

RECENT OBSERVATIONS ON THE BIRDS OF THE KOOLAU FOREST RESERVE, MAUI

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There are few published records on the occurrence and abundance of birds on the island of Maui, Hawaii. Most recent reviews (Banko 1971, Berger 1972) indicated statuses for several species different from those we observed during a two-day visit to the rain forests of Koolau Forest Reserve. The study area extends from 1.2 km northeast to 2 km northwest of Puu Alaea. Elevations range from 1860 m to 2010-2200 m at the upper edge of the forest.

The forest overstory in the reserve is composed primarily of Ohia (*Metrosideros collina*). Fewer than 10% of the trees were in bloom at the time of our visit. The Ohia were relatively small, varying from 20 to 91 cm DBH and 4 to 12 m in height. The understory was composed of olapa (*Cbeirodendron* sp.), kolea (*Suttonia* sp.), akala (*Rubus* sp.), pilo (*Coprosma* sp.), and kanawao (*Broussaisia* sp.).

Although the weather in the upper elevations of the Koolau is usually overcast and rainy, the weather throughout our two days of observation was clear and sunny with very little wind. Observations of birds were made from 0800 to 1230 on 30 April and 0800 to 1330 on 1 May, 1975. We made counts independently each day to cover as much ground as possible. We recorded all birds seen and heard during 18 half-hour observational periods at 18 different stations. Individuals presumably were recorded only once during each count period, and additional observations were made between count periods.

We found nine species of birds in Koolau Forest Reserve (Table 1). Their abundance is indicated on the basis of the number of birds that an experienced observer might expect to hear and/or see in a day's birding, under excellent conditions, in the area we visited: Abundant—more than 100 birds; very common—50-100 birds; common—10-49 birds; uncommon—2-9 birds; rare—0-1 birds. Using the most abundant bird observed, the Apapane, as the standard, we calculated the "relative abundance" of each species by dividing the number of each species observed during 18 half-hour periods by the number of Apapane observed during the same periods.

RED-BILLED LEIOTHRIX. This species was outnumbered by the Apapane by 75 to 1. In addition to the observations made during the count periods, we heard birds of this species at higher elevations on several occasions and saw them twice.

JAPANESE WHITE-EYE. We observed this species 16 times during the two days of observations, but only once during the 30-minute observational periods. It was outnumbered by about 450 to 1 by the Apapane.

AMAKIHI. This species was seen throughout the area at all elevations. It was nowhere numerous and was outnumbered by Apapane during our station counts by 21 to 1.

CREEPER. The Creeper is an abundant bird at all elevations and second in abundance only to the Apapane, which outnumbered it about two to one. As many as 10 birds were observed in a single social group. This species has been classified on Maui as being relatively common on the windward slopes of Haleakala (Berger 1972), status undetermined (Banko 1971) and "undoubtedly restricted in range, but relatively common at least in the Kipahulu Valley" (IUCN 1970). We found Creepers to be much more common on Maui than they are on either Kauai

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Table 1. Birds seen in the Koolau Forest Reserve, Maui, Hawaii on 30 April and 1 May 1975.

SPECIES	ABUN- DANCE	NO. ¹ SEEN	RELA- TIVE ABUN- DANCE	% ² OCCUR- RENCE
Red-billed Leiothrix <i>Leiothrix lutea</i>	Uncommon	6	.01	5.6
Japanese White-eye <i>Zosterops japonica</i>	Uncommon	1	.002 ³	5.6
Amakihi <i>Loxops virens</i>	Common	21	.05	77.8
Creepers <i>Loxops maculata</i>	Abundant	192	.43	91.4
Akepa <i>Loxops coccinea</i>	Rare	1	.002	5.6
Maui Parrotbill <i>Pseudonestor xanthophrys</i>	Rare	1 ⁴	—	—
Apapane <i>Himatione sanguinea</i>	Abundant	450	1.00	100.0
Crested Honeycreeper <i>Palmeria dolei</i>	Very common	60	.13	72.2
Iiwi <i>Vestiaria coccinea</i>	Abundant	120	.27	88.9

1. Total seen during 18 half-hour count periods.
2. Percentage of half-hour count periods during which species was seen.
3. More abundant than observations during count period indicate. Heard and seen on several additional occasions during two-day period.
4. Not seen during count period, but this single bird was seen during our two-day visit.

or Hawaii. The ratio of Creepers to Amakihi observed, nine to one, is considerably different from the ratios on Kauai and Hawaii where, in our experience, the Creeper is always less abundant than the Amakihi.

The Maui Creepers were much more vocal than either the Hawaii Island subspecies (*L. maculata mana*) or the Kauai subspecies (*L. m. maculata*), frequently giving a "chip" call. They also approached observers more readily than do birds of the other two subspecies.

We observed that Creepers on Maui used a much wider variety of foraging substrates than this species uses on Hawaii. They used small twigs and branches rather than the larger branches and trunks so characteristic of the Hawaii Island and Kauai birds (Scott and Sincock unpublished data). The variety of substrates (e.g., size and position of branches) used as foraging substrates by Maui Creepers and their more restrictive foraging patterns on other islands pose a very interesting problem for the behavioral ecologist. Comparison of foraging niche breadth and the frequency of agonistic encounters between this species and the Amakihi where they occur in varying ratios on Maui, Hawaii and Kauai (and inter-island comparisons of these measures, when placed in an ecological context) might provide insights into the varying abundance of these species on different islands.

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AKEPA. This species has been classified on Maui as being rare (Berger 1972), as extremely rare or possibly extinct (IUCN 1970), and as endangered (USFWS 1975). Previous to this census there were only three records of the Akepa on Maui in this century. Three Akapa were reported between 610 and 915 m in the Koa (*Acacia koa*) forests of southeastern Maui (Richards and Baldwin 1953). A single adult male was reported at 1892 m on the north slope of Haleakala in the Koolau Forest Reserve on 18 November 1970 by Dave Woodside (pers. comm.) and was also reported by Casey (1973). A single male at 204 m in a forested ridge above Kipahulu Valley was seen on 17 July 1972 (Casey 1973). This species was not observed during the month-long Kipahulu Valley expedition in 1967 (W. Banko pers. comm.) and only once during the 1973 Hana Rain Forest project (T. Casey pers. comm.).

In view of the limited number of observations of Akepa on Maui during this century, the sighting of what was believed to be an adult male, as determined by its relatively solid wash of reddish-orange over medium brown color, at 1646 m immediately below Puu Alaea on 30 April, and an Akepa, believed to be an immature male because of behavior and a lesser amount of reddish-orange coloration, 1 km east of Puu Alaea at 1707 m on 1 May by John Sincock, are of interest. Both birds were observed for about two minutes feeding in the outer canopy of Ohia trees.

MAUI PARROTBILL. The first record for this century was of a single bird near Puu Alaea at 1950 m elevation (Richards and Baldwin 1953). A second bird was recorded during the Kipahulu Valley expedition (Banko 1968). Three birds were recorded in the vicinity of Puu Alaea in April 1974 (Shallenberger 1974). We observed a single Maui Parrotbill at 1833 m. It was observed at a distance of 8 m for 2 to 3 minutes by two observers (J. M. Scott and Joe Medeiros) and was moving slowly over a 12 cm diameter horizontal branch 3 m up an unidentified tree. We identified the bird as a parrotbill by the large parrotlike bill and the prominent superciliary stripe. The bill appeared quite large for the body size and the lower mandible appeared lighter than the upper.

APAPANE. The Apapane was the most abundant bird seen during our two day trip and was found at all elevations. We saw as many as 50 birds during a 30-minute count period, and a large percentage of the birds were immature.

CRESTED HONEYCREEPER. Very little is known about this species (Berger 1972). It has been considered rare (IUCN 1970) and endangered (USFWS 1975). "Several individuals" were seen at 1768 m 1.1 km northwest of Puu Alaea on 23 November 1943 and a total of 5-6 heard and seen in this same area between 1920 and 2043 m on three different dates in December 1950 (Richards and Baldwin 1953). It was observed only at the higher elevations (above 1840 m) during the Kipahulu Valley expedition and was given a relative abundance scale of 0.01 with the Apapane being given a 10.0 (Warner 1967). Only one or two sightings were recorded per man day in Upper Kipahulu Valley (Warner 1967); however, W. Banko (pers. comm.) observed from one to as many as a half dozen or more at any single instance in the same general area and during the same period as Warner's (1967) observations.

During the two days we spent in the Koolau Forest Reserve we saw and heard over 100 Crested Honeycreepers. They were heard and seen more frequently on the second day, but this was undoubtedly because we were more familiar with their call by that time. The Crested Honeycreeper was outnumbered by the Apapane by 7.5 to 1 and was the fourth most abundant bird we observed. We encountered Crested Honeycreepers shortly after we entered the forest at treeline and continued to observe them down to 1860 m, the lowest elevation we visited. We saw Crested Honeycreepers more frequently at the lower elevations where they were often foraging in the under-canopy of Ohia trees. Among these foraging

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birds were two adults accompanying an immature bird; one of the adults was observed feeding the young bird. The number of birds that we observed and similar observations by the 1973 Hana Rain Forest Project (T. Casey pers. comm.) suggest that Crested Honeycreepers are much more common than formerly indicated (Richards and Baldwin 1953, Banko 1971, Warner 1967, Berger 1972). However, the differences in the numbers we saw and those seen by earlier observers may simply reflect the ideal weather conditions we had and/or seasonal variations in distributional patterns rather than any real change in the numbers of Crested Honeycreepers. Their known range extends from the southwestern rim of Kipahulu Valley, east and north around Maui to 2.0 km northwest of Puu Alaea. The species is restricted to areas at higher elevations (above 1840 m) in the Kipahulu Valley (Warner 1967). We did not reach its lower limits in Koolau Forest Reserve. Seemingly suitable habitat is found to the northwest of its present limits but additional field work is needed to determine whether the Crested Honeycreeper is found there.

IIWI. The Iiwi was an abundant bird at all elevations. We saw as many as 20 birds during a single 30-minute count period. The Iiwi was the third commonest bird we encountered during our two days of observation in the forest, and was outnumbered about 4 to 1 by Apanane. It was seen on all but two of the 30-minute count periods.

The low numbers of exotic species seen was surprising, but our observations were for only a brief period in a single season. Studies at other times of the year may show differences in numbers and relative abundance of the species seen.

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