

Native and Naturalized Turf Species Suitable for Use on Airfields Managed for Wildlife Hazards in the Northeastern US

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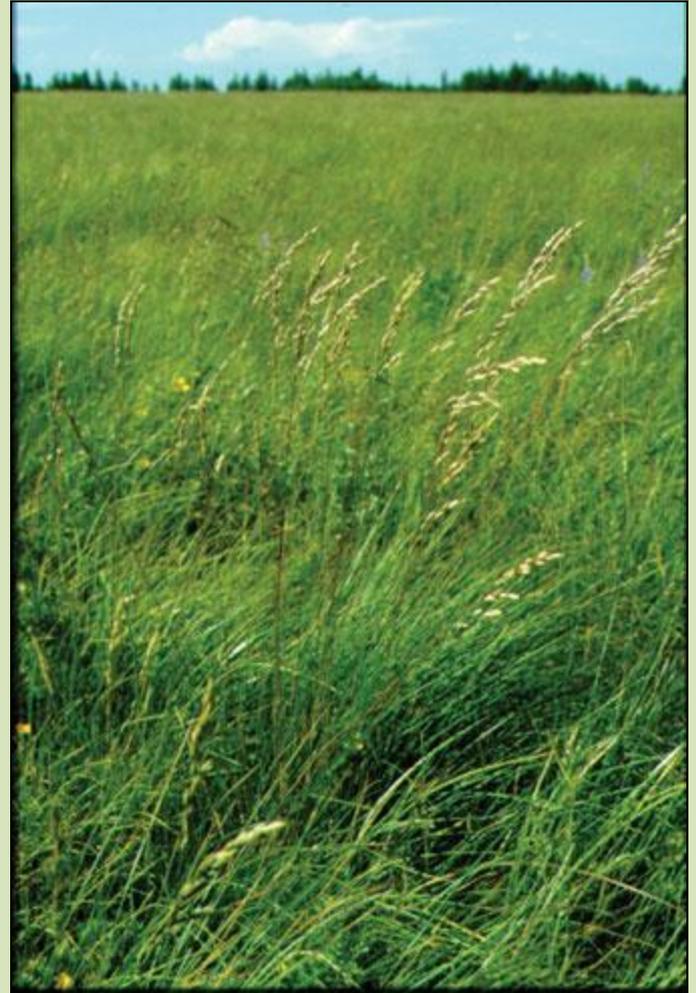
Managing Wildlife on Airfields

- **Birds and other wildlife strikes** cost the U.S. civil aviation industry over \$620 million per year (Dolbeer & Wright 2008).
- Airfield wildlife place human life in jeopardy during take-offs and landings.
- Wildlife hazards may be especially problematic for General Aviation airports in farm friendly regions.
 - **Habitat Management** for an integrated approach.
- **The use of native plants** on airfields has advantages:
 - Adapted to local conditions, low nutrient soils
 - Not as likely to become invasive.
 - Low maintenance requirements (less water, nutrients)



Native Plants in a Wildlife Hazard Management Plan

- This project examined the suitability for native plants to be hydroseeded on airfields compared to seed mixes already commonly used which contain species attractive to wildlife.
 - Support of FAA Aviation Research Grant
 - SUNY Oneonta
 - 3 airports in NY



Robert Redmann photo

Greenhouse study

Spring 2009

- Our greenhouse study was carried out prior to establishment of the field plots to check suitability for hydroseeding, germination and early vigor.



8 turf species
Hydroseeded vs. Broadcast
8 replicates

Greenhouse study

species tested

- **Little Bluestem** *Schizachyrium scoparium* (Michx.) Nash,
- **Purple Love Grass** *Eragrostis spectabilis* (Pursh) Steud.,
- **Crinkled Hairgrass** *Deschampsia flexuosa* (L.) Trin.
- **Poverty Oatgrass** *Danthonia spicata* (L.) Beauv. Ex R. & S.

- **Pennsylvania Sedge** *Carex pensylvanica* Lam.
- **Rough Sand Sedge** *Cyperus schweinitzi* Torrey.

- **Lemon Thyme** *Thymus pulegiodes* L.

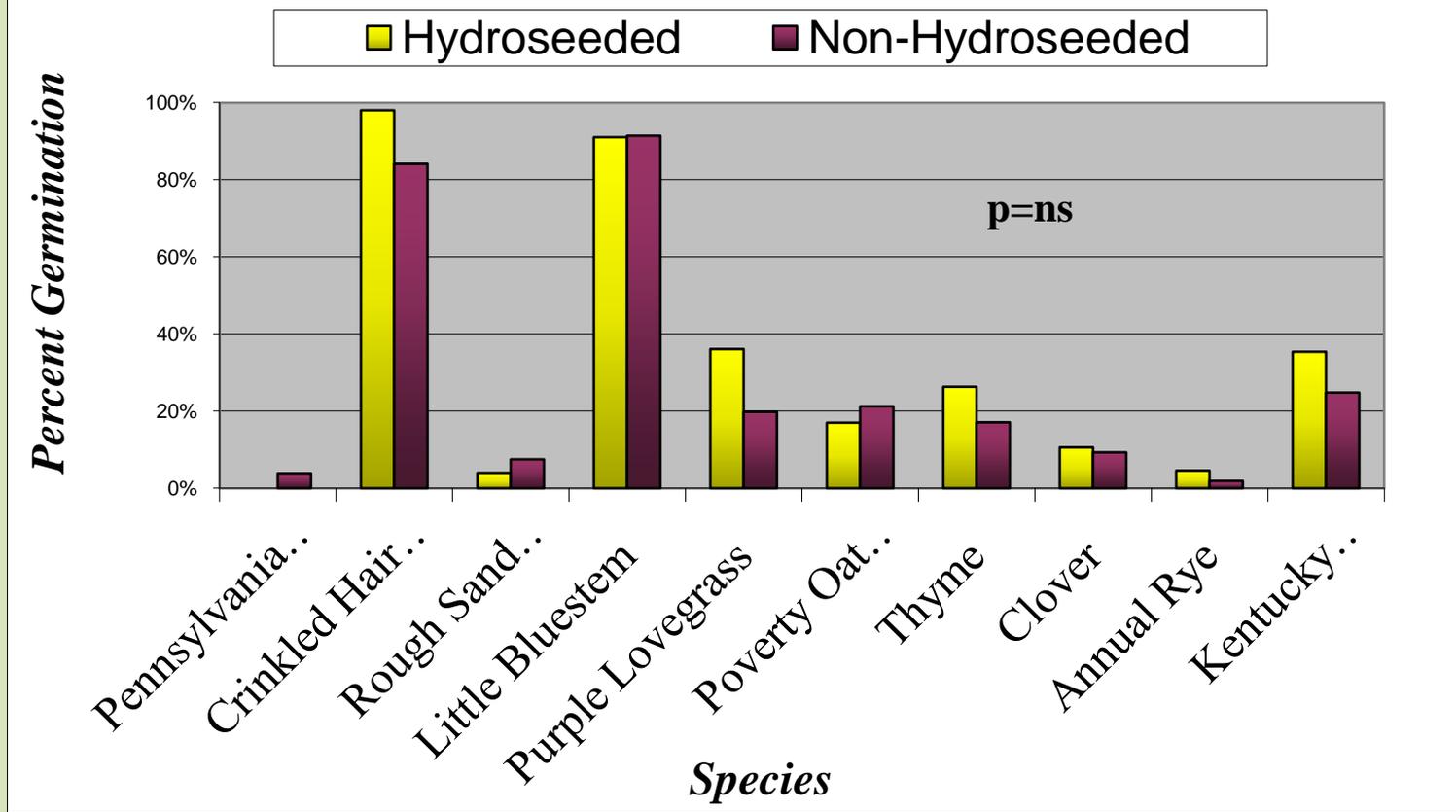
- **Contractor's Mix** was used as the control.
 - Perennial Ryegrass *Lolium* sp. (50%)
 - Annual Ryegrass *Lolium* sp. (12.5%)
 - Kentucky Bluegrass *Poa pratensis* L. (25%)
 - White Dutch Clover *Trifolium repens* L. (12.5%)



Greenhouse Study Results

- As expected the Contractor's Mix germinated earlier and achieved maximum germination by week 2.
- Many of the natives were slower to germinate and achieved maximum germination at week 5.
- By week 5 it was apparent that the germination of seeds that were hydroseeded was equivalent to those that were non-hydroseeded.

Percent Germination at Week 5

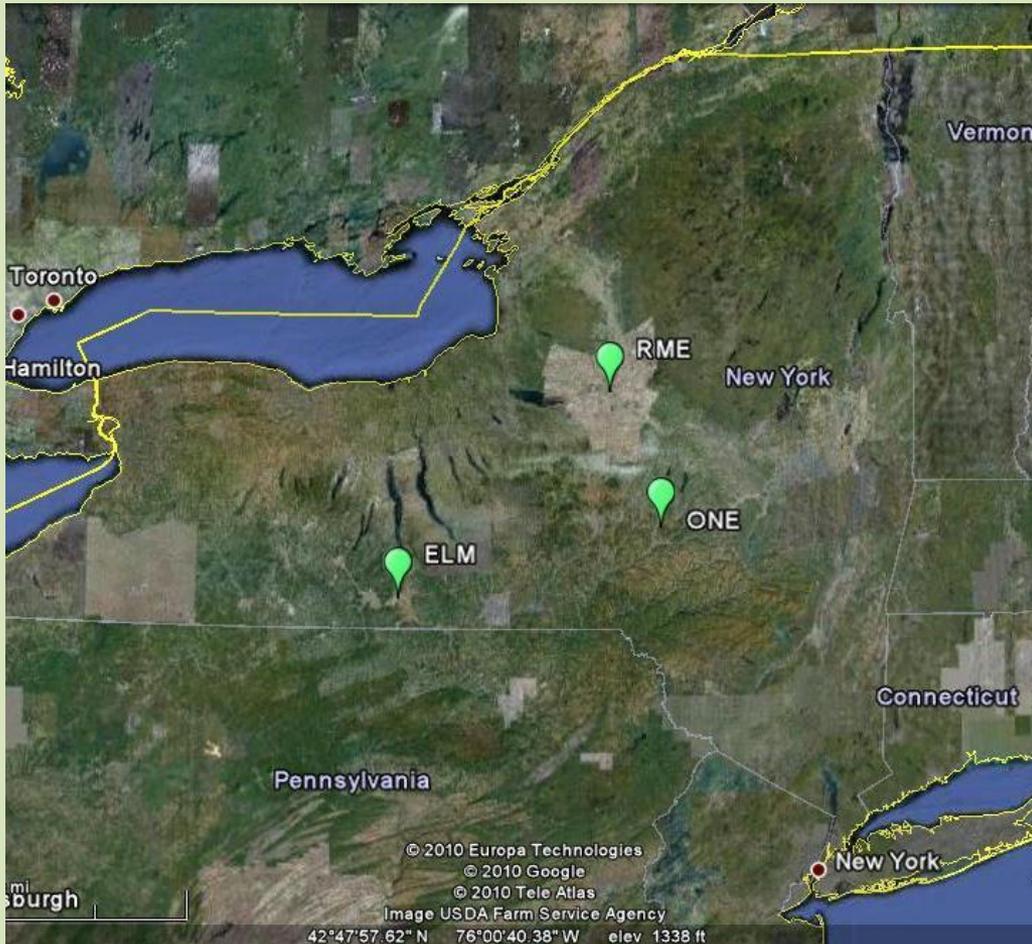


A Wilcoxon Signed Rank Test comparing hydroseeded vs. non hydroseeded germination rates revealed no significant difference ($W_9 = 35$, $P = 0.476$).

Field Trials

- Based on the results from our greenhouse study we selected the top 4 natives for use in our field trials based on total germination, above ground cover after 4 weeks and cost.
- We selected the following natives:
 - Poverty Oats, Crinkled Hairgrass, Little Bluestem, and Lemon Thyme.
 - Indian Grass *Sorghastrum nutans* was also selected due to the species characteristics meeting all of our requirements for suitable grasses as well as it being cost effective.

Field Trial Locations



- All rural settings.
- ONE= Oneonta Municipal Airport GA
- RME = Griffiss International Airport
- ELM = Elmira-Corning Regional Airport

Field Trials

- Plots were rectangular in arrangement with each plot containing six-232.4m² treatment areas and a 3.05m buffer zone surrounding the entire plot.
- Standing vegetation was treated with a nonselective herbicide



Graduate student Kristin Dorsch. Following die back, the field was tilled.

Hydroseeding



- Site preparation essential for weed control.
- Preferred method for airfield seeding.
- Successful germination is possible.

Hydroseeding at ELM airfield plots

Surveys

- Vegetation
 - *five, 1 m² samples selected haphazardly, each treatment area*
 - *percent cover of target species and weed species recorded separately.*
 - *averaged percent cover for the month for each plot.*
- Insect
 - *Insect surveys were conducted monthly at all locations. A sweep net was used to make four passes per treatment covering it in its entirety.*



Sampling for larvae

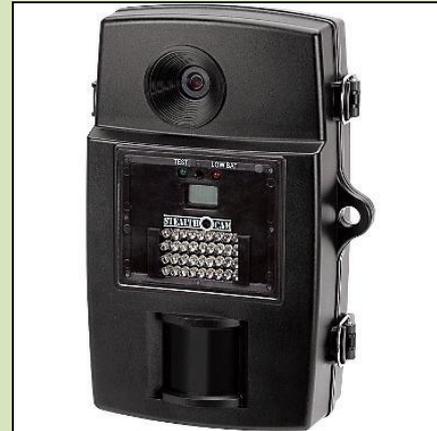
Surveys continued..

- Monthly Bird Surveys
 - Three surveys each during the hours of dawn, afternoon and dusk and lasting one hour.
 - The survey area consisted of the entire experimental plot.
 - Any birds observed were recorded by treatment plot, numbers of individuals and activity (feeding, loafing, perching etc.).
 - Also recorded was the date, time, weather and wind conditions present at the time of the survey.



Mammal Surveys continued...

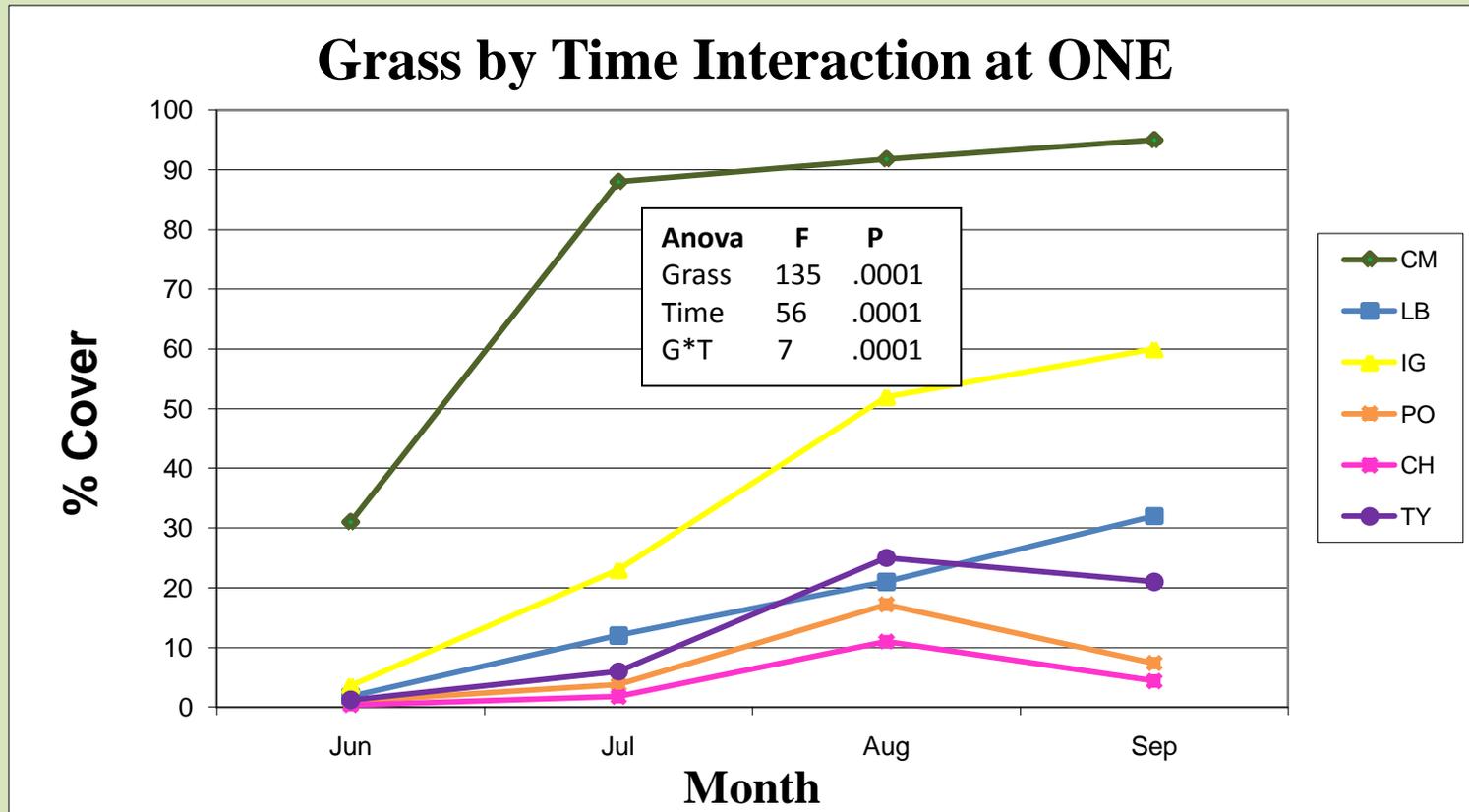
- Large Mammal
 - Visual
 - Trail cameras
 - End of season pellet counts
- Small Mammal
 - Sherman box traps.
 - 18 trap nights/month/site.
 - Some traps tripped, no captures
 - UV light tracking revealed some rodent presence



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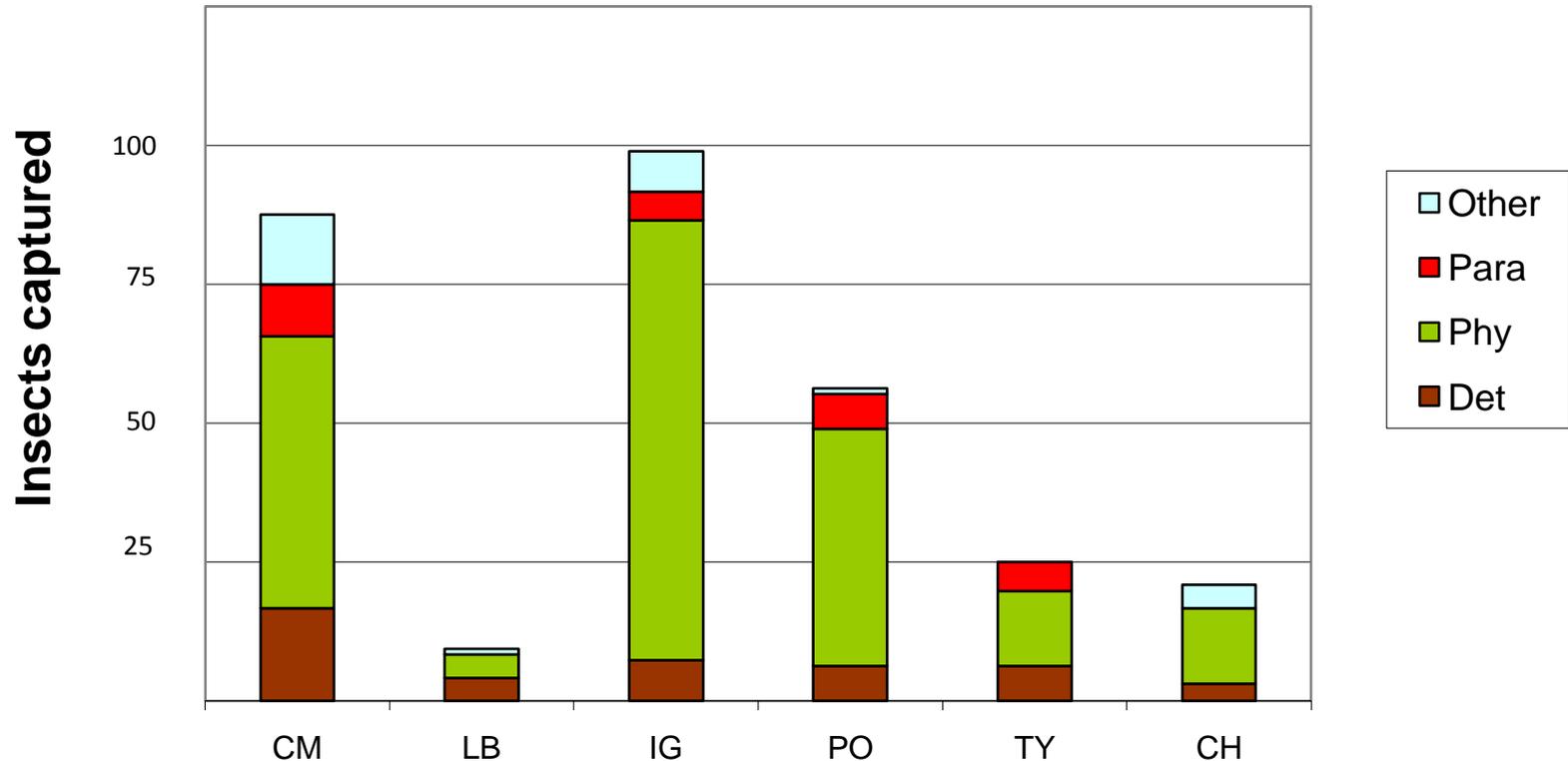
Vegetation Cover



As expected, the Contractors Mix established early, but by August many of the native turf species began to fill in. The highly significant Grass by Time interaction ($P < .0001$) reveals that this trend was not consistent across all grasses at all times.

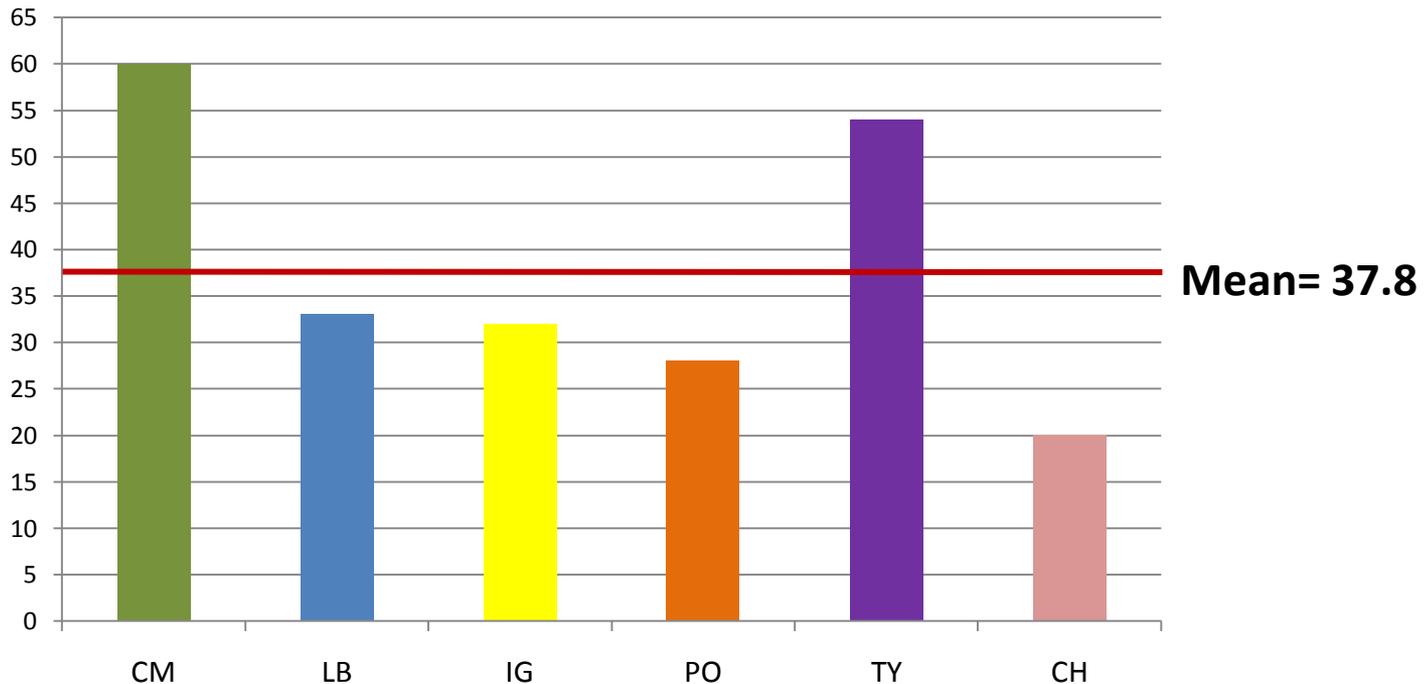
Of the native species, Indian Grass, Little Bluestem and Thyme outperformed the others.

Total Number of Insects Captured by Feeding Type at ONE in September



Results: More insects/plot later in season.
More phytophageous (Plant eating) insects,
General trend of Indian Grass and Poverty Oats attracting as many as Control.

Total number of birds that visited over 36 observation periods



For total bird *counts*, two species (Contractors Mix and Thyme) attracted significantly more birds than the other treatments. ($\chi^2=32.2$, $df=5$, $P<.001$)

Large Mammal Surveys

- Reviewed 215 photo captures of deer from the trail cameras at ONE during 2009.
- Compared the number of deer feeding vs. the number of deer not feeding in both the Contractor's Mix (control) and Indian Grass (native) treatment areas.
- Deer clearly feeding more frequently in Contractor's Mix plot.





Feeding

Cont.Mix obs. **102** (exp.67.5)

Ind. Grass obs. **6** (exp. 13.1)



Non-Feeding

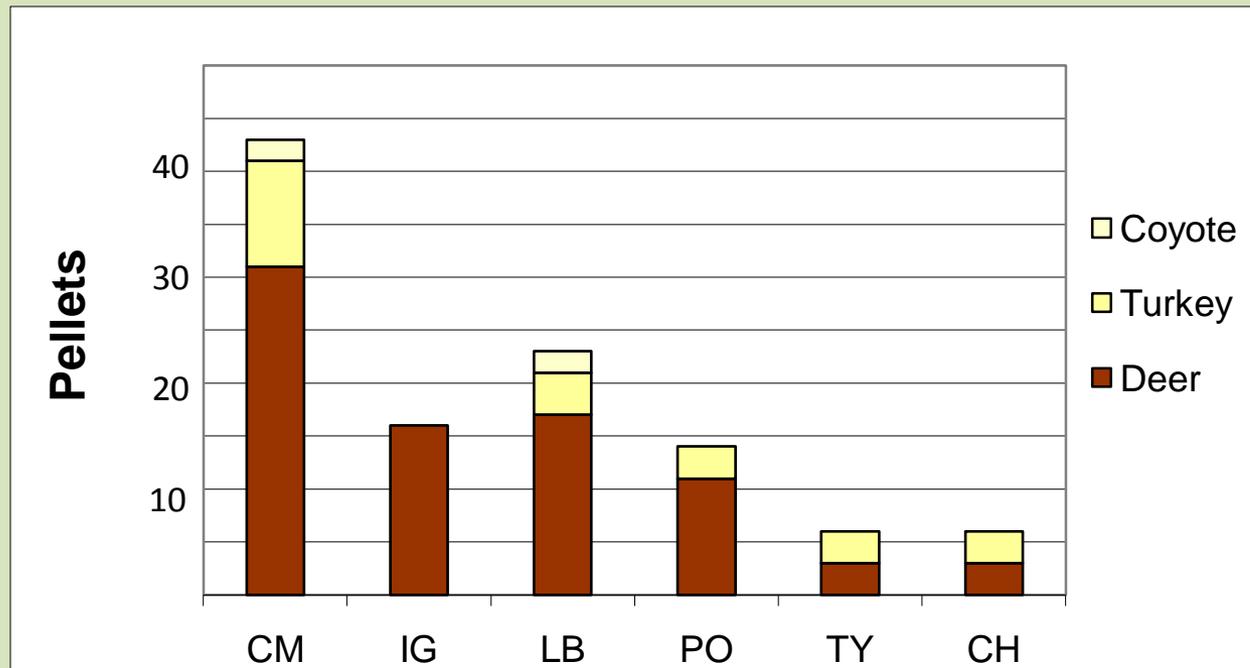
obs. **78** (exp. 65.6)

obs. **29** (exp. 12.7)

- 2 x 2 Contingency table comparing deer activity in 215 photo captures.
- Differences were **highly significant** ($\chi^2 = 53.2$ P<.0001)

Pellet counts

- An October pellet count at all three airports supported the camera data. Summed across all airports the total October pellet/fecal counts in Contractor's Mix was 43. By contrast the total for native turf plots were far less (< 23 pellet groups/treatment).



Conclusions

- Conventional turf more attractive to insects, birds, large mammals.
 - Natives may prove to be less palatable to many species.
 - Small seedhead & less insects = fewer birds.
 - However, some of the attractiveness may be related to coverage.
- Establishment rates of natives low...but not bad.
 - Many natives require +2 yrs to establish a stand.
 - Hydroseeding vs. Broadcast (greenhouse).
 - May need higher seeding rates in the field.
 - Seed mixtures may have better establishment rates.
- Natives species (if chosen wisely) can save money on maintenance including mowing and pesticides.
 - Many, however are not currently cost effective.
 - Site prep and establishment time are longer.
 - Some natives may be a source of revenue (e.g., biofuels)



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