Vegetation and Waterfowl Response to Imazapyr-control of *Alternanthera philoxeroides* in Western TN

UTIA Wetlands Program
Dept. of Forestry, Wildlife, And Fisheries
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Rm 160, Plant Biotech Bldg.

Wednesday April 16, 2014
12:20

Moist-soil Management

- 1940s Illinois River Valley
- Mid-latitude and Southern states
- Traditional Management

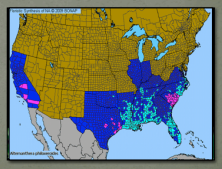


Fredrickson and Taylor 1982, Laubhan and Fredrickson 1993, Nyman et al. 1990

A. philoxeroides

- History
- Impacts
  - Native Wetland Plants
  - Wildlife
  - Economic
- Control





Allen et al. 2007, Barrat-Segretain 2005, Bowmer et al. 1989, Holm et al. 1997, Keast 1984, Vogt et al. 1979

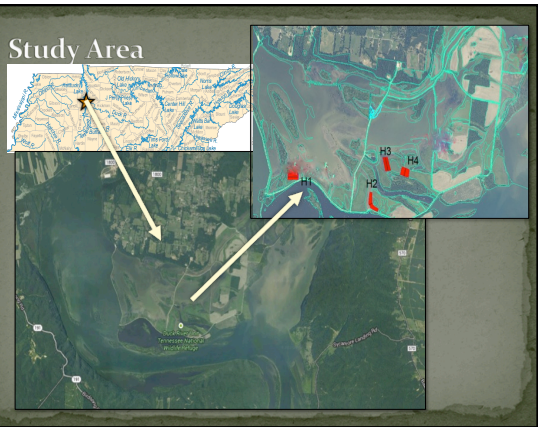
Allen et al. 2007

- Imazapyr and Triclopyr amine
- Timing and Rate
- ↓ Alligatorweed & ↑ Native Wetland Species
- Effects on diversity

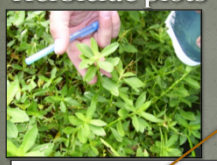
Objectives

- **Quantify response of vegetation communities in imazapyr treated and control plots**
- **Compare waterfowl use between plots treated with imazapyr and control plots.**
- **Compare food availability between plots treated with imazapyr and control plots.**

Study Area



Herbicide plots



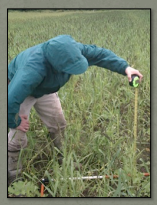
Treatment

Control

Objective 1

Vegetation Response to Herbicides

- Early/late growing season
- Quadrats (10/plot)
- % cover
- % litter
- Heights @ corners, mean



Gray et al. 1999

Objective 2

Density and Behavior

- Logistics
  - Late November-late February
  - Survey 1x/week
  - Sunrise-5 hours after
- Surveys
  - Distance sampling
- Behaviors
  - Alert, Agonistic, Courtship, Foraging, Inactive, Locomotion, Maintenance
- Covariates
- Disturbances

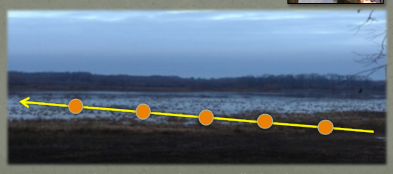
Smith et al. 1995, Bolduc and Afton 2004, Wirwa 2009, Hagy and Kaminski 2012b

Objective 3

Food Sampling

- Food Availability:
  - November-February
  - 5 samples
  - Sampling tools



Salonen and Sarvala 1985, Stafford et al. 2006, Synchra and Adamek 2010, Hagy et al. 2011, Hagy and Kaminski 2012a

Objective 3

Sample Processing

- Sample Preparation
- Washing/Air Drying
- Food Resource Biomass
  - Macro-invertebrates
  - Moist-soil seeds and tubers
- Recovery Bias



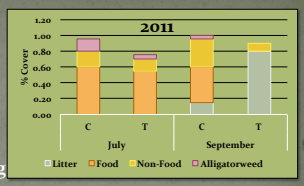


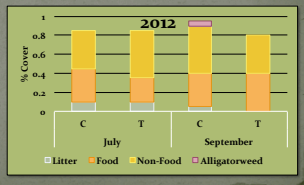
Kg/ha ➡ DED


Murkin et al. 1994, Reinecke et al. 1989, Hagy et al. 2011, Hagy and Kaminski 2012a

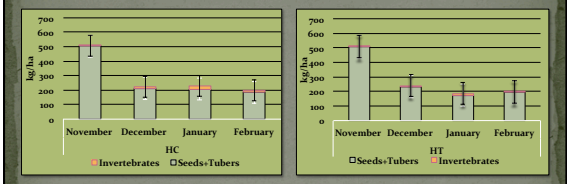
Results

Vegetation Composition in Early and Late Growing Seasons 2011-2012

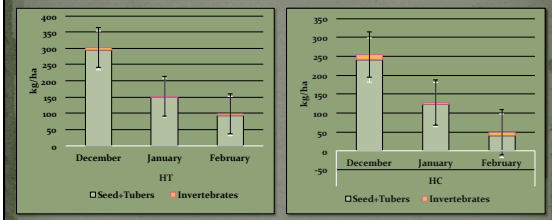




Food Availability for Imazapyr treatment vs Control Plots Nov-Feb 2011-2012



Food Availability for Imazapyr Treatment vs Control Plots Jan-Feb 2013

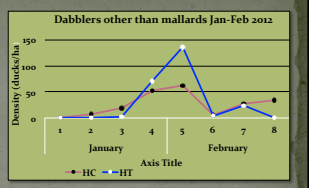


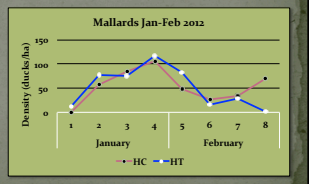
Year of Treatment

- No treatment effect:
  Other dabblers
  $F = 0.62$ $p = 0.4358$

  Mallards:
  $F = 0.17$ $p = 0.7707$
- Depth effect:
  Both guilds
  High percentage used ≤ 21cm

Repeated Measures ANOVA



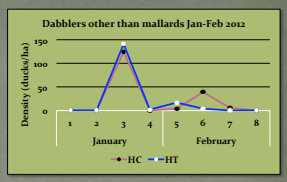


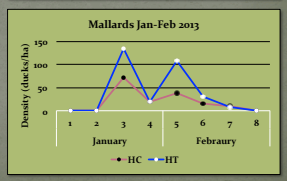
Year after Treatment

- No treatment effect:
  Other dabblers
  $F = 0.36$ $p = 0.5591$

  Mallards:
  $F = 0.28$ $p = 0.6060$
- Depth effect:
  Both guilds
  High percentage used ≤ 21cm

Repeated Measures ANOVA





Discussion/Management Implications

- Imazapyr effective tool for moist-soil management
  - Mirrors Allen et al. 2007
  - Expense/Residual effects
- Year 1 treated plots and food
  - Cyperus tubers
  - Seed bank/Floating seeds
- Waterfowl densities
  - No treatment effects
  - Depth important for dabblers

Implications/Future Work

- Compare behaviors
- Response by species
- Multiple blocks staggered for flooding
- Smaller food items could be key

Acknowledgments

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Questions?

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