

Switchgrass: an adventure in foliar diseases



Switchgrass facts



- Native, perennial grass
- Bioenergy crop
- Bank stabilization and wildlife habitat
- Ornamental plantings
- Grown successfully as an agronomic crop in OK, KA, NE
- Drought tolerant



Switchgrass myths



- A crop with few health issues
- Easy to grow
- Small carbon footprint

‘Northwind’ with rust

Panicum virgatum 'Dallas Blues'



8-16-08

9-9-08

UT Trial Gardens, Knoxville TN

Other Trial Garden Cultivars



Panicum amarum 'Dewey Blues'



Panicum virgatum 'Northwind'

8-16-08

9-9-08

Time course of urediniospore germination in water on glass slides

1 h



2 h



3 h



4 h



5 h



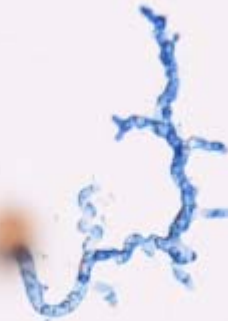
6 h



7 h



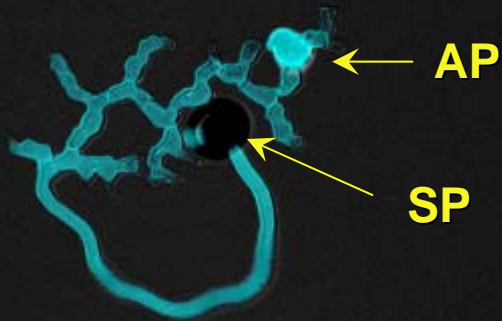
8 h



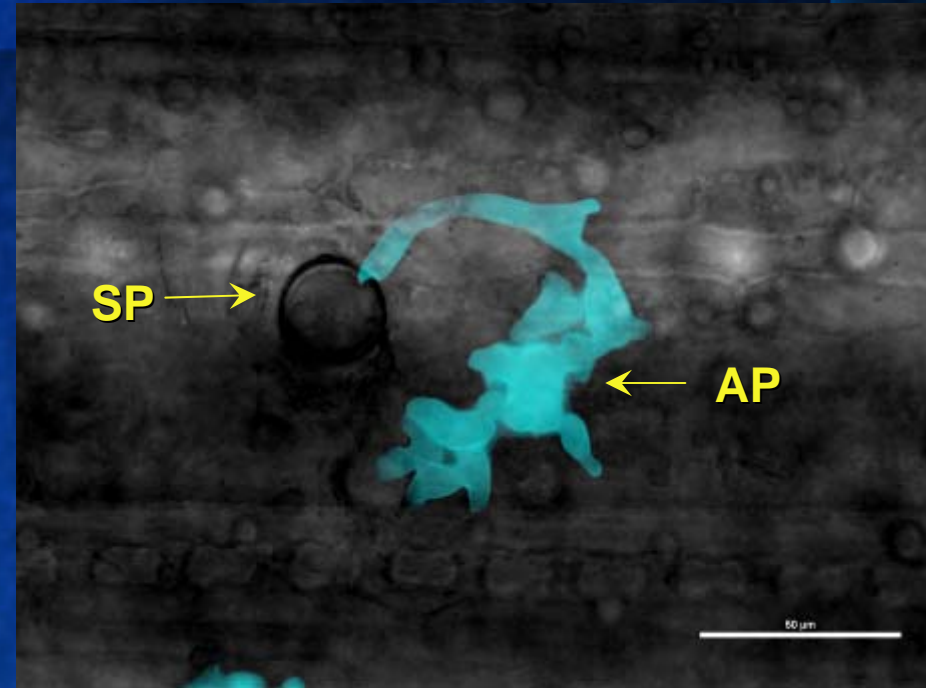
22 h

Appressorium



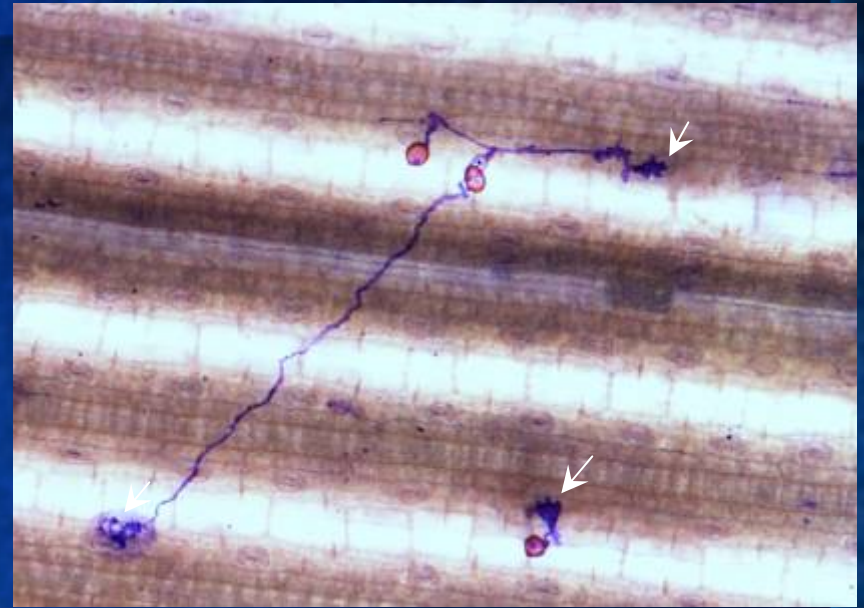
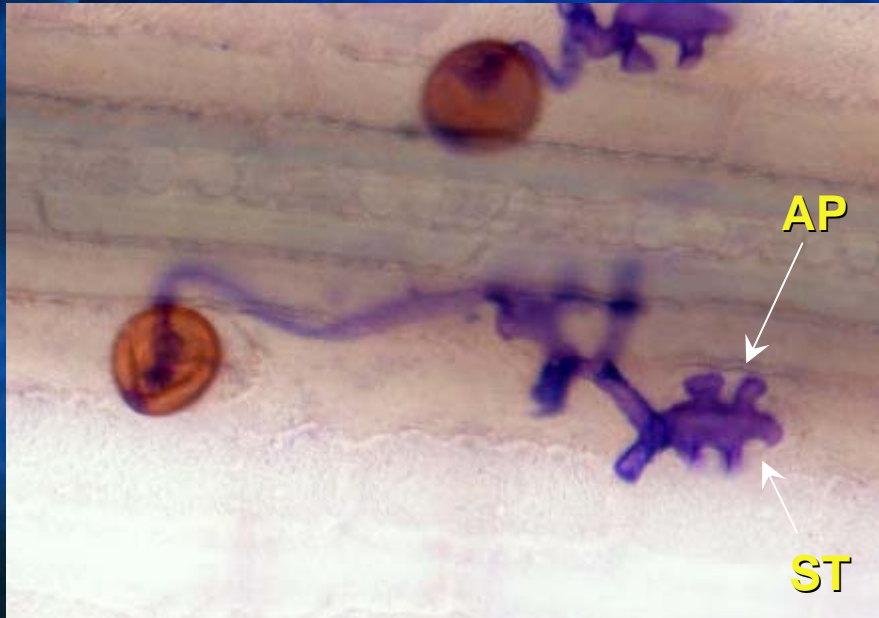


**In water on glass
slides**



On leaf surface

Urediniospore germination in water and on leaf surfaces at 16 h after incubation. Stained with DAPI. Merged image of fluorescence with DAPI filter and DIC bright-field

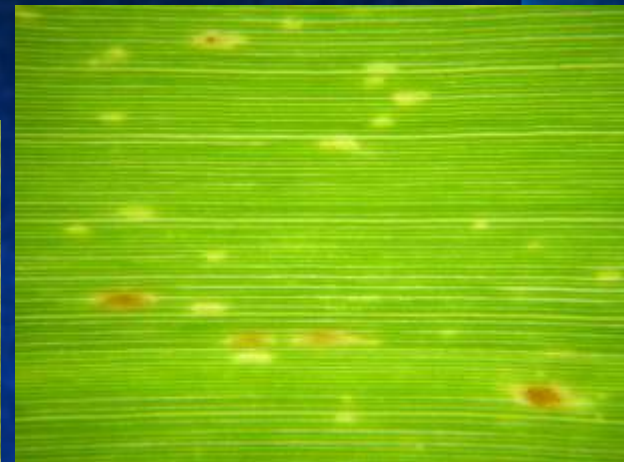


Formation of appressoria over stomata
of switchgrass leaves



'Alamo' from Plant Science Farm, Knoxville, TN 6/14/08

Susceptible ?



'Miami' from Plant Science Farm, Knoxville, TN 6/14/08

Resistant ?



Leaf segments

Uredium

'Alamo' 7 days after inoculation



Leaf segments

Uredium

'Blackwell' 7 days after inoculation



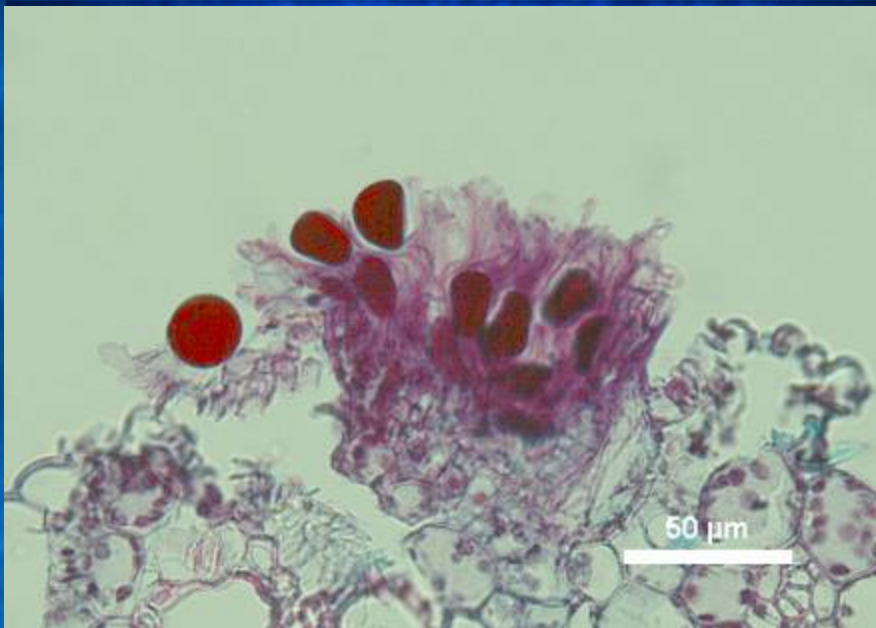
Leaf segments
'Alamo' 13 days after inoculation

Uredia



Leaf segments
'Blackwell' 13 days after inoculation

Uredia



Uredium

Urediospores



Telia and teliospores on 'Alamo' (9-10-08)



Sub-epidermal telia



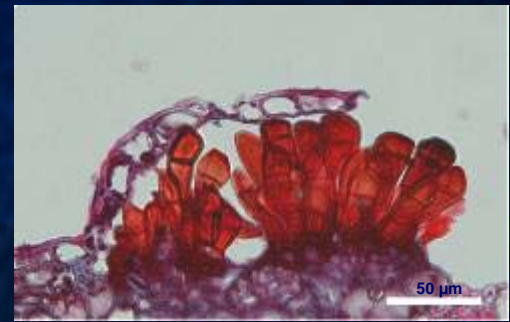
An erumpent telium



Telia on a leaf segment



Telia on a leaf sheath



Sub-epidermal telium

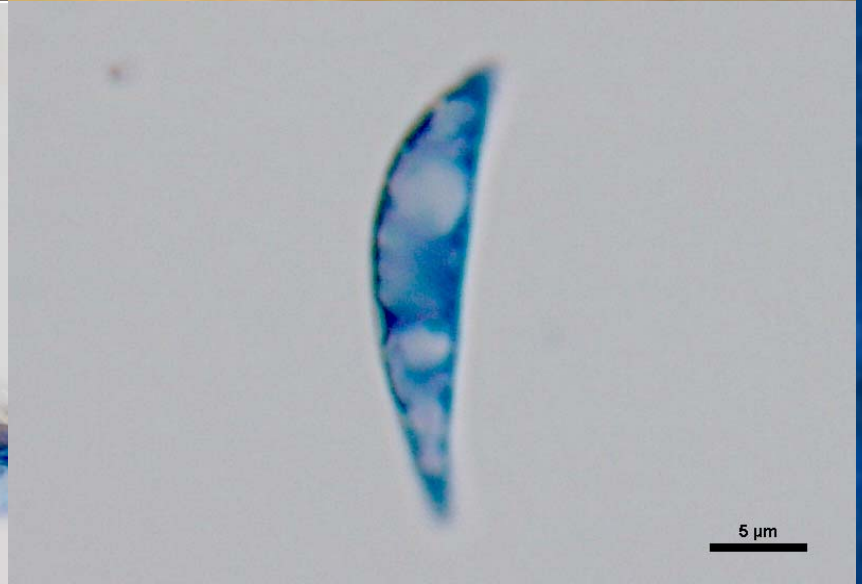
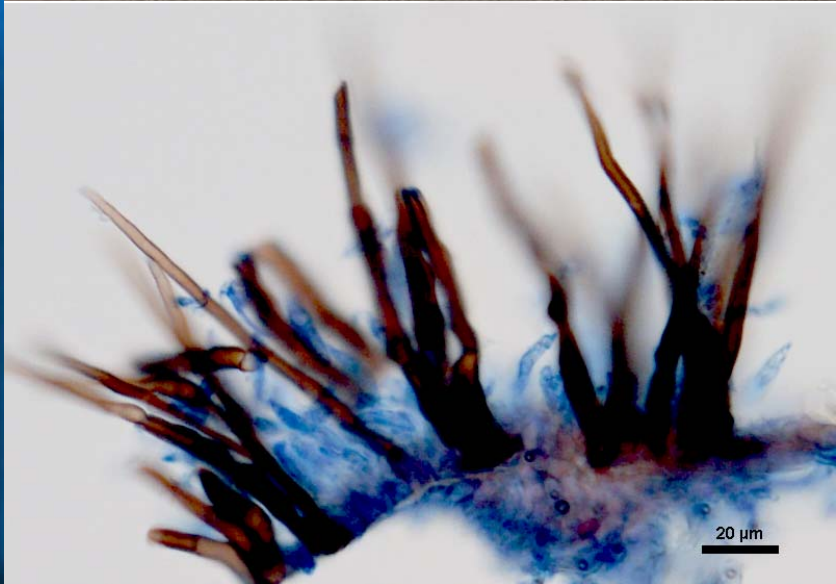
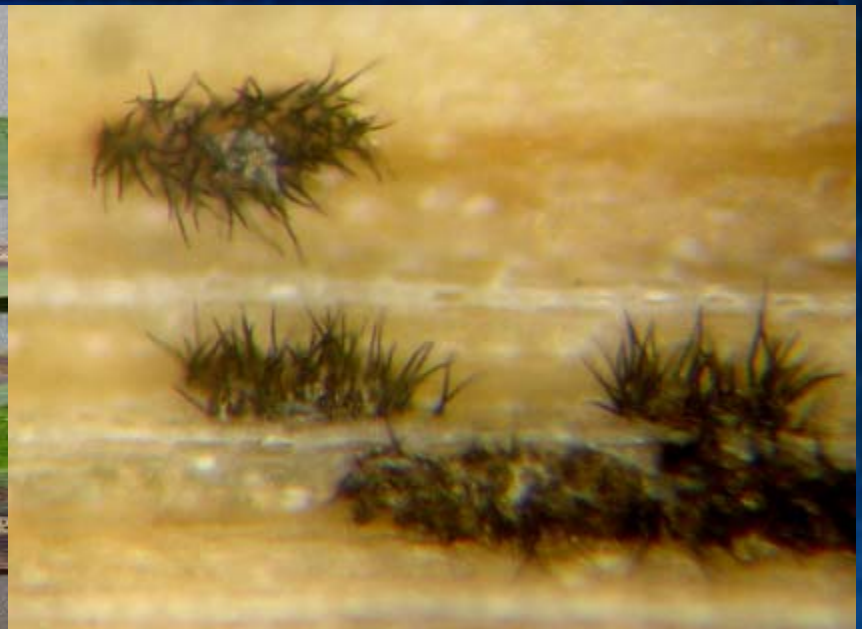


Detached telium



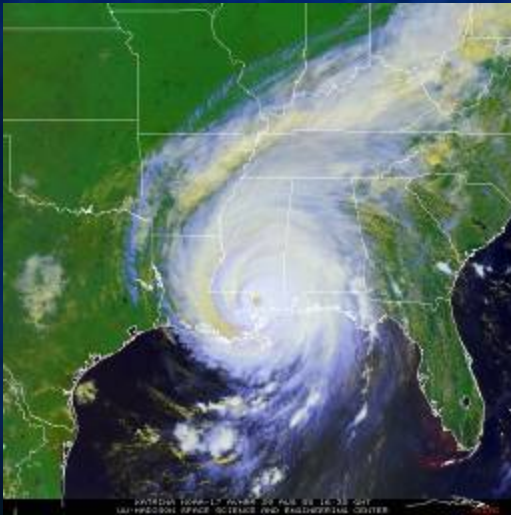
Teliospores

Anthraco



Conclusions

- ✓ Switchgrass has serious plant health issues



Vast acreage of monoculture switchgrass in the southeast may be a perfect storm

- ✓ Severe epidemics were observed in ornamental beds, wildlife habitats, and agronomic fields
- ✓ Other foliar diseases were observed
- ✓ Rust was observed in retail nurseries in AR & TN
- ✓ Dr. Yonghao Li is a talented histologist!