Do birds protect trees?

Trophic Cascades by Birds in an Intensively Managed Forest?

Matt Betts, T. Stokely, M. Scherr, J. Verschuyl
Why is the world green?
Birds as “top” predators?

Birds defend trees from herbivores in a Neotropical forest canopy

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White-nose syndrome

Chidrid fungus

Climate & land-use change
>60% of bird species in Western US in decline

Breeding bird population trend (%/year)

Climate

Landuse

Climate x landuse

Betts et al. In Prep
Abundance of Early-seral Specialists
Control vs. Treatment Contrasts
Shrub-nesting Leaf gleaners most influenced by IFM

Betts et al. 2013 Forest Ecol. & Management
Warblers eat 1.2-1.7 times their weight/day

~7.1 – 42.6 males/ ha
28.4 – 170.4 birds/ ha

~15 g average bird mass

= 2556 g/ ha/ day

Breeding season: 383,400 g/ ha (845 lbs)

Mean mass of an insect in our study = 0.02396

795,075.1 – 16,001,669 insects/ ha consumed by birds

A. Hadley
Trophic Cascades in Managed Forests

Birds MORE effective in less intensively managed stands

Birds LESS effective in less intensively managed stands
Control

Light

N = 28

Moderate

Intensive
Arthropod Data Collection

1. Sweep netting 15 m transects

2. Restricted-area leaf sampling

2. Pollinator watches (5 min samples)
Identified to Family

171,112 arthropods identified
2012-2014
Herbivores: Are top-down effects influenced by management?

GLMM
Bird exclosure: F=124.33, P<0.0001
Bird x treatment: F=4.91, P<0.046
Miridae: most common insect herbivore (also feeds on conifers)

Miridae (Heteroptera)
N=1638 (>4 mm)
Mean ratio = 1.23
Does increase in herbivores decrease tree growth?

Do birds make trees grow faster?

2011-2014
Green World Hypothesis
Top predator

Micro-predator

Primary producers

Herbivores

(-) 

(+)

(-)
Predators: Weaker Top-down effects

GLMM
Bird exclosure: F=5.98, P<0.03
Bird x treatment: F=3.57, P=0.07
“Bottom Up” Hypothesis
Top-down, but to non-Douglas fir
Preliminary conclusions

• More work to be done! (longer term, other mechanisms at work)

• What if valuing nature in economic terms is NOT necessarily beneficial for bird conservation?

The value of valuing nature

Valuing nature in economic terms is not always beneficial for biodiversity conservation

By W. M. Adams
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