

Effects of Fungicides in Controlling Sunflower Rust

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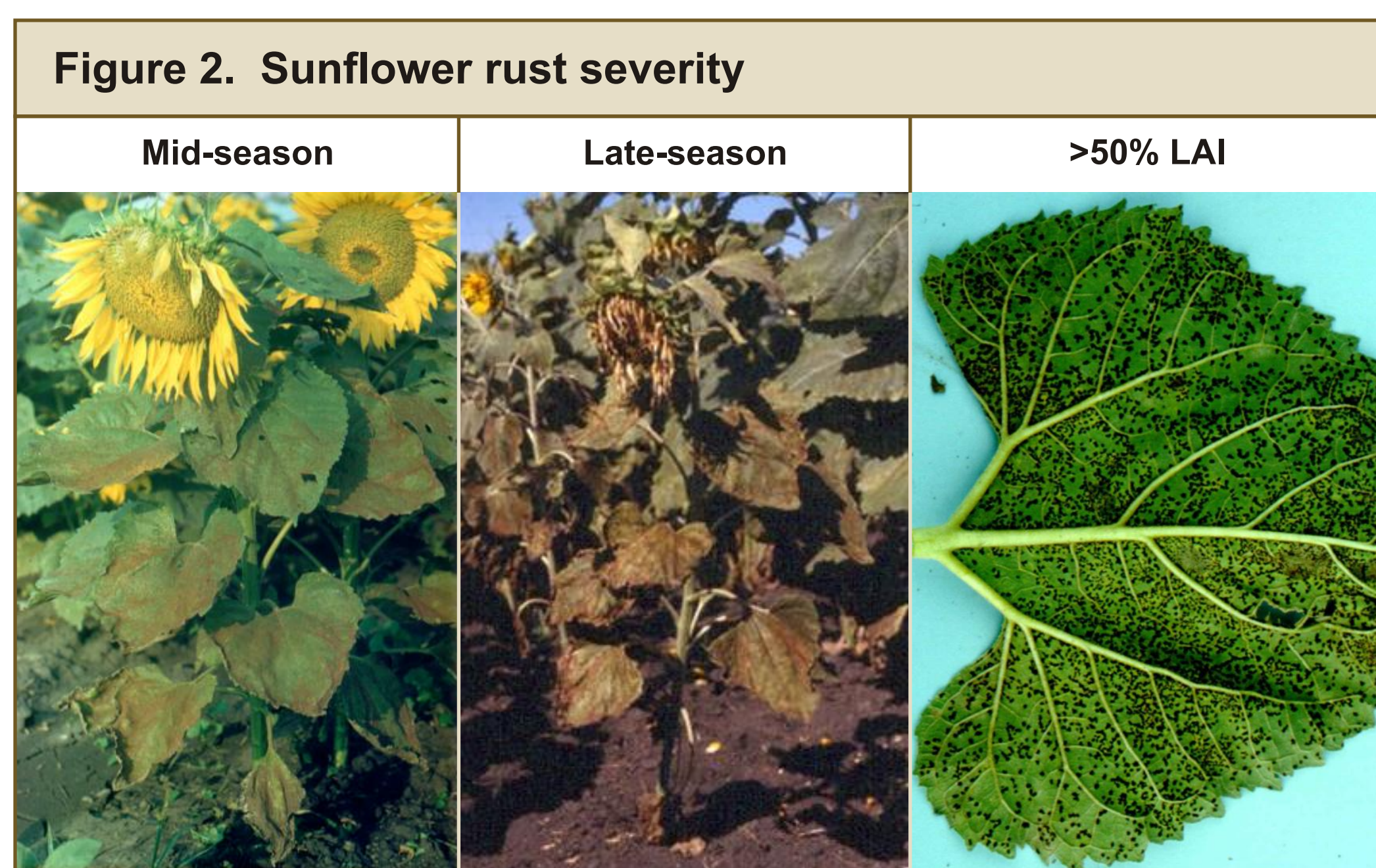


Lack of genetic resistance to some rust races necessitates the identification of foliar fungicide applications to reduce the impact of this disease on sunflower yield and quality of seed



INTRODUCTION

Rust caused by *Puccinia helianthi* Schwein is a major disease affecting sunflower (*Helianthus annuus* L.) in Canada and the USA (Figure 2). The Incidence and severity of the epidemics vary between years and regions depending on the environmental conditions, the predominant races of rust and the specific genes for resistance in the various commercial hybrids (Table 1). This pathogen is comprised of several races virulent on most commercial sunflower hybrids. Local rust epidemics occur and may cause up to 25% losses in yield as well as a significant reduction in quality of seed. The objective of this study was to identify effective fungicide applications that will reduce the severity of rust epidemics and their impact on seed quality.



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

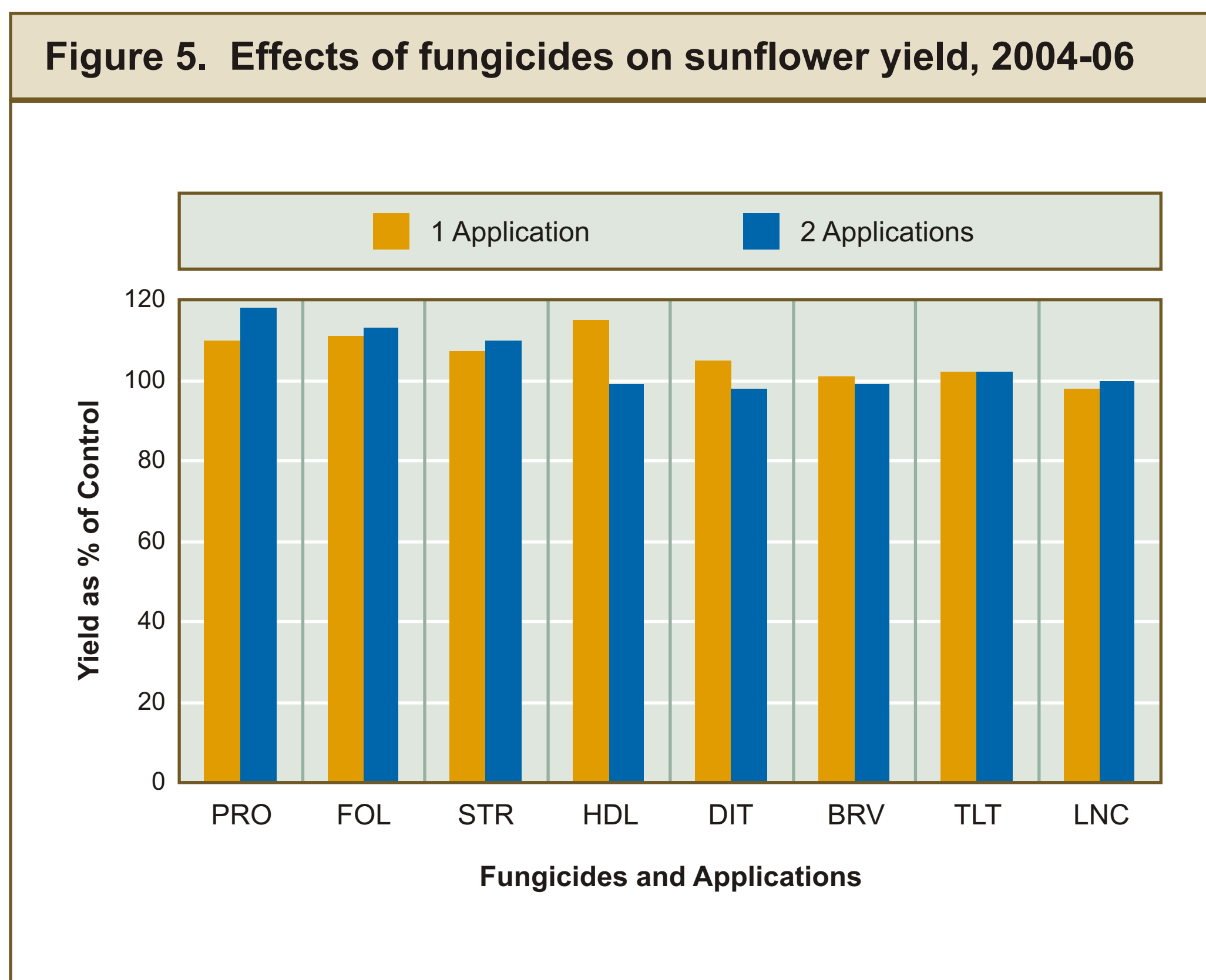
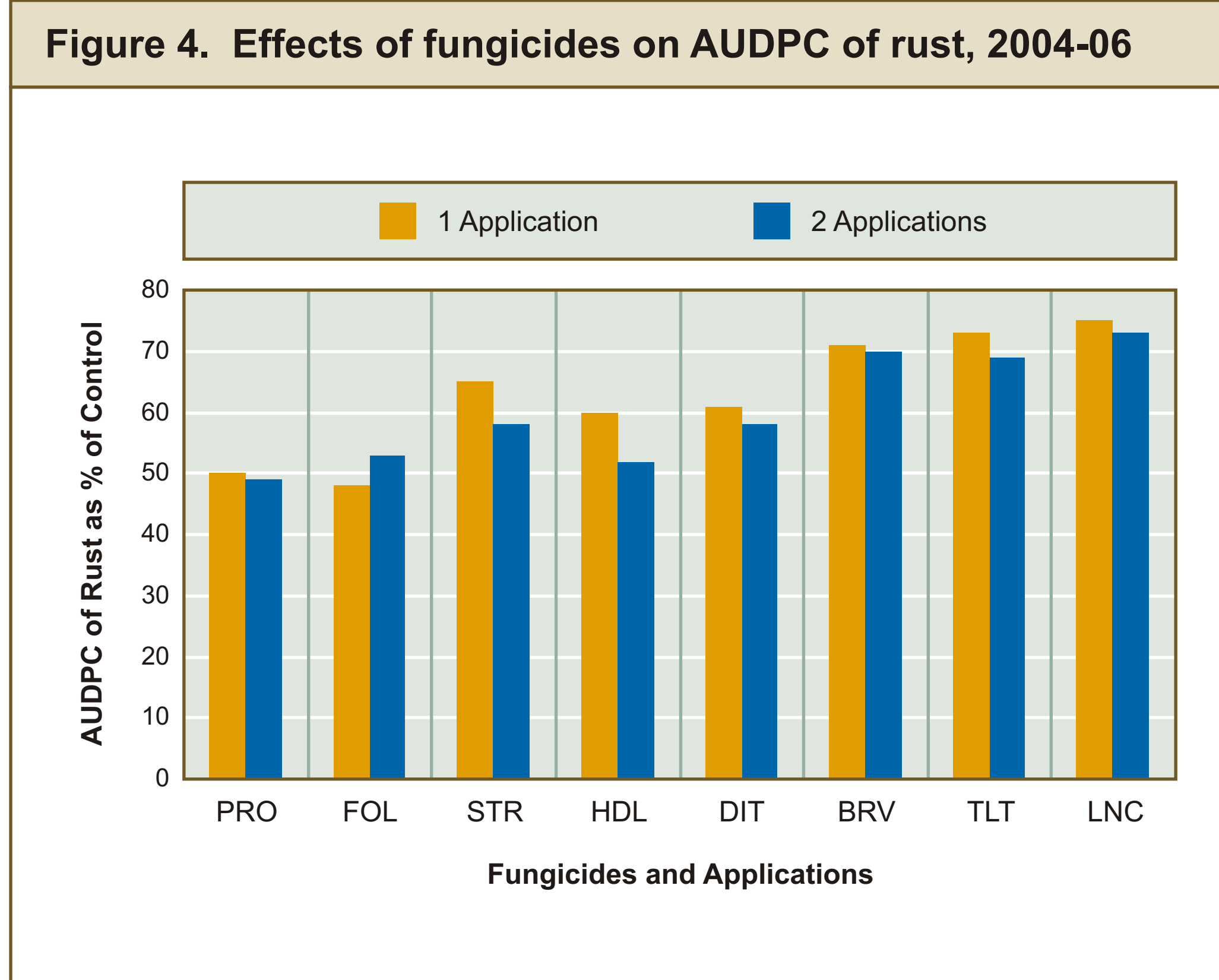


MATERIALS & METHODS

- Four year study using a confection sunflower hybrid
- 10 fungicides with three treatments each applied with a back-pack sprayer:
 - One Early application after flowering (Figure 3)
 - One Late application 2 weeks 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

RESULTS

All fungicides used and treatments applied reduced the rust incidence and severity as expressed in the Area under the disease progress curve (AUDPC) in the three years of the study. The AUDPC of rust was reduced by 40-50% (Figure 4), and yield was improved by 10-20% with Proline, Folicur Headline, Dithane and Stratego (Figure 5). The other fungicides Bravo, Tilt and Lance only reduced AUDPC by 30% and had no significant improvement in yield. The effectiveness of an early or late application or both varied between years depending on the earliness the rust infection and disease development.



CONCLUSIONS

- New variations of races 300 (#3) & 700 (#4)
- Severe rust epidemics in 2003
- All fungicides reduced rust severity & AUDPC
- Proline, Folicur, Headline, Stratego, Dithane reduced rust (40-50%) and improved yield (10-20%)
- Other fungicides reduced rust by up to 30% but did not significantly improve yield
- Two applications generally better than one

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