

MANAGING FIELD CROP DISEASES

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OVERVIEW

- Back to the basics: fundamentals of disease management
 - -Farm Management Decisions
 - -Crop Input Decisions



• Fungicides: risks and rewards



 Top 5 reasons why fungicide applications may give unexpected results





FARM MANAGEMENT DECISIONS

Crop rotation

- Can ensure sustainable crop production
- Will help maximize land use and profitability
- Can help minimize inputs



Influence of rotation length on severity of blackleg of canola

[14 site-years - Scott and Melfort, 2000-06]





FARM MANAGEMENT DECISIONS

- Tillage
 - Handling of crop residues





- Seeding
 - Seeding depth
 - Seeding date
 - (Seeding rate)
 - (Seed quality)
 - (Seed treatments)





FARM MANAGEMENT DECISIONS

- Irrigation
 - Avoid over-irrigation
 - Avoid irrigation at critical points of the disease cycle

- Weed and volunteer management
 - Minimize disease reservoirs

- Utilize disease resistance or tolerance
 - www.seed.ab.ca









CROP INPUT DECISIONS

- Seed quality
 - Seed testing
 - Seed cleaning
 - Seed treatment
- Fertility and nutrition
 - A healthy crop J
 - Lush growth and dense canopies L
- Fungicides



FUNGICIDES: RISK VS. REWARD

- 1. Should I spray? Yes No
- 2. When Should I spray?
 - a) Threshold
 - b) Calendar
 - c) When there are lots of planes in the sky
- 3. What Should I spray?
 - a) Registered product
 - **b) FRAC groupings**
 - c) Management of multiple diseases, cost of product, tank mix options, flexibility, etc



FUNGICIDES: RISK VS. REWARD



(G. Hollaway, DPI Victoria, Australia)



WHY DON'T FUNGICIDE APPLICATIONS ALWAYS PRODUCE EXPECTED RESULTS?

TOP FIVE REASONS

- **1. Application Problems**
 - a) Timing: correct alignment of fungicide with disease progress
 - Infrequent scouting
 - Incomplete understanding of pathogen biology and disease cycle







b) Failure to hit the target (groundspeed, boom height, water volume, nozzle type, environment)



Correct Timing of Fungicide Application

Amount of Disease





Correct Timing of Fungicide Application



Aberta Freedom To Create. Spirit To Achieve.

Correct Timing of Fungicide Application

Amount of Disease





TOP FIVE REASONS

2. Product incompatibilities and limitations

- a) Tank contamination
- b) Intentional mixing of incompatible products
- c) Product not stored within acceptable limits, or past expiry







TOP FIVE

3. MISDIAGNOSIS

- **Physiological disorder a**)
- **b**) **Insect damage**
- **c) Herbicide injury**





PLS



Septoria

Stripe rust

Cereal leaf beetle

Surfactant burn



Government of Alberta

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TOP FIVE

MISDIAGNOSIS

d) Non-fungal pathogens



Aster yellows



Bacterial leaf blight



Barley yellow dwarf



ALBERTA PLANT HEALTH LABORATORY

- Located at the Crop Diversification Centre North (Edmonton, AB)
- Diagnostic support and pathology expertise
- Fee-for-service (partial cost recovery)
- Plans to be open for sample receipt in Spring or Summer of 2013
- More details to be made available soon













A correct diagnosis can be made in hindsight, but its usually much better to have a correct diagnosis before disease severity becomes too great to allow successful treatment.

"I GUESS MIRS, WILSON WASN'T A HYPOCHON-DRIAC AFTER ALL,"



TOP FIVE

4. Environmental effects

- temperature, precipitation, relative humidity, wind, etc.



of Alberta



TOP FIVE

5. Limitations of the fungicide

- Protectant vs. curative
 - Contact fungicides
 - Translaminar fungicides
 - Xylem mobile (apoplastic, acropetal)
 - Truly systemic (symplastic, amphimobile)



- Registered for "CONTROL" or "SUPPRESSION"
- Disease pressure is too high, or too advanced to allow a response

Alberta .

Fungicide movement in wheat leaves and control of powdery mildew Leaf tip Leaf base



Plate 1. Redistribution of strobilurins in wheat to control powdery mildew (Source: Syngenta)

Bartlett, et al., 2002, Pest Management Science 58:649-662



Additional reasons

Varietal effects Fungicide Resistance Rotation Registered for control or suppression Water quality Duration of product activity Improper rates, mixing and sprayer calibration

SUGGESTION:

-----LEAVE A CHECK STRIP------

And avoid comparing fungicide performances from different (multivariate) fields



Conclusions

- Farm Management Decisions (rotation, tillage, cultivar selection, irrigation scheduling) can provide a foundation for successful crop production and pest management
- Crop Input Decisions (fertility, seed quality and seeding rate, fungicides) can help push crop productivity/quality to capacity and may help, or complicate, disease management
- There are risks associated with fungicide use, but there are rewards when best practices are used, and the environment cooperates
- There are limitations to what fungicides can provide, and many reasons why a fungicide application may not give expected results.

