

Mycotoxin Concerns in the Florida Beef Cattle Industry

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Introduction

Beef cattle producers in Florida have expressed concerns of the potential presence of mycotoxins in warm-season perennial grasses and their effect on cattle health. Although fungi associated with cool-season grasses have been known to produce mycotoxins that can lead to economic losses in the cattle industry, little is known about the presence and severity of mycotoxins in warm-season perennial grasses.

Objective: To evaluate mycotoxin occurrence and severity in warm-season perennial grasses.

Methods

- Specialists and Extension Agents collaborated in a multi-year study
- Forage samples of limpograss, bermudagrass, and bahiagrass were collected from 13 ranches across Florida from 2017-2019.
- Additional forage samples were taken in Osceola and Brevard Counties during 2021-2022 with focus on seasonal changes
- To date, over 500 samples have been collected for multi-mycotoxin testing and analysis of fungal community.

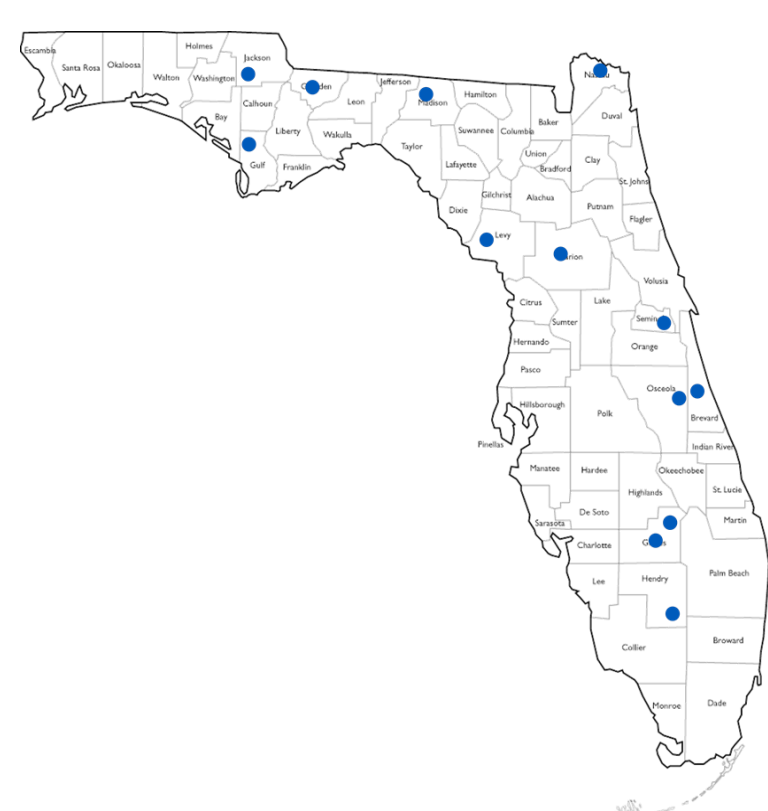


Figure 1. Brittany Justesen collecting grass samples in Osceola County (left). Locations of 13 ranch sites in Florida (right).

Mycotoxin patterns

Grass	ZEAR + metabolites	Fusarenon-X	Alternariol, alternuene + AME	Beauvericin & enniatins	Fumonisin	Emodin	Ochratoxins	Ergoline alkaloids
Bermudgrass	X		X	X	Few	X		
Bahiagrass	X	X	X	X	Few	X	X	Few
Limpograss	X		X	X		X		
Smutgrass			X	X		X	X	X

*ZEAR=Zearalenone, AME=alternariolmethylether

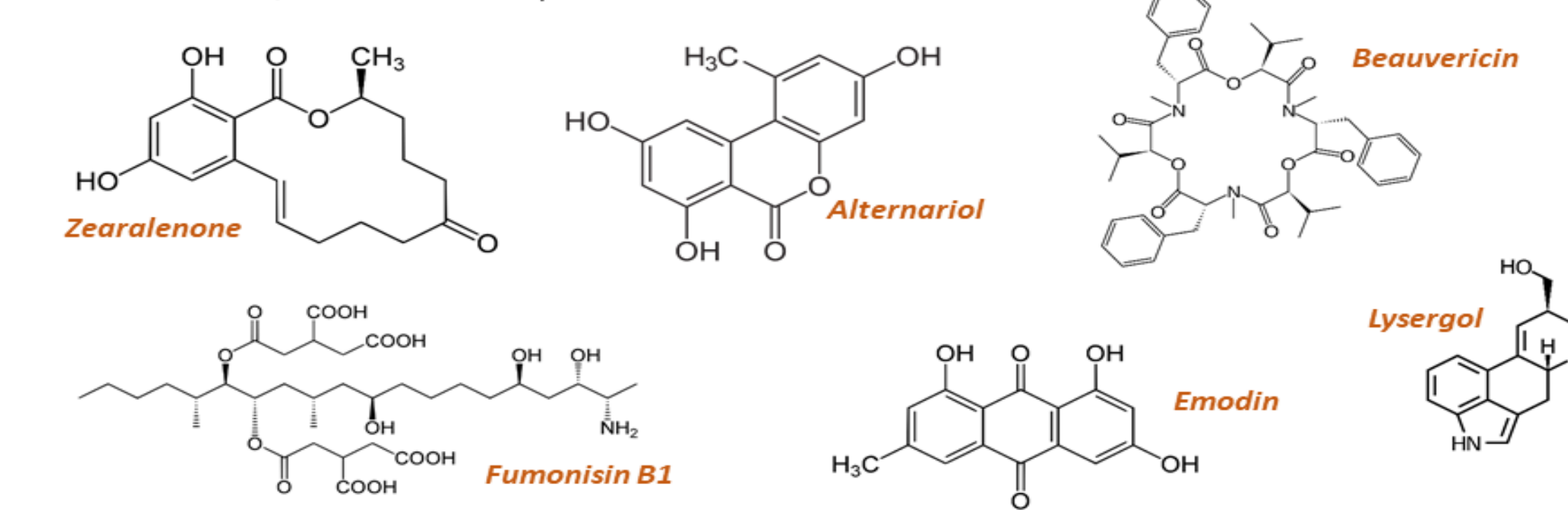


Figure 2. Mycotoxin patterns in Florida forage species.



Figure 3. Limpograss (cv. Floralta) infected with *Myriogenospora atramentosa* found in the pasture. *M. atramentosa* causes a "tangletop" (left) or "blackline braid" (right) appearance.

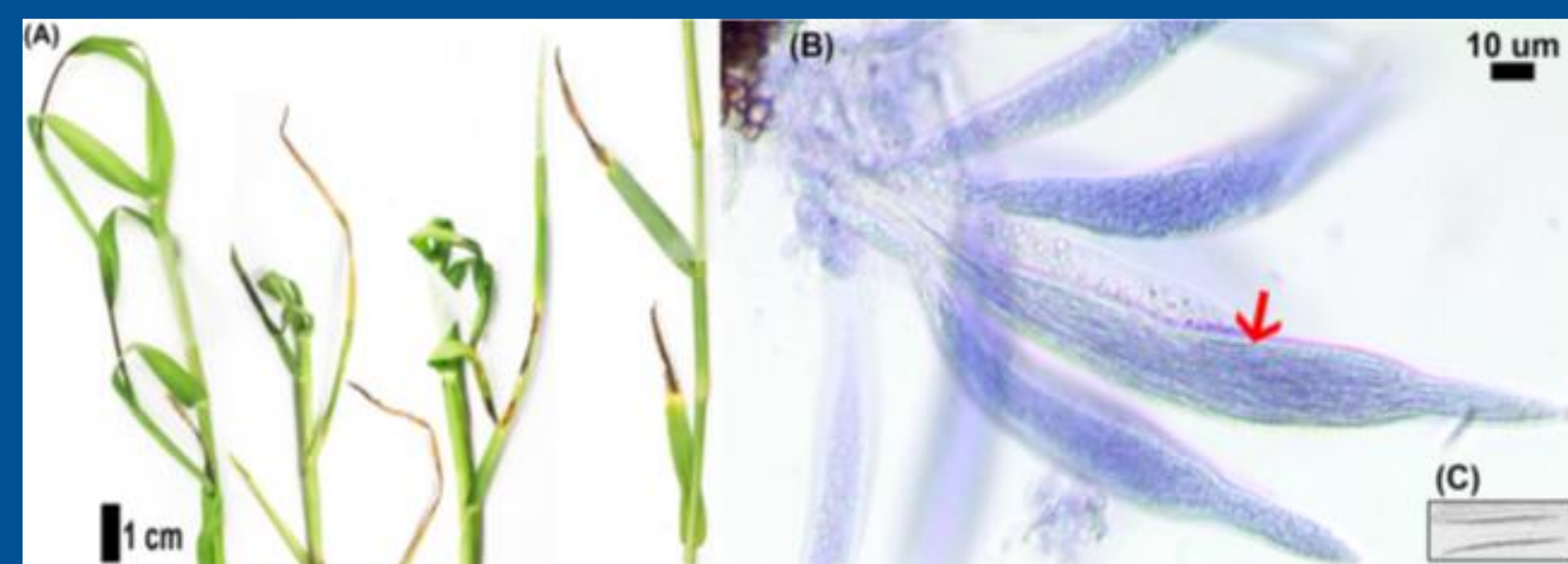


Figure 4. Limpograss leaves infected by *Myriogenospora atramentosa* (left). Asci and ascospores of *M. atramentosa* stained with trypan blue. Red arrow pointing to fusiform asci containing many cylindrical ascospores (right). Fusoid part-spores (bottom right). Credit: Chen K. H, et. al. 2019.

Results

- Results showed that forage species affected the fungal community and mycotoxin profile of the samples.
- Co-occurrence of two or more mycotoxins was common.
- Emerging mycotoxins such as beauvericin were detected (Figure 2).
- Levels of zearalenone, α -zearalenol β -zearalenol, and zearalenone-4-sulfate, were prevalent in higher concentrations in bermudagrass and limpograss.
- Fungal stroma of *Myriogenospora atramentosa* was first documented in limpograss (cv. Floralta) (Figure 3 and 4).

Conclusion

- Results confirm the presence of mycotoxins in Florida pastures
- Zearalenone, an estrogenic mycotoxin, was present in various forms, underlying the importance of routine testing for derivatives of known mycotoxins.
- Many environmental factors can affect mycotoxin occurrence and severity.
- Future studies should determine tolerance levels for beef cattle exposed and pasture management strategies that mitigate mycotoxin in forage grasses.
- This study exemplifies how collaboration between Specialists and Extension Agents can lead to significant scientific discoveries.

Acknowledgements

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