
Reaction of Canada Western Red Spring and Canada Prairie Spring Cultivars to Leaf Spots in Southern Saskatchewan

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Introduction

Leaf spots are presently the most widespread diseases of wheat in Saskatchewan (Fernandez et al., 1997; 1998). None of the cultivars currently registered in western Canada are resistant to this disease complex (Varieties of Grain Crops, 1998).

The most common leaf spot diseases in western Canada are tan spot and the septoria leaf blotch complex (Fernandez et al., 1997; Gilbert et al., 1997). A study of 12 wheat cultivars determined differences among quality classes and species in the relative susceptibility to the various leaf spot pathogens (Fernandez et al., 1996). However, differences in the reaction to leaf spot diseases among common wheat cultivars presently being grown on the Canadian prairies has not been determined. This information would help to predict disease severity of these cultivars in different environments. Information on the relative colonization by each pathogen would be useful for deciding what leaf spot disease to consider a priority when incorporating resistance to this disease complex into adapted germplasm.

The objective of this research was to determine differences in leaf spot severity and colonization by each leaf spot pathogen among commonly grown Canada Western Red Spring (CWRS) and Canada Prairie Spring (CPS) wheat cultivars over two years at two locations in southern Saskatchewan.

Materials and Methods

Twenty common wheat cultivars (20 CWRS and four CPS) were grown in trials at Swift Current and Regina in 1995 and 1996. These were the CWRS cultivars AC Barrie, AC Cadillac, AC Cora, AC Domain, AC Eatonia, AC Elsa, AC Majestic, AC Michael, AC Minto, AC Splendor, CDC Makwa, CDC Teal, Invader, Katepwa, Laura and Pasqua; and the CPS cultivars AC Crystal, AC Foremost, AC Karma and AC Taber. There were three replicates, arranged in a randomized complete block design. At the milk stage, the severity of leaf spots was determined using a 0-11 scale (McFadden, 1991). Leaf spot ratings were an average of the scores of about 50 plants from the center rows of each plot. To identify the leaf spotting fungi, leaf pieces of about 1 cm² were selected randomly from the middle of lesioned upper leaves taken at random from each plot at the time of rating (20 leaves per

plot). Leaf pieces were surfaced-disinfested, plated and incubated as described by Fernandez et al. (1997). Percent isolation of each fungus based on the total diseased leaf area colonized was calculated for each genotype. Leaf spot scores and arcsine-transformed incidence data were analyzed by GLM, and LSD's were calculated.

Results and Discussion

Overall, the most common leaf spotting pathogen isolated from the cultivars tested was *Pyrenophora tritici-repentis* (the causal agent of tan spot) (Table 1). For both locations combined, tan spot was less prevalent in 1995 than in 1996, whereas for both years combined, it was less commonly isolated from Regina than from Swift Current. Among the other leaf spots, the most common ones were septoria nodorum blotch and septoria tritici blotch. These were more prevalent in 1995 than in 1996. Septoria tritici blotch was most common at Regina than at Swift Current, and Septoria nodorum blotch was more common at Swift Current than Regina. Septoria avenae blotch and spot blotch were only occasionally observed.

Table 1. Mean percent colonization of leaf sporting fungi at Swift Current and Regina combined over two years, and in 1995 and 1996 combined over two locations, for 20 common wheat cultivars.

Location/Year	Tan spot	Septoria leaf blotch			Spot blotch
	<i>Pyrenophora tritici-repentis</i>	<i>Septoria</i>			<i>Cochliobolus sativus</i>
		<i>nodorum</i>	<i>tr-itici</i>	<i>avenae</i>	
%					
Swift Current (1995+ 1996)	7s	15	5	1	1
Regina (1995+1996)	69	6	22	0	3
1995 (Regina+Swift Current)	63	15	21	1	1
1996 (Regina+Swift Current)	84	6	7	0	3

Pyrenophora tritici-repentis (the causal agent of tan spot) was almost the only pathogen isolated in all environments from: CDC Teal, AC Cadillac, AC Majestic, Invader, Laura, and AC Karma. The average percent isolation of this pathogen from these six cultivars in all four environments was 84%. In at least one of the two years, three of these cultivars, CDC Teal, Laura and AC Majestic, were more severely diseased at Swift Current than at Regina. In

most environments, the cultivars AC Splendor, Katepwa, AC Michael and AC Foremost were colonized by the *Septoria* species to a greater degree than any of the other cultivars. The average isolation of *S. nodorum* and *S. tritici* from these cultivars was 40%. For the rest of cultivars, the relative prevalence of leaf spot diseases varied with the environment to a greater extent than for the cultivars cited above (data not presented).

The reaction of the wheat cultivars tested ranged from moderate to very susceptible. Leaf spot scores (based on percent leaf area with leaf spot symptoms) for individual plots ranged from 7 (0 to 1% on flag leaves, 6-10% on middle leaves, >50% on lower leaves) to 11 (26 to 50% on flag leaves, >50% on middle and lower leaves). Over the two years combined, most cultivars had significantly lower ($p < 0.01$) leaf spot severity at Swift Current than Regina, whereas less than half of the cultivars had significantly lower leaf spot severity in 1996 than in 1995 (Fig. 1).

Based on the overall reaction of cultivars in the four different environments, AC Splendor and AC Domain were the most susceptible of all CWRS and CPS cultivars tested. AC Elsa and AC Majestic were the most resistant cultivars. Among the CPS cultivars, AC Karma was the most susceptible, and AC Taber and AC Crystal were the most resistant.

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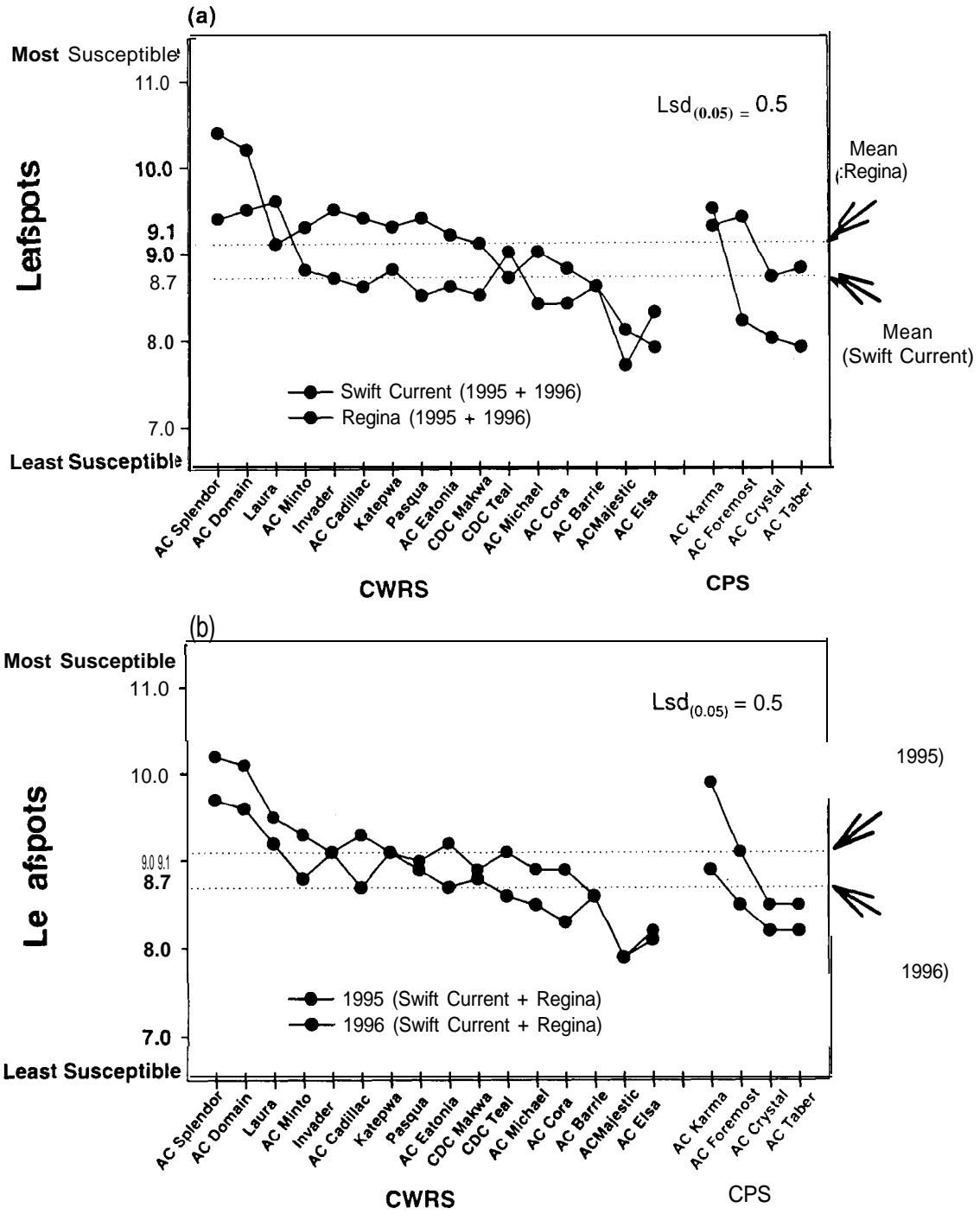


Fig. 1. Leaf spot severity (scale of 0-1) of CWRS and CPS wheat cultivars (a) at Swift Current and Regina over two years (1995 and 1996) combined; (b) in 1995 and 1996 over two locations (Swift Current and Regina) combined.