HAWAII AUDUBON SOCIETY

'ELEPAIO

Journal of the Hawai'i Audubon Society

For the Protection of Hawai'i's Native Wildlife

VOLUME 72, NUMBER 3 **MAY/JUNE 2012**

Conjoined-nesting of the Laysan Finch, *Telespiza cantans*

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Introduction

The Laysan Finch, *Telespiza cantans*, is among those Drepanidines which are most reminiscent of their cardueline ancestor (James 2004, Lerner et al. 2011). This bright yellow bird, well known for its curiosity and ingenuity, is now restricted to the island of Laysan and to Pearl and Hermes Atoll within the Papahānaumokuākea Marine National Monument. Based on fossil records, this species is known to have previously inhabited the islands of O'ahu and Moloka'i (Olson and James 1982, James and Olson 1991, Lerner et al. 2011). Two successful translocation efforts in the 1900s moved birds from Laysan to Midway Atoll in 1905 and to Pearl and Hermes Atoll in 1967 to expand their range and reduce the risk of extinction (Amerson et al. 1974, Sincock and Kridler 1977). Unfortunately, the Midway population was extirpated by 1945 when rats were introduced to the atoll (Sincock and Kridler 1977).

Presently, population size is estimated annually at Laysan from strip-transect surveys. The most recent population estimate was 8,327 ± 1711 birds (C.I. 95%) (Hammond et al. 2010). Population estimates of the Laysan Finch and other Northwestern Hawaiian Islands passerines vary drastically from one year to the next. For example, the Laysan Finch population was estimated at 4,071 ± 936 birds (C.I. 95%) and 11,175 ± 1,944 birds (C.I. 95%) in 2007 and 2008, respectively (U.S. Fish and Wildlife Service unpub. data). Considering a fledgling success rate of only 28% (Morin and Conant 2002) such an increase is not biologically possible, suggesting that the survey methodology might benefit from revision. Other aspects of the bird's biology, such as reproductive success and foraging behavior, are not currently being monitored. The uncertainty of population estimates and limited research on this endangered Hawaiian honeycreeper make it difficult to assess demographic patterns.

Nest Observations

On three occasions during the summer of 2010, unusual nests of Laysan Finches were encountered while removing the non-native plant, *Pluchea indica,* from the interior of Laysan Island. The nests were comprised of two nest cups built so closely together that they shared one side of the nest and the grasses and small twigs of each nest were intertwined *(Fig. 1)*. Two of the three observations were found in *Pluchea indica* shrubs; the other was located at the top of a bunchgrass (*Eragrostis variabilis*) tussock. For all three occurrences, one of the two nests was slightly darker in color and less compact, giving the nest an older appearance.

Figure 1. Two Laysan Finch nests in a bunchgrass tussock conjoined on one side by interwoven material. Illustration by Joel Kutylowski.

***Pluchea indica* at Laysan**

In the past, the Laysan Finch was not thought to nest in *Pluchea indica* (Morin and Conant 1990, M. Morin pers. comm.). This is probably because the total area occupied by this invasive shrub in the late 1980s was much less than it was in 2010 (Morin 1991, Hammond et al. 2010, U.S. Fish and Wildlife Service unpub. data). It also may be possible that nests were not discovered in *Pluchea indica* because it forms large, dense thickets; tracking birds in these thickets would be difficult and intrusive.

Although the *Pluchea indica* was decimated by a storm in 2011 it was a priority species for eradication at Laysan in 2010. Field crews spent a minimum of twenty hours per week on removal efforts. Such removal efforts enabled field biologists to find many nests. To avoid disturbance to Laysan Finches and nesting seabirds, intense *Pluchea indica* removal efforts were conducted only during fall and winter months. Even during these months, field biologists searched for active nests because there is significant temporal variability in the nesting of the Laysan Finch (Morin 1992a, U.S. Fish and Wildlife Service unpub. data). For example, on October 17, 2011 a Laysan Finch nest containing two eggs was documented and in 1997 recent fledglings were sighted in December (Morin and Conant 2002).

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Laysan Finch, Photo credit: Chris Farmer, American Bird Conservancy

Discussion

Because all of the conjoined-nests were inactive when found, it is impossible to know the purpose of these nests. The "older" nest of each conjoined-nest pair was not heavily weathered or dismantled, and was therefore probably built in the same breeding season as the "newer" nest. Site fidelity in the Laysan Finch provides some support for the assumption that these conjoined-nests were built in the same year. Morin (1991) found that thirteen out of twenty marked bunchgrass tussocks supporting nests collapsed before the following breeding season and were therefore unusable as a nest substrate. Only one of the remaining seven nests was reused for nesting (by a different female).

Previous studies of the Laysan Finch report that inactive nests are infrequently located in the same bunchgrass tussock (Morin and Conant 2002), but never conjoined. Although we were unable to find any reference to this exact behavior in other Drepanidines, the construction of a nest superimposed on an older nest has been documented in two species. On the northwestern slope of Mauna Kea, a Hawai'i 'Amakihi (*Hemignathus v. virens*) nest was found to be built on top of a Hawai'i 'Elepaio (*Chasiempis sandwichensis*) nest (van Riper 1976). A similar observation was made of an 'Apapane (*Himatione s. sanguinea*) nest on the wall of a lava tube. In that case, the active nest was built on top of two old nests, which were presumably built by the same bird in previous seasons (van Riper 1973).

Though conjoined-nest building is not common to carduseline finches, it has been observed rarely (among other aberrant nesting behaviors) in the House Finch (Aiken and Warren 1914, Grinnell and Storer 1924, Hill 1993). Aiken and Warren (1914) describe a pair where the female built a nest conjoining the nest of the pair's first brood shortly after the first brood hatched. The female then incubated eggs in this new nest adjacent to the first brood of nestlings. Grinnell and Storer (1924) describe two pairs of House Finches that built their nests conjoined. These nests each contained four eggs at the time of the observation. The conjoined-nests of the Laysan Finch appeared to consist of one nest that was slightly older than the other and therefore were probably not simultaneously active unless one was in a very late stage (near fledging) when the other was built.

Conjoined-nests of Laysan Finches were similar to compound nests, which is a common nest mass in which more than one pair of birds or more than one female of the same species occupy separate compartments (Collias 1964). Gregarious nesting behavior, such as compound nesting, is rare in passerines and is generally observed when a species nests in a safe location such as on a cliff wall or in a thorny tree (Collias and Collias 1984), which are often limited. This is exemplified by the Grey-capped Social Weaver (*Pseudonigrita arnaudi*) which builds both solitary nests and compound nests. The frequency of compound nesting in the Grey-capped Social Weaver increases when birds nest in trees where ants protect nests from predators (Collias and Collias 1977). The Laysan Finch occurs in disease and predator free habitat and nest predation by the Great Frigatebird (*Fregata minor*) (Morin and Conant 1990) or a vagrant raptor would be an extremely rare event. Another tendency of gregarious nesters is for foraging areas to be separate from the breeding area; solitary nesters are more likely to feed and nest in the same locations (Friedmann 1935). Laysan Finches feed in virtually all substrates and they tend to forage away from the nest and do not defend a feeding territory (Morin 1991, Morin 1992b).

Regardless of their purpose, the three conjoined nests were found during the same breeding season indicating that more than one pair is constructing these nests. Although conjoined-nesting may have been overlooked in the past, the island's vegetation has changed dramatically since nest studies were conducted in the late 1980s (U.S. Fish and Wildlife Service unpubl. data). Perhaps the flexibility of this species, with regard to nesting and foraging behavior (Morin and Conant 1990, Morin 1992a, Morin 1992b), has facilitated the development of this aberrant nesting behavior in response to the changing environment? Research on the population size, reproductive behavior, and foraging ecology of the Laysan Finch is necessary to understand the frequency and purpose of conjoined-nest behavior as well as other aspects of the population's ecology. It has been suggested that another translocation of the Laysan Finch be undertaken to create an additional population as insurance in case a natural disaster, such as a tsunami, devastates the Laysan or Pearl and Hermes population. In preparing for such a translocation and to better understand management needs for this species, development of a more thorough monitoring program is needed for the Laysan Finch.

Acknowledgments All funding for research at Laysan Island provided by the United States Fish and Wildlife Service. Thanks to Andrew McClung, Kevin Brinck, Holly Freifeld, and Fern Duvall for providing comments on earlier drafts of this manuscript. We owe a special thanks to Joel Kutylowski for providing the nest illustration.

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ʻElepaio ISSN 0013-6069
Managing Editor: Nicole Galase
Scientific Editor: David Leonard

The ʻElepaio is printed on recyled paper and published six times per year

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???s About Birds (3)

Adapted from: 1001 Questions Answered About Birds. A.D. and H.G. Cruickshank. 1958. Dover Publications. New York.

The Internals

Brains? Very large in proportion to the weight of the body. Optic and hearing portions well developed, but not parts used for smell and taste. Birds mostly "think" instinctively, not consciously although some use reasoning in the use of tools or in baiting for feeding purposes.

Hearts? Similar to mammals birds have four chambers. The heart is proportionately large, but the smaller the bird (hummingbird) the larger the heart and vice versa (albatross). A large heart is needed because of high metabolism needed for life style (flying, feeding etc.) A chickens' heart beats about 300 times a minute; a hummingbird, 615 TAM. Heart failure may be the cause of apparently uninjured birds flying into windows.

Lungs? In addition to large lungs, up to 5 air sacs are spread throughout the body, extending into the hollow bones, sometimes even the toes. These not only aid in respiration for the high metabolic rate, but contribute to lightness for ease of flight. Unlike mammals, the active phase of breathing is in exhaling, not inhaling. Sound is produced through a voice box at the base of the windpipe (syrinx) rather than at the end (larynx) as in mammals.

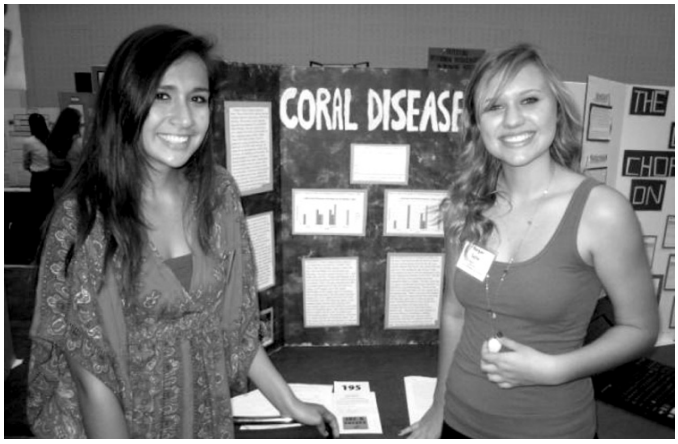
HAS Awards for Student Research

By Wendy Johnson, Education Committee Chair

The Hawai'i Audubon Society recently presented two awards for outstanding research relating to Hawai'i's natural history at the 55th Hawai'i State Science and Engineering Fair held at the Hawai'i Convention Center. In early April, representatives of the Hawai'i Audubon Society's Education Committee joined other agency judges in viewing the exhibits and interviewing students on the subject of their original research. The HAS awards went to students who displayed both knowledge and curiosity about their chosen areas of study, along with an understanding of how their research was relevant to the conservation of Hawai'i's unique native ecosystems.

Gabrielle Desimone and Morgan Taylor, both juniors at West Hawai'i Explorations Academy in Kailua-Kona, received the HAS Senior Division Research Award for their project entitled "Coral Diseases". Snorkelling off Kahalu'u Beach Park over a two month period, the students conducted weekly monitoring of coral disease on lobe coral and cauliflower coral in Kahalu'u Bay. Gabrielle and Morgan identified three areas in the bay as high, medium and low impact areas and studied coral disease prevalence in each area. They learned to recognize four different coral disease symptoms: bleaching, discoloration, zits and fungus, and recorded a positive correlation between disease prevalence in corals and the degree of impact by humans in the study area,

The HAS Award for outstanding Junior Division Research relating to Hawai'i's natural history was presented to Amber Rogers, who is an eigth grader at Hawai'i Preparatory Academy in Waimea. Her research project was entitled "MICONIA: The Beastly Beauty". Concerned about the diminshing effort and funds devoted to miconia eradication on the island of Hawai'i, Amber designed an experiment testing miconia sensitivity to nine common household chemicals. She gathered miconia seedlings from the wild and propogated them under controlled conditions in a greenhouse environment. After conducting an array of controlled tests, Amber determined that miconia growth was most affected by strong bases (bleach) and acids (vinegar). She plans to continue her research to include work on native plants and miconia in natural settings.



Gabrielle Desimone and Morgan Taylor received the HAS award for outstanding Senior Research relating to Hawaii's natural history.

The HAS award for outstanding research in the Junior Division went to Amber Rogers.

Great Frigate Birds Through the Lens of Ilana Nimz

By Nicole Galase, Managing Editor

Ilana Nimz, scientist and proud Hawaii Audubon Society Member, spent the summer of 2011 on Kure Atoll where she lived amongst these "pirates of the sky." When not perched ominously on a branch, these domineering birds spend their time hovering in the sky, ready to swoop down to snatch any loose item of clothing fluttering in the wind. Even as a chick, this youngster has already acquired the typical attitude of a Great Frigate Bird, or Iwa.

Raising the ʻAukuʻu

By Ann Elliott Viets

Ann Elliott Viets is a state and federally licensed wild bird rehabilitator on the island of Maui, Hawaii. This article was published with the permission of the author

On a February morning, a woman walking her dogs at a West Maui golf course came across a small black-crowned night heron lying in the grass. Wrapping the little heron securely in a towel, she immediately called me, walked her dogs back to her home, and drove the 45-minute coastal trip to my house. Gently passing the bundled-up baby bird to me, she explained he'd suffered a 30-foot fall from his platform nest of sticks high in a Schefflera tree where she could hear his noisy siblings squawking. The tiny heron was no bigger than the palm of my hand and weighed only 140 grams.

I quickly examined the nestling for injuries and noticed that the top of his long grey bill was swollen and bleeding. As I looked him over, he closed his eyes and pulled his legs and wings in close to his body for protection. His large olive green feet and tiny pin-feathered wings felt cool to the touch--too cool for a featherless nestling. I rolled a soft towel into a donut-shaped nest, carefully placed him in it, and warmed a cotton sock filled with dry rice in the microwave for a few seconds for him to snuggle against. Soon, he lifted his head and opened his pink gaping mouth. I fed him small slices of diagonally cut frozen smelt soaked in warm Pedialyte. He eagerly swallowed the fish I hand-fed to him, letting each piece travel down his long throat. After eating 15 grams of fish he fell into a deep sleep. I placed him in a pet carrier with a heating pad set on low halfway underneath it, checking on him periodically through the night.

The next morning the heron had a voracious appetite and was alert and responsive, but he was not as active as a nestling should be. He appeared to be in pain and was hesitant to reach up for food as most eager, hungry nestlings do. I called my avian vet, Dr. Roger Kehler, and made an appointment for later that day. Dr. Kehler's staff was curious about the heron and remarked how strange and prehistoric he looked compared to the birds usually brought into the office. After examining the heron's bill, Dr. Kehler said the injury was an abrasion that should heal normally in a few days if kept clean. He examined the eyes, ears, and nares and took a throat swab. The heron's wings and legs were normal and there was remarkably little bruising on his body. Next, the doctor listened to the heron's heart and commented how strong and steady the heartbeat was. As he was removing the stethoscope from the bird's chest, he paused.

"Look," he said. "The heart is visible through the skin just under the surface and I don't see the sternum here. Normally the sternum protrudes a bit to protect the heart, but you can see the heart beating here right under the skin. Let's take an X-ray of the chest so we can see what's going on." The X-ray revealed a broken sternum displaced from its normal position and no longer protecting the bird's delicate heart. He examined the X-ray for tail and spinal injuries but didn't see anything unusual. Dr. Kehler explained the heron's sternum would heal without a splint and hopefully mend into a normal position as the bird grew. He recommended applying a topical antibiotic once a day for the bill injury. When I returned home I made a supportive, soft, padded nest from old pajamas to ease the little heron's pain and to restrict movement. Now he could rest comfortably as his sternum healed.

Ann Elliott Viets with young ʻAukuʻu. Photo credit: Jim Viets

Young herons, like other hand-raised carnivorous birds, are vulnerable to metabolic bone disease, which can occur from insufficient calcium, lack of sunlight and vitamin D3, or an inadequate calcium-to-phosphorous ratio. Crushed tablets containing these nutrients in the correct proportions can be added to food and UV light found in natural sunlight is recommended to help the body utilize vitamin D. I prefer a fish-based diet for herons in rehab and feed them frozen whole smelt available in local supermarkets. I choose the smaller smelt, around three to five grams each, for young herons. The heads of the smelts can be removed which sometimes helps prevent regurgitation. Vitamin B1 (thiamine) should be added to the thawed fish because smelt contain the enzyme thiaminase, which breaks down Vitamin B1, rendering it inactive. Some rehabilitators prefer to add fish oil as well, but only a drop should be used because fish oil on the bill can cause the feathers to become oily as the bird preens. Rapidly growing young herons should always have plenty of protein in their diet along with these important nutrients or developmental problems can occur which could prevent successful release of the bird into the wild.

At three weeks of age the young heron weighed 500 grams and was moved to a large cage where he was able to self-feed

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Photo credit: Ann Elliott Viets

from a shallow dish of thawed smelt floating in water. A dark blue glass bowl made it easy for him to spot the silvery fish. Supplements were sprinkled on top of his smelt and he consumed eight fish per feeding, five to six times a day. He no longer behaved like a baby and sat perched on a piece of driftwood defensively striking at anyone who approached his cage. His body was covered in smooth, soft brown feathers with light spots, but the primary and secondary feathers on his wings were still pinfeathers. The abrasion to his bill healed quickly and his broken sternum mended successfully. He was rapidly developing into a healthy juvenile heron. During the evenings he quacked in a low-pitched tone, calling to the other herons he heard quacking overhead as they flew to the nearby wetland.

At about five weeks of age the heron suddenly stopped eating the thawed smelt that I placed in his dish throughout the day. Sometimes I'd find smelt torn up on the floor of the cage, but he hadn't consumed any. I tried hardboiled eggs and shrimp but he left them untouched in his shallow dish. I discontinued the daily supplements I'd been sprinkling over his thawed smelt, thinking that perhaps the taste was unappealing to him, but he still ate nothing. For a day and a half he sat on his driftwood log observing everything in his dish, eating nothing at all. If this continued, without a continual source of nourishment the young heron would not survive. I'd read that fledgling herons in the wild normally begin to follow their parents around and develop the skills to forage, hunt, and strike at small moving creatures. It occurred to me that perhaps the heron was patiently staring into his food bowl looking for signs of movement, looking for live prey to catch. Thawed smelt don't move and they weren't attracting his attention. Perhaps he needed live prey at this point in his development so he could learn to hunt and catch his food as he would in the wild.

Lā'ie Wetlands is a publicly owned brackish pond several blocks from our house, fed by a fresh water culvert that runs under the road on the mauka side and a narrow salt-water channel on the makai side. We'd often observed herons fishing for minnows from the banks in the evenings, so it seemed like a logical spot to catch live fish. Grabbing a bucket, a net, and a flashlight we headed for the nearby pond around eight in the evening. When we arrived, we saw a mature heron fishing from a rock and observed swarms of minnows around the opening to the culvert. My husband directed the flashlight toward the minnows while I scooped them up with the net. Before long we had more than forty minnows in the bucket and headed for home. As usual the heron was active that night, and we filled a shallow bowl with water, tossed in the lively minnows, and placed it on the floor of his cage. The heron promptly stood on his driftwood log, bristled his feathers, cackled, and struck out like a bolt of lighting towards the bowl. He grabbed a minnow, shook it wildly, and swallowed it. He attacked, striking and throwing minnows in every direction. Then, opening his wings over them like an umbrella, he devoured them all. He also devoured a few leftover thawed smelt in the frenzy. His first attempt at hunting live prey was a huge success. Late-night fishing for minnows at the nearby pond became a part of our daily routine.

At about six weeks of age the heron was ready to move into an aviary equipped with a plastic wading pool for minnow hunting, branches and logs arranged at different angles around the pool, and larger branches overhead for roosting. I placed him, still in his wire cage, on the floor of the aviary with the door wide open so he could explore his new habitat in his own time. Within an hour he'd come out of the cage, explored the entire space, eaten all the minnows in the pool, and climbed to the highest branch in the aviary for an afternoon nap. Over the next two weeks he grew considerably and began to use his wings with confidence as he hopped and flew from branch to branch. At dawn and at dusk he would stand on a log at the edge of his blue plastic wading pool, as still as a statue, staring down his long dark bill waiting for fish to swim by. I'd toss in a few minnows and thawed smelts and he would devour them all within minutes, resuming his statue-like pose on the side of the plastic pool. Each day he refined his hunting skills and became quick, silent, and precise in his attack. His release day was rapidly approaching.

The 9.0 magnitude earthquake that occurred in Japan on March 11, 2011 generated a tsunami that struck the Hawaiian Islands five hours later. A six-foot rise in sea level flooded many low-lying coastal areas including the Lā'ie Wetland where I obtained live minnows for the heron. The tsunami washed out the sand dunes that separated the pond from the ocean, allowing seawater to fill the pond. The fresh-water minnows I had been collecting disappeared and saltwater reef fish populated the pond. These reef fish skillfully evaded the net and were a challenge to catch. Since they were larger than minnows, only a few were needed to satisfy the heron, and they proved to be a challenge for the heron as well. They darted about his blue plastic wading pool and dodged the heron's attacks as he flapped his wings, squawked and struck at them with his long pointed bill. The heron delighted in this new chase and eventually caught

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them all. When we didn't have enough live fish to satisfy his hunger, we found we could launch thawed smelt one by one into the wading pool and the heron would catch them as they glided by.

I preferred a soft release for the heron with access to a location where I could continue to bring food and check on his condition daily if necessary. The site I selected was an estuary with clean, clear water and lots of fish. Mangroves and dense brush covered the bank on one side and a large grassy field was on the other. I regularly saw herons feeding at this site, including juveniles, so it was ideal. Permission was granted to access the area for release and for follow-up observations.

The heron had been in rehab for 100 days on the day of his release. He was a strong, healthy bird with normal fight and flight responses, no improper imprinting, and he demonstrated the proper behavior for his species. We transported the heron to the release site in a carrier, parked and walked through the brush to a small sandy cove where I'd observed schools of minnows. We placed his carrier under a mangrove by the little cove, slowly opened the door, and waited for him to emerge. Cautiously, he wandered out and stretched his long neck to survey his new environment. He spotted a school of minnows swimming in the clear water and flew to an overhanging branch for a better view. I picked up the carrier and slowly backed away. Before leaving I placed a dish of eight smelt nearby, just in case he needed a little extra food. I returned the next day to check on the heron, but there was no sign of him and the dish of smelt was untouched. I visited the release site each morning and evening for two days with no sighting of the bird. On the third evening as I was leaving the release site and walking back to my car at dusk, the heron swooped in from the northeast, circled high above the grassy field and landed in the mangroves by the estuary. He had returned for the evening to hunt and roost, and he looked magnificent.

Photo credit: Ann Elliott Viets

THE END.

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Calendar of Events

June 2 - Paiko Lagoon - Summer Low-tide Walk
View Paiko Lagoon at one of the year's lowest tides. Field trip starts at 7:00am.
Please RSVP to Alice Roberts at Mermaidshi@aol.com

July 14 - Hilton Hawaiian Village Bird Tour
Please RSVP to Alice Roberts at Mermaidshi@aol.com

July – Keep an eye out for information about the next annual Shearwater Soiree!

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