



# Forage Diseases

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## Outline

- What is plant disease?
- What forage diseases do we deal with in central Florida?
- How do we manage forage diseases?



## What is Plant Disease?

Anything that prevents a plant from performing to its maximum potential.

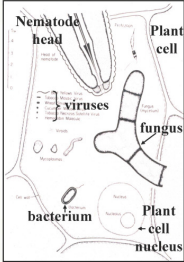
## Types of diseases

- Abiotic (disorders)**
  - Disease caused by a non-living agent
    - Sun scorch, nutrient deficiencies, chemical burn
- Biotic**
  - Disease caused by a living agent.
    - Fungi, bacteria, nematodes, viruses (pathogens)

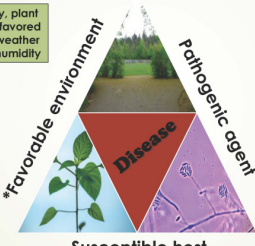
## What size are plant pathogens?

Common plant pathogens and their size relative to each other and to a plant cell




## Plant diseases require

\*Generally, plant disease is favored by warm weather and high humidity



## Disease not a major problem for North Florida forages

- Only 16 forage disease samples submitted to the Florida Plant Disease Clinic since 2005



## Rust



## Rust

**Hosts**

- Rye
- Oats
- To a lesser extent in most other forages

**Management**

- Resistant Varieties/Cultivars
  - Rye = "Florida Rust Resistant"
  - Oat = FL0567, Legend 567, and Horizon 720
- Avoid Susceptible Varieties/Cultivars
  - Bermudagrass = common, Alicia, World Feeder, Jiggs

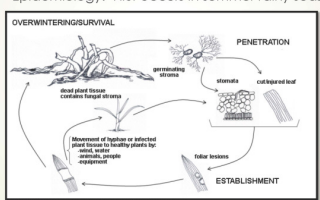
## Dollar Spot

- Host: Bahiagrass
  - Argentine cultivar less susceptible than Pensacola and Tifton 9 (visual observation)
  - Causal Agent: *Sclerotinia homoeocarpa*



## Dollar Spot

- Epidemiology: First occurs in summer rainy season



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## Dollar Spot

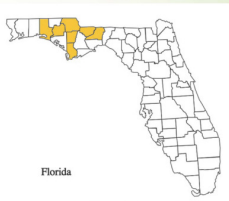
- Symptoms:
  - Hourglass shaped tan lesions with dark brown margins
  - Entire leaf may die as disease progresses
- Signs:
  - Mycellium protruding from lesion
  - Apothecia



## Dollar Spot

2001

- Distribution:
  - Jackson Co.
  - Washington Co.
  - Gadsden Co.
  - Leon Co.
  - Walton Co.
  - Calhoun Co.
  - Gulf Co.



Florida

## Helminthosporium Leaf Spot

- Hosts: Many forages
- Causal Agents: *Bipolaris*, *Drechslera* and *Exserohilum* spp.
  - Fungi
- Epidemiology: Occurs mostly during mild, wet fall and winters. Can appear any time of the year




## Helmenthisporium Leaf Spot

- Symptoms:
  - Vary with each pathogen/host pair
  - Spots range in size from very small (pinhead size), solid brown to purple lesions
  - Expanded lesions with bleached centers that girdle the leaf blade
  - Severely infected leaves turn purple or reddish brown in color, giving the turf an overall purple cast
  - Leaves eventually wither and dry to a light tan color
  - Lesions on stolons are dark purple to black
  - Turf areas thin and die.




## Fungal Diseases of Rye (*Secale cereale* L.)

- Anthracnose : *Colletotrichum graminicola*
- Black head molds : *Alternaria* spp., *Closterosporium herbarum*, *Epicoicum* spp., *Sporobolomyces* spp., *Stemphylium* spp.
- Black point : *Bipolaris sorokiniana*, *Fusarium* spp.
- Bunt (striking smut) : *Tilletia caries* = 7. *tritici*
- Cochlearia smut : *Fymyrella vesicula*
- Common root rot and seedling blight : *Bipolaris sorokiniana*
- Dichotomous leaf spot (shear) : *Dichotomys elongatus*
- Deaf bunt : *Tilletia controversa*
- Ergot : *Claviceps paspali*
- Fusarium root rot : *Fusarium culmorum*
- Head spot : *Pseudopeziza sorokiniana*
- Kernal bunt (partial bunt) : *Neovossia indica*
- Leaf rot (brown rot) : *Puccinia recondita*
- Leaf streak : *Cercosporium graminis*
- Leptochloa leaf spot : *Phaeosporium heptochloides*
- Loose smut : *Ustilago loliae*
- Powdery mildew : *Zygothia* f. sp. *Em. Martialis*
- Pythium root rot : *Pythium sphaerodermatum*, *P. armenianum*, *P. debaryanum*, *P. graminicola*, *P. ultimum*
- Scab : *Gibberella zeae*
- Scald : *Phytophthora secalis*
- Septoria leaf blight : *Septoria secalis*
- Septoria tritic blotch (speckled leaf blotch) : *Septoria tritici*
- Sharp-eyed and Rhizoctonia root rot : *Rhizoctonia cerealis*
- Spot blotch : *Bipolaris sorokiniana*
- Stagonospora blotch (green blotch) : *Stagonospora nodorum*
- Stalk smut (purple smut) : *Urocystis occulta*
- Stem rust : *Puccinia graminis*
- Storage mottle
- Alternaria spp.
- Aspergillus spp.
- Epicoicum spp.
- Alphospora spp.
- Penicillium spp.
- Rhizopus spp.
- Strombospora (eyespot or foot rot) : *Pseudocercospora heptochloides*
- Stripe rust (yellow rust) : *Puccinia striiformis*
- Tale-ell : *Claustromyces graminis*
- Tan spot (yellow leaf spot) : *Pyrenopeziza tritici-secalis*

## Bacterial, Nematode and Viral Diseases of Rye (*Secale cereale* L.)

**Bacterial Pathogens**  
 Bacterial streak (black chaff) : *Xanthomonas campestris* pv. *trunculans*  
 Halo blight : *Pseudomonas syringae* pv. *corallinae*

**Parasitic Nematodes**  
 Cereal cyst : *Heterodera avenae*  
 Leaf and stem : *Oxyechirus glaucus*  
 Root gall : *Subangium malicola*  
 Root knot : *Meloidogyne* spp.  
 Seed gall : *Anguina tritici*

**Viruses**  
 Barley yellow dwarf  
 Barley yellow dwarf virus  
 Saltburn mosaic  
 Wheat saltburn mosaic virus  
 Wheat streak mosaic  
 Wheat streak mosaic virus

## Ergot

- Causal Agent: *Claviceps paspali*






## Ergot

- Epidemiology:**
  - Favored by hot, damp weather

## Ergot

- Management:**
  - Resistance
  - Argentine bahiagrass **more** susceptible than other cultivars

## Ergot Alkaloids and Livestock

- Gangrenous ergotism (i.e., fescue foot)**
  - results in loss of extremities such as hooves, ear tips, and tail switches
- Subtle and chronic decreases in livestock productivity (i.e., summer slump)**
  - characterized by decreases in intake, liveweight gain, circulating prolactin, reproductive performance, milk production, and hyperthermia
- Fat necrosis**
  - often only diagnosed following necropsy.

Klotz, J. L., 2015. Activities and effects of ergot alkaloids on livestock physiology and production. *Toxins*, 7(8):2921-2927.

Photo courtesy of the Utah Pathology Dept. Utah State Vet. Lab.

## Ergot Alkaloids and Livestock

- In the view of some nutritionists, the ergot limit for pigs is zero
- For all other species, the maximum limit is one kernel per 1,000 or 0.1 % by weight (10 ergot bodies per liter of grain)
- Some feed mills will not accept grain deliveries with ergot levels above 0.04 to 0.06 % (four to six ergot-infected kernels per liter of grain).

Dependent on many factors. i.e. the animal's age, health, metabolism etc...

## Plant Disease Management

- Cultural Controls:**
  - Proper nutrient management
  - Avoid excess nitrogen during potential disease development periods
  - Raise mowing height during disease outbreaks (Less plant stress)

## Management

- Chemical Controls:**
  - chlorothalonil
  - Fludioxonil
  - Iprodione
  - Mancozeb
  - myclobutanil
  - propiconazole
  - pyraclostrobin
  - Hiloxystrobin
  - trifloxazole
  - vinclozolin

Diseases typically do not cause enough damage to warrant a fungicide application in perennial grasses

...may reach treatment threshold levels in cereal rye seed production fields

