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NATIVE HAWAIIAN BIRDS, REVIEWED: The Amakihi

The amakihi is a Drepanid belonging to the (old) Chlorodrepanis branch, and is now classified as Loxops by Dr. Dean Amadon, who reduced the number of genera of our Hawaiian birds. In his judgment there were too many. The bird is found on all the main islands. The general coloring is green and yellow; there are four subspecies, three of which are very similar.

Oahu amakihi: Loxops virens chloris (Cabanis)

Male: length, $4\frac{1}{2}$ "

coloring, green or greenish yellow above, golden yellow below; lores black, with yellow superciliary line; wings and tail brownish grey, edged with green; beak dark, curved; feet dark.

Female: similar, but duller, and with two wing bars.

Young: duller, much like female, but with two somewhat irregular yellow wing bars.

Hawaii amakihi: Loxops virens virens (Gmelin)

Under parts said to be more green than in other amakihi (Amadon), but this does not agree with observations of Mace Norton, Hawaii Audubon Society member. He reports the Hawaii amakihi to be brighter than the average Oahu amakihi.

Maui, Lanai and Molokai amakihi: Loxops virens wilsoni (Rothschild)

Almost identical with the Hawaii species; possibly the bill is a little heavier, the plumage a trifle more yellow.

Kauai amakihi: Loxops virens stejnegeri (Wilson)

A little duller than the Oahu species; the bill and the whole bird stockier.

Loxops parva (Stejneger)

Smallest of all the amakihi: $4\frac{1}{3}$ ". Bill less curved, whole bird more uniformly yellowish green; less difference in sexes. Probably represents an earlier colonization than does L. virens stejnegeri.

GENERAL DISCUSSION:

All subspecies of the amakihi are closely related. Plumage is softer than that of the apapane, with more pointed primaries. The bill is more curved, the tail proportionately shorter than in the apapane.

It frequents forest areas, from 1100 to 2500 feet elevation, and may be found on the ridges and in the gulches. Sometimes it frequents the darkest and wettest places, at other times may be high overhead in the tallest trees; again it may be

seen in low bushes, in dry areas, or on the outskirts of the forest.

Favorite trees and plants are the ohia, koa (especially when in flower) tree lobelias, false sandalwood, mamane, and nasturtiums (which grow luxuriantly in some areas). The flowering sandalwood attracts them. Usually the bird is to be found upon the leaves and small twigs, searching for insects. The creeper, for which it might be mistaken, is commonly found upon the trunk of large limbs. This habit difference between the two birds is an important means of field identification.

Wing bars, as a means of identification, are of very little help. Of 52 specimens of Oahu amakihi examined at Bishop Museum, 28 were females. All had wing bars. Seven males, in dull plumage, presumably juveniles, also had wing bars. However, seven other males, all in bright, or fairly bright plumage, also had bars. Eleven males, also in adult plumage, had no wing bars.

The tally of the creeper's bars was just as confusing. Of 38 Oahu creepers examined, 16 were female, all of which had two wing bars. Nine males, in apparently juvenile plumage, also had bars. Three males, in adult plumage, had bars, while nine males, also in adult plumage, had no bars.

From this examination, it would seem that we can conclude that the female and young of both the amakihi and creeper have two wing bars, but that the wing bars in the adult male are variable, making the bill, and the areas on trees where food searching is done, the only means of field identification.

The amakihi is often found in company with the apapane. Henshaw speaks of "flocks", but in present day conditions we do not see them thus. Indeed, while the amakihi is often heard, it is hard to see. In my experience, never more than two or three are to be found together on Oahu.

Insects form one of the main articles of diet, but nectar and fruit are also taken.

The call note is a chirp, not unlike that of a canary. The best-known note is a high "twseet", whistled through the teeth. Another call is a repeated note, given in a series, without change of tone. This is very similar to a call of the Liothrix, and presents a problem to my ear, complicated by the difficulty of locating either bird as the call is sounded. The song is infrequent--a sweet little warble. At Kilauea, the volcano region on Hawaii, one may hear this fairly often. I recall the amakihi's Whisper song as they frequented the fuschias about the cottage where I stayed at Kilauea.

The nest is compact, made of twigs and grass, lined with lichens, poha husks (thin, dry, fibrous, papery sacks) etc. It is usually placed in an upright fork, in fern clumps, to thirty feet above ground in an ohia tree. No information on the number of eggs or number of broods seems to be available. Records of most nests have been made in the month of May.

Grenville Hatch

(Editor's note: This is the second of a series of studies presented at meetings of the Society. Any records on any point will be most welcome, from any source. Send to the Editor, Elepaio, c/o Bishop Museum, Honolulu 17, T. H.)

REVIEW

Notes on the Hawaiian duck, by Charles W. Schwartz and Elizabeth Reeder Schwartz. (The Wilson Bulletin, 65(1):18-25, 1953)

The authors call attention to the fact that the Laysan teal and the Hawaiian goose (nene) are almost extinct. They may be saved by the drastic measures now taken to safeguard them. The Hawaiian duck is not so near extinction but is much reduced. One estimate for an area--Mana, Kauai--is about 400 ducks per square mile in 1923; 30 per square mile in 1946-47. A description of the duck's habitats, food, habits of flocking--no large flocks observed--nesting time--most breeding in the spring of the year--makes interesting reading. Efforts are being made to save the duck (koloa is the Hawaiian name) by the Honolulu Board of Agriculture and Forestry. A few ducks are being raised in captivity, evidently not exceedingly difficult. These may be released later. The Honolulu Zoo is cooperating. A pair has been taken to the Severn Wildfowl Trust, in England, which has done such excellent work in saving birds.

Drainage projects on the island of Oahu will probably discourage the koloa from making this island a home much longer, though two small islands off Oahu are now used by the duck, which brings its young to a large swamp on the main island. Kauai still provides suitable areas for ducks. It is hoped that they will continue to find conditions they like there.

NA LAAU HAWAII

By George C. Munro

In the Elepaio of December, 1952 (Vol. 13(6)), I told of starting in December, 1941, the foundation for the Hawaiian xerophytic on dryland forest which I call Na Laau Hawaii. In 1950 and 1951, there had been some planting of seen in the area, principally of the native wiliwili tree (Erythrina sandwicensis), which demonstrated the suitability of the locality for a living museum of the vanishing xerophytic trees and plants of the Hawaiian Islands. The wet season of 1950-1951 was favorable for the germination and growth of some, but the wet seasons of 1951-1952 and 1952-1953 have been unfavorable to most of them. However, a great deal of seed has been put into the ground to await the arrival of a season favorable to its germination.

The first rains of the season just past came early on October 15th and 16th, about $1\frac{1}{2}$ inches, judging by the depth it penetrated the soil (about four inches to one of rainfall). Then on November 6th there was a nice rain and on the 20th perhaps two inches. On February 16th and 28th there was a heavy rain and also on March 2nd, with showery weather until about the 13th. The long dry period from November 20, 1952 to January 1, 1953, was hard on some plants but those that survived have made a splendid growth since. A condition toward the end of March seemed to be developing, similar to that held from 1947 to 1949, but absent for the last two years--that of early morning light, tradewind showers across the west face of Diamond Head during the dry season. If this continues it will be of great help in establishing plants in Na Laau Hawaii.

The most remarkable response to the early light rains of October has been shown by the native annual kakonakona grass (Panicum torridum). During 1952, I care-

fully fostered a clump of two or three plants in Na Laau Hawaii, the only ones I knew of in this area. At the end of March 1953, there were masses of it wherever there is soil, even all through the kiawe forest. The seed had been in the soil for years but this year, strange to say, was favorable to its germination and growth. The young plants had been well enough developed to withstand the drought of December. I had seen in my Molokai experience two crops of the seedlings die with dry weather after germination and the third crop live to maturity and reseed the ground. Such is the economy of these dryland plants, only a portion of the seed in the ground germinates at a time. With other plants the kakonakona wilted in the dry spell but made a splendid recovery with the later rains and seeded in masses up to three feet high. The only time I remember seeing a growth of kakonakona like it was on Molokai when the central plain in 1901 was a solid growth of this remarkable plant. There were thousands of acres of it, like an immense field of wheat. Unlike the season just past, the rainfall on Molokai that season had been heavy and continuous, starting in October 1900 and continuing into March 1901.

The pili grass (Andropogon contortus) on the kula in Na Laau Hawaii also germinated well but being a perennial has grown more slowly and not made the spectacular growth of the kakonakona. The wiliwili tree, despite plenty of planted seed in the ground, was poor in germination in the rainy season just passed. The early rains were probably too light and the later, heavier rains were at a time when the weather was too cold. The trees which started in 1950 and 1951 responded well to the early rains and branches began to form on some. During the dry spell the leaves turned yellow and fell. The later rains brought on a fresh crop of leaves which they still held at the end of March.

Plants of the large shrub or small tree, heuhiuhi (Cassia gaudichaudi), and the shrub nehe (Lipochaeta lobata var. albescens), growing naturally in Na Laau Hawaii did not all respond to the early rains and some died. The nine foot high Cassia tree only sprouted leaves after the January rains. A nehe about five feet high which had young plants under it about six inches high flowering towards the end of March. Other plants of the species flowered heavily. When the nehe is wider spread it will be a spectacular plant in the wet season. The rare variety of Canavalia bean brought from Lanai in February, 1952, has made a wonderful growth running up into a kiawe tree. It is a plant of the kula (upland) and is making for the sunlight. A plant of the tree-like form of Hibiscus brackenridgii planted out from the nursery in November 1952 is making a splendid growth at the end of March. If we can save these two which I am sure are distinct varieties of each species, as yet undescribed, I will feel that Na Laau Hawaii has already done something for scientific knowledge. They both seem eminently fitted for conditions in Na Laau Hawaii and the aim will be to have them growing in quantity. Both have beautiful flowers. My nephew, Hector G. Munro, has done good service in collecting seed of both. These two varieties still exist in very limited quantity on Lanai but we do not know how long they will be safe there.

I am following three different systems in my planting. One is planting the seeds on the borders of the groves and keeping records of the same, broadcasting and planting in the groves, and raising young plants in the nursery. Those in the nursery are transplanted, as soon as they develop their second leaves, into small, six-inches-high, perishable containers. As soon as settled, they are taken to the chosen location and the container put into the ground without disturbing the roots of the plant. I claim they will in this way develop a root system better able to thrive in the dry conditions. While I have used successfully the accepted system of transplanting the

seedlings into cans and not planting out until well grown with many thousands of trees, I have no faith in it for the class of plants I am now using and the kind of location that is at present being worked on. There is the Kanepuu forest on Lanai for a model, and my experience of twenty years of growing rare Hawaiian dryland plants there; also Mr. Charles Judd's plantation at Waahila, on St. Louis Heights, where all the Hawaiian dryland nursery trees have died. Plants in cans are too heavy for me to carry out to Na Laau Hawaii, but the small milk cartons filled with light humus are easily dealt with and are giving promise of good results. The shrub, or small tree alaweo (Chenopodium sandwichium) this year has done splendidly from last year's broadcasting of seed. Many plants are successfully competing with the grasses. When plenty of seed, especially small seed, is available, broadcasting sometimes has advantages over planting. More ground is covered and the plants have a wider choice for favorable locations. Some seed is likely to fall on ground most suited to it. There is quite a difference in locations even in a small area.

From the nursery planting there are now growing at Na Laau Hawaii nice plants of nau (Gardenia grighami) from Lanai; ohu makai (Reynoldsia sandwicensis) from Hawaii; Breweria menziesii, a rare climber, also from Lanai; iliau (Wilkensia gymnoxiphium), a close relative of the famous silversword from Kokaa, Kauai; Ipomea tuboides, a night-blooming morning glory, which is the Hawaiian moon flower from Lanai, and a number of others. Also in the nursery, almost ready to go out, are holei (Ochrosia sandwicensis), kului (Notorichium sandwicense), hoawa (Pittosporum hosmeri), the latter named for Prof. Ralph Hosmer, who started the watershed forest protection in Hawaii. Those named are uncommon plants, some quite rare and some of them very ornamental. These of course will need to be watered during the dry season if we do not get sufficient showers, but how much water to give them, or perhaps how little to give them, has to be worked out by experience. Some of the dryland plants that I kept alive by watering through the dry season have died when the rainy season came on.

The rotation of the native plants of the kula as exemplified by the kakonakona grass this year will be an exceedingly interesting study as the years go on. If, for instance, we can fill its soil with seeds of the puakala, the Hawaiian poppy (Argemone mexicana), there will come a year when the hillside will seem covered with snow. I saw this on a fallow canefield at Makaweli, Kauai, and in 1899 on Molokai, where the Hoolehua homesteads are at present. I used to ride through a mass of dead stems of this plant that were so high and dense that their prickly tops jagged my knees as my horse passed through them. I was too late to see it in flower. It must have been a wonderful sight. Its seed is slow of germination. A good deal of it was planted around Diamond Head in 1950 and 1951, but so far I have seen only two plants, but more will come up later. I hope to obtain a good supply of seed this summer and have it planted and scattered on the kula before the autumn rains, ready for the arrival of the season favorably to its germination and growth.

I consulted with Mr. Edward J. Morgan, Manager for the Board of Water Supply, in regard to a water supply for Na Laau Hawaii and he kindly sent Mr. Rudolph and an engineer to look into the possibility of granting it. It was found, however, that the regulations of the Board would interfere with carrying water to that elevation and the cost would be too high for the Hawaii Audubon Society, which offered to bear the expense. But neighbors have been very kind in permitting me to draw on their supplies for what is needed and we can get on with very little for a time. The wili-wili trees, for instance, have never been given any water, yet extremely few have died in Na Laau Hawaii,

The plan is to have the forest and kula self-supporting except for the eradication of foreign plants, and I am quite sure this is possible at no great cost. The plan for handling the foreign plants will be the subject of another paper.

There is another and harder problem that must be solved, that of vandalism. It is not important at the present time but will be decidedly dangerous in the future if it cannot be overcome. In December 1952, there was a visitation when water cans were overturned, typed notices telling of the project and asking cooperation were torn, and plant and trail markers removed. Cans were refilled and markers replaced, but within four days the acts were repeated and all tools and appliances removed. I wrote both the morning and evening papers about it and through them I had shamed the perpetrators but we had another even more vicious visit in March this year when all notices were taken and some plants destroyed. The vandals started to carry off the label stakes but abandoned them by the trail. The Board of Agriculture and Forestry had donated aluminum labels stamped with the names of the plants; the Hawaii Audubon Society had furnished painted stakes for these, and a number of them had been placed. Without delay I gathered all together, removed them to safety and decided to change my plans for the time being. Nothing by the necessary open trails will indicate what is going on. The vandals do not know the plants and cannot tell where seed is planted. They removed the label from a rare plant but did not recognize it so it escaped; others more obvious were not so lucky. It is disappointing to have to do this and it will hamper the work to some extent but will not wreck the project. Officers of the National Guard of Hawaii, under whose permission this work is being carried on, have given assurance that their organization will do anything it can to assist and give protection to this interesting undertaking.

JUNE FIELD TRIP

Sunday morning, June 14, four cars left the Library of Hawaii headed for Pupukea Trail. On arriving at the point of disembarkation it was found that a late newcomer in a fifth car had joined the caravan. The weather was ideal for hiking and the lush growth yielded many specimens which brought forth questions from the group and comments by Mr. McGuire. At least three people brought back maile seeds to see if vines could be started at various levels in town. From the standpoint of beauty and interest the trail is very worthwhile; but this particular morning, slightly overcast and windy, did not bring forth many birds.

Flocks of mejiros and rice birds were observed, and one white-tailed tropic bird; also four linnets and three apapane. A bush warbler, liothrix, Kentucky cardinal, amakihi, and elepaio were heard.

After lunch some of the cars went back to town, but three continued on to Ulupau Head and the booby colony. The sun was shining and the water was at its bluest. The boobies, estimated at about 400, were observed in all stages from the downy chicks in the nests, through dark adolescence to white adults wheeling, together with frigate birds, in the sky. Camera addicts had a field holiday and Mace Norton obligingly set up his telescope so that a closer view could be had of Moku Manu with its hundreds of nesting birds.

All in all, the day was altogether satisfying and enjoyable. - Irma Botsford

FIELD NOTES:

On May 18th Mr. John W. Slipp reported having clearly seen a Franklin's gull (Larus pipixcan) as he drove toward Makua, on the coastal road past Nanakuli, in the sugar cane area. The bird was seen twice, on the way out, and on the return trip, the black markings being unmistakable. Mr. Slipp is well acquainted with the Franklin's gull in other areas. This is a very unusual visitor. Bryan's check list gives this as a chance arrival on Maui, apparently only one other time having been reported. The Franklin's gull has also been reported near Kailua, by an Audubon member.

On June 19th Mr. and Mrs. Hugh Deering, visitors from Santa Barbara, were delighted to find a Pacific golden plover, in full breeding plumage, in the National Cemetery at Punchbowl. The bird was markedly lame, so possibly an injury had prevented its flight to the breeding grounds.

JULY FIELD TRIPS:

July 12th. To Waiawa Valley. This is the ewa portal of the Waiahole Tunnel. The trail is level, and the country interesting. Mr. Thomas McGuire, Leader. Meet at the Library of Hawaii at 8:30 A.M.

July 25th and 26th. We have been talking about camping out on Poamoho Trail--this is the time! Meet at the Library of Hawaii with equipment at 5:00 P.M., on July 25th. A committee will take breakfast for the group. Provide your own dinner for Saturday, and lunch for Sunday. Call Grenville Hatch for further information (her telephone number has been changed to 94862).

JULY MEETING:

July 20th, at 7:30 P.M., at the home of Mrs. Ruth Rockafellow, 2232 B Kalia Road. Miss Titcomb will lead the discussion on the Kentucky cardinal.

HAWAII AUDUBON SOCIETY OFFICERS: President, Miss Grenville Hatch; Vice-Presidents, Mr. Mace Norton, Miss Margaret Titcomb; Secretary, Mrs. Ruth R. Rockafellow; Treasurer, Mrs. Blanche A. Pedley.

EDITOR, THE ELEPAIO: Miss Margaret Titcomb.

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