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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 economic losses faced by some [2]
- Blackbird populations thus damage are related to in-field, landscape, and regional characteristics & growing conditions [4]
- Understanding damage distribution within a field informs deployment of management tools and methods [3]

Objectives

- Estimate % sunflower damage statewide in 2020
- Assess within-field, field, landscape, & regional variables that may predict blackbird damage

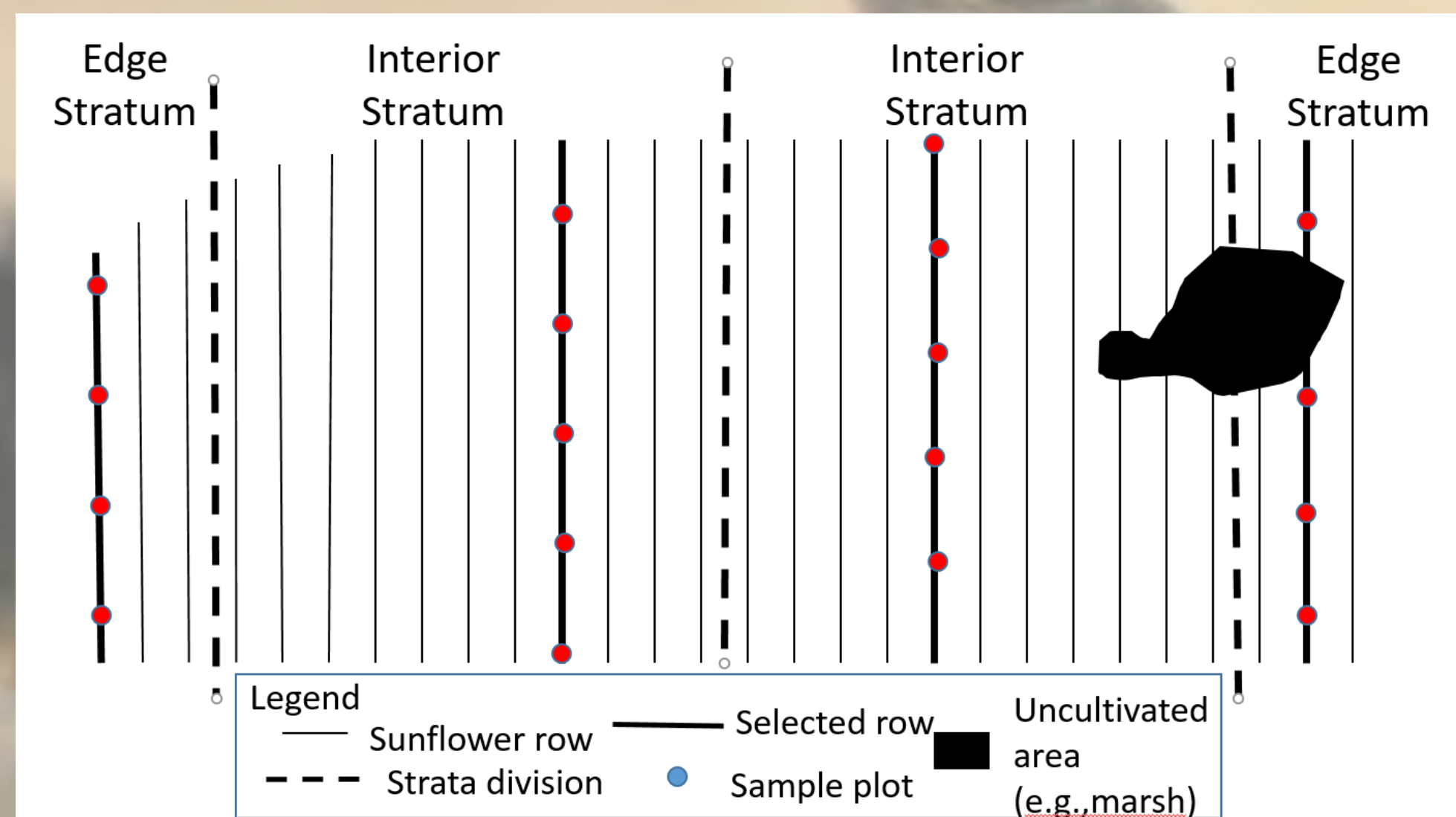


Figure 1. The sampling scheme in each field.

Methods

- We selected fields across North Dakota; number per county based on average sunflower acres (2018 – 2020)
- We randomly selected 1 row from each strata (Fig. 1); 5 consecutive sunflowers were measured every 135 m
- We measured head & undeveloped diameters and area damaged for each sunflower (Fig. 2); we also measured plant height, row spacing, weed density & diversity, weevil presence, and blackbird abundance at each field.



Figure 2. Measuring bird damage to sunflower

Results

Figure 3. Field size ranged from 7.92 to 614.85 (41.64 ± ha; n = 58) and % damage ranged from 0 to 29% (4.1 ± 0.80). Damage was similar between ecoregions (Kruskal-Wallis $H_{55} = 56.0$, $p = 0.4$)

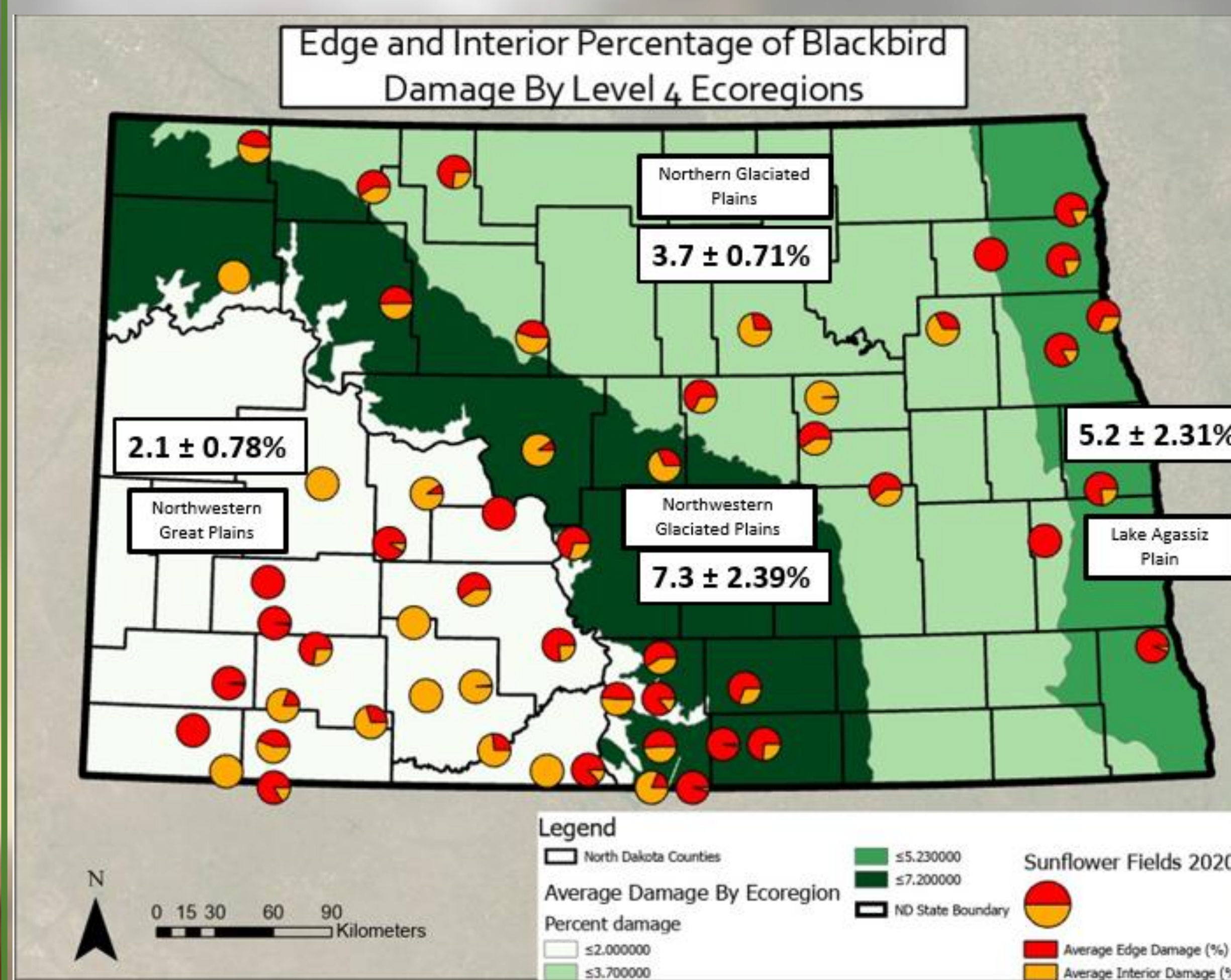


Figure 4. Difference in damage between the field edge ($4.8 \pm 0.98\%$, range = 0 – 34%) and interior ($3.4 \pm 0.81\%$, range = 0 – 39%) was approaching significance (Wilcoxon signed rank test $W = 950$, $p = 0.07$). Weevil infestation for the edge ($6.63 \pm 0.84\%$) and interior ($2.04 \pm 0.30\%$).

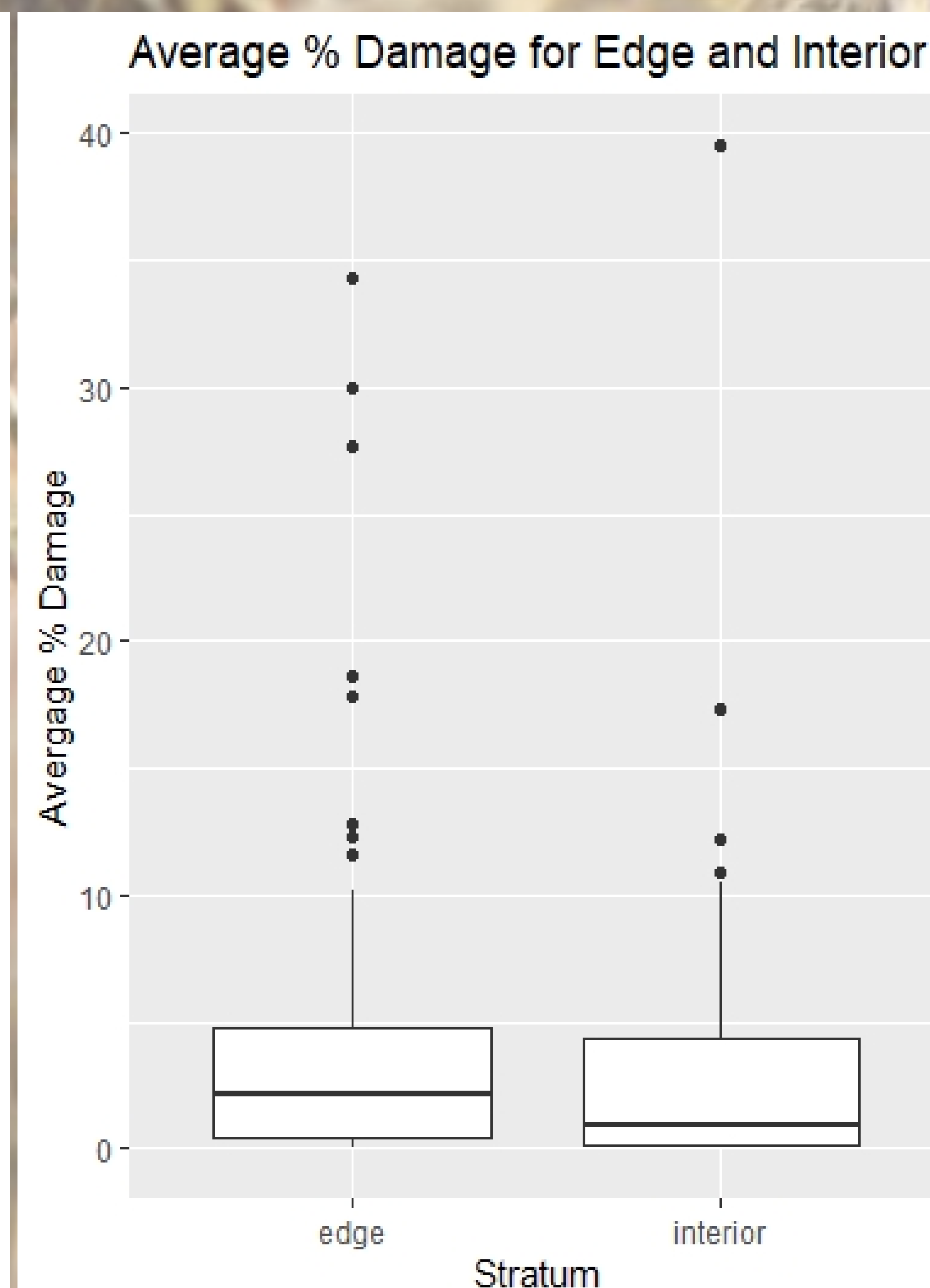
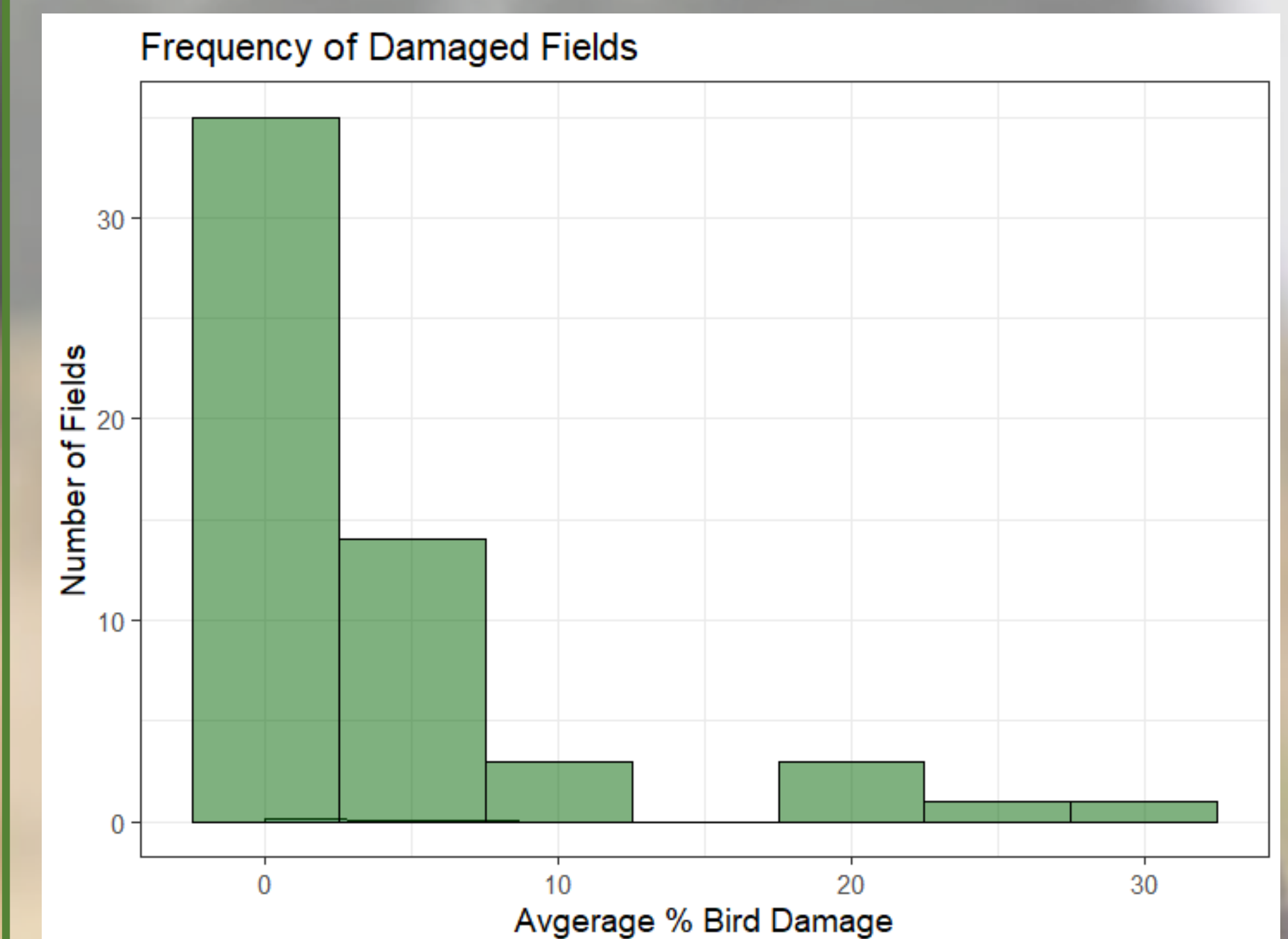


Figure 5. Distribution of total % bird damage with the majority at <5% damage.



Summary

- The average bird damage (4.1%) for 2020 was similar to past surveys
- Bird damage was similar for edge and interior stratum
- Damage was not significantly different between ecoregions but higher in regions with higher sunflower acreage & wetlands.

Future Directions

- We will use crop damage estimates to understand which within-field, field, and landscape variables best predict damage.
- We will compare in-field to producer damage estimates from the Bird Damage to Sunflower Crops survey (Jan. 2021)

Literature Cited:

- [1] Ernst, K., Elser, J., Linz, G., Kandel, H., Holderieth, J., Degroot, S., Shwiff, S., Shwiff, S., 2019. The economic impacts of blackbird (Icteridae) damage to sunflower in the United States. *Pest Manage. Sci.*
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- [4] Besser, J.F., 1978. Birds and sunflower. In: Carter, J.F. (Ed.), *Sunflower Science and Technology*. American Society of Agronomy, Crop Science Society of America, Soil Science Society of America, Madison, WI, USA, pp. 263-278.

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