Birds vs. rodents in transmitting tick-borne pathogens

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In their study, "Transmission patterns of tick-borne pathogens among birds and rodents in a forested park in southeastern Canada," Dumas et al. "investigated and compared the role of breeding birds to rodents in local transmission dynamics of *B. burgdorferi* s.s., *A. phagocytophilum* and *B. miyamotoi*, which are emerging pathogens in southeastern Canada."[1]

Researchers collected ticks and rodents from the Mont Saint-Bruno National Park in Quebec, an area endemic for Lyme disease. They aimed to identify:

- Distribution of tick-borne pathogens *B. burgdorferi, B. miyamotoi,* and *A. phagocytophylum* in ticks and tick hosts;
- Evaluate the contribution of birds as hosts to *B. burgdorferi* transmission compared with white-footed mice;
- Determine risk factors for tick infestation and *B. burgdorferi* infectivity among hosts.

They collected 25,150 larvae, 4,177 nymphs and 232 adult blacklegged ticks. And trapped 665 mice, 13 Eastern chipmunks, 15 Northern short-tailed shrew and one Red-backed vole.

The team found 470 (70.68%) mice, 12 (92.31%) chipmunks and 2 (13.33%) shrews infested with at least one tick. Ticks were not found on the only vole captured. Ticks collected from these small mammals were predominantly attached to the ears.

Approximately 70% of mice and 92% of chipmunks were infested with at least one tick, compared with 29% of captured birds.

Additionally, 849 birds belonging to 50 different species were captured. Researchers found ticks on 28.86% of the birds, "with the majority of these ticks removed from members of the *Passerellidae* (37.41%), *Turdidae* (31.11%) and *Parulidae* (17.04%) families," writes Dumas.

How many hosts were infected with tick-borne pathogens?

When reviewing tick-borne pathogens detected in hosts tissue, the authors found 33.92% of mice were positive for *B. burgdorferi,* 0.48% for *B. miyamotoi* and none for *A. phagocytophilum*.

Meanwhile, 84.62% of chipmunks were positive for *B. burgdorferi,* 15.38% for *B. miyamotoi* and 7.69% for *A. phagocytophilum*.

"Pathogens were not detected in any of the bird biopsies (n = 262)," the authors point out. However, birds may not be infected but they are responsible for carrying the ticks to new areas. They also supply a much needed meal for the ticks.

“Our results support the relevance of considering the role of hosts other than the white-footed mouse in eco-epidemiological studies of tick-borne diseases,” the authors suggest.

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References:

1. Dumas A, Bouchard C, Dibernardo A, et al. Transmission patterns of tick-borne pathogens among birds and rodents in a forested park in southeastern Canada. PLoS One. 2022;17(4):e0266527. Published 2022 Apr 7. doi:10.1371/journal.pone.0266527
