Blackbird damage to sunflower:
The relationship to producer damage estimates and economic opportunity lost when removing sunflower from rotation.

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BACKGROUND

- Sunflower producers face millions ($) worth of crop losses due to blackbirds each fall [1]
- Blackbird damage is highly localized; regional estimates do not reflect severe losses faced by some [2]
- In areas with high blackbird damage, producers may decide to plant less susceptible crops [3]
- Understanding damage distribution and producers' financial losses across the state informs deployment of management tools and methods [4]

OBJECTIVE

We used damage surveys to address 2 objectives:

1) Compare producer bird damage estimates to in-field estimates conducted by biologists.
2) Determine economic loss from bird damage plus opportunity lost or gained when replacing sunflower with other crops.

METHODS

- Surveyed sunflower fields across North Dakota #/ county based on acres (2018-2021).
- Sent surveys to 7,350 producers from the NSA mailing list Jan 2021 (online version on Qualtrics).
- Received 1,065 survey responses (9.2%); ND producers that grew sunflower in 2020 = 321.
- Calculated economic opportunity as follows:

$$\text{(Alt. crop ac. * price * yield) – (Sunflower ac. * } \frac{(\$21.6/\text{cwt})}{100} \text{ * 1,872 lbs/ac)}$$

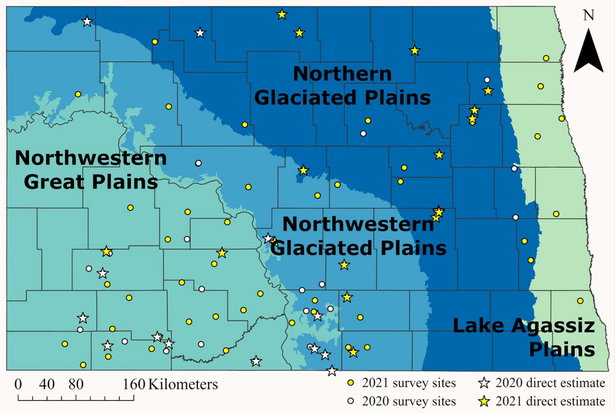
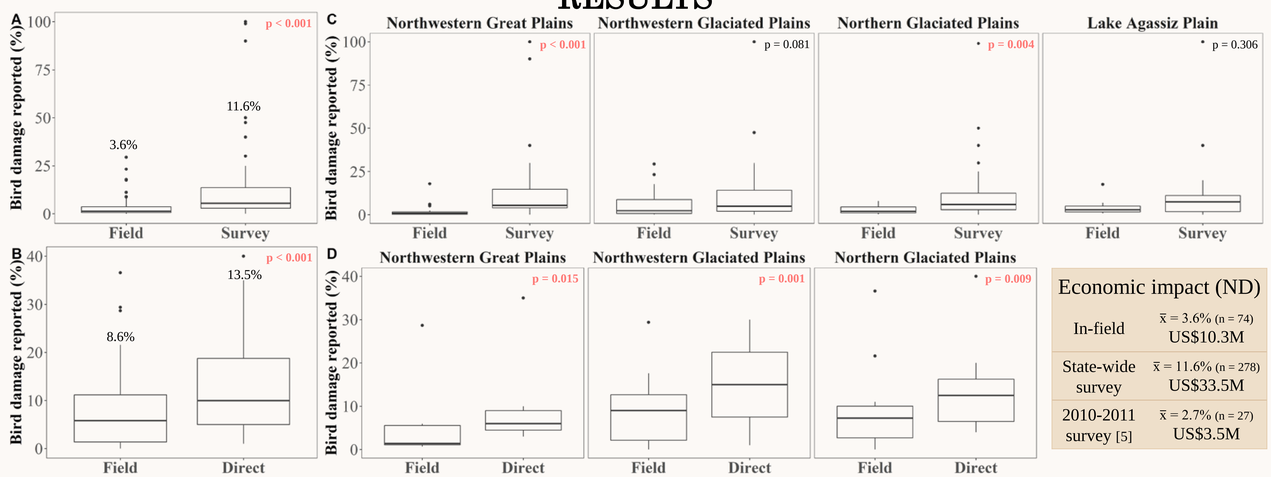


Fig. 1: Fields surveyed for blackbird damage across ND in 2020 and 2021 by Level III Ecoregions. Fields with a star have both in-field damage estimates and producer estimates.

RESULTS



Economic impact (ND)	
In-field	$\bar{x}$ = 3.6% (n = 74) US$10.3M
State-wide survey	$\bar{x}$ = 11.6% (n = 278) US$33.5M
2010-2011 survey [5]	$\bar{x}$ = 2.7% (n = 27) US$3.5M

Fig. 2 Overall (A, B) and ecoregion-specific (C, D) comparisons of in-field and producer-reported estimates of bird damage from mailed surveys (B; state-level; Wilcoxon rank sum test) and direct contact (D; field-level; Wilcoxon signed rank exact test).

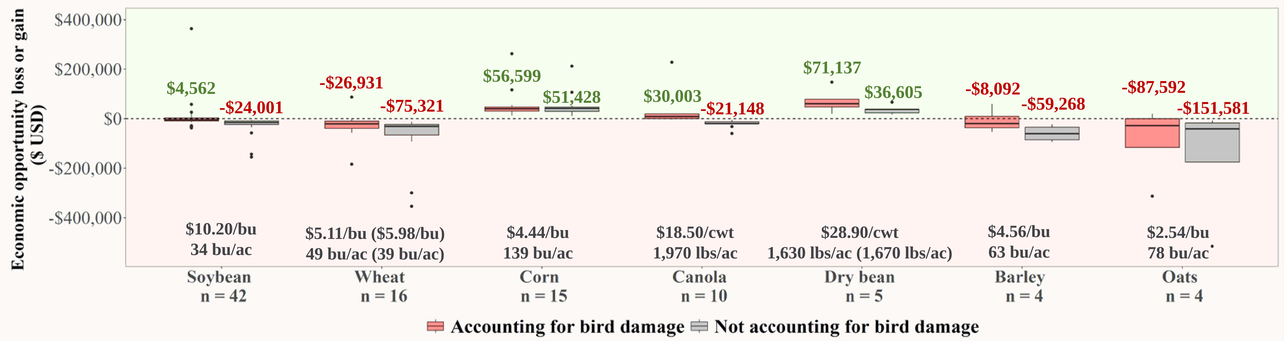
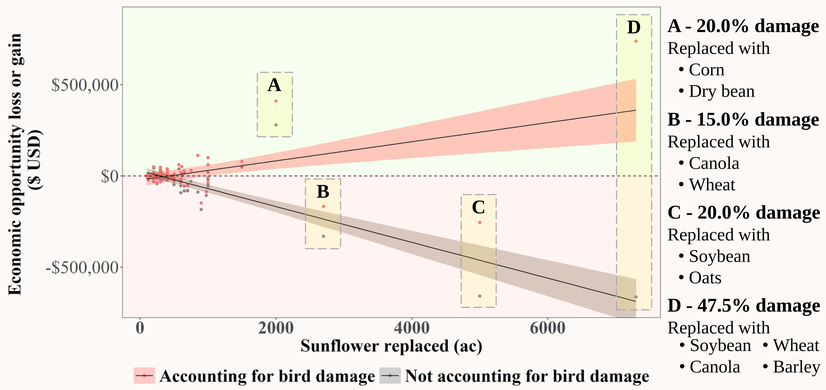


Fig. 3: Economic opportunity lost or gained by replacing sunflower with alternative crop. Economic opportunity was calculated using 2020 state average crop yields and price received (ND; NASS). We used bird damage reported in mail-in surveys. We did not include crops reported once (flax, millet, hay, alfalfa, peas). Mean values are displayed above each box plot (green = economic gain; red = economic loss).



A - 20.0% damage
Replaced with
- Corn
- Dry bean

B - 15.0% damage
Replaced with
- Canola
- Wheat

C - 20.0% damage
Replaced with
- Soybean
- Oats

D - 47.5% damage
Replaced with
- Soybean
- Wheat
- Canola
- Barley

Fig. 4: Correlation between economic opportunity lost or gained and sunflower acres replaced. Examples (A-D) highlight the importance of damage and replacement crop.

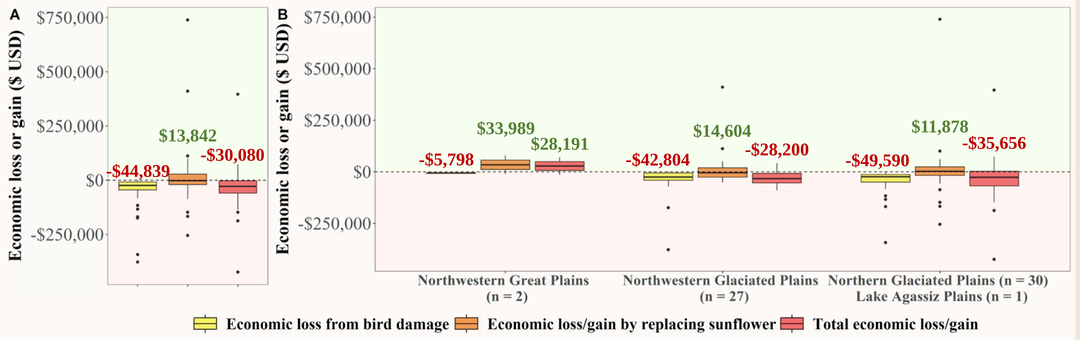


Fig. 5: The A) overall and B) ecoregion-specific economic loss or gain attributed to bird damage (yellow), replacing sunflower with an alternative crop (orange) and the total economic loss or gain (red). Mean values are displayed above each box plot (green = economic gain; red = economic loss). We combined Northern Glaciated Plains and Lake Agassiz Plains due to sample size.

SUMMARY

- Neither state-wide or field-scale producer estimates were similar to in-field estimates.
- Although bird damage occurs state-wide, economic gain from removing sunflower depends on ecoregion, crop selection, acreages and prices received for a given year.

FUTURE DIRECTIONS

- Evaluate using annual crop prices and yields to understand when it beneficial to replace sunflower.

ACKNOWLEMENTS

We would like to thank The National Sunflower Association Board of Directors, as well as all of the farmers who gave us access to their sunflower fields, without them this research could not be possible. We would also like to thank E. Counce, J. Curnyn, C. Danch, and I. Carbajal for their assistance on this project and USDA-APHIS Wildlife Services employees for their support in the field season.

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