

Updates on the Efficacy of Fungicides for Rust Control in Sunflower

Khalid Y. Rashid

**Agriculture and Agri-Food Canada,
Morden Research Station, Morden Manitoba**



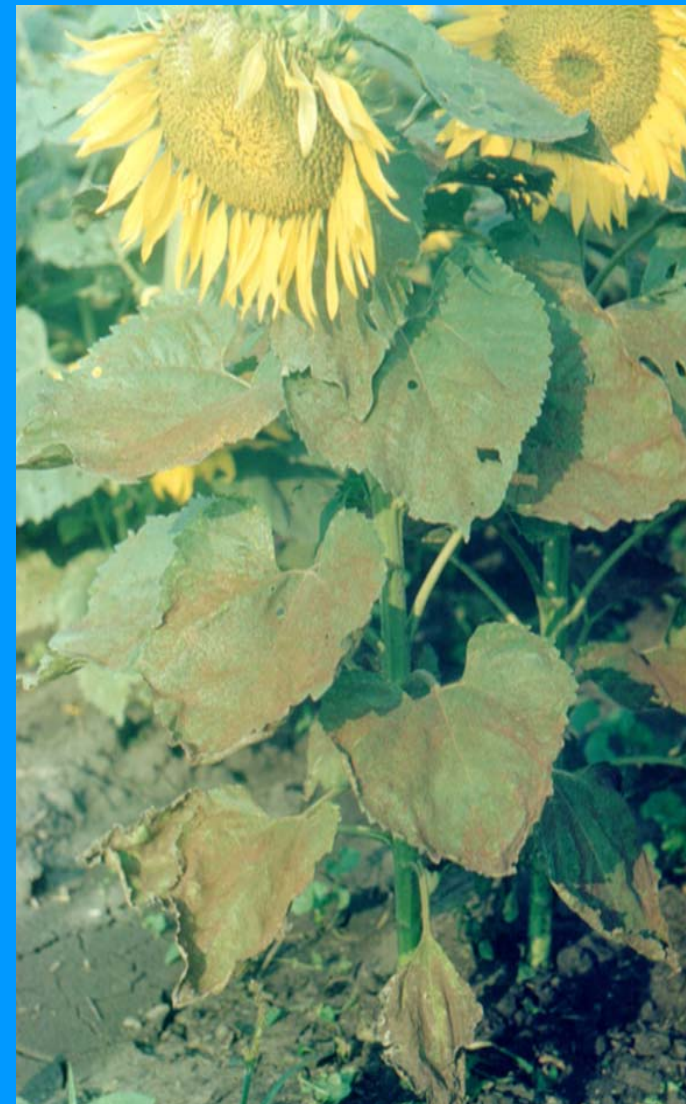
- **INTRODUCTION:**
- **Rust caused by *Puccinia helianthi*.**
- **Major disease affecting sunflower *H. annuus*.**
- **Incidence and severity of epidemics vary between years and regions depending on the environmental conditions, races of rust, and resistance genes in commercial hybrids.**
- **Rust comprised of several virulent races.**
- **Local rust epidemics occur and may cause up to 25% losses in yield and a significant reduction in quality of seed.**

Sunflower rust severity

Mid-season

Late-season

>50% LAI



Prevalence and Severity of Rust in Manitoba

Year	Infested Fields % of Total	Mean Disease % LAI	Range %LAI	Prevalent Races
2007	57%	10%	T-50	3 (300) & 4 (700)
2006	66%	6%	T-40	3 (300) & 4 (700)
2005	27%	8%	T-40	3 (300) & 4 (700)
2004	60%	8%	T-30	3 (300) & 4 (700)
2003	65 %	25	T-80	3 (300) & 4 (700)
2002	50 %	15	T-80	na
2001	27 %	8	T-20	na
2000	40 %	15	5-60	na
1999	60 %	5	T-20	na

Objective:

Lack of genetic resistance to some rust races necessitates the identification of foliar fungicide applications to reduce the impact of this disease on sunflower yield and quality of seed

Materials & Methods

- **Four years study using a confection sunflower hybrid**
- **10 fungicides with three treatments each applied with a back-pack sprayer:**
 - **One Early application after flowering (Figure 2)**
 - **One Late application 2-wks later**
 - **Two applications, Early and Late**
- **Natural rust Inoculum**
- **RCBD with 4-Reps, 3-row plots, 3 meters long**
- **Data on Leaf Area Infected at 10-day intervals**
- **Stem Area Infected at the end of the season**
- **Green leaves at end of season.**

Fungicides used

<u>Fungicide</u>	<u>Chemical % active</u>	<u>Rate ai / ha</u>	<u>Company</u>
Bravo	Chlorothalonil 50	1 kg	Syngenta
Carbendazim	Carbendazim- hydrochloride 4.7	1.25 kg	EERTAVAS
Dithane	Mancozeb 80 Ethyl carbamate	2.25 kg	Dow AgroSciences
Folicur	Tebuconazole 39	0.125 kg	BAYER
Headline	Pyraclostrobin 25	0.15 kg	BASF
Lance	Boscalid 25	0.25 kg	BASF
LEM Exp.	DPX-LEM17	0.35 kg	DuPont
Proline	Prothioconazole 48	0.2 kg	BAYER
Stratego	Propiconazole 12.5 Trifloxystrobin 12.5	0.18 kg	BAYER
Tilt	Propiconazole 25	0.125 kg	Syngenta

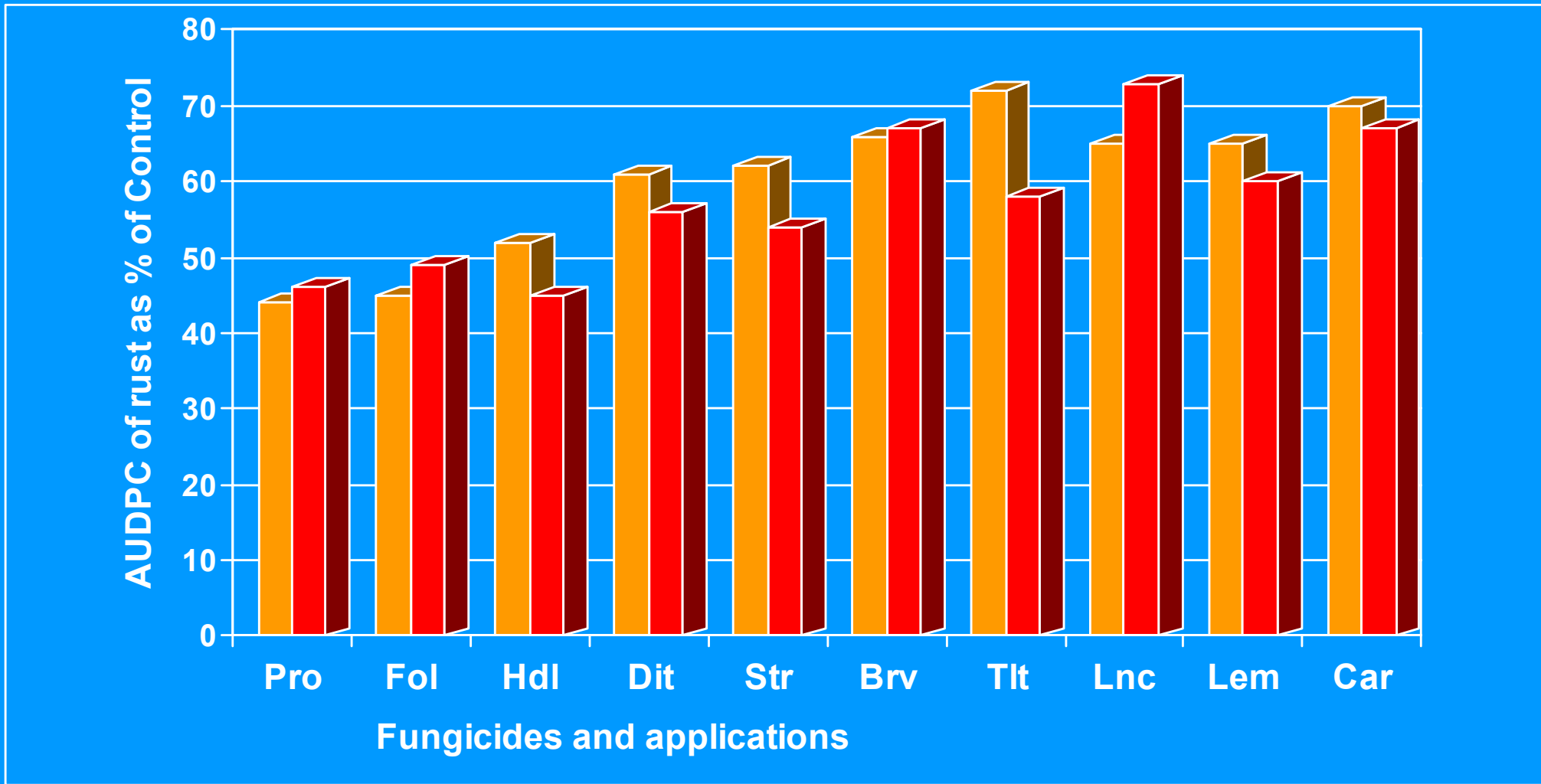
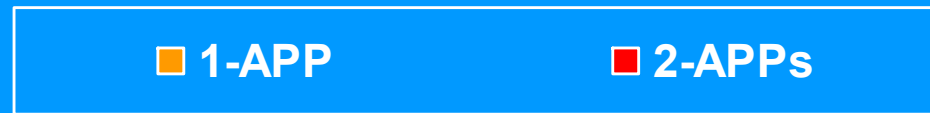
Early fungicide application at full flowering



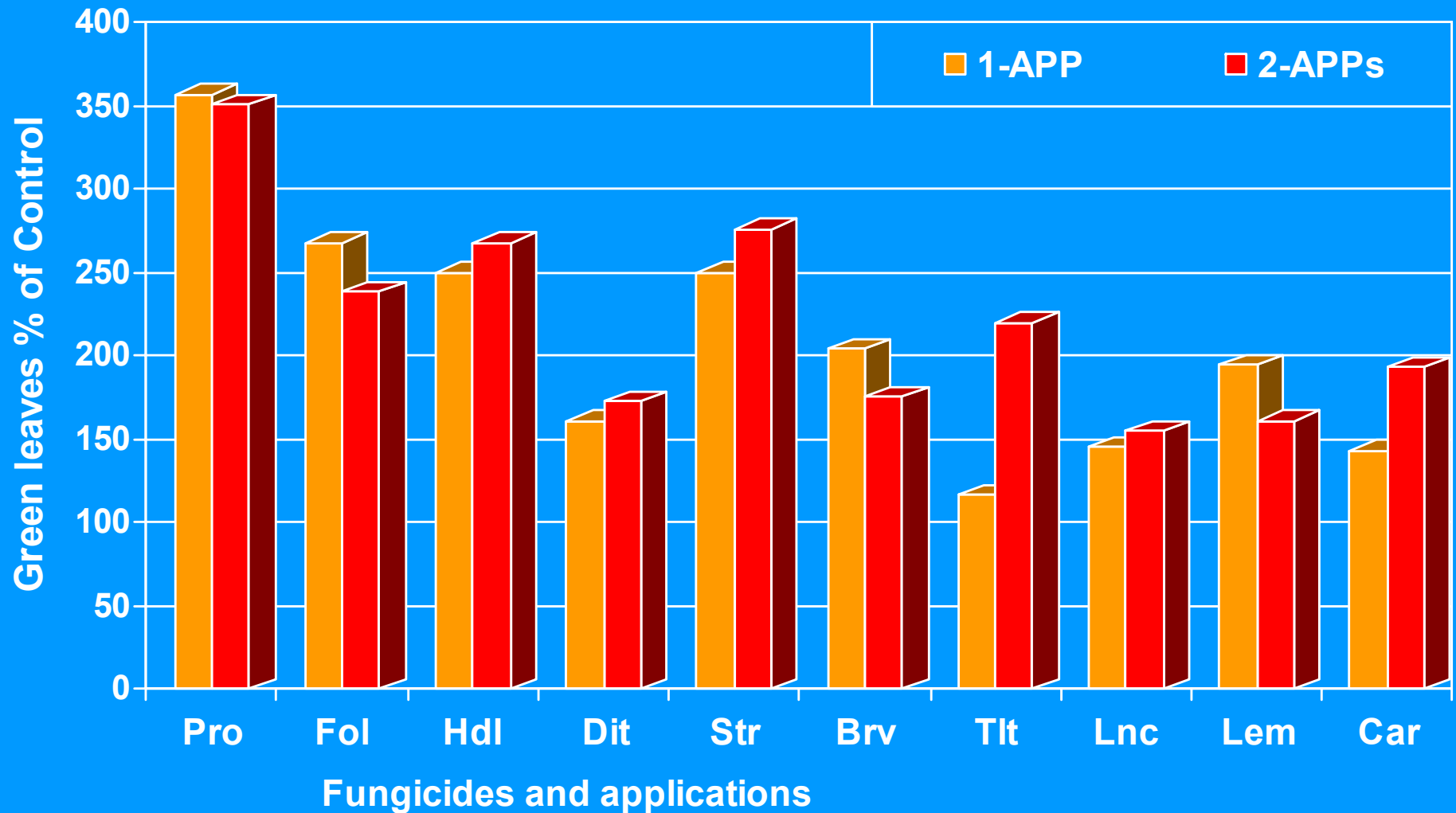
- **RESULTS:**

- All fungicides reduced the rust incidence and severity as expressed in the Area under the disease progress curve (AUDPC) in the four years of the study.
- AUDPC was reduced by 40-50%, and yield was improved by 10-20% with Proline, Folicur Headline, Dithane and Stratego.
- Bravo, Tilt and Lance reduced AUDPC by 30% and had no significant improvement in yield.
- The effectiveness of early and / or late applications varied between years depending on the earliness of the rust infection and disease development.

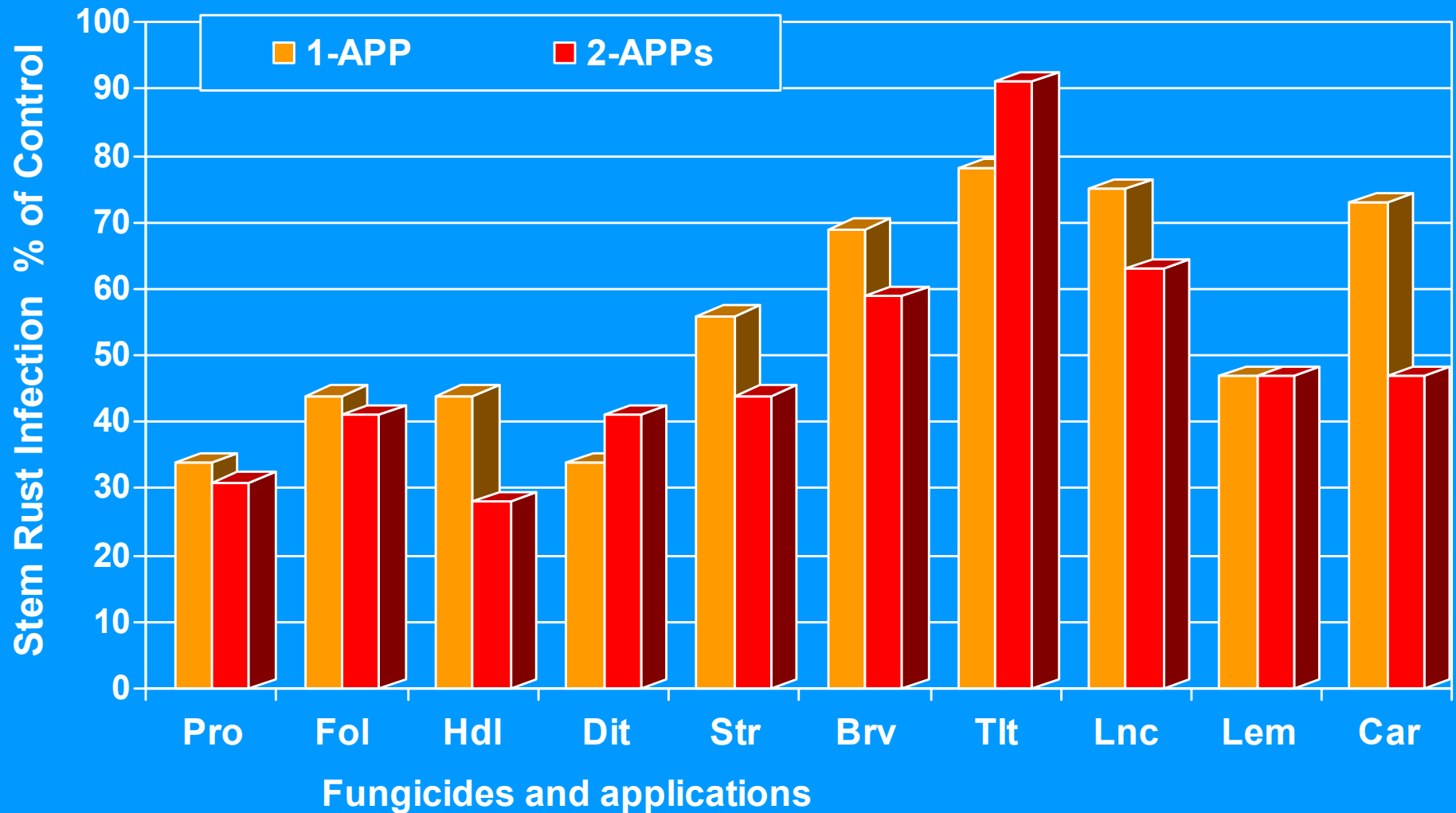
Effects of fungicides on AUDPC of rust, 04-07



Effects of fungicides on Green leafin rust infected plots, 2004-07



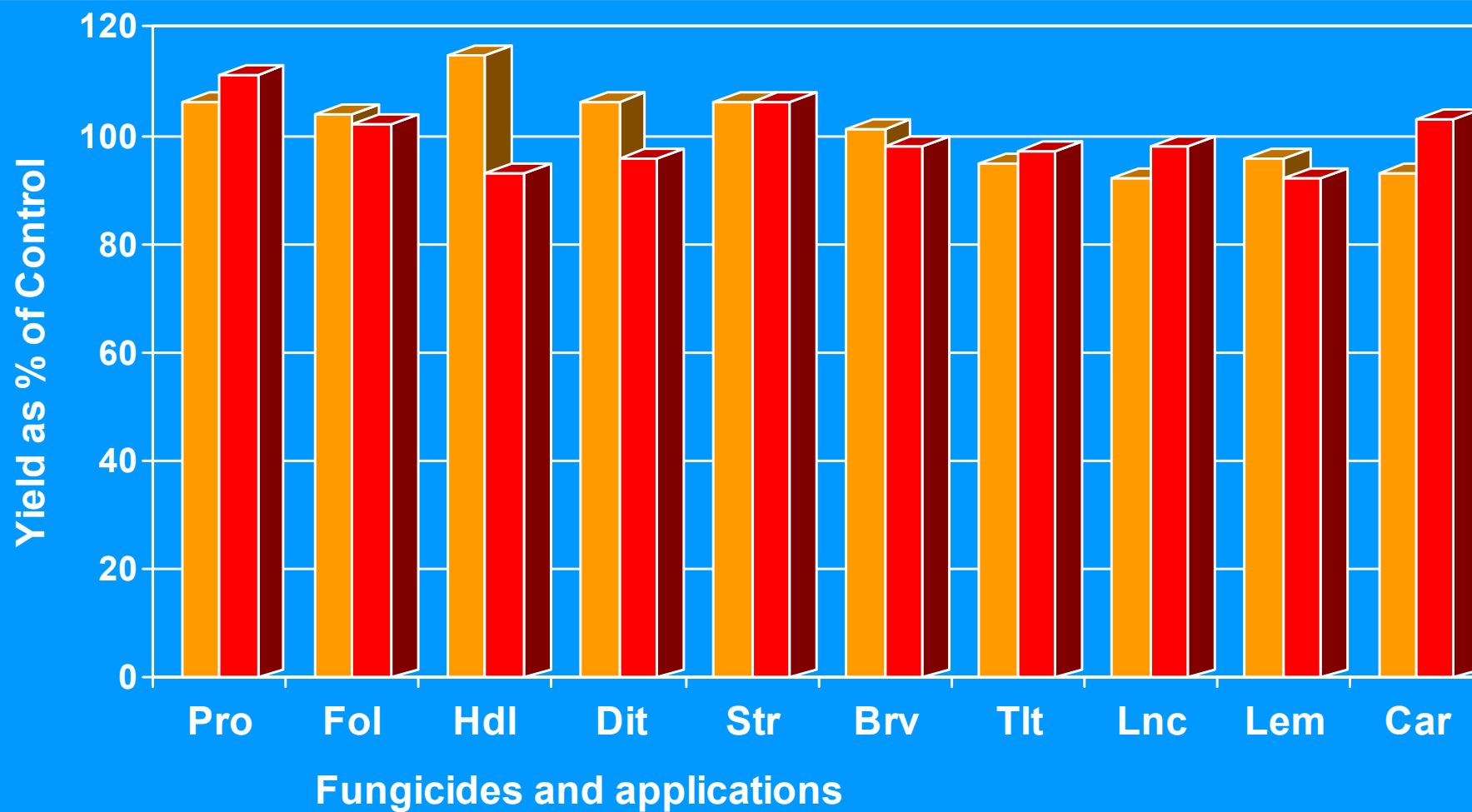
Effects of fungicides on Stem infection in rust infected plots, 2004-07



Effects of fungicides on sunflower yield, 04-07

1-APP

2-APPs



CONCLUSIONS

- ☺ Severe rust epidemics in 2003.
- ☺ All fungicides reduced rust severity & AUDPC.
- ☺ Proline, Folicur, Headline, Dithane, Stratego reduced rust (40-50%) and improved yield (10-20%)
- ☺ Other fungicides reduced rust by up to 30% but did not significantly improve yield.
- ☺ Early application is the most effective
- ☺ Two applications generally better than one.

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MORDEN RESEARCH STATION

