A Bird’s Eye View: Blackbird Flock Response to Unmanned Aircraft System Approaches in Sunflower Fields

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Background

- Mixed blackbird flocks cause (US $) millions of dollars worth of damage to commercial sunflowers fields [1]
- In the Prairie Pothole Region, damage can exceed the industry standard of 5%, and reach total field losses [2]
- Red-winged Blackbirds (Agelaius phoeniceus) are experiencing an overall population decline, while regional trends show an increase based on breeding bird surveys [3]
- A dynamic tool is needed to reduce blackbird damage to sunflowers as the damage is actively occurring [4]
- Research using Unmanned Aircraft System (UAS) platforms to haze blackbirds in sunflower fields found that an increased negative stimulus is needed to promote flock abandonment of sunflower fields [5]

Objectives

1. Establish the flight initiation distance (FID) of free-ranging blackbird flocks in commercial sunflower fields and cattails when approached by the DJI Agras MG-1P
2. Measure variables that may impact FID
   - Flock size, flock distance from launch site and field edge, and vegetation type

Methods

- Trials began with 5-15 min. of pre-observation (5 minutes in 2019). Data recorded included: number of times the flock lifted off, time the flock spent in flight, and presence of raptors.
- The flock location and vegetation type was identified visually by the remote pilot when approached by the DJI Agras MG-1P approach and measure the distance at which the flock took flight.

Preliminary Results

- In 2019, we conducted 35 trials in Emmons, Burleigh, Kidder and Logan counties. (viable trials in sunflower = 13; viable trials in corn = 1; viable trials in cattails = 4)
- In 2020, we conducted 60 trials in Emmons, Burleigh, Kidder, Logan, McHenry and Bottineau counties (viable trials in sunflower = 16; viable trials in cattail = 2)
- Trials were conducted during daylight hours when winds did not exceed 17 mph (sustained) and there was no precipitation
- The average FID in 2019 was 38 meters ± 9.6, and in 2020 was 39 meters ± 16.6

Figure 1. Blackbird damage to sunflower crop in North Dakota (left), and a regional trend map of red-winged Blackbird breeding populations from 1966-2015 (Sauer et al. 2017; right).

Figure 2. A) The DJI Mavic Air II was flown above B) the DJI Agras MG-1P to record the flock response to the Agras approach and measure the distance at which the flock took flight.

Figure 3. The correlation between the flight initiation distance (FID) and log-transformed variables for A) flock size and B) flock distance from launch site of Agras in 2019.

Figure 4. The correlation between the flight initiation distance (FID) and log-transformed variables for A) flock size and B) flock distance from launch site of Agras in 2020.

Figure 5. A) The view from the Maxxi (80 m above ground level) as the Agras approaches a flock, and B) a low-flying view of a flock. Both flocks are foraging in commercial sunflower fields.

Future Directions

- 2020 data will be further broken down between vegetation types (cattail and sunflower).
- Extended hazing (time = 10 min.) will be evaluated for impact on flock behavior.
- Evaluate changes in flock behavior after exposure to UAS hazing.
- Results from this study will inform the use of UAS platforms for precision agriculture and spot treatment of an avian repellent to reduce bird damage to crops.
- ‘The Bird Damage to Sunflower Crops’ survey investigates:
  1. The perception of UAS devices to mitigate blackbird damage
  2. The willingness to adopt new management techniques
  3. The factors that influence the perceived efficacy of current management tools

Acknowledgements & Literature Cited

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Literature Cited:


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