

display close to the female prior to mounting. After the male dismounted, the female shook her feathers and by 07:00 had left the lek.

On the same morning WDS watched from a vehicle the new sharptail dancing ground and at 05:20 recorded 3 sharptail males actively displaying and 1 inactive bird, whose behavior was typical of a female. The birds were flushed at approximately 05:35 and at least 1 flew in the direction of the nearby Pembina lek. It is possible that the sharptail female which copulated at 06:50 on the Pembina lek was flushed from this sharptail lek.

We suggest that the establishment of the sharptail lek in 1977 near the Pembina lek increased the likelihood of a receptive sharptail female encountering a receptive prairie chicken male. No sharptail females were observed on the Pembina lek during the 1975 or 1976 field seasons. Lumsden (pers. comm.), who has had extensive experience observing mixed leks of prairie chickens and sharptails, makes the following comment regarding this documentation. "It is likely that the sharptail female observed was pure, however, some hybrids can only be certainly identified in the hand. The history of observations of hybrids from previous years suggests that there could be some F_2 or F_3 which might be difficult to identify."

Appreciation is expressed to Dr. Fred Hamerstrom, who reviewed the paper and made unpublished data available. Dr. Lewis Oring and Mr. Harry Lumsden also reviewed the paper and made helpful comments.—W. DANIEL SVEDARSKY AND THOMAS J. KALAHAR, Northwest Agricultural Experiment Station, Univ. Minnesota, Crookston, Minnesota 56716. Accepted 7 May 1979.

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Cavity nesting of the Akepa on the island of Hawaii.—Four races of the Akepa (*Loxops coccineus*) occur on different Hawaiian islands: *L. c. coccineus* on Hawaii, *L. c. ochracea* on Maui, *L. c. rufus* on Oahu and *L. c. caeruleirostris* on Kauai. The Oahu race has been considered extinct (Berger, Hawaiian Birdlife, Univ. Press of Hawaii, Honolulu, Hawaii, 1972), but a bird recently sighted on that island (Ralph and Pyle, *Am. Birds* 31:376–377, 1977) may reconfirm its existence. The Kauai race is still fairly common. Although the U.S. Fish and Wildlife Service (Federal Register, Pt. IV, 1976:47180–47198) lists the Maui and Hawaii races as endangered, we found the latter race relatively common between 1400 and 1900 m elev. in the Kau forest.

We found the first nest and eggs of the Akepa on the island of Hawaii on 12 May 1976, when a female flew from a cavity in an ohia tree (*Metrosideros collina*) 90 m east of the Kahuku Ranch cabin at 1884 m elev., near the upper edge of the Kau Forest Reserve. The tree was about 14 m tall and 79 cm in diameter at breast height; the opening of the nest cavity was 12.7 cm high, 5.1 cm at its widest and 83.8 cm above the ground. The nest contained 3 dull white eggs with brown spots circling the larger end. The 1 egg measured was 12.5 × 16.3 mm. The forest within 200 m of the nest-site was both closed canopy ohia, with a fern (*Dryopteris* sp.) understory, and open canopy ohia with a pukiawe (*Styphelia tameiameia*) understory. During preparation for a U.S. Fish and Wildlife Service bird survey of the Kau forest, we found the Akepa to be most numerous in this ecotone.

About 4 h after we discovered the nest, the adult female returned to incubate the eggs. An adult male Akepa was foraging about 35 m from the nest tree, and 30–40 adults were seen or heard near Kahuku Ranch cabin.

Nine days later, when we checked the nest, the female Akepa was incubating. We observed agonistic behavior between 2 male Akepa in an adjacent tree. An immature Akepa

TABLE 1
MATERIALS USED IN CONSTRUCTION OF HAWAIIAN AKEPA (*L. C. COCCINEUS*) NESTS

Nest lining	Abundance
Higher vascular plants:	
<i>Metrosideros collina</i> (misc. pieces of bark)	+ ¹
Misc. pieces of roots	+
<i>Uncinia uncinata</i> , <i>Carex</i> sp. (?) and <i>Gahnia</i> sp. (?) (sedge leaves)	* ²
<i>Astelia</i> sp. (leaf parts)	+
Ferns and fern allies:	
<i>Asplenium</i> spp. (rhizomes), <i>Grammitis hookeri</i> (rhizomes) and Hymenophyllaceae (rhizomes)	*
<i>Xiphopteris saffordii</i> (fronds)	- ³
<i>Grammitis hookeri</i> (fronds)	-
<i>Dryopteris paleacea</i> (fern scales)	+
Bryophytes:	
<i>Rhizogonium spiniforme</i>	-
<i>Thuidium crenulatum</i>	*
Bryophytes	+
Nest body	Abundance
Higher vascular plants:	
<i>Metrosideros</i> (1 leaf)	+
<i>Metrosideros</i> (bark)	+
<i>Metrosideros</i> (?) (1 twig—1 mm diameter, 2 cm long)	-
<i>Microlaena stipoides</i> (leaves)	-
<i>Astelia</i> (leaf)	-
<i>Uncinia uncinata</i> (pieces of leaves)	-
<i>Machaerina angustifolia</i> (shredded leaves)	+
Ferns:	
<i>Asplenium</i> spp. (rhizomes), <i>Grammitis hookeri</i> (rhizomes) and Hymenophyllaceae (rhizomes)	*
<i>Grammitis hookeri</i> (fronds)	-
<i>Hymenophyllum</i> (?)	-
<i>Xiphopteris saffordii</i> (fronds)	+
<i>Dryopteris paleacea</i> (?) (fern scales)	-
Bryophytes:	
<i>Rhizogonium spiniforme</i>	+
<i>Dicranum speirophyllum</i>	+
<i>Bazzania cordistipula</i>	-
<i>Thuidium crenulatum</i>	*
Bryophytes (pieces of 6 other species ?)	+

¹ Species present only as traces.² Dominant components used in construction.³ Species in low numbers.

followed another adult male into a tree nearby, begging and fluttering its wings. At 07:48 the female Akepa left the nest and flew to an adjacent ohia tree, where courtship feeding by the male took place.

On 28 May the nest contained 2 young and 1 unhatched egg. The nestlings had pinkish skin and very fine medium grey down on the back of the head, back and wings; the gape was reddish-pink and the corners of the mouth were light yellow; the feet were yellow. We estimated that they were 2–3 days old, which indicated an incubation period of at least 2 weeks.

On 28 May we installed a remote sensor and camera to record activity at the nest. There was some difficulty with the system, but from dawn to dark on 7 June 1976, the female visited the nest 35 times and the male 33 times, to feed the young and remove fecal sacs.

On 6 June the 2 young weighed 9.5 and 10.0 g. Two days later the nest still contained 2 nestlings and 1 egg. By 11 June the nestlings were fully feathered and ready to fledge, and on 14 June they were gone, apparently having fledged. The nest measured 10 cm in outside diameter, 8 cm inside diameter and 3 cm deep. It has been deposited with the National Museum (USNM No. 47307). The body of the nest was constructed primarily of fern rhizomes (probably *Asplenium* spp., *Grammitis hookeri* and various Hymenophyllaceae) and bryophytes (primarily *Thuidium crenulatum*). Additionally, a few fronds from *G. hookeri* were used, as well as shredded leaves of several unidentified sedge and grass species. The lining was composed primarily of grass and sedge (*Uncinia uncinata*) leaves which were for the most part shredded, with smaller amounts of bryophyte (*T. crenulatum*) and some fern rhizomes. A complete list of plants is given in Table 1.

Before discovery of the Akepa nest on Hawaii, only 2 of Hawaii's 37 extant endemic passerine taxa were known to nest in tree cavities: the Kauai Oo (*Moho braccatus*; Sincock, unpubl.) and the Hawaiian Creeper (*Loxops maculatus mana*; Scott, unpubl.). We found several inactive nests in tree cavities in the Kau forest that were apparently those of drepanidids. Since discovery of the Akepa nest, C. van Riper and J. M. Scott (Condor 81:65–71, 1979) have found several tree cavity nests of the Hawaiian Thrush (*Phaeornis o. obscurus*). On 22 March 1978, M. Collins, U.S. Forest Service, found the second known nest of the Hawaii Akepa (Collins, pers. comm.); it was 8 m up an ohia tree, in a cavity. On 11 May 1978, P. Pyle found the third known nest, 6 m up the limb of a fallen Koa (*Acacia koa*), also in a cavity. This nest contained 1 egg.

It remains to be determined whether cavity nesting is characteristic of the Akepa on Hawaii. Cavity nesting in trees suggests artificial nesting structures might be used. We are presently testing several types of artificial nesting structures in Hawaii.

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Longevity of Hawaiian honeycreepers in captivity.—I know of no published records on the longevity of Hawaiian honeycreepers (Drepanididae). I began to raise members of this family in captivity during January 1968. Since that time C. Robert Eddinger, my former