

Wormsloe Meeting Update

March 21, 2013

Summary of results

Trade-offs in migratory songbirds

My second chapter of my thesis will be examining our original question about migratory songbirds: Is there a trade-off between energetic resources, stress, parasites and immunity in migrating songbirds?

We found differing amounts of parasitism within each species (gray catbirds, common yellowthroats and western palm warblers). About 7.5% (out of 38) catbirds, 25% (out of 28) yellowthroats and 10% (out of 20) palm warblers were found to be infected with either haemoproteus or plasmodium (Figure 2). Both of these parasites cause avian malaria. These were found positive by PCR (Figure 3). Under the microscope 2 more palm warblers were found to be infected with Leukocytozoon, another blood parasite (Figure 1).

We tested for this trade-off in two ways: (1) parasite trade-offs and (2) immunity trade-offs.

Overall we found that there is no noticeable trade-off between fat levels and parasite infection, stress and parasite infection, or body condition and parasite infection. We also found that there is no effect of age on parasite infection or immune measures.

We did find, however, that there is a noticeable effect of parasite infection on immune measures. Birds that were infected with parasites have higher levels of white blood cells. The magnitude of this response was different for each species. We also found that the stress levels are not any higher than during the breeding season.

Conclusively, this is one of the first studies that has examined physiological measures of birds during migration and that has seen a measureable difference in immune cell counts as a result of a parasite infection.

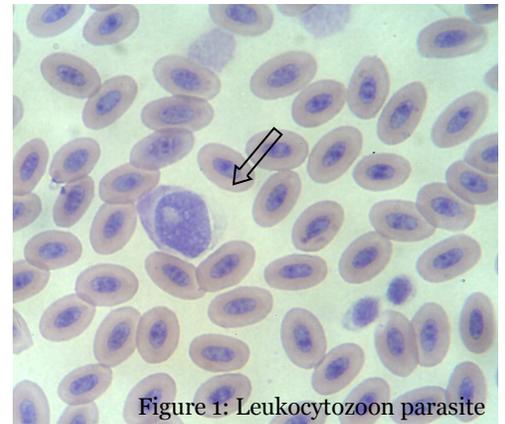


Figure 1: Leukocytozoon parasite

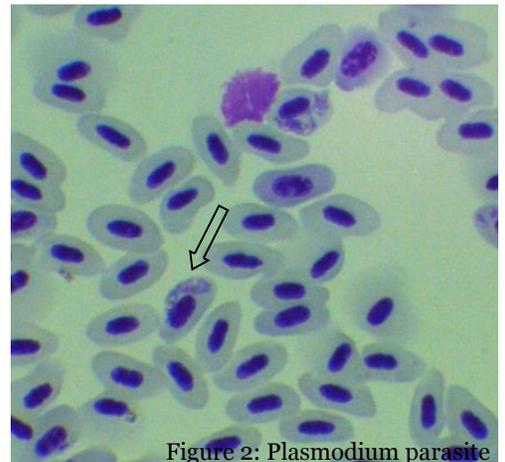


Figure 2: Plasmodium parasite

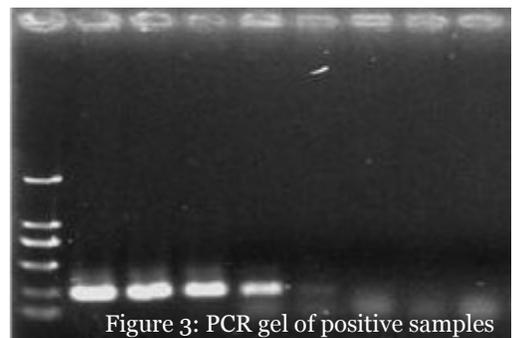


Figure 3: PCR gel of positive samples

Summary of results continued...

Feathers as indicators of condition

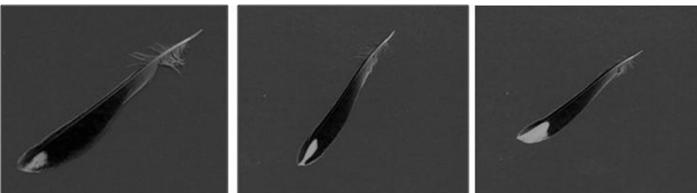
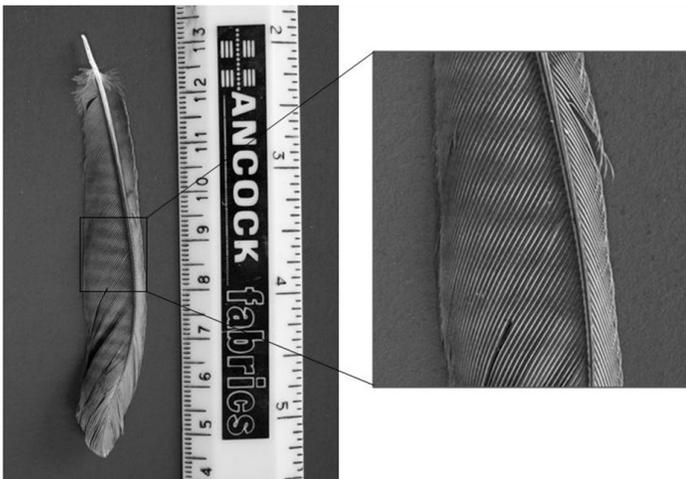
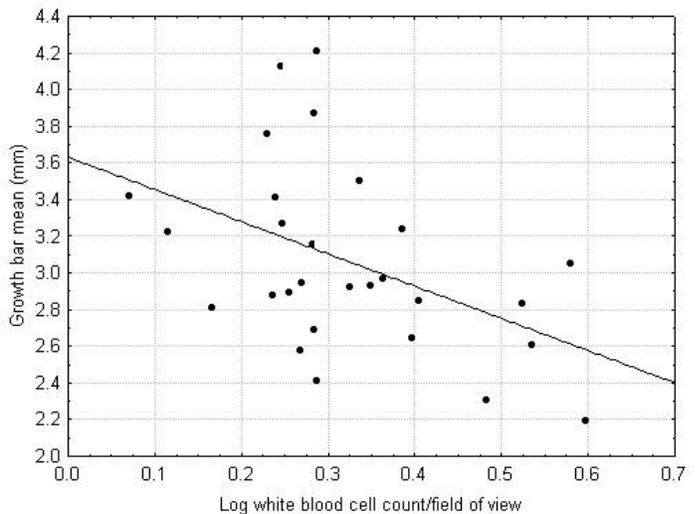
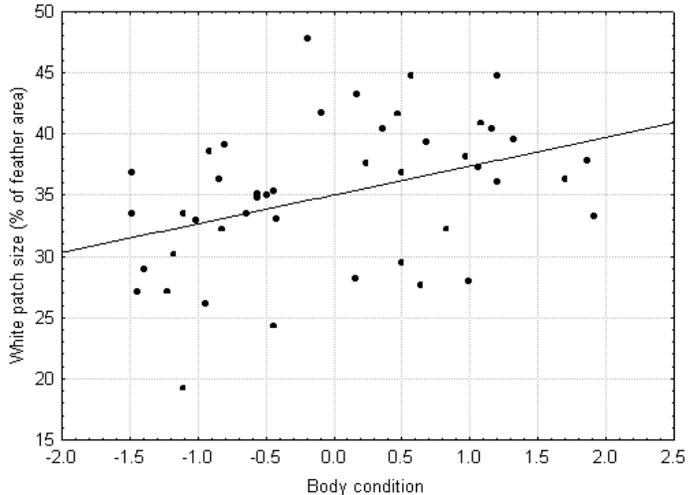
The third chapter of my thesis will be investigating how we can use feathers as indicators of condition during migration.

We are doing this in two ways: (1) white patch size in western palm warblers and (2) growth bars in gray catbirds. Growth bars have been used to assess feather growth for many years (termed “ptilochronology”).

We found that birds with larger white patches tended to be in better body condition during migration. We also found that birds with faster feather growth (larger mean growth bar distance) also had lower white blood cell counts. This might indicate a trade-off between feather growth rate and immune investment.

This research is novel in that very few scientists have examined the role of these white patches (and they are found on many species of birds). Additionally, growth bars have been used to assess the relationship with nutritional status, but never immune investment.

We hope to publish this in a ‘field ornithology’ journal.



Upcoming dates:

First draft of thesis: May 15th, 2013 to committee

Thesis defense: June 5th, 2013 at 10am in the Ecology auditorium

Graduation: August 2nd, 2013