

# Interaction of fire and African grasses in South Texas

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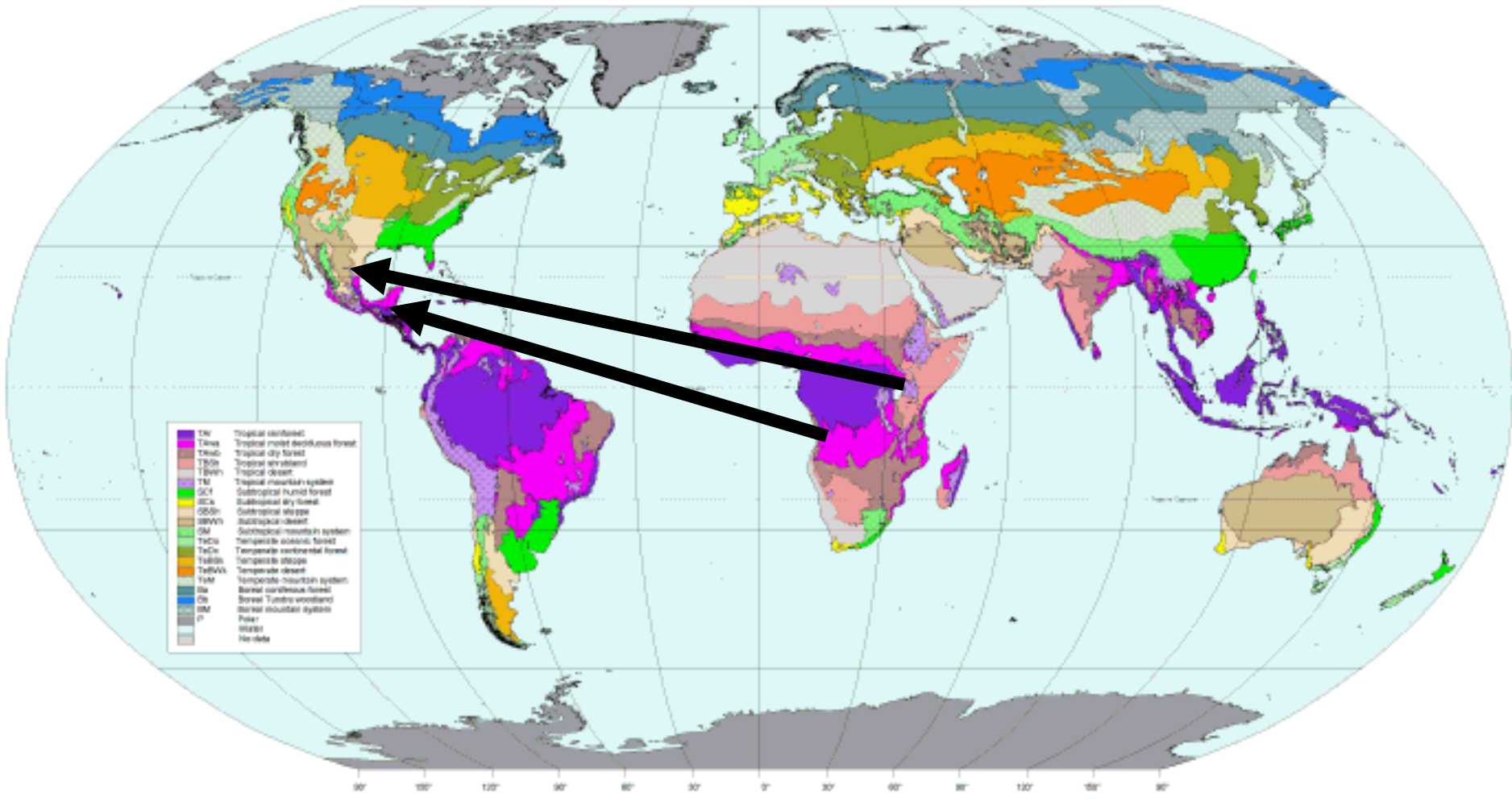
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Weslaco, Texas, USA



# Invasion of African grasses

- Following droughts of 1930s and 50s African (drought tolerant) grasses were introduced to South Texas
- Buffelgrass, *Cenchrus ciliaris* (= *Pennisetum ciliare*)
- Guineagrass, *Urochloa maxima* (= *Panicum maximum*)

# Invasion of African Grasses



- ▶ Buffelgrass, from Kenya
- ▶ Guineagrass, from equatorial Africa
- ▶ Grasses interact with fire and grazing animals to invade



November 1950 – King Ranch - Texas

**LIFE**

# What has changed

- Cattle per acre in South Texas have declined due to increased income from deer and quail hunting
- Less grazing pressure means more fuel load
- Trend towards wet summers mean more fuel load
- Hotter and more frequent fires are killing trees, shrubs and forbs
- Shift in rangeland towards African grasses
- Ranchers want to go back to native grasses and forbs because this is desirable for deer and quail



\$ 12 / acre to lease native grass pastures – J. Everitt, ARS

# Quail and African Grasses

- Juvenile quail feed on insects
- Buffel and Guineagrass pastures have a depauperate insect fauna as compared with native grass pastures
- Invasive grasses cause declines in quail populations and other seed feeding birds

Kuvlesky, W. P., Jr., T. E. Fulbright, R. Engel-Wilson. 2002. The impact of invasive exotic grasses on quail in the southwestern United States. Pages 118–128 *in* S. J. DeMaso, W. P. Kuvlesky, Jr., F. Herna´ndez, and M. E. Berger, eds. Quail V: The Fifth National Quail Symposium. Texas Parks and Wildlife Department, Austin, TX.

# Why is this important?

- Ranchers would like to re-establish native grass pastures to increase wildlife value
- Economic incentive for restoration
- Hunting leads to conservation of native landscape



# Why the transition to African grasses

- few detritivores
- Increased fuel load
- Increase fire frequency
- Increased mortality to native trees, shrubs and forbs
- Reduced plant competition from natives leads to increased dominance of invasive grasses

# Buffelgrass



- Introduced from northern Kenya, 1944
- Drought resistant
- Valuable as forage
- Invasive in Texas, Arizona and Northern Mexico.



Standing buffelgrass detritus



buffelgrass wildfire

# Stakeholder attitudes toward buffelgrass



Ganaderos (++)	Ranchers (+)	Agriculture (crops) (0)	Hunting Leasee (-)	Natural areas (-)
Forage commonly used, especially in hot, arid rangelands	Useful forage in times of drought or in absence of other optimal grasses	Not extremely weedy, suppressed with mechanical control (repeated tilling)	Displaces valuable native vegetation associated with hunting quail	Displaces valuable vegetation, reduces landscape biodiversity

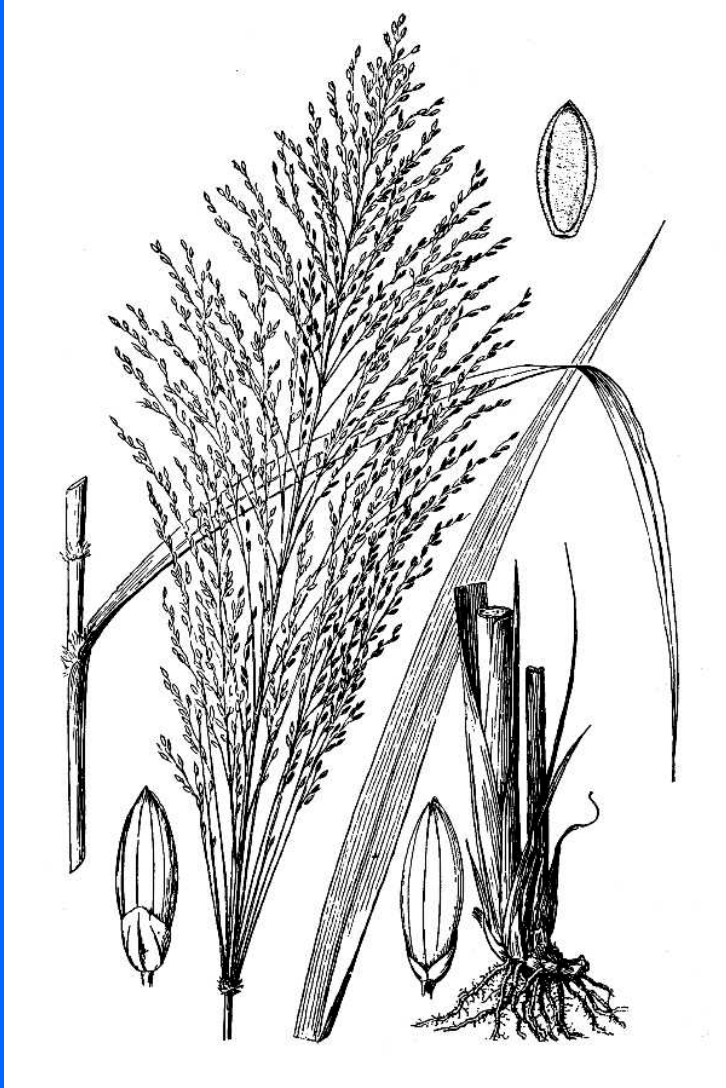
## Texas Highway Department (+)

Ideal for roadside grass, easy to mow and low growing

# Options for control

- Mechanical control not successful
- Chemical control – limited utility
- Reseeding with native grasses, useful, but high cost per acre, timing critical
- Biological control options limited--too important as forage;
- host specific detritivores are one option for biological control.
- Detritivores could reduce fuel load and impact of fires
- Detritivores must be able to survive fire

# Guineagrass



- Introduced into Central America and spread north
- Invasive in South Texas by 1970s
- Invasive in full sun and shade
- Highly invasive in natural areas and agriculture
- Forage value is low
- High fuel load leads to hot, destructive wildfires
- Good candidate for biological control because forage value is low

# Stakeholder attitudes toward guineagrass



Ganaderos (0)	Ranchers (-)	Agriculture (crops) (- -)	Natural areas (- -)
can be used as forage, but not optimal-- other grasses preferred	Undesirable, outcompetes other more valuable grass	Extremely weedy esp. citrus and sugarcane, with no effective controls	Displaces valuable vegetation, reduces landscape biodiversity
		Texas Highway Department (- -)	Private homeowners (- -)
		Un-ideal for roadside grass, hindrance for maintenance and highway safety	Invades lawns and gardens, persistent and difficult to remove



# Ganadero



# Invasive in remaining natural areas of South Texas



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Invasion of subtropical rangelands – The King Ranch



Invasion of peri-urban areas – Mission, TX



Quinta Mazatlan World Birding Center – McAllen, TX



Guineagrass in citrus orchard

A photograph showing a road with a wide, grassy shoulder on the right side. The road is paved and has a white line marking. The grass is tall and green. In the background, there are some trees and utility poles under a clear blue sky. The text "Roadside right-of-ways" is overlaid in a blue box at the bottom left.

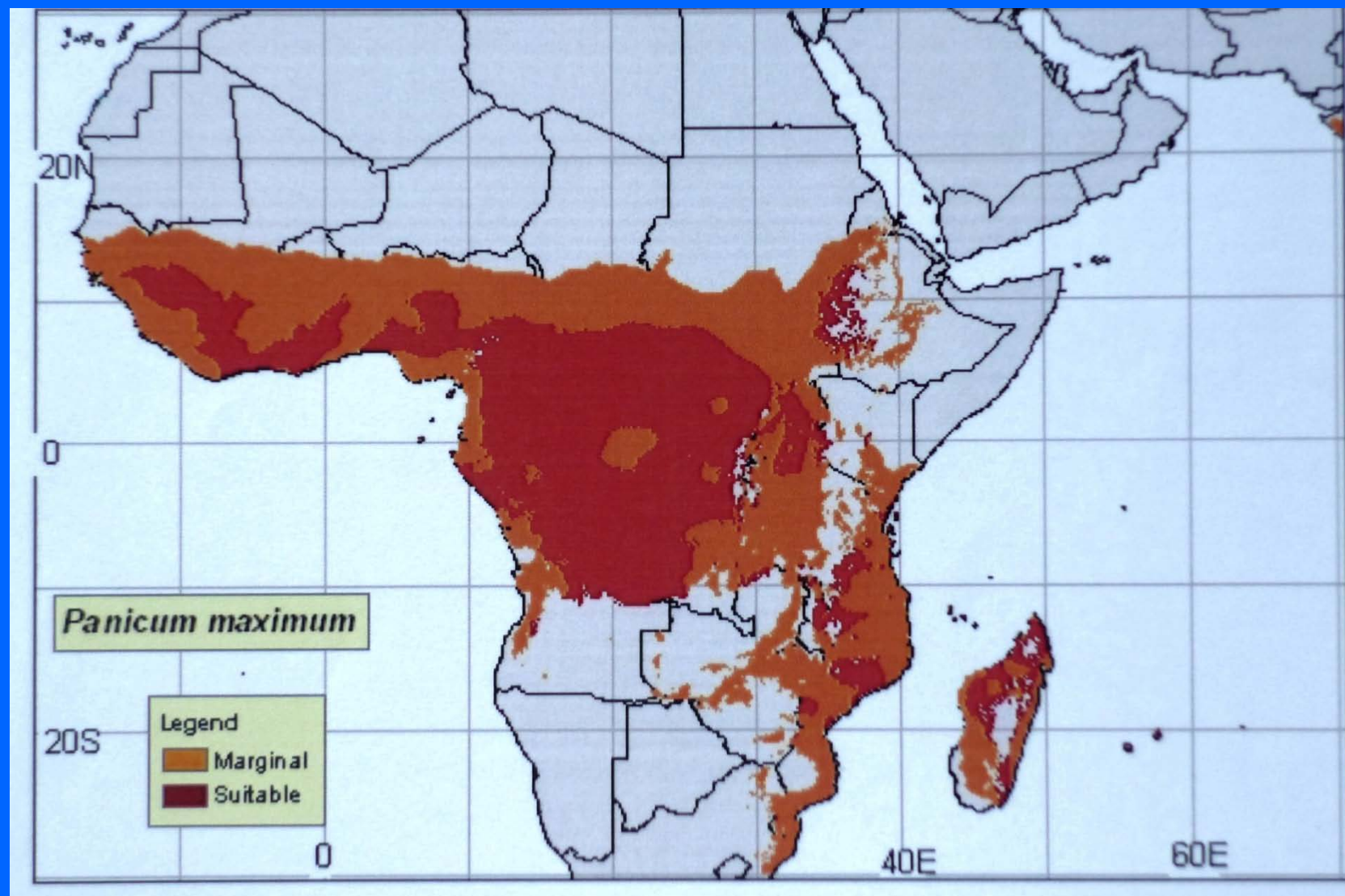
Roadside right-of-ways

# Options for control

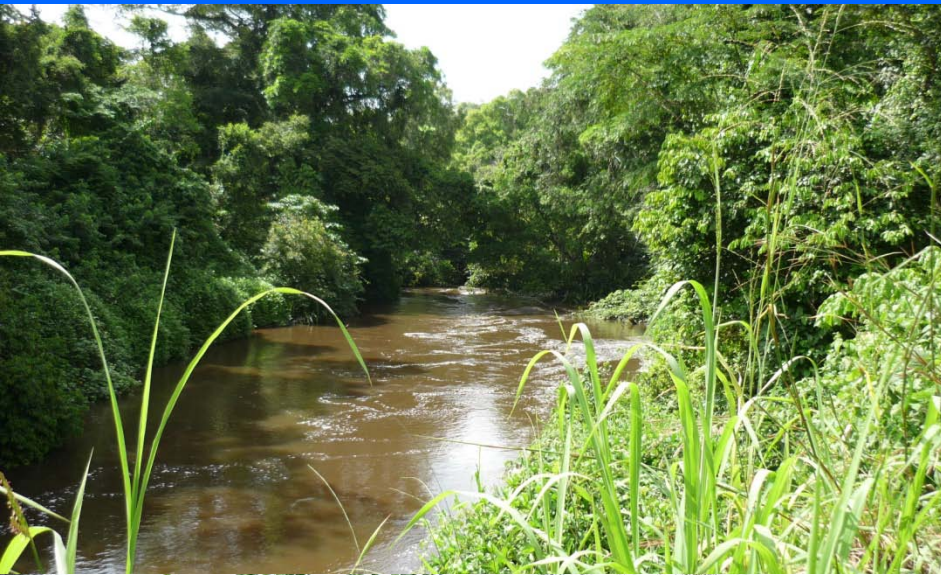
- Mechanical control not successful
- Chemical control – limited utility
- Controlled burns damage native plants
- Biological control may be best option
- Support needed from ranching community for biological control to go forward
- Outreach to ganaderos in northeastern Mexico critical.



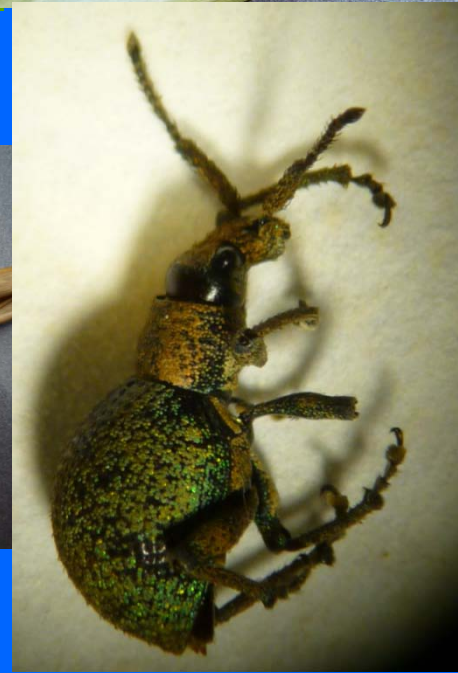
## Native Distribution: *Urochloa maxima*



# Native Range - Africa



# NGOMESSANE, Cameroon



Mercadier, G., Goolsby, J. A., Jones, W. A., Tamesse, J. L. 2009. Results of preliminary survey in Cameroon, Central Africa, for potential natural enemies of *Panicum maximum* Jacq. (Poales: Poaceae), guineagrass. Journal of Subtropical Plant Science. 61, 31-36.

**BORERS**

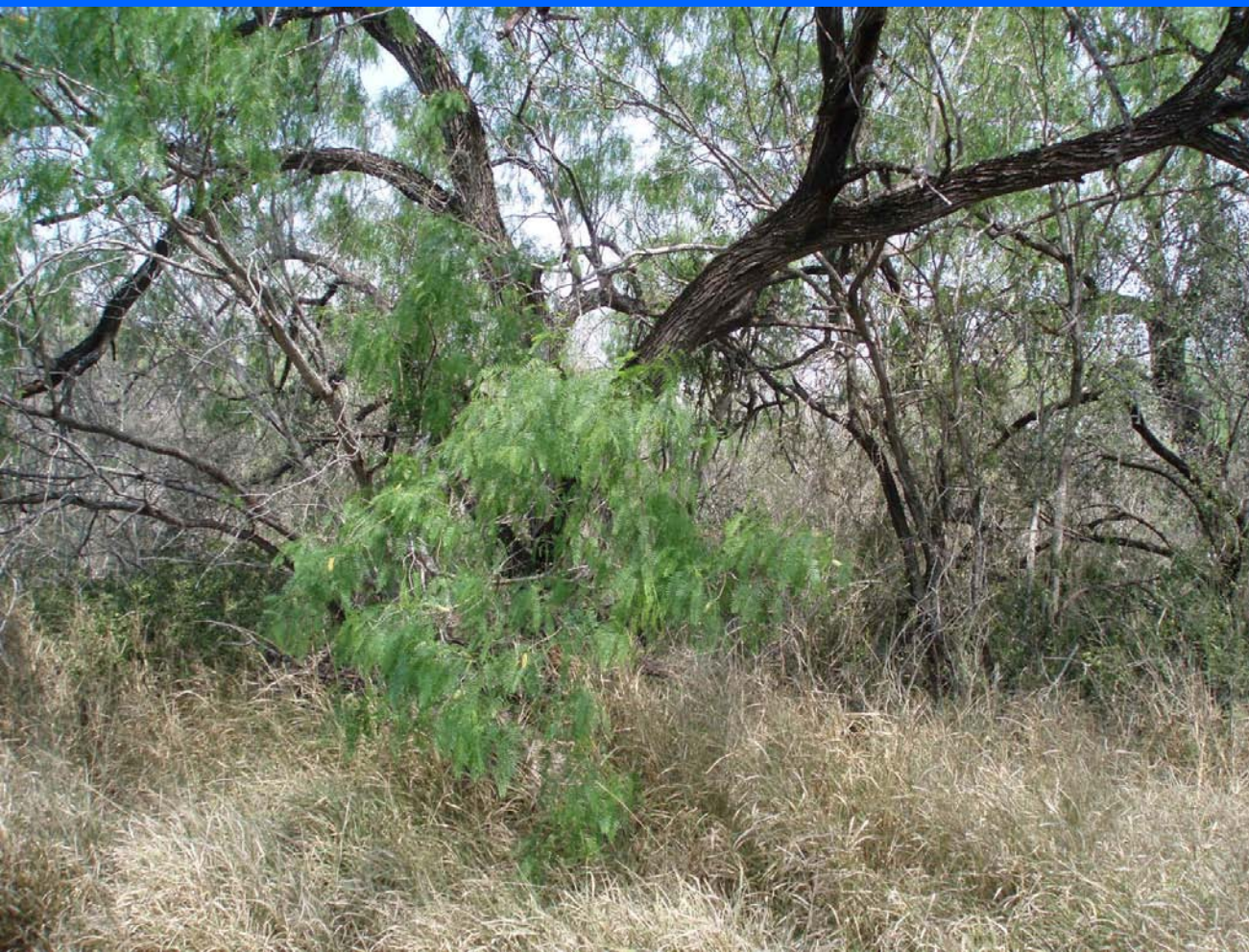
# Preliminary Results of Exploration in Africa

- Guy Mercadier (USDA-ARS-European Biological Control Laboratory conducting foreign exploration
- High diversity of herbivores
- Several promising candidates that may be host specific to *U. maxima*
- Stem borers have considerable impact in the native range
- Which herbivores will survive range fires?

# Conclusion

- African grasses are the most serious invaders in South Texas natural areas
- Interact with fire to transform landscape
- Societal changes provide new opportunity to investigate use of biological control
- Biological control is a feasible option and may be the only option to restore the widespread natural areas and rangelands impacted by these African grasses.

Thank you



# Fire and its interaction with invasive and biological control

- Fire important to many ecosystems that we are trying to restore and protect
- Invasives can change fire frequency and intensity, introduce fire regimes to ecosystems not adapted to fire
- Fire impacts biological control agents +/-
- Grasses are new targets for biological control
- Grasses invade ecosystems that are already regulated by fire and further change fire ecology
- Biological control agents must be adapted to fire