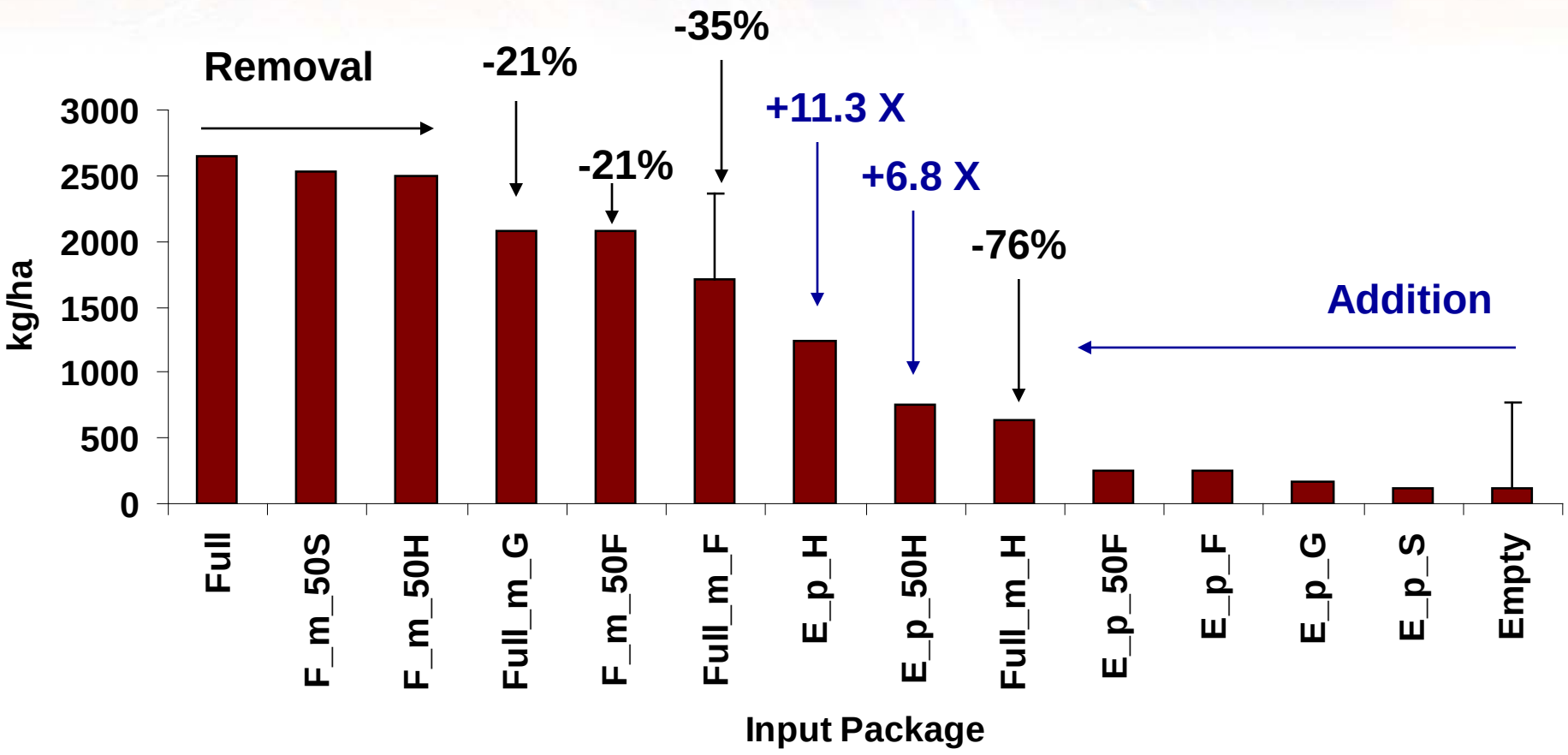
Input Removal and Input Addition Effects on Canola Yield – All Years



Cumulative Effects of Adding or Removing Inputs on Canola Yield



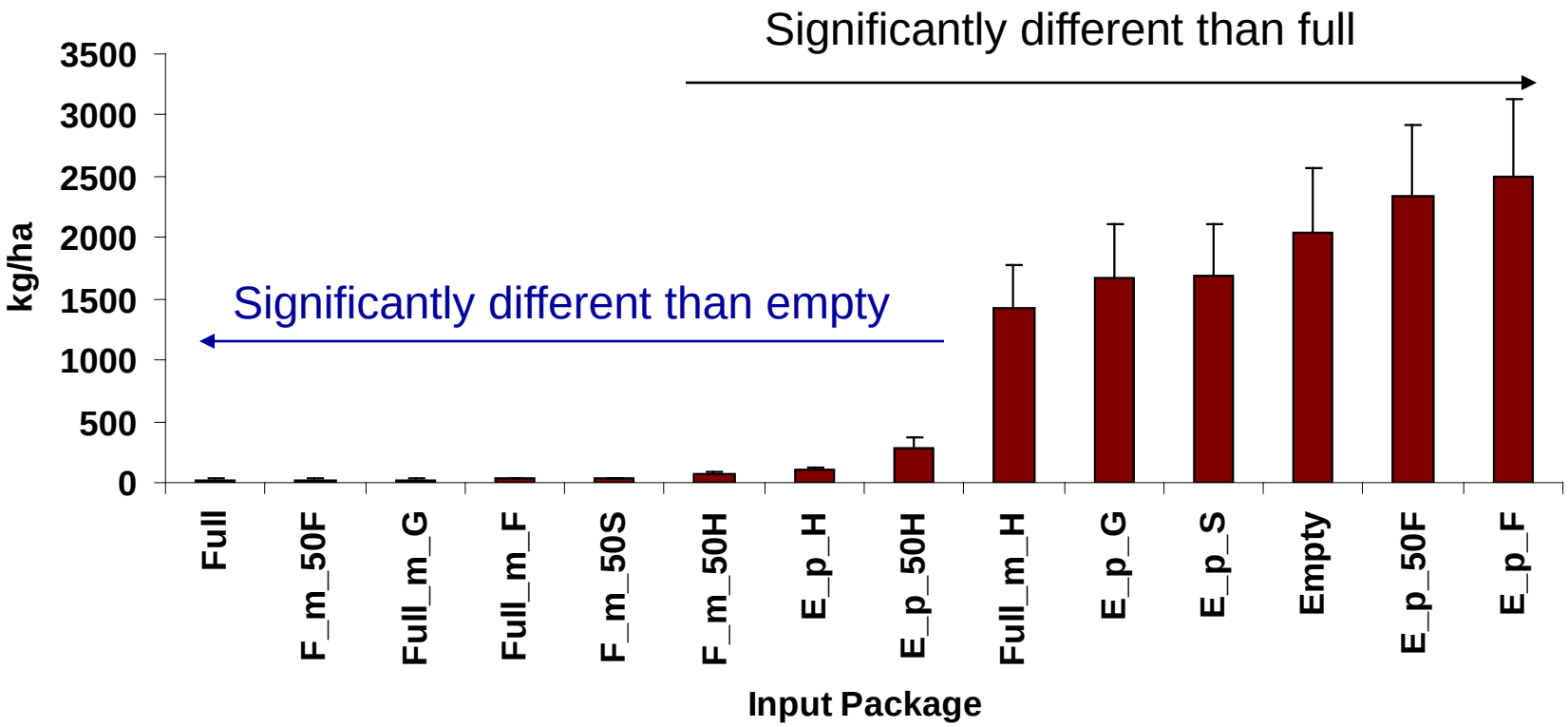
Input Removal and Addition Effects on Canola Yield – Final Year



Input Effects on Canola Yield

	Yield increase [kg/ha]	
	All Years	Final Year
Genetics	179	56
Seed rate	90	6
Fertilizer	195	138
Herbicide	783	1125
TOTAL	1248	1325
Combined	1764	2532
Synergism	516	1207

Input Removal and Input Addition Effects on Weed Biomass – All Years



Input Effects on Weed Biomass

	Biomass reduction [kg/ha]	
	All Years	Final Year
Genetics	-363	+33
Seed rate	-338	-141
Fertilizer	+450	+1046
Herbicide	-1945	-3490

Conclusions

- Ranking of inputs on canola yield over all years was herbicide > fertilizer=genetics > seeding rate
- Ranking of inputs on canola yield in final year was herbicide > fertilizer > genetics > seeding rate
- Some inputs could be reduced for 1-2 years but not over an extended period
- A combination of desirable inputs increased yield more than the sum of individual inputs

Conclusions

- Adding a single input to the empty package had limited benefit with the exception of herbicide
- Competitive cropping systems (hybrid cultivars, adequate seed rates) can lessen dependence on herbicides for weed management
- Economic analysis is still to be completed

Acknowlegments

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