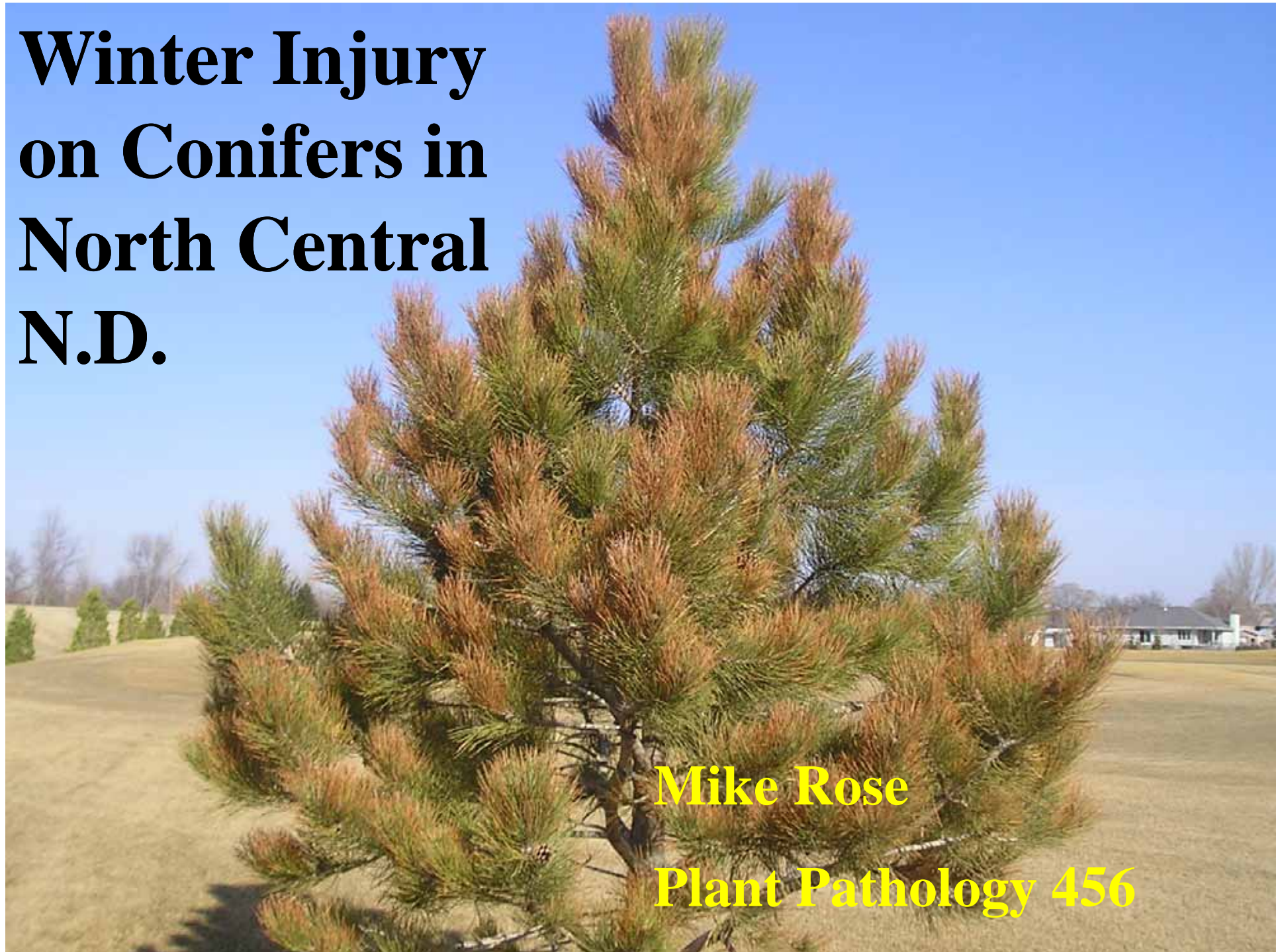


Winter Injury on Conifers in North Central N.D.




Mike Rose

Plant Pathology 456




Seasonal Conditions

- 
- Winters
 - Long, cold, with fluctuating temperatures
 - Fall and Springs
 - Major temperature and moisture extremes
 - Summers
 - Hot, cold, dry, wet, and short




Contributing Factors

- 
- Poor soil
 - Heavy, sandy, high salinity
 - Poor water
 - High SAR and high salinity
 - Semi-arid conditions
 - Can have especially dry conditions going into winter
 - Tree location
 - Bright mulch or house siding
 - Recently transplanted
 - Tree spacing



Winter Damage Caused by a variety of issues

- 
- Transpiration while roots are frozen
 - Sunny days warming tissues in the winter
 - Bleaching of the foliage in a sunny winter day
 - Cold temperatures in the fall before plants have hardened off and cold temperatures in the spring after the dehardening process has begun

Winter Injury

- Eliminate possibility of infectious diseases



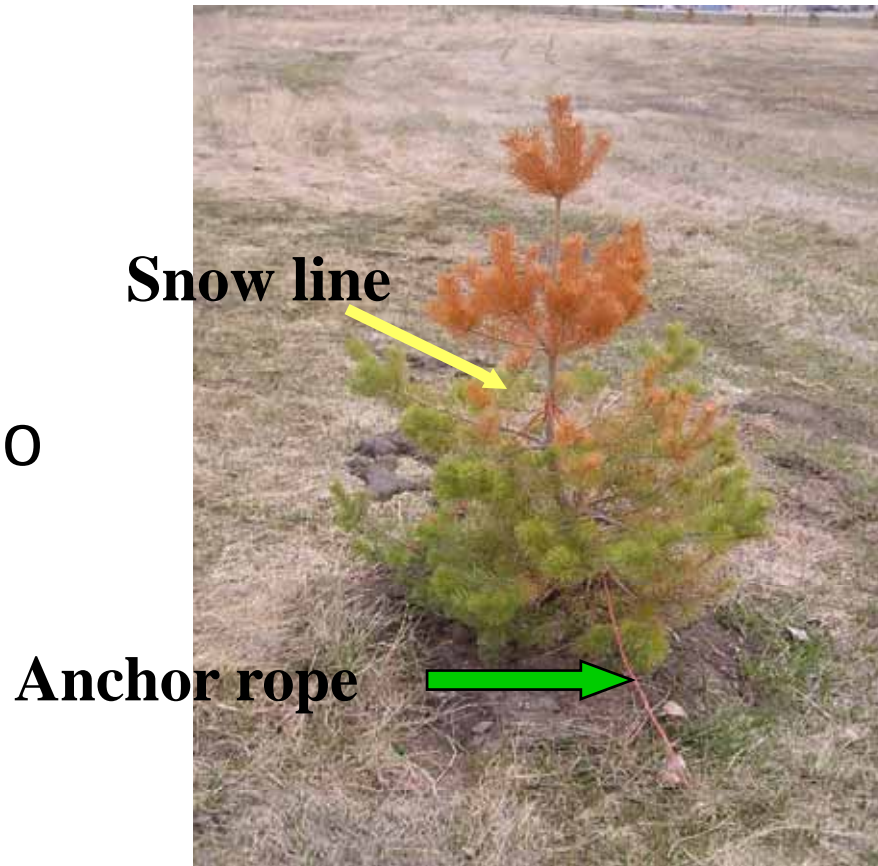
Rhizosphaera needlecast



Spider mite

Winter Injury

- Snow protects needles
- Recently transplanted trees more susceptible to winter injury



Winter Injury

- Application of anti-desiccant in late fall and very early spring have been shown to be ineffective
- Anti-desiccants can be good therapy for the tree owner
- Cosmetic damage!



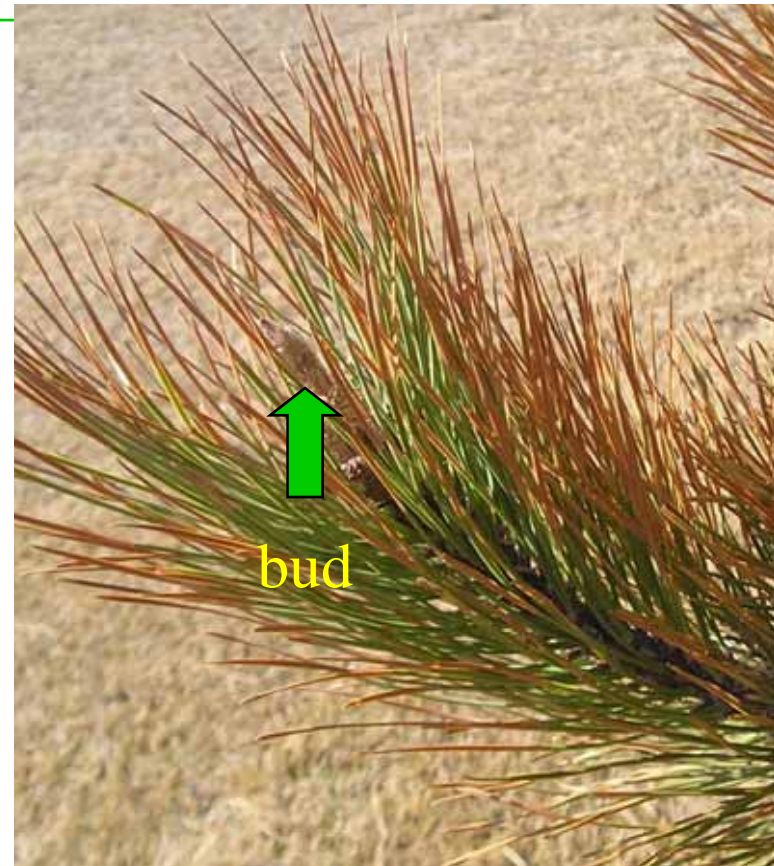
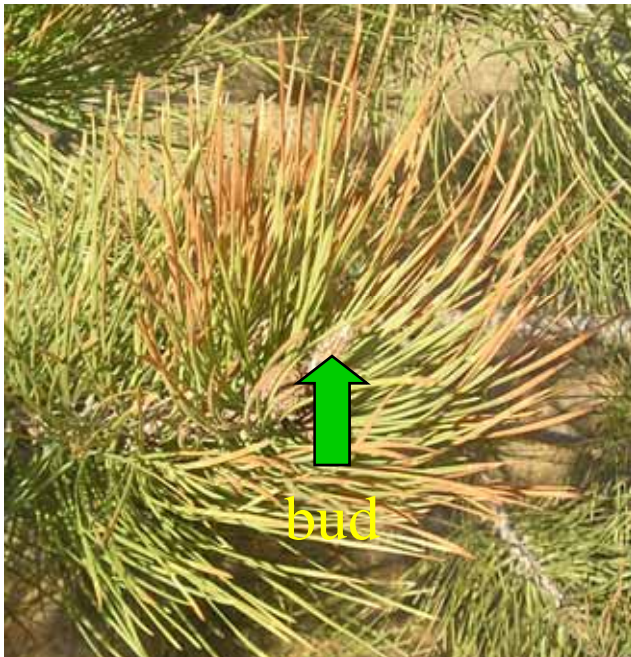
Winter Injury

- Severe damage!
- Vigor of the tree will be reduced – long term prognoses -- poor



Winter Injury

- Check the bud for viability



Winter Injury

- Note the uniform dying back of the needles!



Winter Injury



topside



underside

Winter Injury

- Assessment of total injury should be done after new growth has occurred
- Note the new growth!



Needle Drop/General Decline in Spruce

- Spruce native to cool regions
- Shallow rooted
- Sensitive to:
 - poor drainage
 - shade
 - improper planting space
 - drought
 - winter injury
 - herbicides
 - poor soils(salinity)




Natural Needle Drop

- Conifers do not keep their needles indefinitely
- Needles live one to several years
 - scotch and ponderosa pine needles live about 3 years
 - Blue spruce needles live 5-7 years





Preventing Winter Injury

- 
- Inducing deep dormancy
 - Obtained by not watering in late summer(inducing stress)
 - Tree does not react to short term temperature fluctuations
 - Reducing stress(except in late summer)
 - Insect and disease control
 - Proper pruning
 - Planting in the proper place
 - Proper water schedule
 - Anti-desiccant?



Damaged needles will never turn green again



A close-up photograph of a pine branch. The needles are densely packed and show a mix of vibrant green and reddish-brown colors, suggesting a seasonal change or a specific pine variety. The lighting is bright, creating strong highlights and deep shadows within the foliage.

Questions?

4-21-05