Stress hormone in White-throated sparrows (Zonotrichia albicollis) is not influenced by the cleanliness of a cotton bag

Nidun Daniel

Gregory B. Cunningham
Saint John Fisher College, gcunningham@sjfc.edu

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Stress hormone in White-throated sparrows (Zonotrichia albicollis) is not influenced by the cleanliness of a cotton bag

Abstract
Bird banding stations are used throughout North America to trap and band birds, which allow researchers and government agencies to monitor populations, migration routes, health and a variety of other elements of avian physiology and biology. Birds are commonly trapped in mistnets, placed into a cotton bag, and brought to a research station where they are banded, weighed, measured and released. On some days, the number of birds caught may be so high that birds are left to hang in the bags for 10 – 20 minutes while other birds are processed. During this time in the bag the birds are undergoing a stress response, with their stress hormone levels (corticosterone; CORT) steadily increasing as a result. Given all of the negative effects of chronic stress, such as suppressing reproduction, nest desertion and inhibiting growth, banding labs should endeavor to decrease the stress of captive birds whenever they can. One way that CORT levels may be altered is by manipulating the microenvironment of the cotton bag. To that end, we monitored the stress response of White-throated sparrows (Zonotrichia albicollis) held for thirty minutes in either clean unused cotton bags or in comparable bags that had previously held at least 8 various passerines. For a variety of metrics used to assess CORT, there were no significant differences between the two groups; though both groups increased their CORT over time. Thus, from a stress perspective, a banding lab need not be concerned with whether or not a holding bag is feces free or has been excessively used. The possibility of transmitting disease such as Salmonella via feces, however, should not be ignored.

Disciplines
Biology

Comments
INTRODUCTION

• Bird banding stations are used throughout North America to trap and band birds, which allow researchers and government agencies to monitor populations, migration routes, health and a variety of other elements of avian physiology and biology.
• Birds are commonly trapped in mist nets, placed into a cotton bag, and brought to a research station where they are banded, weighed, measured and released.
• On some days, the number of birds caught may be so high that birds are left to hang in the bags for 10 – 20 minutes while other birds are processed. During this time in the bag the birds are undergoing a stress response, with their stress hormone levels (corticosterone; CORT) steadily increasing as a result.
• Given all of the negative effects of artificially increasing stress, such as suppressing reproduction, nest desertion and inhibiting growth, banding labs should endeavor to decrease the stress of captive birds whenever they can.
• One way that CORT levels may be altered is by manipulating the microenvironment of the cotton bag. To that end, we monitored the stress response of White-throated sparrows (Zonotrichia albicollis) held for thirty minutes in either clean unused cotton bags or in comparable bags that had previously held at least 8 various passerines.

METHODOLOGY

Study Site

• Braddock Bay Bird Observatory (43°19’ N, 77°43’ W) during autumn migration (September – October 2010). Birds captured using mist nets from 06:00 to 12:00 local time.

Blood sampling

• Followed the standardized stress protocol developed by Wingfield (1994), which determines stress hormone levels found in blood at baseline (before capture) and at various intervals thereafter.
• Nets visually monitored and first bleeding occurred within 3-min of first contacting the net.
• Birds then placed into either a clean or dirty white cotton bag (N = 10 for each).
• Blood samples were collected at t = 15 and 30 minutes.
• Used a 26-gauge needle and a 1-mL heparinized hematocrit microcapillary tube to collect blood samples (0.5 – 1.0mL) from the brachial artery. Samples were centrifuged and recovered plasma was stored at -80°C freezer until assaying.

Corticosterone Assay

• Used an Enzyme Immunoassay (EIA) kit from Assay Designs.
• Followed optimizations for White-throated Sparrows (Swett and Breuner, 2008) with plasma diluted in assay buffer at a ratio of 1:40 with a 1% concentration of steroid displacement buffer.
• Each sample run in triplicate, distributed randomly across three plates.
• Average intra-plate coefficient of variation was 4.98% and inter-plate variation was xx%.

RESULTS

• Average intra-plate coefficient of variation was 4.98% and inter-plate variation was xx%.
• Each sample run in triplicate, distributed randomly across three plates.
• Followed optimizations for White-throated Sparrows (Swett and Breuner, 2008) with plasma.
• Used an Enzyme Immunoassay (EIA) kit from Assay Designs.
• Blood samples were collected at t = 15 and 30 minutes.
• Birds then placed into either a clean or dirty white cotton bag (N = 10 for each).

Study Site

• The following diseases could be contracted by a bird as it attempts to preen its feathers after release from a soiled bag.
• Salmonella has been estimated to have killed nearly 70,000 birds in the United States between 1985 and 2004, impacting 98 species from 12 orders (Hall and Saito, 2008).
• Feces of infected birds are known to contain the Salmonella bacterium (Lawson et al., 2010). Transmission of this disease is fecal-oral.
• Avian influenza has been isolated, albeit rarely, from at least 24 species of passerine (see Nemeth et al., 2010). This virus is shed in the feces of infected birds (Forrest et al., 2010).
• West Nile virus, while typically thought of as a mosquito-borne disease, can be shed by infected birds both orally and via their feces (Komar et al., 2003) and healthy birds are able to be infected via contact with diseased birds by unknown means.

REFERENCES