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Sunflower Rust Races in Manitoba

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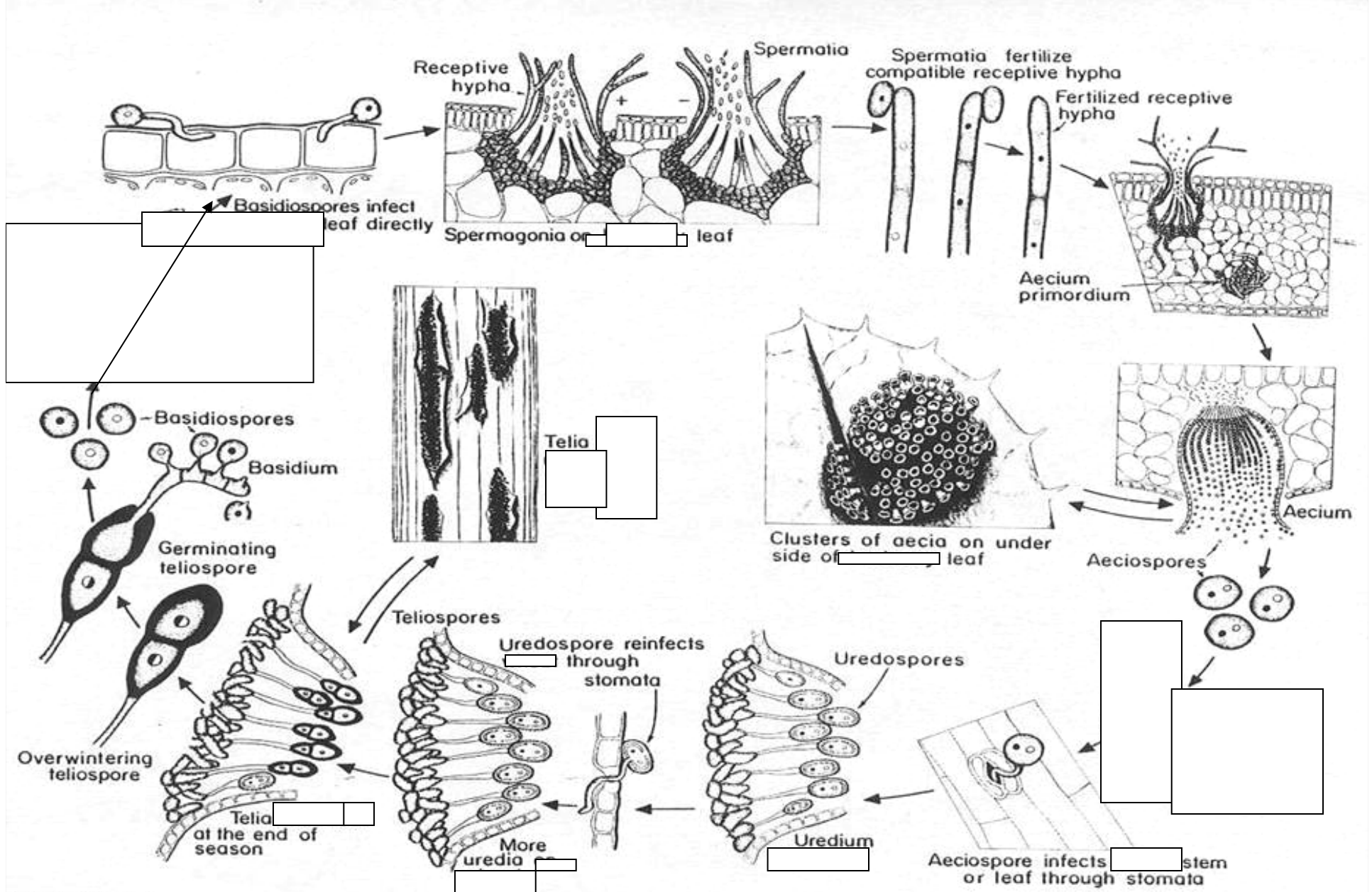
AAFC, Morden Research Station

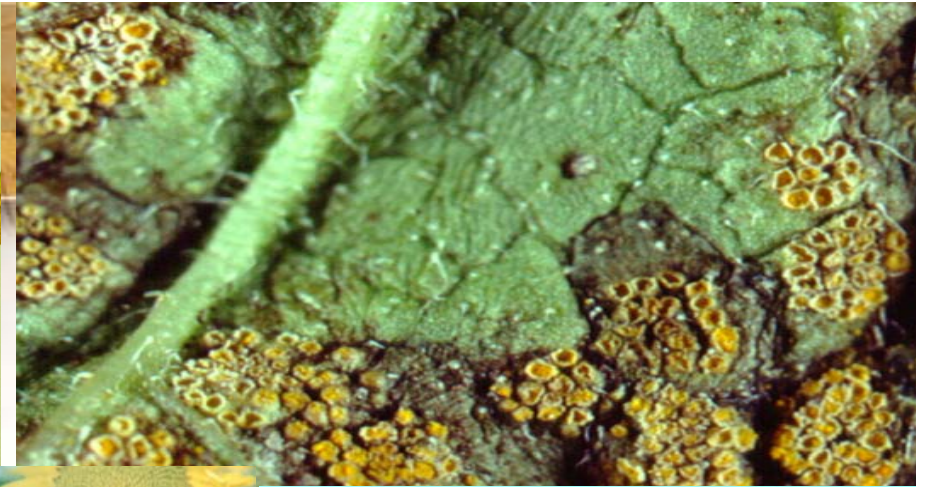


INTRODUCTION

- Rust caused by the fungus *Puccinia helianthi*.
- Major disease affecting sunflower *H. annuus*.
- Incidence and severity vary between years and regions depending on the environmental conditions, prevalent rust races, and resistance genes in commercial hybrids.
- Several virulent races are present in MB, ND
- Local rust epidemics occur and may cause >50% losses in yield and quality of seed.
- Resistance to some races in some hybrids

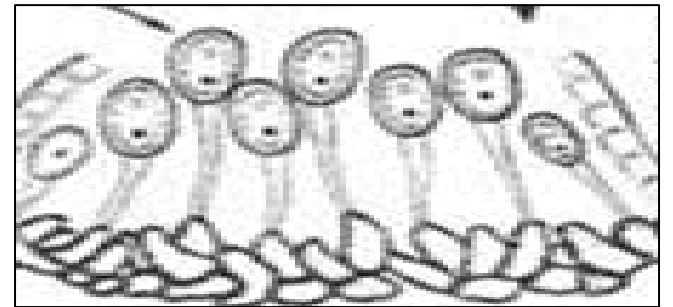
RUST DISEASE CYCLE





What leads to early rust infection and epidemics

- Infested stubble from previous year (Black spore).
- Susceptible volunteer plants for initial infections
- aecial stage (orange in colour)
- High humidity (6-15 hr, overnight) or
- Short periods of light rain
 - 7~10 day cycles starting at seedling,
 - Several cycles/season, daily infections after 1st cycle
- Temperature range from 10-30 °C
- Local inoculum often starts 1-2 wk earlier than in-coming inoculum, and results in higher disease incidence and severity.



OBJECTIVES

- To assess the sunflower rust epidemics and identify prevalent races.

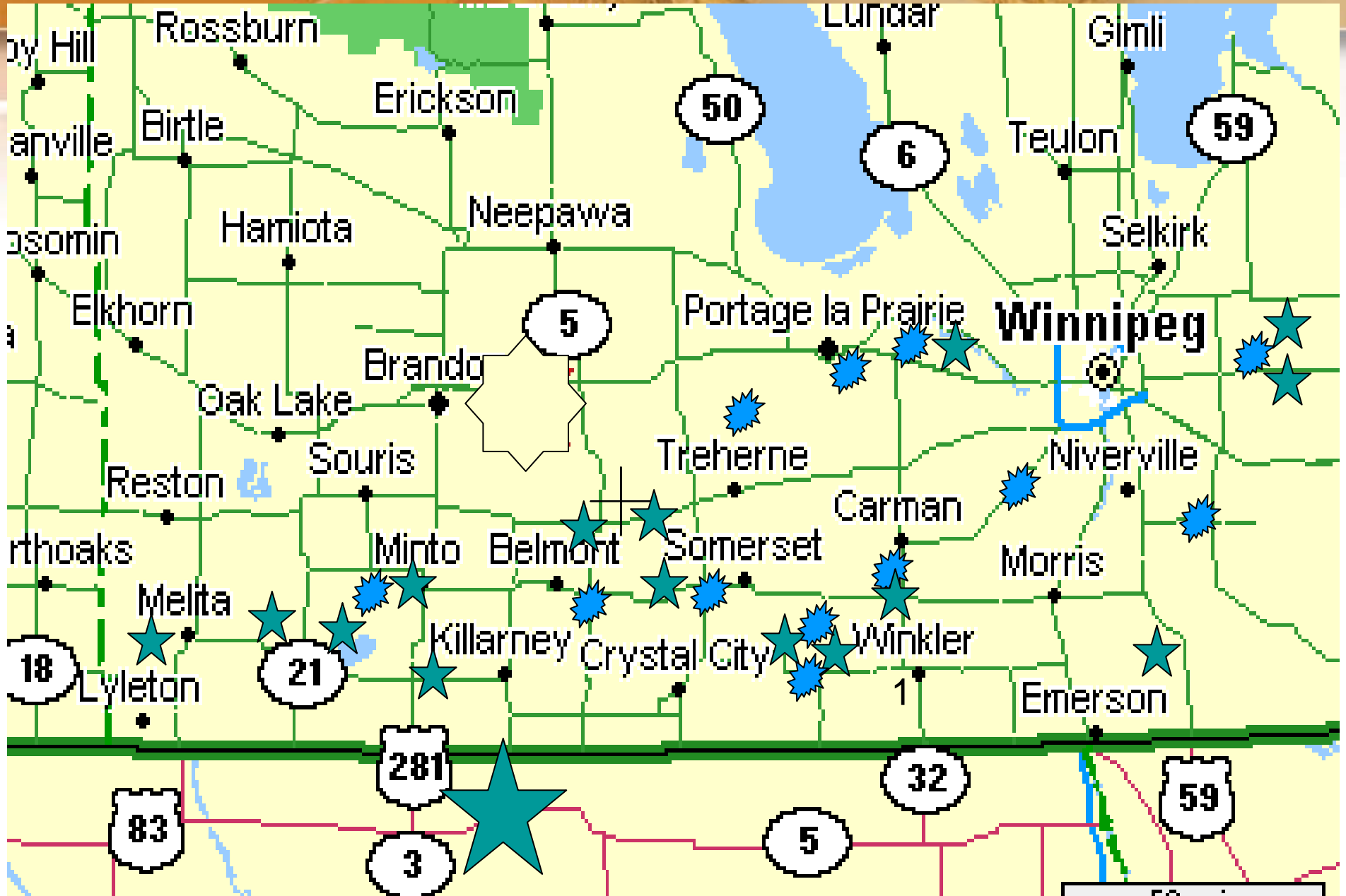
Materials and Methods.

- Survey sunflower crops in major growing areas in Manitoba
- Collect rust infected leaves.
- Bulk rust isolates used in this assessment.
- Inoculate 10-15 plants of each of the set of 9 sunflower differential genotypes.
- Incubate for 18 hrs (HRH) in controlled Growth rooms.
- Assess the reaction of each isolate on differential set.
- Identify the races based on the international coding system.

Prevalence and Severity of Rust in Manitoba

Year	% Infested Fields	Mean-Dis % LAI	Range % LAI	Prevalent Races Old (new)
2009	70%	20%	T-40	4(700) & 3(300)
2008	74%	15%	T-50	3(300) & 4 (700)
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 %	20	T->50	3 (300) & 4 (700)

Area Surveyed in Southern Manitoba 2009



Prevalent Sunflower Rust Races in Manitoba, 2003-09

Year	Race 100 (1)	Race 300 (3)	Race 500 (2)	Race 700 (4)
2003	12%	6%	0	82%
Races	120, 126	326	-	726, 702, 736, 737
2004	20%	65%	0	15%
Races	126, 106	326, 306, 320, 336	-	726, 727
2005	0	87%	0	13%
Races	-	326, 336, 337, 376	-	726, 776, 777
2006	0	84%	4%	12%
Races	-	324, 320, 324, 326, 336, 337, 365	520	734
2007	0	80%	4%	16%
Races	-	336, 326, 304, 377	536	726, 736, 774
2008	0	62%	0	38%
Races	-	336, 326, 320, 324, 337	-	736, 724, 726, 734
2009	3%	23%	0	74%
Races	122	336, 337, 324, 326, 327		776, 777, 726, 736, 737

CONCLUSIONS

- Shift in sunflower rust races occurred over the years.
- Sharp decline in race-groups 100 (1) and 500 (2).
- A decline of race-group 300 (3) in 2008 and 2009
- A steady increase in race-group 700 (4), 2008 / 2009.
- A few isolates of race 777 appeared in 2009 and in previous years capable of infecting all 9 sunflower host differential lines.
- A few hybrids have resistance to race-group 700 (4).

Acknowledgement

- Agriculture and Agri-Food Canada (AAFC)
- National Sunflower Association of Canada (NSAC)
- Tricia Cabernel and Maurice Penner, Technical support.



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2002	50 %	15	T->50	na
2001	27 %	8	T-20	na
2000	40 %	15	T->50	na
1999	60 %	5	T-20	na