Management of Powdery Scab and Potato Mop Top Virus

Jeff Miller

Spongospora subterranea subsp. *subterranea* (Protozoa)


Photo from Ueli Merz

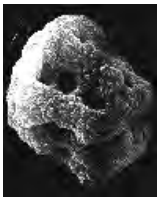


Photo from Ueli Merz

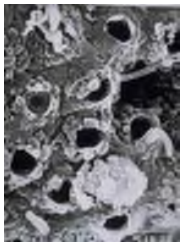
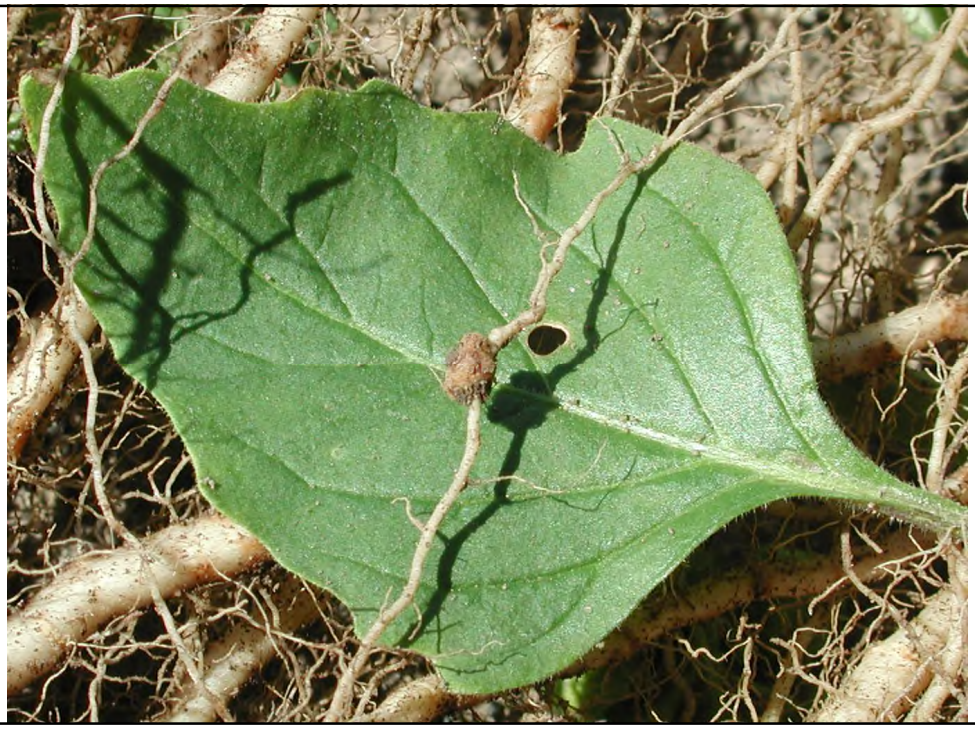
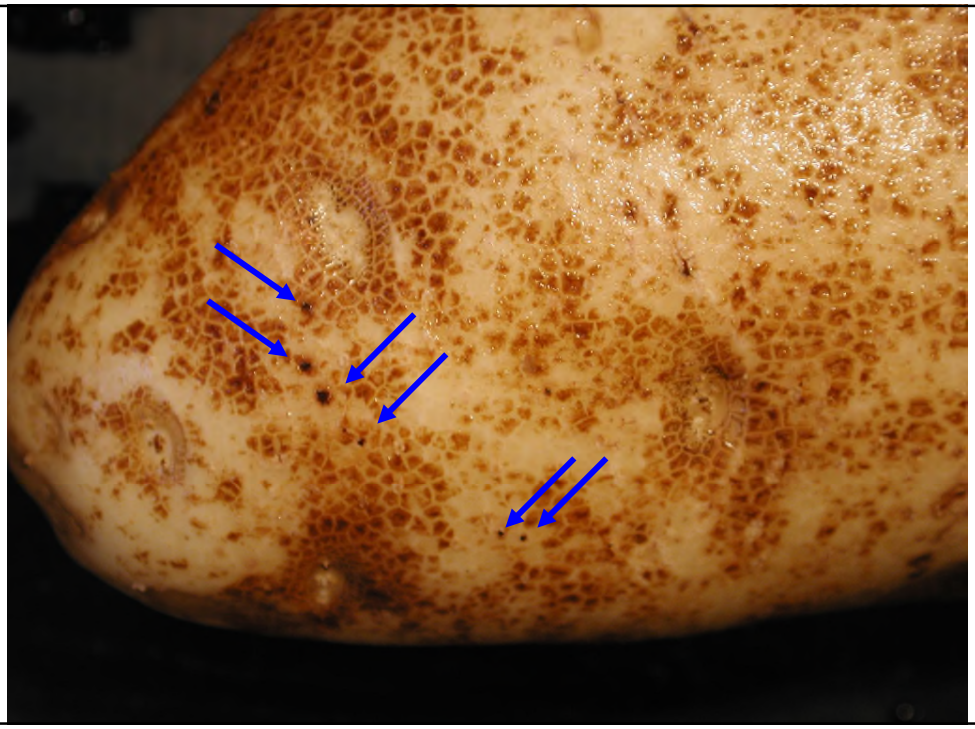


Photo from Ueli Merz


Photo from Ueli Merz





Potato Mop-Top Virus (PMTV)

- Foliar symptoms not associated with primary infection.
- Foliar = similar to calico.
- Symptoms favored by cool weather.
- Tuber = necrotic arcs (may require alternating storage temperatures to develop).
  - Can look like TRV, PVY^{ntn}, internal brown spot
- Symptoms increase with time in storage
- Can cause external symptoms

PMTV

Photos courtesy of Jonathan Whitworth

Which one is PMTV? TRV?

TRV

Photo courtesy of Jonathan Whitworth

Powdery Scab Management Recommendations

1. Plant disease-free seed
2. Avoid planting in contaminated, poorly drained soils
3. Avoid the use of manure if animals have ingested infected tubers
4. Rotate out of infested fields for 3-10 years
5. Plant resistant cultivars
6. Avoid tomato in crop rotation and control nightshade
7. Manage irrigation water

From Compendium of Potato Diseases, 2nd Ed.

Powdery Scab - Variety

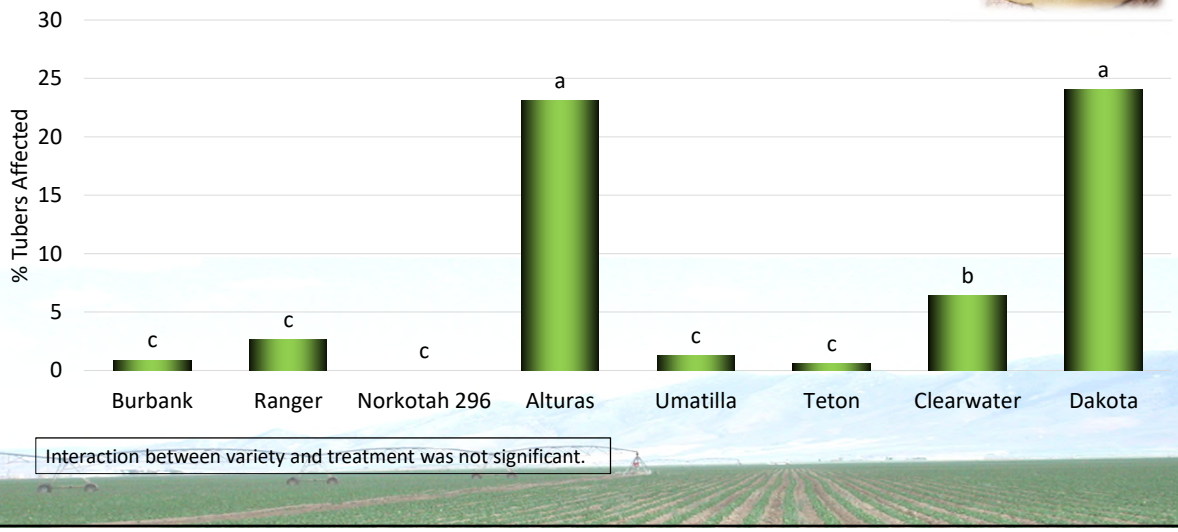
% Incidence

Powdery Scab - Variety

Severity (0-5)

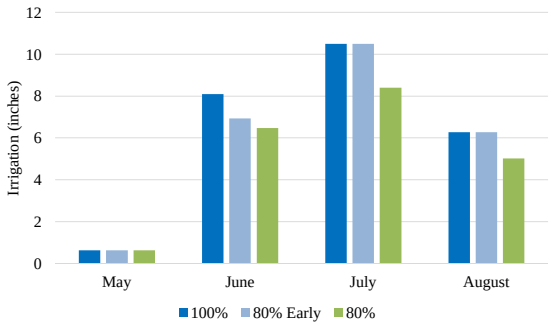
PMTV - Variety

% Incidence of visible symptoms



Interaction between variety and treatment was not significant.

Effect of Irrigation Management



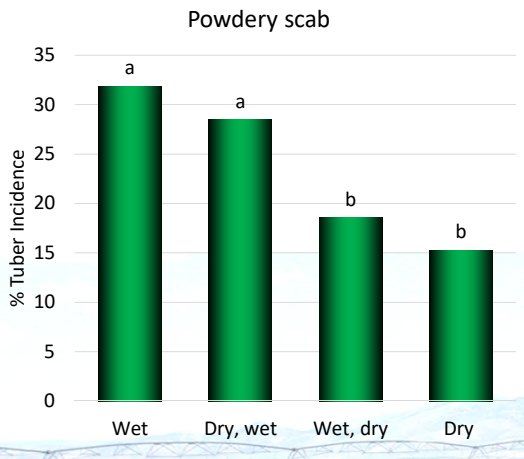
Source	May	June	July	August	Total	% of Total
1. 100% ET	0.63	8.10	10.50	6.28	25.51	100
2. 80% ET early	0.63	6.93	10.50	6.28	24.34	95
3. 80% ET	0.63	6.48	8.40	5.02	20.53	80
Rain	1.05	0	0.06	0.15	1.26	

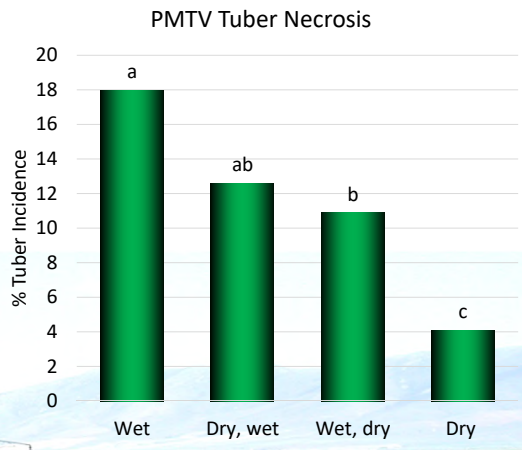
Effect of Irrigation on Mop-Top Symptoms

	Visual Mop-Top	Total Yield	% US#1	% Culls
100% ET	11	462 a	69 a	5.0 a
80% ET early, 100% ET from RC	11	390 b	62 b	6.2 a
80% ET	9	348 b	58 b	9.5 b

Reducing irrigation water did not reduce mop-top symptoms, but resulted in significant yield and quality reductions.

Soil Moisture – Powdery Scab and PMTV

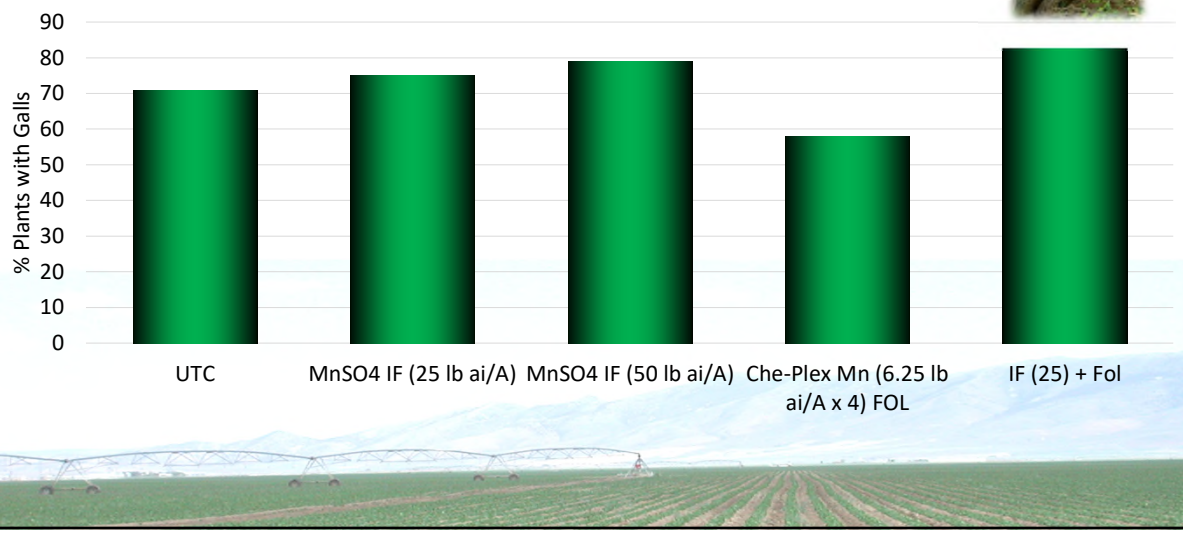




Domfeh and Gudmestad, 2016

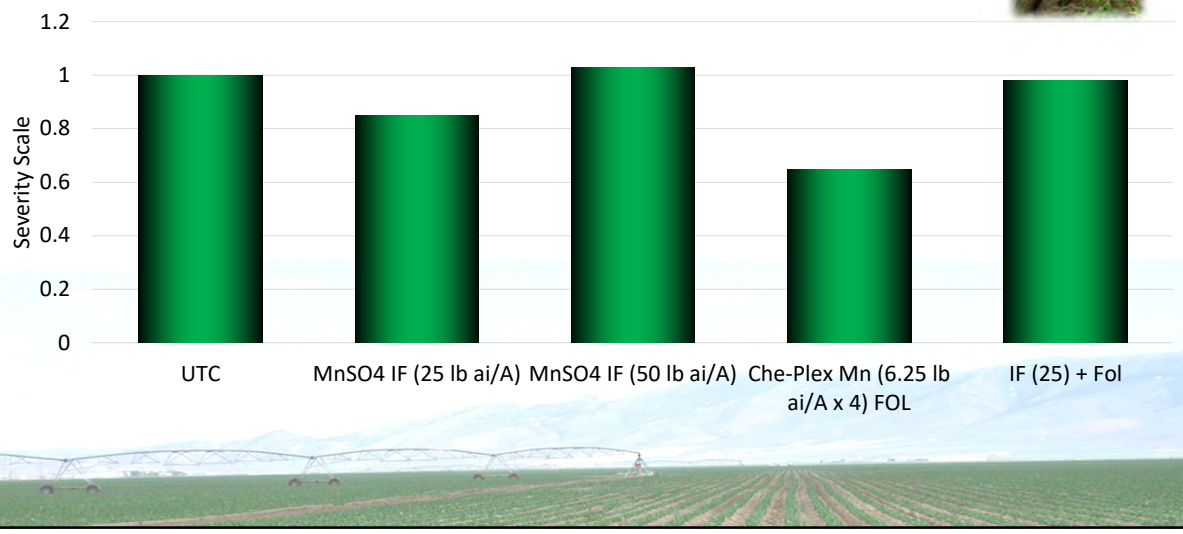
Effect of Mn on Powdery Scab

Incidence



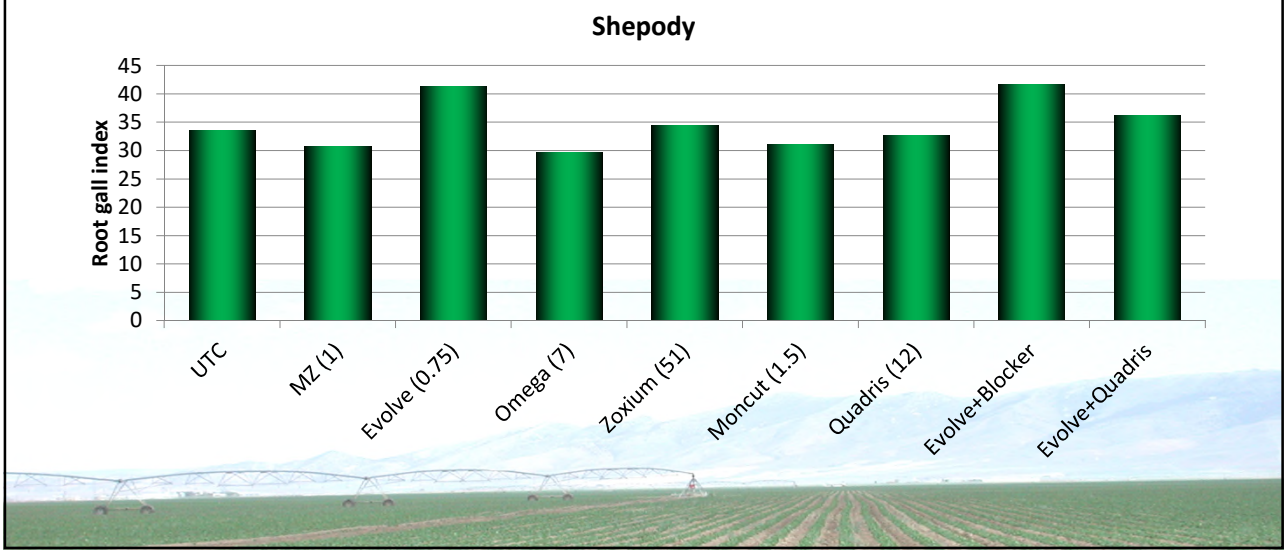
Effect of Mn on Powdery Scab

Severity (0-5)



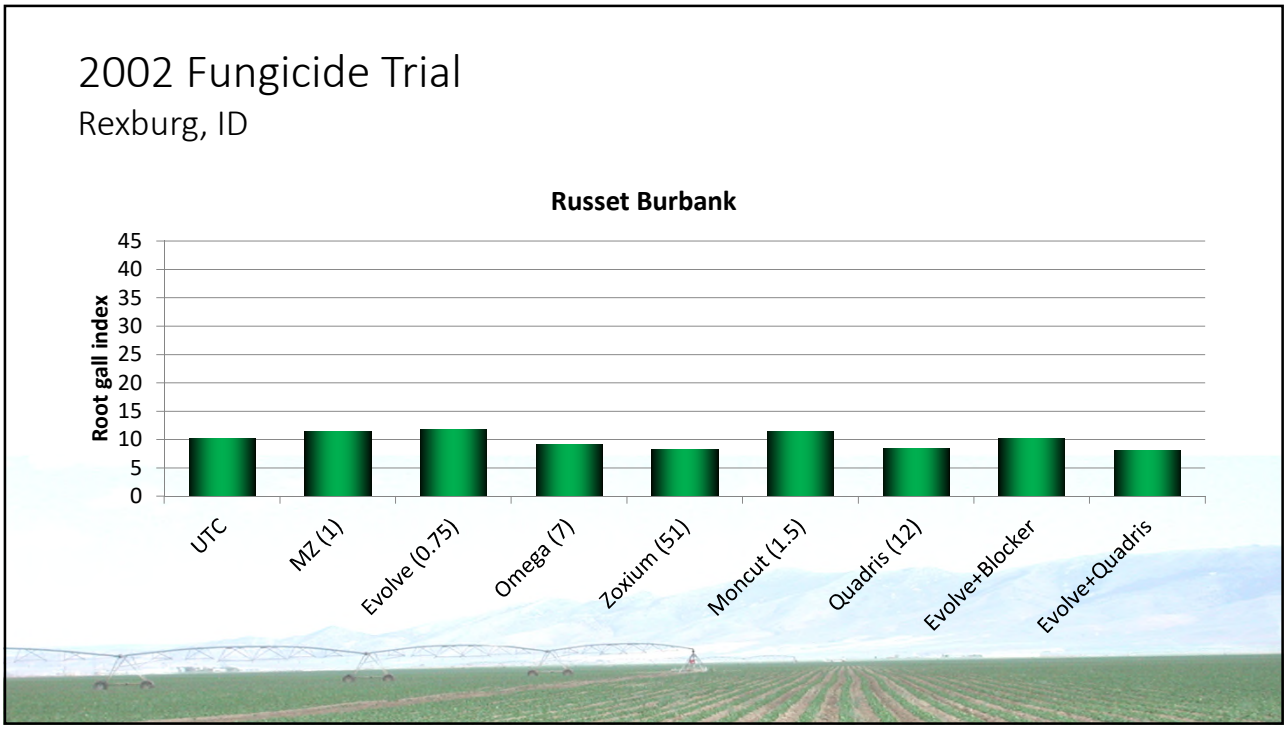
2002 Fungicide Trial

Rexburg, ID



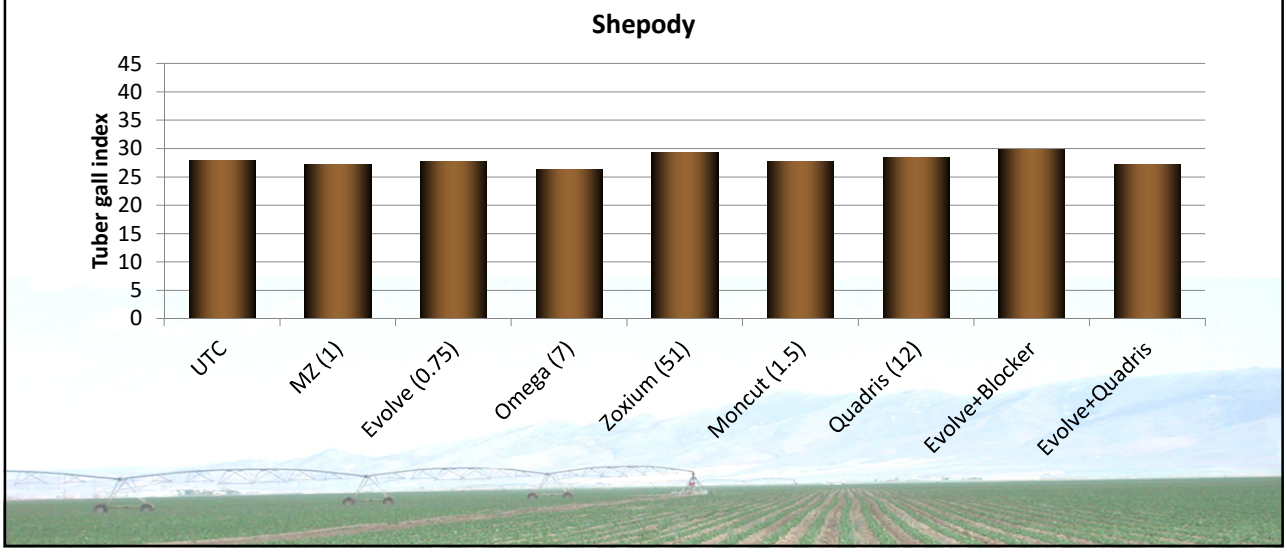
2002 Fungicide Trial

Rexburg, ID



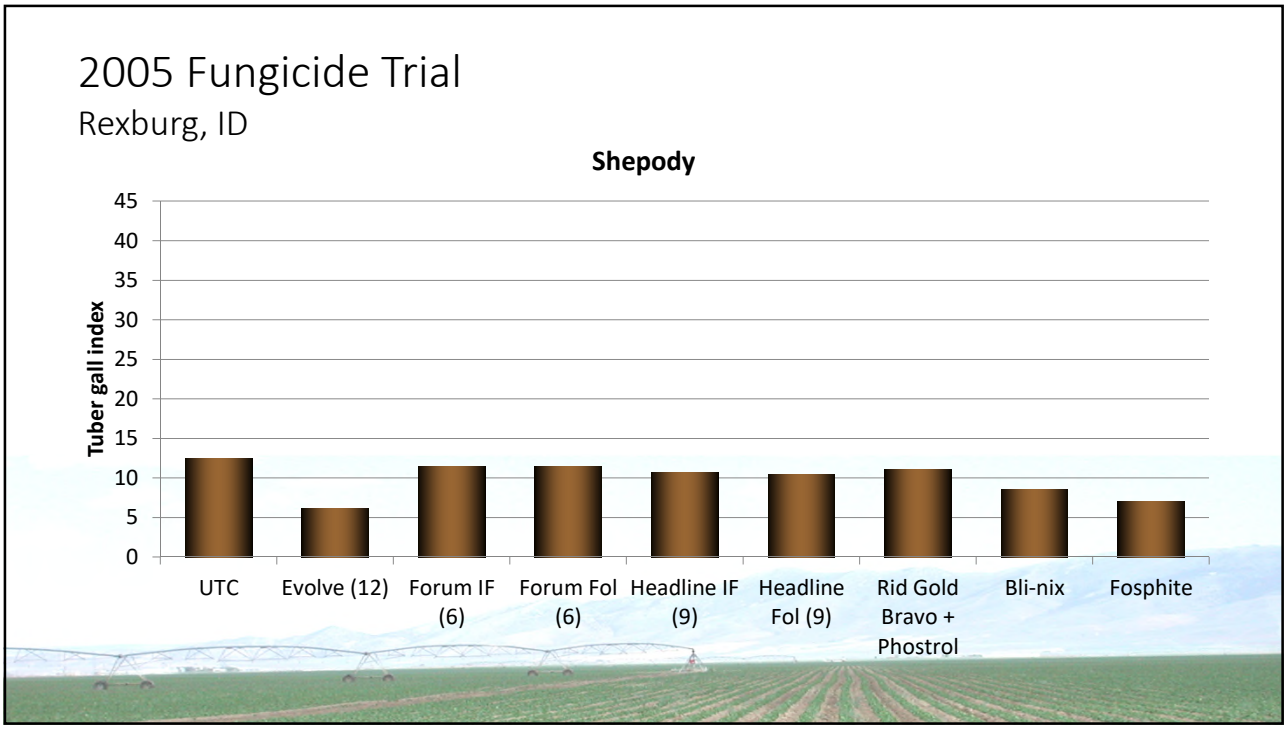
2002 Fungicide Trial

Rexburg, ID



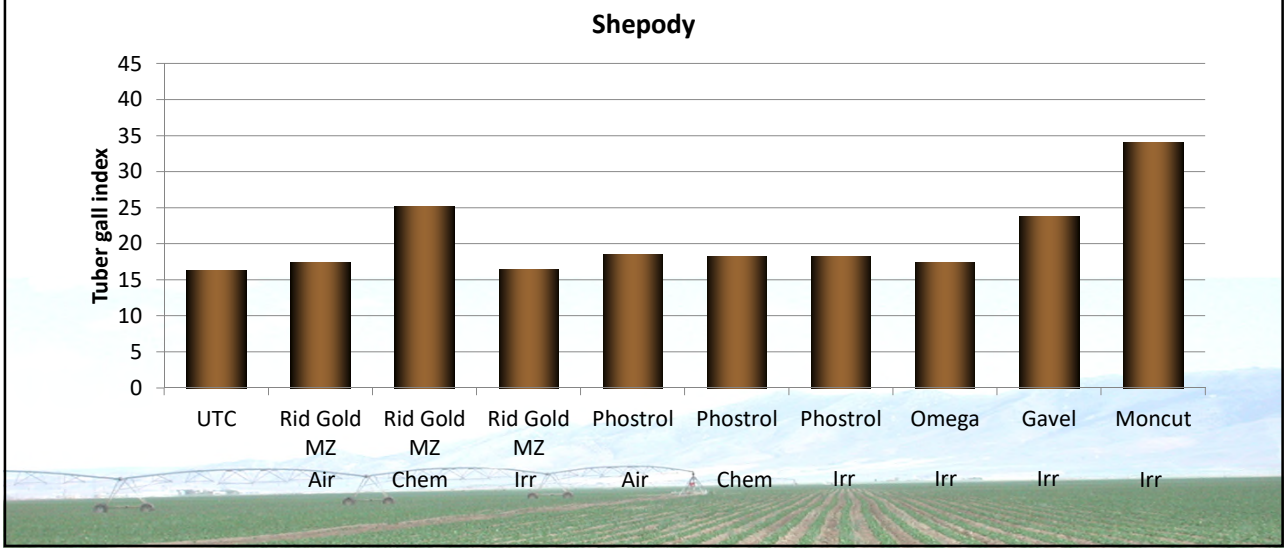
2005 Fungicide Trial

Rexburg, ID

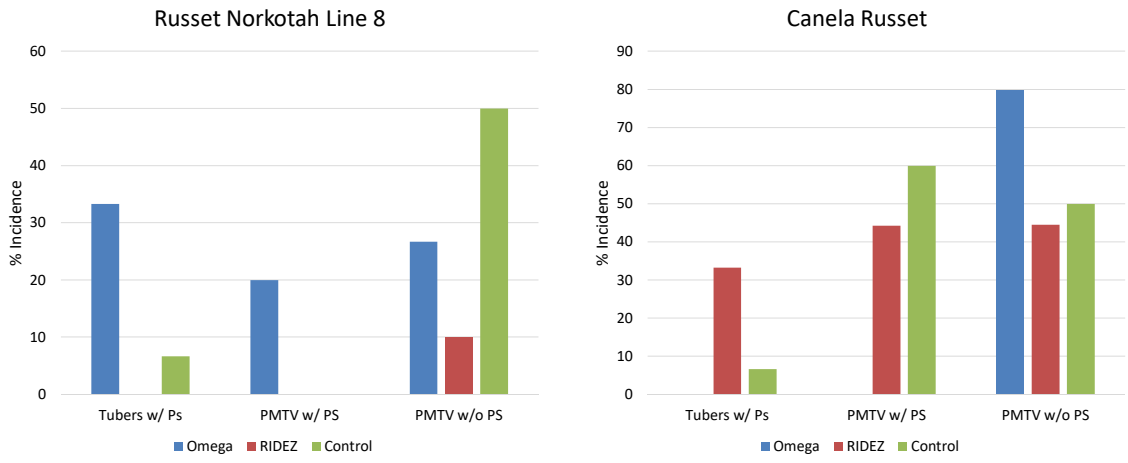


2003 Fungicide Trial

Minidoka, ID



Effect of Chemical Treatment on Scab and PMTV



Zeng et al., 2020, Plant Disease 104:2807-2816

Take Home Message

- Variety selection is the most effective way to manage powdery scab and mop-top.
- Irrigation management was not effective.
  - Reduced irrigation reduced yield and quality but not disease!
- Fungicides are not effective against powdery scab and mop-top.