

NOTE
**Dimensions and Composition of Mariana Crow Nests on Rota,
Mariana Islands**

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Abstract—From 1992 to 1994 we measured dimensions of 11 Mariana crow (*Corvus kubaryi*) nests on Rota. The mean nest diameter, nest height, inner cup diameter, and cup depth were 37.2 cm, 15.4 cm, 13.3 cm, and 6.9 cm, respectively. These nests consisted of an outer platform and intermediate cup primarily composed *Jasminum marianum*, and an inner cup mainly of *Cocos nucifera* frond fibers and *Ficus prolixa* rootlets. The platforms of two nests contained an average of 200 twigs, with most being 2.1–4.0 mm in diameter and 201–250 mm long. The intermediate cups averaged 93 components, with most twigs measuring 0.0–2.0 mm in diameter and 101–150 mm long. Total weight of the two nests averaged 347.5 g, with the following breakdown: platform 284.1 g, intermediate cup 42.1 g, and inner cup 21.3 g.

Introduction

The Mariana crow (*Corvus kubaryi*) is the only corvid in Micronesia and occurs only in forested habitats on two islands in the Marianas, Guam and Rota. It was listed as endangered by the U.S. Fish and Wildlife Service in 1984 (U.S. Fish and Wildlife Service 1984). Although basic information is lacking on all aspects of the life history of the Mariana crow, Jenkins (1983), Tomback (1986), and Michael (1987) describe in varying detail Mariana crow nest construction on Guam and Rota.

We present data on the size and composition of crow nests on Rota. This information may be useful in assessing the potential differences between the Guam and Rota populations and may be of assistance in captive breeding of Mariana crows by allowing comparisons between captive and wild crow nests.

Study Area

Rota (14°10'N, 145°12'S) is the southernmost island in the Commonwealth of the Northern Mariana Islands and lies approximately 60 km (kilometers) north-

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east of Guam. Rota is 85 km², approximately 60% of which was in native limestone forest in 1982 (Engbring et al. 1986), but present levels are probably closer to 50% due to recent clearing for construction and damage to the forest as the result of Typhoon Roy in 1988 (Wiles et al. 1990). Detailed descriptions of the physical geography, meteorology, and vegetation types of Rota can be found in Fosberg (1960), Engbring et al. (1986), and Wiles et al. (1990).

Methods

We measured the dimensions of 11 Mariana crow nests found on Rota from November 1992 to February 1994. Nest searches were conducted primarily during the height of the crow breeding season, October through March, and were concentrated in the limestone forest of the northeast and east-central portion of the island where high crow densities were known to occur (Engbring et al. 1986). We also focused our efforts in these areas to monitor the effects on crow nesting of recent construction activities. Development of a 100 hectare (ha) golf course began in 1991 in the northeast section of the island and a 600 ha agricultural homestead program centered in the eastern end of the island began in 1993.

Stage of nest was recorded when a nest was discovered. When a nest became inactive, it was measured for diameter, height, cup diameter, and cup depth. Diameter of nests which were more oval in shape was determined by an average of its widest and narrowest point. Height was the length from the top of the nest to the bottom. The opening inside the interior cup was cup diameter. Cup depth was measured from the interior bottom of the cup to nest rim.

Composition of two nests was determined. These nests were disassembled into three distinct parts as described by Skead (1952): (1) a platform composed of large twigs, (2) an intermediate cup of grass, roots, and other materials, and (3) an inner cup made of coarse sedge and other materials. Twigs were grouped into 50 mm length categories and divided into diameter classes of 1 mm increments. The number of twigs and species of each group was recorded and weighed. Material in the intermediate and inner cups was identified to species when possible and larger diameter components measured. The remaining tangled mass of rootlets and fibers was sorted and weighed. All weights were taken to the nearest tenth of a gram with a Pesola scale. A reference collection of twigs and fibers from common Rota plants was used in species identification of nest materials.

Results and Discussion

NEST DIMENSIONS

We measured eight complete nests and three in platform stage. All nests occurred within limestone forest. Mean nest diameter was 37.2 cm (SD = 8.6, range = 24.0 to 53.0 cm) and mean height was 15.4 cm (SD = 3.4, range = 10.0 to 21.0 cm) for the eleven nests. Mean cup diameter was 13.3 cm (SD = 1.9, range = 10.3 to 16.0 cm) and mean cup depth was 6.9 cm (SD = 2.1, range = 4.5 to 9.5 cm) for the eight complete nests. These measurements are similar to the 41 cm

by 30 cm by 10 cm deep dimensions (Michael 1987) and the 30 to 35 cm diameter and 12 to 15 cm deep dimensions (Jenkins 1983) reported for Mariana crow nests. Our largest nest, 53 cm diameter, is close to the 50 cm diameter reported by Tomback (1986).

PLATFORM COMPOSITION

Nest platforms were built mainly of vines and branches. The majority (84.0%) of materials were one species of native vine, *Jasminum marianum* (Table 1), a ubiquitous plant on Rota. Qualitative observations of other crow nests on Rota indicate that this vine is the preferred platform building material. It is also the most common material used in crow nests on Guam (Aguon, pers. comm.). Interestingly, nest 936 contained a few twigs that showed evidence of mechanical cutting and large roots that were probably obtained from freshly worked earth. Therefore although crows primarily use natural areas to collect nesting material, they may opportunistically use material from human disturbed sites as well.

Our observations differ from Michael (1987) who recorded a nest on Guam being composed primarily of *Elaeocarpus joga* twigs, but we found this species to be poorly represented. In addition, Tomback (1988) saw crows on Rota construct a nest primarily of *Hernandia* sp. twigs, but this species was absent from the nests we examined. We suspect earlier observers may have misidentified nest material because the twigs were not inspected closely. *J. marianum* vines often form an interwoven mass with smaller branches of the host tree, making the vines and branches difficult to distinguish (pers. obs.). However, differences may also be an artifact of sample size, differences in species availability between habitats, or geographical differences between Guam and Rota crows.

There were a total of 130 twigs in the platform of nest 934 and 270 in nest 936 (mean = 200) (Table 2). Most platform components (67%) fell within the 2.1 to 4.0 mm diameter class (Table 2). This is similar to the 2 to 6 mm range reported

Table 1. Percentage composition of countable components used in the construction of two Marina crow nests on Rota.

Species	Platform			Intermediate Cup		
	Nest 934	Nest 936	Average	Nest 934	Nest 936	Average
<i>Jasminum marianum</i>	86.9	81.1	84.0	100.0	94.5	97.3
Unknown	2.3	11.9	7.1		1.8	0.9
<i>Alyxia torresiana</i>	5.4	0.7	3.1		0.9	0.5
Miscellaneous ¹	1.6	1.9	1.8			
<i>Guamia mariannae</i>	2.3	0.7	1.5		0.9	0.5
<i>Psychotria mariana</i>	1.5	0.4	1.0			
<i>Guettarda speciosa</i>		1.5	0.8			
<i>Maytenus thompsonii</i>		1.5	0.8			
<i>Ficus prolixa</i>		0.4	0.2		1.8	0.9

¹ Species represented by <1%. Includes *Casuarina equisetifolia*, *Elaeocarpus joga*, *Eugenia reinwardtiana*, *Intsia bijuga*, *Leucaena leucocephala*, and *Pouteria obovata*.

by Michael (1987) for a nest on Guam, but slightly larger than the 1 to 1.5 mm range reported by Jenkins (1983) for another nest on Guam. Almost half (46.6%) of all twigs fell in the 151 to 300 mm length class (Table 2). These lengths are similar to those reported for Guam nests, 150 to 200 mm by Michael (1987) and 200 to 300 mm by Jenkins (1983), and for one Rota nest (300 to 500 mm) reported by Tomback (1988).

Table 3 summarizes platform weights. The average platform weight of the two nests was 284.1 g, which accounts for 81.8% of the average total nest weight. No previous authors have recorded weights of Mariana crow nests.

Table 2. Composition of components in two Mariana crow nests on Rota by diameter and length class.

Class	Platform				Intermediate Cup			
	Nest 934	Nest 936	Mean		Nest 934	Nest 936	Mean	
Diameter (mm)	#Comp. ¹	#Comp.	#Comp.	%	#Comp.	#Comp.	#Comp.	%
0.0-2.0	31	37	34	17.0	58	98	78	84.3
2.1-3.0	65	83	74	37.0	17	12	14.5	15.7
3.1-4.0	24	97	60.5	30.3	0	0	0	
4.1-9.0	10	53	31.5	15.8	0	0	0	0
TOTAL	130	270	200		75	110	92.5	
Length (mm)								
0-100	12	34	23	11.5	5	36	20.5	22.2
101-150	2	40	21	10.5	19	40	29.5	31.9
151-200	0	49	24.5	12.3	30	22	26	28.1
201-250	25	59	42	21.0	8	6	7	7.6
251-300	18	35	26.5	13.3	7	4	5.5	5.9
301-350	28	26	27	13.5	6	2	4	4.3
351-650	45	27	36	18.0	0	0	0	0
TOTAL	130	270	200		75	110	92.5	

¹ Number of individual components

Table 3. Summary of components by weight (grams) for two Mariana crow nests on Rota.

	Intermediate Cup					Inner Cup			Total Nest Weight
	Platform	Measurable Components	Fibers ¹	Mesh ²	Total	Fibers ¹	Mesh ²	Total	
Nest 934	205.2	31.6	1.5	13.5	46.6	12.5	8.3	20.8	272.6
Nest 936	363.0	22.3	2.3	13.0	37.6	11.0	10.7	21.7	422.3
Average	284.1	27.0	1.9	13.3	42.1	11.8	9.5	21.3	347.5

¹ Fibers from *Cocos nucifera* fronds.

² An interwoven mesh of *Ficus prolixa* rootlets, *Jasminum marianum*, and small amounts of unknown material.

INTERMEDIATE CUP COMPOSITION

Intermediate nest cups were composed of an interwoven mesh of small branches, rootlets, vines and coconut fibers (Table 2). *J. marianum* accounted for the majority of material in both nests (100% in nest 934 and 94.5% in nest 936) that was large enough to separate and count (Table 2). There were 75 measurable components in the intermediate cup of nest 934 and 110 in nest 936. Of these materials, 84% fell within the 0.0 to 2.0 mm diameter class and 60% fell within the 101 to 200 mm length class (Table 2).

Other components of the intermediate cup were too small to separate, count, and measure individually, but were separated by species and weighed. *F. prolixa* rootlets and *J. marianum* vines in this mesh represented an average of 31.6% of total intermediate cup weight, while *C. nucifera* fibers composed 4.5% (Table 3). No previous authors have described the attributes of the intermediate cup in Mariana crow nests.

INNER CUP COMPOSITION

Inner cups were constructed of finely interwoven fibers, rootlets, and small vines. These materials were easily separated into various categories, but were not measured for length and were all less than 2 mm in diameter. Coconut fibers (probably collected from the base of fronds) accounted for 55.4% of the mean total weight of the inner cup and a mix of *F. prolixa* rootlets, *J. marianum* vines, and unknown vines, branches and rootlets for 44.6% of the mean total weight (Table 3).

We found no evidence of *Pandanus* spp. reported by Michael (1987), or strands of *C. equisetifolia* that Tomback (1988) saw crows carrying while working on a nest on Rota (presumably to be used in inner cup construction). We found inner cup materials on Rota to be similar to those used in Guam (Aguon, pers. comm.). However, differences in inner cup materials may be due to similar reasons that we found differences in platform species composition. Fibers from *Pandanus* spp. and *C. equisetifolia* strands both appear very similar to coconut fibers until they are examined closely.

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