Recent Literature

***Compiled by C. John Ralph (If you would like to help review articles of interest to banders, please contact cjr2 "at" humboldt.edu*, and feel free to mention if you have a particular journal or geographic area of interest).**

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Equipment, Techniques, and Station Reports

Capture height biases for birds in mist-nets vary by taxon, season, and foraging guild in northern California. D. Julian Tattoni[1] and Katie LaBarbera. *Journal of Field Ornithology 93*(3):1. Stanford University, Palo Alto, CA, USA. [1]dtattoni@stanford.edu

This well-designed study quantifies height of mist-net captures, something that most banders have at least thought about, and often take data on. The authors suggest that not taking this into consideration might require that the rarely-tested assumption that the height of nets is unrelated to variables of interest, e.g., condition, molt status, age structure, sex ratio, arrival and departure dates, and probability of recapture. They analyzed almost 6,000 captures for some of these variables from three nearby stations with paired ground-level (< 3m) and elevated (~3–5 m) nets at San Francisco Bay Bird Observatory. Because capture height biases are driven by behavior, they expected that heights might vary by net location, foraging guild, capture history, age, sex, and season. They used models to analyze the effects of these variables. As would be expected, of their 43 taxa, almost half showed a significant difference in capture height, as 13 taxa were biased toward capture in elevated nets and seven toward capture in ground-level nets. Capture height biases were largely consistent with the documented heights of different foraging guilds. The important metrics of most concern to banders is: does net height affect any critical demographic or physiological metrics? They examined demographic measures and found that only one taxon exhibited a sex (Anna's Hummingbird *Calypte anna*) or age (Swainson's Thrush *Catharus ustulatus*) effect on capture height. They note that "…broadly, our results suggest demographic differences in capture height biases are uncommon, as for both age and sex they were present in < 20% of taxa analyzed in this study." However, since their results demonstrated that capture height biases were present, they suggest that the "standard practice of deploying only ground-level nets may bias data in ways not generally recognized". I feel that you can deploy only ground level nets and be reasonably assured that most of your results will be largely valid. that is, not of a magnitude that would alter many conclusions flowing from the data. **CJR**

Identification, Disease, Molts, Plumage, Weights, and Measurements

A tail of plumage colouration: disentangling geographic, seasonal and dietary effects on plumage colour in a migratory songbird. Sean M. Mahoney[1], M.W. Reudink, A. Contina, K.A. Roberts, V.T. Schabert, E.G. Gunther, and K.M. Covino. 2022. *Journal of Avian Biology*. doi:10.1111/jav.02957. Thompson Rivers University, Kamloops, BC. [1]sm2275@nau.edu

Mahoney and colleagues build upon a rich research history examining the role of plumage colouration in avian ecology, communication, and breeding biology with this study focused on plumage variation in the American Redstart (*Setophaga ruticalla*). In an attempt to advance studies into inter- and intra-sexual signaling in this species, the researchers turned their focus to quantifying the underlying variation in plumage colouration related to factors not necessarily linked to variation in individual quality. Using feathers sampled from birds captured in 2016-2017 at the Braddock Bay Bird Observatory in northwestern New York (n = 59 and Appledore

Island Migration Station off the coast of Maine (n = 75), the team conducted stable isotopic analysis ($^{13}C/^{12}C$, $^{15}N/^{14}N$) and collected standard feather colouration measurements (including tetrahedral models to account for the avian visual system). The overarching and expected conclusion was that geography, season, age, and diet all play a role in colour expression, with season (spring versus fall) and age (young versus adult) or their interactions showed the strongest effects in most models. There is clearly more disentangling to be done here, but the research underscores the importance of understanding where an individual is its molt cycle (e.g., before or after the pre-alternate molt in spring, before or after the pre-basic molt in fall) when interpreting the ecological and behavioural significance of variation in plumage colouration. **JJ**

Examination of Macaulay Library images to determine avian molt strategies: A case study on hummingbird. Peter Pyle. *The Wilson Journal of Ornithology 134.* The Institute for Bird Populations, Petaluma, CA. ppyle@birdpop.org

In a somewhat novel approach, using digital photographs, author Peter Pyle examined molt in a complex group of eight hummingbird species from eight different genera that breed in Texas and the Southwestern United States. The molt strategies in these species were poorly understood but Pyle was able to fully describe them by examining over 27,000 digital photographs located at the Cornell Lab of Ornithology's Macaulay Library, most of which are contributed via eBird. Typically, molt is studied via careful examination of a bird in the hand during banding or by examining museum specimens, but the author has pioneered the use of digital photographs to study molt, and in this paper he lays out a roadmap for others interested in this approach. At the conclusion of this study the author makes a request to those loading photographs into eBird: please take photos of birds in molt, no matter how ragged and unappealing they look. More than 50% of the images he encountered were of glittering adult males which, while aesthetically pleasing, tell us very little about molt strategies. **MSW SA**

Application of a global age-coding system ("WRP"), based on molts and plumages, for use in demographic and other studies of birds. Peter Pyle[1], Marcel Gahbauer, Erik I. Johnson, Thomas B. Ryder, and Jared D. Wolfe. *Ornithology 139(1):1-12*. The Institute for Bird Populations, Petaluma, CA, USA. ppyle@birdpop.org

Determination of a bird's age or cohort is critical for studies on avian demography, occurrence patterns, behavior, and conservation management. Age designations have largely been developed in north-temperate regions and utilize calendar-based or seasonally based codes; however, in tropical regions and in the southern hemisphere, these coding systems have limited utility at best. To address these issues, the authors previously devised the "WRP system," based on the nomenclature of Humphrey and Parkes (H–P) and Howell et al., which defines molts in an evolutionary context applicable to birds globally. In this new paper, the authors refine and build on the core concepts and definitions of the WRP coding system, resolving limitations that were identified during its first decade of use. The WRP system employs a three-letter "alpha code" in which each letter describes a different aspect of H–P terminology: the molt cycle (which informs a bird's age) and molt and plumage status within the cycle (each of which can also inform age). The new paper lays out the argument for continued use of most of the original WRP coding while augmenting the system with an optional adjunct code entry for comprehensiveness, clarity, and flexibility. The authors also suggest a few additional codes to cover less common molting and plumage strategies. For most users, the 10 or so core and one adjunct WRP code will be sufficient to describe all plumages and provide molt status and ages for demographic studies or other purposes. The revised WRP system is flexible enough to be adapted to the specific goals of programs while also providing core codes that can facilitate the comparison of avian age, molt, and plumage status on a global basis. **MSW SA**

North American Banding Results

Migration and non-breeding ecology of the Yellow-breasted Chat *Icteria virens*. Kristen A. Mancuso[1], K.E. Hodges, J.D. Alexander, M. Grosselet, A.M. Bezener, L. Morales, S.C. Martinez, J. Castellanos-Labarcena, M.A. Russello, S.M. Rockwell, M.E. Bieber, and C. A. Bishop. 2022 *Journal of Ornithology 163*:37-50. University of British Columbia, Vancouver, BC, Canada. [1]Kmancuso88@gmail.com

Understanding the full annual cycle of any migratory songbird requires the participation of scientists and research partners in all parts of the target species' range. In this paper, Mancuso and colleagues document the results of just such a collaborative effort that spanned breeding grounds in British Columbia and California, migration sites in Chiapas and Veracruz, Mexico, and non-breeding locations in Nayarit, Mexico. Using a combination of GPS tags, geolocators, and stable isotope analyses, the combined team attempted to (1) describe migration routes and non-breeding locations, (2) characterize the land tenure status and landscape context of non-breeding locations in California and Mexico, (3) determine the sub-specific composition of non-breeding populations, and (4) infer potential breeding locations for birds sampled during the non-breeding season. Chats that breed in British Columbia and California appear to spend the non-breeding season in west-central Mexico, after following the Pacific Flyway. Of the five individuals from which the GPS tags were recovered with useable data, three spend the non-breeding season in tropical or sub-tropical broadleaf deciduous forest, and two spent the non-breeding season in a more heavily modified landscape. The team did not document any mixing of the western and eastern subspecies during the non-breeding season, suggesting strong migratory connectivity at the subspecies level; however, isotopic values in collected feathers suggest that birds from multiple breeding locations within a subspecies' range are likely mixing during the non-breeding season. Although hampered by small sample sizes and equipment that did not perform as expected, this collaborative effort filled some important knowledge gaps for this species, including the potential for the non-breeding range of the western subspecies to be much smaller than expected. **JJ**

Banding data show hummingbirds have high rates of hybridization. Christopher Clark[1], David Rankin, and Carl Rudeen. 2021, *Ornithology*. Department of Evolution, Ecology, and Organismal Biology, University of California, Riverside, CA, USA. [1]cclark@ucr.edu

In this manuscript, the authors use the BBL database on nearly a million banded hummingbirds from the United States and Canada, as well as a questionnaire to hummingbird researchers to estimate the rate of hybridization in this group. The researchers found that the rate of hybridization in hummingbirds is likely to be larger than previously thought, especially due to the difficulty in identifying hybrids in female hummingbirds and that some banders avoid banding hybrids. Annually from 2006 to 2019, an average of 44,600 individual hummingbirds and 14 hybrids were banded The researchers estimate that approximately 0.1% of hummingbird individuals are hybrids (in areas in Canada and the US where there are more than one species of this group). **PVM**

Characterizing suitable habitat for the largest remaining population of the threatened Florida Scrub-Jay *Aphelocoma coerulescens*. Karl E. Miller[1], Colin P. Shea. 2021. *Endangered Species Research* 45:99–107. https://doi.org/10.3354/esr01128. Florida Fish and Wildlife Conservation Commission, Gainesville, FL USA. [1]karl.miller@myfwc.com

The Florida Scrub-Jay is the subject of one of the longest-running population studies in North America, the result of five decades of work by Glen Woolfenden and colleagues. The species has been in steady decline due to loss and degradation of the Florida shrubland community. The authors quantified scrub-jay density and productivity in response to the age, size, and connectivity of randomly selected early-successional habitat patches (<15 years since

harvest) in the Ocala National Forest. From 2011-2014 they banded >50% of the local population with a unique combination of three color bands, then observed these individuals to determine sex and breeding status, map territories, document territorial encounters, and determine what habitat patches were being used. The greatest number of family groups, adults and juveniles, were found in habitat patches of intermediate age (6.5-7.4 years post-harvest), and there was a positive linear relationship between stand size and scrub-jay numbers. The authors recommend that land managers could maximize scrub-jay populations by increasing the availability of habitat that is within 3-10 years post-harvest by increasing the annual acreage harvested. As with many recommendations targeting a single endangered species, I am left wondering how these proposed actions could impact other species that might rely on older forests. **CMS**

Evidence of long-term declines in Island Scrub-Jay vital rates. Brittany A. Mosher[1], Paul F. Doherty, Jr., Jonathan L. Atwood, Kennon A. Corey, Charles T. Collins. 2021. *Avian Conservation and Ecology* 16:21. https://doi.org/10.5751/ACE-01997-160221. University of Vermont, Burlington, VT USA. [1]brittany.mosher@uvm.edu

Meanwhile, on the other side of the continent, the Island Scrub-Jay (*Aphelocoma insularis*) is also undergoing population decline, being limited to Santa Cruz Island in the Channel Islands off the California coast, rather than being limited to islands of habitat. From 1986-2007, 677 scrub-jays were banded with a unique combination of three plastic bands of five colors, allowing the authors to identify individuals on spring and fall surveys. Their objectives were to assess long-term trends in adult scrub-jay survival, recruitment and population growth and relate these trends to major drivers of island extinctions, such as disease (West Nile Virus), invasive species (domestic sheep and pigs, and Wild Turkeys *Meleagris gallopavo*), and winter precipitation. Because they lacked empirical data on the first two drivers, they generated predictions based on key dates, such as introduction dates of introduced species. The authors estimated the scrub-jay population was declining at ~1.8% / year during their study, and that adult apparent survival (average = 0.80; range 0.73-0.89) had a greater influence on this rate than did declining recruitment (average = 0.18). Of all the extinction drivers modeled, only the Wild Turkey population impacted adult scrub-jay survival, explaining 37% of the variance. Wild Turkeys may have competed with scrub-jays for food resources, and contributed to overgrazing of the habitat. Wild Turkeys were eradicated from the island after the study concluded, and there is an opportunity now to gain further insights into that relationship. **CMS**

Non-North American Banding Results

Which birds participate in mass concentrations of Bramblings *Fringilla montifringilla*? – Ring recoveries, biometry, age and sex composition. Lukas Jenni. 2022. *Journal of Ornithology* 163:1-17. Swiss Ornithological Institute, Sempach, Switzerland. lukas.jenni@vogelwarte.ch

The fall and winter gathering of Bramblings throughout Europe in areas of beech mast can number in the millions (estimates reach as high as 15 million) and represents one of the more impressive documented avian aggregations. The primary reason for the aggregation is known: food. What is less clear is the demographic composition of these mass concentrations (a term Jenni prefers to "irruptions" given the Brambling is an obligate rather than facultative migrant). Jenni has been working with Bramblings for a large portion of their career (over 40 years) and has amassed an impressive data set (n > 6,000 birds from banding recoveries, museum specimens and focused capture efforts) to approach two questions: (1) Do the Bramblings that visit mass concentrations come from different breeding populations than would visit a given wintering area in a typical year; and (2) What is the interaction between documented differential migration in this species and participation in mass concentrations in beech mast areas? The first primary conclusion is that

birds that attend the mass concentrations are not going too far out of their way to do so; that is, birds tend to join mass concentrations that they encounter on their normal migration routes. The second primary conclusion is that the mass concentrations are composed a disproportionately high number of adult males, which is hypothesized to be a result of competitive advantages and potential increased ability to manage risks associated with the beech mast getting covered by snow. Even with long-term datasets, questions remain: What are the cues that Bramblings use to identify locations of beech mast? How does the information spread? Does the tendency towards site fidelity override the push to attend mass concentrations? Is there a connection between attendance at mass concentrations and individual fitness? Answering these questions requires the ability to identify individual birds and solidifies the importance of bird banding as a core tool in the ecologist's tool box. **JJ**

Long-term demographic consequences of habitat fragmentation to a tropical understory bird community. N.M Korfanta[1], W.D Newmark, and M.J. Kauffman. 2012. *Ecology, 93*: 2548-2559. https://doi.org/10.1890/11-1345.1. University of Wyoming, Laramie WY USA. [1]korfanta@uwyo.edu

This unique study uses bird banding to track the survivorship of bird communities living in small forest fragments within the Usambara Mountains of Tanzania. The location may seem far from home for those of us in North America, but its message is extremely relevant given the pervasive impacts of forest loss and fragmentation throughout the world. Demographic studies are extremely data hungry, requiring long-term studies that span a decade or more, and what really stands out about this work is the 22 years that biologists returned to the same network of 14 fragments to capture and band over 22,000 understory birds. The fragments were all surrounded by a uniform landscape of tea plantations and ranged in size from < 1ha to 880 ha. In the end the researchers had sufficient captures for 22 out of the 49 forest species encountered, including stunning species like the Eastern Double-Collared Sunbird (*Cinnyris mediocris*), Red-faced Crimsonwing (*Cryptospiza reichenovii*), and Forest Batis (*Batis mixta)*.

In general, fragment size had a big impact on avian demography. Survival for species in large fragments ranged between 0.6 – 0.8 and required low levels of reproduction and immigration to maintain population stability. In contrast survival was 34% lower for birds in small fragments, with extremely variable estimates ranging from 0.1 – 0.9. Because survival was so low, many species required high rates of immigration to avoid extinction. Even so, the population growth rate for most species in small fragments was less than one, meaning that those populations will eventually go extinct, barring changes in local reproduction or immigration from other population sources. Indeed, several understory species absent from small fragments were known by the researchers to have limited ability to disperse or move among habitat patches. These results strongly suggest that the small fragments still owe an "extinction debt", meaning that future extinctions are likely to occur given sufficient time and demographic instability. This research provides important insights into avian population dynamics underlying the world's fragmented forests and emphasizes the critical conservation data mark-recapture studies provide that cannot be collected from observational surveys.

Florida Scrub Jay
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