Drones: Modern day scarecrows?

Lucas Wandrie, Page Klug, and Mark Clark

Theory

Buses, Cars, Bicycles and Walkers: The Influence of the Type of Human Transport on the Flight Responses of Waterbirds

Emily M. McLeod, Patrick-Jean Guay, Alice J. Taysom, Randall W. Robinson, Michael A. Weston

Fatal injuries to birds from collisions with aircraft reveal anti-predator behaviours

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Theory

Autonomous System for Pest Bird Control in Specialty Crops using Unmanned Aerial Vehicles

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Authors: Yiannis Ampatzidis, Joshua Ward, Omar Samara

Autonomous Unmanned Aerial Vehicle System for Controlling Pest Bird Population in Vineyards

Brian A. Grimm, Brooke A. Lahneman, Peter B. Cathcart, Robert C. Elgin, Greg L. Meshnik and John P. Parmigiani

Objectives

- Determine the antipredator behavioral responses of captive red-winged blackbirds to different hazing approaches by fixed-wing and rotary-wing UAS platforms.
- Determine the effectiveness of fixed-wing and rotary-wing UAS platforms as scare devices for deterring free-ranging red-winged blackbirds from crops.

Methods

- Approached captive and free-ranging flocks with fixed-wing and rotary-wing UAS at different altitudes.
- Behavioral responses were classified into one of three categories.

Aircraft specs

	FourthWing Vireo	DJI Inspire 1
Max flight speed	64 kph (40 mph)	79 kph (49 mph)
Max wind speed resistance	48 kph (30 mph)	36 kph (22 mph)
Minimum flight altitude	52 m (170’)	No minimum
Max flight time	60 min.	18 min.

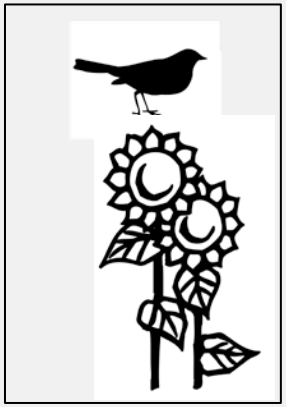
52 m (170’) AGL

30 – 5 m AGL descent

30 m (100’) AGL

15 m (50’) AGL

80 m (262’)



Results (captive study)

Treatment (AGL)	Behavioral response			
	No response	Vigilant	Escape	
Control	5	0	0	__
Fixed-wing (52 m)	3	0	0	NS
Rotary-wing (30 m)	4	1	0	NS
Rotary-wing (15 m)	4	0	1	NS
Rotary-wing descent	1	1	3	**

67 m (220’) AGL

52 m (170’) AGL

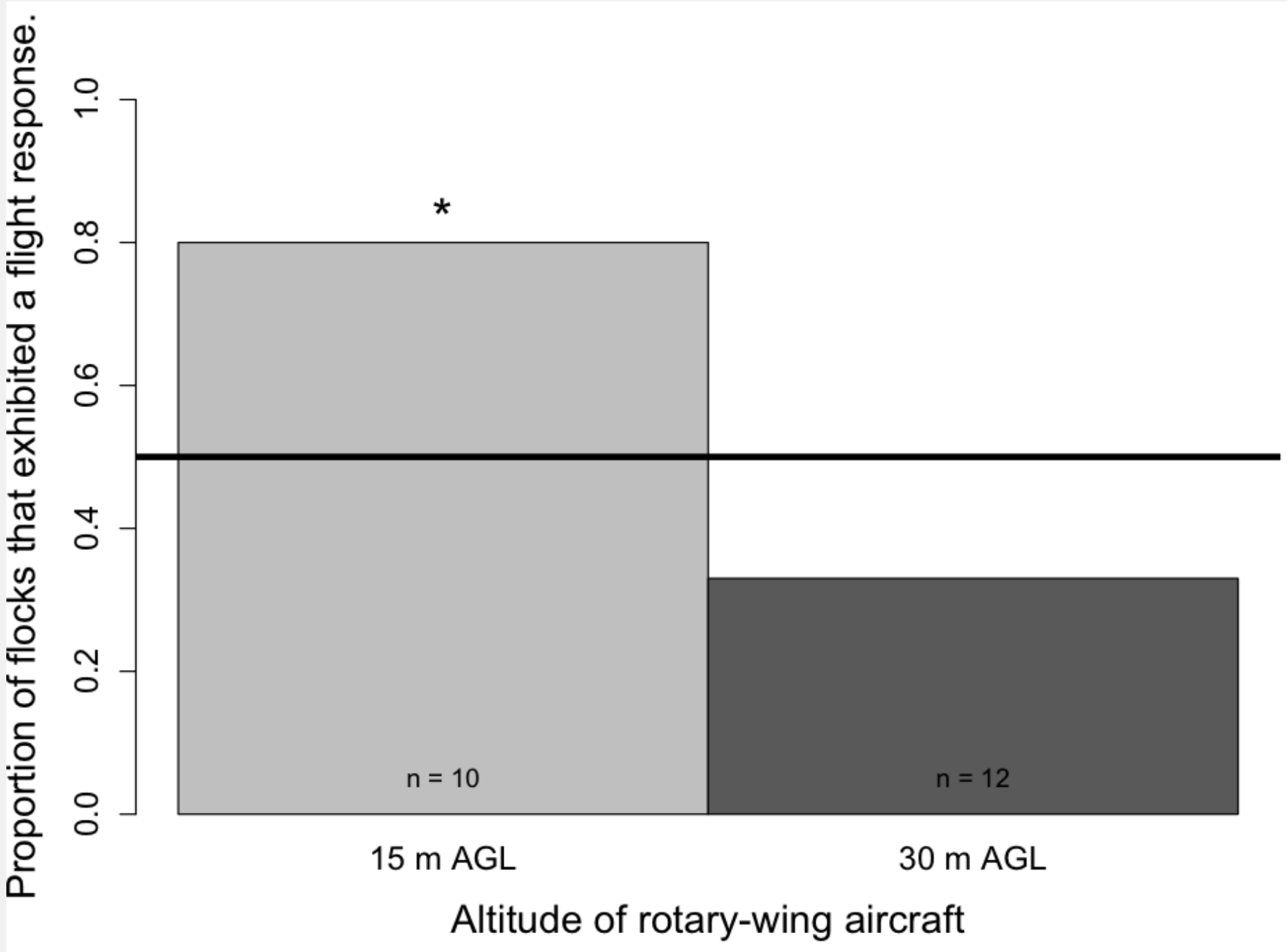
30 m (100’) AGL

15 m (50’) AGL

342 ± 67 m (1122 ± 220’)

Results (free-ranging study)

Treatment (AGL)	Behavioral response			
	No response	Vigilant	Flight	
Control	21	0	0	--
Fixed-wing (67 m)	3	0	0	NS
Fixed-wing (52 m)	3	0	0	NS
Rotary-wing (30 m)	2	6	4	***
Rotary-wing (15 m)	1	1	8	***


Proportion of flocks that exhibited a flight response.
0.0
0.2
0.4
0.6
0.8
1.0
*
n = 10
n = 12
15 m AGL
30 m AGL
Altitude of rotary-wing aircraft

Conclusions

- Is there potential for UAS to protect sunflower crops from blackbird damage?
  - Yes, with caveats.
- Are rotary-wing aircraft more effective than fixed-wing aircraft for hazing blackbirds?
  - Unknown.

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