Three Icterids breed in northern New England. Do they compete for resources? A review of the (scant) evidence.

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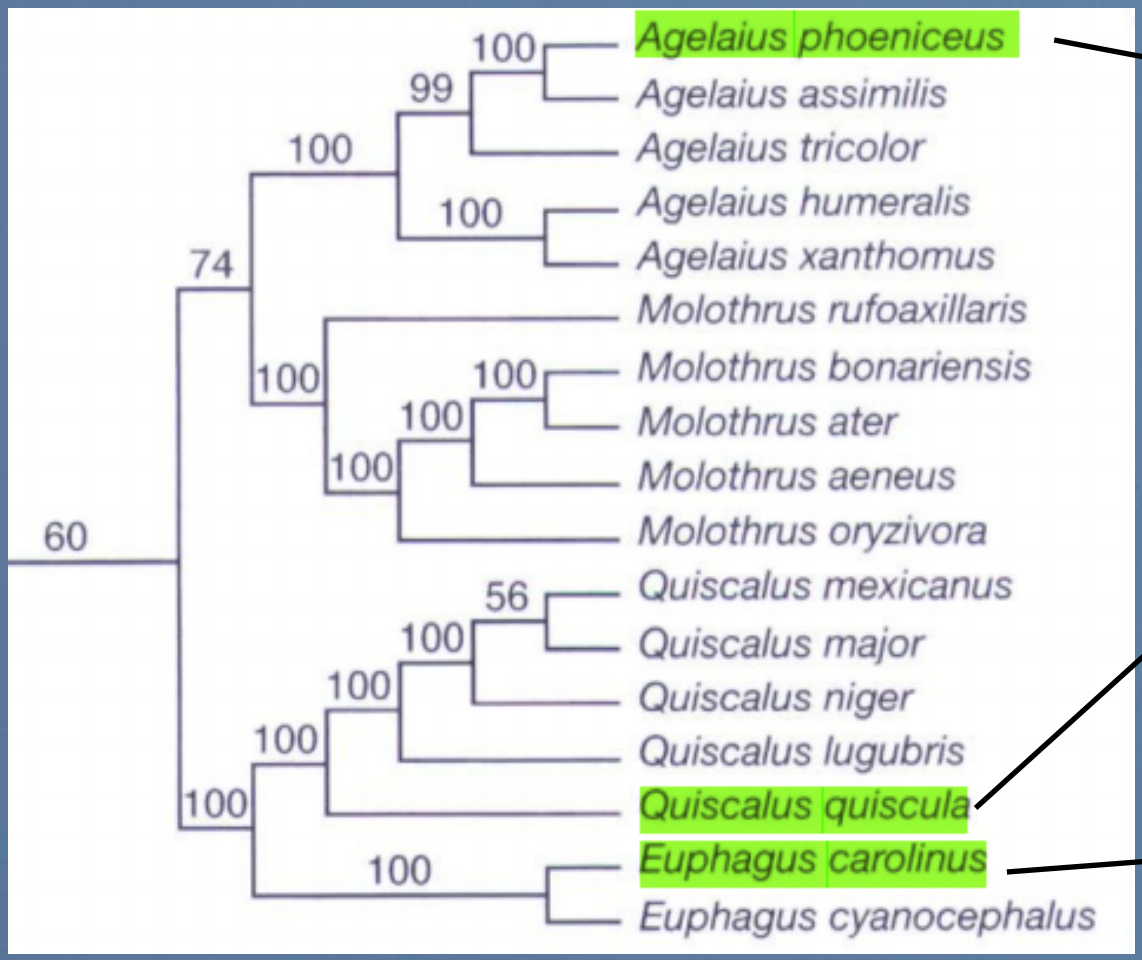
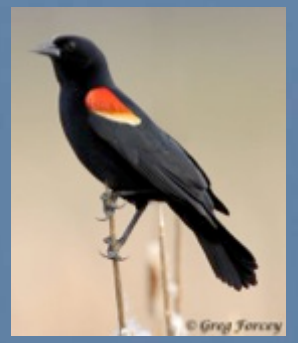
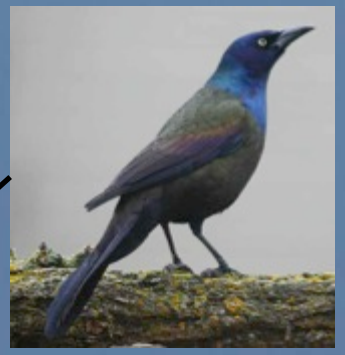
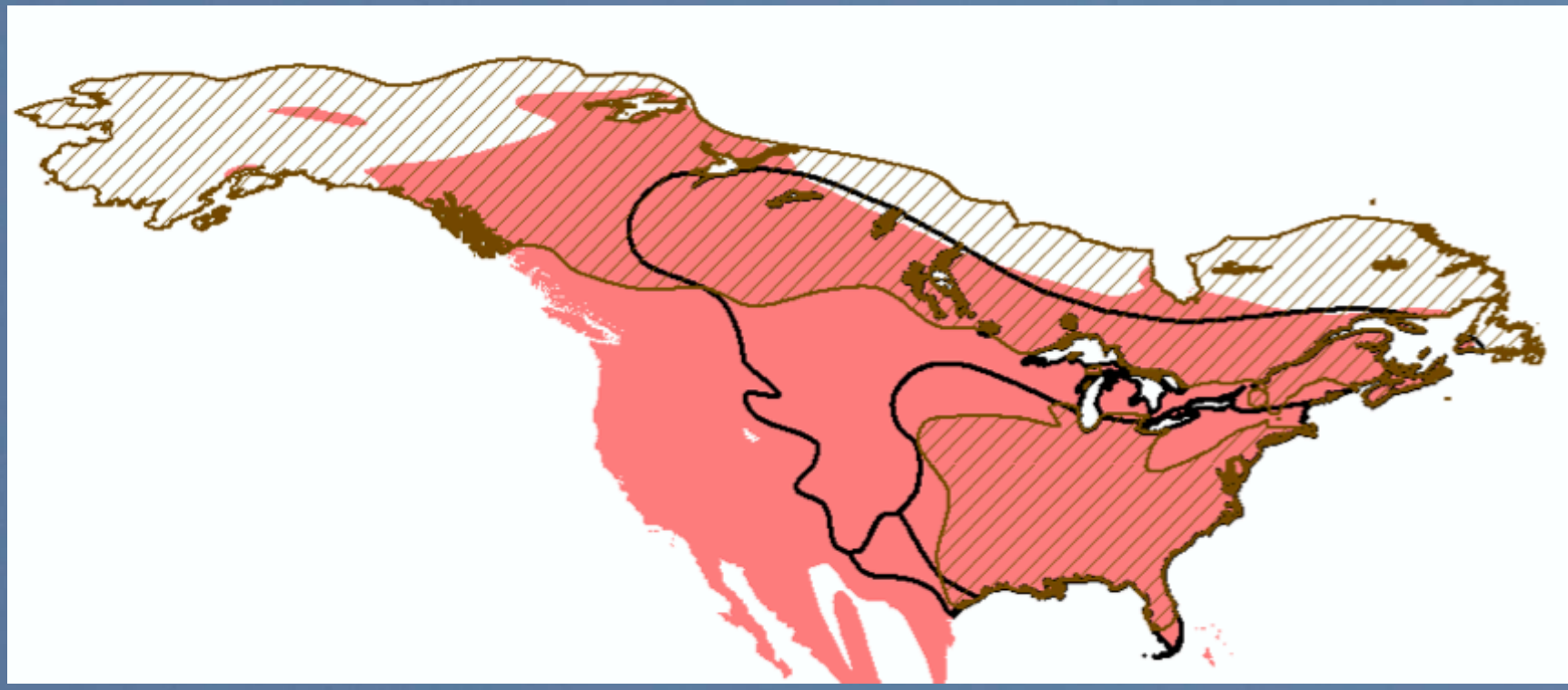
Phylogeny – Eaton 2006







Breeding Range Overlap



Key

Rust: Rusty

Black: Grack

“Red”: Red-wing

Ellison (1990): Red-winged Blackbirds

- RWBL respond aggressively to RUBL playback on four occasions.

- "On 22 and 23 May I saw male Red-winged Blackbirds attack and drive off male Rusty Blackbirds. The Red-winged Blackbirds flew at foraging male rusties on two occasions in full aggressive flight display with the red coverts exposed and song given in flight. After displacing the smaller blackbird the red-wings rose to high perches and gave song-spread displays".

- RWBL prefer open areas – less foraging in "**ephemeral pools** in swamps and clearcuts".

- "Clearing of most of the trees in wet coniferous woodlands and from the margins of ponds may lead to more intense competition between red-wings and rusties leading to local declines of the latter". –Walter Ellison, 1990

Photo: animal.discovery.com

Common Grackles

"Clear-cutting of forests around wooded swamps favours Grackles, which depend on more open areas for foraging and may lead to replacement of the Rusty by the larger blackbird".

-Erskine 1990, Maritimes BBA

"Common Grackles did not appear to react aggressively to Rusty Blackbirds in spite of their tendency to respond to playback of Rusty Blackbird song".

-Ellison 1990

Photo: Dan Tallman

Dhondt (2012)

Conditions required to ***prove*** existence of interspecific competition

(*consider breeding OR wintering*)

1. Fitness of one species reduced by presence of another
2. Distribution or abundance of one species is reduced by the presence of another
3. Resource use by one species affects resource availability of another

Photo: James Osenton

Dhondt (2012)

Conditions required to ***prove*** existence of interspecific competition

1. Fitness of one species reduced by presence of another

Prediction I: RUBL body condition reduced in presence of COGR / RWBL

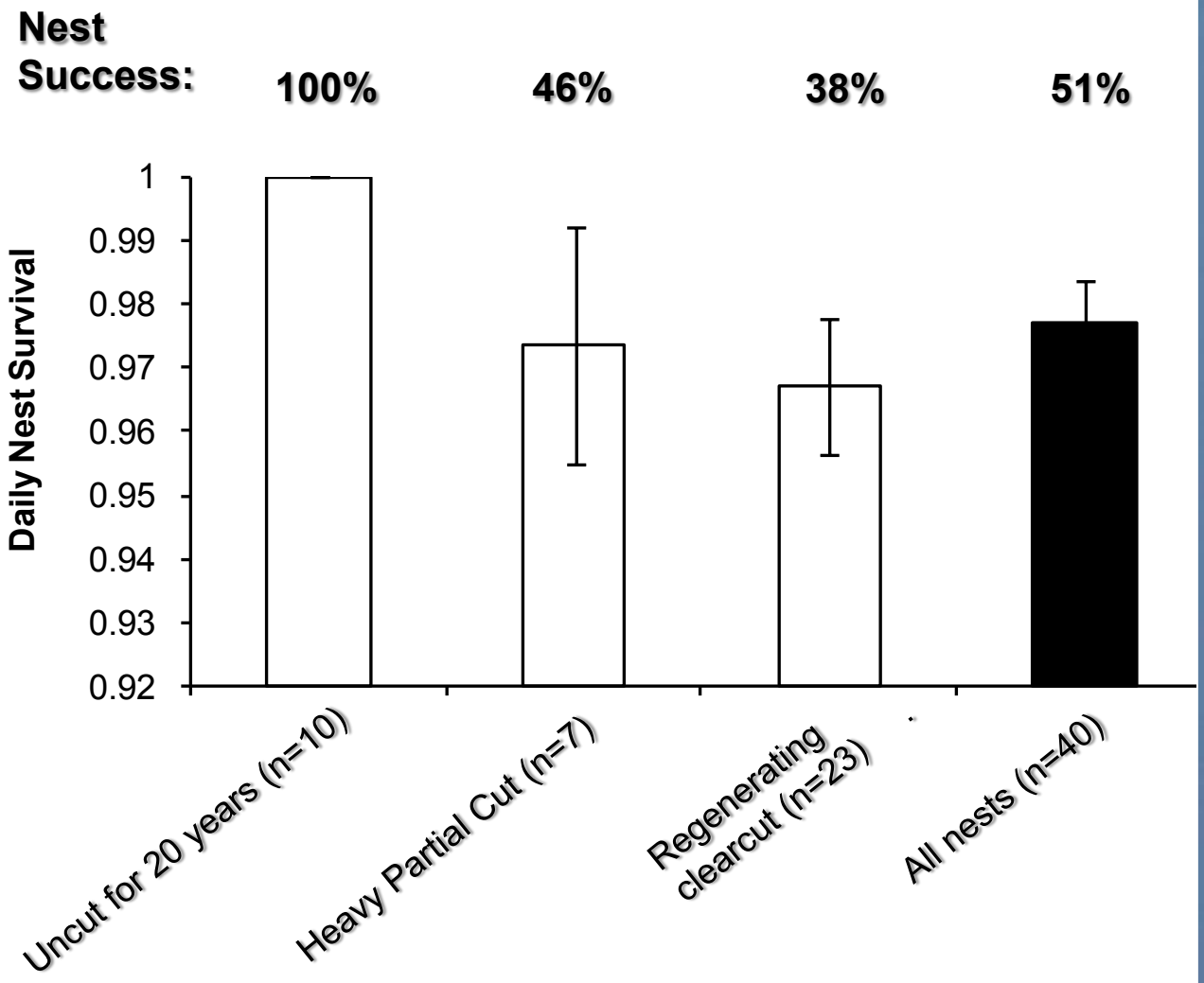
Prediction II: RUBL stress hormones increased in presence of COGR / RWBL

Prediction III: RUBL parasite loads increased in presence of COGR / RWBL

Prediction IV: RUBL Nest success negatively correlated w/ COGR / RWBL presence

Nest Survival/Success

2006-2008 ME & VT



Photos by J. Osenton

Dhondt (2012)

Conditions required to ***prove*** existence of interspecific competition

1. Fitness of one species reduced by presence of another
2. Distribution or abundance of one species is reduced by the presence of another

Prediction I: COGR/RWBL colonization drives RUBL occupancy in following years (lag)

Prediction II: RUBL occupancy reduced by COGR / RWBL occupancy

RUBL Occupancy Affected by Icterids?

Model	-2 Log-likelihood	K [a]	AIC	ΔAIC	w_i
ψ(SOFTWD_UP + BEAVER + PUDDLES) [b]	471.7	11	493.7	0.0	0.47
ψ(SOFTWD_UP + BEAVER + PUDDLES + YEAR)	470.9	12	494.9	1.2	0.26
ψ(SOFTWD_UP + PUDDLES)	476.2	10	496.2	2.6	0.13
ψ(SOFTWD_UP + PUDDLES + WETAREA)	471.4	13	497.4	3.7	0.07
ψ(SOFTWD_UP + BEAVER + PUDDLES + ROAD)	469.9	15	499.9	6.3	0.02
ψ(PUDDLES + YNGSF)	480.8	10	500.8	7.1	0.01
ψ(MUD + HARVEST5TO15)	481.0	10	501.0	7.3	0.01
ψ(PUDDLES + YNGSF +YEAR)	479.2	11	501.2	7.5	0.01
ψ(WETAREA + MUD + BEAVER)	476.3	13	502.3	8.7	0.01
ψ(YNGSF + MUD)	483.0	10	503.0	9.4	0.00
ψ(WETAREA + MUD + BEAVER + COGR)	476.0	14	504.0	10.3	0.00
ψ(WETAREA + HARVEST5TO15)	480.3	12	504.3	10.7	0.00
ψ(YNGSF + MUD + YEAR)	482.8	11	504.8	11.1	0.00
ψ(MUD + HARVEST5TO15 + COGR)	487.1	10	507.1	13.4	0.00
ψ(BEAVER + YNGSF)	487.3	10	507.3	13.7	0.00
ψ(MUD + HARVEST5TO15 + COGR + RWBL)	486.1	11	508.1	14.5	0.00
ψ(MUD + HARVEST5TO15 + YEAR)	489.1	10	509.1	15.5	0.00
ψ(BEAVER + YNGSF + RWBL)	487.2	11	509.2	15.5	0.00
ψ(BEAVER)	491.8	9	509.8	16.1	0.00
ψ(·)	495.6	8	511.6	18.0	0.00

[a] K, no. of parameters; ΔAIC, difference in AIC relative to the most parsimonious value; w^i, Akaike wt.

[b] Base model for all models shown: ψ(CHOICE), p (WIND + DATE + PLAYBACK), where p denotes detectability.

Dhondt (2012)

Conditions required to ***prove*** existence of interspecific competition

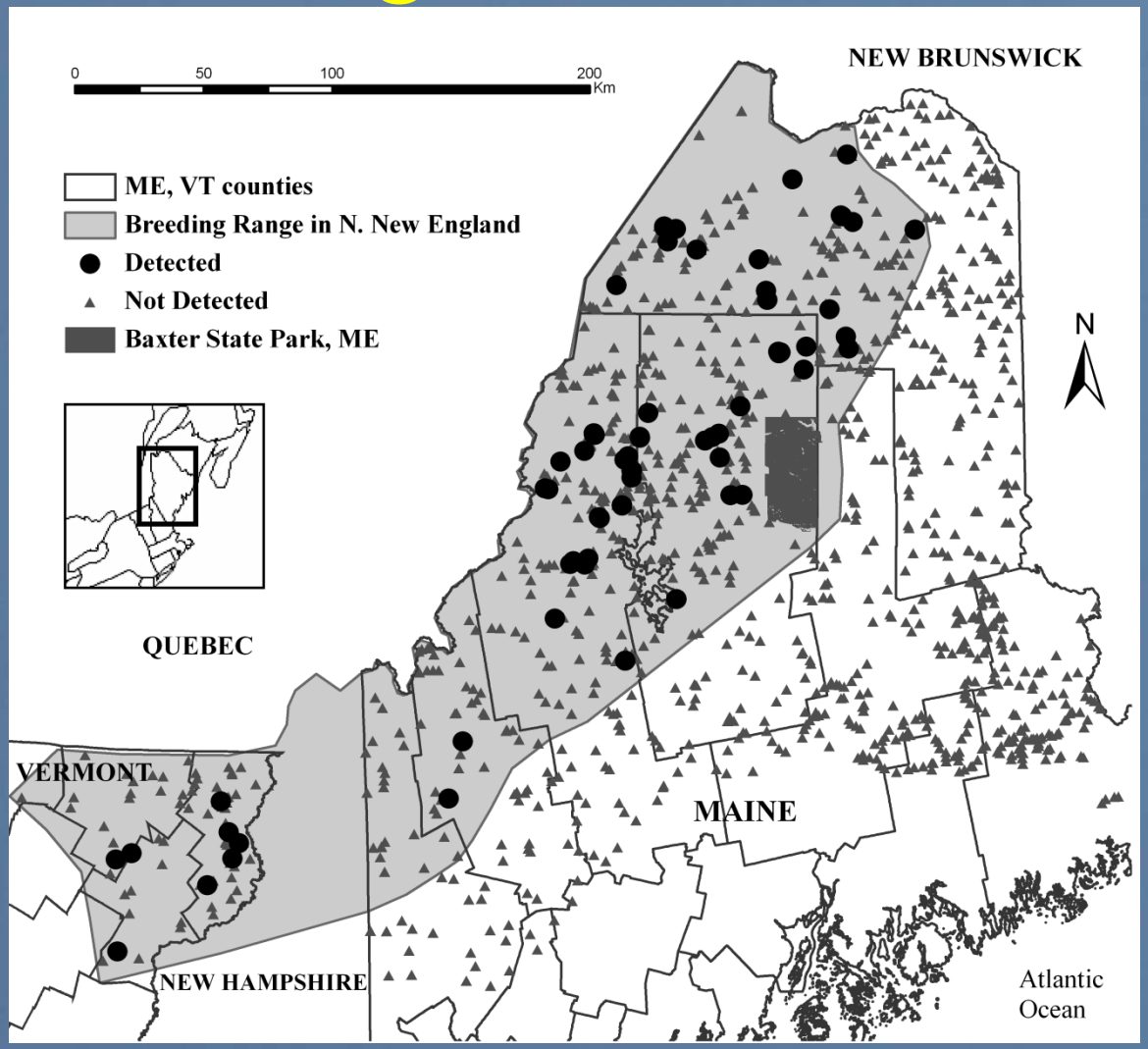
1. Fitness of one species reduced by presence of another
2. Distribution or abundance of one species is reduced by presence of another
3. Resource use by one species affects resource availability of another

Prediction I: COGR/RWBL consume RUBL food (indirect competition)

Prediction II: COGR / RWBL directly exclude RWBL from resources (food, space)

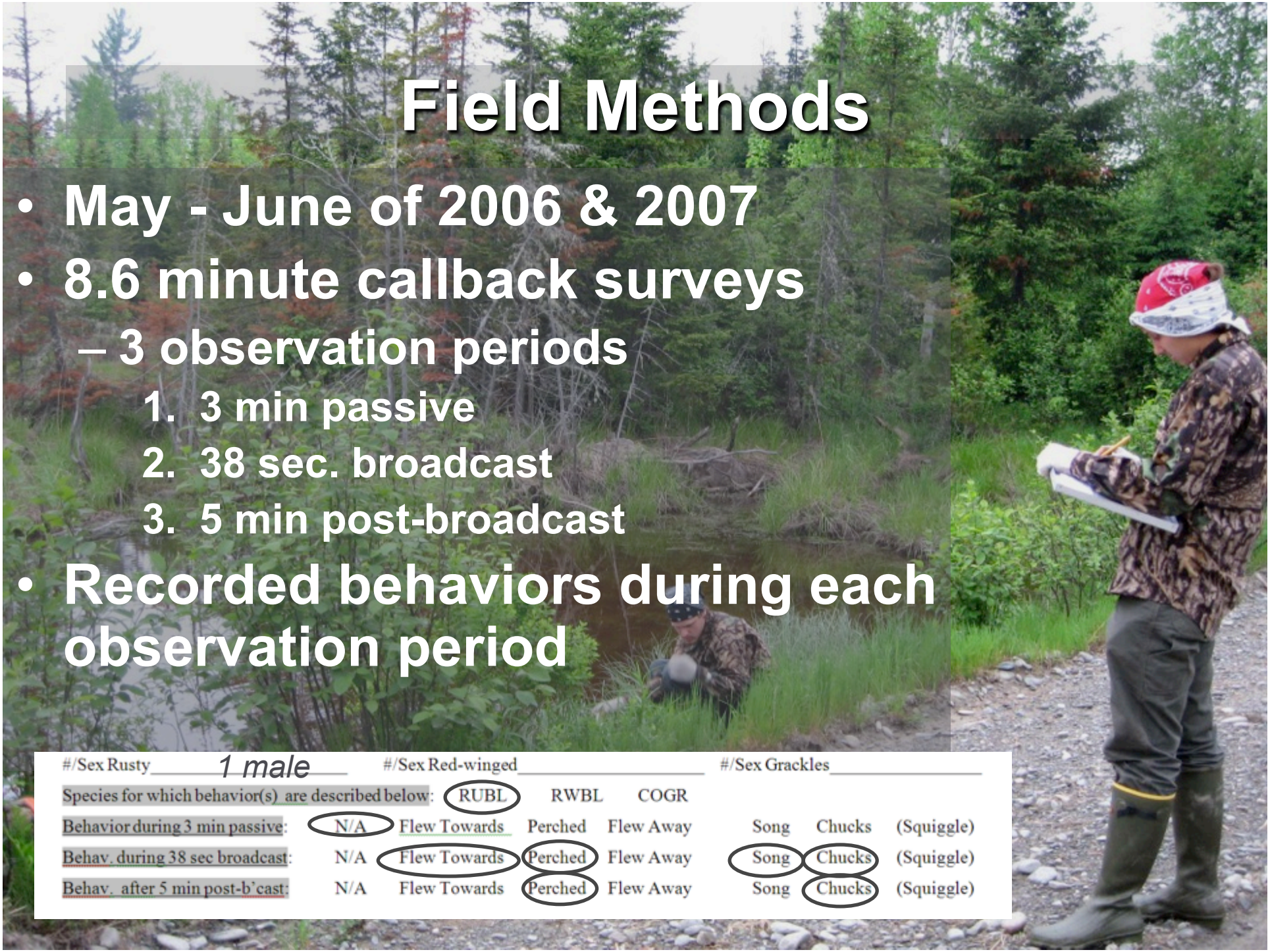
Prediction III: If COGR / RWBL compete directly with RUBL, they will respond to RUBL playback more often than by chance

> 550 Wetlands Surveyed in Range, 2006-2007



Field Methods

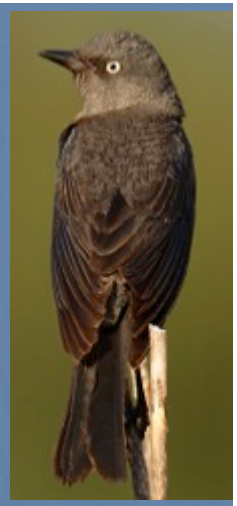
- May - June of 2006 & 2007
- 8.6 minute callback surveys
  - 3 observation periods
    1. 3 min passive
    2. 38 sec. broadcast
    3. 5 min post-broadcast
- Recorded behaviors during each observation period



#/Sex Rusty 1 male #/Sex Red-winged _____ #/Sex Grackles _____

Species for which behavior(s) are described below:	(RUBL)	RWBL	COGR				
Behavior during 3 min passive:	(N/A)	Flew Towards	Perched	Flew Away	Song	Chucks	(Squiggle)
Behav. during 38 sec broadcast:	N/A	(Flew Towards)	(Perched)	Flew Away	(Song)	(Chucks)	(Squiggle)
Behav. after 5 min post-b'cast:	N/A	Flew Towards	(Perched)	Flew Away	Song	(Chucks)	(Squiggle)

Statistical Methods



- GLM on behavior counts with poisson errors
- Deviance distributed as chi-square
- Offset accounts for difference in period lengths
  - 3-min passive, 38-sec b'cast, 5-min post-b'cast
  - Compare behavior counts among periods
    - H_0: behavior observed no more often than in passive period
    - H_A: behavior observed more/less often than in passive period

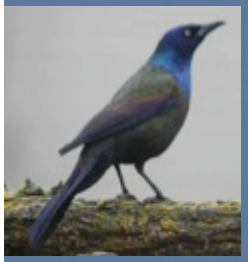
#/Sex Rusty *1 male* #/Sex Red-winged _____ #/Sex Grackles _____

Species for which behavior(s) are described below:		(RUBL)	RWBL	COGR			
Behavior during 3 min passive:	(N/A)	Flew Towards	Perched	Flew Away	Song	Chucks	(Squiggle)
Behav. during 38 sec broadcast:	N/A	(Flew Towards)	(Perched)	Flew Away	(Song)	(Chucks)	(Squiggle)
Behav. after 5 min post-b'cast:	N/A	Flew Towards	(Perched)	Flew Away	Song	(Chucks)	(Squiggle)

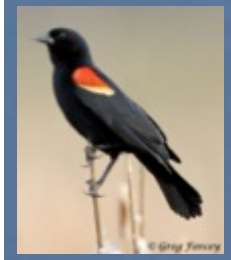
Response to Broadcast

*** $P < 0.001$; * $P < 0.1$

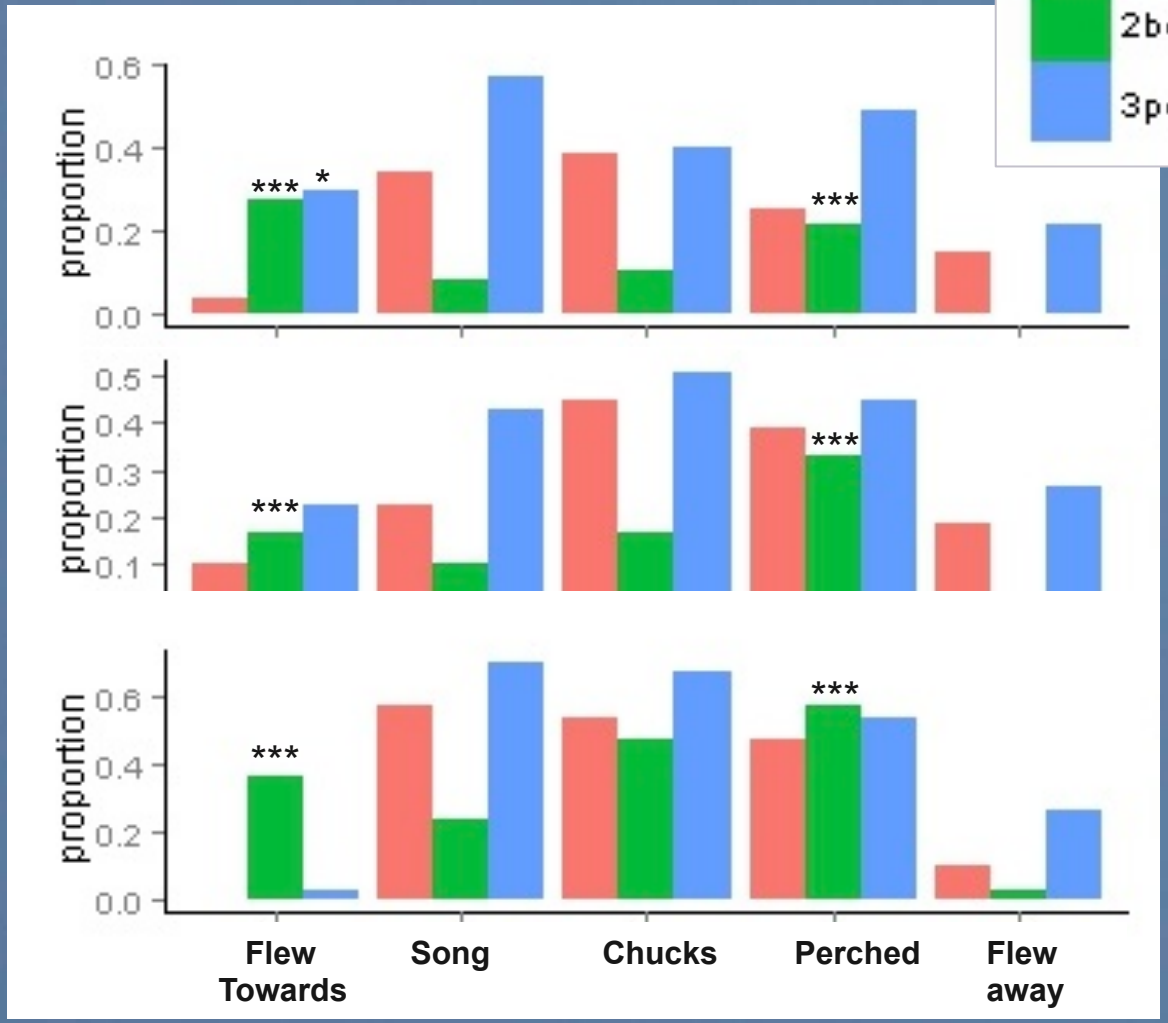
RUBL
n = 47



COGR
n = 49



RWBL
n = 30



Summary – Evidence for Competition

1. Fitness of one species reduced by presence of another
   - Unevaluated
   - Recommendation: Evaluate RUBL blood parasites, body condition & nest success among mgmt. conditions and in the presence of other icterids
2. Distribution or abundance of one species is reduced by presence of another
   - Currently no evidence
   - Recommendation: Multi-sp, multi-season occupancy model
3. Resource use by one species affects the resource availability of another
   - Weak evidence – non-aggressive response to RUBL playback
   - Recommendations:
     - Playback experiments, all ways, with decoys, early in breeding season
     - Food supplementation experiment -> e.g. add puddles w/ amphibian eggs
     - RWBL/COGR removal experiments – probably only feasible in winter

Conclusions

- Competition is difficult to prove

  HOWEVER

- Without rigorous tests, interspecific competition cannot be excluded as a contributor to RUBL declines
- COGR and RWBL have very flexible foraging behaviors – RUBL less flexible
- Habitat change has disturbed vast areas, allowing for colonization by COGR/RWBL
- Great potential for manipulative experiments, especially on the wintering grounds

Acknowledgements

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  - William Halteman
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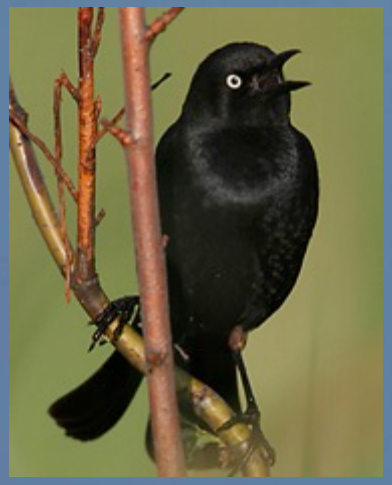
  - Angela Januzzi
  - Jason Oliver & Dr. T.R.



Questions?