Dealing with blackbird damage in rice

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Every year, rice growers in the EAA experience rice loss to birds that consume rice seed at both the seeding/seedling and heading phases.
Generally considered “blackbirds,” the crop-damaging birds in the EAA are primarily red-winged blackbirds. A much smaller percentage are grackles or cowbirds.
Estimating damage

- Spatial dynamics of rice damage by blackbirds (2012)
- Growers perceptions of blackbird effects on rice (2012-2013)
- Quantification of blackbird effects on rice yields (2013)
Surveyed 142 rice fields

Fields varied by:
- Variety
- Planting Date
- Distance to the closest natural area
Visual sampling of blackbird damage

- Used an ocular tube to stratify field of view
  - Quantitative assessment of % damaged in each visual quadrant
  - Sampled 3 spots along each field
Results

- Yields for each field supplied by Florida Crystals

- Damage varied by rice variety
  - $F_{4,136} = 8.37$
  - $P < 0.0001$
- No relationship between planting date and damage index

- Damage highest near natural areas
  - $F_{2,139} = 3.39, P < 0.0366$
No relationship between seedling damage index and yield

$R^2 = 0.004$

$R^2 = 0.005$
Methods:

- Electronic surveys sent to 26 people
  - 9 farms
- Usable responses received from 9 people
  - 5 farms
Responses

- How often do blackbirds cause damage?
  - Every year: 100% of responses

- How much damage?
  - Some kind of damage: 56%
  - Serious damage: 33%
  - Destroy entire crop: 11%
When does most damage occur?
- Seedling phase: 22%
- Mature phase: 33%
- Damage is equal: 44%

By how much are yields reduced?
- 1-10% reduction: 22% people
- 11-25% reduction: 67%
- 26-50% reduction: 11%
- Significance of problem?
  - Not significant: 0%
  - Significant: 33%
  - Very significant: 67%

- Costs of damage per acre?
  - $21-30: 33%
  - $30-45: 11%
  - $45-60: 11%
  - > $60: 11%

66% estimated damage to be > $20
Acceptable costs per acre?

- $1-10: 33%
- $11-20: 33%
- $21-30: 11%

66% estimated damage to be > $20
Impacts on yield: Experiment

- 4 fields planted to variety Wells in mid-late June
- 32 exclosures & 32 controls (8 each per field)
Methods

- Exclosures were ~ 25’ long
- Divided into 5 sections
- Mesh bird netting

- Seedlings counted in 2 sections
- Mature rice harvested in 3 sections
Exclosure design
Seedling Counts

- Control*:  
  - $80.7 \pm 14.0$ (sd)
- Exclosure:  
  - $83.2 \pm 15.8$

- $t = 0.6604$
- $p = 0.5115$

* One outlier excluded
Yield (Lbs/Acre)

- Control:
  - $5,294 \pm 1,549$
- Exclosure:
  - $5,479 \pm 1,010$
- $t = 0.5659$
- $p = 0.5735$

Non-significant difference of 3.4%
While not statistically significant, findings may be *economically* significant.

At $14.90/CWT ($596/acre) a 3.4% reduction in yield costs $20.26/acre.

This is above the level that 66% of respondents would be an acceptable cost to bear.

Impacts appear to be greatest at mature phase of rice production.
Blackbird Control

![Bar chart showing the number of respondents for various blackbird control methods. The x-axis represents different methods such as Methiocarb, Shooting, Poisoning, Propane cannon, etc., and the y-axis represents the number of respondents on a scale from 0 to 5. The chart uses colors to indicate the level of respondents: NA, None, Low, Medium, High.](chart.png)
Further implications

- Estimates are likely to be conservative
- Study suggests more effective blackbird controls may be necessary to keep costs due to blackbirds within acceptable ranges
- Blackbird control measures should cost < $20.26/acre to be worthwhile
Future studies

- Blackbirds
  - Timing of spring and fall migration
  - Timing of nesting and fledging of local (breeding) birds
  - Roost sites
Future studies

- Rice
  - Study of the spatial patterns and extent of damage to mature rice is needed to target control measures and high-risk fields
  - Damage should be assessed in relation to timing of planting, harvest, and timing of blackbird breeding
Future studies

Control
- Are scare tactics practical and cost-effective?
- Where and when should control be focused?
- What new or emerging methods for blackbird could be tried?
What role can new technologies play in blackbird control?
- Thermal imaging?
- Drone technology?
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