

Seasonal and Regional Dynamics of Invasive Stem Borers on Dominant Cultivated and Weed Plant Hosts

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Stem borers in graminaceous crops

Two invasive stem borers (Lepidoptera: Crambidae)

The sugarcane borer
Diatraea saccharalis (F.)



The Mexican rice borer
Eoreuma loftini (Dyar)



Reay-Jones et al. 2006, Way et al. 2006

Stem borer non-crop hosts

“Virtually all grasses large enough to afford them shelter within the stem”

- *Echinochloa* grasses
 - *Leptochloa* grasses
 - *Panicum* grasses
 - *Paspalum* grasses
 - *Sorghum* grasses
- } Poaceae

Bessin and Reagan 1990, Box 1951, 1956, Browning et al. 1989, Holloway et al. 1928, Johnson 1984, Jones and Bradley 1924, Osborn and Phillips 1946, Van Zwalunenburg 1926

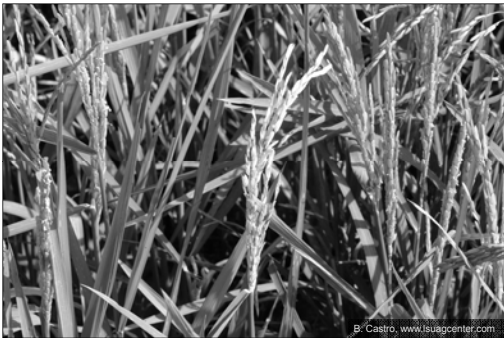
Stem borer IPM research has focused on the crop component:

- Insecticides and economic thresholds
- Resistant cultivars
- Biological control
- Cultural practices
- Role of populations in non-crop components?

Hypothesis:

Non-crop hosts play a major role in stem borer population dynamics

Rice (*Oryza sativa* L.)



Way 2002

Preliminary quantification of stem borer infestations in non-crop grasses relative to rice

- Five non-crop grass species
 - Johnsongrass, *Sorghum halepense* (L.) Persoon
 - Vaseygrass, *Paspalum urvillei* Steud.
 - Amazon sprangletop, *Leptochloa panicoides* (Presl) Hitchc.
 - Broadleaf signalgrass, *Urochloa platyphylla* (Munro ex C. Wright) R. D. Webster
 - Barnyardgrass, *Echinochloa crus-galli* (L.) P. Beauv.
- A crop grass: Rice, cultivar Cocodrie

Grasses have the potential to sustain and build-up stem borer populations

Weedy Habitat Surveys

Objective:

Provide seasonal estimates of stem borer use of non-crop hosts in the Texas rice agroecosystem

Weedy habitat surveys, southeast TX

- April, 2007 to February, 2008
- 3 farms - upper, medium, lower TX rice area



Weedy habitat surveys, southeast TX

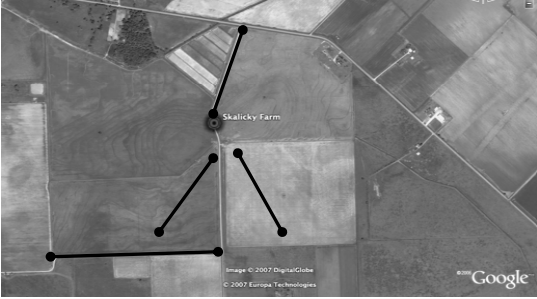
- Each farm: 2 transects through field margins



Weedy habitat surveys, southeast TX

- Each farm: 2 transects through field margins
- 1 transect in fallowed rice
- 1 transect in newly planted rice

Spring only



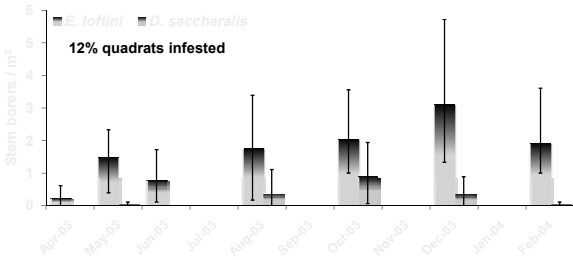
Weedy habitat surveys, southeast TX

- Each transect: 3 sampling areas



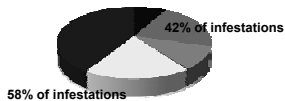
- Each area: 3 quadrats, 1 m² each

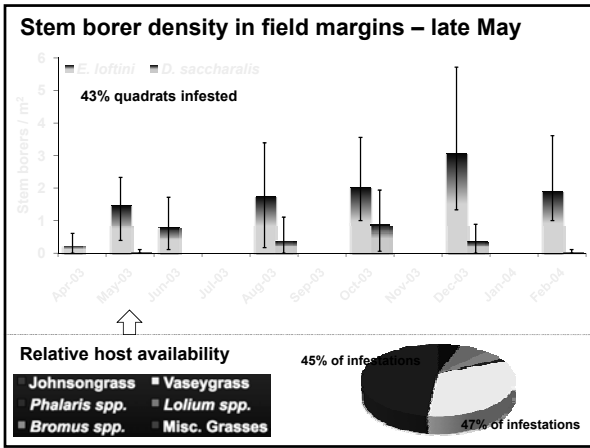
Stem borer density in field margins – early April

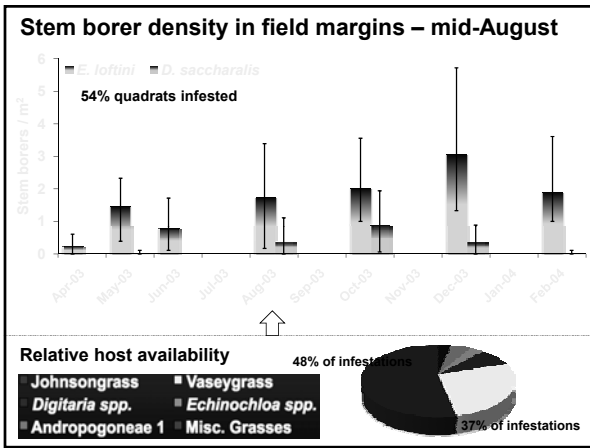


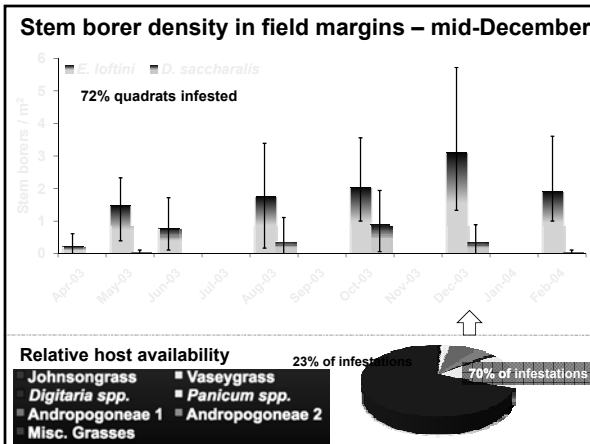
Relative host availability

- Johnsongrass
- Vaseygrass
- Phalaris spp.
- Lolium spp.
- Bromus spp.
- Misc. Grasses

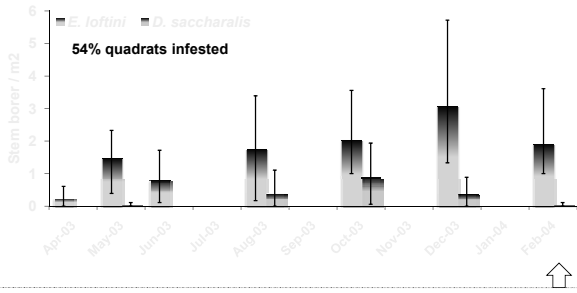








Stem borer density in field margins – late February



Relative host availability



Stem borer density in rice fields (early season)

- Young rice: No *E. loftini*
- Fallowed rice:
 - Early April:
 - No *E. loftini* in old rice culms
 - One *E. loftini* larva in *Phalaris* spp.
 - Late May:
 - No data collected

Discussion – Seasonal dynamics in rice agro-ecosystems

- Early growing season:
 - *E. loftini* built-up in grasses found in field margins
 - *E. loftini* did not feed on young rice
- Late and post growing season:
 - *E. loftini* infestations were high in margin grasses
 - Overwintering habitat
 - Fallow rice fields may play a role if not plowed early

Discussion – Stem borer regional dynamics

- Non-crops are *E. loftini* sources
 - Non-crops increase areawide populations
 - Assist in expanding *E. loftini* range
 - Source-sink interactions (movement, host preference, survival)
- Implications for Louisiana sugarcane
 - Early detection of *E. loftini*
 - Comprehensive management from early infestations
 - Crop and non-crop components

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Questions?



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